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Key Factors Influencing the Outcome of Energy Projects Procured Using Public Private Partnerships in South Africa

By

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For

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ACRONYMS

CESA	Consulting Engineers South Africa
CIMO	A tool linking causal mechanisms, contexts, outputs and interventions
CLD	Causal Loop Diagram
CSF	Critical Success Factor
CSP	Concentrated Solar Power
DOE	Department of Energy
ECSA	Engineering Council of South Africa
IPP	Independent Power Producer
KPMG	KPMG (a global auditing, tax and advisory business)
OECD	Organisation for Economic Cooperation and Development
PB	Preferred Bidder
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PSC	Public Sector Comparitor
PV	Photovoltaic
PWC	PricewaterhouseCoopers
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme

SAIMechE	South African Institute of Mechanical Engineers
SCM	Supply Chain Management
SPIPPP	Small Projects Independent Power Producer Programme
VFM	Value for Money

ABSTRACT

Processes required for the procurement of construction projects by the public and private sectors must comply with many requirements and incentives, not least of which is usually the requirement to provide value for money. However, large capital works construction projects, particularly those undertaken by the public sector, have a tendency to over-run both their construction schedules and their budgets. This is amply demonstrated in South Africa by the construction of the Medupi and Kusile coal fired power stations by Eskom, the South African national power utility, which are both running over schedule and are projected to be over budget by 52% and 48% respectively. In contrast, Public Private Partnership contracts between the private sector and the South African government were recently used to construct large, utility scale renewable energy facilities in South Africa, with a total capacity equivalent to that of Medupi power station, on time and on budget.

This research study considers the various procurement options in use globally for the construction of capital projects, before looking in detail at the Public Private Partnerships approach for infrastructure procurement, both globally and in the South African context for energy projects. The research study and aims to answer the questions, "What are the key factors that influence the outcome of energy projects procured using public private partnerships in South Africa?" and "What interventions could improve the success rates of projects procured using public private partnership contracts in South Africa?".

A social constructionist epistemology was adopted to guide the research, as the context of the research questions is complex requiring flexible research approaches, able to consider matters such as the perceptions of stakeholders involved in energy projects.

The research study makes use of a systematic literature review of international publications, and a survey of individuals working in the South African renewable energy industry. The data was analysed using qualitative content analysis to identify themes, and further coded to identify the factors. The research study aims to contribute to the body of knowledge on the use of the effectiveness of the Public Private Partnerships approach used for the procurement of energy projects in South Africa as there appears to have been little research undertaken in this area to date.

The systematic literature results found that there are eight critical success factors which are essential to the successful development of projects using the public private partnerships contracting approach internationally. The assessment of the survey results identified an additional critical success factor, Economic Development, that is of particular relevance to the success of projects in South Africa using the public private partnerships contracting approach. Contributing to economic development, in developing countries such as South Africa, is key to getting the necessary political support required for public private partnership projects to succeed.

The research study also shows that while these critical success factor areas were adhered to when the South African renewable energy programmes were established, work is required in some key areas, including the factors of political certainty and programme consistency, if the programmes are to continue to be successful.

An interrelationship diagraph and a causal loop diagram were developed in order to understand how the critical success factors that were identified interact and where possible interventions might be best located in order to improve the performance of PPP projects in South Africa. Through developing an understanding of the resulting behaviours of the critical success factors, four possible interventions were identified, which if implemented could strengthen the critical success factors which are failing and therefore increase the level of economic development of the country, which was identified as the key outcome of the analysis. The interventions identified are:

- Review of the barriers and opportunities to reduce the cost of finance of PPP projects in South Africa and hence improve the critical success factor, “Suitable Financial Conditions”.
- Undertake a root cause analysis to understand the reasons for lack of commitment for the critical success factor, “Commitment of Public & Private Parties”.
- Undertake regular reviews to ensure PPP framework remains favourable to both public and private parties and hence improve the “Favourable PPP Framework” critical success factor.
- Review barriers and opportunities to increase local content of projects.

Opportunities exist to expand this research through further study and increasing the number of survey responses as well as broadening the pool of industry professionals that respond. The answer to this research question would also benefit from undertaking an assessment of the level of maturity of the critical success factors identified for the South African renewable energy PPP programmes, which would

provide further details of the aspects of the critical success factors that are being successfully met and those that require further work.

The learnings from this research study could be of benefit to the body of knowledge surrounding the development and execution of PPP energy projects in South Africa and other developing countries.

1. INTRODUCTION

1.1 PURCHASING AND PROCUREMENT IN THE PRIVATE AND PUBLIC SECTORS

Purchasing and procurement are essential tasks undertaken by both the private sector and the public sector for the provision of a wide range of goods and services, from the purchasing of goods, such as stationery, to the procurement or development of capital projects, such as for the provision of infrastructure. However, how this procurement is undertaken and the incentives behind it vary considerably between the private and public sectors. In the private sector, goods and services are generally procured on the basis of least cost for a given level of quality (Walker & Brammer, 2009); however, how these goods and services are procured in the private sector varies from company to company. Webster (1992) observes that the increasing need for organisational flexibility in order to be able to respond quickly to changes in technology, competition and client requirements has resulted in private sector businesses having a wide range of relationship structures between consumers and suppliers. These structures range from businesses at one end of the spectrum that procure all purchases by tendering, to those that have repeated transactions with particular suppliers, to partnerships involving negotiations, to at the other end of the spectrum, strategic alliances being formed between businesses. Strategic alliances are defined by Webster in this context as "the formation of a new entity such as a product development team, a research project, or a manufacturing facility, to which both parties commit resources and which serves clear strategic purposes for both" (Webster, 1992:5).

The objectives of public sector procurement processes are usually much broader than just aiming for procurement on the basis of least cost and provision of value. In addition to these two factors, they often include social and environmental objectives as well as political objectives, as noted by National Treasury (2015a) and Arlbjorn and Freytag (2012). That is not to say that private sector business does not include social objectives in their procurement processes; however, for the private sector this is a choice, rather than an obligation (Walker & Brammer, 2009). An example of the differences in focus between procurement considerations in the private and public sectors is given by Arlbjorn and Freytag (2012:204), "Within the public sector one seeks to include as many vendors as possible in order to increase competition, whereas the private industry seeks to minimise this number in order to reduce risks".

Public procurement is also governed by particular sets of rules including the need for transparency, the provision of value for money and the use of good governance processes. In South Africa, the procurement regulations require that good governance is used in the supply chain management process as "good governance ensures transparency, accountability, efficiency and upholding of the rule of law in economic, political and administrative processes" (National Treasury, 2015a:15). Similarly, in the UK, "Public Procurement is guided by the principles of transparency, accountability and achieving value for money for citizens and tax payers" (Walker & Brammer, 2009:128).

In South Africa, the inefficiencies of public procurement are well documented. In an effort to improve the procurement processes of the public sector in South Africa, in 2015 the National Treasury commissioned a review of the public sector supply chain, the 2015 Public Sector Supply Chain Management Review (National Treasury, 2015a:1). The opening paragraphs in the foreword of this document state the following:

> Supply chain management (SCM) is one of the key mechanisms enabling government to implement policy. Traditionally SCM has been misunderstood and undervalued. Its strategic importance has not been recognised, and it has been under-capacitated.
>
> The negative effects of inefficient public sector SCM, particularly in the procurement phase of the chain, are well documented. Suppliers charge excessive prices: goods and services contracted for and delivered are of poor quality and unreliable; and there is corruption and waste.
>
> The private sector, by contrast, has tended to invest astutely in SCM to maximise shareholder value and ensure that its products and services match clients' needs.

Achieving good supply chain management is therefore essential in order to achieve value for money in procurement, whether in the private or public sectors. Mentzer et al. (2001:3) observe that "a supply chain consists of multiple firms, both upstream (i.e. supply) and downstream (i.e. distribution), and the ultimate consumer." Mentzer et al. (2001:15) go on to define supply chain management as a philosophy, the implementation of which, "enhances customer value and satisfaction, which in turn leads to enhanced competitive advantage for the supply chain as well as each member firm. This, ultimately, improves the profitability of the supply chain and its members." Focussed good management of the full supply chain is reported by Lummus and Vokurka (1999) as first taking place in the textile industry in the USA in the mid-1980s. By the mid-1990s the approach had spread to the supermarket and computing businesses (Lummus & Vokurka, 1999); however by the early 2000s it was still yet to be used by the public sector in the USA (Korosec, 2003). As is stated above, in South Africa, investment in supply chain management in the public sector was still to take place as recently as 2015.

Considering the procurement processes, the procurement of goods and services is usually undertaken in a staged process, which varies according to needs but generally has the same basic components. Tadelis (2012) summarises the procurement process as a four stage process. First of all, the buyer has to decide exactly what is to be procured and how to advertise this need to potential suppliers. Second, a contract must be specified that details all the contractual obligations of the buyer and the supplier as well as the means of compensation. Third, a means of awarding the contract must be selected and last of all a cost effective means of allowing changes to be made to the product being supplied, whether defined by the purchaser or the supplier must be in place. In a not dissimilar vein National Treasury (2015a) states that in South Africa the public procurement process has three main steps; pre-tender, tender and post tender. The pre-tender stage is noted as being the most critical stage in the procurement process and includes "needs assessment, planning and budgeting, development of specifications, and selection of the most suitable procurement strategy."

It can be seen from the above that the business of purchasing and procurement in both the private and public sectors is complex and requires proper resourcing and training if it is to meet the requirements of the relevant stakeholders.

1.2 Infrastructure Procurement

Public sector procurement, as mentioned above, is a very broad subject area. This research study focusses on one sector of public procurement, the procurement of infrastructure projects, and in particular those projects in the South African power sector. However, as a start, the meaning of infrastructure must first be clarified. Grimsey and Lewis (2000) note that infrastructure is difficult to define but go on to observe that infrastructure is used to provide basic services to communities and industries and is essential for economic activity. Infrastructure includes energy systems (generation and supply), transport systems, fresh water provision and waste water removal and treatment, communication systems and social infrastructure such as hospitals, prisons, courts, museums and schools.

The need for good supply chain management in infrastructure provision is demonstrated by the fact that large capital works construction projects, particularly infrastructure projects undertaken by the public sector, have a tendency to over-run both their construction schedules and their budgets. KPMG estimates that globally 90% of public sector infrastructure projects are completed late and over the budget (KPMG, 2015).

This tendency of large capital works construction projects to over-run their construction schedules and budgets is amply demonstrated in South Africa by the construction of the Medupi and Kusile coal fired power stations by Eskom, the South African national power utility. These projects were originally projected to have project costs of R69 billion and R80 billion respectively (Steyn, 2015). However, these two power plants are now projected to have total project costs of R105 billion and R118.5 billion (National Treasury, 2015b), which are increases of 52% and 48% respectively. The construction of both power stations are also running late, although how late is difficult to confirm as projected completion dates for these facilities are not readily available. The first of Medupi's six units was originally scheduled to commence power generation in 2012 (Patel, 2013); however, this unit eventually only started generating power in 2015 (Eskom, 2016).

To put the severity of the above cost over-runs into context, the South African government estimated revenue for 2016/17 is R1,331.5 billion, of which infrastructure investment is planned to be R813.1 billion over three years (National Treasury, 2015), or an average of R271 billion per year. Given that Cantarelli, Flyvbjerg, Molin, and van Wee (2010) estimate that globally large infrastructure projects cost, on average, 28% more than planned, if this figure, which is almost half of the cost over-runs of the Medupi and Kusile projects, is used as the average level of cost over-run, then this equates to R76 billion of wasted expenditure by the South African government (National Treasury, 2004c).

This problem of cost over-runs and late delivery of infrastructure projects has also been identified by Consulting Engineers South Africa (CESA). They have noted on their website that there are many inefficiencies in the engineering supply chain management system including, "inappropriate approaches for procuring consulting engineering services, lack of technical project management capacity and capability in the public sector (resulting in poor planning and poor management of implementation of infrastructure projects), lack of other desired technical skills in the public sector (impacting negatively on maintenance of existing infrastructure) and rampant corruption" (CESA, 2015). The above statements, as well as the infrastructure procurement track record of South African public sector as evident in the Kusile and Medupi projects, clearly indicate that the conventional means of procuring infrastructure projects by the South African public sector are not working.

To meet the shortcomings identified above by CESA (2015), would require significant investment in training and capacity building if conventional means of procurement are to continue to be used by the public sector. To meet some of these shortcomings, the South African government has started to utilise

Public Private Partnership (PPP) contracts for the procurement of roads infrastructure, prisons and water infrastructure and more recently for power generation infrastructure (National Treasury PPP Unit, n.d.). Public Private Partnership contracts are defined by Broadbent and Laughlin (2003:334) as "an approach to delivering public services that involves the private sector, but one that provides for a more direct control relationship between the private and public sector that would be achieved by a simple (legally-protected) market-based and arms-length purchase." Public Private Partnership contracts are considered in more detail in Chapter 2.

Considering the power generation sector of the construction industry, Public Private Partnership contracts between the private sector and the South African government, were recently used to construct large, utility-scale renewable energy facilities in South Africa, with a total capacity equivalent to that of Medupi power station, on time and on budget, as indicated by Engineering News (2015). While this example may indicate that PPP contracts are a more effective way to procure energy projects, with the exception of articles, such as Eberhard et al (2014) and Eberhard and Kaberger (2016), there appears to have been little research into how successful this means of procurement has been in South Africa for the procurement of energy infrastructure projects. This may be due to the relatively recent use of the PPP model to develop energy projects in South Africa compared to the use of conventional procurement methods used to develop energy projects such as the Medupi and Kusile power stations.

1.3 The Focus and Objectives of this Research

This chapter has highlighted that procurement, whether via the private or public sectors is a complex matter. As indicated above, despite the importance of infrastructure to national economies, the South African public sector has historically not invested in supply chain management in comparison with the efforts of the private sector. To meet some of these shortcomings the South African government has started to use the PPP contracting approach for certain types of infrastructure, including energy generation. However, there has been little research into how successful the PPP contracting approach has been in South Africa and what actions could be taken to improve the PPP contracting approach.

This research study is intended to contribute to the body of knowledge on energy project procurement and considers how energy infrastructure projects are procured in South Africa using Public Private Partnership contracts in comparison with international best practice use of PPP procurement practices. Where areas of South African PPP procurement practice are identified as needing improvement these

will be highlighted and possible actions indicated. This research attempts to answer the research questions:

- RQ1: What are the key factors that influence the outcome of energy projects procured using public private partnership contracts in South Africa?
- RQ2: What interventions could improve the success rates of projects procured using public private partnership contracts in South Africa?

Answering the research questions requires the generation of principles and theories rather than the testing of any principles or theories, which is an inductive approach. The nature of the questions requires the use of an epistemological approach which allows the many diverse perspectives present in the procurement of PPP projects to be considered. The diverse perspectives of procurement also mean that much of the data available for this research is not easily defined and must be extracted from a range of sources. Considering these requirements, a qualitative approach was selected for the research and a social constructionist epistemology was adopted. A contents analysis methodology was utilised to gather and then analyse the associated data.

1.4 The Structure of this Dissertation

This dissertation is presented in six chapters which are summarised below:

- Chapter 1 (Introduction) introduces the research topic. It provides the background to the research and states the research objectives and the question to be answered.
- Chapter 2 (Literature Review) presents a review of the literature related to the procurement of infrastructure, including energy projects, globally and in South Africa, to give context to the research question. It commences with a review of the different definitions of procurement before considering different views on how infrastructure projects are procured internationally and in South Africa. The use of public private partnerships as a contracting model internationally is then reviewed before narrowing down to a review of the use of PPPs as a model for the procurement of power generation facilities.
- Chapter 3 (Methodology and Methods) commences with a discussion of the philosophy underpinning management research before considering the methodologies appropriate for the research study to be undertaken and then finally explaining the methods used for the research

undertaken. The chapter concludes with a section that outlines the importance of trustworthiness and ethics and the application of these concepts in this research study.

- In Chapter 4 (Results) the results of the systematic literature review and the survey are presented. The chapter includes explanations of how the critical success factors associated with international projects compare with those associated with South African projects and how these factors are related.
- Chapter 5 (Discussion) presents a discussion of the findings and proposed interventions. The chapter concludes with a summary of how this research could be developed further.
- Chapter 6 (Conclusions and Recommendations) is the final chapter and brings together the key findings of the research study as well as the limitations and areas where further research is required.

2. LITERATURE REVIEW

2.1 INTRODUCTION

This chapter provides a review of the available literature on the procurement of infrastructure, including energy projects. As infrastructure is generally procured by the public sector, the literature review concentrates on procurement in the public sector. Tranfield, Denyer, and Palminder (2003) note that the literature review process is a key tool to enable the researcher to map out the available literature and to define the research question, or questions, in a manner that will develop the body of knowledge further. The literature review commences by firstly considering the definitions of procurement, this is followed by the review of literature on infrastructure procurement globally, before narrowing down to the available literature on infrastructure procurement in South Africa. A high level commentary on the effectiveness of the different types of procurement is included. The chapter then considers one particular procurement route, the use of Public Private Partnerships. The history of the use of the Public Private Partnership contracts for the procurement of infrastructure projects is considered as well as the strengths and weaknesses of this approach.

2.2 DEFINITIONS OF PROCUREMENT

For the purposes of this study, it is useful to understand what is meant by the term "procurement". Further to the introduction to the topic of procurement in Chapter 1, procurement is defined by the Cambridge Dictionary as the "process of getting supplies" (Cambridge Dictionary, n.d.). However, when referring to activities in industry, procurement is quoted by Jefferies and Rowlinson (2016:2) as "the tendering and selection systems required to obtain anything from paperclips to power stations," and in particular with relation to capital projects, procurement is defined by Jefferies and Rowlinson (2016:2) as "the organisational structure adopted by the client for the management of the design and construction of a building project." Lloyd and McCue (2004) take these definitions further and show that the processes of procurement by governments, or other public bodies vary significantly from country to country and indeed between provinces or states within countries. They go on to note that public procurement processes usually include the following: procurement planning; publishing of upcoming tenders; preparing and issuing tenders; evaluating bids, proposals and quotations; conducting the assessment of bids, proposals and quotations; assessing contractor capabilities; awarding contracts; monitoring contractor performance; modifying contracts; extending or terminating contracts; closing out completed

contracts; evaluating contractor past performance. These aspects are in accordance with the summary of the procurement process provided by Tadelis (2012), which, as noted in Chapter 1, is a four stage process. First of all, the buyer has to decide exactly what is to be procured and how to advertise this need to potential suppliers. Second, a contract must be specified that details all the contractual obligations of the buyer and the supplier as well as the means of compensation. Third, a means of awarding the contract must be selected and finally, a cost effective means of allowing changes to be made to the product being supplied, whether defined by the purchaser or the supplier must be in place.

2.3 Procurement of Infrastructure Projects Globally

There are many different methodologies used to procure infrastructure by government bodies. The following sections discuss the literature available on different aspects of the procurement and development of infrastructure projects, with viewpoints provided from a number of different countries, such as the USA, the UK, Korea, Zambia, Nigeria, as well as the countries which make up the European Union. As previously mentioned in Chapter 1, public sector procurement is governed by rules and regulations pertinent to the country where the procurement takes place.

The procurement of infrastructure projects involves many competing factors, such as the client, stakeholders, finance, politics, national and organisational cultures, to name but a few. An indication of the number of these factors involved in the procurement of infrastructure projects and the relationships between them is demonstrated by (Rowlinson, 1999) in Figure 1. The effectiveness of the procurement processes used, are dependent on all of these factors successfully interacting, although some will have more influence than others. Rowlinson (1999:29) notes that "Elements, such as contract strategy and the client are functional parts of the procurement system. However, the effectiveness of the client organisation or the contract strategy is modified by other procurement variables such as culture, sustainability, economic and political environment and more practical concepts such as partnering." Of the factors identified, which influence the procurement of construction projects, Rowlinson (1999) goes on to discuss the project client and the contracting strategies factors in more detail.

Research has also been undertaken on other factors affecting procurement processes. Green and Lenard (1999) consider various means by which the project procurement process can be organised, while Murray, Langford, Hardcastle, and Tookey (1999) consider the different ways in which the temporary organisations, which are often created to enable the procurement of large infrastructure projects, can be

set up. Another factor which influences infrastructure procurement is culture, which is considered by Liu and Fellows (1999). Culture is not only an environmental variable, external to the project and whose level of influence is dependent on the porousness of the project boundary, but is also present within the project as "cultures are embodied in all people and therefore are present within the system and in the environment" (Liu & Fellows, 1999:142).

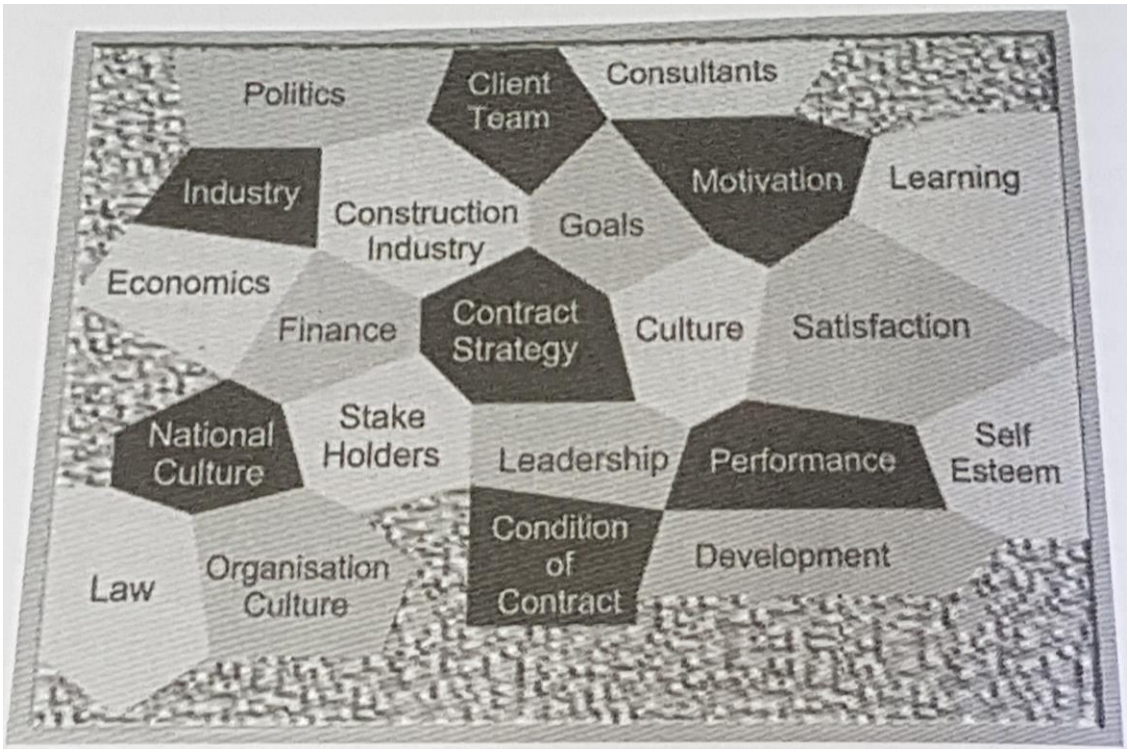

FIGURE 1: A SYSTEMS VIEW OF PROCUREMENT (ROWLINSON, 1999:28)

Due to the many different factors involved in the procurement of construction projects there are a plethora of procurement approaches used; however no international definition or classification system exists (McDermott, 1999). McDermott (1999) goes on to note that in the UK the National Economic Development Office has listed five main procurement routes which are traditional; design and build; design and manage; management contracting and construction management, although a definition of what these routes are or how they vary is not provided. However, Rowlinson (1999) does provide guidance as to what four of these different approaches are, which are summarised below.

- **Traditional Approach** – The key characteristic of this approach is the separation of the design and construction processes. The design is undertaken by a consultant and the construction is

undertaken by a contractor independent of the consultant. The design and construction processes are sequential and independent of each other.

- **Design and Build Approach** – In this approach the client appoints a single party to undertake both the design and the construction phases of work and there is the opportunity to overlap the design and construction phases.
- **Management Contracting** - In this approach instead of the client managing the contractors and consultants as in the Traditional Approach and the Design and Build Approach, the trades contractors contract with the managing contractor as opposed to with the client.
- **Construction Management** – This approach is similar to management contracting; however, the trades contractors contract with the client, not the construction manager.

The advantages and disadvantages of each approach as well as some background to each approach are also provided by Rowlinson (1999).

Where services, which were previously provided by the public sector, are to be provided by the private sector via competitive tender, additional costs must be considered. "Competitive tendering may impose new burdens on public services, for example transaction costs, trust costs and rent-seeking costs" (Boyne, 1998:710). Boyne (1998) goes on to note that in the UK, at the date of writing, there was limited evidence regarding the benefits or not of competitive tendering. Estache and Iimi (2008) note that where there is limited funding available to deliver infrastructure projects such as in the developing world, including countries in Africa, this funding must be very carefully spent and areas for improving cost effectiveness must be considered. The research considers the importance of ensuring competition in achieving cost efficiencies in procuring infrastructure projects such as electricity, roads and water infrastructure projects and argues that for competition to be effective, "in road and water projects at least seven firms are required for an auction to be competitive enough. The required level of competition for electricity projects may be much lower, perhaps at three, but this is less conclusive" (Estache & Iimi, 2008:38). This research does not consider the different contractual models used for procurement of infrastructure and their impact on the project costs, nor the additional costs required to administer the tender process and resulting contracts.

On the subject of tender process design, Bergman and Lundberg (2013) consider the various supplier selection methods used for public procurement in the EU and the USA and make recommendations for when the different methods should be used. Bergman and Lundberg note that the EU procurement

directives stipulate that tenders must be awarded to either the lowest bidder or the applicant that submits the most economically advantageous tender. Bergman and Lundberg also propose that the use of the most economically advantageous tender become mandatory, although it adds complexity to the supplier selection process. How this added level of complexity could be managed, while maintaining the requirements of transparency and avoidance of subjectivity in tender adjudication, is not considered. Falagario, Sciancalepore, Costantino, and Pietroforte (2012) address this concern of how to adjudicate tenders based on the most economically advantageous tender approach transparently and avoiding subjectivity. They propose an approach that will enable the bidders to be ranked without the need for subjective assessments and thereby improving the governance of such tender processes. The proposed approach was validated through the use of a case study concerning the refurbishment of the Polytechnic of Bari in Italy. How much training will be required by tender adjudicators to use this approach and what additional costs will be accrued as a result, was not considered.

Related to public sector supplier selection, Lorentziadis (2010) notes that conventional competitive, sealed bidding does not permit any recognition to be provided where enhanced characteristics may be offered at a slightly higher price, but provide better overall value. Lorentziadis notes that using bid assessment criteria based on the most economically advantageous tender allows a combination of non-price and price based factors to be used; however, as with Bergman and Lundberg (2013), consideration of how good governance can be maintained in the adjudication of such tenders is not considered. The locations that this research would apply to are not provided.

The use of the different contract forms has also varied over time. Oyegoke, Dickinson, Khalfan, McDermott, and Rowlinson (2009) note that in the UK as an example, reviewing survey results from 1985 to 2004, the use of design and build contracts, which includes Public Private Partnership contracts, steadily increased from 3.5% to 13.3%, while the use of the traditional contracting approach reduced from 92.6% to 76.7%, although it is still the preferred contracting approach for the majority of construction works undertaken. A detailed review of these different contract forms is provided; however, the reasons for the changes in popularity of the different contract forms are not presented.

International publications available on the subject of infrastructure procurement inefficiencies include the UK government publication, Infrastructure Procurement Route Map – a guide to improving delivery capability (HM Treasury, 2013), and the Western Australian Government publication, Infrastructure Procurement Options Guide (Government of Western Australia, 2010). HM Treasury (2013) provides a

guide to the processes and decisions which must take place to successfully procure infrastructure projects. The document highlights the importance of selecting the correct procurement strategy for a particular project and ensuring that the project procurement team has the correct skills. As would be expected, this publication notes that many projects will have a number of different possible procurement options. Which one is most suitable will depend on a number of factors, including the risk appetite of the project sponsor and the project specific details. A number of contractual procurement approaches are listed, ranging from the traditional approaches listed above to less conventional approaches such as the use of public private partnerships, known in the UK as Private Finance Initiatives. The Infrastructure Procurement Route Map highlights that to improve the efficiency of infrastructure procurement a lean procurement initiative has been set-up and training has been provided to senior project leaders working in UK public procurement. This is a good example of the type of investment required in public procurement supply chains in South Africa, highlighted by National Treasury (2015a). The need for the client body in charge of the procurement process to be adequately skilled is further emphasised, "Client capability is critical to achieving success in procurement particularly when using more sophisticated procurement models. Choosing a procurement strategy with little or no understanding of capability requirements will rarely result in an efficient outcome" (HM Treasury, 2013:5).

In addition to the need for public body clients or project sponsors to have appropriate understanding of the procurement processes, HM Treasury (2013) indicates that other key areas which are essential for successful infrastructure delivery are collaborative working; appropriate risk allocation; incentivisation of the supply chain at the 1st and 2nd tier levels; and supply chain performance management.

The Infrastructure Procurement Options Guide is intended to help improve understanding of a range of infrastructure procurement models, assist public sector executives and managers with making decisions relating to infrastructure asset investment and provide guidance on Western Australia government asset management policies (Government of Western Australia, 2010). Like the Infrastructure Procurement Route Map, the Infrastructure Procurement Options Guide emphasises the need for client bodies and other project parties to be adequately skilled. It does not lay out a detailed map of the processes to be followed during the project procurement, but does provide a detailed list of the advantages and disadvantages of the various procurement contracting approaches as well as indicating whether the client or contractor makes the key decisions or whether this responsibility is shared. These two documents are therefore complementary to each other.

2.4 Infrastructure Procurement in South Africa

A limited amount of research has been undertaken on the effectiveness of infrastructure procurement in South Africa. Watermeyer has published a number of conference papers on procurement in South Africa, including Delivering Infrastructure at Scale in Developing Countries: Numbers or Systems (Watermeyer & Thumbiran, 2009) and Changing the Construction Procurement Culture to Improve Project Outcomes (Watermeyer, n.d.). These papers discuss the process of construction procurement and recommendations are made on how improvements could be made through moving from a combative type approach using traditional, design and build or management contracting to a partnering or collaborative type of approach between project parties. Suggestions on how this could be achieved or what would be required to enable this change are not, however, provided.

Ramabodu and Verster (2010) and Monyane (2013) consider various aspects of project delivery inefficiencies in their research. Ramabodu and Verster (2010) consider the problem of cost over-runs in infrastructure projects in South Africa and through the use of surveys of construction professionals, arrives at various factors that contribute to cost over-runs. However, this article is limited in its detail as it only considers the construction stage of the project and not the procurement and planning stages that precede construction. Monyane (2013) reports on a similar investigation considering public sector works in the Free State province in particular and concludes that the major causes of cost over-runs on public sector projects in the Free State province are additional works requested by clients, inadequate planning and low bidding by contractors. The reasons for inadequate planning and why contractors might be underbidding were not investigated. Neither Ramabodu and Verster (2010) nor Monyane (2013) tested the appropriateness of the contract structures used.

2.5 The Public Private Partnership (PPP) Procurement Model for Infrastructure Projects

Of the many procurement models available, the PPP model has, over the last 30 years, grown in popularity as a means for governments to continue to provide the infrastructure necessary to ensure economic growth in times when available public finance is limited (Jefferies & Rowlinson, 2016). Indeed, Jefferies notes that the model was used in the 1700's and 1800's for projects such as the Suez Canal, where governments did not fund such infrastructure and left the provision of it to the private sector. From the end of the 19th century, governments used their own financial resources for the

development of new infrastructure; however, from the 1970's a combination of factors such as the need for infrastructure development to keep pace with levels of population growth and changes in population demographics resulted in the PPP contracting model resurfacing (Jefferies & Rowlinson, 2016). Burger and Hawkesworth (2011) notes that from 2000 to 2010, 12% of the UK government capital expenditure was spent on PPP projects. However, while the PPP contracting model has been in use in Europe since the early 80s, arrangements for its use in South Africa have only been in place since 1997 with a dedicated PPP unit created within the South African National Treasury from 2000 (National Treasury, n.d.).

Many articles and publications are available on the subject of PPP contracting, whether for buildings or for infrastructure development and, generally, for projects located outside South Africa. There are also a number of articles on the use of PPP processes for the procurement of large infrastructure projects in various countries, although not for South African projects. However, the South African National Treasury has made publicly available a detailed manual on public sector guidance and requirements for PPP projects (National Treasury, 2004a). This manual consists of nine parts, South African Regulations for PPPs; Code of Good Practice for BEE in PPPs; PPP Inceptions; PPP Feasibility Study; PPP Procurement; Managing the PPP Agreement; Auditing PPPs; Accounting Treatment for PPPs and An Introduction to Project Finance.

A key reason for using the PPP contract model to deliver infrastructure projects is that it transfers certain risks and risk mitigations away from the public sector, to the private sector. The level of success, in this regard, of PPP energy projects in the South African context will be considered in this research. Many papers and articles have been written on risks in PPP projects internationally and include Grimsey and Lewis (2000) and Bing et al. (2005) on projects in the UK, Ameyaw and Chan (2013) on projects in Ghana and Jefferies and Rowlinson (2016) who considers the state of PPP risk management in the UK, Germany, Switzerland and Australia.

Grimsey and Lewis (2000) draw on the experience of undertaking risk assessments for PPP projects in the UK and propose a framework for assessing risks from the perspectives of the procuring body, the project sponsors and the senior lenders on the project. Grimsey and Lewis (2000) indicate that there are at least nine key risk areas that must be considered, which are technical risk; construction risk; operating risk; revenue risk; financial risks; force majeure risk; regulatory / political risks; environmental risks; and project default. Methodologies for assessing how these different risks can be shared between the project sponsors, the procuring body and the lenders are not considered. However, this aspect of risk

management on PPP projects is considered by Li, Akintoye, Edwards, and Hardcastle (2005b) and by Jefferies and Rowlinson (2016), which are discussed below.

Which party becomes responsible for managing the different risks on a PPP project is a matter for careful negotiation between the project parties and as Jefferies and Rowlinson (2016) notes, the party that negotiates away a particular risk will pay a price. Based on the results of a survey of individuals involved in PPP projects in the UK, Li et al. (2005b) have developed a risk allocation matrix, which is shown in Figure 2. They summarise that in "in order to achieve value for money objectives in public project and service delivery development, the public and private sector partners need to reach a mutually acceptable risk allocation scheme before the contract is awarded" (Li et al, 2005b:34). Details of how the risks are allocated between the parties and which party is best placed to manage each risk, are not provided.

Based on a review of 16 PPP projects in China, Ke, Wang, Chan, and Lam (2010) developed a list of seven risk factors which could cause PPP project failures, namely political, construction, operation, legal, market, economic and other, which is broken down further as force majeure, residual risk and weather. These are generally similar to those risks proposed by Grimsey and Lewis (2000), despite being for PPP projects undertaken under different cultural settings. Based on analysis of survey results where respondents with PPP practitioner or academic experience were asked to indicate how each risk should be allocated, Ke et al. (2010) developed a numerical methodology to determine which party should be allocated each risk. Jefferies and Rowlinson (2016) note that other methods used to solve the risk allocation problem include Monte Carlo Simulations, real options theory, artificial neuronal networks, fuzzy logic, stochastic processes and game theory.

Ameyaw and Chan (2013) through a review of six PPP water supply case studies in Ghana identify 40 different risk factors, which are grouped into the following eight categories: political and regulatory risks; operational risks; market / revenue risks; financial risks; relationship risks; project and private consortium selection; social risks; and third party risks, which are again very similar to those risks highlighted in other publications for projects in the UK and China. The details of these risk areas are discussed in the paper; however, how these risks should be shared between the project parties and then mitigated is not covered.

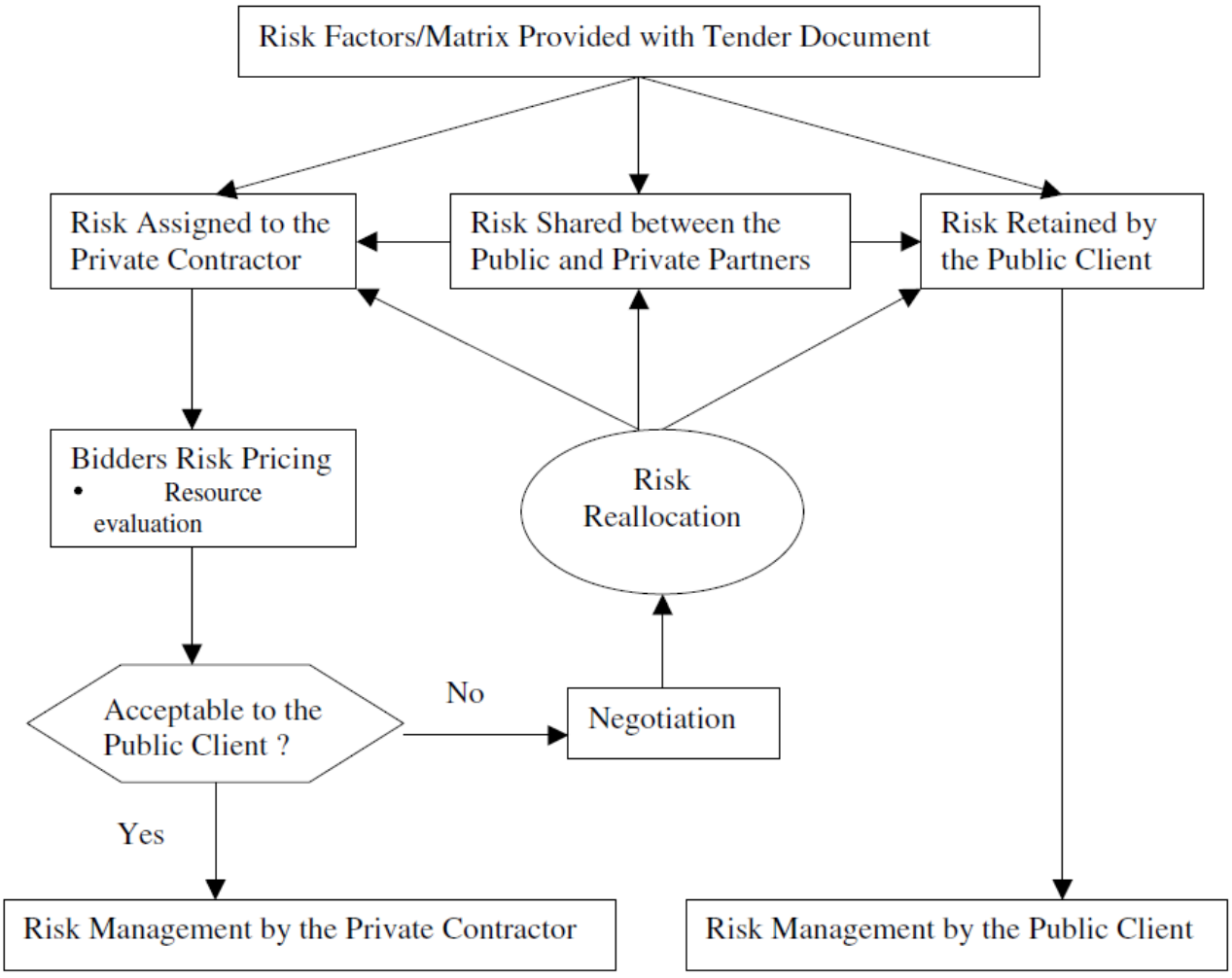

FIGURE 2: RISK ALLOCATION PROCESS IN PPP CONTRACT PROCUREMENT (LI ET AL., 2005B:27)

Many of the risk areas identified in the PPP literature are areas associated with project governance. To assist with remedying this problem, the United Nations has published a Guidebook on Promoting Good Governance in Public-Private Partnerships (United Nations, 2008). This publication includes case studies of successful PPP projects in Canada, France, Israel, Tajikistan and the USA.

A few publications are available which consider the track record of the PPP contractual approach. Spackman (2002) discusses lessons learned from the implementation of PPP projects in the UK and notes that the use of PPP projects in the place of public sector procurement has resulted in better defined contracts, improved contract management as well as design innovations. However, they have also resulted in increased tendering and setup costs, although the balance between the benefits and these increased costs are not currently known. Farlam (2005) considers the lessons learned from PPP projects

in Africa through the use of eight case studies covering a range of infrastructure procurement in South Africa, Mozambique, Uganda, Gabon and Tanzania. The publication notes that the PPP model should bring the benefits of private sector expertise and finance to develop projects; however, it is also observed that these projects do not always deliver on these promises. Farlam (2005:ii) concludes in his executive summary that "This review of PPPs suggests that, above all, governments must fundamentally improve their systems for dealing with the private sector to realise the efficiency and effectiveness gains that these partnerships promise." The publication includes a list of 19 recommendations to improve the performance of PPP projects in Africa.

A concern when considering appropriate procurement models for sustainable infrastructure is whether the PPP model is appropriate. Koppenjan and Enserink (2009) note that the use of PPP contracts may not align with the need of societies to develop sustainable infrastructure, due to the private sector often having a focus on short term financial returns. In this article Koppenjan and Enserink (2009) identifies that the three key areas of governance which governments must pay attention to if their PPPs are to be both successful in terms of sustainability and value for money, are prevention of regulatory capture through ensuring sufficient regulatory capacity and expertise, prevention of regulatory rent seeking through ensuring transparency and accountability and making sustainability a part of the regulator's agenda through the use of targets and an appropriate incentive structure. These are all aspects of good governance, which must be put in place for all PPP projects to be successful as supported by the United Nations (2008).

A number of articles consider the cost aspects and value for money presented by the PPP contract approach. Hoppe, Kusterera, and Schmitza (2013) finds that PPP structures incentivise cost reduction investments, compared to conventional contracting, although these cost reduction investments can either increase or decrease service quality. This is supported by Robinson and Scott (2009:195), who state that "Subjectivity in the output specification has a significant impact on the scope of service delivery and level of compliance." Robinson and Scott (2009:195) go on to say that to ensure that service quality is maximised, "Long term relationships between private sector service providers and public sector clients in PFI projects can provide a powerful stimulus to facilitate learning, knowledge sharing innovation and continuous improvement in service delivery."

Grimsey and Lewis (2005) consider whether PPP procurement provides good value for money and review the value for money assessment approaches used in over twenty countries. In many of these

countries a calculation is used, known as the Public Sector Comparator. However, the outcome is highly dependent on the assumptions used and as such it is recommended that the PSC is just one part of the value for money assessment and that other aspects, such as the transfer of risk from the public sector to the private sector should be considered. Grimsey and Lewis (2005) conclude by noting that while PPPs are not necessarily suitable for small projects, due to the large setup costs, nor to projects where the scope cannot be defined in detail due to flexibility requirements, prior to the introduction of PPP contracting, 75% of large infrastructure projects in the UK were late and over budget, while 75% of projects delivered using PPP contracting are delivered on time and to budget. UK Treasury guidance in 2008 for the threshold for a cost effective PPP project is a project capital cost of £20 million (Burger & Hawkesworth, 2011). Projects below this size can be developed using PPP contracting provided they can be bundled together into a single project (McCormack, n.d.), which is supported by the researcher's own experience of working in the South African PPP sector, where the approach of bundling small projects together to enable the use of project finance is also used.

The aspects of PPP contracting that are essential for such projects to be successful, known as critical success factors, have been widely discussed and vary according to location and to a certain extent project type. Some examples of this discussion are: Li, Akintoye, Edwards, and Hardcastle (2004), Jacobson and Sang (2008) and Cheung et al. (2012a). The concept of a critical success factor was first used by Rockart (1982:4) who defines critical success factors as "those few key areas of activity in which favourable results are absolutely necessary for a manager to reach his/her goals". When considering construction projects, a critical success factor is defined by Li et al. (2004) as those key areas where absolute success is necessary for a project to succeed. In other words, a failure in any one of the areas identified as a critical success factor area, could result in the project failing. Eighteen critical success factors were tested by Li et al. (2004), for projects in the UK, through survey responses from a mix of public and private sector bodies. These were then found to fall into five categories, effective procurement, project implementability, government guarantee, favourable economic conditions and available financial market.

Jacobson and Sang (2008) notes that for projects in the USA there are ten success factors, which are: a unifying specific vision shared between PPP parties; commitment of parties; open communication and trust; willingness to collaborate / compromise; respect for all parties; community outreach; political support; expert advice and review; risk awareness; and clear roles and responsibilities. In contrast Cheung

et al. (2012a) states that for PPP projects undertaken in Hong Kong and China there are seven critical success factors which are equitable allocation of risks; strong private consortium; judicious government control; transparent and efficient procurement process; project economic viability; adequate legal framework and stable political environment; and, available financial market.

The difference in the types of critical success factors identified for these different countries and the difference in the numbers of critical success factors for each country can be argued to be indicative of the differences in the social, policy and economic context of undertaking PPP projects in the different countries. Factors which are common to projects in all locations, based on the above publications are good governance, adequate legal frameworks and available financial markets.

Related to critical success factors, the World Economic Forum has also investigated the inefficiencies of infrastructure delivery globally and notes that while the PPP contracting model should enable the development of much needed infrastructure through utilising available private sector finance and efficient delivery capabilities, many eligible projects do not proceed, especially in developing countries. The reason for this paradox, according to the WEF (2013), is the lack of well prepared, projects that investors are willing to invest in. This is supported by the South African National Treasury PPP Manual, Module 6 Managing the PPP Agreement, which highlights that the appointment of a good "project officer" by the relevant state department or PPP unit, is vital to the success of the project (National Treasury, 2004b).

The World Economic Forum in its guidelines for infrastructure development has developed detailed guidelines for what are viewed as the four key steps that should be taken when developing PPP contracts and the risks that should be mitigated. These steps can be summarised as putting a rigorous project preparation process in place; undertaking a bankable feasibility study; ensuring balanced risk allocation and appropriate legislation; and ensuring a conducive enabling environment is in place (World Economic Forum, 2013).

Whether PPP contracting models have actually produced the results anticipated has not been extensively investigated. Raisbeck, Duffield, and Xu (2010) note that in Australia, "PPPs provide superior performance in both the cost and time dimensions, and that the PPP advantage increases (in absolute terms) with the size and complexity of projects"; however, according to Hodge and Greve (2009) the available literature is inconclusive as to the benefit of PPP contracts, even when only value for money,

is considered. This is supported by Spackman (2002), who, as noted above, observed that when considering UK PPP projects, it could not be concluded whether the PPP project savings outweighed the increases in setup costs, compared to alternative procurement approaches.

Jefferies and Rowlinson (2016), report that in the UK, a form of PPP contracting, the Private Finance Initiative (PFI), was used from 1992 to 2012. PFIs were used to procure both social and economic infrastructure. The particular innovation in the PFI contract was the use of a shadow payment by the government entity in place of the typical toll type payments used to provide the revenue required by the concessionaire. UK National Audit Office (NAO) reports into the performance of the PFI programme noted that the use of PFI procurement does improve project performance with regard to programme and costs; however, the cost of capital and transaction costs were higher than for conventional procurement. In addition the level of flexibility within PFI projects is generally poor so whether PFI procurement provides good value for money is unclear, which supports the conclusions of Spackman (2002). Jefferies and Rowlinson (2016) note that where PFI procurement is used for economic infrastructure that aids economic growth, the benefits are much clearer.

2.6 Use of the PPP Model for Procurement of Power Generation Energy Facilities

On the use of PPP contracts to procure the construction and operation of renewable energy facilities, a few papers and articles have been produced. Dinica (2008) considers the role of PPP contracting in implementing the procurement of wind power installations in Spain and concludes that the PPP contracting structure was vital to the development of the wind power industry in Spain and allowing it to evolve from public private partnerships, which were necessary to mitigate the commercial and policy risks, to the use of fully private developments, over a period of 10 years. The PPP structure helped to reduce economic risks for private investors, while also creating a political climate willing to reduce risks embedded in the economic support instruments. With regard to the success of the PPP projects in Spain, Dinica (2008:3570) notes, “trust in policy continuity has proved to be more important than high profitability.”

Cravinho Martins, Cunha Marques, and Oliveira Cruz (2011) also analysed PPP contracting for wind projects, this time in Portugal. Rather than considering the impact of PPP contracting in developing the wind industry, Cravinho Martins et al. assessed the processes used for the PPP contracting of wind power in Portugal through a review of the first wind power project developed in Portugal using a PPP contract.

The article acknowledges the benefit of the private finance that was leveraged for the project through the use of the PPP contract and that the resultant cost of power supplied by the project is more expensive than for conventional power plants in Portugal. The reason provided for the cost premium is the cost of wind technology at the time that the project was developed. Whether the PPP contracting structure used added a premium to the costs is not considered.

Eberhard et al. (2014) summarise the processes behind the South African PPP large scale renewable energy procurement programme, known as the Renewable Energy Independent Power Producer Procurement Programme or the REIPPPP, and discusses the key lessons learned and the factors behind its success. It is noted that the programme demonstrates that if private sector equity and debt finance are required to fund such projects then a well-designed and transparent process is required, including a clear procurement framework, which is in agreement with the critical success factors outlined earlier by Li et al. (2005). Eberhard et al. (2014) go on to note that in addition key risks must be mitigated by government and reasonable levels of profitability for investors must be allowed for. This research was undertaken after the initial rounds of the REIPPPP had been completed and the programme was running very successfully. It does not include the later rounds of the REIPPP, which have been subject to considerable delays as noted by Oliphant (2016). The reasons for this change in the level of success of the programmes do not appear to have been investigated.

After the success of the initial rounds of the REIPPPP the South African government has also initiated a small projects independent power producer programme, or SPIPPP, designed to increase the participation of South African local businesses. “The Programme is aimed at emerging, smaller power developers (less than 5 MW) with an emphasis on South African and SME participation in Projects” (Independent Power Producer Procurement Programme Unit, n.d.). This resource provides the background to the different IPP programmes in South Africa but does not provide any analysis of how successful they are, or possible reasons for any shortcomings.

As noted by Li et al. (2004), political commitment is vital for the success of PPP projects. To assist with getting the political commitment required for the South African renewable energy PPP programmes to succeed, various minimum economic development requirements were made compulsory aspects of the programme (Eberhard & Kaberger, 2016). The economic development aspects include areas such as local content, job creation, ownership, management control, preferential procurement, enterprise development and socioeconomic development.

2.7 CONCLUSIONS

The literature review has indicated that there is a large body of knowledge on the subject of infrastructure procurement, with efforts being made in a number of countries to find ways to improve the efficiency of the procurement processes. One of the procurement methods that is being increasing used around the world, particularly where public bodies have limited funding for capital projects, is the use of Public Private Partnership contracts. However, PPP procurement must be carefully designed and managed for the projects to be successful, with a range of critical success factors proposed for PPP projects around the world. The use of PPP procurement in South Africa is not new, although it has only recently been applied to the procurement of energy projects in the form of the REIPPP and the SPIPPP programmes. While there appears to be some agreement in the literature between certain aspects of the PPP energy projects procured in South Africa and international best practice, no research appears to have been undertaken to assess how well these projects are being procured in South Africa.

3. METHODOLOGY

3.1 INTRODUCTION

This chapter considers the research design that was used to undertake the investigations necessary in order to answer the questions, "What are the key factors that influence the outcome of energy projects procured using public private partnership contracts in South Africa?" and "What interventions could improve the success rates of projects procured using public private partnership contracts in South Africa?" The chapter first considers the philosophies informing management research, before discussing the methodologies available and the methods that were then used to collect the appropriate data to answer the research questions. The chapter concludes with a consideration of the trustworthiness and ethical aspects of the research.

3.2 RESEARCH PHILOSOPHY

When considering the design of the research to be undertaken, which methodological approach to use must be decided. There are a number of methodological approaches available to a researcher undertaking management research. The choice of which approach to adopt is dependent on the research problem to be answered, as well as the the assumptions of what constitutes reality and what constitutes knowledge (Morgan & Smircich, 1980). Mason (2002) notes that important philosophical considerations which must be considered when designing research include assumptions concerning of the nature of reality, the ontological perspective, as well as what represents knowledge and how this is demonstrated, the epistemological perspective. Easterby-Smith, Thorpe, and Jackson (2012:18) add to this, indicating that "awareness of philosophical assumptions can both increase the quality of research and contribute to the creativity of the researcher."

The research questions to be answered require the analysis of data concerning procurement approaches, which are socially developed processes. Morgan and Smircich (1980:497) note that "the epistemology that views reality as a social construction focuses on analysing the specific processes through which reality is created. Here reality resides in the process through which it is created and possible knowledge is confined to an understanding of that process".

Easterby-Smith et al. (2012) further observe that when considering research epistemology, research can be classed as either positivist or social constructionist research. Positivist-based research generally

involves the use of observations, which can be measured objectively, to answer the research question and is often described as quantitative research, as noted by Johnson and Onwuegbuzie (2004). In contrast, social constructionist research, described by Johnson and Onwuegbuzie (2004) as qualitative reseach, uses the experiences of people, individually and collectively, to answer a research question, a view supported by Silverman (1993). Marshall (1996:522) adds to this by noting that quantitative research approaches are used to, "test pre-determined hypotheses and produce generalizable results"; whereas qualitative studies are most useful for developing insights into and answering 'how' and 'why' type questions.

The selection of the appropriate research methodology is dependent on the type of research being undertaken and the type of knowledge required to answer the questions posed. Positivist research may use surveys or experiments to gather defined data on a particular problem, whereas Easterby-Smith et al. (2012) note that constructionist research may involve a wide range of methodologies, including action research, co-operative enquiry, archival research, ethnography and what they define as "narrative methods". This is supported by Crotty (1998:9) who with regard to the constructionist approach states that, "Meaning is not discovered, but constructed. In this understanding of knowledge, it is clear that different people may construct meaning in different ways, even in relation to the same phenomenon."

In some instances a methodology drawing on both qualitative and quantitative approaches may be appropriate, known as a mixed methods approach. Johnson and Onwuegbuzie (2004:20) observe that "the majority of mixed methods research designs can be developed from the two major types of mixed methods research: *mixed model* (mixing quantitative and qualitative approaches within or across the stages of the research process) and *mixed method* (the inclusion of a quantitative phase and a qualitative phase in an overall research study)."

For this research, a social constructionist position was adopted as the context of the research questions is complex, requiring flexible and interpretative research approaches, which can be adjusted for the data as it is determined and analysed. The research design which was consequently utilised is summarised in Figure 3.

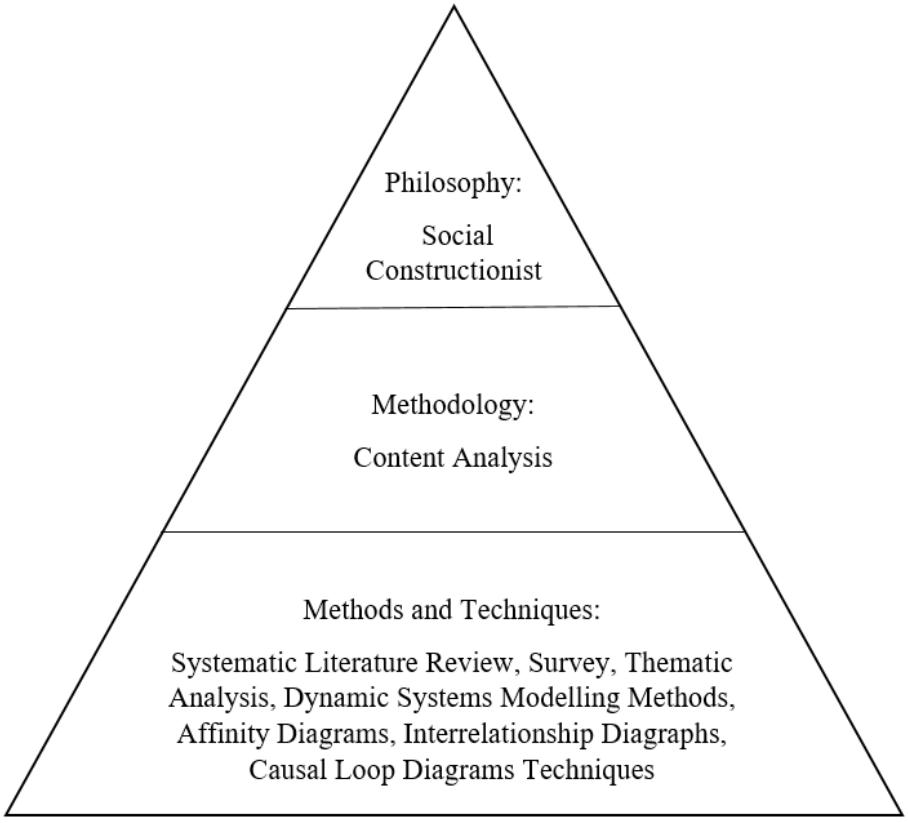

FIGURE 3: A SUMMARY OF THE RESEARCH DESIGN UTILISED

3.3 METHODOLOGY

Once the research philosophy has been adopted, the appropriate research methodology must next be identified. Management research methodologies can include quantitative approaches, such as experiments and surveys, as well as qualitative approaches, which include action research and co-operative enquiry, archival research, ethnography and narrative methods (Easterby-Smith et al., 2012).

The research methodology details the strategy and design of the research methods to be used (Crotty, 1998). It was argued earlier that a social constructionist approach is appropriate to answer the research question since the procurement of large infrastructure projects using PPP procurement include many diverse perspectives. In addition to the constructionist research methodologies, such as action research, co-operative enquiry, archival research, ethnography and narrative methods, which are commonly used in management research, as noted by Easterby-Smith et al. (2012), other constructionist methodologies include content analysis, phenomenology and case studies, amongst others (Creswell, Hanson, Plano Clark, & Morales, 2007; White & Marsh, 2006).

Content analysis is a research methodology that originated from the study of mass communications in the 1950s and can be used for systematically analysing messages in any type of communication (Kondracki, Wellman, & Amundson, 2002; Krippendorff, 2013; White & Marsh, 2006). White and Marsh (2006) observe that content analysis is used in fields ranging from anthropology and political science to management and sociology and can be used in both quantitative and qualitative studies. Content analysis techniques have been in use since the 19th century and are commonly used in the communication, journalism, sociology, psychology and business sectors as well as in research for analysis of documents (Elo & Kyngäs, 2008).

Elo and Kyngäs (2008) note that content analysis uses methods and techniques such as thematic analysis, which are of particular relevance for the analysis of texts such as newspaper articles, interview transcripts or peer reviewed papers and reports. The literature review has shown that there is a large body of research published on PPP procurement practice, from many countries around the world. The literature associated with the published PPP research is therefore available for use as a source of data to answer the research questions. Content analysis methods and techniques are therefore appropriate to use in conjunction with data gathering techniques such as systematic literature reviews and surveys to answer the research questions.

In thematic analysis, a theme is defined by Vaismoradi, Turunen, and Bondas (2013:402) as "a coherent integration of the disparate pieces of data that constitute the findings. It captures something important about the data in relation to the research question, and represents some level of response pattern or meaning within the data set." Themes can be identified using top down coding, or deductive processes, where researchers impose a predetermined coding scheme on a body of text, or a bottom up coding process, where relevant elements are identified inductively (Bergman, 2010; Vaismoradi et al., 2013). Once the initial themes, or first order categories, have been identified, then the themes can be grouped into second order or main categories using tools such as affinity diagrams (Elo & Kyngäs, 2008). After the categories have been identified, the research can end at that point or can be analysed further using techniques such as the assessment of the relationships between the categories or examination of the structures and patterns of the categories, as indicated by (Bergman, 2010). This is supported by White and Marsh (2006:37) who note that when using qualitative content analysis methods, such as thematic analysis, to answer research questions, the researcher will read through the documentation and "tag key phrases and text segments that correspond to those questions, notes others that seem important but are

unexpected, sees similarities in expressing the same concept, and continues iteratively to compare the categories and constructs that emerge through this process." Braun and Clarke (2006) summarise that "thematic analysis provides a flexible and useful research tool, which can potentially provide a rich and detailed, yet complex account of data."

Considering the diverse contexts of the research subject and the interpretive nature of the research questions, a content analysis based methodology was selected for the research. This methodology allowed the flexibility to use a range of methods and techniques, as described in the following section, to gather and process the data required for the research from different sources and analyse it as required in order to answer the research questions.

The use of a number of different methods and techniques allowed triangulation of the results, which improved the trustworthiness of the outcome (Johansson, 2003). Furthermore, the ability to use multiple sources of data also increased the trustworthiness of the research results (Noor, 2008).

3.4 METHODS

The research questions, "What are the key factors that influence the outcome of energy projects procured using public private partnership contracts in South Africa?" and "What actions could be taken to improve the success rates of projects procured using public private partnership contracts in South Africa?", require principles, or theories to be generated rather than principles or theories to be tested. Therefore an inductive approach to the research was taken, as opposed to a deductive approach (Johansson, 2003). This is supported by Thomas (2006:238) who states that "inductive analysis refers to approaches that primarily use detailed readings of raw data to derive concepts, themes or a model through interpretations made from the raw data by an evaluator or researcher." The advantage of such an approach compared to deductive approaches, is that inductive approaches allow key themes to be identified which are often obscured or missed by the investigators as a result of preconceptions driven by the nature of data collection and analysis procedures used in deductive approaches (Thomas, 2006). This is in keeping with the content analysis research methodology selected, which is appropriate for inductive and deductive research, as noted by White and Marsh (2006) and Kondracki et al. (2002).

This research used two different data gathering techniques, a systematic literature review and a survey. Inductive data analysis techniques were then applied to the data gathered, in order to gain additional insights. Further details are provided in the sections below.

3.4.1 Data Collection

Systematic Literature Review

As a first step in gathering the data to answer the research questions, a systematic literature review was undertaken of published papers and articles. This provided an international view on the subject of critical success factors in Public Private Partnership energy projects, from literature published between 2000, which was the date of the earliest publication on PPP projects identified in the literature review and 2016, the date when the research study was started. Systematic literature reviews are a means of synthesizing existing data from literature through the use of a defined process (Harden & Thomas, 2010) and can be undertaken using a number of different methods. Tranfield et al. (2003) note that systematic literature reviews are an important research tool as they are transparent and reproducible whereas traditional literature reviews can be biased by the researcher and often lack rigour.

The method used for the systematic literature review was based on that proposed by Easterby-Smith et al. (2012), which includes the following steps:

1. Documents for review must be peer reviewed;
2. Clear search criteria are used and a defined number of databases searched;
3. The required key data from the documents identified must then be extracted.

Survey

A web-based survey was sent to individuals working in the South African renewable energy PPP procurement industry, which, as mentioned in Chapter 2, consists of two PPP project programmes, the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) for projects of 5MW or greater in generation capacity and the IPP Small Projects programme, which is for projects of between 1MW and 5MW in capacity. The aim of the survey was to gain a local outlook on the South African PPP projects in the energy sector.

A purposive sampling design was used for the survey. Easterby-Smith et al. (2012) summarise that purposive sampling is a non-probability sampling design where the respondents invited to respond to a survey have been pre-screened by the researcher as meeting certain eligibility criteria. Tongco (2007) notes that purposive sampling is an inherently biased means of sampling; however, the method of sampling remains robust when compared to random probability sampling provided that the respondents are carefully selected based on industry knowledge and understanding. Seidler (1974) supports this and

adds that bias can be controlled using a number of techniques. These include selecting a balanced set of informants resulting in a likely slight positive and negative bias, avoiding uninformed respondents and where possible standardise the perspectives of respondents by selecting occupants of specific positions.

The individuals invited to respond to the survey undertaken to inform this research were all professionals working in the South African renewable energy industry and were selected from the researcher's extensive network across the South African energy industry. To improve the level of confidence in the responses, and to ensure that the survey results would be as representative as possible of the different stakeholders in the industry, recipients were selected from the different stakeholder groups, including project developers, financiers, lawyers and engineering consultants, all of whom were known to be working in the South African PPP energy industry on a range of different project types, including wind, solar and hydro projects.

The principles outlined by Easterby-Smith et al. (2012), of keeping the survey simple with one focus per question and the avoidance of jargon, colloquialisms and negatives, were used when designing the survey questions. Devers and Frankel (2000) note that where the research is exploratory or attempting to refine or discover concepts, then questions should be structured in an open manner. The survey questions for this research were therefore deliberately structured in an open manner and requested the respondents to provide their opinions on matters such as what the key success factors of the South African renewable energy procurement programme are, how it could be improved, lessons that could be learned from other similar procurement practices globally and the impact of recent changes to the programme. This approach is in contrast to that used by other researchers investigating PPP critical success factors who, in almost all the articles reviewed, requested the survey respondents to select critical success factors from a predetermined list. The survey for this research was designed to have both qualitative aspects to it as well as quantitative aspects to it as defined by Jansen (2010), as the diversity of answers were of interest as well as the frequency of any common responses. Tick box type questions were not used as these would not allow respondents to provide their own opinions and might exclude the provision of new or novel ideas. A copy of the survey consent form can be found in Appendix 1 and a copy of the survey template in Appendix 2.

3.4.2 Data Analysis

This section summarises the approach used for analysis of the data collected. As the research study did not set out to test whether the data was, "consistent with prior assumptions, theories or hypotheses

identified or constructed by an investigator" (Thomas, 2006:238), where a deductive approach to analysis would be appropriate, an inductive approach was used for the research using content analysis based techniques. Inductive approaches are used where a researcher wishes to allow the research findings to "emerge from the frequent, dominant or significant themes" present in the data (Thomas, 2006:238). The inductive approach therefore requires the researcher to assess the data collected to determine concepts, themes or a model.

Thematic Analysis

The initial step of the data analysis undertaken, which can be found in Appendices 4 to 8, was to review the documents identified during the systematic literature review and use the principles of thematic analysis to identify any factors that had a significant influence on the outcome of energy projects procured using public private partnerships globally. A two stage coding process was used. In the initial step, the documents were read and the key aspects, relating to the success or not of the projects, were recorded. This is the step in content analysis referred to by Krippendorff (1989:406), as unitising, where the units of analysis are defined and identified in the available data. In the second step, the key aspects were reviewed for similarities and those with similar themes were placed in groups. The third step was the formation of an affinity diagram, which is a technique developed by anthropologist Jiro Kawakita (Mazur, 1993), through comparisons of the groups, into thematically similar clusters. Based on the themes of each cluster, a label was developed for the cluster, or critical success factor. A similar process was used on the survey results data to derive a set of PPP critical success factors for the South African context. The two sets of critical success factors were then compared, in order to determine whether there were any differences in the critical success factors, as well as how well they were performing on South African projects.

The relationships between the critical success factors, which resulted from the analysis, were next explored using systems thinking based approaches and techniques. These were used to develop feedback loops in order to better understand the system and as a result develop possible interventions in order to improve the system.

The research process utilised is summarised in Figure 4.

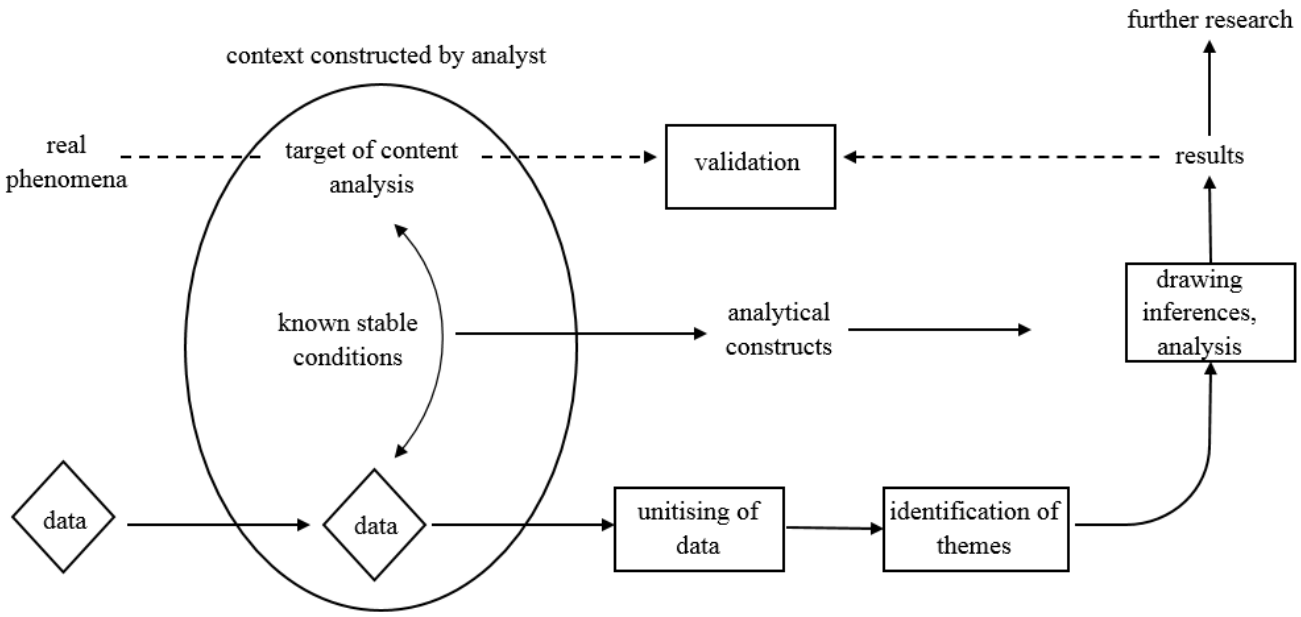

FIGURE 4: THE CONTENT ANALYSIS RESEARCH PROCESS - ADAPTED FROM Krippendorff (1989:406)

SYSTEMS THINKING BASED-ANALYSIS

Systems thinking is a discipline that has developed out of the systems dynamics processes developed by Jay Forrester in the 1950s, where complex relationships are conceptualised and their impacts on each other and the wider system is assessed (Chaker et al.2015). Qualitative system dynamics can be described as a method to show system dynamic relationships, with feedback and interactions on the associated systems. Mingers (2015:323) notes that "system dynamics provides a practical approach to simulating complex dynamic systems based on influence diagrams and multiple cause diagrams." This is supported by Wolstenholme (1982:555) who presents system dynamics as, "a system methodology, capable of assisting with practical problem definition, analysis and change in a wide range of systems." System dynamics diagrams are based on the principles of control engineering and are also known as influence diagrams or causal loop diagrams (Wolstenholme, 1982).

Causal loop diagrams are a tool which can be used to understand the nature of dynamic problems through the linking together of key variables into a system or mechanism (Kim, 1992). A system is defined by Toole (2005) as a collection of connected elements which influence each other. In order to improve the understanding of the relationships between the key variables in a system, these can be first analysed through the use of interrelationship diagraphs. Interrelationship diagraphs are a means of establishing the cause and effect relationships between a group of variables and are often used to investigate the

relationships between variables in problems where there is very little historical data (Brassard, 2011). Based on the results of the interrelationship diagraph, feedback loops are then identified, which are developed into causal loop diagrams (De Pinho, 2015a).

Once the causal loop diagram representing the system or mechanism has been developed, possible interventions can then be identified which might result in changes to the outcome of the mechanism. The locations in a causal loop diagram, where interventions will have the greatest impact, are known as leverage points. Leverage points can be classified as low leverage points, where a small change or intervention will result in a small change in the behaviour of the system or high leverage points, where a small change or intervention causes a large change in the mechanism's behaviour. Low leverage points are used to address intermediate causes of a problem, whereas high leverage points are used to address the root causes to problems (De Pinho, 2015a). Appropriate interventions for each leverage point are then developed, based on the context and the desired outcome using CIMO-logic. CIMO-logic is a process where for a given mechanism (the M in CIMO and for this research this is the causal loop diagram that was developed) and considering context surrounding the problem (the C in CIMO) and the desired outcome (the O in CIMO), a logical intervention can be devised (Denyer et al.2008), considering the leverage points identified.

As indicated above, the third analytical stage of the research study was the use of an interrelationship diagraph to investigate the relationships between the categories identified by the thematic analysis. Using the results of the thematic analysis, the interrelationship diagraph was developed as per the guidelines laid out by De Pinho (2015b). Each of the categories was assessed to determine whether they influenced the other categories and then an arrow was drawn to show the direction of influence. Where two categories had different degrees of influence on each other, the arrow was drawn to show the direction of the greater level of influence (De Pinho, 2015a).

The relationships identified by the interrelationship diagraph were used to determine possible feedback loops, which were then integrated into a causal loop diagram using the principles of qualitative system dynamics. This mechanism was then analysed to determine possible interventions which could adjust the outcomes of the mechanism to produce the design result using the CIMO-logic process, which as outlined by Denyer et al. (2008) is as follows. In order to achieve an outcome 'O', using mechanism 'M' and considering context 'C', what intervention 'I' would be required?

3.5 Trustworthiness and Ethics

3.5.1 Trustworthiness

Research trustworthiness includes the concepts of credibility, transferability and dependability. As noted by Lincoln and Guba (1985) and Collier-Reed, Ingerman, and Berglund (2009) for the research to have credibility it must be designed, undertaken and communicated in such a manner that all of these aspects are credible and that the results can be scrutinised by the research community in order to judge for themselves the credibility and legitimacy of the research. As such, the research for this study has been designed and undertaken in a manner that ensures that it is repeatable, within the bounds of the study, while remaining appropriate to achieve the research goals. This is supported by Kondracki et al. (2002:226) which notes that "when properly applied content analysis methods are both reliable and valid."

The concept of transferability depends on the researcher providing sufficient detail for the reader to judge the level of similarity between the research undertaken and the specific context of the reader (Collier-Reed et al., 2009). In keeping with this concept, the research has been undertaken and reported such that that it can be applied, not just to PPP projects in other sectors other than energy, but also in countries with a similar level of development to South Africa.

Dependability of management research is essential, if research findings are to be consistent. Lincoln and Guba (1985) note that to ensure dependability the research must use appropriate methodology, including sampling and where possible, triangulation processes should have been used during the processing of the data. Triangulation is defined by Easterby-Smith et al. (2012:346) as "using different kinds of measures or perspectives in order to increase confidence in the accuracy of observations". For this research, triangulation processes utilised included the use of two different data gathering methods (the systematic literature review and the survey) as well as ensuring that all literature review data was peer reviewed. The survey data also added to the trustworthiness of the research by providing local South African context for the research, as supported by Easterby-Smith et al. (2012).

3.5.2 Ethical Considerations for this Study

Bell and Bryman (2007) note that ethics are integral to every aspect of management research with the key areas being grouped as conflicts of interest and affiliation bias; power relations; harm, wrongdoing and risk; and confidentiality and anonymity. Easterby-Smith et al. (2012) adds to this list, the need for

ensuring honesty and transparency in communicating about the research and the need for avoidance of any misleading or false reporting of research findings.

Bell and Bryman (2007) observe that management researchers can be susceptible to conflicts of interest and affiliation bias, with management researchers, as with those in the scientific fields, having the potential to be influenced by matters relating to funding in how they conduct the research and the findings are presented. As such, management researchers should declare any conflicts of interest or affiliations that may influence the findings of the research. On the subject of the power relations between the researcher and interviewees, Bell and Bryman (2007) suggests that the power relations of both parties must be considered and their rights and interests protected, while on harm and wrongdoing they conclude that a balance should be found between the need to protect research participants and the need to undertake research that challenges powerful or well entrenched business organisations. Lastly, on the matter of confidentiality and anonymity, they observe that being overly prescriptive with ensuring confidentiality and anonymity can, in some cases, undermine the ability to undertake meaningful management research. Therefore, a balance must be found.

With regard to the research undertaken for this dissertation, it is hereby confirmed that no funding was received from organisations with an entrenched position in the South African Public Private Partnership industry and as such no conflicts of interest or affiliation bias were present. The research processes were also undertaken in such a manner as to minimise the impacts of any power relations and to ensure that no harm came to any of the research participants. All efforts were made to ensure that all communication concerning the research was undertaken in an honest and transparent manner and the research has been reported as accurately as is possible. Ethics approval for this research study can be found in Appendix 3 – Ethics Approval Form.

3.6 CONCLUSIONS

This chapter has considered the design used for the research undertaken in order to answer the questions, "What are the key factors that influence the outcome of energy projects procured using public private partnerships in South Africa?" and "What interventions could improve the success rates of projects procured using public private partnership contracts in South Africa." A social constructionist epistemology was adopted to guide the research, as the context of the research questions is complex requiring flexible research approaches, which can be adjusted for the data, as it is determined and

analysed. To accommodate the need for a flexible research approach a content analysis-based methodology was utilised.

Data for the research was gathered using a systematic literature review and a purposive survey of stakeholders in the South African energy industry. Inductive data analysis techniques were utilised to assess the data gathered. An inductive approach was selected, as the research question required the generation of theories, as opposed to the testing of existing theories. The inductive approach was also appropriate for the analysis of the qualitative data, in the form of survey data and systematic literature review results, used in the research. Data analysis techniques employed included thematic analysis, affinity diagrams, interrelationship diagraphs and causal loop diagrams.

The chapter concludes with consideration of the trustworthiness and ethical aspects of the research. Regarding trustworthiness, triangulation processes were utilised that included the use of two different data gathering methods (the systematic literature review and the survey) as well as ensuring that all literature review data was peer reviewed. Local context was included in the research, through the use of the survey. With regard to the ethical aspects of the research, it is hereby confirmed that no funding was received from organisations with an entrenched position in the South African Public Private Partnership industry and as such no conflicts of interest or affiliation bias were present. The research processes were also undertaken in such a manner to minimise the impacts of any power relations and to ensure that no harm came to any of the research participants.

The following chapter of the report considers the research results.

4. RESULTS

4.1 INTRODUCTION

In this section, the data collected using the systematic literature review and the survey is reported.

4.2 SYSTEMATIC LITERATURE REVIEW OUTCOME

As a first step in the systematic literature review, the databases to be searched were selected. The Google Scholar, Emerald, Sage and Wiley Online databases were chosen as they included the research area of focus, as well as holding peer reviewed documents and papers, which was a requirement to ensure trustworthiness. The second step was to decide on the search strings to be used.

An initial search for documents was made using the search terms, "Public Private Partnerships" and "energy generation" published between 2000 and 2016, which were available online and using all available search fields.

The initial search results were as follows:

- Emerald – 31 articles
- EBSCOhost – 11 articles
- Wiley Online – 11,500 articles
- Google Scholar – 18,300 articles

For databases that produced a significant number of results, these were then narrowed down to those articles that met the search terms, "public private partnerships", "energy" and "procurement" using all search fields. The revised results were as follows:

- Wiley Online – 1259 articles
- Google Scholar – 18,000 articles

As the number of articles identified was still greater than could be reviewed, the search was limited to articles that included the terms "public private partnerships", "procurement" and "energy" in the abstract or where this option was not available, in the title. However, this proved to be too prescriptive and resulted in 4 or less hits on the Wiley Online and Google Scholar databases. To make the search terms

less prescriptive the search was then run just using the "public private partnerships" and "energy" in the abstract or where this option was not available, in the title, which produced the following results:

- Wiley Online – 21 articles
- Google Scholar – 22 articles

The search was also completed using the terms "public private partnerships" and "procurement" in the abstract or where this option was not available, in the title. This search produced the following results:

- Wiley Online – 25 articles
- Google Scholar – 18,400 articles

An analysis of the resultant articles from Emerald, EBSCOhost, and Wiley Online was then made to exclude any articles that matched the above search criteria but were not related to procurement of electricity generation projects. As the Google Scholar search results were too extensive to be meaningfully analysed, the initial 20 documents identified by the last Google Scholar search were also investigated for relevance. This analysis of the documents from all the databases for relevance resulted in the narrowing down of the documentation to the following:

- Emerald – 2 articles
- EBSCOhost – 2 articles
- Wiley Online – 14 articles
- Google Scholar – 14 articles

Given the relatively small number of relevant articles resulting from the above searches and analysis, the search process was re-run using the search terms "public private partnerships" and "critical success factors" in the abstract (or title if "abstract" resulted in significant results) for peer reviewed publications dated between 2000 and 2016 and analysed for relevance. This resulted in an additional 13 articles as follows:

- Emerald – 13 articles
- EBSCOhost – 0 articles
- Wiley Online – 0 articles
- Google Scholar – 1 article

In total 46 relevant articles were thus sourced for thorough review and their details can be found in Appendix 4 – Systematic literature Review. The results of the analysis of these sources is shown in Appendix 5 – Systematic Literature Review Affinity Diagram and Appendix 6 – Systematic Literature Review Thematic Analysis Results.

In summary, the analysis of the systematic literature review results yielded eight critical success factor (CSF) categories relevant to international projects. The eight critical success factors, for energy projects developed using Public Private Partnerships to succeed, are as follows. They are not reported in any order of importance, as if any of them is not achieved, then the project is likely to fail. It is also argued that the PPP critical success factors identified for energy projects by the research are no different from those for other infrastructure projects, such as roads or water:

- Commitment of Public and Private Parties
- Effective Governance
- Favourable PPP Framework
- Identification of Suitable Projects
- Competitive and Transparent Procurement
- Strength of Consortium
- Suitable Financial Conditions
- Appropriate Risk Allocation and Risk Sharing

The key aspects of each critical success factor identified by the research are discussed below:

Commitment of Public and Private Parties

The need for serious commitment of both public and private parties is seen as critical to the success of PPP projects in countries ranging from China, Hong Kong, Malaysia, Australia and the UK to Nigeria (Ameyaw & Chan, 2013; Babatunde, Opawole, & Akinsiku, 2012; Cheung, Chan, & Kajewski, 2012b; Cheung et al., 2012a; Ismail, 2013). Commitment from government can be demonstrated by designing policies which encourage private sector investment in infrastructure. However, such policies will usually require the projects to be structured such that both the private and the public sectors benefit or in other words both parties feel that value is added. For example Love et al. (2000:58) note that in the infrastructure policy for investment in the state of Victoria in Australia, dated 1994, “The Policy,

however, requires that a project is structured in a manner that is value-adding to both the private and the public sectors, that there are on-going benefits to both parties throughout the procurement process."

Commitment of public and private parties can be argued to also include ensuring that both governments and private sectors have the expertise to identify all of the relevant risks before entering into the partnership contract. Governments must also have the contract management skills to ensure that those risks are in fact borne by the private sector (Murphy, 2008). In some countries a dedicated PPP unit has been developed within the relevant government department to provide the administration strength required to develop the necessary legislation (Ameyaw & Chan, 2013; Jamali, 2004). In South Africa, when the PPP model was selected to deliver renewable energy projects, the availability of experienced advisory services to augment the available skills within the public sector was critical to the design and management of the PPP processes (Eberhard et al.2014). This need to ensure that the public sector has sufficient expertise to deliver PPP projects is supported by Jamali (2004:428) who states that, "PPPs indeed often falter because of hastily prepared tender documents and contracts and negotiations taking place between unequally qualified and experienced professionals, mainly to the disadvantage of the representative from the public sector."

The need for strong political support for PPP projects is also seen as critical to the success of PPP projects and is a key aspect of this particular critical success factor, particularly in developing countries (Ameyaw & Chan, 2013; Babatunde et al., 2012; Wibowo & Alfen, 2015). To maintain the cost efficiencies that PPP contracts can bring, governments must honour the long time frames of the concessions as the lack of commitment to these long time frames can result in extensive additional transaction costs (Valero, 2015).

Effective Governance

Effective Governance includes themes such as corruption avoidance and honouring of the contractual agreements by all parties and independence of the courts system. The need for effective governance of the legal processes governing PPP projects, including the independence of the courts systems and control of corruption, are seen as essential for PPP projects as without this the private sector will not provide the necessary investment as discussed by Vagliasindi (2012), Beh (2010), Wibowo and Alfen (2015) and Ismail (2013). In Malaysia, Ismail (2013:13) notes that in a survey of the importance of critical success

factors in PPP projects, "Good governance was ranked first as a necessary factor to ensure the success of PPP projects."

Favourable PPP Framework

Successful delivery of PPP projects requires a carefully considered, appropriate legal framework to be put in place, including the use of irrevocable contracts (Wibowo & Alfen, 2015). In China and Hong Kong the need for a favourable PPP framework is considered the most important critical success factor for PPP projects (Cheung et al.2012a). In Nigeria, Ghana and Malaysia a favourable PPP framework is also seen as a critical success factor (Babatunde et al., 2012; Ismail, 2013; Kwofie, Afram, & Botchway, 2016). However, in countries where the legal frameworks for PPP contracts are well developed, such as Australia and the UK, this critical success factor is given less importance, as observed by (Cheung et al.2012b:52) who on the importance of having a favourable legal framework in place, observes that "respondents from Australia and the UK ranked this success factor of medium importance only."

Identification of Suitable Projects

Grimsey and Lewis (2000:117) note that when planning and delivering PPP projects, "the principal aim for the public sector is to achieve value for money in the services provided while ensuring that the private sector entities meet their contractual obligations properly and efficiently." Water and transportation projects developed using PPP contracting will generally deliver reasonable efficiency gains and are therefore more appropriate for procurement using the PPP contracting model, whereas IT, hospitals and schools show minimal gains and are therefore less appropriate for procurement via this model (Ameyaw & Chan, 2013; Grimsey & Lewis, 2005; Iossa & Martimort, 2015).

Identification of suitable projects for PPP contracting is thus a key success factor and ensuring that PPP projects provide value for money (VFM) is seen as one of the main metrics when judging whether projects are perceived as successful or not. Judging value for money is a complex business and a number of countries, including South Africa, have developed formulas or value for money tests, known as Public Sector Comparitors (PSC). However, as these value for money tests are highly dependent on the assumptions made, the use of competitive bidding should ensure value for money is achieved (Grimsey & Lewis, 2005), as it avoids the need for such assumptions. Grimsey and Lewis (2005:375) go on to note that there is value in the use of the Public Sector Comparitor approach as "Its development constitutes a

valuable discipline upon public sector procurement in assisting decision makers to understand the project, the risks involved and how to deal with them contractually."

In the UK, excluding software projects, PPP projects on average cost 9% less than using alternative procurement routes (Ball & King, 2006), while in Australia the level of improved cost effectiveness ranges from 11% to 30% (Raisbeck et al., 2010). Grimsey and Lewis (2005) also notes that in sectors where PPP contracting has been used for some time, value for money assessments are often not required. In Nigeria, Babatunde et al. (2012) note that in their research, transportation projects were best for PPP contracts, followed by electricity and water projects. Education and real estate projects were judged to be the least suitable for delivery using PPP contracting.

Regarding project scale, the advantage of using the PPP delivery route has been shown to increase as the size and complexity of projects increases (Grimsey & Lewis, 2005). In Holland the PPP delivery route must be considered for all projects over a certain capital value, which in 2007 was €25 million (Zeegers & Ang, 2007), while in Canada the PPP delivery route is the model of choice, for delivering large infrastructure works (Siemiatycki, 2015).

Competitive and Transparent Procurement

Competitive and Transparent Procurement is identified as a critical success factor as it is necessary in order for the private sector to partner successfully with the public sector. The need to ensure competitive and transparent procurement as a condition of using private finance is an essential condition for private sector involvement, as confirmed by (Eberhard et al.2014) and (Coviello, Gollan, & Perez, 2012). However, care must be taken to ensure competitive bidding and hence that the projects provide value for money, in markets with few major players (Mols, 2010). This problem is not unique though to PPP procurement as "over-dependence on one supplier and asymmetric lock-in can equally occur in more traditional forms of procurement" (Mols, 2010:242).

In a competitive bidding environment the private sector requires there to be a reasonable chance of success, hence where individual PPP contracts are to be awarded then usually no more than three bidders should be invited (Ball & King, 2006). However, where multiple contracts are available, then multiple bid winners are an important incentive for the private sector to participate (Eberhard et al.2014).

Strength of Consortium

Project partnerships needs sufficient expertise to deliver high quality services to meet the needs of all the project partners. Indeed Ameyaw and Chan (2016:128) notes that for PPP projects "a consortium's lack of appropriate knowledge and skills is the significant failure factor." The strength of the consortium is therefore a critical success factor for the delivery of PPP projects. The strength of the consortium delivering the PPP project is identified as a critical success factor in Ghana, the UK, Australia, Hong Kong and China (Ameyaw & Chan, 2013; Cheung et al., 2012b; Li, Akintoye, Edwards, & Hardcastle, 2005a).

Suitable Financial Conditions

Suitable Financial Conditions includes the "Stable Macro-Economic Conditions" theme, which is sometimes reported as well as the "Suitable Financial Market" theme identified by some researchers as a critical success factor. In countries where suitable financial markets exist and have stable macro-economic conditions, such as the UK and Australia, this critical success factor did not feature as strongly in the literature; however, in locations such as China where there are financial restrictions this critical success factor is seen as very important (Cheung et al., 2012b; Cheung et al., 2012a). In Nigeria the presence of sound economic policies and a suitable financial market are seen as the top two critical success factors (Babatunde et al., 2012), while in Malaysia they are both in the top five critical success factors (Ismail, 2013) and in Ghana they are numbers five and six respectively (Kwofie et al., 2016). Kwofie et al. (2016:69) go on to state that "appropriate economic policies that lead to a stable and growing environment are *sine qua non* to enhancing success on PPP projects and as such remain the much sought-after success factor by stakeholders and parties in PPPs".

Appropriate Risk Allocation and Risk Sharing

The Appropriate Risk Allocation and Risk Sharing critical success factor assumes that the PPP model is set up to ensure that the party best able to manage a risk is given responsibility for managing that risk. As stated previously, one of the key reasons for using the PPP contracting structure is to transfer certain risks from the public sector to the private sector, particularly those related to the delivery and operations of the facilities (Li et al., 2005a). However, Takashima, Yagi, and Takamori (2010) make the point that due to project uncertainties, the long timeframes of the contracts and the risk capital involved, many such projects are not feasible without the mitigation of certain risks by government. This is supported by

(Eberhard et al.2014) who note that the mitigation of key risks by government is one of the main requirements for investment in PPP infrastructure projects, such as utility scale renewable energy generation projects in South Africa. Hence one of the critical factors determining whether a PPP project will be successful or not is the proper and reasonable sharing of risks between the private and public sector parties to the project.

For appropriate risk allocation in PPPs to take place, governments must have the expertise to identify all of the relevant risks before entering into the partnership contract. Governments must also have the contract management skills to ensure that the appropriate risks are borne by the private sector (Murphy, 2008). However, PPPs where public and private sectors are involved in all phases of a project are more attractive to the private sector since the risks are shared by government (Coviello et al., 2012) and so are more likely to be successful. This is supported by Siemiatycki (2015: 359) who notes that "one of the success factors in Canadian PPPs is the public sector maintaining a strong role in owning the asset, designing project specifications, and ensuring public control related to key features of their long-term operations." In Canada, contract re-negotiations on PPP transportation projects where anticipated user demand has not been met, have been avoided through structuring the project revenues based on availability of the facilities rather than user based charging (Siemiatycki, 2015), thus moving the risk from the private sector to the public sector.

4.3 Survey Results

Twelve responses to the survey requests were received and the results analysed as described in Chapter 3. Key findings from the analysis of the survey results can be summarised as follows. The full list of survey responses can be found in Appendix 7 – Survey Responses.

Six critical success factor themes were identified from the survey results. Of these six, five themes are in common with the results of the systematic literature review and are: the need for reduced political uncertainty; improved commitment of the public sector parties; improved commitments to development programmes; the need for reductions in the cost of project development; and the need for the PPP programmes to be well planned, but also to be able to evolve. In addition to these five critical success factor themes, an additional theme was identified which is economic development.

The need for improved commitment of the public sector parties, improved commitments to development programmes and reductions in project development costs themes are clearly linked to the critical success

factor “Commitment of Private and Public Parties”. An example survey response received was that “delays cause uncertainty which increases the risk as well as cost of the project”, which clearly demonstrates the importance to the success of the project of all the project parties being fully committed to the project.

An example response to the survey question on which areas of the REIPPP programme would be improved is, “the current political uncertainty should be addressed head on to provide all participants with confidence in the programme,” which supports the need for reduced political uncertainty theme, which in turn can be aligned with the critical success factor “Effective Governance”.

The themes around programme planning and programme evolution support the “Favourable PPP Framework” critical success factor and the need for government to back certain key risks supports the critical success factor “Appropriate Risk Allocation and Risk Sharing”.

As mentioned above, a sixth key theme was identified from the survey results, which is economic development, and is a finding that is in addition to the findings which resulted from the systematic literature review analysis. Associated findings from the analysis of the survey results include sub-themes such as the importance of the use of localisation requirements within the PPP frameworks as a tool to improve the development of the country as a whole, as well as the need to ensure that the localisation requirements are carefully planned and kept in balance with the other aims of the programmes, such as ensuring electricity tariff reductions. A quotation taken from the survey responses (see responses to survey question 4 in Appendix 7) is, “while EDO (Economic Development Obligation) initiatives are to be applauded, localization must not impede advantages in the global market to further reduce tariffs”.

Critical Success Factor Performance Analysis

Further analysis of the themes resulting from the analysis of the survey results was undertaken and from this analysis it can be argued that while some of the critical success factors identified are working as planned, certain of the critical success factors are not performing at a level where they remain successful and work is required in these areas. The critical success factors which are performing well are Favourable PPP Framework and Competitive and Transparent Procurement.

The critical success factors which are identified as requiring improvement if the South African PPP programmes are to continue to be successful are the Effective Governance and the Commitment of the

Public and Private Parties critical success factors. The analysis also identified that there are various technical aspects of the Favourable PPP Framework critical success factor which although this critical success factor is currently working as intended, could be enhanced further, such as permitting the inclusion of time of use tariffs and energy storage.

The following table, Table 1, shows the results from the analysis of the survey responses. The table shows the initial and principal themes developed, as well as which of the critical success factors are working as intended and those which require attention.

TABLE 1: THEMES AND CRITICAL SUCCESS FACTORS EXTRACTED FROM THE SURVEY RESPONSES

Survey Questions	Initial Themes Extracted from the Survey Responses	Principal Themes Developed	Performance Analysis
Q1: What are the key factors that you perceive are behind the success of the REIPPP programme?	REIPPPP success factors are programme transparency, bankable PPA, government backing of the buyer giving guaranteed sales, well designed tariffs, experienced PPP office	Transparency, predictability, well designed programme	The Favourable PPP Framework, Effective Governance, Competitive and Transparent Procurement critical success factors appear to be working as required.
Q2: Are there particular aspects of the REIPPP programme that could be improved?	Reduced political uncertainty, improved consistency of timing of PPP programme	Predictability and timing	The Effective Governance and Commitment of Private and Public Parties critical success factors appear to require improvement
Q3: What is the minimum size of project that is appropriate for auction systems, such as the REIPPP programme, in US$?	US$3 - 65 million		N/A
Q4: Which aspects, if any, that are used in other programmes internationally should be considered for future bid windows of the REIPPP?	Alternative sources of revenue, national benefit of local content requirements compared to ability to reduce costs further need investigation.	Programme localisation and evolution	The Commitment of Private and Public Parties critical success factor appears to need improvement.
Q5: It is noted that the delays in preferred bidder announcements and extensions of	0% up to 10%	Programme predictability	The Commitment of Private and Public Parties critical success

Survey Questions	Initial Themes Extracted from the Survey Responses	Principal Themes Developed	Performance Analysis
financial close dates cause economic uncertainty for developers and investors. What level of premium do you add to your tariff to compensate for delays in announcement of preferred bidders and financial close?			factor appears to need improvement.
Q6: Given the high level of competitiveness of the wind and solar aspects of the REIPPP programme and hence the low success rates, could the high cost of bidding could be seen by some as a deterrence to potential bidders?	high bid cost and low success rates are seen by 10 of the 12 respondents as a deterrence to potential bidders	Programme design	
Q7: Is the level of oversight of the projects during the construction and operation stages, that required by the DoE, appropriate for PPP projects of this scale?	10 of 12 respondents see the level of oversight during construction and operations as appropriate.	Programme design and economic development	N/A
Q8: In contrast to the initial Bid Windows, the DoE adjusted the bid requirements for later bid windows such that developers did not need to have a confirmed lender and	Improvements to PPP programme seen as a welcome change, changes lead to benefits for project developers, lenders and consumers	Programme evolution	The Commitment of Private and Public Parties critical success factor appear to be working as required.

Survey Questions	Initial Themes Extracted from the Survey Responses	Principal Themes Developed	Performance Analysis
EPC confirmed prior to bid submission. Please could you comment on the consequences of this change, including whether this reduced bidding costs; enabled some developers to submit "low ball" bids that risk not being able to reach financial close; and whether this change enable developers to agree better terms with both lenders and EPCs since terms would only be agreed once the developers are confirmed as preferred bidders.			
Q9: Given the rules and requirements of the REIPPP programme and / or the SPIPPs programme what are the non-government or Eskom related key factors that determine whether a project will be delivered successfully?	Eskom factors seen by 8 of 12 respondents as key risk areas e.g. Grid code compliance and grid connection costs, other risks from extent of EPC experience	Project cost and competencies of project participants	The Commitment of Private and Public Parties critical success factor OR appears to need improvement.
Q10: Are there areas where the South African renewable energy industry (finance, legal, consultants, contracts, other?) could improve in order to time and cost of project delivery further?	Potential areas for industry improvement are improved programme management, Cost reductions across the project facets, particularly legal	Programme design, economic development and cost reduction.	The Favourable PPP Framework critical success factor although currently performing has potential for further improvement.

4.4 Analysis of the Critical Success Factors

After identification of the critical success factors, the next step of the analysis was to assess the relationships between them. The analysis utilised techniques such as interrelationship diagraphs and causal loop diagrams, as discussed in Chapter 3.

In order to determine the presence of any relationships between the critical success factors identified, the data was reassessed. Directional relationships between each of the critical success factors were decided upon based on what Yan and Horwitz (2008) call "correlational or associative connotations" of the data associated with each critical success factor, including consideration of the local contexts of each factor, such as the local environment, legislation and actual PPP project results. Critical success factors that had an influence on the other were linked by an arrow, with the direction of the arrow pointing in the direction of influence (Yan & Horwitz, 2008). The combined set of influences is shown in the interrelationship diagraph, in Figure 5.

The critical success factors were then classified as either "Driver" or "Outcome" factors according to whether they had a greater number of arrows leaving the factor (Driver) or going into the factor (Outcome) (Yan & Horwitz, 2008). The "Key Outcome" variable is the variable that is influenced by the most variables (De Pinho, 2015a), in other words it has the most arrows feeding into it. The "Key Driver" factor is the variable which has the most arrows leaving it and is therefore the most influential variable as this is the location where a possible intervention will be most effective in a causal loop mechanism (De Pinho, 2015b). Which of the critical success factors are Drivers and which are Outcomes is shown in Table 2.

Other locations where possible interventions might have leverage to enable change, albeit it in a less effective manner, will be through the other driver variables, which are shown in Table 2. In this manner, an understanding of the relationships of each of the critical success factors with the other factors was created. Although nine critical success factors were assessed and each therefore has eight potential relationships with other factors, in some cases no relationship could be established. Therefore, for that particular factor, the number of relationships was less than eight. Two factors were identified which were influenced by less than eight factors. One was the Identification of Suitable Projects factor, which links to six other factors, while the other is the Competitive and Transparent Procurement factor, which links to seven other factors.

In this analysis two Key Driver variables were identified which are the Effective Governance critical success factor and the Commitment of Public and Private Parties critical success factor. Both of these critical success factors were found to have a relationship with all of the other eight critical success factors and influence all but one of the other factors.

The Effective Governance critical success factor is influenced by the Commitment of Public and Private Parties critical success factor and in turn influences all the other critical success factors. The Effective Governance critical success factor would have been expected to drive all the other critical success factors as the importance of there being an independent judicial system, as well as control of corruption is quoted as being essential for the private sector to provide the necessary investment for such infrastructure projects, as discussed in Section 4.2 above. However, in the case of energy PPP projects in South Africa, the commitment of certain public bodies, such as Eskom and the Department of Energy, would appear to be determining the success of the PPP programmes in practice, as is highlighted by the survey responses and sources such as Oliphant (2016). Therefore, the Commitment of Public and Private Parties critical success factor is, in South Africa, driving the Effective Governance critical success factor.

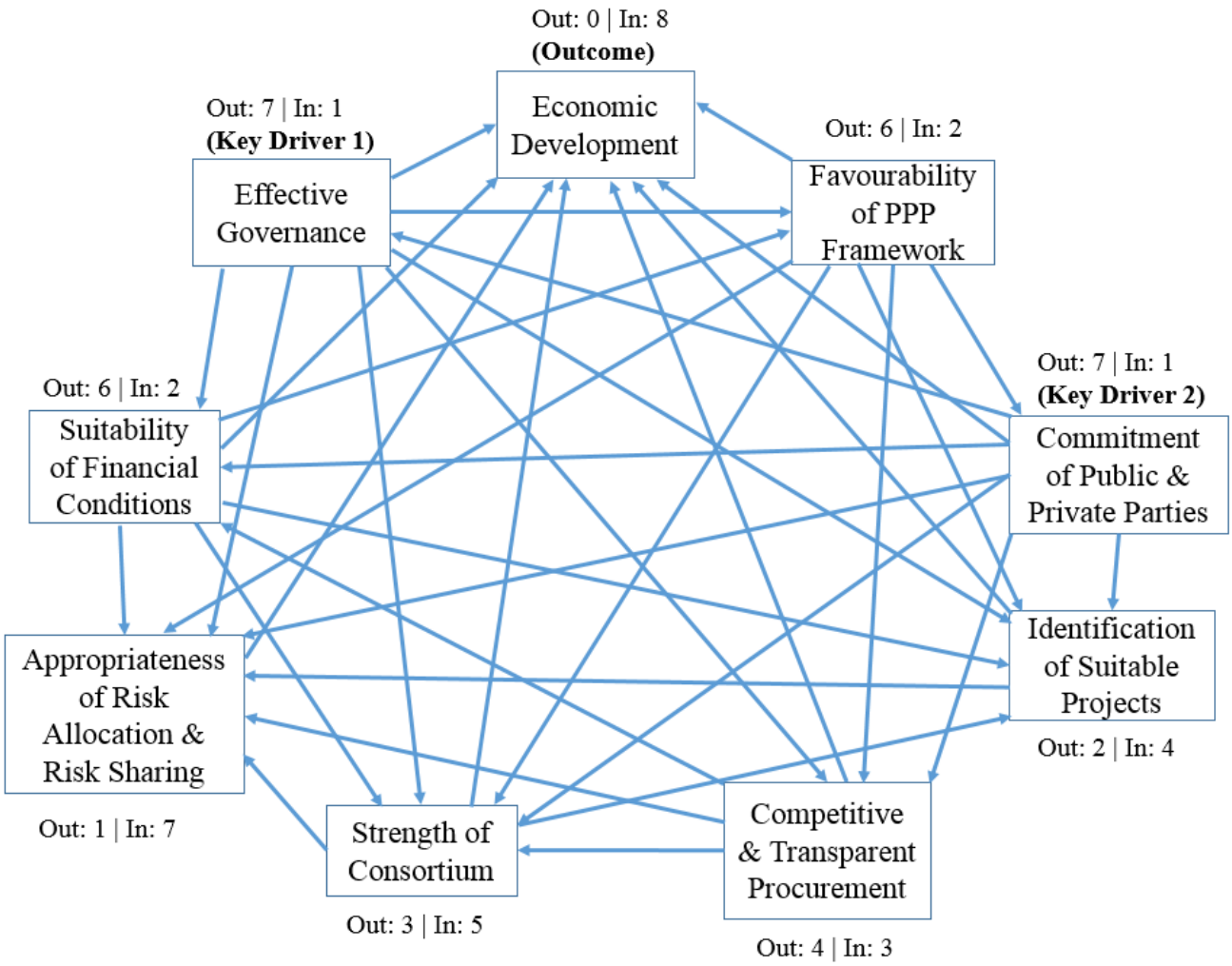

FIGURE 5: PPP PROJECTS CRITICAL SUCCESS FACTOR INTERRELATIONSHIP DIAGRAPH

The Commitment of Public and Private Parties critical success factors is influenced by the Favourable PPP Framework critical success factor as is argued above in Section 4.2 and in turn influences all the other critical success factors. This is supported by the fact that commitment of certain public bodies, such as Eskom and the Department of Energy, would appear to be determining the success of the PPP programmes in practice as is highlighted by the survey responses and sources such as Oliphant (2016).

The Key Outcome was identified as the Economic Development critical success factor, which aligns with the reasons for initiating the South African PPP energy programmes, which were to enable the South African economy to benefit from the foreseen cost reductions in renewable energy as the technologies developed over time (Department of Energy, 2015).

TABLE 2: CRITICAL SUCCESS FACTOR RELATIONSHIPS

Critical Success Factor	**No. of Arrows Indicating Level of Influenced By Others**	**No. of Arrows Indicating Level of Influence on Others**	**Classification**
Economic Development	8	0	Key Outcome
Effective Governance	1	7	Key Driver 1
Commitment of Public and Private Parties	1	7	Key Driver 2
Favourable PPP Framework	2	6	Driver
Appropriate Risk Allocation and Risk Sharing	7	1	Outcome
Suitable Financial Conditions	2	6	Driver
Competitive and Transparent Procurement	3	4	Driver
Strength of Consortium	5	3	Outcome
Identification of Projects Suitable for PPP Contracting	4	2	Outcome

As described in Chapter 3, the results of the interrelationship diagraph were developed into a systems dynamic diagram, known as a causal loop diagram, as shown in Figure 6, focussed on improving the Economic Development variable, as this was the Key Outcome variable derived from the interrelationship diagraph. Through considering the context and the desired outcomes of the causal loop diagram, possible interventions were identified using CIMO-logic, which if implemented would result in improvements to the Key Outcome, in other words, would result in increases in the levels of economic development achieved.

The causal loop diagram which was developed is based on the Success to the Successful archetype closed loop diagram, as described by ISEE Systems (2006) and Wolstenholme (2003). System archetypes are a "formal and free-standing way of classifying structures responsible for generic patterns of behaviour over time, particularly counter-intuitive behaviour" (Wolstenholme, 2003:8). The proposed mechanism consists of three loops, one of which is a feedback loop. This mechanism is shown in Figure 6. The relationships between these loops and the variables that they consist of, are detailed below.

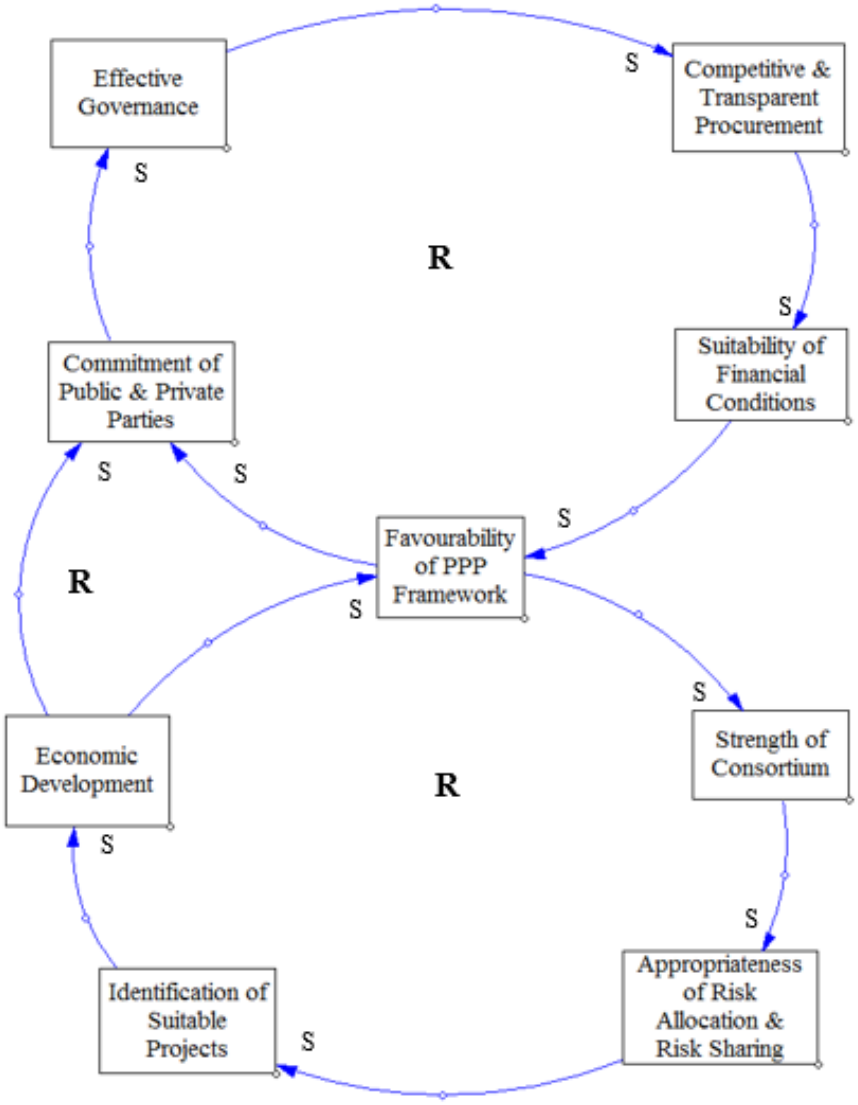

FIGURE 6: SOUTH AFRICAN ENERGY PPP PROJECTS CLD

The relationships can be summarised as follows: The upper loop, which is the enabling loop, contains the critical success factors which are required to ensure that an appropriate environment is in place to

enable the projects, which are the driver critical success factors. The upper loop of the mechanism therefore drives the lower loop, the delivery loop, which consists of outcome critical success factors. The performance of the delivery loop then impacts on the appetite of the private and public sectors for more of such projects, via the feedback loop. Typically for this archetype, if the common variable shared by the two loops has a finite level of resource then the one loop will gain at the other's expense (Systems, 2016; Wolstenholme, 2003); however, if the common factor is not limited, as in this case, then logically each loop can benefit from the other in a virtuous cycle and improve all the factors, or conversely can drag the other into a negative spiral and lower the ability to successfully deliver the projects.

In accordance with the interrelationship diagraph developed for this research, the Commitment of Public and Private Parties critical success factor is the only critical success factor which influences the Effective Governance critical success factor, which in turn ensures that the Competitive and Transparent Procurement critical success factor is achieved, which influences whether there are Suitable Financial Conditions, which is a precursor for a Favourable PPP Framework being put in place. The loop is a reinforcing loop, as indicated by the letter 'R', as an improvement in any particular variable will result in an improvement in the adjacent variable and so forth leading to an improvement in the system.

The lower loop of the causal loop diagram, the delivery loop, as stated above, contains the outcome-type critical success factor variables that relate to the delivery of the projects, Favourable PPP Programme, Strength of Consortium, Appropriate Risk Allocation and Risk Sharing, Identification of Suitable Projects and the key outcome variable, Economic Development. As with the upper loop, the lower loop is also a reinforcing loop as the improvement of any particular variable will result in the following variable also improving and over time the loop improving as a whole.

In summary therefore, to drive improvements in the key outcome variable, Economic Development, improvements should be first sought in the five critical success factors, which make up the enabling loop, i.e. the Commitment of Public and Private Parties factor, the Effective Governance factor, the Competitive and Transparent Procurement factor, the Suitability of Financial Conditions factor and the Favourability of PPP Framework factor. These factors have all been indicated, through the interrelationship diagraph, as driver factors and so would have the most leverage to improve the operation of the mechanism. They would therefore be the most effective means of improving the key outcome variable, particularly where available resources are limited. Of these driver factors, the factors with the most leverage are those that are the most influential, which as previously stated, are the Key Driver

factors, which in this mechanism are the Effective Governance critical success factor and the Commitment of Public and Private Parties critical success factor.

4.4.1 INTERVENTIONS

Using the results of the interrelationship diagraph and the CIMO-logic process as described in Chapter 3, the points of greatest leverage in the causal loop mechanism were identified and some possible interventions have been proposed, which would act to maximise the levels of economic development achieved. All of the interventions identified, act on variables in the Enabling Loop in order to maximise their impact as these driver variables have the greatest degree of leverage. It can also be argued that as the enabling loop drives the delivery loop, interventions focussed on variables in the enabling loop have the greatest level of impact. The full CIMO diagram can be in Appendix 8. The interventions identified are:

1. Undertake root cause analysis to understand the reasons for lack of commitment for the critical success factor, "Commitment of Public and Private Parties". Improving the level of commitment of the all the consortium partners, in particular the public parties, will act to improve the standards of governance of the project parties. This will result in more competitive and more transparent procurement processes, which will in turn lead to improved financial conditions for the projects. This will then enable further improvements to the PPP framework to be incorporated which will logically then drive improvements in the Strengths of the Consortium, which will in turn improve how risks are allocated. This will then result in additional projects being identified as viable, which will then, assuming that the projects are then developed, result in increased levels of economic development of the country.
2. Review barriers and opportunities to reduce the cost of finance of PPP projects in South Africa and hence improve the critical success factor, "Suitable Financial Conditions". This will enable the PPP framework to be improved, as per intervention 1 and will drive the improvement of the delivery loop critical success factors which will then, assuming that the additional projects identified are then developed, result in increased levels of economic development of the country.
3. Undertake regular reviews to ensure PPP framework remains favourable to both public and private parties and hence improve the "Favourable PPP Framework" critical success factor. This will, as per interventions 1 and 2, ultimately result in increased levels of economic development of the country.

4. Review barriers and opportunities to increase local content of projects. This intervention, although acting directly on the “Favourable PPP framework” critical success factor, will still need to work through the lower loop of the mechanism in order for the desired increase in the “Economic Development” critical success factor to be achieved.

4.5 CONCLUSIONS

The analysis has identified eight critical success factors associated with successful PPP projects globally and found that of these, four are also applicable to South African projects. The analysis has also identified an additional critical success factor that is applicable to South African PPP projects. Furthermore, the findings show that two of the critical success factors (Favourable PPP Framework and Competitive and Transparent Procurement) are performing well, while work is required on two of the critical success factors (Effective Governance and Commitment of the Public and Private Parties), if PPP projects are to continue to be successful in South Africa.

The additional critical success factor identified by the analysis for South African projects in particular, is Economic Development. The Economic Development critical success factor is representative of the overall success of PPP projects in South Africa and as a result is influenced by all of the critical success factors identified.

To gain an understanding of the relationships between the critical success factors, an interrelationship diagraph and a causal loop diagram were developed. The interrelationship diagraph indicated the type of relationship between each of the critical success factors with the other critical success factors, while the causal loop diagram portrayed the feedback structures and dynamic relationships between the critical success factors. Analysis of the ID and the CLD demonstrated that the critical success factors are not all equal in value. Rather, that interventions made to certain of the critical success factors, the driver critical success factors, would be more effective at improving the ability of the mechanism to drive an improvement in the key outcome than making interventions to other critical success factors.

Through the use of the causal loop diagram, four interventions were identified, which if put in place, would act to improve the critical success factors through improving the effectiveness of PPP procurement in the energy sector in South Africa, which will in turn increase the levels of economic development in the country.

A discussion of these results follows in the next chapter.

5. DISCUSSION

5.1 INTRODUCTION

In this section, the results of the systematic literature review and the survey are discussed and compared. A discussion of the wider evidence available to confirm these findings is also included.

5.2 DISCUSSION

This research study is focussed on answering the questions, "What are the key factors that influence the outcome of PPP energy projects in South Africa?" and "What interventions could improve the success rates of projects procured using public private partnership contracts in South Africa?" In answering the questions, through analysis of the international research and the survey results, eight key critical success factors, as shown in Table 3, were identified, of which four were also identified by the survey respondents as being particularly pertinent to South African projects. A ninth critical success factor is also proposed for South African projects.

Depending on the project type and location, the number of critical success factors for PPP projects identified in the literature can vary from five up to fifteen, as indicated by Li et al. (2004), Cheung et al. (2012a) and Jacobson and Sang (2008). With the exception of the Economic Development critical success factor and the Identification of Projects Suitable for PPP Contracting critical success factor, the remaining seven critical success factors identified in the research, or critical success factors similar to them, are all included in the collection of critical success factors listed in these papers.

How successful the South African energy PPP procurement programmes are actually proving to be and where further work is required, based on the research results, is discussed below. A number of possible interventions to improve the way in which PPP projects are undertaken in South Africa were identified by the research and are also reviewed in this chapter.

Table 3: Critical Success Factors Identified by the Research

International Critical Success Factors Pertinent to South African Projects
• Commitment of public and private partners • Effective governance • Favourable PPP framework • Appropriate risk allocation and risk sharing
Additional Critical Success Factors Relevant for International Projects
• Suitable financial conditions • Competitive and transparent procurement • Strength of consortium • Identification of projects suitable for PPP contracting
Additional Critical Success Factor Pertinent to South African Projects
• Economic development

5.2.1 Effective Governance, Favourable PPP Framework and Suitable Financial Conditions Critical Success Factors

The success of a framework put in place to enable the implementation of PPP projects will have to be evaluated against the needs of the different stakeholders. However, as of January 2018, up to date data for the number of projects that have completed construction and are now operational, under the South African REIPPP programme, is not readily available. In April 2015, 41 projects were reported as being operational (earthworks, n.d.) and by 2015, the total contracted although not necessarily yet operational was 92, with a total investment committed of US$19 billion (Eberhard & Kaberger, 2016). This implies that a favourable and well considered legal framework has been put in place for these PPP projects, hence the Favourable PPP Framework, Effective Governance and Appropriate Risk Allocation and Risk Sharing critical success factors would appear to be in place for renewable energy PPP projects in South Africa. This is supported by the research survey results. The quantum of private sector investment in the

South African REIPPP programme as detailed above would also suggest that the Suitable Financial Conditions critical success factor has been met and that Effective Governance measures are in place.

The importance of the effective governance critical success factor is noted by The United Nations Economic Commission for Europe (2008) which states that there is a PPP projects development maturity curve, which can be divided into three main stages as shown in Table 4. Furthermore, this guidebook goes on to observe that, "moving up the maturity curve is not automatic and PPPs have proved difficult to implement in many countries. The main reason for this is the need to develop institutions, processes and procedures to deliver PPP projects. The lack of well performing institutions in many countries is reflected in several things such as the protracted length of negotiations between public and private partners, the slowness of reaching closure, the lack of flexibility in risk sharing, and the cancellation of many projects with all the resultant waste" (United Nations2008:8).

TABLE 4: THE THREE STAGES OF PPP DEVELOPMENT (UNITED NATIONS, 2008:7)

Stage 1	Stage 2	Stage 3
• Define policy framework • Test legal viability • Identify project pipeline • Develop foundation concepts (PSCs etc) • Apply lessons from earliest deals to other sectors • Start to build marketplace	• Introduce legislative reform • Publish policy and practice guidelines • Establish dedicated PPP units • Refine PPP delivery models • Continue to foster marketplace • Expand project pipeline and extend to new sectors • Leverage new sources of funds	• Fully defined comprehensive "system" established • Legal impediments removed • PPP models refined and reproduced • Sophisticated risk allocation • Committed deal flow • Long-term political consensus • Use of full-range of funding sources • Thriving infrastructure market involving pension funds and private equity funds • Well-training civil service utilises PPP experience

5.2.2 Competitive and Transparent Procurement and Commitment of Public and Private Partners Critical Success Factors

The initial high level of commitment of the public sector aspects of the South African REIPPPP projects is evidenced by the setting up of a dedicated PPP unit, led by an individual highly experienced in the

development of PPP projects as well as extensive experience of working with the private sector (Eberhard et al., 2014). The high level of commitment of the private partners is supported by the fact that when the REIPPPP was launched in 2011 it was expected that 3,725MW of projects would be procured through five bidding rounds; however, this total allocation was taken up in the first three rounds (Papapetrou, 2014), which shows the popularity of the program with the private sector. Indeed international accolades have been earned for the development and design of the REIPPPP (Department of Energy, 2015), which would appear to be support for the Competitive and Transparent Procurement critical success factor being in place. However, the level of commitment of the public sector in the REIPPPP bidding rounds since bid window 3 has, unfortunately, been diminishing with delays to financial close being caused by Eskom refusing to sign PPAs, or issue final quotations for the cost of grid connection works, as evidenced by the survey responses and sources such as the Business Day newspaper (Oliphant, 2016). As noted by one survey respondent, these delays place financial strains on development companies, which must find alternative sources of income for the delay period. If these projects fail, given the over-subscription of each bid window (Eberhard et al. 2016) there will be projects to take their place; however, there will inevitably be additional costs for both the new sponsor and the public stakeholders due to resultant reworking required to get such projects up to the relevant project stage.

5.2.3 Strength of Consortium and Appropriate Risk Allocation and Risk Sharing Critical Success Factors

The presence of strong project consortiums bidding for projects in the South African PPP market and suitable financial conditions to fund the projects are also evidenced by the high number of successful projects that have been delivered so far, as detailed above. The high number of projects delivered so far would also indicate that both the public and private sector are comfortable with the risk allocation and the levels of risk sharing. Interestingly the South African Treasury PPP guidance documentation (National Treasury, 2004c) does not discuss risk allocation and risk sharing; however, despite this lack of official guidance, the risk management aspects of the PPP planning and negotiations appears to have been done well. This is supported by the survey analysis results which indicated that the Favourable PPP Framework critical success factor is functioning well in South Africa.

5.2.4 Identification of Projects Suitable for PPP Contracting Critical Success Factor

Identification of projects suitable for PPP contracting is a key PPP success factor and as stated previously, the WEF notes that the identification of bankable projects and the associated necessary agreements and

processes required to render a project bankable can block many infrastructure developments from progressing (World Economic Forum, 2013). Under the legal structure of the REIPPPP preferred bidders must enter into a power purchase agreement (PPA) with Eskom, which enables firm revenue projections, albeit within the limitations of the technologies selected. This bankable PPA is one of the main requirements to render a project "bankable" or worthy of investment by financiers and is one of the key aspects behind the REIPPPP's success as noted by survey respondents and supported by the Department of Energy (2015) report.

With regard to the South African renewable energy PPP procurement programmes, further similarities are shown between the critical success factors identified from the systematic literature review and those from the survey responses. These include competitive and transparent procurement, appropriate risk allocation and risk sharing and a favourable PPP framework. It is also noted that although the requirements of the South African PPP renewable energy programmes have evolved, these changes have been managed so as not to been seen as creating policy uncertainty. Indeed, these changes have been welcomed by all the survey respondents, as they reduce bidding costs and therefore the tariffs which can be bid for the projects, which is to the benefit of the South African economy as a whole.

In addition to the need for greater public commitment, the other critical success factor area identified as needing urgent attention is the need to ensure that the PPP framework remains favourable, particularly the need for improved consistency of the programmes. PPP contracts are based on private sector involvement and the private sector needs regular income streams in order to remain in business. A consequence of this lack of consistency is that although the competitive tendering nature of the South African renewable energy PPP procurement programmes has been reducing the costs of technologies, such as wind and solar PV (Eberhard & Kaberger, 2016), survey respondents have noted that the political and programme uncertainties are forcing them to include a factor of up to 10% in their tariffs to accommodate these programme uncertainties. This means that the price reductions that South Africa is seeing from the generation of lower and lower bid tariffs, for wind and PV at least, may be reduced, although the competitive nature of the auction programme will tend to mitigate this risk to a certain extent.

Other areas which the research identified where the South African renewable energy PPP programmes could be improved are that currently the cost of bidding into the programmes is very high and the chances of success low, which is a potential deterrent to new bidders and has already resulted in some project

developers moving on to other markets in Africa. However, it was noted by one respondent that this high cost does deter "rent seekers" from bidding. In other words, it deters non-serious bidders. While the programmes are over-subscribed, as they have been in the initial bid windows (Eberhard et al.2016), the highly competitive nature of the programmes works as intended to reduce tariffs. However, there will inevitably be a point at which the tariffs will stabilise and even perhaps increase if the market ceases to be competitive.

Considering the most appropriate model for delivery of utility scale renewable energy projects, Grimsey, (2005) has shown that the case for the PPP model improves as projects become larger and more complex. Zeegers and Ang (2007) noted that the minimum scale for a PPP project in Holland in 2007 was €25 million, and Burger and Hawkesworth (2011) reported that in the UK, in 2008, the minimum size project for a PPP contracting model to be considered was £20 million. The first round of bids in the REIPPPP, which are all now operational, are reported by Eberhard et al. (2014) to have had a total capital investment value of almost US$6 billion. This is well in excess of these guidance figures, so in terms of capital investment, the PPP model would appear to be appropriate for the programme as a whole. Reference data for the appropriate scale of projects within the programme is not readily available; however, the survey respondents believe that the minimum size of project would range from US$3 million up to US$100 million.

5.2.5 Economic Development Critical Success Factor

Through analysis of the survey data, Economic Development, an additional critical success factor for South African PPP projects is proposed. The importance of economic development as a success factor for PPP projects in South Africa is noted by Eberhard et al (2016), as being key to getting the necessary political support required for the projects and hence is also a key aspect of the Commitment of Public and Private Parties critical success factor. The South African Department of Energy reports that by June 2015, after the first five bid windows of the REIPPPP, 6,327MW of energy generation had been allocated of which 1,827MW were already operational and many of the economic development targets have been exceeded. Employment opportunities are greater than expected, with 19,050 job years of employment that have been created so far, preferential procurement is as high as 89% whereas the target was 60% and socio-economic development spend by projects has reached 2.2% of revenues against a target of 1.5% (Department of Energy, n.d.). Although these statistics appear to be excellent, a very valid question was raised by one of the survey respondents is whether the high local content requirements, that project

developers are now required to adhere to by the PPP programme, are hindering the reduction of electricity generation tariffs further. This concern is supported by the Organisation for Economic Cooperation and Development (OECD). The OECD notes in its trade policy note dated February 2016 that while local content requirements "may help governments achieve certain short-term objectives, they undermine long-term industrial competitiveness," (OECD, 2016).

Whether or not countries, such as South Africa, include preferential procurement requirements, such as the inclusion of minimum levels of local content in the projects, implementation of PPP projects in a country is often linked to an increase in GDP, or in other words, the economic development of a country. Shediac, Abouchakra, Hammami, and Najjar (2008) observe that "analyses show that a 1% increase in PPP investment will increase GDP per capita by 0.3%, implying that consistent investment in PPPs will increase GDP levels sizably." This is supported by the observation that countries which invested in 70 or more PPP projects between 1990 and 2003 achieved a growth rate of 25% (Shediac et al., 2008).

5.2.6 Critical Success Factor Performance Analysis

The analysis identified that certain areas of the South African energy projects PPP programmes are in need of improvement if they are to remain successful. The two critical success factors identified which are in need of improvement are the Effective Governance critical success factor and the Commitment of Public and Private Parties critical success factor. Other areas for improvement identified by the analysis relate to the design of the South African renewable energy PPP programmes, as well as to the effectiveness of certain aspects of the renewable energy PPP industry. The introduction of time of use tariffs is suggested, as is the introduction of grid scale energy storage. The separation of the electricity grid operator from the electricity generation assets is also suggested as a means to reduce the conflict of interest that Eskom finds itself in currently. Improvements in the design of the financial aspects of the programme are suggested in order to enhance its effectiveness, as are the need to find ways to reduce the cost of the legal services required by the project developers. While the level of oversight during the projects operations stage and associated reporting by the project operators is noted as being a burden it is also noted by other respondents as being necessary given the public sector involvement in the projects. This aligns with the transparency critical success factor identified by the research.

5.2.7 Interventions to Improve the Critical Success Factors in Order to Increase Economic Development

The analysis undertaken and summarised in Chapter 4 identified that work is required in a number of areas to improve the delivery of PPP projects in the energy sector in South Africa and hence increase the level of economic development of the country. The analysis undertaken has identified four interventions, whose implementation would help to improve the critical success factors that are failing. The interventions are:

1. Review the barriers and opportunities to reduce project cost of finance of PPP projects in South Africa and hence improve the critical success factor, "Suitable Financial Conditions".
2. Undertake root cause analysis to understand the reasons for lack of commitment for the critical success factor, "Commitment of Public and Private Parties".
3. Undertake regular reviews to ensure PPP framework remains favourable to both public and private parties and hence improve the "Favourable PPP Framework" critical success factor.
4. Review the barriers and opportunities to increase local content of projects, which acts directly on the control variable, "Economic Development".

Support for the proposed interventions is as follows.

Undertake root cause analysis to understand the reasons for the lack of commitment for the critical success factor, "Commitment of Public and Private Parties". With Eskom refusing to sign PPAs there is clearly a problem with the commitment of the public parties to the PPP programme. As noted by Le Cordeur (2017), this is a multi-faceted problem involving not only Eskom but also trade unions. It is therefore proposed that as a first step to resolving this problem a root cause analysis of this problem is undertaken. This will enable an improved understanding of the problem, which will hopefully lead to the development of possible resolutions.

Review barriers and opportunities to reduce the cost of finance of the PPP projects in South Africa. Whether a PPP framework will be successful depends to a large extent on whether the private sector can make adequate financial returns to meet the requirements of their shareholders, while keeping the projects to a price that is acceptable to the public sector (Love et al., 2000). Hence the causal loop diagram developed shows the variable Suitable Financial Conditions as being key to the success of the Favourable PPP Framework variable. Nelson and Shrimali (2014) indicates that in developing countries the cost of

finance of renewable energy projects, such as wind and solar projects can add between 24% and 32% to the cost of projects. The intervention identified is therefore a key consideration to improve the viability of PPP projects in South Africa, as the causal loop diagram developed indicates that if increased numbers of suitable projects can be identified and implemented then the levels of economic development will rise.

Undertake regular reviews of the PPP framework in order to ensure that it remains favourable to both the public and private parties. All development programmes should be regularly reviewed and revised as required, in order to ensure that all aspects are optimised as far as possible given changes in technology development, costs, risks and the needs which the programme is intending to fulfil, to name but a few. This is supported by various of the survey responses. Therefore, one of the interventions identified is to undertake regular reviews of the PPP framework in order to ensure that it remains favourable to both the public and private parties.

Review barriers and opportunities to increase local content of projects. As noted by Eberhard and Kaberger (2016), increasing the level of economic development of the country is key to maintaining political support for South African energy PPP programmes. Hence one of the interventions proposed is to undertake a holistic review of the barriers and opportunities for increasing the level of economic development associated with the development of PPP projects in South Africa, while minimising any long term impacts on the competitiveness of the country (OECD, 2016).

5.3 Research Limitations and Areas for Further Research

The South African PPP industry plays an important part in the South African economy through its ability to attract significant quantities of foreign investment into the country, as indicated by Eberhard et al. (2014). This research can assist with the work necessary to further develop the South African PPP industry and thereby maintain or even increase these levels of international investment.

Although survey responses were received from respondents working across the energy sectors, this research study was limited due to the number of survey responses received. The research thus could be enhanced through increasing the number of respondents to the survey. The receipt of additional responses would add further diversity to the responses received as well as provide a better indication of any trends in this particular market sector.

The interventions identified in the analysis will help to improve the performance of the failing critical success factors. However, further research will be required to determine whether the interventions are sufficient. The interventions identified are not simple actions, but rather packages of work that will in themselves result in further actions, which will in turn need to be implemented if the interventions are to be fully successful. Given the complex and dynamic nature of the problem it is likely that ongoing research and regular interventions will be required for South African PPP projects to continue to be successful.

An aspect of the research that has not been included in this study, is the concept of the level of maturity of each of the critical success factors identified. While critical success factors indicate the areas that need to be concentrated on to ensure success of PPP projects, the readiness of the relevant stakeholders to successfully deliver PPP projects can be shown by the level of maturity of each critical success factor (Babatunde et al.2015). This would be particularly pertinent to countries, such as South Africa, where it would be particularly beneficial to assess the maturity levels of the Commitment of Public and Private Partners critical success factor which was identified as being a key area where the South African renewable energy PPP programmes are failing, in order to gain further insight into the reasons for these failings and what might be possible to be done to improve the situation.

Another aspect that was outside the scope of this research study is whether the PPP model is the best vehicle for the delivery of the economic development obligations placed on the renewable energy PPP project developers. Further research should be undertaken to address whether the price being paid for the level of economic obligations is worth the increased electricity tariffs that result, or whether these economic development gains can be better provided using other tools and processes.

5.4 CONCLUSIONS

The international sources have shown that there are eight critical success factors associated with successful PPP projects globally of which four are particularly appropriate for the South African context, which are the Commitment of Public and Private Parties, Effective Governance, Favourable PPP Framework and Appropriate Risk Allocation and Risk Sharing. An additional critical success factor for the South African context has also been identified, which is Economic Development. The research shows that while the PPP programme developed to deliver energy projects in South Africa met all four of the international factors relevant to South Africa, work is required in two of these areas to ensure that the

programme remains successful, the Effective Governance critical success factor and the Commitment of Public and Private Parties critical success factor.

The analysis undertaken has identified four possible interventions, whose implementation will improve the development of PPP projects in South Africa. The implementation of these interventions will need to be monitored in order to confirm whether they are sufficient or whether additional implementations are required.

Further research on possible interventions to improve PPP project implementation in South Africa would be beneficial as would extending the scope of the current research to consider the maturity of the critical success factors identified. The reasons for failures of the critical success factors and the interventions that can be put in place to minimise such failures could be further expanded.

6. Conclusions and Recommendations

The research study was undertaken to answer the questions, "What are the key factors that influence the outcome of energy projects procured using public private partnerships in South Africa?" and "What interventions could improve the success rates of projects procured using public private partnership contracts in South Africa?". The research has identified nine critical success factors which influence whether or not a Public Private Partnership energy project will be successful, eight of which are relevant to international Public Private Partnership projects and one factor that is particularly relevant to South African projects.

This research indicates that the South African renewable energy PPP project development programmes, the REIPPP and the IPP Small Projects programmes have been designed in line with international best practice, with all projects awarded in the initial bidding rounds of the REIPPPP, which was started prior to the IPP Small Projects Programme, meeting these critical success factors. These projects have been delivered successfully and appear to be providing value for money. Initially at least, the South African renewable energy PPP programmes appear to be meeting all of the critical success factors identified.

However, the research undertaken also indicates that since Round 3 of the REIPPPP, and the commencement of the IPP Small Projects Programme, two of the critical success factors, Effective Governance and Commitment of Public and Private Parties, are not being met so well. This is due to the levels of commitment by the public sector partners diminishing in key areas such as the political uncertainty regarding the energy projects PPP programmes, signing of project PPAs by Eskom and the announcements of preferred bidders by the Department of Energy, which have been significantly delayed in both cases. The risks resulting from these critical success factors not being met can manifest in the form of project failures, particularly where the project sponsors do not have the financial backing to absorb the delays and continue with the projects. While additional projects may be available to take the failed project's allocated generation capacity, this will result in additional costs for both the public and private sector stakeholders.

Other results of the delays, as well as the high cost of bidding and low success rates, have been the exiting of the South African PPP renewable energy market by some developers, which are now seeing other markets, such as in various other African countries, being more attractive, as well as the deterrence of some potential bidders from bidding into the South African programmes. While there are sufficient

developers in the market to ensure that each bid window is over-subscribed then the aims of the programmes should be met, assuming the projects reach financial close and construction proceeds as planned. However, care should be taken to ensure that the programmes remain sufficiently attractive to project developers to ensure that the competitive structure of the programme works as intended and the trend of steadily reducing tariffs is not reversed.

In addition to meeting the critical success factors identified by the research for projects internationally, a measure of the level of success of the South African PPP energy projects is the level of economic development achieved, which is key to getting the necessary political support required for compliance with aspects of the Commitment of Public and Private Partners critical success factor. This is the ninth critical success factor identified, which is of particular importance when developing PPP projects in developing countries, such as South Africa.

A number of interventions were identified by the research, which would help improve the critical success factors which are failing and in so doing increase the level of economic development associated with undertaking PPP projects in South Africa. The interventions identified range from undertaking root cause analyses to identify the reasons for the lack of public sector commitment to reviewing barriers and opportunities to increasing project local content requirements and reducing project financing costs, to the undertaking of regular reviews in order to ensure that the PPP framework remains favourable to both public and private parties.

Analysis of the critical success factors has shown that improvements in some factors will be more effective at improving the level of economic development in South Africa than improvements in others. In other words, interventions made to certain factors will have more leverage than when made to other factors. In order to maximise the effectiveness of the interventions, it was identified that they should be aimed at the Commitment of Public and Private Parties critical success factor, the Favourable PPP Framework critical success factor and the Suitable Financial Conditions critical success factor, as these are the three factors identified as having the most leverage to improve the level of economic development in South Africa.

Opportunities exist to expand this research through further study and increasing the number of survey responses as well as broadening the pool of industry professionals that respond. The utility of this research could therefore be improved through getting a larger number of survey responses from a broader

spectrum of individuals involved in the energy industry. This study provides the preliminary work for further research such as undertaking an assessment of the level of maturity of the critical success factors identified for the South African renewable energy PPP programmes, would provide further details of the aspects of the critical success factors that are being successfully met and those that require further work.

The learnings from this research will be of benefit to the body of knowledge surrounding the development and execution of PPP energy projects in South Africa and other developing countries.

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APPENDIX 1 – SURVEY CONSENT FORM

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

Informed Consent Form

Name of researcher:

Justin Wimbush

Title of research project:

Project procurement in developing countries: a case study in the use of public private partnerships for development of energy infrastructure projects in South Africa

By filling out this questionnaire / answering the questions put to me:

- I agree to participate in this research project.
- I have read this consent form and the information it contains and had the opportunity to ask questions about them.
- I agree to my responses being used for education and research on condition my privacy is respected, subject to the following: - *(tick as appropriate)*

	Yes	No
My name may be used in the published research		
My personal details (e.g. age, occupation, position) may be included in the published research		
My responses can only be used in a way that I cannot be personally identifiable		
I would like a copy of the final research paper		

- I understand that I am under no obligation to take part in this project.
- I understand I have the right to withdraw from this project at any stage.
- I understand that this research might be published in a research journal or book. In the case of dissertation research, the document will be available to readers in a university library in printed form, and possibly in electronic form as well.

Name of Participant *(or Guardian if participant is under 18)* :

Date :

The researcher must supply you with an ***Information sheet*** which provides his / her contact details, outlines the nature of the research and how the information will be used and explains what your participation in the research involves (e.g. how long it will take, participants' roles and rights (including the right to skip questions or withdraw without penalty at any time), any anticipated risks/benefits which may arise as a result of participating, any costs or payment involved (even if none, these should be stated))				
Has this been provided?	**Yes**		**No**	
Have your received verbal confirmation/explanations where needed?	**Yes**		**No**	

South African Renewable Energy Procurement - Room for Improvement?

Thank you for your time taken to complete this questionnaire, the data from which will feed into my dissertation for my master's degree in Engineering Management from the University of Cape Town, in which I am investigating the use of Public Private Partnership Contracting for Renewable Energy Projects in South Africa. Your answers to the questions below will help to identify the key factors that influence the outcome of energy projects procured using public private procurement contracting forms.

Thank you again for your time in assisting me with this work.

By completing this form:

- It is assumed that you agree to participate in this research project.
- It is assumed that you agree to your responses being used for education and research on condition your privacy is respected, subject to the responses to questions 1 and 2.
- It is assumed that you understand that this research might be published in a research journal or book. In the case of dissertation research, the document will be available to readers in a university library in printed form, and possibly in electronic form as well.

1. Please confirm whether your name can be used in the published research
2. Please confirm if your responses can only be used in a way that you cannot be personally identifiable
3. Please confirm if you would like a copy of the final research paper
4. What are the key factors that you perceive are behind the success of the REIPPP programme?

5. Are there particular aspects of the REIPPP programme that could be improved?

6. What is the minimum size of project that is appropriate for auction systems, such as the REIPPP programme, in US$?

7. Which aspects, if any, that are used in other programmes internationally should be considered for future bid windows of the REIPPP?

8. It is noted that the delays in preferred bidder announcements and extensions of financial close dates cause economic uncertainty for developers and investors. What level of premium do you add to your tariff to compensate for delays in announcement of preferred bidders and financial close?

9. Given the high level of competitiveness of the wind and solar aspects of the REIPPP programme and hence the low success rates, could the high cost of bidding could be seen by some as a deterrence to potential bidders?

10. Is the level of oversight of the projects during the construction and operation stages, that required by the DoE, appropriate for PPP projects of this scale?

11. In contrast to the initial Bid Windows, the DoE adjusted the bid requirements for later bid windows such that developers did not need to have a confirmed lender and EPC confirmed prior to bid submission. Please could you comment on the consequences of this change, including whether this reduced bidding costs; enabled some developers to submit "low ball" bids that risk not being able to reach financial close; and whether this change enable developers to agree better terms with both lenders and EPCs since terms would only be agreed once the developers are confirmed as preferred bidders.

12. Given the rules and requirements of the REIPPP programme and / or the SPIPPs programme what are the non-government or Eskom related key factors that determine whether a project will be delivered successfully?

13. Are there areas where the South African renewable energy industry (finance, legal, consultants, contracts, other?) could improve in order to time and cost of project delivery further?

APPENDIX 3 – ETHICS APPROVAL FORM

Application for Approval of Ethics in Research (EiR) Projects
Faculty of Engineering and the Built Environment, University of Cape Town

APPLICATION FORM

Please Note:
Any person planning to undertake research in the Faculty of Engineering and the Built Environment (EBE) at the University of Cape Town is required to complete this form **before** collecting or analysing data. The objective of submitting this application *prior* to embarking on research is to ensure that the highest ethical standards in research, conducted under the auspices of the EBE Faculty, are met. Please ensure that you have read, and understood the **EBE Ethics in Research Handbook** (available from the UCT EBE, Research Ethics website) prior to completing this application form: http://www.ebe.uct.ac.za/usr/ebe/research/ethics.pdf

APPLICANT'S DETAILS		
Name of principal researcher, student or external applicant		Justin Wimbush
Department		Mechanical Engineering
Preferred email address of applicant		jmrwimbush@gmail.com
If a Student	Your Degree: e.g., MSc, PhD, etc.,	MPhil
	Name of Supervisor (if supervised):	Corrinne Shaw
If this is a researchcontract, indicate the source of funding/sponsorship		Click here to enter text.
Project Title		Project procurement in developing countries: a case study in the use of public private partnerships for development of energy infrastructure projects in South Africa

I hereby undertake to carry out my research in such a way that:

- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

SIGNED BY	Full name	Signature	Date
Principal Researcher/ Student/External applicant	Justin Wimbush		**04 Sep 2016**

APPLICATION APPROVED BY	Full name	Signature	Date
Supervisor (where applicable)	Dr Corrinne Shaw Click here to enter text.		21/09/16 Click here to enter a date.
HOD (or delegated nominee) Final authority for all applicants who have answered NO to all questions in Section1; and for all Undergraduateresearch (Including Honours).	Prof Tunde Click here to enter text. Bello-Ochende		13/09/2016 Click here to enter a date.
Chair : Faculty EIR Committee	Click here to enter text.		Click here to enter a date.

Page 1 of 2

APPENDIX 4 – SYSTEMATIC LITERATURE REVIEW

Author	Title	Date of Publication	Database
Galik et al.	Meeting Renewable Energy and Land Use Objectives Through Public-Private Biomass Supply Partnerships	2016	EBESCOhost
Vagliasindi	The Role of Policy Driven Incentives to Attract PPPs in Renewable-based Energy in Developing Countries	2012	
Ameyaw & Chan	Critical Success Factors for Public-Private Partnership in Water Supply Projects	2014	Emerald Insight
Babatunde et al.	Critical Success Factors in Public Private Partnership (PPP) on Infrastructure Delivery in Nigeria	2012	
Babatunde et al.	Methodology for Developing Capability Maturity Levels for PPP Stakeholder Organisations using Critical Success Factors	2015	
Babatunde et al.	Stakeholder Perceptions on Critical Success Factors For Public-Private Partnership Projects in Nigeria	2016	
Cheung et al.	Factors Contributing to Successful Public Private Partnerships: Comparing Hong Kong with Australia and the United Kingdom	2012	
Cheung et al.	A Comparative Study of Critical Success Factors for Public Private Partnerships (PPP) Between Mainland China and the Hong Kong Special Administrative Region	2012	
Ismail	Critical Success Factors of Public Private Partnership (PPP) Implementation in Malaysia	2013	
Jacobson and Cboi	Success Factors: Public Works and Public-Private Partnerships	2008	
Jamali	Success and Failure Mechanisms of Public Private Partnerships (PPPs) in Developing Countries: Insight from the Lebanese Context	2004	
Jefferies	Critical Success Factors of Public Private Partnerships: A Case Study of the Sydney Super Dome	2006	
Kwofie et al.	A Critical Success Model for PPP Public Housing Delivery in Ghana	2016	
Mouraviev & Kakabadse	Conceptualising Public-Private Partnerships: A Critical Appraisal of Approaches to Meanings and Forms	2016	
Wibowo & Alfen	Government-led Critical Success Factors in PPP Infrastructure Development	2014	

Author	Title	Date of Publication	Database
Wibowo & Alfen	Identifying Macro-Environmental Critical Success Factors and Key Areas for Improvement to Promote Public-Private Partnerships in Infrastructure: Indonesia's Perspective	2014	
Akintoye et al.	Perceptions of Positive and Negative Factors Influencing the Attractiveness of PPP/PFI Procurement for Construction Projects in the UK: Findings from a Questionnaire Survey	2005	Google Scholar
Almarri & Blackwell	Improving Risk Sharing and Investment Appraisal for PPP Procurement Success in Large Green Projects	2014	
Burger & Hawkesworth	How to Attain Value for Money: Comparing PPP and Traditional Infrastructure Public Procurement	2011	
Coviello et al.	Public-Private Partnerships in Renewable Energy in Latin America and the Caribbean	2012	
Eberhard & Kolker	South Africa's Renewable Energy IPP Procurement Program: Success Factors and Lessons	2014	
Grimsey & Lewis	Are Public Private Partnerships Value for Money? Evaluating Alternative Approaches and Comparing Academic and Practitioner Views	2005	
Fantozzi et al.	Public-Private Partnerships Value in Bioenergy Projects: Economic Feasibility and Analysis Based on Two Case Studies	2014	
Ghose	Prospects and Limitations of Public-Private-Partnerships as a Means for Technology Transfer: The Case of Nuclear Energy in India	n.d.	
Hampton et al.	Project Delays and Cost: Stakeholder Perceptions of Traditional v. PPP Procurement	2012	
Heldeweg et al.	Public-Private or Private-Private Energy Partnerships? Toward Good Energy Governance in Regional and Local Green Gas Projects	2015	
Hoppe et al.	Public-Private Partnerships versus Traditional Procurement: An Experimental Investigation	2013	
Raisbeck et al.	Comparative Performance of PPPs and Traditional Procurement in Australia	2010	

Author	Title	Date of Publication	Database
Sustainable Development Advisors for the International Institute for Environment and Development	Remote Access Expanding Energy Provision in Rural Argentina Through Public Private Partnerships and Renewable Energy	2011	
Zeegers & Ang	Client Involvement in Performance Based Briefing in Public-Private Partnerships Brocurement [sic] and the Use of ICT: Dutch Best Practice	2007	
Abbott	Engaging the Public and the Private in Global Sustainability Governance	2012	Wiley Online
Ball & King	The Private Finance Initiative in Local Government	2006	
Beh	Development and Distortion of Malaysian Public-Private Partnerships – Patronage, Privatised Profits and Pitfalls	2010	
Castano et al.	Unpacking the Path-Dependent Process of Institutional Change for PPPs	2014	
Cruz et al.	Local Mixed Companies: The Theory and Practice in an International Perspective	2014	
Forsyth	Enhancing Climate Technology Transfer Through Greater Public-Private Cooperation: Lessons from Thailand and the Philippines	2005	
Hoppe & Schmitz	Public Private Partnerships Versus Traditional Procurement: Innovation Incentives and Information Gathering	2013	
Iossa & Martimort	The Simple Microeconomics of Public-Private Partnerships	2013	
Jenkins	Towards a Biobased Economy: Examples from the UK	2008	
Mols	Harnessing Market Competition in PPP Procurement: The Importance of Periodically Taking a Strategic View	2010	
Murphy	The Case for Public-Private Partnerships in Infrastructure	2008	
Siemiatycki	Public-Private Partnerships in Canada: Reflections on Twenty Years of Practice	2015	
Siemiatycki	The Global Production of Transportation Public-Private Partnerships	2013	
Valero	Government Opportunism in Public Private Partnerships	2013	

APPENDIX 5 – SYSTEMATIC LITERATURE REVIEW AFFINITY DIAGRAM

TABLE 5: AFFINITY DIAGRAM OF THE INSIGHTS RESULTING FROM THE SYSTEMATIC LITERATURE REVIEW

Effective governance - corruption avoidance, honoring of the contractual agreements by all parties, independence of courts	**Favourable PPP framework, including legal framework**	**Commitment of private and public partners**	**Competitive and transparent procurement**	**Strength of consortium**	**Suitable financial market & macro-economic conditions**	**Appropriate risk allocation and risk sharing**	**Identification of projects suitable for PPPs**
Malaysia PPP CRITICAL SUCCESS FACTOR - good governance	Government programmes e.g. feed in tariffs essential for private sector participation in PPPs	Nigeria PPP CRITICAL SUCCESS FACTOR - serious commitment with adequate tech strength	Nigeria PPP CRITICAL SUCCESS FACTOR - competitive procurement processes	Ghana PPP CRITICAL SUCCESS FACTOR - strength of consortium	Nigeria PPP CRITICAL SUCCESS FACTOR - favourable economic environment	China PPP CRITICAL SUCCESS FACTOR - appropriate risk allocation and risk sharing	Ghana PPP CRITICAL SUCCESS FACTOR - asset quality and social support
Higher standards of governance in government e.g. control of corruption are important in getting private parties to enter the market	Nigeria PPP CRITICAL SUCCESS FACTOR - favourable framework	Ghana PPP CRITICAL SUCCESS FACTOR - political environment	Nigeria PPP CRITICAL SUCCESS FACTOR - thorough and realistic assessment of costs	HK, UK & AUS PPP CRITICAL SUCCESS FACTOR - strong and good private consortium	Nigeria PPP CRITICAL SUCCESS FACTOR - stable macroeconomic conditions	HK PPP CRITICAL SUCCESS FACTOR - appropriate risk allocation and risk sharing	Nigeria PPP CRITICAL SUCCESS FACTOR - bankable project with adequate stakeholder involvement
Effective governance is key to success	Nigeria PPP CRITICAL SUCCESS FACTOR - reliable concession agreement	Ghana PPP CRITICAL SUCCESS FACTOR - commitment of partners	Ghana PPP CRITICAL SUCCESS FACTOR - competitive and transparent procurement process	PPP CRITICAL SUCCESS FACTOR - partnership needs sufficient expertise to deliver high quality services	Nigeria PPP CRITICAL SUCCESS FACTOR - sound economic policy	Nigeria PPP CRITICAL SUCCESS FACTOR - appropriate risk allocation and risk sharing	Ghana PPP CRITICAL SUCCESS FACTOR - right project identification and project tech feasibility

Effective governance - corruption avoidance, honoring of the contractual agreements by all parties, independence of courts	Favourable PPP framework, including legal framework	Commitment of private and public partners	Competitive and transparent procurement	Strength of consortium	Suitable financial market & macro-economic conditions	Appropriate risk allocation and risk sharing	Identification of projects suitable for PPPs
Extent of lack of independence of the courts can present a risk to PPP investments	China PPP CRITICAL SUCCESS FACTOR - favourable legal framework	Nigeria PPP CRITICAL SUCCESS FACTOR - political support	Indonesia PPP CRITICAL SUCCESS FACTOR - financial transparency	In Hong Kong another highly ranked CRITICAL SUCCESS FACTOR was "strong and good private consortium" but this was not ranked highly in China as there are many other risks that could disrupt a PPP project.	Nigeria PPP CRITICAL SUCCESS FACTOR - availability of suitable financial market	HK, UK & AUS PPP CRITICAL SUCCESS FACTOR - appropriate risk allocation and risk sharing	PPPs must start with a comprehensive feasibility study and economic evaluation.
Indonesia PPP CRITICAL SUCCESS FACTOR - corruption eradication	HK PPP CRITICAL SUCCESS FACTOR - favourable legal framework	Nigeria PPP CRITICAL SUCCESS FACTOR - strong political will with committed private sector partners	Value for money calculation requires a government comparitor calculation	HK PPP CRITICAL SUCCESS FACTOR - strong and good private consortium	Malaysia PPP CRITICAL SUCCESS FACTOR - sound economic policy	Indonesia PPP CRITICAL SUCCESS FACTOR - sensible and manageable risk sharing arrangements	In Holland all projects with value of over 25M Euros have to have a study to determine whether a PPP approach will provide better value.

Effective governance - corruption avoidance, honoring of the contractual agreements by all parties, independence of courts	**Favourable PPP framework, including legal framework**	**Commitment of private and public partners**	**Competitive and transparent procurement**	**Strength of consortium**	**Suitable financial market & macro-economic conditions**	**Appropriate risk allocation and risk sharing**	**Identification of projects suitable for PPPs**
This article has discussed issues related to the alignment of Malaysia's PPP/PFI developments with the public interest. It has highlighted the importance of credibility in the government's efforts as well as promises of change in the system that includes the need for greater accountability and transparency.	Favourable legal framework and stable macro-economic conditions are well developed in UK and Australia so given less importance by respondents	HK, UK & AUS PPP CRITICAL SUCCESS FACTOR - commitment & responsibility of public and private sectors	Areas for improvement in South American implementation programmes are access to credit and transparency and clarity of the processes.	Possible failure mechanisms: 1. Hastily prepared tender docs and contracts 2. Negotiations taking place between unequally qualified and experienced professionals	Malaysia PPP CRITICAL SUCCESS FACTOR - available finance market	PPPs where public and private sectors involved in all phases of project are more attractive to private sector since the risks are shared by government.	Defense services. Roads and prison PPP project demonstrate reasonable efficiency gains whereas schools and hospitals show minimal gains.
	HK PPP CRITICAL SUCCESS FACTOR - favourable legal framework	China PPP CRITICAL SUCCESS FACTOR - Commitment and responsibility of public and private sectors	CRITICAL SUCCESS FACTOR - minimum no. bidders required to avoid collusion	Negative aspects, relating to factors such as the inexperience of the participants, the over-commercialisation of projects, and high participation cost and time, make PPP/PFI procurement less attractive.	HK PPP CRITICAL SUCCESS FACTOR - stable macroeconomic conditions	The need for contract renegotiations when user demand is not met is avoided in Canada where guaranteed availability payments were used instead of user revenues	PPPs are the model of choice in Canada for delivering large scale infrastructure works.

Effective governance - corruption avoidance, honoring of the contractual agreements by all parties, independence of courts	Favourable PPP framework, including legal framework	Commitment of private and public partners	Competitive and transparent procurement	Strength of consortium	Suitable financial market & macro-economic conditions	Appropriate risk allocation and risk sharing	Identification of projects suitable for PPPs
	Malaysia PPP CRITICAL SUCCESS FACTOR - favourable legal framework	HK PPP CRITICAL SUCCESS FACTOR - Commitment and responsibility of public and private sectors	private sponsors and financiers are more than willing to invest in renewable energy if the procurement process is well designed and transparent with a clear procurement framework	CRITICAL SUCCESS FACTORs used to develop a 5 level framework for assessment of PPP stakeholder organisations	China PPP CRITICAL SUCCESS FACTOR - Stable macro-economic conditions.	PPPs have been proposed as mechanisms for cash strapped governments to pay for infrastructure without taking on additional debt (Bovaird, 2004), harness private sector expertise in facility design and operations (Russell et al., 2006), and transfer the risk of unexpected cost overruns and revenue shortfalls from government to the private sector (Flyvbjerg et al., 2003).	PPPs suitable for sectors where added construction value can lower overall costs e.g. water and transport. It is less suitable for sectors such as schools, nursing homes and IT.

Effective governance - corruption avoidance, honoring of the contractual agreements by all parties, independence of courts	Favourable PPP framework, including legal framework	Commitment of private and public partners	Competitive and transparent procurement	Strength of consortium	Suitable financial market & macro-economic conditions	Appropriate risk allocation and risk sharing	Identification of projects suitable for PPPs
	Sydney Superdome CRITICAL SUCCESS FACTOR - streamlined approvals and legislation	Malaysia PPP CRITICAL SUCCESS FACTOR - commitment of public and private sectors	In markets with few major players / bidders extra care must be taken to ensure collusion is avoided and competitive tendering is achieved.		Lebanon PPP CRITICAL SUCCESS FACTOR - financial accountability and transparency	Private sponsors and financiers are more than willing to invest in renewable energy if the procurement process is well designed and transparent with a clear procurement framework, transactions have reasonable levels of profitability, and key risks are mitigated by government.	Bundling project phases and long-term contracting allow PPPs to provide efficient long-term incentives and to optimize the trade-off between investment and maintenance along the life of the project.
	Lebanon PPP CRITICAL SUCCESS FACTOR - sound legal and regulatory framework	Indonesia PPP CRITICAL SUCCESS FACTOR - strong political support	Multiple bid winners is an important incentive for the private sector to participate in the REIPPP.		Sydney Superdome CRITICAL SUCCESS FACTOR - streamlined finance process	Nigeria PPP CRITICAL SUCCESS FACTOR - government support with enabling legislation	PPP advantage increases (in absolute terms) with the size and complexity of projects.

Effective governance - corruption avoidance, honoring of the contractual agreements by all parties, independence of courts	Favourable PPP framework, including legal framework	Commitment of private and public partners	Competitive and transparent procurement	Strength of consortium	Suitable financial market & macro-economic conditions	Appropriate risk allocation and risk sharing	Identification of projects suitable for PPPs
	Ghana PPP CRITICAL SUCCESS FACTOR - favourable and efficient legal framework	To maintain the cost efficiencies of PPPs, governments must honor the long time frames of the concessions.	Requirement in bid windows 1-3 for bids to be fully underwritten with debt and equity almost eliminated the risk that competitive bidding has in under-bidding to win contracts.		HK PPP CRITICAL SUCCESS FACTOR - Stable macro-economic conditions.	Nigeria PPP CRITICAL SUCCESS FACTOR - government guarantees	Many countries use Public Sector Comparitor calculations to test that PPPs will provide value for money before going ahead with the PPP. As PPP financing costs are higher than public debt, the project NPV must be lower, brought about by more efficient delivery of the project.
	Indonesia PPP CRITICAL SUCCESS FACTOR - an irrevocable contract	One of success factors in Canadian PPPs is the public sector maintaining a strong role in owning the asset, designing project	To incentivise bidders through providing a reasonable chance of success, usually a max of 3 parties invited to bid.		China PPP CRITICAL SUCCESS FACTOR - available financial market	Ghana PPP CRITICAL SUCCESS FACTOR - government guarantees	This paper compares the value for money tests used in many countries, including SA and notes also that "Provided there is a competition, VFM should be

Effective governance - corruption avoidance, honoring of the contractual agreements by all parties, independence of courts	Favourable PPP framework, including legal framework	Commitment of private and public partners	Competitive and transparent procurement	Strength of consortium	Suitable financial market & macro-economic conditions	Appropriate risk allocation and risk sharing	Identification of projects suitable for PPPs
		specifications, and ensuring public control related to key features of their long-term operations					ensured by competitive tension between bidders." It is noted that public sector comparitor calculations which are used in many countries, are highly dependent on the assumptions used, such as the discount rate.
	Indonesia PPP CRITICAL SUCCESS FACTOR - a sound legal basis	Indonesia PPP CRITICAL SUCCESS FACTOR - policy continuity	High bid costs bias against small and medium scale developers		Ghana PPP CRITICAL SUCCESS FACTOR -Stable macroeconomic conditions and sound economic policy	Appropriate risk allocation in PPPs requires that governments have the expertise to identify all of the relevant risks before entering into the partnership contract.	In sectors where PPPs have been used for some time, VFM assessments are often not required.

Effective governance - corruption avoidance, honoring of the contractual agreements by all parties, independence of courts	Favourable PPP framework, including legal framework	Commitment of private and public partners	Competitive and transparent procurement	Strength of consortium	Suitable financial market & macro-economic conditions	Appropriate risk allocation and risk sharing	Identification of projects suitable for PPPs
						Governments must also have the contract management skills to ensure that those risks are in fact borne by the private sector	
	Specific legal frameworks are essential to attract private investment	**National PPP unit**			Ghana PPP CRITICAL SUCCESS FACTOR - Available strong and resilient financial market.	Advantage of PPPs is the allocation of plant reliability and tech risk to private sector	To ensure competitive bidding and reduce reliance on VFM comparitor calculations governments should take a systematic and strategic view of the markets they are operating in and not just focus on individual contracts.

Effective governance - corruption avoidance, honoring of the contractual agreements by all parties, independence of courts	Favourable PPP framework, including legal framework	Commitment of private and public partners	Competitive and transparent procurement	Strength of consortium	Suitable financial market & macro-economic conditions	Appropriate risk allocation and risk sharing	Identification of projects suitable for PPPs
	problems in policy formulation and implementation, as well as with corruption, supervision and a lack of access to investment capital, have affected PPP growth	Lebanon PPP CRITICAL SUCCESS FACTOR - strong administration to guide legislation provision			Ranked highly in China due to financial restrictions was "available financial market".	China and Hong Kong CRITICAL SUCCESS FACTOR: - appropriate risk allocation and risk sharing	PPP CRITICAL SUCCESS FACTOR - requires clear public need
	few countries have the highly sophisticated legal frameworks and institutional capacity necessary to carry out PPPs — important preconditions for attracting private sector investment (Koppenjan and Enserink, 2009)	Ghana PPP CRITICAL SUCCESS FACTOR - National PPP unit					A criticism of PPPs is that privately delivered infrastructure is predominantly focused on providing 'premium network' connections in high value locations, while less profitable geographic regions and project types are often overlooked

Effective governance - corruption avoidance, honoring of the contractual agreements by all parties, independence of courts	Favourable PPP framework, including legal framework	Commitment of private and public partners	Competitive and transparent procurement	Strength of consortium	Suitable financial market & macro-economic conditions	Appropriate risk allocation and risk sharing	Identification of projects suitable for PPPs
	Top ranked CRITICAL SUCCESS FACTOR in both China and Hong Kong was "Favourable legal framework".	REIPPPP also highlights the need for effective program champions with the credibility to interact convincingly with senior government officials, effectively explain the program to stakeholders, and communicate and negotiate with the private sector					Value for money test criticised as is NPV based and includes subjective factors e.g. factors included for risk transfer.
	PPP CRITICAL SUCCESS FACTOR - there must be clear lines of accountability and redress	PPP CRITICAL SUCCESS FACTOR - public sector must have sufficient expertise					

Effective governance - corruption avoidance, honoring of the contractual agreements by all parties, independence of courts	Favourable PPP framework, including legal framework	Commitment of private and public partners	Competitive and transparent procurement	Strength of consortium	Suitable financial market & macro-economic conditions	Appropriate risk allocation and risk sharing	Identification of projects suitable for PPPs
	Recommends inclusion of a renegotiation clause to allow the contract to be revised to account for changes in long term trends so as to maximise public benefits - this requires much care as renegotiation clauses can lead to failure of contracts.	Possible failure mechanisms: 1. Negotiations taking place between unequally qualified and experienced professionals					
	Suggests the inclusion of "Put and Call" options to increase flexibility of contracting while avoiding opportunism in negotiations by either side.	Availability of sophisticated advisory services was critical to the design and management of the REIPPP programme.					

Effective governance - corruption avoidance, honoring of the contractual agreements by all parties, independence of courts	Favourable PPP framework, including legal framework	Commitment of private and public partners	Competitive and transparent procurement	Strength of consortium	Suitable financial market & macro-economic conditions	Appropriate risk allocation and risk sharing	Identification of projects suitable for PPPs
	Possible failure mechanisms: 1. Hastily prepared tender docs and contracts 2. Negotiations taking place between unequally qualified and experienced professionals						
	PPP project specifications must be carefully considered and due to the length of the contract they must consider how changes in the future will be taken into account. A five step systematic process for developing the project specifications was						

Effective governance - corruption avoidance, honoring of the contractual agreements by all parties, independence of courts	Favourable PPP framework, including legal framework	Commitment of private and public partners	Competitive and transparent procurement	Strength of consortium	Suitable financial market & macro-economic conditions	Appropriate risk allocation and risk sharing	Identification of projects suitable for PPPs
	developed for the project.						
	As the risk of regulatory opportunism increases, the case for PPPs becomes weaker						

APPENDIX 6 – SYSTEMATIC LITERATURE REVIEW THEMATIC ANALYSIS RESULTS

TABLE 6: THEMATIC ANALYSIS PROCESS – EFFECTIVE GOVERNANCE CRITICAL SUCCESS FACTOR

Relevant Factors		**Initial Themes**		**Final Category**
Good governance is a PPP critical success factor in Malaysia				
Higher standards of governance in government e.g. control of corruption are important in getting private parties to enter the market				
Effective governance is key to success				
Extent of lack of independence of the courts can present a risk to PPP investments		Corruption avoidance, honouring of the contractual agreements by all parties, independence of courts	→	Effective Governance
Corruption eradication is a PPP critical success factor in Indonesia.	→			
Matters related to the alignment of Malaysia's PPP/PFI developments with the public interest. Importance of credibility in the government's efforts as well as promises of change in the system that includes the need for greater accountability and transparency highlighted.				

TABLE 7: THEMATIC ANALYSIS PROCESS - STRENGTH OF CONSORTIUM CRITICAL SUCCESS FACTOR

Relevant Factors		**Initial Themes**		**Final Category**
Strength of consortium is a PPP critical success factor in Ghana				
Strong and good private consortium is a critical success factor in Hong Kong, the UK & Australia				
Project partnership needs sufficient expertise to deliver high quality services				
Strong and good private consortium is not ranked highly as a critical success factor in China as there are many other risks that could disrupt a PPP project.				
Strong and good private consortium is a PPP critical success factor in Hong Kong	→	Experienced private and public project partners, skilled project parties, strength of consortium	→	Strength of Consortium
Possible project failure mechanisms: 1. Hastily prepared tender docs and contracts 2. Negotiations taking place between unequally qualified and experienced professionals				
Negative aspects, relating to factors such as the inexperience of the participants, the over-commercialisation of projects, and high participation cost and time, make PPP/PFI procurement less attractive.				
Critical success factors used to develop a 5 level framework for assessment of PPP stakeholder organisations				

TABLE 8: THEMATIC ANALYSIS PROCESS – FAVOURABLE PPP FRAMEWORK CRITICAL SUCCESS FACTOR

Relevant Factors		**Initial Themes**		**Final Category**
Govt programmes eg feedin tariffs essential for private sector participation in PPPs	→	Favourable legal and regulatory frameworks, accountability, robust contracts	→	Favourable PPP Framework
Nigeria PPP critical success factor - favourable framework				
Nigeria PPP critical success factor - reliable concession agreement				
China PPP critical success factor - favourable legal framework				
HK PPP critical success factor - favourable legal framework				
Favourable legal framework and stable macro-economic conditions are well developed in UK and Aus so given less importance by respondents				
HK PPP critical success factor - favourable legal framework				
Malaysia PPP critical success factor - favourable legal framework				
Sydney Superdome critical success factor - streamlined approvals and legislation				
Lebanon PPP critical success factor - sound legal and regulatory framework				
Ghana PPP critical success factor - favourable and efficient legal framework				
Indonesia PPP critical success factor - an irrevocable contract				
Indonesia PPP critical success factor - a sound legal basis				
Specific legal frameworks are essential to attract private investment				

Relevant Factors		Initial Themes		Final Category
problems in policy formulation and implementation, as well as with corruption, supervision and a lack of access to investment capital, have affected PPP growth				
few countries have the highly sophisticated legal frameworks and institutional capacity necessary to carry out PPPs — important preconditions for attracting private sector investment (Koppenjan and Enserink, 2009)				
Top ranked critical success factor in both China and Hong Kong was "Favourable legal framework".				
PPP critical success factor - there must be clear lines of accountability and redress				
Recommends inclusion of a renegotiation clause to allow the contract to be revised to account for changes in long term trends so as to maximise public benefits - this requires much care as renegotiation clauses can lead to failure of contracts.				
Suggests the inclusion of "Put and Call" options to increase flexibility of contracting while avoiding opportunism in negotiations by either side.				
Possible failure mechanisms: 1. Hastily prepared tender docs and contracts 2. Negotiations taking place between unequally qualified and experienced professionals				

Relevant Factors		Initial Themes		Final Category
PPP project specifications must be carefully considered and due to the length of the contract they must consider how changes in the future will be taken into account. A five step systematic process for developing the project specifications was developed for the project.				
As the risk of regulatory opportunism increases, the case for PPPs becomes weaker				

TABLE 9: COMMITMENT OF PRIVATE AND PUBLIC PARTNERS CRITICAL SUCCESS FACTOR

Relevant Factors		**Initial Themes**		**Final Category**
Nigeria PPP critical success factor - serious commitment with adequate tech strength	→	Commitment and responsibility of private and public sectors, strong political support, need for public and private sector expertise	→	Commitment of private and public sectors
Ghana PPP critical success factor - political environment				
Ghana PPP critical success factor - commitment of partners				
Nigeria PPP critical success factor - political support				
Nigeria PPP critical success factor - strong political will with commited private sector partners				
HK, UK & AUS PPP critical success factor - commitment & responsibility of public and private sectors				
China PPP critical success factor - Commitment and responsibility of public and private sectors				
HK PPP critical success factor - Commitment and responsibility of public and private sectors				
Malaysia PPP critical success factor - commitment of public and private sectors				
Indonesia PPP critical success factor - strong political support				
To maintain the cost efficiencies of PPPs, governments must honor the long time frames of the concessions.				
One of success factors in Canadian PPPs is the public sector maintaining a strong role in owning the asset, designing project specifications, and ensuring public control related to key features of their long-term operations				

Relevant Factors		Initial Themes		Final Category
Indonesia PPP critical success factor - policy continuity				
Lebanon PPP critical success factor - strong administration to guide legislation provision				
Ghana PPP critical success factor - National PPP unit				
REIPPPP also highlights the need for effective program champions with the credibility to interact convincingly with senior government officials, effectively explain the program to stakeholders, and communicate and negotiate with the private sector				
PPP critical success factor - public sector must have sufficient expertise				
Possible failure mechanisms: 1. Negotiations taking place between unequally qualified and experienced professionals				
Availability of sophisticated advisory services was critical to the design and management of the REIPPP programme.				

TABLE 10: COMPETENT AND TRANSPARENT PROCUREMENT CRITICAL SUCCESS FACTOR

Relevant Factors		**Initial Themes**		**Final Category**
Nigeria PPP critical success factor - competitive procurement processes				
Nigeria PPP critical success factor - thorough and realistic assessment of costs				
Ghana PPP critical success factor - competitive and transparent procurement process				
Indonesia PPP critical success factor - financial transparency				
Value for money calculation requires a government comparitor calculation				
Areas for improvement in South American implementation programmes are access to credit and transparency and clarity of the processes.	→	Competitive procurement, financial transparency, value for money	→	Competent and transparent procurement
Critical success factor - minimum no. bidders required to avoid collusion				
private sponsors and financiers are more than willing to invest in renewable energy if the procurement process is well designed and transparent with a clear procurement framework				
In markets with few major players / bidders extra care must be taken to ensure collusion is avoided and competitive tendering is achieved.				

Relevant Factors		Initial Themes		Final Category
Multiple bid winners is an important incentive for the private sector to participate in the REIPPP.				
Requirement in bid windows 1-3 for bids to be fully underwritten with debt and equity almost eliminated the risk that competitive bidding has in under-bidding to win contracts.				
To incentivise bidders through providing a reasonable chance of success, usually a max of 3 parties invited to bid.				
High bid costs bias against small and medium scale developers				

TABLE 11: SUITABLE FINANCIAL CONDITIONS CRITICAL SUCCESS FACTOR

Relevant Factors		**Initial Themes**		**Final Category**
Nigeria PPP critical success factor - favourable economic environment				
Nigeria PPP critical success factor - stable macroeconomic conditions				
Nigeria PPP critical success factor - sound economic policy				
Nigeria PPP critical success factor - availability of suitable financial market				
Malaysia PPP critical success factor - sound economic policy				
Malaysia PPP critical success factor - available finance market				
HK PPP critical success factor - stable macroeconomic conditions				
China PPP critical success factor - Stable macro-economic conditions.	→	Availability of finance, stable macroeconomic conditions	→	Suitable financial conditions
Lebanon PPP critical success factor - financial accountability and transparency				
Sydney Superdome critical success factor - streamlined finance process				
HK PPP critical success factor - Stable macro-economic conditions.				
China PPP critical success factor - available financial market				
Ghana PPP critical success factor - Stable macroeconomic conditions and sound economic policy				
Ghana PPP critical success factor - Available strong and resilient financial market.				
Ranked highly in China due to financial restrictions was "available financial market".				

TABLE 12: APPROPRIATE RISK ALLOCATION AND RISK SHARING CRITICAL SUCCESS FACTOR

Relevant Factors		**Initial Themes**		**Final Category**
China PPP critical success factor - appropriate risk allocation and risk sharing				
HK PPP critical success factor - appropriate risk allocation and risk sharing				
Nigeria PPP critical success factor - appropriate risk allocation and risk sharing				
HK, UK & AUS PPP critical success factor - appropriate risk allocation and risk sharing				
Indonesia PPP critical success factor - sensible and manageable risk sharing arrangements				
PPPs where public and private sectors involved in all phases of project are more attractive to private sector since the risks are shared by government.	→	Key risks mitigated by governments, appropriate risk allocation and risk sharing	→	Appropriate risk allocation and risk sharing
The need for contract renegotiations when user demand is not met is avoided in Canada where guaranteed availability payments were used instead of user revenues				
PPPs have been proposed as mechanisms for cash strapped governments to pay for infrastructure without taking on additional debt (Bovaird, 2004), harness private sector expertise in facility design and operations (Russell et al., 2006), and transfer the risk of unexpected cost overruns and revenue shortfalls from government to the private sector (Flyvbjerg et al., 2003)				

Relevant Factors		Initial Themes		Final Category
private sponsors and financiers are more than willing to invest in renewable energy if the procurement process is well designed and transparent with a clear procurement framework, transactions have reasonable levels of profitability, and key risks are mitigated by government.				
Nigeria PPP critical success factor - govt support with enabling legislation				
Nigeria PPP critical success factor - govt guarantees				
Ghana PPP critical success factor - govt guarantees				
Appropriate risk allocation in PPPs requires that governments have the expertise to identify all of the relevant risks before entering into the partnership contract. Governments must also have the contract management skills to ensure that those risks are in fact borne by the private sector				
Advantage of PPPs is the allocation of plant reliability and tech risk to private sector				
China and Hong Kong critical success factor: - appropriate risk allocation and risk sharing				

TABLE 13: IDENTIFICATION OF SUITABLE PROJECTS CRITICAL SUCCESS FACTOR

Relevant Factors		**Initial Themes**		**Final Category**
Ghana PPP critical success factor - asset quality and social support				
Nigeria PPP critical success factor - bankable project with adequate stakeholder involvement				
Ghana PPP critical success factor - right project identification and project tech feasibility				
PPPs must start with a comprehensive feasibility study and economic evaluation.				
In Holland all projects with value of over 25M Euros have to have a study to determine whether a PPP approach will provide better value.				
Defence services, roads and prison PPP project demonstrate reasonable efficiency gains whereas schools and hospitals show minimal gains.	→	PPPs more suitable for certain types of projects, need for comprehensive feasibility studies, value for money	→	Identification of suitable projects
PPPs are the model of choice in Canada for delivering large scale infrastructure works.				
PPPs suitable for sectors where added construction value can lower over all costs eg water and transport. It is less suitable for sectors such as schools, nursing homes and IT.				
Bundling project phases and long-term contracting allow PPPs to provide efficient long-term incentives and to optimize the trade-off between investment and maintenance along the life of the project.				
PPP advantage increases (in absolute terms) with the size and complexity of projects.				

Relevant Factors		Initial Themes		Final Category
Many countries use Public Sector Comparitor calculations to test that PPPs will provide value for money before going ahead with the PPP. As PPP financing costs are higher than public debt, the project NPV must be lower, brought about by more efficient delivery of the project.				
This paper compares the value for money tests used in many countries, including SA and notes also that "Provided there is a competition, VFM should be ensured by competitive tension between bidders." It is noted that public sector comparitor calculations which are used in many countries, are highly dependent on the assumptions used, such as the discount rate.				
In sectors where PPPs have been used for some time, VFM assessments are often not required.				
To ensure competitive bidding and reduce reliance on VFM comparitor calculations govts should take a systematic and strategic view of the markets they are operating in and not just focus on individual contracts.				
PPP critical success factor - requires clear public need				
A criticism of PPPs is that privately delivered infrastructure is predominantly focused on providing 'premium network' connections in high value locations, while less profitable geographic regions and project types are often overlooked				
Value for money test criticised as is NPV based and includes subjective factors eg factors included for risk transfer.				

APPENDIX 7 – SURVEY RESPONSES

Q1	**What are the key factors that you perceive are behind the success of the REIPPP programme?**
Q1R1	Consistent market signalling and treatment of the bidders has made the process predictable
Q1R2	Right tariffs, bankable PPA (government guarantee), large enough size (MW allocations) and predictability (number of bidding rounds)
Q1R3	Its open and transparent process
Q1R4	1. The appropriate policy environment for private sector investment in public infrastructure (PPP) was in place and well tested; 2. The project director (Karen) has significant experience in facilitation PPP transactions, understanding of the bankability requirements, and access to decision makers in government; moreover her character and determination gave the investor community confidence that the programme would not fail 3. World-class transaction advisors were appointed, who brought along international and local best practices and experience to the development of the request for proposal and project agreements; 4. The development of bankable project agreements and government support undertaking, which were tested in the market, gave investors and lender confidence; 5. The shortfall in electricity supply and ineptitude of the national utility in constructing new capacity – resulted in strong support from the industrial and business sector; 6. The initial price caps provided sufficient incentive for investors
Q1R5	Rigid procurement that is transparent and based on integrity and legislative requirements. The IPP office was a decimated champion of the Programme able led by Karen Breytenbach. The non-negotiability of the Project documents assisted the process so to the willingness of the South African based Lenders to lend to the projects based on the payment commitment of the State under the IA - Eskom liquidity restraints were a concern and the payment undertaking was necessary and still needs to be there . The political will to implement REIPPP was crucial but the current impasse with the Eskom stance is regrettable and re-kindled political will and leadership needs to be demonstrated as a matter of urgency.
Q1R6	The DoE's commitment to consistent announcement of projects, government and industry support--which makes projects bankable with robust PPAs, experienced developers take part--mostly, as well as a robust bidding programme which has been thoroughly thought through.

Q1R7	The efforts of the IPP office in the early days on the REIPPP
Q1R8	Focused execution by the IPP Office, definitive policy, timing (load shedding) etc., standardised procurement process, utilisation of international and local advisors in the procurement process.
Q1R9	Open, transparent process with understandable requirements and outcomes.
Q1R10	Strong government backing from all sources including policy, treasury, willingness to adapt to overcome obstacles.
Q1R11	Rolling rounds and the initial tariff caps
Q1R12	Strong SA government commitment to the REIPPP programme from the DoE and IPP Office, the use of world class consultants with good local and international experience, engaging with Sponsors and Lenders in the design of the programme, and strong programme management to ensure that Financial Close is reached on projects within a reasonable time period of the stated dates for Financial Close, as well as continuity of the programme via the respective bidding rounds.
Q2	**Are there particular aspects of the REIPPP programme that could be improved?**
Q2R1	As difficult as it is, the framework needs to be absolutely clear on timelines and those timelines should remain sacrosanct. If not, it gives the impression that the politicians are attempting to influence the decision making process and that is the wrong signal to be sending out after such success.
Q2R2	Predictability and timing
Q2R3	The time and the costs of getting projects to financial close can be reduced. The current political uncertainty should be addressed head on to provide all participants with confidence in the programme.
Q2R4	No comment.
Q2R5	The market is familiar with the Programme. Deals are unfortunate and damage the integrity of the overall Programme. Political commitment must be clearly demonstrated with concrete actions as a matter of urgency - capital thrives in certainty and is a coward in an uncertain environment. RE is driving the new energy economy and consequences flowing from been interrupt able can be and will be addressed by storage, use of Interconnectors and demand side management programmes. Regular and consistent communication is important and inter acting state entries need to be aligned and Disruptors brought into line - grand standing in public media must be curtailed.

Q2R6	The interface with Eskom (e.g. better coordination between Cost Estimate Letter and Budget Quote, more defined process in getting Budget Quotes signed, etc.). Also, allowance for time-of-generation tariffs (as is included with CSP projects) would open the door for grid-level storage and make renewables a valuable player in easing stress during peak load times. Aspects that would reduce bidding costs could also be discussed--which would open the door to smaller and local developers to take part as the SPIPPPs have not really proved to be very successful at a reasonable cost (costs are still quite high).
Q2R7	Policy support and interface with Eskom
Q2R8	Communication of bid windows and timing. Bidding cost can be reduced to increase the market participation.
Q2R9	Fixed and dedicated timelines that does not move (i.e. announcement of Preferred bidder, period for reaching FC etc.)
Q2R10	Yes, a more defined and strict program where windows are announced, tendered and adjudicated in a consistent manner. Technology allocations should be adapted/increased/decreased each window to evolve with the market along with the IRP. This would ensure the country's procurement program offers the consumers/tax payers the optimum power generation infrastructure to suit the current demand. Time of generation tariffs should be introduced to encourage storage and other technologies a more cost reflective payment profile thereby advancing the technology learning which reduces costs and intermittency.
Q2R11	More consistent timing and adhering to set times.
Q2R12	The management of timelines to financial close and the involvement and the continued commitment of key government departments and state owned companies (such as Eskom) could be improved.
Q3	**What is the minimum size of project that is appropriate for auction systems, such as the REIPPP programme, in US$?**
Q3R1	$25 million
Q3R2	$3 million
Q3R3	R200m ($15m)
Q3R4	The minimum size of project is really determined by transactional costs – lower that USD 65 million would not be feasible.

Q3R5	The distinction between the REIPPP and small REIPPP appears to be technically correct. The financing of the small Programme needs to be co-ordinated through the DFIs to ensue simplicity and competitive funding terms.
Q3R6	My opinion is that it should be 10MW(ac) minimum to provide sufficient scale. This will allow financial room for all advisors to be involved in sufficient detail to ensure a good, bankable and technically excellent project.
Q3R7	It depends on the technology and the procurement requirements or goals of procurement (e.g. cheapest price or industrial enhancement).
Q3R8	$5 million
Q3R9	Minimum size is irrelevant, this should be left up to the bidder, the cost input would naturally push the minimum size up.
Q3R10	Ideally here should be no minimum size as the market should dictate the optimum size and hence lowest cost to consumer however this does have set backs. Smaller projects offer better competition through more industry players, greater local job creation per MW, smaller upfront costs for new entrepreneurs leading to increased SME's, smaller upstream grid requirements, improved distribution of projects and grid impacts etc.
Q3R11	There is no minimum size requirement as a smaller project can have a lower grid connection and capex price thereby making it more competitive.
Q3R12	I think the minimum size would be US$100m.
Q4	**Which aspects, if any, that are used in other programmes internationally should be considered for future bid windows of the REIPPP?**
Q4R1	Alternative sources of revenue such as carbon credits to be generated and traded as part of the local commitment to climate change.
Q4R2	Don't know other programmes.
Q4R3	None that I know of.
Q4R4	I think aspects of the government support (implementation agreement) can be reduce or eliminate. In many first-world jurisdiction, no government support is provide and investors are willing to take the risk.
Q4R5	The REIPPP is customized to suit the SA environment while EDO initiatives are to be applauded, localization must not impede advantages in the global market to further reduce tariffs.

Q4R6	Time-of-generation tariffs, which would open the door for grid level storage. I also think that allowance for multi-contracting (as opposed to only one main EPC) would allow for better pricing.
Q4R7	Pre-qualification of developers (based on development and financing experience) rather than specific projects.
Q4R8	No comment.
Q4R9	Fixed timelines and more information sharing upfront.
Q4R10	Time of Generation tariff, regional scaling to levelise the radiation / grid congestion, separate grid operator from the generation assets to remove the conflict of interest the country is currently experiencing.
Q4R11	None.
Q4R12	Potentially, the DoE should consider adjusting all of the key financial variables at financial close of the projects (namely, interest rate swaps and the real reference rate on CPI linked debt), not just adjusting the foreign exchange rates at Financial Close.
Q5	**It is noted that the delays in preferred bidder announcements and extensions of financial close dates cause economic uncertainty for developers and investors. What level of premium do you add to your tariff to compensate for delays in announcement of preferred bidders and financial close?**
Q4R1	In our case, the premium would be an added percentage to the IRR of 5%.
Q4R2	N/A as hydro projects bid at max tariff, but I should say 10%.
Q4R3	N/A participate as long term lenders so interested in the long term interest rate on the senior debt facilities. Delays do make it very difficult to allocate capital to the projects however.
Q4R4	Agreed that confidence is affected by uncertainty and delays. However, one must understand the underlying reasons for the delays. With regards to the announcement of preferred bidders – more time was required than expected to obtain ministerial approval of the contingent liability obligations of government, as well as co-operations from other organ of state – notable the national utility. With regards to financial close – the government does not control financial close. In the first rounds, government wanted to co-ordinate simultaneous commercial close on all the projects in the round. However, most preferred bidders and their lenders were not ready. Therefore, more time was allow for preferred bidders and their lenders to finalise their projects. To suggest there should be a pricing premium is nonsensical, as bidder are fairly compensation for market movements between bid submission and commercial close.

Q4R5	Delays cause uncertainty which increases the risk as well as cost of the project. The ability of EPC contractors to hold prices firm for protracted periods is difficult. There must be a form of a stabilization mechanism available to maintain the economics of the bid project - financiers are best placed to advise. The difficulties between cost estimate letters and budget quotes are regrettable and seriously undermine the economics of the project. Eskom stance is regrettable both from a costing and timing perspective plus unwarranted requests for information from bidders are wrong - the DOE and IPP office need to engage Eskom urgently on the Eskom approach to these issues - the determinations under a Section 34 of the ERA have been made and must be implemented - No part should have the ability to rail road the process.
Q4R6	As technical advisors, we do not add premiums to our costs--as we indicate to possible clients that our fee will increase every year, in line with CPI. As far as developers and EPCs are concerned we've heard that allowance is made, deemed to be sufficient for possible delays.
Q4R7	Zero. Adding any premium results in being non-competitive.
Q4R8	No comment.
Q4R9	I cannot comment as I have zero visibility on Tariff.
Q4R10	This is a fundamental flaw of the REIPPP as a prudent developer/tenderer you optimise your project and tariff on the basis of the time frames provided. If you add uncertainty premiums you directly affect the competitiveness of your offer which is unfairly passed onto the consumer. A more rigid program would negate this.
Q4R11	None.
Q4R12	This question will need to be asked of the Sponsors and Preferred Bidders, but as a Lender i think that a buffer or tariff premium is needed to compensate the projects for the extensive delays experienced on REIPPP projects in South Africa.
Q5	**Given the high level of competitiveness of the wind and solar aspects of the REIPPP programme and hence the low success rates, could the high cost of bidding could be seen by some as a deterrence to potential bidders?**
Q5R1	100% correct.
Q5R2	We've been able to manage the direct cost of bidding internally. Then it is not so high. Bidding using only advisors with no internal resources can be expensive.

Q5R3	Absolutely. I think many potential bidders have already moved on from REIPPPP due to the cost of bidding (and now the political uncertainty) and are looking to off-grid and other African opportunities.
Q5R4	Definitely. Bidders have to trade-off bidding risk and reward (returns). In the first round there were no capacity ceiling and all bidders submitted prices at or close to the ceiling price, thus, all qualified bidders (those that passed the technical, financial, legal and BEE criteria) we appointed as preferred bidders. In the second round capacity ceiling were introduced to drive competition, resulting in only the cheapest bids within the cap being awarded. Competition has the desirable effect of eliminating "rent-seeker". Thus rent-seeker are deterred from bidding.
Q5R5	I am not aware of this issue. We must realize that our REIPPP projects will compete with other global Programmes.
Q5R6	Yes, certainly, especially for smaller (and mainly local) developers. Smaller and starting developers cannot hang around for a long time while announcements are delayed and delayed again--without some other form of revenue.
Q5R7	Yes, but it is also a barrier to entry that excludes 'cowboys' from entering the process.
Q5R8	Yes it could.
Q5R9	Yes.
Q5R10	Most definitely, developing projects to be tender ready is extremely capital intensive and high risk. Small developers or IPP's would struggle to remain afloat after one or two failed windows and we have directly seen this happening too many competent SME's who narrowly missed awards that were swallowed by larger internationals. We as a small local development company was lucky to have been awarded RD1 and RD3 projects as it would be very difficult to see our doors open had it not been for these early successes.
Q5R11	Yes
Q5R12	Yes indeed, and that is why i think that some bidders have decided to go and compete in other African renewable energy markets.
Q6	**Is the level of oversight of the projects during the construction and operation stages, that required by the DoE, appropriate for PPP projects of this scale?**
Q6R1	Yes

Q6R2	Construction OK, but far too high a level of oversight required in operational stage. We are delivering generation data to 3 different entities at a level of detail that no one apart from researchers would want to look at.
Q6R3	Yes
Q6R4	Oversight is always required when government is buying a service or commodity, to ensure that tax-payers (or electricity consumers in this case) are receiving best value for money. Without the oversight, project owner can easily become squatters, tying up supply capacity without delivery energy. Given the desperate need for supply capacity, this situation could not be afforded by the economy.
Q6R5	The oversight by the LTA is more critical in my view .the role of Eskom in the connection component via its role as the Gris secretariat is an inherent conflict which needs to be addressed.
Q6R6	Yes, in my opinion.
Q6R7	Yes
Q6R8	Yes
Q6R9	Yes, the Independent Engineer role fits well into these projects.
Q6R10	Yes, the projects should be seen as a country asset and investment and should be closely monitored throughout the projects life on the country's behalf.
Q6R11	Yes
Q6R12	Yes i still think that this level of oversight and project monitoring is appropriate for PPP projects of this scale, as the economic development obligations of the REIPPP Programme are very important to the South African government and its people.
Q7	**In contrast to the initial Bid Windows, the DoE adjusted the bid requirements for later bid windows such that developers did not need to have a confirmed lender and EPC confirmed prior to bid submission. Please could you comment on the consequences of this change, including whether this reduced bidding costs; enabled some developers to submit "low ball" bids that risk not being able to reach financial close; and whether this change enable developers to agree better terms with both lenders and EPCs since terms would only be agreed once the developers are confirmed as preferred bidders.**

Q7R1	This enabled the tariff to be reduced at the cost of potentially losing one idiot bidder, who in turn would risk their bid guarantee. The risk to the DOE of the single loss of bidder is worth the success of the strategy to reduce the tariff
Q7R2	It does create some risk for gaming the bid process, but acknowledges that there are always structure changes post preferred bidder, so overall good.
Q7R3	As a lender, this is a much better position as it enables us to provide support to more projects as the time and costs related to the DD is no longer required to be incurred.
Q7R4	All of the about are true, the intent was to reduce bidding cost, simulate more competition and thus reduce prices. It is a gamble, in that awarded projects might not reach financial close. However, long-stop provision protect government in this regard. Moreover, the supply constraints are not as tight. Consequently, the relaxation of requirements has been beneficial to tax-payers.
Q7R5	No comment.
Q7R6	I do believe this approach reduced bidding costs, even though EPC contractors do not usually charge to provide a cost to be part of a project. Lenders require audited documentation if they are to support a project and this would reduce cost if not required. On the other hand, since EPCs don't have to provide a cost pre-bid, consultants are now asked to provide prices and typically they inflate costs to allow for unknowns--which may inflate a bidding price. This approach may allow more time to properly negotiate with EPCs and if a developer has won preferred bidder status he has the power to negotiate more favourable terms--whereas the EPC has to ensure proper pricing in order to be successful with a winning project.
Q7R7	It is common place for a developer to continue negotiations with more than one EPC and Lender to close to Financial Close, in order to be able to negotiate a competitive contract.
Q7R8	This will increase competition and the volume of bidders which might reduce costs. The DOE then run the risk of projects not getting to FC because of EPC and Lenders not being able to participate in the projects as it may not be bankable. The DOE will therefore incur the costs in reviewing and awarding projects that is not bankable. I agree that more time will assist the developers in further refining their offering, however developers and the market matured in a manner that the marginal improvement may not be that significant.
Q7R9	This is a double edged sword as you noted in your questions, however the freedom of not being locked to a specific EPC does allow for better terms to be reached. From experience once you are locked in and the EPC knows this they inflate their prices, if there is still competition to the end then the developer can leverage this

	for a better price and ultimately can allow for better tariffs (should the Bidder take the risk to bid lower). This being said, it does have the distinct risk that in the future a bidder would not be able to close their projects due to "low ball" pricing and non-competitive EPC agreements after PB.
Q7R10	The change was for the better as allowed projects to adapt to the market changes or varying costs. Projects that were bound to EPC's and Lenders were not able to negotiate post submission even when the market had changed significantly. Unforeseen costs such as 200% cost estimate to Budget Quotes increases, were passed onto the project which had little to no negotiation angles to mitigate the impacts and in some cases affected the viability to the point of collapse.
Q7R11	This was a welcome change as such terms should only be finalized after the projects have been awarded so as to save time, costs and improve terms.
Q7R12	I think that this was an understandable development from a bidding perspective, as the costs of submitting fully underwritten bids from Lenders and EPC Contractors became more and more expensive. However, i think it was a dangerous development as it left all of the key negotiations with Lenders, EPC Contractors and O&M Contractors to the period after the announcement of preferred bidders when the electricity tariffs had be "locked in" by the DoE. I don't think that this change enabled developers to agree better terms with both lenders and EPCs post the announcement of the preferred bidders for the respective REIPPPP bidding rounds.
Q8	**Given the rules and requirements of the REIPPP programme and / or the SPIPPs programme what are the non-government or Eskom related key factors that determine whether a project will be delivered successfully?**
Q8R1	The cost factor associated with the interconnection point.
Q8R2	Eskom is imposing high risks on the projects with very onerous and unnecessary costly grid compliance requirements and an uncertain grid connection approval process.
Q8R3	Experience and qualification of key counter parties i.e. EPC who has experience in RSA REIPPPP and shareholders with technical experience and knowledge (not just financial investors).
Q8R4	No comment.
Q8R5	Factors to be considered would be : * compliance with the RFP * equity and debt funding commitments from reputable third party lenders and equity funding from parties with strong financial balance sheets

	* legally binding EPC , O & M, land and servitude agreements, management services agreements * robust financial model underpinning the project * grant of all the necessary permits, licenses and authorizations required by the Project * market reputation of all shareholders, third party contractors and lenders * value for money proposition and sufficient risk transfer per PPP principles
Q8R6	Eskom's willingness to provide a budget quote and grid connection at a price not too far removed from the price indicated in the Cost Estimate Letter. Also, I believe that EPC capability is key--to know where the unknowns are and adequately allowing for every eventuality, whilst keeping overall costs to a minimum.
Q8R7	Whether Eskom will execute the PPA and facilitate grid integration.
Q8R8	Non-government: effective value chain development for the procurement of project material and services. Eskom: Grid code compliance and related costs.
Q8R9	Timeous responses and work by Eskom is a key risk, the grid connection is the responsibility (ultimately) of Eskom and should they lag or delay (which is mostly the case) this can cause severe strain on the project timelines.
Q8R10	A strong and experienced development team which includes consultants and advisors who are able to adapt to evolving requirements without burdening the project with unforeseen fees. A transparent and trusting project partnership where the members have clear roles aligned with their strengths and trusted to fulfil that role appropriately. An EPC who understands all the project dynamics, especially from an owner's perspective, and optimizes their margins to obtain the lowest LCOE whilst not affecting long term profitability.
Q8R11	These outside factors have a minimal impact on the projects. Eskom is directly linked to the programme and should simply adhere to the rules stipulated for it role to ensure that projects are delivered successfully.
Q8R12	The availability, timings and costings of budget quotes from Eskom have proven to be key success factors for competing REIPPPP bidders. Similarly, the availability of grid connections and the existing loadings on the transmission network in different parts of South Africa have been another key determinant of tendering success.
Q9	**Are there areas where the South African renewable energy industry (finance, legal, consultants, contracts, other?) could improve in order to reduce the time and cost of project delivery further?**
Q9R1	The market became efficient very quickly, so not any more.

Q9R2	Legal and banking is still inefficient. We should get the same result for less cost.
Q9R3	Standardized legal agreements.
Q9R4	No comment
Q9R5	Unwavering political will and leadership to REIPPP to ensure commitment and adherence to timelines, alignment of all inter -dependent government departments and SOEs to REIPPP and their respective roles, regulate and consistent communication with the market. Alignment of all legislation and flow through of tax benefits in respect of rehabilitation obligations as seen in the mining industry as well the grant of Sec 53 permits under the MPRD. Impact of localization requirements on the tariffs - is South African based industry sufficiently competitive with global market especially with PV panels and converters. Regard to be had to global developments and enhanced features of other global Programmes which could be used in REIPPP. Use of previously banked documentation (finance, construction, operation and maintenance) that has been signed off by lender credit committees so as not to re-invent the wheel
Q9R6	Legal advisors could make better use of technical consultants earlier in the process to ensure no comebacks later regarding contractual and performance matters.
Q9R7	More policy certainty and government support is required for the industry to continue delivering projects.
Q9R8	There is always room for innovation and improvement across each sub-sector that will result in overall improvement.
Q9R9	Ultimately an increase in allocation (up from 140MW and 75MW) would reduce pricing as a whole, but more favourable lending rates would be essential, contractors are currently already under pressure to do both Local content and lower prices, reduction in Consultant would save on price as currently there is no synergy between DD parties and this is causing both time and cost delays to some projects.
Q9R10	Legal fees represent one of the biggest costs for projects and often appear to go to unnecessary levels without the projects best interest in context. Standardized project agreements could assist in reducing this expense however this approach has yet to yield benefits. Environmental legislation and authority decisions are becoming increasingly unpredictable and have resulted in large amount of projects and resources fail at the 11th hour, often based on questionable decisions. Recourse for the project is a double edged sword as challenging the authorities puts risk on the relationship and future projects which the developers business is reliant on.
Q9R11	Costs need to be reduced across all facets to match the reduction in tariffs and the level of returns that are required to make the projects successful.

Q9R12	I think that there needs to be much tighter programme management of the REIPPP programme from the DoE / IPP Office so that EPC bid validity periods and EPC pricings and conditions are not compromised for developers, and that the interest rate yield curve does not move out (increase) beyond the developers pricing expectations at the bid submission stage (as reflected in the financial model).

APPENDIX 8 – ANALYSIS RESULTS

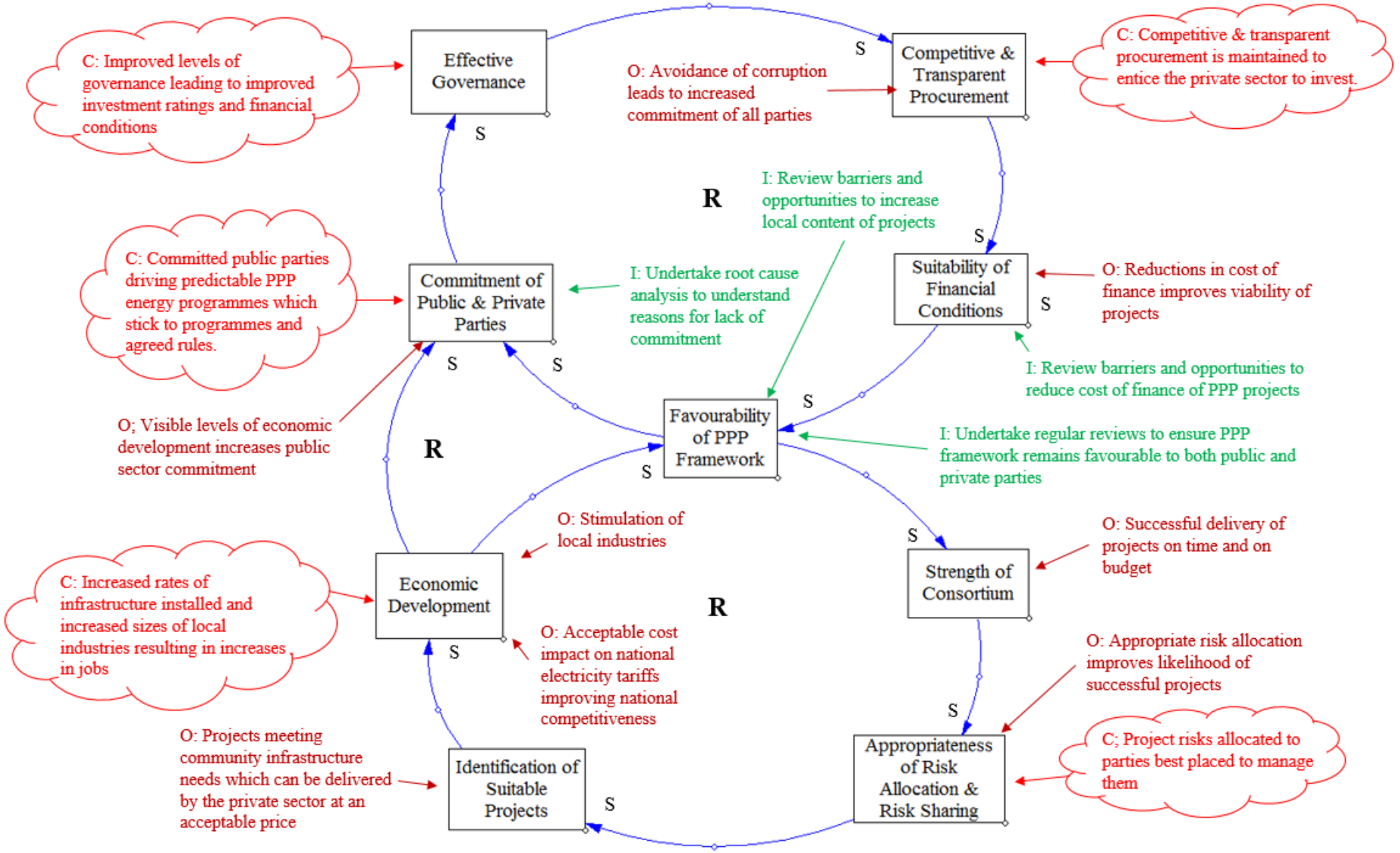

FIGURE 7: SOUTH AFRICAN PPP PROJECTS CIMO