A success index for public private partnership programmes' success in the electricity generation sector of South Africa

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ABSTRACT

This research study explored factors that contribute to the success of formal reverse auction Public Private Partnership (PPP) programmes in the electricity generation sector of South Africa. The approach chosen was qualitative in nature, with semi-structured interviews conducted with a total of twenty-one (21) professionals. The interviews were recorded on Microsoft teams, transcribed and analysed in the MAXQDA software. A five-step inductive-deductive approach was used to analyse the data. A detailed conceptual Success Index framework was developed from the literature and refined empirically from the interview findings. Integrating the enabling Critical Success Factors, measurable Critical Success Criteria and the Critical Risk Factors in driving success outcomes of the programmes and the projects. The key findings showed that the formal reverse auction public private partnership programmes required strong political will and support, co-ordinated grid expansion and modernization as well as a focus on ensuring that local economic development and social impact are core to the programmes design. Furthermore, it was found that for PPP projects both quantitative hard project construction management factors and soft qualitative ESG factors were important in driving their successful outcomes. The findings showed that programme(s) needed to evolve within the context of the rapidly changing electricity supply industry of South Africa to remain relevant. The historical focus of the programmes on low prices was found to be encouraging unsustainable practices amongst Independent Power Producers, leading to an increased occurrence in bid compliant but unbankable projects. The factors within the Success Index framework showed value creation for both the public and private sectors involved a shift in focus to project readiness to reach Financial Close.

KEY WORDS - *critical success factor, critical success criteria, critical risk factor, public private partnership, independent power producers, South Africa electricity generation*

DECLARATION

I, **Mogale Diagile Modisane**, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of **Master of Management in the field of Energy Leadership** at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Name: Mogale Diagile Modisane Signature: 

Signed at Johannesburg

On the 23th day of February 2025

DEDICATION

Praise be to GOD

First and foremost, I would like to thank and dedicate this study to my Lord Jesus Christ. Without his providence completing this research report would not have been possible.

I would like to thank my local church Renewal Fellowship and everyone who has given me encouragement over the last two years – spurring me on to preserve and overcome. Each and everyone of you holds a special place in my heart.

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Lastly, I would like to dedicate this study to my two late grandmothers. Nancy Ngoalengwe Leshilo and Susan Mokgaetji Modisane who encouraged me to reach for the stars long before I even believed that I could begin to dream. May their souls rest in peace; and may their names and memories be ever immortalized in the hallways of academic research through their inclusion within this study.

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LIST OF ACRONYMS and ABBREVIATIONS

BBBEE	Broad-Based Black Economic Empowerment
BW	Bid Window
CLO	Community Liaison Officer
COD	Commercial Operation Date
DFFE	Department of Forestry, Fisheries and the Environment
DMRE	Department of Mineral Resources and Energy
ECSA	Engineering Council of South Africa
ED	Economic Development
ERA	Electricity Regulation Act
ESIPPPP	Energy Storage Independent Power Producer Procurement Programme
LCOE	Levelized Cost of Energy
MOU	Memorandum of Understanding
NERSA	National Energy Regulator of South Africa
OEM	Original Equipment Manufacturer
P	Participant (followed by number)
PPA	Power Purchase Agreement
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RMIPPPP	Risk Mitigation Independent Power Producer Procurement Programme

CHAPTER 1. INTRODUCTION

1.1 Purpose of the study

This research is a qualitative study to explore factors that contribute to the success of formal reverse auction Public Private Partnership (PPP) programmes within the electricity generation sector of South Africa. A holistic PPP Project Delivery Success framework was developed conceptually from literature and refined empirically through semi-structured interviews. This framework is intended for use by policy makers and professionals. Figure 1, depicts the flow of the formal reverse auction PPP programmes within the electricity generation sector of South Africa. This is a common thread throughout all the formal PPP Programmes in the electricity generation sector of South Africa.

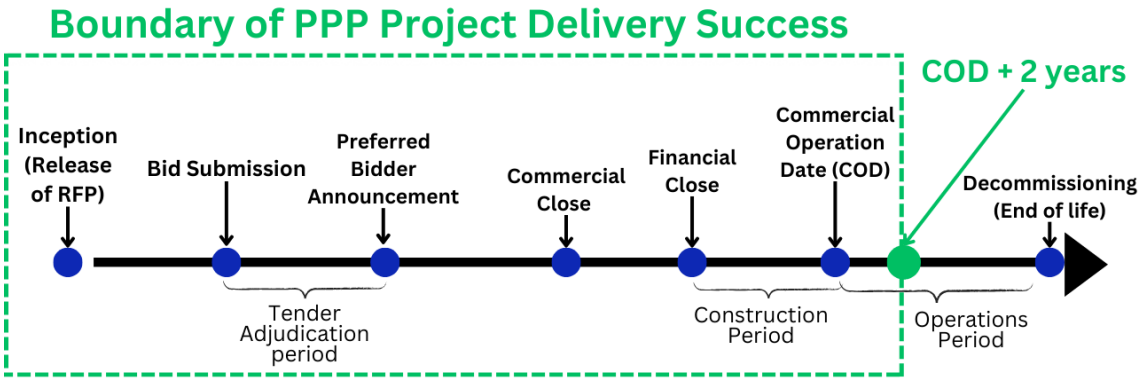


Figure 1. Flow of formal PPP Programme in the electricity generation sector in South Africa

This framework, termed the Success Index – was underpinned by an integrated view of the Critical Success Factors (CSF), Critical Success Criteria (CSC) and Critical Risk Factors (CRF) that best enable PPP Project Delivery Success. Figure 2 provides a high-level conceptual overview of the framework.

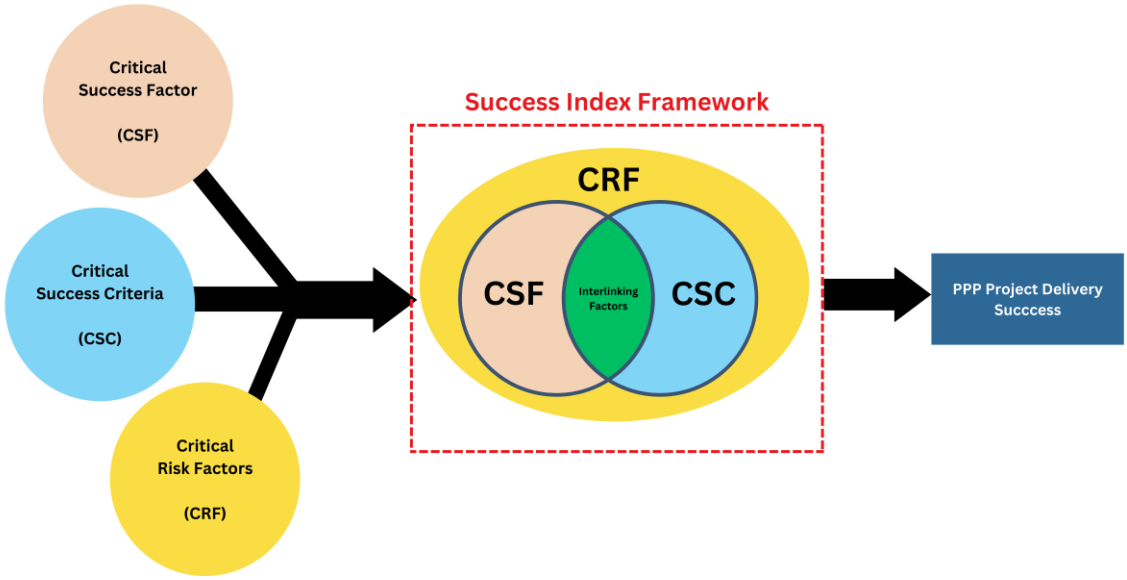


Figure 2. High level conceptual framework for PPP project delivery in the electricity generation sector in South Africa

1.2 Context of the study

Although the number of people worldwide without access to electricity has decreased from over 1.4 billion in 2010 to less than 750 million in 2024. The figures for Sub-Saharan Africa have worsened, with over 597 million people without access to electricity in 2024, as opposed to just over 580 million in 2010 (IEA, 2024). This means of the people globally without access to electricity, just under 80% of them live in Sub-Saharan Africa. South Africa on the other hand is one of the leaders on the Africa continent in terms of electricity access (over 86%) which is more than double the Sub-Saharan average (Byaro & Mmbaga, 2022). However, the country is not without its electricity challenges having been grappling with issues of supply reliability that have necessitated loadshedding to protect the system from total collapse (Naidoo, 2023). Loadshedding since 2007 has progressively been getting worse as per Figure 3. Peaking in 2023 at approximately 24 869 GWh (CSIR, 2024).

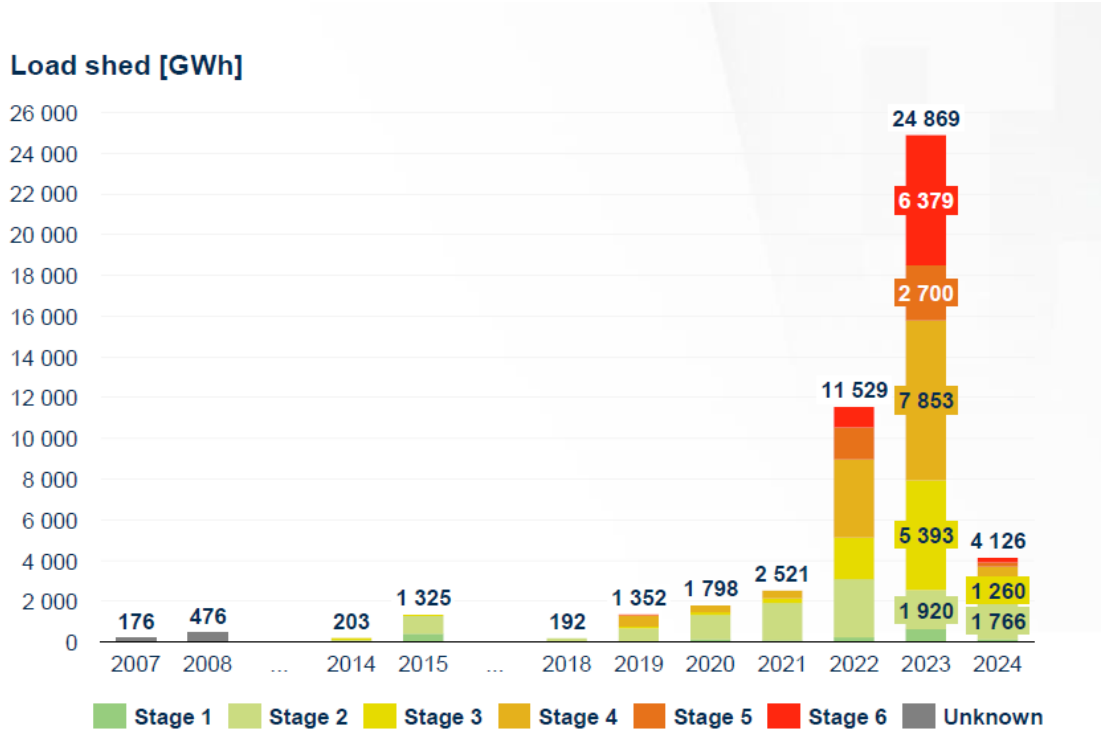


Figure 3. Total load shed in South Africa from 2007 – 2024 (CSIR, 2024)

This increase in loadshedding especially from the period of 2018 – 2023 was in line with a deteriorating Energy Availability Factor (EAF) within Eskom's generation fleet as shown in Figure 4, with the stabilization of loadshedding in 2024 (Figure 3) aligning with an improved EAF within the same period (Figure 4).

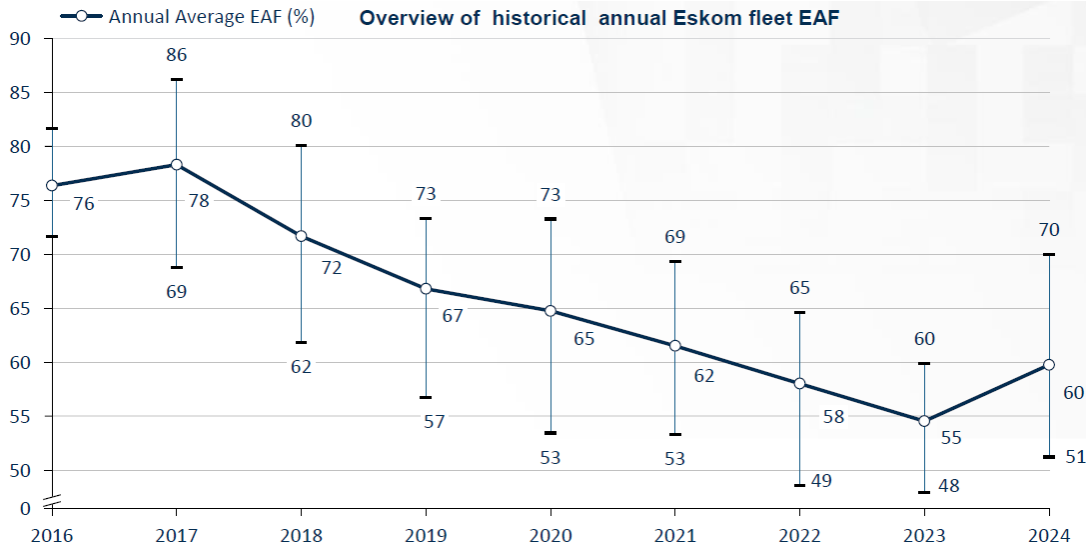


Figure 4. Historical Eskom fleet EAF (2016 - 2024) (CSIR,2024)

However, even with the improved Energy Availability Factor in 2024, the need for an increase in electricity generation infrastructure remains a challenge. Especially as South Africa looks to diversify its generation mix to ensure energy security, developmental goals and emissions reductions are in line with its global commitments (Ndlovu & Inglesi-Lotz, 2019). The Integrated Resource Plan envisions more than 100 GW of renewable energy generation by 2050 (DMRE, 2024), from the current installed capacity of around 7.3 GW (IPPO, 2024). To bridge this gap Meridian Economics (2020) report has shown that issues surrounding policy and regulatory uncertainty will potentially be major challenges in mobilizing the necessary capital for the roll out of renewable energy projects in South Africa. Historically, Africa accounted for only 2% of the cumulative sum of global renewable energy investments from 2000 to 2020 (IRENA & AfDB, 2022). Numerous initiatives have been proposed to mitigate this funding gap for Africa, amongst these include green bonds, green banks and public private partnerships (Owusu-Manu et al., 2021). Public Private Partnerships were the focus of this study, as they had been touted as potentially viable alternatives to traditional public procurement mechanisms to bridge the infrastructure gap (Leigland, 2018). Leigland (2018) further proposes that the flow of foreign direct investment to finance PPP programmes especially within the electricity generation sector in Sub-Saharan Africa is subject to the structure of these PPP programmes being well designed for all stakeholders. Although PPP laws and policy frameworks have gained traction and are well established with 42 of the 54 countries in Africa having enacted PPP legislation (World Bank, 2024). There has been mixed and sporadic uptake of actual infrastructure developments within these developing countries (Osei-Kyei & Chan, 2017). Kang et al. (2019) suggests that this poor uptake is down to poor governance and lack of economic stability which act as impediments to effective utilization of PPP type models in the electricity generation sector.

This sporadic uptake combined with poor empirical data on projects is further complicated by the fact that there is no single authoritative and universally

accepted definition of public private partnerships (PPP) as stated by Almeile et al. (2024) making it difficult for a common understanding and the implementation of standardization practices across geographies. However, this has not stemmed the growing interest and implementation of PPP type models - with total investments globally in PPP's reaching $86 billion dollars in 2023 – 1% higher than the previous 5 year rolling average (World Bank, 2023). The energy sector in 2023 accounted for 73% of total PPP investments of which 98% was in the electricity sector (97% of that being renewable energy projects) (World Bank, 2023). In South Africa public private partnership programmes in the electricity generation sector have been operating since 2011 – see Table 1, starting with the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and its various rolling Bid Windows (BW), followed by a once off emergency Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP) in 2020 and recently the Battery Energy Storage Independent Power Producer Procurement Programme (ESIPPPP) launched in 2023, currently at its third Bid Window. This rollout of programmes is off the backdrop of REIPPPP being lauded globally as a successful reverse auction PPP tender as stated by Eberhard and Naude (2016), with REIPPPP BW1 to BW4 having 90 of the 92 Preferred Bidder projects managing to achieve Financial Close, with all currently in operation.

However, problems within the programmes became apparent to the public when Eskom refused to sign PPA's in 2015 for REIPPPP BW 3.5 and BW 4 projects. This issue was subsequently resolved with the PPA's being signed in 2018 (Trollip, 2023) In REIPPPP BW 5 problems persisted, in which only 11 of 25 Preferred Bidder projects reached Financial Close (with all 11 projects currently under construction). The problems continued to be observed in REIPPPP BW6 as Green Cape (2024) showed that only 6 projects out of 56 bids were selected as Preferred Bidders due to grid constraints (2 have since reached Financial Close, whilst the other 4 are in still in the process). The RMIPPPP also had issues with only 7 of the 11 Preferred Bidder project reaching Financial Close (with 3 currently in construction and the other 3 have achieved Commercial Operation). This deterioration in Preferred Bidder projects reaching Financial Close in

REIPPPPP BW5, BW6 and RMIPPPP warrants a review of the formal reverse auction PPP programmes in the electricity generation sector of South Africa.

Table 1. Progression of projects throughout the history of the various PPP programmes in South Africa (IPPO, 2024)

Bid Submission	PPP Programmes	Preferred Bidders (Number of Projects)	Financial Close (Number of Projects)	Commercial Operation (Number of Project)	Actual Reached Financial Close (MW)	Capacity Allocated in Programme (MW)	Actual Reached FC vs Capacity Allocated in Programme (%)
2011	REIPPPP BW 1	28	28	28	1415	1416	99.93%
2012	REIPPPP BW 2	19	19	19	1033	1044.3	98.92%
2013	REIPPPP BW 3	17	16	16	1428	1456	98.08%
2014	REIPPPP BW 3.5	2	2	1	100	200	50.00%
2014	REIPPPP BW 4	26	26	26	2205	2130	103.52%
2020	RMIPPPP	11	7	3(4*)	578	2000	28.90%
2021	REIPPPP BW 5	25	11	(11*)	1159	2600	44.58%
2022	REIPPPP BW 6	6	2 (4**)	(2*)	1000	5200	19.23%
2023	ESIPPPP BW1	4	(4)	(4*)	360	513	70%

(*) = currently in construction
** = currently working toward Financial Close (achievement of FC is assumed for calculation purposes)

1.3 Research problem

The main research problem is that recent formal reverse auction public private partnership programmes within the electricity generation sector of South Africa have not been as successful as their predecessors (see Table 1) with the exception of the ESIPPPP Bid Window 1, and hence consequently an explanation for this recent trajectory is required.

Although there may be wider and or alternative explanations, this study has a narrower focus and looked to derive an understanding from professionals both within the public and private sector on what the Critical Success Factors, Critical Success Criteria and Critical Risk Factors are that influence project delivery within PPP programmes. This study also intends to tackle a gap within the literature of the lack of an integrated and established conceptual theoretical base of all the interlinked success components and risks within the context of PPP in the electricity generation sector of South Africa. It seeks to do this by developing a usable conceptual framework that has utility for practice and for further theoretical development by academics in other PPP contexts.

1.4 Research questions

The research questions that the study intends to answer are listed below:

Research Question 1: What are the Critical Success Factors in enabling PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?

Research Question 2: What are the Critical Success Criteria that could be used in measuring PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?

Research Question 3: How do the Critical Success Factor and Critical Success Criteria overlap (Interlink Factors) in driving PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?

Research Question 4: What are the Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?

1.5 Significance of the study

The trajectory of private sector participation in electricity infrastructure is intended to continue to grow globally and within the context of South Africa (Global Infrastructure Hub, 2018). This research is significant in that the successful roll out of solar, wind and battery energy storage projects under a public private partnership model in accordance with the Integrated Resource Plan is a national imperative to South Africa's ambition in closing the supply and demand deficit within the electricity sector (DMRE, 2024).

The theoretical significance of this study was the development of a conceptual framework, that brings together a dispersed theoretical base (Figure 5) in an integrated manner, with the attempt to integrate the Critical Success Factors, Critical Success Criteria and Critical Risk Factors specific to driving PPP Project Delivery success in the electricity generation sector of South Africa.

The empirical significance of this study was the detail gleaned from the contributions of electricity industry sector professionals in both the private and public sector – who have worked experience in public private partnerships within the sector. Their combined experiences and insights served the purpose of providing rich and context specific knowledge.

Furthermore, the Success Index can be utilized by academics to further build upon it's basis and to test causal relationships using more quantitative theory testing techniques. This Success Index framework can also be further refined and

tested in other developed and developing geographies within the electricity generation sector.

Within industry, professionals both public and private can utilize the findings to better inform policy decisions and enrich decision gates throughout the process to ensure PPP type projects and programmes within the electricity generation sector are implemented effectively factoring in empirical experiences of professionals within the sector. These could include aligning skills development roadmaps with implementation of PPP programmes in the electricity generation sector of South Africa. Further aligning localization of viable value chains with opportunities to incorporate ESG principles within policy directives.

1.6 Delimitations of the study

This research seeks to understand holistically how success of a PPP programme in the electricity sector in South Africa is understood by sector professionals. The following delimitations hence refer to specific boundary conditions imposed on the study, with a guided explanation justifying the delimitation.

The delimitations of this study are the following:

Corporate or private PPA's are not considered for this study, as their RFP's do not have the same procurement requirements as the formal reverse auction tender programmes. Furthermore, they do not use standardized contracting templates as found within the formal programme.

Electricity generation comes in many forms, for the purposes of this study, small scale embedded generators (SSEGs) were not considered, only projects that have been bid within the formal PPP programmes of REIPPPP, RMIPPPP and ESIPPPP will qualify as "electricity generation projects". Any municipal procurement or procurement through energy traders was considered as these do not follow the same procurement process of formal reverse auction PPP tenders in the electricity generation sector of South Africa.

1.7 Definition of terms

Term	Definition
Commercial Operation Date	A date under a long term PPA in which the commissioning test have been passed and the electrical generating asset can start producing power to earn revenues (DMRE Tender, 2024)
Defects Liability Period	A process to rectify damage, faults or imperfections to a construction project within a specific time frame (Hashim et al., 2017)
Direct Agreement	An agreement that allows lenders to have specific step in rights in the case of a private consortium failing to meet their obligations as per the various financing agreement (European Bank, 2024)
Distribution Agreement	An agreement between a private consortium and distributor to allow for the project to connect onto the distribution network (DMRE Tender, 2024)
Energy Availability Factor	The difference between the maximum availability and all unavailability's expressed as a percentage, excluding renewables, IPPs and international exports ((Eskom, 2025)
Energy Regulation Act	An Act to establish a "national regulatory framework for the electricity supply industry" (ERA, 2006)
Financial Close	Date at which all project agreements, financing contracts and lenders conditions have been fulfilled or waived (Yescombe,2002)
Implementation Agreement	An agreement signed between a private consortium and offtaker, that acts as a sovereign guarantee in the case the offtaker fails to honour its obligations under the PPA (Eberhard et al., 2014)
Independent Power Producer	A private entity that owns and operates electricity generation assets for the purpose of selling power to utilities and end users (SAIPPA, 2024)
Power Purchase Agreement (PPA)	Long term Agreement signed with the offtaker for the sale of electricity and associated services (World Bank Group, 2024)
Preferred Bidder	A private sector Consortium with a compliant and competitive bid, selected to provide power under a formal reverse auction PPP programme in the electricity generation sector (DMRE Tender, 2024)
Rolling or staged bids	Refers to the periodic release of a formal reverse auction tender programme. (Authors own)

1.8 Assumptions

The following assumptions are made:

- The participants provided truthful information in line with their perceptions and experiences.
- The participants were available and put thought into answering questions within the allotted timeslot.
- The information that was publicly available on the PPP programmes was accurate and true.
- The participants undertook the semi-structured interview completely within their free will.

1.9 Structure of the report

This research report is divided into five different chapters. Chapter 1 (this chapter) is the introduction which provides context to the research problem, research questions and the overall aims of the study. This is followed by Chapter 2 which provides a literature review of key concepts and themes underpinning the research questions and overall research aims. Within Chapter 2 the detailed conceptual Success Index framework was presented (Figure 6). Chapter 3 provides an outline on the methodology, detailing the approach including the sample size, research instrument and data collection procedure. Chapter 4 provides findings and discussions on the outcomes of the systematic empirical analysis in the context of theoretical literature. In this chapter similarities and differences between data and literature are expound upon and synthesized. Within Chapter 4 the final empirically verified Success Index framework is also presented. Chapter 5 brings everything together and provides conclusions and potential recommendations and suggestions for future research.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

This chapter provides a brief theoretical background and description of the terms Critical Success Factors, Critical Success Criteria, Critical Risk Factors, and their significance in driving PPP Project Delivery Success the electricity generation sector of South Africa. With a focus on how these constructs combine providing a conceptual Success Index framework. Lastly propositions were developed in line with the research questions and aims.

2.2 Definition of topic or background discussion

2.2.1 *Definition: Critical Success Factor (CSF)*

Critical Success Factors (CSF) are the few areas of activity within a project in which favourable results are necessary for the project to achieve its goals and objectives (Adapted from Rockart, 1979).

In Rockart's (1979) original definition, reference was made to "managers" due to the context of the study which focused on information systems within an organizational context. Due to the widespread application of Critical Success Factors within the literature focused on construction projects as stated by Mulyani (2021), the definition was adapted to refer to a "project" as opposed to "managers". The term *favourable results* refer to a "set of circumstances that facilitate success" as described by Osei-Kyei et al. (2017) and not the actual measurement of success. That is captured in the following definition on Critical Success Criteria.

2.2.2 *Definition: Critical Success Criteria (CSC)*

Critical Success Criteria (CSC) are "parameters on which success is measured" (Chan et al., 2002).

This definition was taken directly from the literature as it is the one most referenced and most suitable for this study. Borges et al. (2024) uses the same definition when describing such parameters for success in construction projects in Guyana. Following is the definition of Critical Risk Factors.

2.2.3 *Definition: Critical Risk Factors (CRF)*

Critical Risk Factors are the systematic and project specific aspects that increase the likelihood of an unfavourable outcome. (adapted from Xu, et al., 2015)

The focus is on both systematic (macro level items) and project specific factors as described by Xu et al. (2015).

2.2.4 *Definition: Public Private Partnership (PPPs)*

In South Africa PPP's have a legal definition (Public Finance Management Act, 2003). A PPP is defined as a contract between a government institution and private party, where:

1. The private party performs "an institutional functional on behalf of the [government] institution" (Public Finance Management Act, 2003).; and/or
2. "Acquires the use of state property for its own commercial purposes" (Public Finance Management Act, 2003).; and/or
3. The private party "assumes substantial financial, technical and operational risk in connection with performance of the institutional function and/or use of state property" (Public Finance Management Act, 2003)., and/or
4. The private party "receives a benefit for performing the institutional functional" through "consideration to be paid by the institution" (Public Finance Management Act, 2003).

Furthermore, an additional point five (5) was included to state that a PPP should be "for the development, financing, build and operation of infrastructure" (Yescombe,2007). This excludes PPP's that are policy based for the purpose of this study, ensuring the definition only focuses on PPP's that are project based

built under a Design-Build-Finance-Operate (DBFO) model, providing services through infrastructure (Yescombe,2007).

Henceforth for the purposes of this study, the South African government's formal reverse auction electricity procurement programmes REIPPPP, RMIPPPP and ESIPPPP can be considered public private partnerships as described in Table 2 below.

Table 2. Adapted definition of Public Private Partnership

Why REIPPPP, RMIPPPP and ESIPPPP are considered Public Private Partnerships
1. **Institutional function** of electricity is still under the state through the transmission network; however, the Independent Power Producers (IPP) generate electricity on behalf of the institution and provide this through the use of state property (i.e. transmission infrastructure) to customers.
2. **Substantial project risk** is given to IPP via Direct Agreement, PPA, Implementation Agreement and Eskom Grid Connection Agreements.
3. The projects get **paid by the institution** from PPA's signed with Eskom.
4. The Private consortium is responsible for the **design, finance, build and operation (DBFO) of the electrical generation infrastructure.**

2.2.5 *Definition: Public Private Partnership Project Delivery Success (PPP Project Delivery)*

PPP Project Delivery Success refers to a project that has been successfully constructed, commissioned and has been operational for two (2) years post Commercial Operation Date (Adapted from Helmy et al., 2020).

For the purposes of this study a successfully constructed project is a public private partnership electrical generation infrastructure project that has been developed and delivered (1) Within budget; (2) as per designed specifications and scope of works; (3) With capability to produce desired and specified levels of performance; (4) Constructed to highest quality standards to customer and various stakeholders satisfaction (Helmy et al., 2020).

The end of a PPP project lifecycle as per Bao et al. (2018) coincides with the end of the long-term contract, in this case the Power Purchase Agreement. However, the conundrum is that within the formal reverse auction PPPs in the electricity generation sector of South Africa, there are no projects currently that have reached the end of their PPA term. There are however over 7.3 GW currently in operation (IPPO, 2024). Therefore, the framing of the term PPP Project Delivery warrants a composite definition.

Projects within REIPPPP, RMIPPPPP and ESIPPPP are delivered under a Design-Build-Finance-Operate (DBFO) arrangement in which the private entity is responsible for designing, constructing, arranging the finance and operating the completed electricity generating project over the lifetime of its long-term Power Purchase Agreement. Hence a well-rounded definition of PPP Project Delivery Success requires inclusion of the operations phase. Unfortunately, in South Africa, none of these projects have completed their operations phase and reached the end of their useful life. Although inconvenient, this is not an insurmountable problem because the focus of this research is on the ‘front end’ of the project life.

Consequently, a period ending two (2) years post Commercial Operation Date (COD) has been selected to represent the operations phase as this typically

aligns with the end of the Defect Liability period after which the principal contractor is no longer liable for workmanship repairs in the form of Serial and Latent defects (Hashim et al., 2017). Beyond this two-year post COD milestone, the project is contractually completely handed over to the operating company. Hence for the purpose of this study signifying a “delivered project”.

2.2.6 *Definition: Private and Public Sector Professionals*

A professional is an individual with sufficient experience, for specific skillsets within a predefined domain of competence (Adapted from Balthazard,2015)

In this section a definition is provided that will structure the selection of participants for their lived and worked experiences in PPP projects in the electricity generation sector in South Africa, as opposed to only focusing on individuals who as described by Balthazard (2015) are registered under a professional body in line with their definition. Hence the definition of a professional is a composite for the purposes of this study, as that best aligns with ensuring the research aims and goals are achieved.

2.2.7 *Background on PPP programmes in electricity generation sector in South Africa*

The REIPPPP, RMIPPPP and ESIPPPP programmes have a similar programme design. All of these operate as reverse auction tenders (DMRE Tender, 2024). The initiation of the programme is kicked off with the issuance of the Request for Proposal (RFP), as per Figure 1. The documentation as released within the RFP includes:

- Part A – General Requirements Rules and Provisions.
- Part B – Qualification/Functional Criteria.
- Part C – Evaluation Criteria.

Included are standard templates for the Power Purchase Agreement, Implementation Agreement, Direct Agreements, Distribution and/or Transmission Agreement, Distribution Connection and Use-of-System (DCUOSA) Agreement and the various returnable schedules including Economic Development Criteria (DMRE Tender, 2024). Milestone dates for Bid Submission, announcement of Preferred Bidders, Commercial and Financial Close as well as the Scheduled Commercial Operation Date are provided within Part A of the tender pack. Part B refers to all the legal, technical and economic requirements (together with their deliverables) to enable a project to be bid compliant (DMRE Tender, 2024). Part C refers to the criteria, weighting and scoring of compliant bids based on Price and Economic Development Criteria (DMRE Tender, 2024). Hence due to this consistency in PPP programme design, insights from projects across the different programmes can be studied with a view to developing an integrated conceptual framework that is useful for PPP Project Delivery within the electricity generation sector of South Africa.

2.2.8 *Theories and background: Critical Success Factors, Critical Success Criteria and Critical Risk Factors in PPP literature*

The concept of Critical Success Factors originates from work conducted by Daniel (1961), however the methodology gained theoretical traction upon the seminal work of Rockart (1979) who used what is often termed as the original Critical Success Factor method/Rockart's original Critical Success Factor method to capture key success factors in an organization with inputs from senior management and the executive. This method was useful in enabling success of information systems within business as the advent of personal computing was disrupting corporate information flows mid-20th century. The versatility of Rockart's original Critical Success Factor method has been the basis from which all other adaptations have developed. This versatility has also been a source of criticism with Vanessa (2008) stating the difficulty in determining the correct number of critical success factors to be extracted when performing an analysis - arguing that it makes it difficult to assess the utility of the method in varying contexts. Furthermore, in Davis (1979) historical critique the issue of bounded

rationality in collating Critical Success Factors qualitatively is highlighted, speaking to the concept that decision makers, when faced with extracting qualitative success factors are often bound by memory which results in them often choosing a satisfactory decision as opposed to an optimal one. Vanessa (2008) further highlighted the limitation of utilizing Critical Success Factors in that they need to constantly be re-evaluated to remain relevant in an ever-changing business world. These limitations have not stemmed research in Critical Success Factors as a method of enabling PPP projects. Fernando and Nanayakkara (2020) used the Critical Success Factor method to identify six (6) Critical Success Factor topical themes that could enable the Ceylon Electricity Board in Sri Lanka to undertake expansion programmes in electrical generation infrastructure, amid negative cash flow issues caused by tariffs that could not recover costs. Furthermore, Berisha et al. (2022) used the Critical Success Factor method to also identify six (6) topical Critical Success Factor themes for Albania as they attempted to restructure their economy to access the European Union.

This wide applicability of the method has prompted research into context specific settings. As the method has grown within the PPP literature attempts have been made to understand if the Critical Success Factor methods can be statistically inferred to the population at large to show utility in the methods ability to provide generalizations. Maqbool et al. (2018) undertook a quantitative causal study using structural equation models with mixed results. This approach of generalization historically has had its detractors with Thurman et al. (2015) criticizing these attempts to infer Critical Success Factors stating that important soft issues tend to be under-represented when the approach is utilized quantitatively. This is supported by Opiyo and Muchelule (2024) who reflect on the bargaining game theory, in which private and public sector participants must engage in a negotiation that is aligned with unified goals of proportionate risk sharing and promotion of co-operation. These are difficult phenomenon to capture using hard quantitative methods alone. A small subset of the literature has attempted to use mixed methods as a recognition of soft issues getting lost in translation. Maqbool and Sridhar (2023) used mixed methods utilizing the combination of a quantitative questionnaire survey combined with a qualitative

case study to explore governance impacts on public private partnerships in the United Kingdom with the aim of understanding nuances associated with soft issues in driving PPP success. However, this approach has not gained theoretical traction (Osei-Kyei & Chan, 2015).

From this desire to gain holistic insights into identified Critical Success Factors (both hard and soft factors) attempts have been undertaken to understand which of the critical success factors are more critical than the others. Nguyen et al. (2020) undertook a quantitative study looking at Vietnam's PPP market, categorizing Critical Success Factors and then ranking them, with the top five ranked Critical Success Factors being (1) land acquisition, (2) private sector financial strength, (3) effective project management, (4) effective regulatory frameworks, (5) feasibility of PPP. However, these attempts are impractical for theoretical development as they basically lead to re-ordering of items in which all are already important, albeit in varying degrees. The attempts to strengthen Critical Success Factor methods (qualitatively, quantitatively and using mixed methods) to provide better enabling indicators for the success of projects are noble. However, the issue and limitations are embedded within the Critical Success Factor method irrespective of its adoption, since many Critical Success Factors are not measurable items, but rather components that are critical enablers for the success of a PPP project or programme.

This problem of measurability has also been extensively investigated within the literature (Okudan & Budayan,2021; Osei-Kyei et al., 2017;Osei-Kyei & Chan,2018) to counteract the shortcomings of Critical Success Factors in predicting PPP outcomes .These factors have collectively become known as Critical Success Criteria (CSC), and were developed with the aim of bridging the gap between enabling factors (CSF) and success of PPP projects. These Critical Success Criteria also however have their own shortcomings, with Magalhaes et al. (2020) highlighting that historical project measurement methods have always relied upon hard tangible factors namely cost, time and scope which are uni-dimensional measures that do not cater for the complexities of multi-stakeholder type arrangements such as PPP's. Penyalver (2022) further highlights this stating

that these uni-dimensional measures are no longer sufficient in delivering modern complex infrastructure projects. Environmental objectives and sustainable development imperatives need to be incorporated into the concept of successful PPP Project Delivery Success, to ensure all role players (public, private and communities) perceive that their expectations are being met. With Wegrzyn and Wojewnik-Filipkowska (2022) highlighting that this can aid in reducing the likelihood of stakeholder friction and improve overall support and buy in for the project.

As both strands of research have matured separately, nevertheless there has developed a growing subset within the literature of looking at both Critical Success Factors and Critical Success Criteria together (Lamprou & Vagiona, 2022; Frefer et al., 2018). With results showing that there are interlinks between the two concepts, and that some Critical Success Factors are also Critical Success Criteria as stated by Frefer et al. (2018), hence certain factors operate as being both enablers and measurable items throughout the project's delivery. The Principal Agent Theory which highlights the dynamics between two entities whereby the 'agent' (private party) is required to undertake a task on behalf of a 'principal' (public entity) is largely at play throughout PPP projects or programmes in the electricity generation sector, especially within the interlinks (Awuku et al.,2022). This differentiation of control dynamic needs to be adequately captured within the contractual documentation, such that each entity is fully aware of their role and responsibility within the programme or project.

Although there is appreciation of the work undertaken to map out the Critical Success Factor and Critical Success Criteria interlinks – the differentiation of control dynamic has led researchers to highlight a growing concern with respect to the importance of risk in the entire equation of delivery successful PPP projects (Babatunde et al., 2018). Risk analysis is well established when focusing on costs within the PPP's, with Fleta-Asin & Munoz (2021) highlighting the relevance of the Transaction Cost theory, whereby private entities make decisions on projects primarily due to future financial benefits superseding the risks. This mitigation is typically captured in the project or country risk premium applied to the cost of

finance (Odhiambo et al., 2020). Furthermore, Rybnicek et al. (2020) took a more holistic approach to risk by developing a conceptual model looking at risk through the lens of the project life and the various stakeholders. However, Yescombe (2007) a leading author in public private partnerships highlights a more structural issue with risk, stating that irrespective of a firm theoretical understanding of Critical Success Factor, Critical Success Criteria and their ensuing interlinks there remains a broader issue of actual vs theoretical risk transfer with respect to successful delivery of PPP projects. This is captured in the fact that private sector consortium, will typically finance PPPs in the electricity sector under Special Purpose Vehicles (SPV), utilizing Project Finance theory (Sainati et al., 2020). This means that worst case scenario private sector liability is only up to agreed-upon contractual caps. However, the public authorities ultimately carry the risk of service provision – whether the private entity defaults or not. This conundrum of inherent risk as stated by Rybnicek et al. (2020) can partly be mitigated within a PPP if risk management practices are implemented throughout the PPP projects life although never fully being alleviated from the public sectors responsibilities. From the perspective of the public entity the Pareto Optimality theory can be used as a guiding principle when analysing if this risk is worth taking in the first place (Awuku et al., 2022). In accordance with the theory, PPP's only make sense for public entities if they can provide a service (electricity in this instance), that is of the same quality but cheaper, or at a higher quality at the same cost than if it were to be procured by public authority directly. However irrespective of the ultimate decision on risk allocation, the inherent interfaces within a PPP arrangement require clear and effective risk management practices. Hence, there remains a need within the literature for the development of a conceptual framework that integrates Critical Success Factor, Critical Success Criteria and Critical Risk Factors holistically in driving PPP Project Delivery Success in South Africa's electricity generation sector. Figure 5 below provides an overview of the dispersed but interlinked theoretical base of the Critical Success Factor, Critical Success Criteria and Critical Risk Factor concepts.

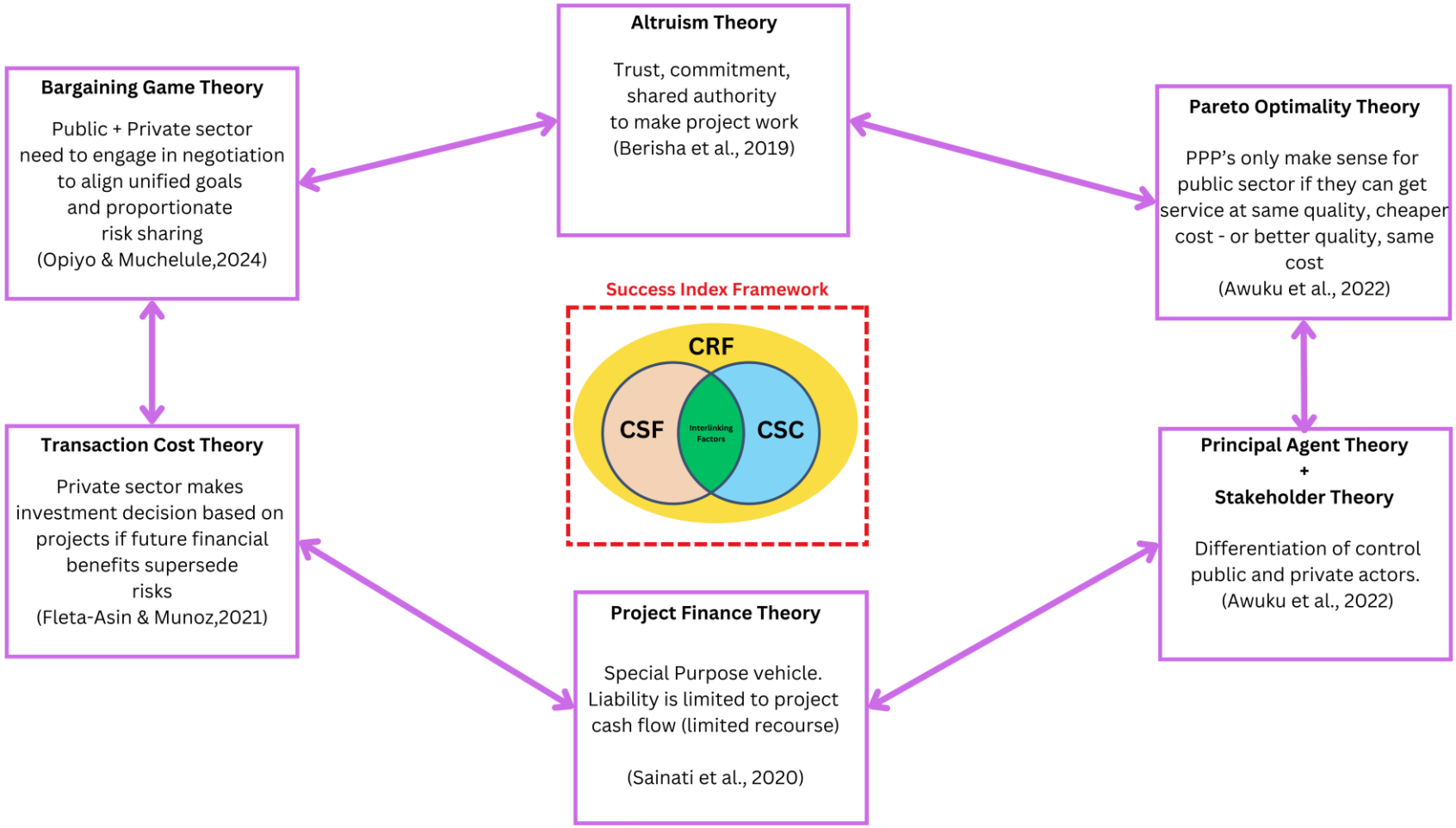


Figure 5. Key theories that influence the Success Index (Authors own)

2.3 What are the Critical Success Factors in enabling PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa.

The Critical Success Factors were investigated, and similar concepts were captured into themes as described in the following sub-sections.

2.3.1 *Theme: Macro Political and Regulatory Factors*

Stability at the country level politically and within the regulatory frameworks have been identified as key Critical Success Factors within the literature (Montmasson-Clair & Ryan, 2014). The National Energy Regulator of South Africa (NERSA) is mandated to regulate the electricity industry in accordance with the Electricity Regulation Act (Electricity Regulation Act, 2006). In the context of PPPs registration licenses have been given to preferred bidder projects from NERSA as a pre-requisite to achieving Financial Close. The signing into law of the Electricity Regulation Amendment Act 38 of 2024 (Electricity Regulation Amendment Act, 2024), coupled with the unbundling of Eskom transmission has added a layer of complexity to the implementation of the formal government programmes, with increased competition from private or corporate PPA projects. These complexities further extend to considerations surrounding the Broad-Based Black Economic Empowerment (BBBEE) Act, No 53 of 2003 within PPPs in the electricity generation sector. With many private sector entities finding the BBBEE laws complex and costly with intended outcomes of enabling tangible broad based wealth creation and financial inclusion often not being realized due to politically connected BBBEE partners often being selected. (Chetty, et al., 2023).

Strong political will and support to PPP type infrastructure programmes has a big impact on whether PPPs should have an enabling environment to thrive or not (Fernando & Nanayakkara, 2020). This is evident throughout literature, Mokan

(2021) states that “political soundness” is one of the critical items to consider when implementing PPP type models in the power sector.

Sound energy policy has been identified as a Critical Success Factor, according to Ndlovu and Telukdarie (2020). South Africa was ranked amongst the top ten countries globally in 2015 with respect to renewable energy penetration, due in part to sound energy policy and stability in the regulatory and statutory environments. However, this changed when the REIPPPP program was paused from 2015 to 2018, with the then Eskom CEO refusing to sign PPA’s (Kruger, 2023). This coincided with a period whereby there was a lack of clarity with respect to coal and nuclear procurement within the energy mix, creating hesitation for private sector investors due to policy uncertainties (Baker, 2015). Although political decisions within the power sector are not purely economic, the decision to recommit to the REIPPPP programme under the Ramaphosa administration with the signing of the PPA’s by the then Minister of Energy Jeff Radebe in 2018 following a hiatus, showed the impact that political will can have on electricity procurement programmes implemented under PPP arrangements.

This was seen in other geographies as well, whereby Amovic et al. (2020) undertook a study in Bosnia and Herzegovina a country going through a market and political transition that highlighted political instability as a hinderance to the adoption of PPPs in the infrastructure sector within that country. Zhang and Shahid (2024), further highlight that the high capital costs associated with PPP projects often run the risk of governance issues, with high-ranking officials often embroiled in allegations of political interference and corruption. Furthermore, Eskom was not immune to the impacts of corruption, political interference and poorly implemented cadre deployment policies that were characteristic of State Capture (Bhorat et al.,2017).

2.3.2 *Theme: Effective Procurement*

The PPP model within the electricity sector in South Africa is reliant on the successful procurement of energy and associated ancillary services. Transparency, consistency and fairness in the procurement and adjudication

process has been highlighted as a critical factor in PPP's (Fernando & Nanayakkara, 2020). Cost and resource allocation is a major determinant factor in effective procurement, and the best way to get value for money for both the private and public sector is through a competitive tender process Muleya et al. (2019). Which has clear bid responsibilities and requirements for all stakeholder entities Montmasson-Clair & Ryan (2014). This should be conducted under periodic and rolling tenders/bids over time to capture technological evolution and allow for gradual market and supply chain maturity (Kruger & Eberhard, 2023). However, as Muleya et al. (2019) has shown that setting up a competitive tender is not adequate to solicit private sector interest, this needs to be accompanied by a bankable Power Purchase Agreement (Zhang & Shahid, 2024). The PPA should include very clear clauses with regards to dispute resolution, ethics and matters of contract governance such as corruption and ethical supply chain concerns. Within PPP in the electricity sector in South Africa, the bankable PPA is accompanied by an Implementation Agreement, Direct Agreements and Grid Connection Agreements (DMRE Tender, 2024). These project documents are provided in a standardized form to allow for a "like for like" comparison amongst competing bidders purely from a techno-commercial and economic development criteria perspective, which increases private sector confidence in the programme. Upon selection as a Preferred Bidder, the private consortium concerned is responsible to ensure that all the necessary approvals and permits are in place prior to the commencement of construction at Financial Close.

2.3.3 *Theme: Financial and Economic Factors*

Stable economic conditions within the host country play an important enabling role for PPP in the electricity sector, especially given the high up-front capital costs of renewable energy projects in Sub-Saharan Africa (Kruger & Eberhard, 2023). Given the fact that in PPP type arrangements in the electricity sector in South Africa, the private consortium is responsible for raising 100% of the total investment cost, certainty with respect to revenue streams and tariff structures are critical components in driving competition within the sector (Berisha et al., 2022). The model of transferring risk of capital raising to the private sector

consortium, allows the government to "free up its balance sheet" and allocate it's capital budget elsewhere (Debela, 2022) although in SA it still decided to provide guarantees which curtail its ability to raise capital for other sectors. The government's electricity procurement programme in South Africa is also structured in such a manner that 1% of the development fee is paid to the Project Development Fund as highlighted by Eberhard and Naude (2016) upon the signature of the Implementation Agreement by the Preferred Bidders. Theoretically this allows the programme to in essence self-sustain in terms of administrative costs without any further financial assistance from other government departments. Historically government backed guarantees have often been viewed as critical in markets looking to drive a greater penetration of PPP models (Owolabi et al., 2019). They reduce the risks to the private capital providers for buyer default, making the projects more attractive financially and reducing financing costs tied to risk premiums (PPIAF, 2019). In South Africa, government guarantees have historically been 100% for the previous bidding rounds, however with the government's electricity procurement programme growing in market maturity, calls to have these reviewed and reduced have been implemented with these guarantees having been reduced to 80% for the REIPPPP Bid Window 7 (DMRE Tender, 2024). Another critical factor for PPP adoption is the availability of suitable and adequate capital markets as stated by Fleta-Asin and Munoz (2021), further supported by strong local capital providers for both debt and equity (Muleya et al., 2019). Suitable capital markets and strong local capital providers are important as they are often capable of providing project liquidity in local currency, which can provide stability against exchange rate fluctuations (Muleya et al., 2019). Furthermore, getting the price "right" - "sustainability in the tariff" and striking a balance between competitivity and overall project lifecycle fiscal sustainability is an imperative that requires public sector focus and attention in the adjudication process (Montmasson-Clair & Ryan, 2014). Van der Merwe and Brent (2020) refer to this as the capability of the project to provide a profit and pay off its debts without violating any of the covenants attached to the loans.

2.3.4 *Theme: Project Feasibility Factors*

The actual physical construction project needs to be viable. Opiyo and Muchelule (2024) highlight the need for a thorough and realistic project lifecycle cost and benefits analysis, that incorporates a feasibility assessment, resource planning, as well as development, construction and operations budgeting. Furthermore, in the fast-moving renewable energy industry technology quickly becomes obsolete, therefore Kukah et al. (2023) states that projects should be designed and built with an inclination towards energy efficiency – which in turn requires the latest technologies at an optimized project levelized-cost-of-electricity (LCOE). This is ever more vital given that within the electricity supply industry of South Africa, private generating assets are competing for limited grid capacity with projects bid under the formal reverse auction tender programmes. Therefore, the PPP programmes must be designed to ensure that projects selected as Preferred Bidders are able to connect to the national grid within allotted timelines and costs (Ayamolowo et al., 2022). Kruger and Eberhard (2023) also highlighted the necessity of having sufficient confidence on sub-surface geotechnical conditions within the development area of the PPP project. Montmasson-Clair and Ryan (2014) add to the requirements of project feasibility by reiterating the need for a thorough energy yield assessment in reducing uncertainties on production as a key enabler to PPP Project Delivery Success.

2.3.5 *Theme: Organizational Factors*

Casady et al. (2019) state that PPP's form part of a new type of organization that interlinks government with private sector actors through a paradigm known as New Public Governance (NPG). NPG forms the foundation of PPP projects being delivered successfully and is categorized by a network of complex interactions and contractual agreements between the public and private sector entities responsible for delivering PPP projects successfully. This arrangement as referred to by Casady et al. (2019) is underpinned by "pillars" of trust, capacity and legitimacy. Altruism theory plays a major role in organizational factors, with Berisha et al., (2019) highlighting that for this new type of organization to work,

shared authority, commitment and responsibility are essential altruistic components between the private and public sector actors. Given the nature of the PPP arrangement – the literature highlights appropriate risk transfer to the private sector for the financing, design, build and operation of the projects as the most critical organizational factors (Opiyo & Muchelule, 2024; Fleta-Asin & Munoz, 2021; Debela, 2022). Fernando and Nanayakkara (2020) show that this can only be achieved by a capable and well experienced private consortium. Thus far the focus has been on structure of the organizations and the people, however Telukdarie (2020) states that necessary systems must be in place to manage costs, schedule and quality of the construction programme as this will strengthen the public-private organizational structure, allowing for competing demands and needs to be managed centrally with agreed upon KPI's. This will assist in alleviating the inherent tensions and power relations that are typical of an SPV type arrangement within project financed infrastructure projects, as is the case in the formal reverse auction electricity generation programmes in South Africa (Liu et al., 2022). Communication is critical in such arrangements and Berisha et al. (2022) mentions that well established and clear contracting structures combined with distinct management roles in a clear organogram, could help ease the burdens of public sector administration resourcing as stated by Debela (2022) which are critical factors for successfully delivering PPP projects. Muleya et al. (2019) further emphasises the importance of a well-resourced, competent central PPP office to facilitate and act as an interface between private partner stakeholders and intergovernmental bodies responsible for enabling PPP project delivery success. This is further supported by Montmasson-Clair and Ryan (2014) in that the public sector should ensure that there is strong alignment inter-governmentally to avoid unnecessary backlogs.

2.3.6 *Theme: Social Factors*

For large scale infrastructure projects to be successful, community buy in is an imperative (Boyer, 2019). To enable this Eberhard and Naude (2016) show that the PPP requires a clear plan and engagement strategy on ensuring that beneficiation via local economic development initiatives is supported by

community members and leaders. Another social factor consideration is the job opportunities and technology transfer to the local industry and localization of certain value chains as described by Zhang (2024) that overtime may develop into platforms for local economic development.

2.3.7 *Proposition for Research Question 1*

There are a total of twenty-nine (29) Critical Success Factors that enable PPP Project Delivery Success within the formal reverse auction electricity generation sector of South Africa. These Critical Success Factors can be captured into six themes, namely (1) Macro Political and Regulatory Factors, (2) Effective Procurement Factors, (3) Financial and Economic Factors, (4) Project Feasibility Factors, (5) Organizational Factors, and (6) Social Factors.

2.4 What are the Critical Success Criteria that could be used in measuring PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa

2.4.1 *Theme: PPP Measurement Specific Factors*

The Critical Success Criteria within the literature include components that were identified as measurement specific factors driving PPP Project Delivery Success. Okudan and Budayan (2021) highlighted that measurability is pivotal throughout all stages of a project. Aspects such as environmental performance (Osei-Kyei & Chan, 2019), health and safety (Aisheh et al., 2019) and governance of the relationship between private consortia and the public sector entities (Osei-Kyei & Chan, 2019) have been identified as key measurement factors specific to PPPs. Furthermore, the traditional project management factors of time, budget and scope have also been identified as key measurement factors in driving PPP Project Delivery Success (Osei-Kyei et al.,2017).

2.4.2 *Proposition for Research Question 2*

There are a total of six (6) Critical Success Criteria that include all the measurement specific items that could be used in measuring PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These combined all fall under the theme: PPP Measurement Specific Factors and include a combination of “hard” traditional project management factors, as well as “soft” environmental performance and relationship governance factors.

2.5 How do the Critical Success Factor and Critical Success Criteria overlap (Interlink Factors) in driving PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa

In certain instances, due to the similarities between Critical Success Factors and Critical Success Criteria – they often overlap as stated by Lamprou and Vagiona (2022), creating these Interlink Factors that are both enablers and measurable items.

Within the reviewed literature in the theme: Macro political and regulatory factors, there were two (2) identified Interlink factors, namely: (1) strong political will and support; and (2) low levels of political interference. Strong political will and support was found theoretically to be a factor that was an enabler and a measurement factor in PPP projects (Fernando & Nanayakkara, 2020). Furthermore, low levels of political interference were found to be both an enabling factor and measurement factor that is required to be constantly monitored throughout a PPP project. Identifying and flagging potential matters pertaining to conflict of interests linked to politically connected individuals (Tsireledzo, 2022).

Within the theme Social factors, there were another (2) identified Interlink factors, namely: (1) Project beneficial to local economic development, and (2) Technical upskilling of the local community. Lawrence (2020) as well as Eberhard and

Naude (2016) highlighted the importance of local employment within the PPP projects as well as ensuring IPP's monitored and met their Economic Development thresholds (DMRE Tender, 2024). With Pandey et al. (2021) stating that effective technology transfer tied with technical skills development should be imparted within local communities and monitored for its effectiveness in developing countries.

2.5.1 *Proposition for Research Question 3*

There are a total of four (4) Interlink factors, which are an overlap of components that are both enabling (Critical Success Factors) and measurable (Critical Success Criteria) factors. These interlinks occur within the themes of Macro political and regulatory factors and theme of Social factors. The Interlink factors are namely: (1) low levels of political interference, (2) strong political will and support, (3) project being beneficial to local economic development and (4) ensuring technical upskilling of local communities is prioritized within the programmes.

2.6 What are the Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa

Wang and Zhang (2017) stated that effective risk management is an overarching component required to make a PPP project successful. The risks are described below.

2.6.1 *Design, Land and, Permitting and Site-Specific physical risks*

Design risks and site-specific physical risks, such as geotechnical, hydrological and topographical risks need to be accounted for upfront to enable the project to be viable (Jokar et al., 2021). Wang and Zhang (2017) have also stated that all issues related to land and permits must be sorted out in alignment with the programme schedule to prevent delays.

2.6.2 *Legal Risks*

Sarmento and Renneboog (2021) state that legal risks play a major role in ensuring that procurement practices during the tender phase are transparent and aligned, to avoid discrepancies that may later lead to legal challenges or even the halting of the programme due to misalignment of laws and statutes.

2.6.3 *Financial Risks*

Overarching financial risks from lenders to equity providers need to be managed for the PPP Programme to be successful (Alomea-Frimpong et al., 2022).

2.6.4 *Government and political risk*

Political risks need to be accounted for throughout a project, especially with respect to changes in law and government – including managing risks associated with political interference (Ampratwum et al., 2022).

2.6.5 *Supply chain risk*

PPP projects within the electricity generation sector in South Africa are exposed to risks associated with supply chain constraints that need to be managed. These are caused by geopolitical tensions such as the Russia-Ukranian war and COVID-19 that may cause shipping congestion - increasing prices and delaying delivery as described by Notteboom, Pallis and Rodrigue (2020) for exported key equipment such as battery packs, wind turbine nacelles and solar panels.

2.6.6 *Change management risk*

PPP projects as a form of the hybrid organization categorized under the New Public Governance concept are subject to change management risk (Krogh & Triantafillou, 2024). The intertwined contractual documentation and intricate interactions between public and private sector actors are always dynamically

changing as the market changes, this risk needs to be managed to ensure alignment amongst all stakeholders.

2.6.7 *Public opposition risk*

Furthermore, the risk of labour strikes on construction projects due to poor community engagement is a risk that needs to be managed (Wang & Zhang, 2017). This can be done via a well thought out stakeholder and public engagement plan (Boutilier & Zdziarski, 2017).

2.6.8 *Environmental risk*

The PPP Projects are subject to environmental risk due to the requirements to have Environmental Authorizations (EA) in accordance with the Environmental Management Act 107 of 1998 (NEMA) for bid submission (DMRE Tender, 2024). Furthermore, interested parties opposed to the development have legal grounds to challenge the projects during the Environmental Impact Assessment (EIA) process.

2.6.9 *Construction, Commissioning and Operational Risks*

Once a project has achieved Financial Close, risks that can lead to delays or cost overruns need to be managed intently, and Mazher et al. (2022) has highlighted that this management of risks of the construction, commissioning and environmental performance are critical to ensure a project can be successful.

2.6.10 *Proposition for Research Question 4*

There are thirteen (13) Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These are namely (1) Design risks, (2) Site specific physical risks, (3) Land and permitting risks, (4) Government and political risks, (5) Supply chain risks, (6) Legal risks, (7) Change management risks, (8)

Financial risks, (9) Public opposition risks, (10) Construction risks, (11) Commissioning risks, (12) Operations risks and (13) Environmental risks.

2.7 Conclusion of Literature Review

This chapter provided an overview of the key definitions and their theoretical basis including a summary of Critical Success Factor, Critical Success Criteria, their interlinks and Critical Risk Factor literature as it pertains to PPPs within the formal reverse auction electricity generation sector of South Africa.

From the literature it was identified that there were twenty-nine (29) enabling Critical Success Factors, six (6) measurable Critical Success Criteria, four (4) Interlink factors and fourteen (14) Critical Risk Factors that needed to be managed to drive PPP Project Delivery Success. These combined factors are the basis upon which the detailed conceptual Success Index framework schematised in Figure 6 has been developed. This conceptual framework shows how the seven (7) different themes namely: (1) Macro Political and Regulatory Factors, (2) Effective Procurement Factors, (3) Financial and Economic Factors, (4) Project Feasibility Factors, (5) Organizational Factors, (6) Social Factors and (7) Project Measurement Specific Factors combine the Critical Success Factor, Critical Success Criteria, Interlink Factors and Critical Risk Factors into a consolidated detailed conceptual Success Index framework. The framework model is colour coded with a descriptive legend. This framework will be the theoretical starting point for the empirical analysis and discussion of the finding in Chapter 4.

Given the literature review, four main research propositions have emerged from the research question, these are summarised and presented in the following subsections as well as in the consistency Table 3.

2.7.1 *Proposition for Research Question 1*

There are a total of twenty-nine (29) Critical Success Factors that enable PPP Project Delivery Success within the formal reverse auction electricity generation sector of South Africa. These Critical Success Factors can be captured into six themes, namely (1) Macro Political and Regulatory Factors, (2) Effective Procurement Factors, (3) Financial and Economic Factors, (4) Project Feasibility Factors, (5) Organizational Factors, and (6) Social Factors.

2.7.2 *Proposition for Research Question 2*

There are a total of six (6) Critical Success Criteria that include all the measurement specific items that could be used in measuring PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These combined all fall under the theme: PPP Measurement Specific Factors and include a combination of “hard” traditional project management factors, as well as “soft” environmental performance and relationship governance factors.

2.7.3 *Proposition for Research Question 3*

There are a total of four (4) Interlink factors, which are an overlap of components that are both enabling (Critical Success Factors) and measurable (Critical Success Criteria) factors. These interlinks occur within the themes of Macro political and regulatory factors and theme of Social factors. The Interlink factors are namely: (1) low levels of political interference, (2) strong political will and support, (3) project being beneficial to local economic development and (4) ensuring technical upskilling of local communities is prioritized within the programmes.

2.7.4 *Proposition for Research Question 4*

There are fourteen (13) Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation

sector of South Africa. These are namely (1) Design risks, (2) Site specific physical risks, (3) Land and permitting risks, (4) Government and political risks, (5) Supply chain risks, (6) Legal risks, (7) Change management risks, (8) Financial risks, (9) Public opposition risks, (10) Construction risks, (11) Commissioning risks, (12) Operations risks and (13) Environmental risks.

Table 3. Consistency Table: Research questions and propositions

RQ #	Research Question	Prop #	Proposition
1	What are the Critical Success Factors in enabling PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?	1	There are a total of twenty-nine (29) Critical Success Factors that enable PPP Project Delivery Success within the formal reverse auction electricity generation sector of South Africa. These Critical Success Factors can be captured into six themes, namely (1) Macro Political and Regulatory Factors, (2) Effective Procurement Factors, (3) Financial and Economic Factors, (4) Project Feasibility Factors, (5) Organizational Factors, and (6) Social Factors.
2	What are the Critical Success Criteria that could be used in measuring PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?	2	There are a total of six (6) Critical Success Criteria that include all the measurement specific items that could be used in measuring PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These combined all fall under the theme: PPP Measurement Specific Factors and include a combination of “hard” traditional project management factors, as well as “soft” environmental performance and relationship governance factors.
3	How do the Critical Success Factor and Critical Success Criteria overlap (Interlink Factors) in driving PPP Project	3	There are a total of four (4) Interlink factors, which are an overlap of components that are both enabling (Critical Success Factors) and measurable (Critical Success Criteria) factors. These

RQ #	Research Question	Prop #	Proposition
	Delivery Success in the formal reverse auction electricity generation sector of South Africa?		interlinks occur within the themes of Macro political and regulatory factors and theme of Social factors. The Interlink factors are namely: (1) low levels of political interference, (2) strong political will and support, (3) project being beneficial to local economic development and (4) ensuring technical upskilling of local communities is prioritized within the programmes.
4	What are the Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?	4	There are thirteen (13) Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These are namely (1) Design risks, (2) Site specific physical risks, (3) Land and permitting risks, (4) Government and political risks, (5) Supply chain risks, (6) Legal risks, (7) Change management risks, (8) Financial risks, (9) Public opposition risks, (10) Construction risks, (11) Commissioning risks, (12) Operations risks and (13) Environmental risks.

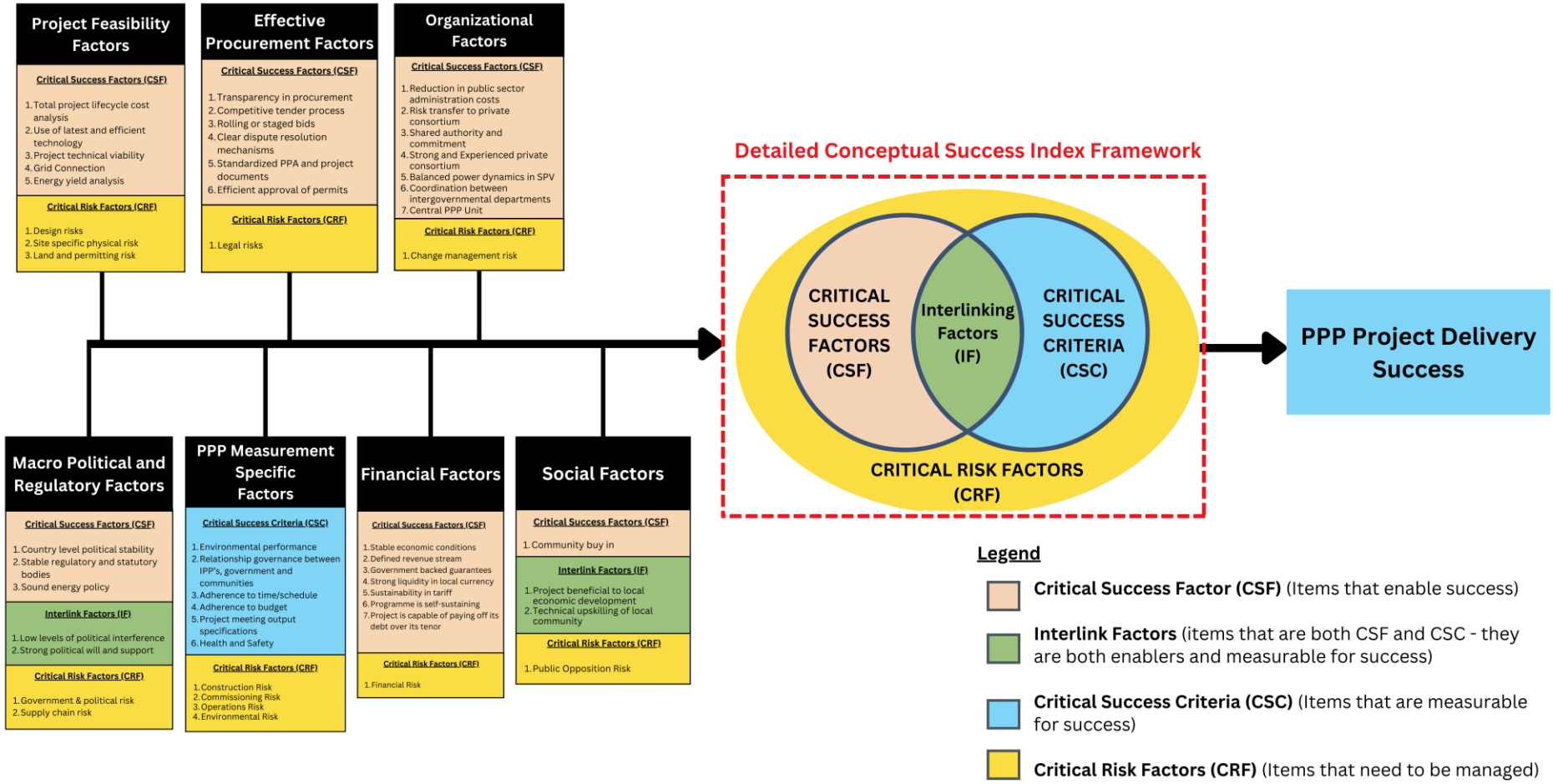


Figure 6. Detailed conceptual framework of the Success Index derived from the literature review (Authors own)

CHAPTER 3. RESEARCH METHODOLOGY

This chapter details and justifies the methodology that was implemented for this research study on the development of a Success Index framework for PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. The research approach, research design, data collection methods, population and sample size, measurement instruments, trustworthiness and limitations together with ethical considerations were presented in the following sub-sections.

3.1 Research approach

This research study intends to capture insights from practical working experiences of professionals within public-private partnerships (PPP) in the formal reverse auction electricity generation sector of South Africa. Hence a qualitative research approach was employed in gathering this information on the Critical Success Factor, Critical Success Criteria and Critical Risk Factor constructs and their inter-relationships in driving PPP Project Delivery Success. Qualitative research is suitable for collecting and analysing non-numerical information within context specific phenomena as stated by Ravitch and Carl (2016) - such as was the case in this study. Furthermore, as described by Al-Saadi and Abdou (2016) the qualitative approach is useful in consolidating expert opinions from both public and private sector individuals with respect to understanding success factors of PPP infrastructure developments.

3.2 Research design

This study employed a deductive qualitative research design, with an interpretivist approach in which data was collected using semi-structured interviews. The interpretivist paradigm was chosen for this research study as it enabled knowledge creation through the lense of mutual interaction between the interviewer and the participants (Thanh & Thanh, 2015). Deductive qualitative

research was used for this study as it draws from the propositions and conceptual framework developed during the literature review (Figure 6), as the departure in conducting empirical analysis (Pearse, 2019). This deductive research approach has the benefit of highlighting attention towards existing theory, hence focusing the research on theory refinement, or theory testing whilst simultaneously allowing for the flexibility of the qualitative approach to allow for new insights to emerge from empirical interview data (Fife & Gossner, 2024). In the case of this study the detailed conceptual Success Index framework was the initial "consolidated theory" guiding the development of the interview guide.

3.3 Data collection methods

The data collection method used was a semi structured interview. A semi-structured interview was selected due to it being interactive in nature, versatile and allowing for flexibility during the interview process (Saunders et al., 2015). This interview method is typically coupled with an interview guide (Adeoye-Olatunde & Olenik, 2021). Kallio et al. (2016) describes an interview guide as a coherent list of predetermined questions that are designed to direct overall conversation towards answering the research aims.

For this study the five (5) step approach described by Kallio et al. (2020) was utilized in designing the interview guide (APPENDIX B – Interview Guide).

Step one required determining if semi-structured interviews were the optimal solution for the research problems. This was found to be the case as the interpretivist stance required depth of context specific insights from industry professionals as stated by Elbardan and Kholeif (2017), whilst simultaneously maintaining flexibility to allow dialogue and conversations to flow.

Step two involved having a firm grasp on prior knowledge and literature. This is captured in the detailed conceptual Success Index framework (Figure 6) developed as described in the literature review section (Chapter 2).

Step three involved formulation of the interview guide. Care was taken to ensure that questions were not leading but were as neutral as possible to allow participants to expand on their own professional experiences (Ruslin et al., 2022).

Step four included conducting a pilot test of the interview. This was undertaken to confirm questions are understandable and the interview design captured the insights of the professionals within the allotted 60 minutes. Pilot testing was conducted on the 17th of October 2024, done to strengthen the rigour and improve the reliability of the study (Majid et al., 2017). The pilot tester mentioned minor adjustments to the interview guide which were incorporated into the final version.

Step five involved consolidating the final guide ready for field interviews with professionals. The interview guide that was used to collect the empirical data can be found in APPENDIX B – Interview Guide.

3.4 Population and sample

This section details the population and the sample to be used for the purposes of achieving the study aims.

3.4.1 *Population*

The population for this study was split into three (3) groups. Group 1 was the private sector participants, Group 2 aligned with the public sector participants and Group 3 included professionals that had relevant working experience from both public and the private sector.

Group one included private sector professionals with working experience within Independent Power Producers (IPPs), Private Equity Providers (including BBBEE entities, finance institutions), service providers and consultants, and debt providers (commercial banks or development finance institutions) that had worked on projects within the programmes from RFP release to anywhere up until Commercial Operation plus two years (Project Delivery Success) as per Figure 1.

Group two included the professionals that had worked on either of the formal reverse auction government PPP programmes, through their capacity within either of the following public sector organisations: (1) Independent Power Producer Office (IPPO); (2) Department of Mineral Resources and Energy (DMRE); (3) Energy Regulator (NERSA) and/or (4) Eskom.

Group three included professionals with experience in both private and public sector institutions within the formal reverse auction PPP programmes. This group was important as they were able to opine on questions from the lense of a professional that had worked on both spectrums – enhancing the triangulation of participants as Natow (2019) highlighted that expert interviews where often susceptible to inaccuracies and bias with triangulation a norm amongst researchers to improve credibility.

3.4.2 *Sample and sampling method*

a. *Sample*

The criteria for selecting participants with professional experience within PPP in the electricity generation sector for the purposes of this study was comprised of the requirements below:

- At least 3 years of working experience in PPP programmes within the formal reverse auction electricity generation sector of South Africa.
- Having operated/currently operating in mid-management, senior management or executive roles in line with Rockart's original Critical Success Factor method (Rockart, 1979).

b. *Sample method*

Purposive sampling combined with snowballing was used for this study. Purposive sampling is useful as it allowed for the selection of specific information rich participants, within a selected criteria to best provide answers to the research questions (Patton, 2002). Furthermore, snowball sampling method as defined by Naderifar et al. (2017) was used in tangent with purposive sampling to leverage

professional networks. A total of 21 individuals were interviewed. These consisted of eleven (11) people with private sector only experience, five (5) with public sector only experience, with the remaining five (5) people having both private and public sector experience working within the formal reverse auction PPP programmes in the electricity generation sector of South Africa.

Table 4. Categories of the interview participants

Description of participants	Number of participants interviewed
Participants with private sector ONLY experience	11
Participants with public sector ONLY experience	5
Participants with both public and private sector experience	5
TOTAL	**21**

Saunders et al (2018) highlights the tension between choosing a correct sample, as a limited sample could lead to inconclusive findings, whilst simultaneously avoiding too large a sample in qualitative research as it may create issues of redundant repetition. Cobern and Adams (2020) highlights that due to a lack of consensus researchers should rather be more concerned on ensuring that differing and unique opinions be the markers in selecting a sample from the population, and only when new insights are saturating should the sample be considered valid. Historically Guest et al. (2006) showed that saturation can occur as early as 6 interviews and typically within the first twelve. Helmy et al (2020) used 13 professionals in a similar study. Hence for this study the sample size was determined by saturation.

3.5 The research instrument

The research instrument that was used for this study was a semi-structured interview (APPENDIX B – Interview Guide), with questions in line with the detailed conceptual Success Index framework that was developed under the literature review (Figure 6).

The semi-structured interview research instrument began with descriptive items that formed attribute codes to ensure the participants met minimum requirements to partake in the study as described in section 3.4.2a. This was then followed by the main interview questions - all participants were asked these questions to ensure a level of consistency. Kallio et al. (2016) mentions that this structure is also useful for the novice researcher. Lastly broad open-ended questions were afforded to the participants to garner unique insights that may have been overlooked in the interview guides' design. Given the time availability and flow of the conversation follow up questions were readily available at hand to further facilitate dialogue with the aim of discouraging the use of single word "yes" or "no" type answers (Kallio et al.,2016). Table 5 provides few examples of the questions used in the interview guide (APPENDIX B – Interview Guide).

Table 5. Examples of questions used within the interview guide

Question Type	Example Questions
Descriptive items	Example 1: *"How many years of work experience do you have in total over your entire career?"* Example 2: *"Which technologies in your unique experience have you worked on within the programmes above?*
Main Interview Questions	Example 1: *"In your experience, what are the big macro level factors that need to be in place to enable governments formal reverse auction tender programmes to be successful?"* Example 2: *"What are the social factors that need to be incorporated into a project that enable long term success?*
Broad open-ended questions	Example 1: "Is there anything more that should be measured within the programme to enable more projects reach Financial Close and Project Delivery Success?" Example 2: "Any other factors that could impact programme(s) from delivering projects successfully? Please provide Specific examples (if any)."
Follow up questions	Example 1: "*How important is it for local banks to be able to provide debt in local currency?"*

	Example 2: "How important is an analysis of total project lifecycle cost analysis in selecting a site?

3.6 Procedure for data collection

The respondents were sourced from the interviewer's professional networks. It was made very clear through the cover letter and communication that participation within the semi-structured interview was to be undertaken voluntarily, and responses were to be completely confidential. The participants that agreed to partake, signed consent forms. Balushi (2018) states that signature of the consent form via email can be tricky as it potentially provides a hurdle for participants to commit, therefore, to ease barriers, it was communicated that email confirmation of participation is acceptable and the consent form could be signed prior to the commencement of the interview. This worked well and all participants signed consent forms. For the interviews through online medium like Microsoft teams, signatures of consent forms were sent via DocuSign and signed prior to interview commencement. For those who participated in person, signatures were captured prior to the commencement of the interview in person (if it had not been signed via email). In terms of duration semi structured interviews according to Jamshed (2014) can take anywhere between thirty (30) minutes to over one (1) hour. For this study the actual average time for all 21 interviews was 1:06:03 (1 hour, 6 minute and 3 seconds). Each participant was given an opportunity to read their transcript and make amendments before the data was analysed. Stahl and King (2020) refer to this as member checking, it is helpful in improving the credibility of the overall data.

3.7 Data analysis and interpretation

This study employed qualitative data analysis and interpretation techniques that are rooted in both deductive and inductive strategies (Bingham & Witkowsky,

2022). The five phase deductive-inductive analysis approach as described by Bingham (2023) was used for this study as a viable data analysis frame to achieve the goals of the research and provide detailed answers to the research questions.

Step 1 involved organization of the data. The data collected from the semi-structured interviews was transcribed and captured within the MAXQDA software, then attribute codes focused on experience, public/private sector, medium of interview (face-to-face or online) and identifier of participant were recorded. These attribute codes were developed deductively prior to undertaking the interviews.

Step 2 involved sorting of the data. The acquired interview data was then sorted into themes. These themes were (1) Macro political and regulatory factors, (2) Effective procurement factors, (3) Financial and economic factors, (4) Project feasibility factors, (5) Organizational factors, (6) Social factors and (7) PPP measurement specific factors. These themes were also developed deductively and aligned with the conceptual framework of the Success Index developed within the literature review.

Step 3 involved understanding the data. Once data has been captured within the themes as described in Step 2, a process of open coding and constant comparison was undertaken. The constant comparative method is an inductive technique that involves an iterative process in which codes are developed, defined, re-defined and applied to the data (Glaser, 1965). This process involved multiple iterations on every transcript until all the interview data had been sufficiently analysed. The code book in this phase was a live document that included a definition of each open code and inclusions and exclusions as stated by Bingham (2023), improving the validity and consistency of the analysis.

Step 4 involved data interpretation. In this step a process of pattern coding was employed to group certain open codes together with the aim of deriving findings from the patterns that would be emerging from the empirical data. The process

of pattern coding included combining data, summarizing and deleting information that was not relevant for the research aims (Elliott, 2018).

Step 5 then involved explaining and discussing the data (Chapter 4 of this report). In this step findings are explained in the context of the detailed conceptual Success Index framework (Figure 4) and the dispersed but interlinked key theoretical base that influenced the development of the conceptual framework. This step consolidates empirical findings with the theoretical base allowing for comparisons, confirmation, deviations or even new context specific findings to emerge enriching the research area of Critical Success Factor, Critical Success Criteria and Critical Risk Factor research in PPP within the formal reverse auction electricity generation sector of South Africa.

3.8 Limitations of the study

The use of a non-probabilistic sampling technique and the context specific qualitative design ensures that findings are not easily generalizable.

- Due to the nature of the professionals being interviewed, time was of the essence and only 60 minutes (1 hour) was allocated for the interview. This therefore may have not allowed time for deeper probing into very specific items.
- The interviewer himself is within the sector, even though ethical considerations and confidentiality were communicated to participants, answers to specific questions may have been guarded with the aim of protecting intellectual property or corporate competitive advantages.
- The researcher knows many of the participants personally through interactions within the industry at large, therefore bias in selecting participants and conducting interviews was prevalent – despite attempts to mitigate for this using a detailed reflexivity journal and triangulation.

3.9 Trustworthiness

Researchers are required to show that the highest level of academic rigour and research quality has been undertaken throughout their study. Stahl and King (2020) show that the varying nature of qualitative inquiry requires clear and thorough explanations with respect to the Trustworthiness of the overall research undertaken. Trustworthiness which is the qualitative equivalent of validity or reliability refers to the academic rigour undertaken in ensuring a high level of confidence in the data, interpretation thereof and methods that were utilized (Kakar et al., 2023). Nassaji (2020) specifies four (4) criteria that should be factored into the study and its overall design to ensure quality research outputs in qualitative studies, these are namely, (1) Transferability, (2) Credibility, (3) Dependability, (4) Confirmability. These are described in the following sections, with specific focus on how they apply to this research study.

3.9.1 *Transferability*

This study utilized qualitative analysis techniques with a non-probabilistic sampling method that rules out the random selection of participants (Patton, 2002). However, due to the deductive approach the study can strengthen its ability to be transferable based upon findings aligning with the initial codes and themes. However, the overall design of the research study is not focused on generalizations in multiple contexts.

3.9.2 *Credibility*

Credibility of research refers to how congruent the research findings are to actual reality (Stahl & King, 2020). This concept is the qualitative equivalent to internal validity in quantitative research. In this study triangulation of different PPP programmes and participants from the private, public sector and those having experience working in both have been used to strengthen credibility. Furthermore, the interviews were conducted using different mediums one-to-one in person and via Microsoft Teams one-to-one online. Stahl and King (2020)

states that by applying triangulation of datasets and participants, coupled with member checking in the form of respondent validation by sending transcriptions back to participants to read and provide any corrections is a way of strengthening credibility that was used within this study. A reflexive journal (see extracts in APPENDIX F – Audit Trail and Extracts of Reflexivity Journal) to document thoughts throughout the process was used within this study also as a way of improving the credibility of the research project (Stahl & King, 2020).

3.9.3 *Dependability*

Dependability refers to how much the findings can be trusted (Ahmed, 2024). Haq et al. (2023) refers to dependability as a means of how the research findings endure over time. To increase dependability, Nassaji (2020) states that a comprehensive audit trail should be kept showing the evolution of the study. See APPENDIX F – Audit Trail and Extracts of Reflexivity Journal.

3.9.4 *Confirmability*

Confirmability refers to the degree to which the research study's findings are impartial or objective, with minimal or no impact of researcher biases (Nassaji, 2020). Ahmed (2024) argues that the very nature of selecting a methodology infuses a level of subjectivity into any study thus introducing bias, the argument put forth is that all research has a degree of bias inherent in its overall design, although with varying degrees. For this study due to its interpretative nature, coupled with the qualitative design it is impractical for bias to be completely removed. Junjie and Yingxin (2022) further reiterates that axiologically the values of the researcher undertaking the semi structured interviews are inherently part of the findings. Although high levels of confirmability will not be possible due to this study's design, attempts to improve confirmability were implemented in the form of reflexive journaling and member checking of transcripts (Nassaji, 2020).

3.10 Ethical considerations

This research study incorporated ethical considerations throughout from the research design decisions to the data collection methods, all the way to analysis of the empirical information and reporting of the findings. Especially when interviewing participants.

These ethical considerations were achieved by ensuring that all participants were made aware that all discussions within the semi-structured interviews were to be fully confidential. It was further communicated, that their names were not to appear anywhere within the code book or the final report, as Allmark et al. (2009) states that this is a way to ensure that participant's confidentiality is maintained. Furthermore, their names were replaced by predetermined codes based upon when they are interviewed, in relation to the other participants.

With respect to privacy, participants being interviewed one-on-one were given the opportunity to do so in a closed meeting room, or if it is online via an invite only one-to-one meeting on Microsoft teams. They were alerted to the fact that the interviews will be recorded for transcription and empirical analysis purposes, with the final raw data to be stored in a password encrypted cloud service for a maximum of five (5) years, beyond which the data will be deleted. Privacy and confidentiality operate closely with the concept of informed consent (Allmark, et al., 2009). Informed consent refers to a participant's continuous consent throughout the dynamically changing context of the actual interview. Some participants may feel obliged to continue even though they no longer feel comfortable, or they feel they were uninformed by the initial engagement in setting up the interview. To counteract this, two (2) verbal prompts embedded within the semi structured interview guide asking the participant *"There are some more questions, just checking if you are still comfortable to continue the interview?"*, were used to factor in mitigations for informed consent. If an interviewer requests to pause or end the interview, their requests were duly obliged. One (1) of the twenty-one (21) participants stopped the interview at the prompt of informed consent. See APPENDIX E – Participant's Informed Consent and Member Checking of Transcripts. Although perceived to be minimal, the topic

discussed may raise uncomfortable emotions within the participant, to factor for this, the researcher let the participant know that they can at any point pause or stop the interview and they can decide to not answer any questions in which they are not comfortable providing answers.

The interviewer is a prominent young member of the industry at the time of conducting this research report, and hence participants, especially those approached via purposive sampling may feel obliged to participate due to power dynamic as highlighted by Allmark et al. (2009). This consideration was taken seriously, and the researcher ensured that this is minimised by making the semi-structured interview questions as participant-oriented and neutral as plausible. With interviews conducted at a location and time that best suits the participant.

3.11 Consistency table

RQ #	State Research Question	Prop #	State Proposition	Data Collection Details	Data analysis method
1	What are the Critical Success Factors in enabling PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?	1	There are a total of twenty-nine (29) Critical Success Factors that enable PPP Project Delivery Success within the formal reverse auction electricity generation sector of South Africa. These Critical Success Factors can be captured into six themes, namely (1) Macro Political and Regulatory Factors, (2) Effective Procurement Factors, (3) Financial and Economic Factors, (4) Project Feasibility Factors, (5) Organizational Factors, and (6) Social Factors.	Interview Guide Questions 6,9,12,15,18,21,27,28,29	Five phase deductive-inductive analysis approach
2	What are the Critical Success Criteria that could be used in measuring PPP Project	2	There are a total of six (6) Critical Success Criteria that include all the measurement specific items that could be used in	Interview Guide Questions 2,11,14,17,20,23,24,25,27,28,29	Five phase deductive-inductive analysis approach

RQ #	State Research Question	Prop #	State Proposition	Data Collection Details	Data analysis method
	Delivery Success in the formal reverse auction electricity generation sector of South Africa?		measuring PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These combined all fall under the theme: PPP Measurement Specific Factors and include a combination of “hard” traditional project management factors, as well as “soft” environmental performance and relationship governance factors.		
3	How do the Critical Success Factor and Critical Success Criteria overlap (Interlink Factors) in driving PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?	3	There are a total of four (4) Interlink factors, which are an overlap of components that are both enabling (Critical Success Factors) and measurable (Critical Success Criteria) factors. These interlinks occur within the themes of Macro political and regulatory factors and theme of Social factors. The Interlink factors are namely: (1) low levels of political interference, (2) strong political will and support, (3) project being beneficial to local economic development and (4) ensuring technical upskilling of local	Interview Guide Questions 6,18,21,24,27,28,29	Five phase deductive-inductive analysis approach

RQ #	State Research Question	Prop #	State Proposition	Data Collection Details	Data analysis method
			communities is prioritized within the programmes.		
4	What are the Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?	4	There are thirteen (13) Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These are namely (1) Design risks, (2) Site specific physical risks, (3) Land and permitting risks, (4) Government and political risks, (5) Supply chain risks, (6) Legal risks, (7) Change management risks, (8) Financial risks, (9) Public opposition risks, (10) Construction risks, (11) Commissioning risks, (12) Operations risks and (13) Environmental risks.	Interview Guide Questions 7,10,13,16,19,22,26,27,28,29	Five phase deductive-inductive analysis approach

CHAPTER 4. FINDINGS AND DISCUSSIONS

4.1 Introduction

The findings are presented and discussed in this chapter. The purpose of this study is to explore and identify factors that contribute to the success of formal reverse auction PPP programmes within the electricity generation sector of South Africa. Furthermore, the study aimed to organize these factors into a Success Index framework categorizing them into enablers (Critical Success Factors), measurable items (Critical Success Criteria), factors that are both Critical Success Factors and Critical Success Criteria – referred to as Interlink Factors and the associated risks (Critical Risk Factors) that drive PPP Project Delivery Success.

Each following section within this chapter will include the collated findings with supporting quotations from the research participants. This is coupled with supporting literature and discussions pertaining to the findings in response to the propositions as stated in section 3.11 Consistency table. This chapter will conclude with a comparison of the detailed conceptual Success Index Framework and the updated empirically verified version factoring in context specific insights.

4.1.1 *Historical policy development and key events*

Key events and policy developments have happened in line with the development of the REIPPPP, RMIPPPP and ESIPPPP within South Africa. Figure 7 provides a snapshot with details on each described throughout the findings of this chapter.

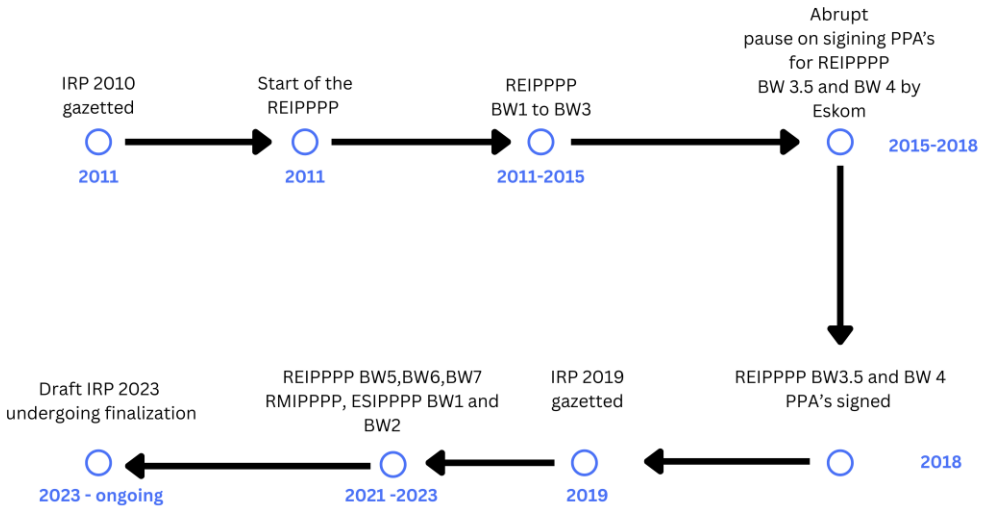


Figure 7. Historical policy developments and key events within the development of REIPPPP, RMIPPPP and ESIPPPP

4.1.2 *Profile of professional participants*

Table 6 provides the profile of the participants that undertook the semi-structured interview for this study, together with the Participant Attribute code as a placeholder to keep their identities anonymous.

Table 6. Participants professional demographics

Participant Attribute	Total Yrs Work Experience	Total Yrs of Electricity Sector PPP Experience	Electricity Sector PPP Experience (Public/Private/Both)	Seniority	Medium of Interview
P1	25-30	13	Both	Senior Management	Online (MS Teams)
P2	10-15	5	Public	Mid Management	Online (MS Teams)
P3	35-40	8	Public	Senior Management	Online (MS Teams)
P4	15-20	10	Private	Mid Management	Online (MS Teams)
P5	5-10	5	Private	Mid Management	Online (MS Teams)
P6	15-20	13	Private	Executive	Online (MS Teams)
P7	25-30	8	Private	Executive	In Person (Face to Face)
P8	15-20	10	Private	Mid Management	Online (MS Teams)
P9	10-15	4	Public	Mid Management	Online (MS Teams)
P11	10-15	3	Public	Senior Technical	Online (MS Teams)
P12	30-35	10	Public	Mid Management	Online (MS Teams)
P14	20-25	13	Both	Senior Management	Online (MS Teams)
P15	30-35	5.5	Private	Executive	In Person (Face to Face)
P16	20-25	5.5	Private	Senior Management	Online (MS Teams)
P18	15-20	13	Private	Executive	Online (MS Teams)
P19	25-30	13	Private	Executive	Online (MS Teams)
P20	15-20	8	Both	Mid Management	Online (MS Teams)
P21	15-20	4	Private	Senior Management	Online (MS Teams)
P23	15-20	13	Private	Executive	In Person (Face to Face)
P24	20-25	5	Both	Executive	In Person (Face to Face)
P27	40+	8	Both	Executive	Online (MS Teams)

From the twenty-one (21) respondents that were interviewed, six (6) of them had been involved in the programme since the inception of REIPPPP BW1 – which correlated with the start of the formal reverse auction PPP programmes in the electricity generation sector of South Africa as shown in Table 1. Eight (8) of the respondents were executives in their current roles, six (6) of the respondents were in senior management and the remaining seven (7) were in mid-level management positions. The respondents in total encompassed comprehensive cross functional experience across the entire sector as per the word cloud in Figure 8. Which depicts their roles and experiences within the formal reverse auction PPP programmes. Thirteen (13) people had IPP experience, four (4) had experience in Development Finance Institutions (DFI), four (4) had experience within the consulting industry in the sector, three (3) people had Eskom experience, three (3) had IPP Office experience, two (2) had commercial bank and senior lender experience, two (2) had DMRE experience, and one (1) had NERSA experience working on the programmes and, one (1) had experience working on formal reverse auction tender programmes from the perspective of National Treasury.

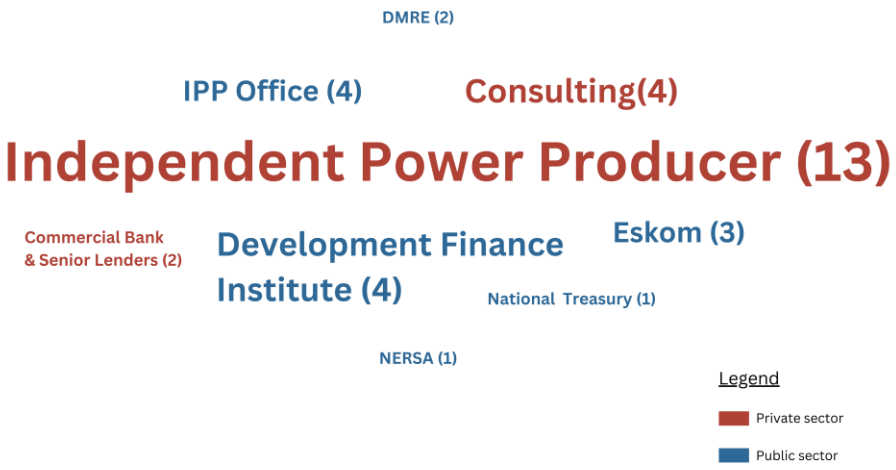


Figure 8. Word Cloud showing the experience spread of the participants

Furthermore, the participants had a good spread of experience working on different bidding rounds as per Figure 9.

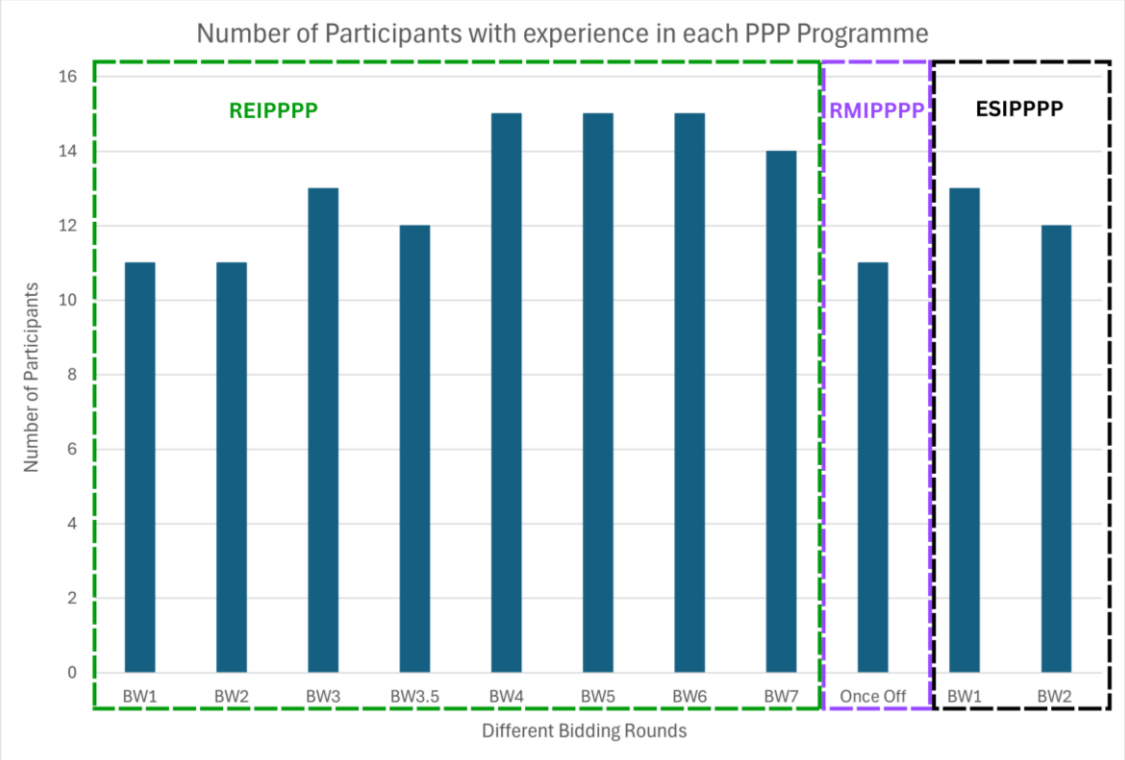


Figure 9. Experience spread of respondents

As shown in Figure 9, the participants in their totality had experience within the various bidding rounds across the board. With BW1, BW2 and the RMIPPPP (Once off programme) having the lowest: 11 out of the 21 respondents (over 50%) with experience. Whilst REIPPPP Bid Window 4, 5 and 6 having the highest number of participants with experience:15 out of 21 (over 70%).

The participants did not only have a balanced spread across the various bidding rounds, but they also had in totality cross functional technology experience. Figure 10 shows technology experience of the various participants across the formal reverse auction PPP programmes in the electricity generation sector of South Africa. All participants had worked on solar within the programme(s), followed by wind (20 participants), hybrid technologies in the RMIPPPP programme (16 participants). Battery energy storage (14 participants), Concentrated solar projects (CSP) (12 participants), Small hydro (6 projects), Biomass (5 participants) and Landfill/biogas (4 participants).

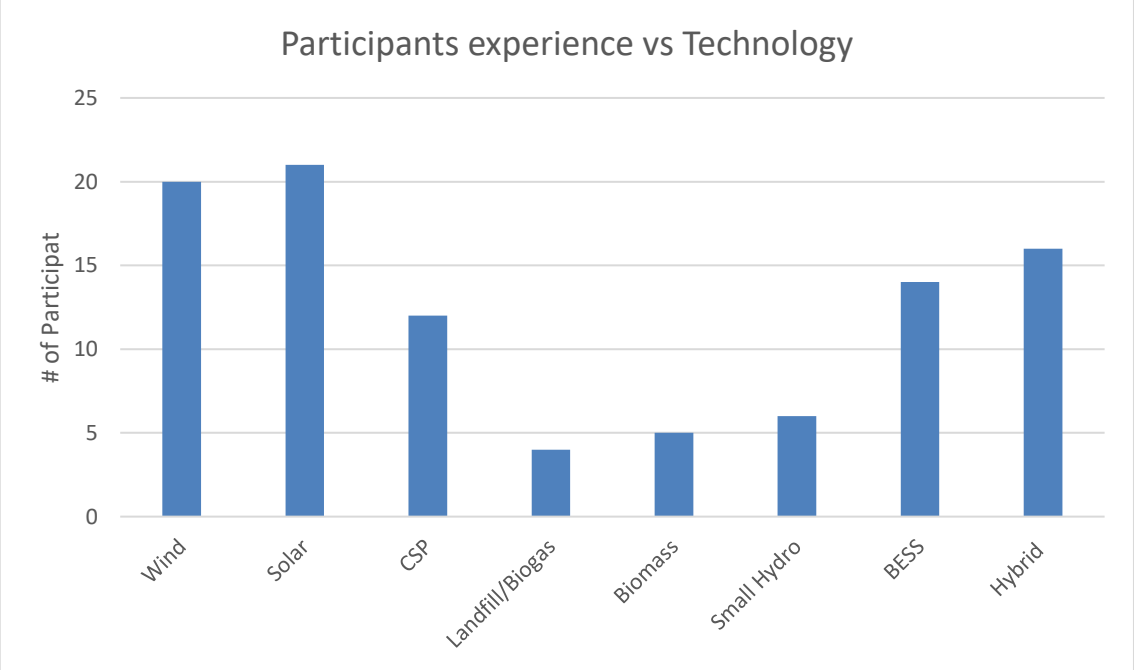


Figure 10. Participants experience vs technology

In the following sections findings pertaining to the research propositions are presented. The quotations throughout this chapter were represented and participants are recognized using the nomenclature:

[*Participant Attribute Code; Seniority; Electricity Sector PPP Experience]*

4.2 in alignment with the details from Table 6. Findings and discussions pertaining to Proposition 1: Critical Success Factors in enabling PPP Project Delivery Success.

The theoretical Proposition 1 as described within Section 3.11 Consistency Table is stated as "*There are a total of twenty-nine (29) Critical Success Factors that enable PPP Project Delivery Success within the formal reverse auction electricity generation sector of South Africa. These Critical Success Factors can be captured into six themes, namely (1) Macro Political and Regulatory Factors, (2) Effective Procurement Factors, (3) Financial and Economic Factors, (4) Project Feasibility Factors, (5) Organizational Factors, and (6) Social Factors."*

Interview questions number 6,9,12,15,18,21,27,28 and 29 as per the APPENDIX B – Interview Guide were aligned with gathering empirical data pertaining to this proposition. The following sub-sections provide insights gleaned from the professional participants with respect to Critical Success Factors that enable PPP Project Delivery Success.

4.2.1 *Critical Success Factors related to Theme: Macro Political and Regulatory Factors*

The Theme: Macro Political and Regulatory Factors was found to consist of four (4) different sub-themes representing Critical Success Factors that enable PPP Project Delivery Success. Within Figure 11 a sentiment analysis is provided of the empirical data showing the percentage of respondents in support of each of the Critical Success Factor components, in relation to the number of respondents per Critical Success Factor.

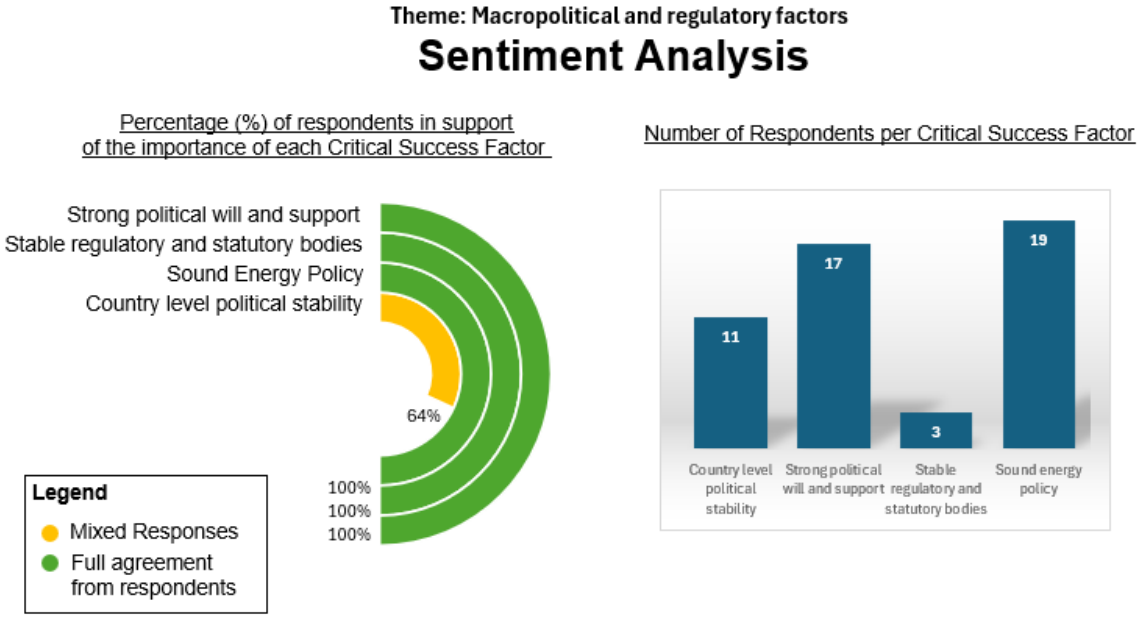


Figure 11. Sentiment analysis of the Critical Success Factors within the theme Macropolitical and regulatory factors

a. *Strong political will and support*

Seventeen (17) of the twenty-one (21) participants provided responses aligned with the need for strong political will and support. All respondents were aligned that it is a key enabler to PPP Project Delivery Success. This finding aligns with literature from Fernando and Nanayakkara (2020) in which the same was identified in an analysis of critical factors for attracting investment for public private partnerships in electricity generation projects for the Ceylon Electricity Board (CEB) of Sri Lanka. P9 mentioned that the very start of the REIPPPP programme in 2011 was enabled by strong political will and support in which the technical modelling outputs for the *Base Case Scenario 0.0* had no renewables, and was policy adjusted to the *Balanced Scenario* (DOE, 2010) to include renewables and enable the materialization of the REIPPPP programme.

"So, for the IRP 2010, the technical modelling outcomes [Base Case 0.0 scenario] were giving coal and no renewables none whatsoever… there was a policy

adjustment for renewable energy to be part of the outcomes of the IRP." [P9, Mid Management, Public]

Furthermore, respondents unanimously raised the issue that a lack of political will caused an abrupt disruption to the programme due to Eskom not signing PPA's of Preferred Bidder projects from REIPPPP Bid Window 3.5 and Bid Window 4. This view aligns with Lawrence (2019) who states that during this period investment within the REIPPPP programme went from R170 billion in 2011, to R50 million in 2017.

"I mean it was exemplified from 2014 to 2018. Everything stopped." [P15, Executive, Private]

Furthermore, as highlighted by (Lawrence, 2019) political support under the Ramaphosa administration restarted the programme in 2018 with the signing of the twenty-seven (27) outstanding PPA's from REIPPPP Bid Window 3.5 and 4.

The empirical findings align with the literature. Describing that strong political will and support is a key enabler in driving PPP Project Delivery Success within the various programmes.

b. ***Country level political stability***

There were mixed responses from eleven (11) of the twenty-one (21) participants with respect to country level political stability and it's enabling impact on PPP Project Delivery Success. Amongst the Macro-Political and Regulatory factors this received the most mixed responses.

"Although you can do these projects in a country where there's not a lot of political stability. I think you're going to struggle a little bit more and it will be more expensive because you will pay for the political instability. But I think it is possible." [P27, Executive, Both]

The "more expensive" as stated by P27 aligns with insights from P24 who states that from the perspective of global IPP's investing in South Africa political stability

at a country level is a key contributing factor to enabling favourable investment conditions.

“There's a country risk premium that's built into cost of capital, if political stability become difficult, it first influences your country risk premium. But then at a macro level, being a multinational or having an international multi-country portfolio, you must look to see where your money is best placed. Globally.” [P24, Executive, Both]

The literature pertaining to the Transaction Cost Theory supports P27 and P24’s views that having country level political stability reduces associated contingencies and layered costs related to factoring in the risk of political instability upfront (Fleta-Asin & Munoz, 2021). Amovic et al. (2020) undertook a study in Bosnia and Herzegovina during a period of wide-reaching market and political transitions, and it was found that political instability was a core hindrance to PPP adoption. The programme(s) remain attractive to IPP’s especially international IPPs due to future financial benefits superseding risk as per the Transaction Cost Theory (Fleta-Asin & Munoz, 2020). However, having country level political stability enables PPP Project delivery success by minimizing provisions for costs beyond the core transaction of procuring electricity utilizing the PPP model.

c. *Stable regulatory and statutory bodies*

Three (3) of the twenty-one (21) participants highlighted stable regulatory and statutory bodies as enablers of the programme. Before the commencement of REIPPPP, NERSA had announced a Renewable Energy feed-in Tariff (REFiT) scheme as a means of attracting investment into renewable energy in 2009. However, as stated by Lawrence (2019) the then Minister of Energy indicated that 2009 tariffs as opposed to the NERSA revised 2011 tariffs would be used in the first procurement round. This in essence subsidized the first round of the REIPPPP. The tariffs for REIPPPP Bid Window 1 were hence capped at these 2009 ReFIT rates (Lawrence, 2019).

“NERSA tried [REFiT]…. but because there was no certainty in terms of the policy framework, particularly in terms of guarantees and in terms of the PPA not being commercially acceptable. It did not go ahead.” [P1, Senior Management, Both]

This aligns with Montmasson-Clair and Ryan (2014) that stable regulatory frameworks create certainty in how the programmes are to operate serving as a key enabler to PPP Project Delivery Success. The empirical data and the literature are well aligned.

d. ***Sound energy policy***

Nineteen (19) of the twenty-one (21) participants spoke to sound energy policy as a key enabler to PPP Project delivery success. The respondents unanimously stated that clarity within energy policy, especially the Integrated Resource Plan (IRP) creates certainty within the formal reverse auction government tender process. Although as shown in section 4.2.1b, with Country level political stability the projects can go ahead despite policy uncertainty, albeit at a cost. This aligns with literature from Ndlovu and Telukdarie (2019) that highlighted South Africa being on the correct trajectory to diversify its electricity supply mix with regards to energy policy - albeit policy implementation still being a concern. However, as an enabling factor sound energy policy received the most attention in terms of the quantum of respondents amongst the enablers within the Theme: Macro political and regulatory factors.

“I think the formal government programmes have been great… and creates certainty in the market and hopefully when the IRP 2023/24 comes out, it will create that same amount of confidence, stability and certainty.” [P20, Mid Management, Both]

The empirical data and the literature are well aligned on sound energy policy being a key enabling factor in driving PPP Project delivery success.

4.2.2 *Critical Success Factors related to Theme: Project Feasibility Factors*

The Theme: Project Feasibility Factors was found to consist of four (4) different sub-themes representing Critical Success Factors that enable PPP Programme success. Within Figure 12 a sentiment analysis is provided of the empirical data showing the percentage of respondents in support of each of the Critical Success Factor components, in relation to the number of respondents per Critical Success Factor.

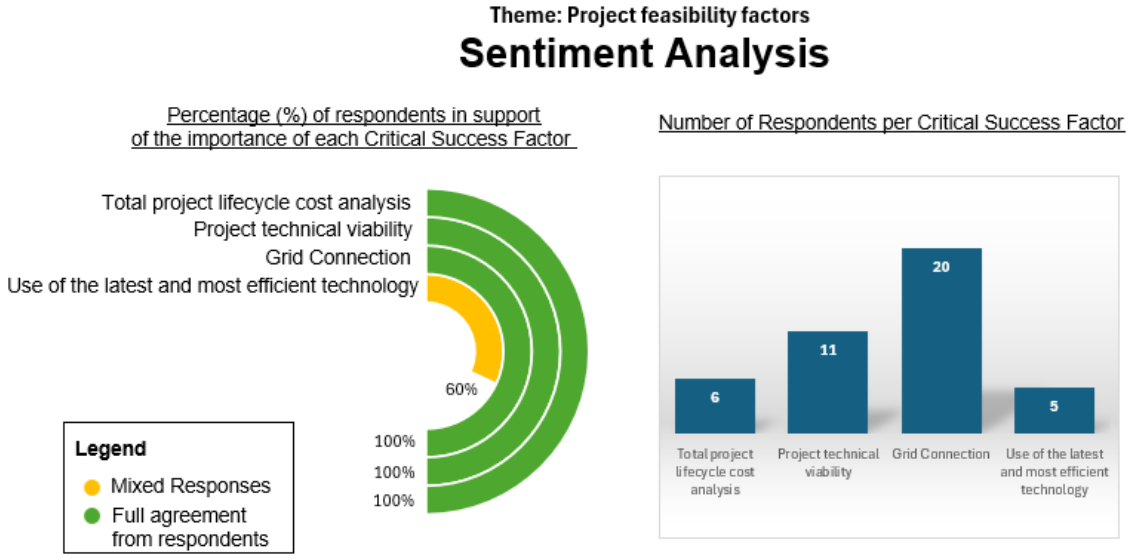


Figure 12. Sentiment analysis of the Critical Success Factors within the theme Project feasibility factors

a. *Total project lifecycle cost analysis*

Six (6) out of the twenty-one (21) participants, mentioned aspects related to an analysis of total project lifecycle cost as an enabler to PPP Project Delivery success. All respondents agreed on its importance in relation to modelling and provisioning for lifecycle viability upfront. Vanegas-Cantarero et al. (2022) aligns with this further stating that a holistic multi-criteria evaluation looking at the techno-economic, environmental and socioeconomics of a project should be

incorporated into the lifecycle costing and not be purely based on a levelized cost of energy calculation alone.

“It's important [Total project lifecycle cost analysis] because it plays into your tariffs. We haven't seen what a decommissioning looks like yet in these programmes, but it's been covered within the RFP, and we hope that's going to be a success.” [P4, Mid Management, Private]

A study by Opiyo and Muchelule (2024) highlighted that a thorough and realistic project lifecycle costing is an enabler for project success. Therefore, the empirical data and the literature are well aligned on the importance of undertaking a total project lifecycle analysis upfront, with a key subtlety being that soft costs associated with socio-economic, and environment-related factors are not ignored at the expense of traditional hard project costs typical of an LCOE analysis.

b. *Use of the latest and most efficient technology*

Five (5) of the twenty-one (21) participants provided mixed responses with regards to whether the use of the latest and most efficient technology was an enabler to PPP Project Delivery Success. Amongst all the factors under the Theme: Project Feasibility Factors, the use of the latest and most efficient technology had the most mixed responses. Some respondents stated that it does enable PPP Project Delivery Success due to reducing cost, mitigating for technological obsolescence and overall improvements in the environmental impact due to a smaller project development footprint.

“The more efficient the technology is, the smaller the footprint becomes. You now see with the latest technology in PV that the footprint of a plant is much smaller than it was in Bid Window 1”. [P12, Mid Management, Public]

“In an ever-evolving technology sector, it's important to move with the latest and most efficient technology. We've seen that module wattages for example from

two years ago have already become obsolete from a production point of view." [P20, Mid Management, Both]

The insight from P12 and P20 align with Kukah et al. (2023) who stated that energy efficiency should be a key determinant in the overall project design, hence encouraging the latest and most efficient technology.

Respondents however cautioned that using the latest and efficient technology can hinder the project development due to new platform prototype models, especially in wind often being untested in real-site conditions due to the rapid technological evolution.

"I think it is important to get the latest technology, but sometimes you also want more steady technology." [P7, Executive, Private]

"I know early on in the program we had problems with the wind turbines where they were prototypes." [P4, Mid Management, Private]

The mixed responses may in part be explained by most projects being developed and banked historically using Project Finance Theory (Sainati et al., 2020) with the SPVs often having 80 - 90% of the total investment cost in debt financing (IEJ, 2022). Hence the lenders of the debt influence technology selection preferring tried and tested solutions to reduce the impacts of poor plant performance and availability, which in turn will harm the ability of the project to service its debt. Therefore, the IPPs are required to undertake a trade-off between "new" best-in-class equipment and tried and tested options.

c. *Project technical viability*

Eleven (11) out of the twenty-one (21) participants mentioned project technical viability as an enabling factor. From these respondents it was unanimous that high confidence in the project's overall technical solution upfront was an enabler of PPP Project Delivery Success. The most important consideration being that project sites should undertake technical feasibility studies and assessments that reduce technology-specific uncertainties.

“Ensure feasibility studies are done” [P6, Executive, Private]

This finding aligns with Montmasson-Clair and Ryan (2014) who also highlight the importance of project technical viability within the projects in the various programmes.

Furthermore, site selection and design considerations should align closely with maximizing resource potential, with care to be done to avoid underestimation, as participants have highlighted this as a common issue for solar and wind projects.

“Resource is important because the right technology needs to thrive under the right resource. Hence there are specific areas that you see more of a specific technology whether it's PV or more of wind.” [P6, Executive, Private]

P6 highlights that key to the technical viability of a project is in choosing a development site with the highest possible energy resource specific to the technology. For solar PV this would be maximizing the Global Horizontal Irradiation. Whereas for wind projects it would be optimizing the site-specific wind speed and power curve. The empirical data related to project technical feasibility aligns with the literature as a key factor in enabling PPP Project delivery success.

d. *Grid Connection*

Amongst all the critical success factors, grid connection received the second (2^{nd}) most attention from the respondents with twenty (20) of the twenty-one (21) participants stating that it is one of the primary reasons for failure within the programmes, and if unlocked could become a key enabler driving PPP Project Delivery Success.

From the findings grid connection factors can be categorized into four (4) components. Namely: (1) Grid expansion; (2) Grid modernization and grid code compliance, (3) Grid connection process and associated costs, and (4) Streamlining of grid accessibility rules. Figure 13 provides a graphical representation of the four (4) grid connection components identified through the empirical data, the arrows represent how all four components are required to work

together to ensure grid connection becomes an enabling factor to PPP Project Delivery Success. In the following sub-sections, each component was detailed with supporting data empirically and from relevant literature.

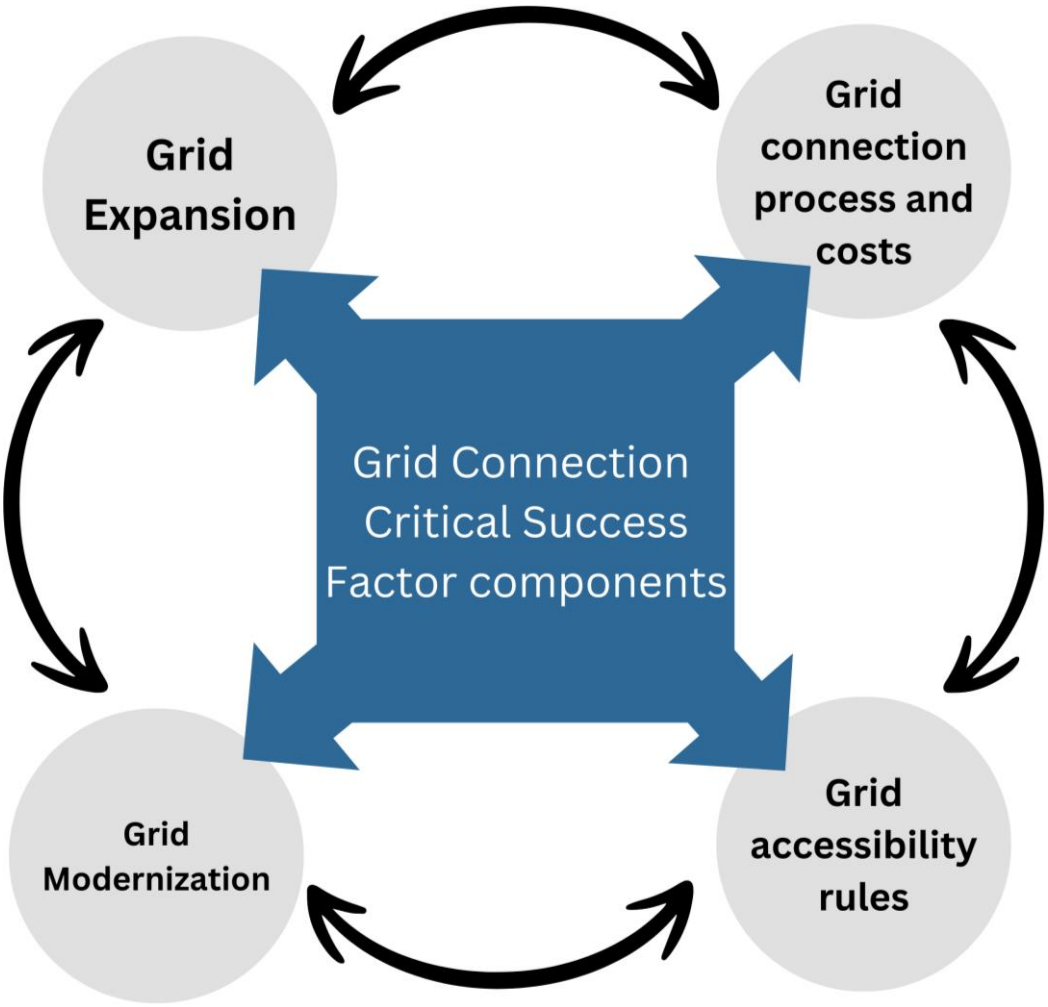


Figure 13. The grid connection components that enable PPP Delivery Success

i. Grid expansion

Respondents mentioned that investment into the transmission infrastructure in line with the Transmission Development Plan (TDP) was a key enabling factor in unlocking grid capacity, with nearly 14 500 km and 210 transformers providing 133 000 MVA of transformation capacity required by between 2025 – 2034 (Eskom, 2024).

“That goes to my point that I made from RMIPPPP up to REIPPPP Bid Window 6. The problem that you have is there's no investment into grid capacity.” [P12, Mid Management, Public]

With the DMRE stating that for Bid Window 6 they had received 4 116 MW of Onshore Wind bids (for the allotted 3 200 MW), however, none could be selected due to “no grid capacity being available to connect” in the provinces of the Eastern Cape and Western Cape (DMRE, 2022).

Respondents highlighted models such as the Independent Power Transmission (IPT) model – in which the private sector and the public sector collaborate on grid expansion projects. This to fast track the grid expansion bottleneck. This model is not new within the global context of the electricity supply industry. Developing countries such as Brazil have private sector participation through concessional type Independent Power Transmission (IPT) projects (Santos et al., 2021). In the context of South Africa, National Treasury released a Request for Information into the market on the 11 December 2024 to gather insights and market appetite for the ITP (National Treasury, 2024). However, P12 bemoans the lack of urgency, reiterating that this issue has been common knowledge within the industry.

“I know that the IPP office is working on a pilot project to procure grid, but that's already two years in the making. They're too slow. They're not moving with the times. We need grid now.” [P12, Mid Management, Public]

Furthermore, P5 highlighted the issues concerning servitudes for grid infrastructure needing to be in place as another bottleneck in the process of rolling out the transmission line infrastructure.

“It’s really tough to get servitudes.” [P5, Mid Management, Public]

President Cyril Ramaphosa signed into law legislation that provides organs of the state with mechanisms to expropriate land in the public interest (Republic of South Africa, 2024). This new law replaces the previous very similar Expropriation Act (Act No. 63 of 1975) and may enable Eskom to fast-track servitude negotiations with landowners further speeding up the process. The empirical data

and literature align that the need for grid expansion is an enabler of PPP Project Delivery Success.

ii. Grid modernization and grid code compliance

Participants also raised that it is not purely grid expansion but also grid modernization that needs to be undertaken. P11 states that ensuring Original Equipment Manufacturers (OEMs) specifications for active and reactive equipment such as inverters or other power electronic equipment are aligned with the relevant South African Grid Codes and ancillary services requirements is an enabling factor in PPP Project delivery success.

"For example, the inverters that are used in our plants are pretty much built in Europe or China, and they are built according to European specification or IEEE specification…. But there also needs to be some testing of these inverters done within South African standards" [P11, Senior Technical, Public]

Furthermore, the findings show that grid modernization does not only speak to the physical equipment, but as P12 mentions, it touches on the regulatory levers to allow for mechanisms such as a grid curtailment framework to enable the System Operator to alleviate congestion at specific grid nodes as a key enabler to PPP Project delivery success. At the time of writing, Eskom was busy consulting the industry about a revised grid curtailment framework.

"Curtailment is very important, especially for the wind technology." [P12, Mid Management, Public]

iii. Grid connection process and associated costs

Respondents mentioned the need to have better alignment between Eskom's Cost Estimate Letter, which is a budgetary estimate of cost and scope for grid connection works and the binding Budget Quote Process to enable better scoping and costing of the grid projects. The literature from Filipova et al (2019) aligns with the view of P6 in that the budget quote cost "in many instances is several times more expensive" than what was received at the CEL stage.

"*There is a discrepancy between the cost of connection that you get when you apply for the CEL [Cost estimate letter] versus what you get when you're in BQ [Budget Quote] stage" [P6, Executive, Private]*

This finding aligns with Ayamolowo et al (2022) who state that getting the costing aligned and less variability between CEL and BQ can enable efficient and effective connection of projects within the correct timelines to the national grid.

iv. Streamlining grid access rules

Lastly, Participants mentioned that the initial focus should be on the "low-hanging fruit", and it was highlighted that incentivizing IPPs to bid at certain substations or nodes of the network that were not congested could reduce the impact of congestion. The Energy Storage Programme (ESIPPPP) was mentioned as a good example of how designating connection substations assisted the projects in moving from Preferred Bidder to Financial Close.

Furthermore, the findings show that the growing private/corporate PPA (cPPA) market is bolstered by the Electricity Regulation Amendment Act that was signed into law on the 16th of August 2024 (Electricity Regulation Amendment Act, 2024). This amendment allowed for wide-reaching reforms to transform the electricity generation sector in South Africa into a system and market operator model. Therefore, allowing cPPA projects to compete with the formal reverse auction PPP projects for grid access via wheeling agreements with private entities. This created issues as the formal reverse auction projects required preferred bidder status before advancing to grid connection with Eskom, whereas the cPPA projects did not have the same dependency – often allowing them to advance grid connection faster. This created an unfair advantage for cPPA projects competing with formal reverse auction projects for the same limited grid capacity. To circumvent and formalize grid access rules Eskom published the Interim Grid Capacity Allocation Rules (IGCAR, 2023).

Participants welcomed the IGCAR rules for their principle of “first ready first serve”. Encouraging an orderly queuing system for all grid connection applications (be it cPPA or formal reverse auction government programme applications).

4.2.3 *Critical Success Factors related to Theme: Effective Procurement Factors*

Theme: Effective Procurement Factors included eight (8) different sub-themes that are Critical Success Factors in enabling PPP Project Delivery Success. Within Figure 14 a sentiment analysis is provided of the empirical data showing the percentage of respondents in support of each of the Critical Success Factor components, in relation to the number of respondents per Critical Success Factor.

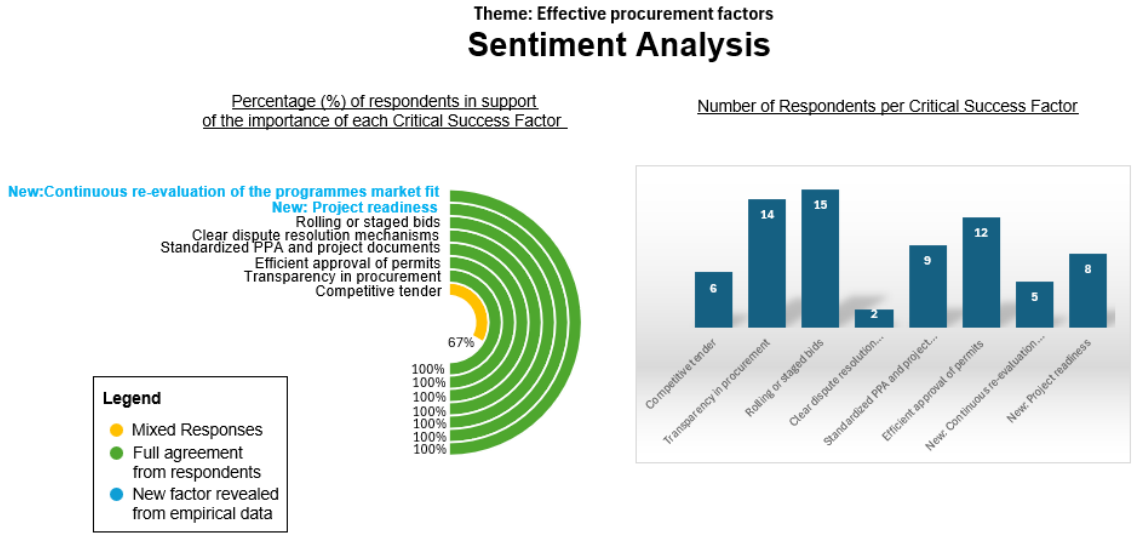


Figure 14. Sentiment analysis of the Critical Success Factors within the theme Effective procurement factors

a. *Transparency in procurement*

Fourteen (14) of the twenty-one (21) participants responded to transparency in procurement being an enabling factor, all respondents were unanimous that it is one of the most critical factors in establishing credibility and maintaining fairness when adjudicating submitted bids within the programmes. This aligns with the

literature as Fernando and Nanayakkara (2020) in their study on attracting public-private partnerships for the Ceylon Electricity Board in Sri Lanka mentioned fairness in the procurement and adjudication process as one of the key enabling factors.

“So, the evaluation is also performed by external parties. It is then presented to the IPP office staff or leadership, and it then also goes through a process to the department (DMRE). But the department does not have any influence in the evaluation process.” [P12, Mid Management, Public]

Figure 15. Extracted from IPPO Q2 report (IPPO, 2024)

Figure 15 provides a graphical representation of the evaluation process (IPPO, 2024). (1) Starting with an assessment of the bids, followed by (2) interdisciplinary meetings, (3) clarifications to bidders, (4) Finalization of Part B outcomes and then (5) evaluation of Part C which include Price (90%) and Economic Development (10%) (DMRE Tender, 2024). P15, a private sector executive, mentioned that this separation of responsibilities and stringent measures put in place enabled tight controls providing confidence within the market amongst IPPs that adjudication is undertaken fairly and without disturbance.

"Not once have I sensed that anyone from the IPP office or the advisors for that matter, are leaking prices.” [P15, Executive, Private]

However, P9 states that policy adjustments were undertaken which in essence skewed procurement from the least cost in 2010, with very little transparency on the decision.

“There was a policy adjustment for renewable energy to be part of the outcomes of the IRP.” [P9, Mid Management, Public]

Although this was favourable to the REIPPP, the increased need to ensure energy security in line with the decommissioning of coal sees future policy adjustment changes that may favour dispatchable power in the form of gas and nuclear from 2030 (Draft Integrated Resource Plan, 2024).

The empirical findings show that although within the programme there has been transparency in procurement. This has not been the case at the policy level with the “policy adjustments” to the integrated resource plan not being undertaken transparently.

b. *Competitive tender*

Six (6) out of the twenty-one (21) participants provided responses related to aspects of competition as an enabler in driving PPP Project Delivery Success. The respondents were aligned on its importance, however, there were mixed responses with some cautioning that hyper-competition may encourage unsustainable practices.

The battery tender was highlighted as an example of a programme that encouraged good competition. ESIPPPP Bid Window 1 and Bid Window 2, were stated by P15 to have very different requirements to the REIPPPP as the substations in which bidders could submit compliant bids were pre-selected. Therefore, competition between bidders at each substation was purely based on capital expenditure and proximity to the connection substation.

It was highlighted that competition discourages the harmful practice of collusion between IPPs and other private sector actors – facilitating efficiently priced bids in alignment with the Transaction Cost Theory (Fleta-Asin & Munoz, 2021).

So, I think the reality is that if you don't have competition, you have risk of collusion and that's detrimental to all of us." [P21, Senior Management, Private]

Respondents however cautioned that aiming to be competitive can often result in other important "soft" social and environmental factors being neglected. The study done by Vanegas-Cantarero et al. (2022) criticizing over-reliance on levelized cost of energy at the expense of other important softer factors aligns with the findings that price should be cognisant of environmental and socio-economic considerations. P16 reiterates this point.

"From my perspective, I represent the ESG components…I'd say that the pricing competitive element can really affect the ability for developers to bring in the sustainability elements." [P16, Senior Management, Private]

From the empirical findings, competition in the formal reverse auction tender programmes is a key enabling factor. This aligns with the literature; however, mechanisms should be in place to ensure that competition is not at the expense of other critical components such as sustainability within environmental and social factors.

c. ***Rolling or Staged Bids***

Fifteen (15) of the twenty-one (21) participants provided insights concerning the irregularity and unpredictability with respect to the timing of the RFP release per bidding round. Amongst all the Critical Success Factors under the Theme: Effective Procurement Factors, rolling or staged bids were highlighted as the one that is disabling the programme the most however, the respondents mentioned that if this "low hanging fruit" could be improved, it could become one of the key enablers to the overall procurement process driving PPP Project Delivery

Success. This specific factor aligns with the altruistic commitment required from both private and public sector actors to make the programme work (Berisha et al., 2019). Private sector respondents stated unanimously that foreknowledge of RFP release dates was a key factor in mobilizing teams and resources, to ensure that the most comprehensive and competitive bids are prepared.

“If you know, for example, that an RFP is going to be released every year in March, you can prepare towards, that mobilize resource towards that, and you have that momentum on an annual basis.” [P8, Mid Management, Private]

It was further mentioned that announcement of Preferred Bidder projects should preferably not happen in the month of December, as was done for REIPPPP Bid Window 7 and ESIPPPP Bid Window 2 as this aligns nationwide with the “*builder’s break”* a period when most contractors, consultants, financiers and employees of government are on leave (Engineering News, 2024).

“When the holidays start, that's a very bad time to announce Preferred Bidder. You can't mobilize until next year when everybody is back.” [P19, Executive, Private]

Furthermore, public and private respondents agreed that proper planning of bid release dates could minimize the impact of running two (2) or more RFPs concurrently. As was the case with REIPPPP Bid Window 7 and the ESIPPPP Bid Window 2 programme as shown in Figure 16. As described in section 4.5.5c (New: Skilled labour shortage risk) concurrent RFPs stretch the already limited resource pool within the country.

“We see that at the current moment having to adjudicate REIPPPP Bid Window 7 plus ESIPPPP Bid Window 2 creates a bit of a bottleneck.” [P21, Senior Management, Private]

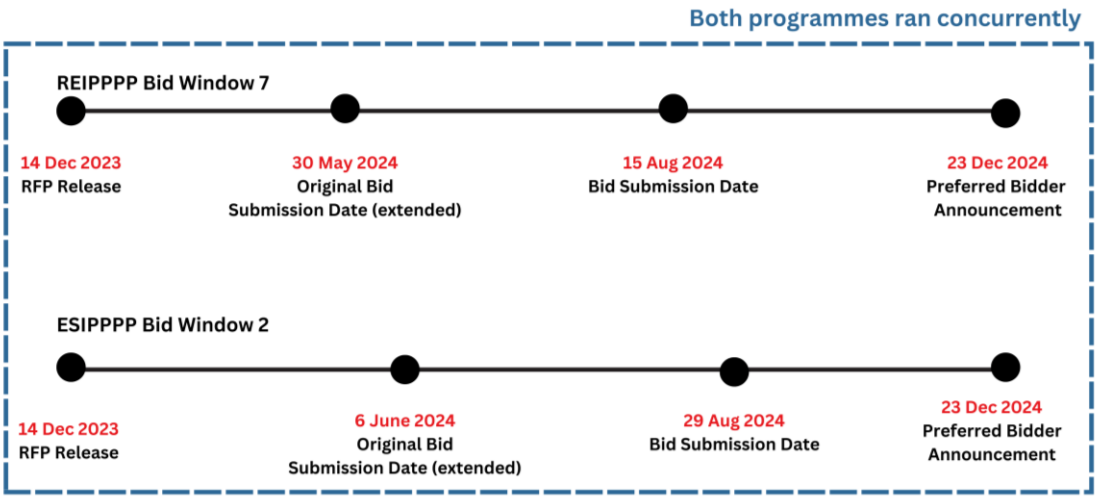


Figure 16. Graphical depiction of the timelines between RFP release and Preferred Bidder announcement for both REIPPPP BW7 and ESIPPPP BW2 (Author's own)

P19 mentions that there is also a financial impact on projects when dates are extended and do not align within the stipulated tender document timeframes.

"There is also a financial impact from haphazard bids - the longer the time ensues between bid submission and financial close, the riskier the project becomes because of movements in the exchange rate." [P19, Executive, Private]

The empirical findings show that bid release dates set well in advance with predictable regularity provide the market with certainty and allow IPP's, lenders, consultants, partners and the relevant government entities time to plan, reducing a lot of the bottlenecks and issues observed in previous bidding windows hence enabling more projects to achieve PPP Project Delivery Success. Furthermore, from the perspective of government planned roll out of RFPs allows for sufficient time to adjudicate with the best possible consultants and advisors.

d. *Clear dispute resolution mechanisms*

Only two (2) of the twenty-one (21) participants mentioned clear dispute resolution mechanisms as being key enablers to PPP Project Delivery Success.

The low response to this component may largely be due to respondents mentioning that these already exist within the clear contractual structure of the programme(s), embedded within the PPA, Implementation Agreements, Direct Agreements and the various Connection Agreements.

“It's outlined upfront. They indicate what jurisdiction you will have if you go for arbitration… so they are quite clear” [P1, Senior Management, Both]

The findings are aligned with Zhang & Shahid (2024) who mention that a bankable PPA includes clear dispute resolution mechanisms. The empirical evidence is aligned with the literature on clear dispute resolution mechanisms being a key enabler to PPP Project delivery success. P3 states that due to the clarity of the contractual documents, the IPPO historically has spent very little time in court, enabling them to focus on their core mandate of procuring formal reverse auction PPP electricity generation projects.

e. ***Standardized PPA and project documents***

Nine (9) of the twenty-one (21) participants highlighted the importance of the standardized PPA and project documents. All respondents agreed that this factor was a key enabler to PPP Project Delivery Success due to it creating a level of certainty across the market for all IPPs.

“I do think that it's beneficial because it does create certainty in the market. It also creates certainty for the IPP [which in turn] creates certainty for the lenders as well.” [P18, Executive, Private]

P5, an executive, makes the point that this standardization reduced the time private consortia spent with lenders as the banks already understand the risk profile of the programmes.

“The fact that the project documents are standardized makes our financing easier. We spend very little time with banks.” [P5, Mid Management, Private].

The empirical data aligns with literature from Nel (2018) on the growing PPP market in the energy sector of South Africa stating the benefits of standardized PPA and project documents. Therefore, having these standardized documents streamlines the procurement process and enables PPP Project Delivery Success.

f. *Efficient approval of permits*

Twelve (12) of the twenty-one (21) participants highlighted that efficient approval of permits was a key enabler, however it was mentioned that it is often confusing having different timelines and requirements for different programmes.

"*In the ESIPPPP, there has been a reduction in the requirements around EIA legislation. So, you undertake a much more reduced and expedited process" [P16, Senior Management, Private]*

Participants highlighted that the establishment of a "One stop shop" whereby all the various government departmental bodies are co-ordinated and streamlined can better enable efficient approval of permits driving PPP Project Delivery Success.

"*You have other entities that pull in different directions. So, there's no coordination. You see this in renewables as well. That's why the National Energy Crisis Committee (NECOM) wanted to start that One Stop Shop." [P12, Mid Management, Public]*

Within the literature Owusu-Manu, Adjei, Sackey, Edwards and Hosseini (2020) show that delays and slow approvals are one of the components that disable Ghana's growing interest in public private partnership type models in the energy sector. The empirical data aligns with the literature regarding the importance of permits being approved efficiently in driving PPP Project delivery success.

g. *New: Continuous re-evaluation of the programmes market fit*

A new sub-theme emerged from the empirical data, a definition to describe Continuous re-evaluation of the programmes market fit is provided below:

Table 7. Definition of continuous re-evaluation of the programmes market fit

Sub-Theme	Researchers own definition
Continuous re-evaluation of the programmes market fit	Recurrent multi-stakeholder engagements to review the programme and identify items that are working and those that could be improved. *(Author's own)*

Five (5) out of twenty-one (21) participants mentioned that for the programmes to remain relevant in the dynamically changing environment of electricity generation procurement in South Africa. Constant re-evaluation is required both at a programme-specific level and energy policy level. Ensuring alignment between private and public sector actors in driving PPP Project Delivery Success.

"*So, we need to think about changing with the time and making sure the program stays relevant." [P27, Executive, Both]*

This aligns with the Bargaining Game theory and the New Public Governance paradigm of constant engagement between public and private sector actors (Opiyo & Muchelule, 2024; Casady et al., 2019). It was raised by P23 that currently when an RFP is released engagement occurs through briefing notes which was stated as being helpful. However, it was noted that more workshopping can be done in between bids to align goals and ensure proportionate risk sharing.

"From the IPPO side, I think that they need to look at retrospective learning to see what is working instead of just continuing the process." [P23, Executive, Private]

Private sector respondents noted that the perfect example of this was the grid issues for wind projects in REIPPPP Bid Window 6, and again in REIPPPP Bid

Window 7 with both bidding rounds unable to procure a single wind project from the combined allocation of 6 400 MW from both programmes.

Respondents noted that not much retrospection was done to adjust/amend the programme to account for the grid constraints from REIPPPP BW 6 to BW 7. Leading to the "grid disaster" as mentioned by P15 repeating itself with REIPPPP BW7.

h. *New: Project Readiness*

Another new sub-theme emerged from the empirical data referred to as Project Readiness. A definition used to identify this sub-theme is provided below.

Sub-Theme	Researchers own definition
Project Readiness	Mechanism to be incorporated into the adjudication process to ensure projects submitted during a bid are ready to reach Financial Close and start construction within the stipulated timeframes of the programme. *(Author's own)*

Eight (8) of the twenty-one (21) participants highlighted that a major enabling factor for PPP Project Delivery Success is that projects that are bid into the programme(s) are shovel ready if awarded Preferred Bidder status.

"So, project readiness is key…. If the lowest tariff is not a winning tariff, if it's not able to reach Financial Close, then it's meaningless. I think it's time we weighed other aspects such as ability and readiness to reach Financial Close." [P5, Mid Management, Private]

This factor was contentious within the findings not due to its importance but rather to the perception of readiness, which were different between the public and the private sector participants. P3, a respondent from the public sector, mentioned that the adjudication process from their experience was rigorous enough that bidders being award Preferred Bidder status had projects that were ready to close.

However, the sentiment was not the same amongst the private sector participants as stated by P5 who stated that bids are laden with assumptions due to there

being no requirement to having binding offers from principal contractors at bid submission within the programme(s). It was further noted that the financial model audit is not sufficient to check for assumptions as it focuses on the “logic integrity and internal consistency” of the formulae as opposed to confirming project readiness (DMRE Tender, 2024).

“If someone bids on fiction….and they still need to go and negotiate, it makes it more difficult. So, project readiness is key.” [P5, Mid Management, Private]

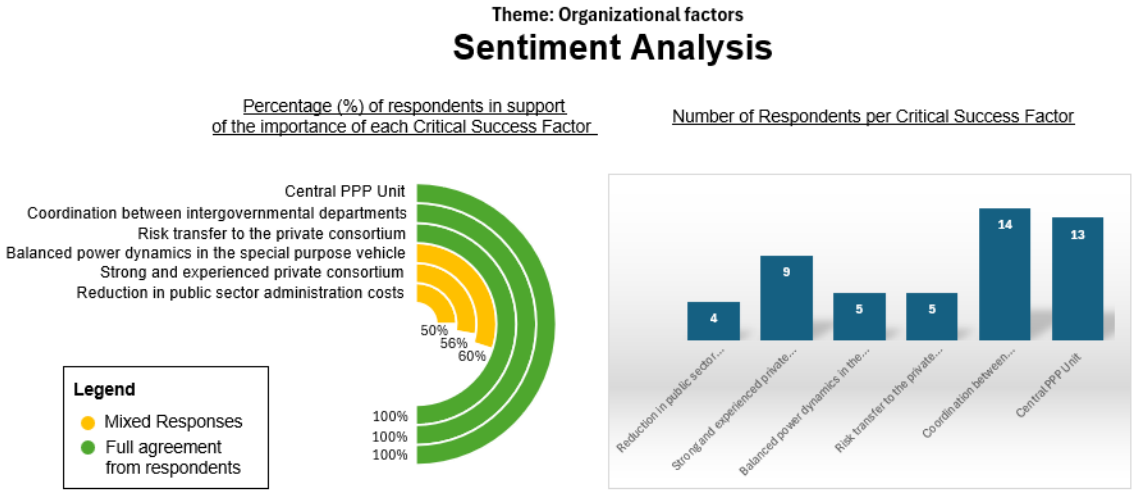
The entire concept of project readiness aligns with the literature on the Principal Agent and Stakeholder theory showing that irrespective of the PPP model, the public entity is ultimately responsible for service provision (Awuku et al., 2022). This has been observed in the calling of the Bid Bonds by the IPP Office for fourteen (14) Preferred Bidder projects in Bid Window 5 that failed to reach Financial Close in Q4 2024. Although the public entity is within its right – this was highlighted as an ineffective long-term solution as 1 400 MW of renewable energy electricity generation from those projects did not materialize as per the IRP’s requirements and timelines. Therefore, still leaving the country with a supply deficit. Project readiness is not a straightforward exercise with higher levels of certainty typically tied to longer development time frames and costs for both lenders and IPPs – which may not be optimal if projects have yet to be selected as Preferred Bidders. However, respondents mentioned that more focus on ensuring Project Readiness upfront would bode well in enabling PPP Project Delivery Success.

4.2.4 *Critical Success Factors related to the Theme: Organizational Factors*

The Theme: Organizational Factors includes six (6) subthemes that are Critical Success Factors in enabling PPP Project Delivery Success. The findings related to these are detailed in the following subsections. Within Figure 17 a sentiment analysis is provided of the empirical data showing the percentage of respondents

in support of each of the Critical Success Factor components, in relation to the number of respondents per Critical Success Factor.

Figure 17. Sentiment analysis of the Critical Success Factors within the theme Organizational factors



a. ***Reduction in public sector administration costs***

Four (4) of the twenty-one (21) participants highlighted mixed responses concerning transferring risks from Design-Build-Finance-Operate (DBFO) projects to a private consortium. With private sector respondents mainly stating that the public sector would not have the capacity to undertake such projects internally. This aligns with the view of Debela (2022) that easing the administration burden on the public sector is a critical factor in enabling the delivery of PPP Projects.

"I honestly don't think they have the capacity for it." [P18, Executive, Private]

However, a respondent with experience working on the formal reverse auction tender programmes from within both the public and the private sectors highlighted that in a country like South Africa, a programme such as REIPPPP or ESIPPPP should enable broader capacity building within the public sector.

"no one can still answer us to this day why Eskom was not allowed to participate in the various IPP rounds." [P14, Senior Management, Both]

It may be argued that the programme was not intended to upskill the public sector but to fill the infrastructure development gap in electricity generation that the public sector could not undertake internally. Hence the programme design aligns with the Pareto Optimality theory (Awuku et al., 2022).

Therefore, reducing public sector administration costs is seen as a key enabler in driving PPP Project Delivery Success.

b. *Risk transfer to private consortia*

Five (5) out of the twenty-one (21) participants spoke to the sub-theme of risk transfer to the private consortium within the programmes' design. The respondents were all aligned that it is an enabler of PPP Project Delivery Success as the current structure of the government entities surrounding the programme were not designed to procure, construct, finance, and operate renewable energy projects within the electricity generation sector of South Africa. However, P20 mentions that only the large IPPs can take the entire design-build operate and construction risk.

"You'll find that some of the larger ones can take on the whole Design Build Finance and Operate scope…it is kind of restrictive because it does not allow any new players or smaller players to enter the market." [P20, Mid Management, Both]

Similarly, Fleta-Asin & Munoz (2021) and Debela (2022) mentioned that it is one of the most important organizational factors in ensuring the public-private partnership model thrives.

c. *Strong and experienced private consortium*

Nine (9) of the twenty-one (21) participants provided mixed insights on the importance of having a strong and experienced private consortium in driving PPP Project Delivery Success within the programmes.

Some participants mentioned that it is vital in de-risking the projects from initial development through to the operations phase. Furthermore, it was highlighted

that a good industrial developer be part of the consortium to bring experience from other projects. This view is reiterated by Fernando and Nanyakkara (2020).

“It's firstly important that you have a very strong industrial player in the Special Purpose Vehicle (SPV) and then supported by other entities which could be, funds or investment vehicles.” [P8, Mid Management, Private]

Furthermore, it was not only technical know-how but also the financial strength of the consortium that was highlighted empirically as being a valuable enabler.

“Financial strength is important for a consortium. In the event that these risks that are not covered by contracts occur, then they can be able to use their financial resources to resolve any issues that may arise.” [P5, Mid Management, Private]

There were differences in the literature and the empirical data. Some respondents highlighted that a strong and experienced private consortium should not be a hinderance to healthy competition and the development of BBBEE partners within the consortium itself.

“The funding for the BBBEE partner and the capacity and capability of the BBBEE partner to actively engage in the negotiations is even after 13 years still limited” [P19, Executive, Private]

From the findings and the literature, a strong and experienced private consortium is required as this greatly improves the chances of PPP Project Delivery Success. However, such a private consortium should align with the principles of the Altruism theory allowing for shared commitment and shared authority between all the shareholders (Berisha et al., 2019).

d. ***Balanced power dynamics in the Special Purpose Vehicle (SPV)***

Five (5) of the twenty-one (21) participants mentioned the difficulty in having balanced power dynamics in the Special Purpose Vehicle (SPV), due to the unbalanced shareholding structure. Hence of the enabling sub-themes within the Theme: Organizational Factors this was viewed as having the most mixed responses. Respondents mentioned that in the incorporation of the SPV, the Memorandum of Understanding (MOU) and the Shareholders Agreement should include aspects that ensure each entity benefits from the arrangement in line with altruistic principles of shared authority and commitment (Berisha et al., 2019).

"It boils down to how the shareholding structure and how the shareholding agreements are structured." [P6, Executive, Private]

With respondents ultimately stating that the responsibility lies with each entity to get the best deal for themselves. However, it was found to be prudent that all shareholder entities within a particular project are aligned to reduce friction and enable PPP Project Delivery Success.

e. ***Coordination between Intergovernmental departments***

Fourteen (14) of the twenty-one (21) participants mentioned aspects with regards to coordination between inter-governmental departments within the programmes. All respondents unanimously stating that this was a critical enabler within the programmes in driving PPP Project Delivery Success. Hai, Toan and Van Tam (2021) comprehensive study on success factors aligns with the finding on the importance of inter-governmental entity support for PPP projects. P12 a public sector respondent states:

"Since RMIPPPP up until bid Windows 6 you have a distinct problem. The project success rate in these programs is about 47% if you take all the projects that have not reached Financial Close. So, you can see there is a material problem there. The problem is mostly a lack of collaboration between government departments and the lack of grid capacity." [P12, Mid Management, Public]

The empirical data is well aligned with the literature on the importance of coordination between intergovernmental departments. This is a key enabler to PPP Project Delivery Success. This also aligns with section 4.2.3f (Efficient Approval of Permits) as better governmental co-ordination will facilitate efficient approvals.

f. *Central PPP Unit*

Thirteen (13) of the twenty-one (21) participants highlighted that the IPP Office was a key enabler, with all respondents unanimously mentioning the importance of such an interface and project office in driving the success of these programmes.

"So, the IPPO for me has been instrumental in the last decade and a bit…In fact, if it wasn't for that office, then none of this would be here." [P14, Senior Management, Both]

However, P12 mentioned that the IPP Office should be firmer in coordinating other government departments, to avoid issues observed within the RMIPPPP concerning gas supply. See Table 8.

"You will note that there were three power ships [Karpowership] from RMIPPP and then one project from Mulilo Total. All four of them did not reach Financial Close. And there's a very good reason for that. It was the gas supply because none of the ports had the infrastructure in place to get the gas supply into the ports…There should have been better coordination from the IPP office side together with the other role players." [P12, Mid Management, Public]

Table 8. The impacts of no gas supply on RMIPPPP projects

Project Name	Evaluation Price (R) (2021)	Contracted Capacity (MW)	Technology	Reached Financial Close
Scatec Kenhardt 1	1 884,64	50	Solar PV, Battery	Yes
Scatec Kenhardt 2	1 884,61	50	Solar PV, Battery	Yes
Scatec Kenhardt 3	1 884,56	50	Solar PV, Battery	Yes
Oya Energy Hybrid Facility	1 550,34	128	Solar PV, Wind, Battery	Yes
ACWA Power Project DAO	1 462,00	150	Solar PV, Battery	Yes
Umoyilanga Energy	1 721,64	75	Solar PV, Wind, Storage	Yes
Karpowership SA Coega	1 468,87	450	**Gas**	No
Karpowership SA Richards Bay	1 496,03	450	**Gas**	No
Karpowership SA Saldanha	1 686,48	320	**Gas**	No
Mulilo Total Coega + Gemsbok PV	1 885,37	197,76	Solar PV, **Gas**	No
Mulilo Total Hydra Storage	1 515,97	75	Solar PV, Battery	Yes

From Table 8, it can be shown that projects that failed to reach financial close all had gas as a technology.

Furthermore, respondents mentioned that the IPP Office should adapt as the market changes and matures.

"So, I think the IPP office hasn't grown with the market and the times we had Minister [Jeff] Radebe, he always said we need to be agile." [P27, Executive, Both]

Muleya et al (2019) states that apart from the presence of a central PPP unit, it is also required to be well-resourced. The empirical data is aligned with the literature. However, respondents from both the public and the private sector were aligned that the IPP Office should be more of a driving force in ensuring that its effectiveness as an enabling factor is maximized.

4.2.5 *Critical Success Factors related to the Theme: Social Factors*

The theme: Social Factors includes three (3) subthemes that are Critical Success Factors in enabling PPP Project Delivery success. The findings related to these are detailed in the following subsections. Within Figure 18 a sentiment analysis is provided of the empirical data showing the percentage of respondents in support of each of the Critical Success Factor components, in relation to the number of respondents per Critical Success Factor.

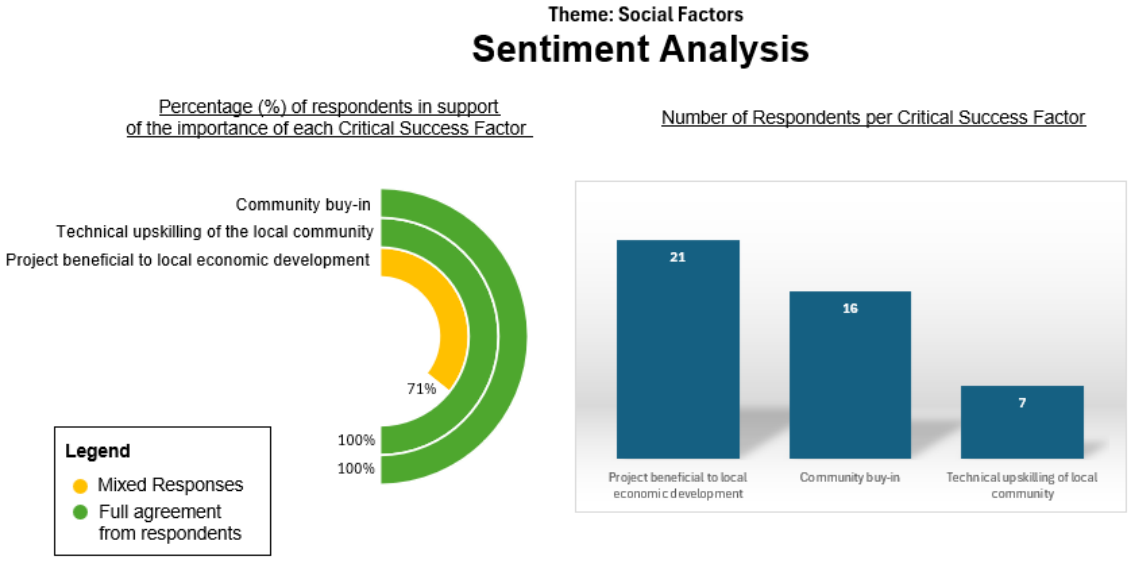


Figure 18. Sentiment analysis of the Critical Success Factors within the theme Social Factors

a. *Community buy-in*

Sixteen (16) of the twenty-one (21) participants mentioned aspects related to community buy-in. All respondents were unanimously in agreement that it is a key enabler for PPP Project Delivery Success. Boyer (2019) supports the empirical data by reiterating the importance of having the community on board from the beginning.

"*You cannot continue without local community buy-in." [P7, Executive, Private]*

Respondents further mentioned that early and focused engagement with landowners, surrounding community leaders, and local business councils was important in avoiding misleading expectations concerning the opportunities the project may bring to the local community.

"I think community engagement early on is very important. It's one thing to just deal with the landowner, however, I do believe that you need to engage with the local community leaders as part of a steering committee so they're fully aware of what's going on." [P20, Mid Management, Both]

The view from P20 aligns with literature from Eberhard and Naude (2016) that public-private partnerships with organized and clear engagement plans were better placed to have community support.

The appointment of an experienced Community Liaison Officer (CLO) was mentioned to better streamline communication as the projects develop (Nkoana, 2018).

"Having some kind of a Community Liaison Officer, especially during the early stages of development and construction… that will be the bridge between you and your stakeholder community, that is very important." [P18, Executive, Private]

The findings concerning community buy-in as a key enabling factor align with the literature. Hence community buy-in was identified as a key enabling factor to drive PPP Project Delivery Success.

b. *Project Beneficial to local economic development*

All twenty-one (21) of the participants provided insights with respect to the project being beneficial to the local economy as an enabler of PPP Project Delivery Success, albeit with mixed responses. Amongst all the enabling factors within the Success Index framework, this was the one that received the most attention from the respondents (with mixed insights), followed closely by the enabling factor of grid connection.

Respondents were aligned that local employment was a key enabler of local economic development, with Eberhard and Naude (2016) in agreement from the literature. P23 a private sector executive reiterated that:

"Emphasis needs to be placed on local employment." [P23, Executive, Private]

However, many respondents also raised concerns that the recent changes in the Economic Development (ED) scoring thresholds from 30% in REIPPPP Bid Window 4 to 10% in the subsequent Bid Windows had the potential to be a long-term disabler to the programmes incentivizing IPP's to focus on tariff above the ED criteria (DMRE, 2022).

"This is a bit of a complex one, but I mean the whole ED portion going down from 30% to 10% was a big loss for the program." [P4, Mid Management, Private]

P4 was not alone in their concerns, with P5 stating that items such as community trusts which are often expensive and *"difficult to fund"* may not be the best way of ensuring maximal beneficiation for the local community. Furthermore, P6 stated that the benefits of a community trust are not well aligned with the intent of local economic development in the formal reverse auction PPP programmes in the electricity generation sector of South Africa.

"But what is the intention of the ownership [in a community trust]? Is it to gain revenue from the dividends and for the community to benefit? If that is the case, why are we just not increasing the Socio-Economic Development spend threshold? [P6, Executive, Private]

Respondents shared mixed insights concerning the viability of local beneficiation via local content and localization. Kaziboni and Stern (2021) mentioned the historical complexities of implementing local content policies in REIPPPP - stating that they “can limit competition and access to international markets”.

“If you want to do local content in terms of PV and battery, there's no way South Africa can compete. Because the technology advances so quickly.” [P24, Executive, Both]

The designated local content requirement removed certain key equipment such as PV modules and inverters (DMRE Tender, 2024). Furthermore, many stated that it can become a key enabler to the programmes if undertaken prudently focusing on localizing aspects of the value chain in which South Africa has a competitive advantage and those that are cross-industry, not specific to renewable energy projects only.

“If you look at the competitive advantages of South Africa, it is very organized around certain minerals and availability of certain technology, not around being the best in class when it comes to manufacturing solar equipment or wind equipment or even battery yet.” [P21, Senior Management, Private]

“Local content is important, but I think we need to really do a deep dive on the value chain of the procurement process and really hone in on what can be truly localized and can be sustained beyond that particular program.” [P6, Executive, Private]

P3 mentions that the formal reverse auction programmes were such an opportunity to change the economic landscape of the country however it has not materialized as was intended. This view aligns with the empirical evidence from other respondents and the literature that having a focused view on local beneficiation is an imperative enabler in driving PPP Project delivery success.

c. ***Technical upskilling of local community***

Seven (7) of the twenty-one (21) participants mentioned that developing the technical skills within the community is an enabling factor. However, it required a co-ordinated plan upfront to ensure that technical skills transfer was done sustainably to ensure that the skills are available up to PPP Project Delivery Success and potentially even beyond for other industries and future projects.

"*I do believe that over a period of 20 years for the operation of a plant, there is more opportunity that can be provided to local communities with regards to skills transfer". [P20, Mid Management, Both]*

Pandey et al. (2021) aligns with the empirical findings in that technical upskilling made effective technology transfer more viable within the community better enabling PPP Project Delivery Success.

4.2.6 *Critical Success Factors related to the Theme: Financial and Economic Factors*

The theme: Financial and Economic Factors included seven (7) sub-themes that are enablers in PPP Project Delivery Success. The findings related to these are detailed in the following subsections. Within Figure 19 a sentiment analysis is provided of the empirical data showing the percentage of respondents in support of each of the Critical Success Factor components, in relation to the number of respondents per Critical Success Factor.

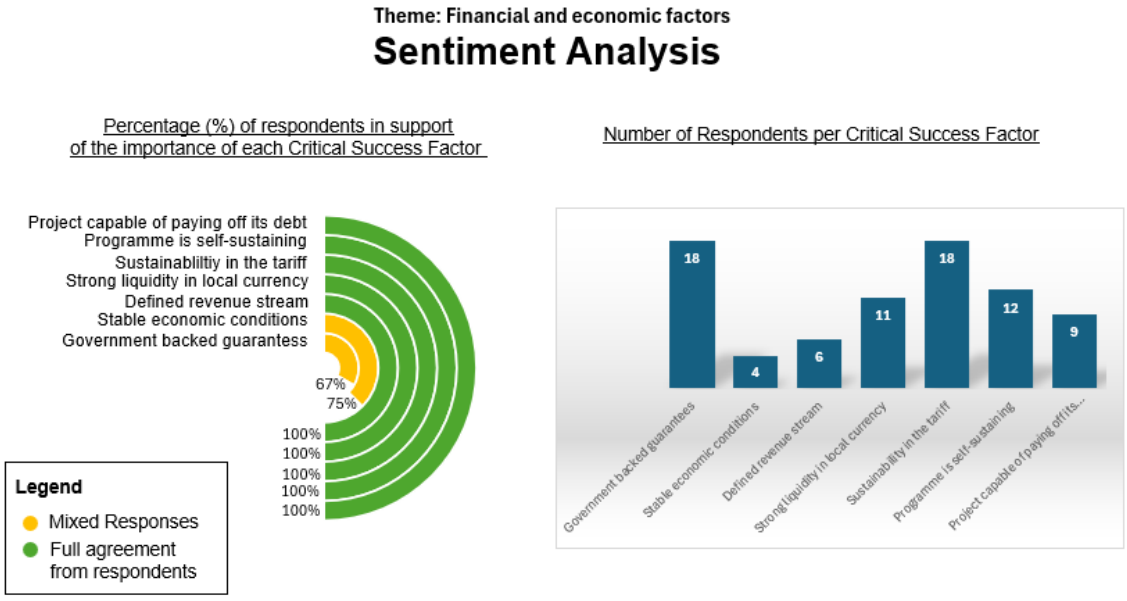


Figure 19. Sentiment analysis of the Critical Success Factors within the theme Social Factors

a. *Stable economic conditions*

Four (4) out of the twenty-one (21) participants spoke to aspects of stable economic conditions. Respondents mentioned that it is an enabler of PPP Project Delivery Success. This aligns with Kruger and Eberhard (2023) view that stable economic conditions play a key role within these programmes. It was however mentioned that care should be taken concerning the clauses within Part B of the RFP (DMRE Tender, 2024) allowing for bidders to submit Partially Indexed Price and Fully Indexed Price to ensure provision against economic fluctuations.

"For instance, if your REIPPP program is not linked or indexed to the CPI, as an investor you could end up having a shortfall." [P1, Senior Management, Both]

However, this sentiment was not unanimous as this may be seen as rent-seeking from the private sector as neither the renewable energy resource nor the upfront capital costs are influenced by the impacts of inflation.

The literature shows that stable economic conditions are an enabler, however**,** the robust design of the entire RFP as shown by the empirical data fosters PPP Project Delivery Success even in instances of economic instability. Therefore,

although stable economic conditions are important, a well-designed programme may enable successful outcomes considering the inevitable economic fluctuations.

b. *Defined revenue stream*

Six (6) out of the twenty-one (21) participants highlighted defined revenues as an enabling factor. It was unanimous amongst the respondents that having defined revenue over the PPA term was one of the elements that made the government's formal reverse auction programmes attractive and often oversubscribed. This aligns with (Berisha et al., 2022) view that certainty concerning the revenue is critical.

"That's why this program is so successful. It's that it's very easy for people to see what this program is going to pay you." [P4, Mid Management, Private]

The response from P4 aligns with the Transaction Cost Theory in that certainty in revenue streams greatly reduces the costs related to contingencies, hence increasing transaction efficiencies between the government and the IPP-led consortium (Fleta-Asin & Munoz, 2021). Transaction efficiencies were ever more pertinent given Eskom's good track record of paying projects on time. P15, an executive, states it well, saying:

"Every single invoice I have ever sent since I came here - to Eskom for power has been paid on time. It has never been late, not once" [P15, Executive, Private]

The signing of the Implementation Agreement further binds the government to pay for the electricity generated – also protecting the seller through sovereign guarantees. Hence as stated by P1 during COVID-19, when electricity demand was low, Eskom wanted to curtail wind energy plants under the auspice of a Force Majeure event to protect the grid from oversupply. However, P1 states

"The contractual arrangements within the power purchase agreement protected those investors because the PPA had a take or pay clause which meant ESKOM had to take [and pay] for that power." [P1, Senior Management, Both]

The empirical evidence aligns with the literature on the criticality of defined revenue streams as a key enabling factor.

c. *Government backed guarantees*

Eighteen (18) of the twenty-one (21) participants highlighted the presence of government backed guarantees as an enabler for driving PPP Project Delivery Success with mixed responses.

P18 mentioned that from a position of attracting private sector participation, the provision of protection against contingent liability was an enabler to the programme. This aligns with PPIAF (2019) in that government backed guarantees attract better financing by reducing risk premiums tied to country-level risk for private IPP-led consortia.

However, various respondents expressed the view that despite the reduction from 100% to 80% government backed guarantee in REIPPPP BW7, the programme was still more than double the MW oversubscribed – with 48 onshore wind and solar projects bids totalling 10 218 MW submitted under the formal programme (which only had up to 5 000 MW). This view aligns with (Owolabi et al, 2019) who states that government backed guarantees serve the purpose of driving greater penetration in new markets.

However, in the case of South Africa, respondents mentioned that the formal reverse auction electricity procurement programmes were “mature”. Given Eskom’s good track record of payment as described in section 4.2.6b – it was noted that there was room for further reductions in the government guarantees.

P18 proposed that reducing the government backed guarantee without disabling competition within the programme was viable.

“a 50% government guarantee may be what is needed. The government guarantee covers two things that are within the control of the government. The

one is the ability and the willingness of the off-taker [Eskom] to pay. The other part of the government guarantee is expropriation or early termination of the PPA." [P19, Executive, Private]

Respondents also highlighted that the growing interest in corporate PPA projects – where there is no government backed guarantee supports appetite for further reduction. Therefore, from the evidence of the empirical data coupled with the literature, it is suggested that further reductions in government guarantees may be investigated easing the balance sheet burden on the fiscus whilst not disabling PPP Project Delivery Success.

d. ***Strong liquidity in local currency***

Eleven (11) out of the twenty-one (21) participants responded with respect to strong liquidity in local currency being an enabling factor to PPP Project Delivery Success. The respondents unanimously stated that it was one of the most critical enablers, due to the ability of the local banks to provide competitive lending terms. This is further supported by a study done by Muleya et al (2019) that strong liquidity provided a base for competitive funding terms and protection against fluctuations in foreign currency. Especially for large capital expenditure projects with imported equipment and technology.

"Without the local banks in South Africa, the electricity price is going to be much higher because they are aggressive. In South Africa, they are aggressive to the extent I've never seen anywhere else before. I have gone to export credit agencies in Denmark, Germany, and other places to see if they can do better for two bid rounds in a row now and they can't." [P15, Executive, Private]

Also, respondents mentioned that debt being provided in local currency was optimal as the PPA tariff was being paid in South African rands.

"Debt in local currency...that's the best way to do things." [P4, Mid Management, Private]

“Our revenue is in local currency. We need to be able to match our revenue with our debt, and that by the way is the biggest strength of the South African program”. [P19, Executive, Private]

The literature is well aligned with the empirical evidence in that strong liquidity in local currency is one of the key enabling factors in ensuring PPP Project Delivery Success.

e. ***Sustainability in the tariff***

Eighteen (18) out of the twenty-one (21) participants responded concerning sustainability in the tariff. All respondents were aligned that it is a key enabler. Montmasson-Clair and Ryan (2014) stated that striking a balance between price and long-term viability of projects was required.

However, mixed responses were raised concerning the current way that the tariff is adjudicated, with some participants stating an over-emphasis within the programme’s evaluation criteria on the “lowest” price.

“I don't think the lowest price should always be awarded Preferred Bidder (status)…I mean the lowest tariff can win but can these projects also last?” [P4, Mid Management, Private]

Furthermore, it was gathered from the empirical data that there were differing views between public sector and private sector participants. From the public sector perspective, adjudication is viewed as being robust and only when the requirements and the rules of the programme have been complied with (Part A of the RFP); coupled with the bidder submitting a compliant bid with respect to land, legal, environmental, technical and financial criteria (Part B). Then only a comparative evaluation of compliant bidders looking at the Price (90%) and the Economic Development (10%) portion is evaluated (Part C). Hence the lowest price should be selected as stated by P3 a public sector participant because at the point of comparative evaluation (Part C) the projects are in essence *shovel ready*.

Many private sector respondents however differ, highlighting that if the lowest price cannot reach Financial Close as was seen in Bid Window 5, then it is pointless.

"*The lowest tariff is not a winning tariff. It can be low but if it's not able to reach Financial Close, then it's meaningless." [P5, Mid Management, Private]*

This aligns with the Principal Agent theory within the literature in that despite a differentiation in control dynamic between an "agent" (IPP-led consortium bidding into the programmes) and a "principal" (IPP Office acting on behalf of government procuring electricity) a collapse in the arrangement still leaves the principal without the intended outcome – in this case electricity from renewable energy sources.

Therefore, the responsibility of being prudent in ensuring that compliant bids with the lowest price are truly sustainable in their tariff and able to reach Financial Close remains the responsibility of the IPP office as chief project and procurement office responsible for adjudication. To discourage bidders from submitting unsustainable prices, the IPPO may be more effective in pulling Bid Bonds timeously.

The literature and the empirical data align with the view that sustainability in tariff is one of the most important enabling factors to drive PPP Project Delivery Success.

f. *Programme is self-sustaining*

Twelve (12) out of the twenty-one (21) participants provided insights concerning the efficacy of the Project Development Fund. All respondents were aligned that it serves as a key enabler. Furthermore, the nature of the fund, which is anchored by the Government Support Framework Agreement was hailed by P27 for its robustness in making it difficult for any single entity or individual to easily access

the funds. This aligns with Eberhard and Naude (2016) that upon signing the Implementation Agreement payment is required into the ring-fenced Project Development Fund.

Private sector respondents did however mention mixed responses regarding the quantum of the Development Fee at 1.5% of the total project costs (DMRE Tender, 2024).

“That's quite a high fee looking at the actual capital value of a project.” [P20, Mid Management, Both]

P3 a public sector respondent differed and raised the fact that the fee structure is not a form of continuous income. The funding model is heavily dependent on Preferred Bidder projects reaching Financial Close as the 1.5% of the Development Fee to be paid into the Project Development Fund is only disbursed when the Implementation Agreement has been signed. The findings state that this potentially leaves the IPP office subject to cash flow issues if projects are delayed in reaching Financial Close.

From a governance perspective, participants highlighted that transparency on how the money is spent would improve trust and assist in galvanizing shared commitment in line with the theory of Altruism (Berisha et al., 2019).

“I don't know if there's transparency for us to see where that money goes. We understand that it funds the IPP office.” [P23, Executive, Private]

The empirical evidence aligns with the literature that the Project Development Fund is an enabler to PPP Project delivery success However it was noted that it is important to ensure that the funding mechanism remains sustainable from a long-term cash flow perspective for the IPP Office.

g. ***Project capable of paying off its debt over its tenor***

Nine (9) out of the twenty-one (21) participants mentioned that structuring the project in such a manner as to ensure that it can pay off its debt over its tenor is

an imperative for lenders and a key enabler for PPP Project Delivery Success. Van der Merwe and Brent (2020) highlight the same referring to a project's capability to maintain its covenant attached to the loan agreements as a critical enabling factor. P1 mentions the Debt-Service-Coverage Ratio (DSCR) as one of the pivotal financial covenants that enable the servicing of debt.

“The most important is debt service cover ratio…So it's quite important to make sure that the debt can be serviced.” [P1, Senior Management, Both]

The literature highlights that many of these projects within the various programmes are structured using Project Finance Theory (Sainati et al., 2020) in which a Special Purpose Vehicle is financed on a limited recourse basis. Hence ensuring that covenants remain unbreeched is important to enabling PPP Project Delivery Success.

4.2.7 *Conclusion and summary of findings and discussion for Proposition 1: Critical Success Factors in enabling PPP Project Delivery Success*

This section addressed the proposition aligned with the research question: *“What are the Critical Success Factors in enabling PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?”*.

From the empirical findings, there are a total of thirty-two (32) Critical Success Factors that enable PPP Project Delivery Success within the formal reverse auction electricity generation sector of South Africa. These Critical Success Factors can be captured into six themes, namely (1) Macro Political and Regulatory Factors, (2) Effective Procurement Factors, (3) Financial and Economic Factors, (4) Project Feasibility Factors, (5) Organizational Factors, and (6) Social Factors. Two new factors emerged from the findings namely: (a) Project readiness and (b) Continuous re-evaluation of the programme(s) market fit. Both were sub-factors of the Theme: Effective procurement factors.

4.3 Findings and discussions pertaining to Proposition 2: Critical Success Criteria (CSC) used to measure PPP Project Delivery Success.

The theoretical Proposition 2 as described in section 3.11 Consistency Table is stated as *"There are a total of six (6) Critical Success Criteria that include all the measurement specific items that could be used in measuring PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These combined all fall under the theme: PPP Measurement Specific Factors and include a combination of "hard" traditional project management factors, as well as "soft" environmental performance and relationship governance factors."*

Interview questions number 2,11,14,17,20,23,24,25,27,28 and 29 as per the APPENDIX B – Interview Guide were aligned with gathering empirical data pertaining to this proposition. The following sub-sections provide insights gleaned from the participants with respect to Critical Success Criteria.

4.3.1 *Critical Success Criteria related to the Theme: PPP Measurement Specific Factors*

There were seven (7) Critical Success Criteria identified as measurement-specific factors that drive PPP Project Delivery Success. These factors can be categorized into (1) ESG factors and (2) Project Management factors as shown in Figure 20.

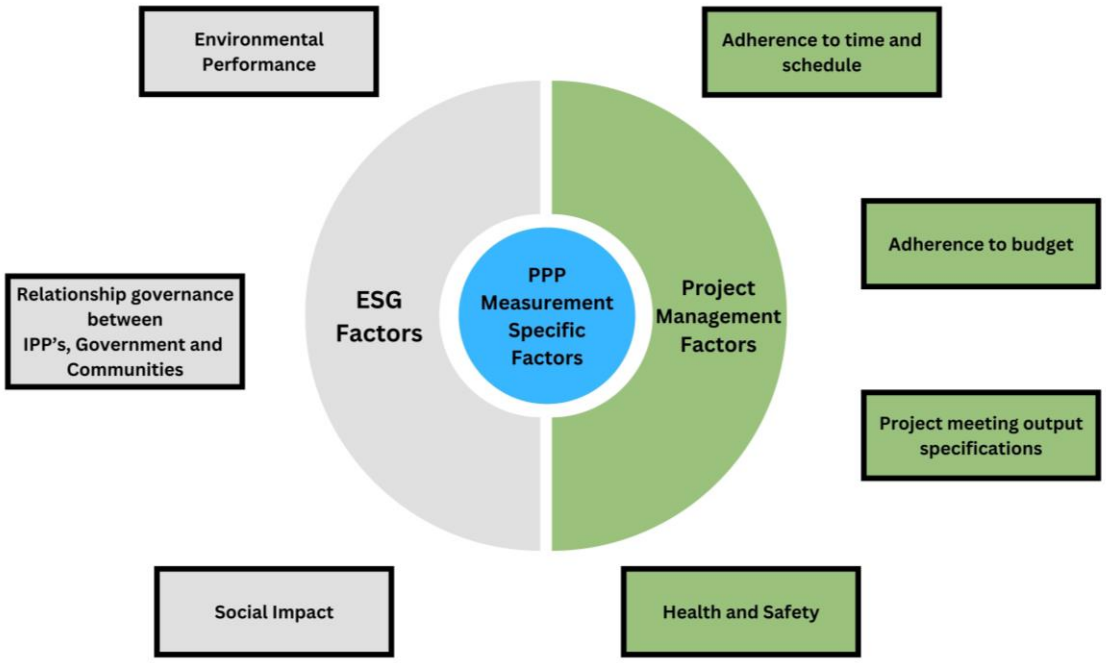


Figure 20. PPP Measurement specific factors

A Description of each sub-theme is detailed in the following sub-sections.

a. *Environmental performance*

Respondents highlighted that an Environmental Authorization (EA) is a requirement for PPP projects in the formal reverse auction government electricity generation programmes under the National Environmental Management Act 107 of 1998 (NEMA), as a condition for a compliant bid. This applies across technology (DMRE Tender, 2024). Part of the environmental consent will include an Environmental Management Plan (EMP). Respondents mentioned that measures are important to ensure that during construction and operations, specialist recommendations and constraints are monitored, implemented, and measured in line with the EMP to ensure PPP projects have a high level of environmental performance. P16 highlighted its importance by mentioning that although the legislation is solid, projects run the risk of environmental non-compliance due to lack of implementation of the EMP. Hence the requirement for robust measurement.

“In some ways we've got very strong environmental measures and controls, but I think that there's a lack of capacity to actually monitor. So, while our environmental legislation is very strong, the actual implementation of it, especially in the operational phase, is not very strong.” [P16, Senior Management, Private]

This finding aligns with literature from (Osei-Kyei, 2019) who mentioned that although environmental performance is more a subjective measure, it still needs to be monitored as poor, or underperformance can derail PPP Project Delivery Success.

b. *Relationship governance between IPP’s, Government and Communities*

It was highlighted by respondents that often the community engagement component is an afterthought. For example, P18 highlighted that communities are often uninformed about how the projects are to impact them directly. Osei-Kyei (2019) further reiterates this concern by mentioning that although there may be plans in place - however governance concerning how these stakeholder relationships are monitored, coordinated and measured is imperative in driving PPP Project Delivery Success. This further aligns with the literature on Stakeholder theory in that all parties involved should have their interests met (Wojewnik-Filipkowska & Wegrzyn, 2019).

Furthermore, long-term relationship building should occur between entities that are within the SPV as stated by P9 a public sector respondent:

“I would also like to measure the strength of a strong consortium by how much it shares with a weaker and inexperienced private IPP” [P9, Mid Management, Public]

As stated by the theory of Altruism - information sharing, common commitment, and trust should be cornerstones of the long-term relationship building effort (Berisha et al., 2019).

P23 mentioned that retrospective learning of the programme and how it impacts the stakeholders should be measured and it was stated by P23 that this be led by the IPP Office.

"I think that from the IPPO side, they need to do a retrospective learning to see what is working instead of just continuing the process and updating." [P23, Executive, Private]

Long term relationship building is key as it touches on many of the key theories that make up the Success Index framework – further supported by the empirical data. The pulse and the health of the multi-stakeholder relationships require constant monitoring to better drive PPP Project Delivery Success.

c. *New: Social Impact*

A new sub-theme emerged from the empirical data referred to as Social Impact, the definition that was used to define this component is provided in Table 9.

Table 9. Definition of Social Impact

Sub-Theme	Definition
Social Impact	"A significant positive change that addresses a pressing social challenge" (Johnson & Moudgil, 2014)

Respondents noted that a focus on Social Impact rather than purely compliance in meeting bid thresholds should be measured and incorporated into the scoring mechanism of Preferred Bidders, to discourage behaviour such as tick-box exercises or "fiscal dumping" as referred to by P12 on ED spend. Fiscal dumping can be referred to as the practice of using funds that have been budgeted for a specific purpose in a manner that it was not intended.

"How do we leave these places better than how we found them." [P14, Senior Management, Both].

"In my experience that I had is that I always called it fiscal dumping. A project with underspend on the socioeconomic development and enterprise development,

once they see the contract year is coming to an end, they suddenly start painting houses. My question was always, how many times can you paint a house and how does that help the development of the community?" [P12, Mid Management, Public]

Another issue that was raised by respondents is that often various projects would be clustered around certain communities or within the same region and there can occur an issue of "uncoordinated over-investing" in certain communities at the expense of others. This concern was mostly palpable amongst the public sector respondents.

"I think another important mistake or failure that we [IPP office] did, we never looked broader. And I think that's again something that the IPP office needs to do, look broader, say in a province or in a region because some of the projects there are communities in the middle of the two projects who got benefits from both projects." [P27, Executive, Both]

Hence measuring social impact was highlighted as "not being easy", however from the empirical data it was an important measurement factor especially given the socio-economic specificities of South Africa.

d. *Adherence to time/schedule*

Participants unanimously agreed that constructing the projects within the stipulated timeframes needs to be measured and constantly monitored to ensure PPP Project Delivery Success. Osei-Kyei et al. (2017) aligns with the empirical data stating this is a core traditional element of project management in construction.

"If you promise to meet a certain deadline, you should meet that deadline, and milestones should also be reached." [P11, Senior Technical, Public]

e. *Adherence to budget*

Furthermore, it was mentioned that closely tied in with time and schedule, budget considerations were key. Respondents also mentioned that using milestone

schedules may assist in keeping track and measuring disbursements of funds during construction and operations in line with agreed upon progress or task completion. Osei-Kyei et al. (2017) is aligned from the literature stating that this is a traditional element of project construction success.

“Key for everybody to get paid and for money to be draw down…but remember the drawdown of your funding from the lenders and the equity partners is dependent on key milestones being achieved at a particular time.” [P18, Executive, Private]

f. ***Project meeting output specifications***

Respondents also further highlighted that the output performance of the plant, coupled with the availability and the operational philosophy should be constantly monitored and measured to ensure PPP Project Delivery Success.

“Throughout the performance of the plant, obviously the availability of the equipment is quite important to monitor to make sure that there are no issues.” [P1, Senior Management, Both]

g. ***Health and Safety***

Respondents highlighted that health, and safety should be closely monitored throughout to ensure PPP Project Delivery Success. This aligns with literature from Amoah and Simpeh (2020) which states that the construction industry in South Africa is notorious for the occurrence of accidents, with both compliance to workplace safety and proactively placing measures to ensure a safe work environment often lacking.

Aisheh et al. (2021) highlight that a reduction in incidents and accidents on site is imperative for construction success, and it involves constant empowerment and training of workers within the construction sites. This should be keenly monitored and incorporated into the entire project scheduling and construction planning process.

“With regards to safety, this is something which has not really been taken into account. Generally, the programs have had very little focus on safety.” [P4, Mid Management, Private]

Hence the literature and the empirical data are aligned with the importance of constantly measuring health and safety performance on site.

4.3.2 *Conclusion and summary of findings and discussions for Proposition 2: Critical Success Criteria (CSC) used in measuring PPP Project Delivery Success.*

This section addressed the proposition aligned with the research question: *“What are the Critical Success Criteria that could be used in measuring PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?*”

There are a total of seven (7) Critical Success Criteria that include all the measurement specific items that could be used in measuring PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These combined all fall under the theme: PPP Measurement Specific Factors and include a combination of “hard” traditional project management factors – such as time, cost and scope as well as “soft” ESG factors such as environmental performance, relationship governance, and a new factor termed (a) Social Impact.

4.4 Findings and discussions pertaining to Proposition 3: Critical Success Factor and Critical Success Criteria overlap (Interlink Factors) in driving PPP Project Delivery Success.

The theoretical proposition 3 as described within section 3.11 Consistency Table is stated as *“There are a total of four (4) Interlink factors, which are an overlap of components that are both enabling (Critical Success Factors) and measurable (Critical Success Criteria) factors. These interlinks occur within the themes of*

Macro political and regulatory factors and theme of Social factors. The Interlink factors are namely: (1) low levels of political interference, (2) strong political will and support, (3) project being beneficial to local economic development and (4) ensuring technical upskilling of local communities is prioritized within the programmes."

Interview questions number 6,18,21,24,27,28,29 as per the APPENDIX B – Interview Guide were aligned with gathering empirical data to validate this proposition. Figure 21 provides a diagrammatic representation of the Interlink factors found in the empirical data.

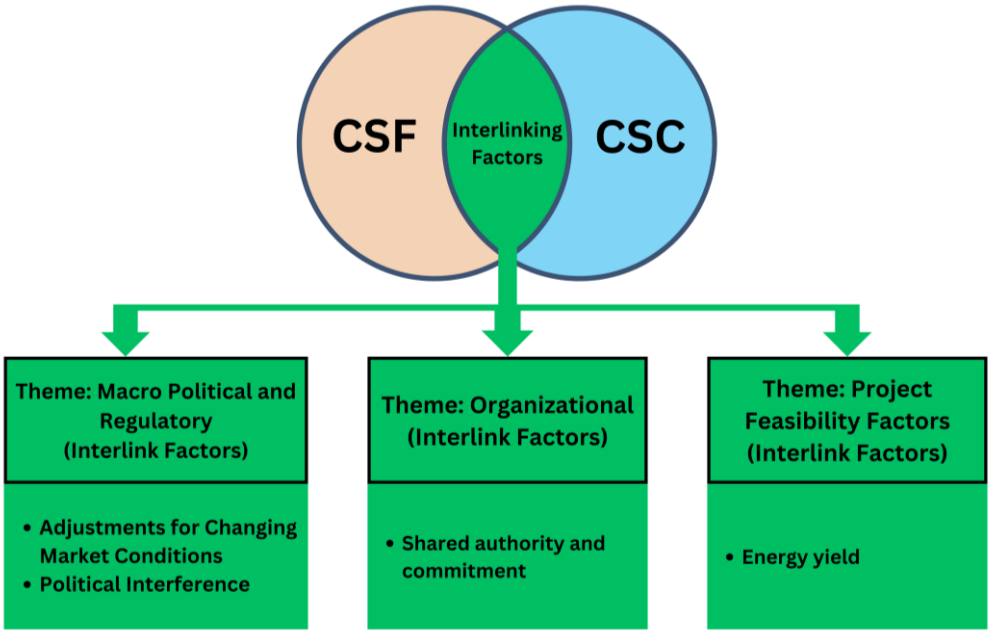


Figure 21. Interlink factors findings from empirical data

From Figure 21, there are Interlink factors within three of the topical themes, namely (1) Macro political and regulatory factors, (2) Organizational factors, and (3) Project feasibility factors. The following sub-sections expand on each Interlink Factor.

4.4.1 *Interlink Factors related to the Theme: Macro Political and Regulatory Factors*

a. *Adjustments for Changing Market Conditions*

A new sub-theme emerged from the empirical data that is both an enabling and measurable factor. A definition of the theme is provided in the Table 8.

Table 10. Definition: Adjustment for changing market conditions

Sub-Theme	Researchers own definition
New: Adjustments for changing market conditions	An adjustment to tariff for material unforeseeable changes in macro conditions that impact adversely on project economics. (Author's own)

Eleven (11) of the twenty-one (21) participants raised concerns and issues concerning the structure of the current tender programmes as contributing to disabling PPP Project Delivery Success due to a lack of an adjustment mechanism to increase the tariff post-bid Submission or Preferred Bidder Announcement.

"There should be mechanisms to allow for adjustments in things like the tariff itself if there are external factors outside of the control of the country." [P8, Mid Management, Private]

Regulation Nine of the Electricity Regulations on New Generation Capacity states that a public entity buyer cannot enter into a power purchase agreement unless it represents "*Value for Money*" (Electricity Regulation Act, 2011).This aligns with the Pareto Optimality Theory in that PPPs make sense for the public sector institution on the basis that they provided "acceptable outcomes to both Eskom and the government" (Eberhard & Naude, 2016). This was introduced to protect Eskom from entering PPA's that were unjustifiably risk adjusted and cost unreflective at the expense of the government.

However as per the literature and in alignment with the Altruism theory of shared authority and commitment (Berisha et al., 2019), the Bargaining Game theory of open negotiation aligned with unified goals (Opiyo & Muchelule, 2024) and the

Transaction Cost theory of ensuring transaction efficiency. private sector participants will only invest in projects if future financial gains supersede the risk taken (Fleta-Asin & Munoz,2021). Hence Value for Money is a mechanism within the programme to protect the government, however many respondents both public and private alluded to the need for an equivalent counter mechanism to justifiably protect the private consortium.

Contreras (2022) speaks on the aspect of tariff-adjustments in public private partnerships when there is a major technological breakthrough – in essence, a reduction in tariff, once again aligning with the principle of Value for Money.

However, respondents mentioned that in the case of pandemics such as COVID-19 or a 10% import tariff increase on solar PV modules communicated in a notice (No 49196) as issued in the Government Gazette on the 25th of August 2023 (Government Gazette, 2023) and signed into law on the 28th of June 2024. Projects are often exposed without recourse to changes in law that have material financial impacts, especially after Bid Submission and Financial Close.

To account for this conundrum, the World Bank refers to a concept of financial equilibrium that may be incorporated into PPP-type contractual agreements to cover for this unconstraint risk (The World Bank, 2024). Investigating the inclusion of financial equilibrium clauses are not foreign to power purchase agreements with Perusahaan Listrik Negara (PLN), the Indonesian state-owned electricity company also looking at the inclusion of such principles within their PPA's with IPPs (Rachmani & Joesoef, 2021). The challenge in South Africa was found that most projects are implemented using the theory of Project Finance (Sainati et al., 2020). This means that once a project reaches Financial Close the disbursable funds for construction are ring-fenced and may only be drawn down in alignment with stringent Facility Agreements with the senior lenders. Therefore, the only way more capital may be injected into the Special Purpose Vehicle is through an equity injection – diluting shareholder returns.

The findings furthermore state that for unforeseeable instances outside of the developer's control a provision to ensure that equity providers are made "whole"

via an adjustment in tariff due to changing market conditions should be considered. Both public and private sector respondents were aligned that such a clause should be incorporated into the tender documents to account for such unforeseeable macro changes.

b. *Low levels of political interference*

Respondents mentioned that low levels of political interference were both enablers and key measurable factors to drive PPP Project Delivery Success. The respondents made mention of DNG Power Holding (Pty) Ltd who took the DMRE to court to set aside the appointment of Preferred Bidders under the RMIPPPP based on allegations of corruption and malfeasance (DNG Power Holdings (Pty) Ltd v Minister of Mineral Resources and Energy and others, 2022). Although the case was dismissed, it caused a delay in the RMIPPPP projects progressing towards Financial Close.

“Risk mitigation. We had the court cases.” [P24, Executive, Both]

Furthermore, participants raised the issue of political interference in selection of senior leadership at Eskom disabling the programme. This aligned with findings from Tsireledzo (2022) who states that historically political interference had plagued governance issues at Eskom.

“We've seen that throughout the life of Eskom where they change senior leadership all the time based on their political interference or political connections.” [P11, Senior Technical, Public]

P19 mentioned that measuring and monitoring of management and board level changes within Eskom is a key measurement metric to keep track of any potential conflicts of interest that may occur.

“*So, on an annual basis, the board, the transparency, the accountability and the independence of the board must be measured similarly with the management team.” [P19, Executive, Private]*

The empirical data aligns with the literature that low levels of political interference is a key enabler and measurable factor in driving PPP Project Delivery Success.

4.4.2 *Interlink Factors related to the Theme: Organizational Factors*

a. *Shared authority and commitment*

This factor was highlighted by respondents as being both an enabler and a measurement factor due to its importance in aligning key performance metrics (KPI's) between the government and the private sector and constantly keeping track of them to ensure that both stakeholder group's interests are being met, and accountability is being monitored.

Respondents spoke to the key enabler and measurable factor of having both private entities and government entities aligned and involved in ensuring PPP Project Delivery Success. The theory of altruism is prevalent within this factor requiring joint commitment, trust, and shared authority in making the programme(s) function (Berisha et al., 2019).

Casady et al. (2019) point out that a PPP forms part of a new type of organizational paradigm referred to as New Public Governance (NPG). NPG is underpinned by trust and ensures that all entities achieve their ends (Berisha et al, 2019), the empirical evidence aligns with the literature on shared authority and commitment being a key enabling and measurement factor.

4.4.3 *Interlink Factors related to the Theme: Project Feasibility Factors*

a. *Energy yield analysis*

Respondents touched on aspects of technology-specific energy yield as a key factor that enabler project feasibility and required measurement throughout PPP Project Delivery Success. Liu, Aberle, Buonassisi, and Peters (2016) where aligned with the findings on the importance of energy yield.

“Resource is important because the right technology needs to thrive under the right resource and hence why there are specific areas that you see more of a specific technology, whether it's PV or more of wind.” [P6, Executive, Private]

Participants were also supportive of the requirement to have the yield assessments independently reviewed by a third-party consultant to ensure bankability of methodology and assumptions (DMRE Tender, 2024).

“By virtue of an independent reviewer, reviewing the yield or production, they're essentially also looking at the facility itself.” [P20, Mid Management, Both]

Respondents highlighted those onsite measurements of energy yield data reduced uncertainty as shown by Ruiz-Munoz and Hoyos-Gomez (2024). This improved the bankability of projects, due to more confidence in the P50, P75 or P90 energy yield figures - driving PPP Project Delivery Success.

“So, you need to measure clearly before you start because I was with an IPP, and he explained that in the beginning they thought there's wind on a site because of the Wind Atlas that we have in the country. And then when they got there and they put up their mast, there was no wind.” [P27, Executive, Both]

Respondents highlighted that an underestimation of yield is not a new phenomenon within the programme. With P1 mentioning that a small hydro project underestimated the flow and the auxillary consumption to a nearby community, which almost rendered the project unfeasible.

“There's a hydropower project in Northern Cape that actually had a problem with the estimation of the resource. A gross under estimation not taking into account the releases to the community.” [P1, Senior Management, Both]

To counteract the issue of yield underestimation, REIPPPP has introduced a Forecast Penalty which in essence fines an operating plant for deviating more than 10% from its Daily Forecast Generation profile on an hourly basis. Therefore, enforcing that accurate measurements of yield are undertaken by IPPs throughout the project’s development, construction and operations.

“So, you now have the 10% variation penalty in your forecasts” [P12, Mid Management, Public]

Private sector respondents also highlighted that assumptions approved by the Forecast Energy Sales Independent Reviewer (FESIR), need to be aligned for consistency to ensure that bidders are making comparable assumptions across the board.

“It comes down to the onsite measurement campaigns and then, the independent verification” [P8, Mid Management, Private]

The findings from the empirical data aligns with the literature on the importance of energy yield as an important enabling and measurement factor driving PPP Project Delivery Success.

4.4.4 *Conclusion and summary of findings for Proposition 3: Critical Success Factor and Critical Success Criteria overlap (Interlink Factors) in driving PPP Project Delivery Success.*

This section addressed the proposition aligned with the research question: *“How do the Critical Success Factor and Critical Success Criteria overlap (Interlink Factors) in driving PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?”*

There is a total of four (4) Interlink factors, which are an overlap of components that are both enabling (Critical Success Factors) and measurable (Critical Success Criteria) factors. These interlinks occur within the themes of Macro political and regulatory factors, Organizational factors, and Project feasibility factors. The Interlink factors are namely: (1) low levels of political interference, (2) shared authority and commitment, (3) Energy yield, and a new Interlink factor referred to as (a) Adjustments for changing market conditions.

4.5 Findings and discussion pertaining to Proposition 4: Critical Risk Factors (CRF) that need to be monitored to drive PPP Project Delivery Success.

The Proposition 4 as described within section 3.11 Consistency Table is stated as *"There are fourteen (14) Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These are namely (1) Design risks, (2) Site specific physical risks, (3) Land and permitting risks, (4) Government and political risks, (5) Supply chain risks, (7) Legal risks, (8) Change management risks, (9) Financial risks, (10) Public opposition risks, (11) Construction risks, (12) Commissioning risks, (13) Operations risks and (14) Environmental risks."*

Interview questions number 7,10,13,16,19,22,26,27,28,29 as per the APPENDIX B – Interview Guide were aligned with gathering empirical data pertaining to this proposition. The following sub-sections provide insights gleaned from the participants with respect to the Critical Risk Factors.

4.5.1 *Critical Risk Factors related to PPP programme success within Theme: Macro Political and Regulatory Factors*

From the empirical data two (2) sub-themes were highlighted as Critical Risk Factors that need to be mitigated to drive PPP Project delivery success. These are detailed in the following sub-sections.

a. *Government and Political Risk*

Six (6) out of the twenty-one (21) Participants highlighted aspects related to government risk to the programmes. From the respondents a major concern was Eskom's financial standing, especially as the utility was undergoing structural reforms. This view is aligned with the audit opinion based on their 31st March 2024 financials in which Deloitte & Touche the auditors mentioned "*a material uncertainty relating to the going concern status of Eskom*" (Eskom Holdings, 2024).

"*Governments going out on tender is assuming that ESKOM is going to remain relevant." [P11, Senior Technical, Public]*

With respect to the impacts of political risk, P1 mentioned that it its impact on the programme is quite low given the Project Finance nature of the deals with their extensive contractual agreements, minimizing government payment default risk (Vygovskyy, 2019).

b. ***Supply Chain Risk***

Ten (10) out of the twenty-one (21) participants provided responses with respect to supply chain risk issues. Respondents highlighted that due to the large reliance on exports sudden geopolitical shocks such as COVID-19 or the Russo-Ukranian war may cause challenges such as congestion on major shipping routes impacting time and cost (Notteboom, Pallis, & Rodrigue, 2020). Participants also highlighted the risks of geopolitical tensions between China and the United States of America, impacting shipping lanes and routes.

"*You're going to see now the impact should it happen that tariffs on China by the US are going to have on Chinese exports. We are struggling right now with shipping lane congestion because the Chinese are trying to ship as much as they can before the US imposes tariffs." [P19, Executive, Private]*

Furthermore, it was stated that another major risk to the programme is the over reliance on China for key equipment such as wind turbine nacelles, PV modules, battery cells and inverters. P14 reiterates that this is a global issue.

"I don't know how wise it is for the world's green or greening to rely on one country, which is China." [P14, Senior Management, Both]

Hence the literature and the empirical data highlights the importance of managing and mitigating supply chain risks to ensure improved PPP Project delivery success.

4.5.2 *Critical Risk Factors related to PPP programme success within Theme: Project Feasibility Factors*

Four (4) sub-themes emerged from the findings as Critical Risk Factors aligned with the Theme: Project Feasibility Factors. These are detailed in the following sub-sections.

a. *Design Risks*

Six (6) of the twenty-one (21) participants mentioned risks pertaining to the design of the projects. P14 highlights that designs are either rushed or not adequately scoped for the site conditions leading to re-designs and expenses post Commercial Operation Date. This finding aligns with Jokar et al. (2021) who mentioned the importance of proper designs upfront, factoring in site specifics.

"I've got projects that are 10-13 years old, and there are upfront design issues that are still trying to be resolved…. Where you've got foundation issues… and now there's redesigning of the actual site itself." [P14, Senior Management, Both]

Hence the empirical findings and literature are aligned on the importance of undertaking a thorough design process as a mitigation against potential re-designs which increases complexity and costs.

b. *Site Specific physical risks*

Eleven (11) of the twenty-one (21) participants mentioned risks that pertain to the actual locality of the chosen project. It was mentioned that many developers skip technical studies upfront with many respondents highlighting that this tends to come back later and be an issue. Literature from Jokar et al. (2021) re-affirms that initial studies may often uncover major risks.

"*So, they tend to just skip to your technical studies…and those geotechnical studies in the end can come back and haunt the project." [P1, Senior Management, Both]*

Hence the literature and the empirical data are aligned on ensuring that mitigation measures such as upfront site studies are undertaken to quantify geotechnical, hydrological and topographical considerations.

c. *Land and Permitting Risk*

Twelve (12) out of the twenty-one (21) participants touched on the risks associated with land and permitting of the sites. P1 mentioned that although the Environmental Authorization (EA) process was comprehensive, you still had residual risk of identifying sub surface issues during construction.

"For instance, you could find graves on the site or artifacts" [P1, Senior Management, Both]

Furthermore, it was raised that a thorough due diligence of the validity of the land lease agreements must be undertaken to avoid lease agreements that are not bankable.

"So, your lease agreement must be looked at by a competent legal advisor that can make sure that they close all the loopholes and that the land you are choosing is not potentially subject to any claims by the land claims authorities." [P1, Senior Management, Both]

P7 mentions that a project in REIPPPP Bid Window 5 was unable to achieve Financial Close due to a long-standing lease agreement lapsing. Eberhard and Naude (2016) reiterate this point from the literature stating that often maintaining leases for long periods of time results in costly up front expenditure.

Furthermore, respondents raised concerns that there is very little intergovernmental co-ordination regarding land use and associated permits. With P15 mentioning that there are project sites which had been found in the Free-State province to have dual authorizations. Both hydrocarbon Exploration Rights (granted in terms of Section 80 of the Mineral and Petroleum Resources Development Act) and approved Environmental Authorizations (EA) for the

development of renewable energy activities. This creates confusion and risk on which authorization takes precedence.

"There has also been an issue of dual rights especially in the Free-State with much of the province having gas exploration rights" [P15, Executive, Private]

The empirical data and the literature are aligned with respect to land and permitting being key risks to consider in driving PPP Project delivery success.

d. *New: Climate Change Risk*

Three (3) of the twenty-one (21) participants raised a new risk referred to as Climate Change risk, the definition utilized is provided in Table 11.

Table 11. Definition for Climate Change Risk

Sub-Theme	Definition used for sub-theme
Climate Change Risk	The risk to a project due to significant variations in the average weather conditions at a specific location (Adapted from World Bank,2021)

It was raised that considerations of climate change need to be incorporated into the entire lifecycle design, financing, build and operation of the plants to account for rapid changes and mitigations concerning changing meteorological patterns (Gernaat et al., 2021). This is a key emerging risk that was identified within the empirical data.

"We need to consider the fact that there's global warming and the climate is changing." [P2, Mid Management, Public]

4.5.3 *Critical Risk Factors related to PPP programme success within Theme: Effective Procurement Factors*

Two (2) sub-themes emerged from the findings as Critical Risk Factors aligned with the Theme: Project Feasibility Factors. These are detailed in the following sub-sections.

a. *Legal Risks*

Eleven (11) of the twenty-one (21) participants mentioned that legal risks could delay or even derail projects from achieving PPP Project Delivery Success. The DNG Power Holding (Pty) Ltd case as described in section 4.4.1b was referred to by many respondents as an example of the programme being taken to court. Furthermore, Sarmento and Renneboog (2021) aligned with the empirical data mentioning that legal risks are a major consideration for public private partnership type models.

b. *New: Concentration risk*

A new risk emerged from the findings, this risk is referred to as concentration risk, the definition is provided in the Table 12 below.

Table 12. Definition of concentration risk

Sub-Theme	Definition used for sub-theme
Concentration Risk	The risk of having a single IPP or private consortium selected for a large majority of the allotted MW capacity in a bidding window. (Author's own)

Respondents highlighted that the prevalence of concentration risk is more pronounced in instances whereby tariffs are substantially lower than competitors for a similar round.

"I'm going to use Round five as an example where again, by the design of the rules, it did not limit one company being awarded 50% of their allocation" [P6, Executive, Private]

In this statement P6 is alluding to the Mainstream and Globeleq consortium being awarded a large majority of the projects in Bid Window 5.

Figure 22 and Figure 23 depict this with fourteen (14) out of the twenty-five (25) Preferred Bidder projects failing to achieve Financial Close. Twelve (12) of these being Mainstream/Globeleq projects, one (1) being Engie project and the other

being a Total/Mulilo project. Concentration risk is clearly shown with the Mainstream/Globeleq consortium having a large majority of projects having tariffs that were substantially lower than their competitors.

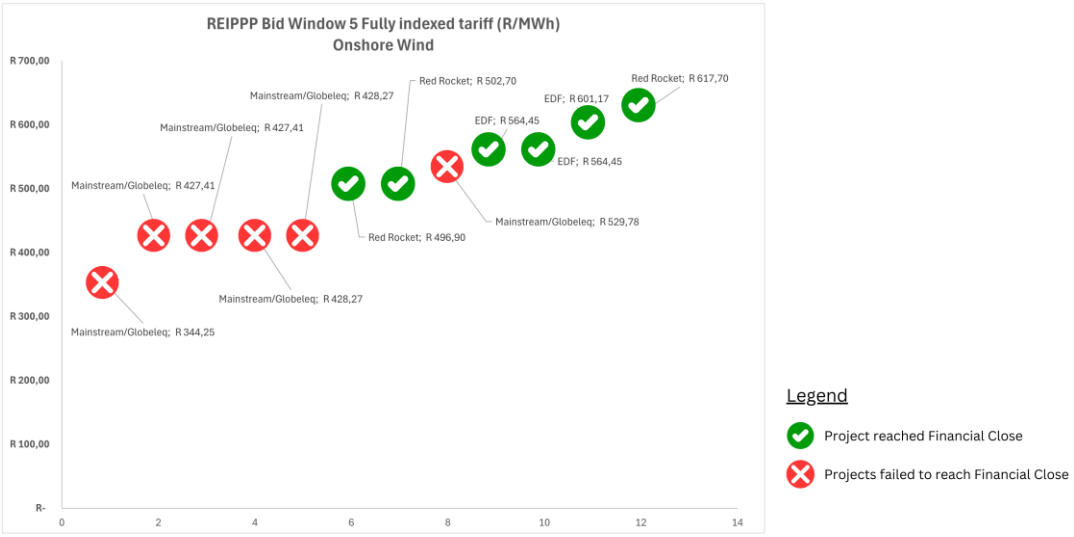


Figure 22. REIPPPPP Bid Window 5 Fully indexed tariffs - Onshore Wind

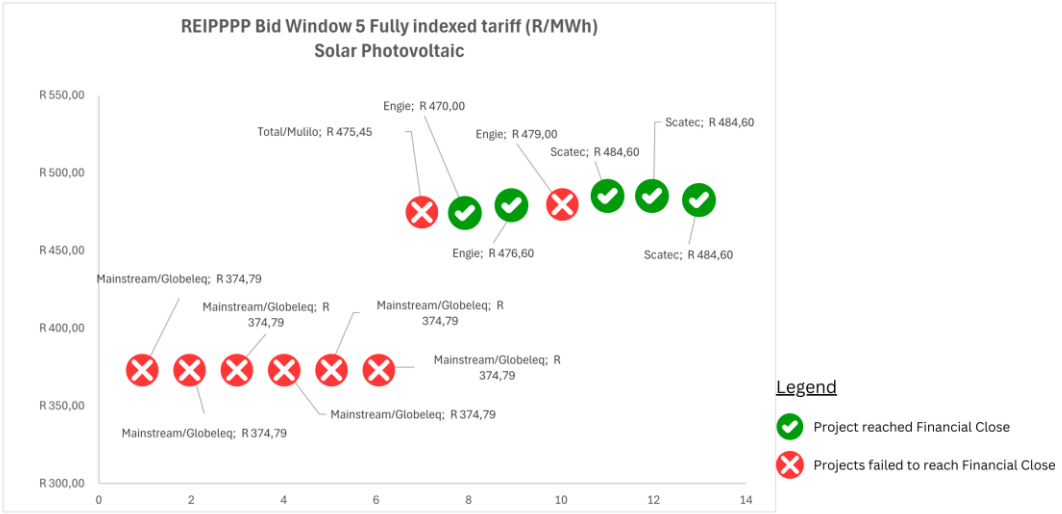


Figure 23. REIPPPP Bid Window 5 Fully indexed tariffs - Solar Photovoltaic

The findings also show that the concentration risk is not only for the main developer, but there is also concentration risk within the BBBEE partners of Preferred Bidder projects.

“There was a concentration over Bid Window 5 where one partner or local partner was supporting most of the projects that they did then restrict that.” [P23, Executive, Private]

Respondents highlighted this as a major risk item, especially given that concentration risk is tied to projects with lowest tariffs.

4.5.4 *Critical Risk Factors related to PPP programme success within Theme: Organizational Factors*

One sub-themes emerged from the findings as Critical Risk Factors aligned with the Theme: Organizational Factors. It is detailed in the sub-section below.

a. *Change Management Risk*

Three (3) of the twenty-one (21) participants mentioned that there is very little co-ordination and workshopping hence private sector respondents mentioned that they are often left confused on the impacts of changes in government, regulation and/or departmental changes on the functioning of the programme(s).

“*I suppose it goes back to stakeholder engagement that I was referring to earlier on. That there was not enough workshopping.” [P14, Senior Management, Both]*

P14 highlighted this confusion being ever more palpable when Implementation Agreements need to be signed, and it was not clear which government entity is responsible given the recent changes from the Department of Mineral Resources and Department of Energy and Electricity.

Hence managing the risks that come due to changes is critical to driving PPP Project delivery success.

4.5.5 *Critical Risk Factors related to PPP programme success within Theme: Social Factors*

Three (3) sub-themes emerged from the findings as Critical Risk Factors aligned with the Theme: Social Factors. It is detailed in the sub-section below.

a. *Public opposition Risk*

Eleven (11) of the twenty-one (21) participants mentioned the possibility of protest and strikes by the local community as a risk that needs to be managed and mitigated.

"So, I think the protests and strikes is a definite risk." [P8, Mid Management, Private]

b. *New: Extortion Risk*

Three (3) participants raised a new risk, termed extortion risk. The definition used is provided below.

Sub-Theme	Definition used for sub-theme
Extortion Risk	The risk of money or property being obtained by force, intimidation or undue illegal power (Merriam-Webster, 2025)

It was mentioned that there is a growing concern of organised criminal syndicates infiltrating the South African construction industry. One participant referred to this group as "construction mafia". Nyangiwe, Amoah and Mukumba (2023) study aligns with the empirical findings of the risks associated to construction mafia.

"Especially with the projects moving away from the Cape region and moving more to Mpumalanga and KZN, we're going to be dealing a whole lot more with construction mafia issues." [P14, Senior Management, Both]

It was further noted that this is an ever-increasing risk as projects, due to grid constraints, move closer towards populated load centres such as Limpopo, Mpumalanga and Kwazulu-Natal.

c. *New: Skilled Labour shortage risk*

Twelve (12) participants highlighted a new risk termed as Skilled labour shortage risk. The definition used for this item is provided below.

Sub-Theme	Definition used for sub-theme
Skilled labour shortage risk	The risk of an imbalance between the demand for a particular skill within the industry and the supply of that skill. (Specialist Staffing Group,2025)

Respondents mentioned that skilled resources within the industry are limited, and the impact of the shortage is foreseen to increase in the coming years as more and more skilled people leave the country. This phenomenon of brain drain is not unique to South Africa and has been observed in other African countries as well (Tuj-Zohura & Bhowmik, 2024).

"For me, the biggest risk that we did not really touch on is skilled resource which are very few in the country and the brain drainage will occur in the years to come. That's definite." [P21, Senior Management, Private]

4.5.6 *Critical Risk Factors related to PPP programme success within Theme: Financial and Economic Factors*

One (1) sub theme emerged from the findings as a Critical Risk Factors aligned with the Theme: Financial and Economic Factors. It is detailed in the sub-section below.

a. *Financial Risk*

Sixteen (16) participants spoke to aspects of financial risk. With P19 raising that for the first time in the programmes' history the Bid Bonds were being called for the REIPPPP Bid Window 5 Preferred Bidder projects that could not reach Financial Close. This was met with mixed responses from both the private and public sector participants. Some stating that it set a precedence for the programme to be more efficient in term of timelines. Furthermore, that it signals to the market that projects should be ready to close once selected.

"So that's one of the big risks is that we now see that bid bonds can be pulled and the IPP office is very willing to pull those bid bonds if projects do not achieve financial close within 12 months." [P19, Executive, Private]

However, others have stated that this opens the programme to legal risks that are not catered for in the programmes design. P27 a public sector respondent states that the programme is designed in such a manner that risk does not return back to the National Treasury.

"The Government Support Framework Agreement, the regulatory environment…we basically use all of that to make sure that we protect our Treasury." [P27, Executive, Both]

However, if the IPPO is unable to pull the Bid Bonds successfully and the court cases are dismissed with cost, it was highlighted from the findings that it is not clear how that exposure from the government's perspective will be financed.

4.5.7 *Critical Risk Factors related to PPP programme success within Theme: PPP Measurement Specific Factors*

Four (4) sub-themes emerged from the findings as a Critical Risk Factors aligned with the Theme: Measurement Specific Factors. It is detailed in the sub-section below.

a. *Environmental Risk*

Two (2) participants mentioned that there remains a residual risk that although all EA approvals have been attained, there remains a risk of appeals.

"Once the environmental authorization has been approved, there's still the risk of appeals" [P6, Executive, Private]

b. *Construction Risk*

Thirteen (13) participants mentioned that the construction risks are very dependent on the organizational structure and contracting structure utilized during the construction period. It was highlighted that upon thorough due diligence and selection of a principal contractor, as much of the construction risk

should be transferred to that entity. (Mazher et al. 2022) supports this view from literature.

“It depends on the contracting structure. In a situation whereby you have a fully wrapped EPC. The risk is fully transferred to the EPC contractor. You just need to ensure that the EPC contractor has a sound and strong financial position.” [P5, Mid Management, Private]

c. *Commissioning Risk*

Eleven (11) participants mentioned that there are pivotal risks that need to be managed during commissioning to drive PPP Project Delivery Success. One participant mentioned that not adequately planning for commissioning during construction creates issues of important technical scope being missed. Furthermore, it was communicated that ensuring all the relevant stakeholders (including the Original Equipment Manufacturers) are involved in the commissioning phase greatly minimizes this risk. Mazhar et al (2022) aligns with this view from the literature.

“You will find that during commissioning week, there's a lot of technical issues and scope creep that were not really thought about at the inception stage of the project.” [P2, Mid Management, Public]

“*I'll give you an example from grid code compliance, before we issue your compliance, we also need to be sure that the inverters that you are modelled according to the design limitations, constraints and specifications as set out by the OEM…. for us to determine if a plant is going to be grid code compliant.” [P11, Senior Technical, Public]*

d. *Operations Risk*

Nine (9) participants highlighted the importance of managing risks during the first two years of operations in line with PPP Project Delivery Success. One of the most pertinent factors was with respect to ensuring that smooth handover and spare parts management was done at a minimum in accordance with OEM and

principal contractor requirements. With P19 mentioning that this process is often rushed at the long-term expense of plant performance.

"During the handover process people are just in a rush to kind of close out the projects…that they miss out on key aspects." [P19, Executive, Private]

4.5.8 *Conclusion and summary of findings for Proposition 4: Critical Risk Factors (CRF) that contribute to PPP programme success in the electricity generation sector of South Africa*

This section addressed the proposition aligned with the research question: "*What are the Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?*"

The empirical data found that seventeen (17) Critical Risk Factors need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These are namely (1) Design risks, (2) Site-specific physical risks, (3) Land and permitting risks, (4) Government and political risks, (5) Supply chain risks, (6) Legal risks, (7) Change management risks, (8) Financial risks, (9) Public opposition risks, (10) Construction risks, (11) Commissioning risks, (12) Operations risks, (13) Environment risks. Furthermore, four new risks were identified empirically that were not identified in the literature during the development of the detailed conceptual framework. These were namely (14) Climate change risks, (15) Concentration risks, (16) Extortion risks, (17) Skilled labour shortage risks.

4.6 Comparison of the theoretical and empirically verified Success Index Framework

The purpose of this section is to collate the findings and graphically present an empirically verified update of the conceptual Success Index framework (Figure 6). The changes from the theoretical framework model to the empirically verified

framework model were highlighted in red from Figure 24 to Figure 30, and described in the following sub-sections. The final empirically verified Success Index Framework will be presented in section 4.7.

4.6.1 *Empirically verified Success Index Framework: Macro Political and Regulatory factors*

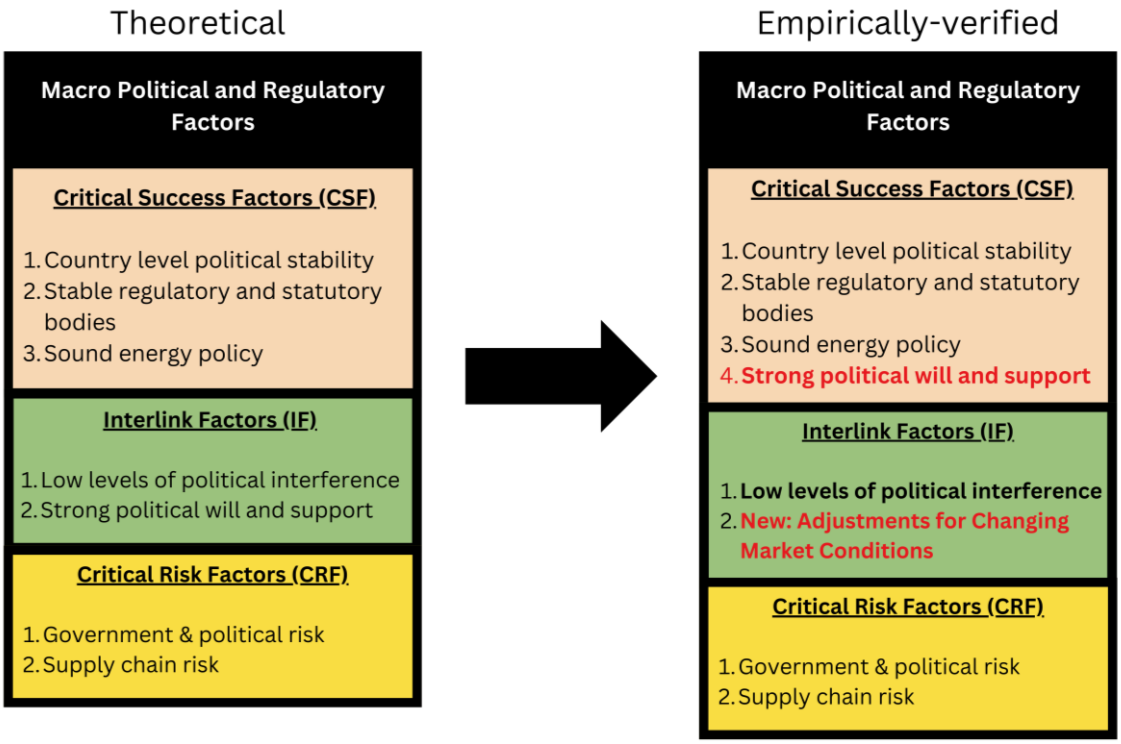


Figure 24. Theoretical vs empirically verified Success Index Framework component of Theme: Macro political and regulatory factors

As per Figure 24, from the empirical findings, the component of *Strong political will and support* was found to only be an enabling Critical Success Factor, as opposed to being an Interlink Factor as theorized. The reason is that respondents mentioned the difficulty in measuring this component specifically for the context of formal reverse auction PPP in electricity generation in South Africa. Furthermore, there was a new component: *Adjustments for Changing Market conditions* that was found to be an Interlink Factor. All other items remained unchanged with broad alignment between the theoretical and empirical framework within this theme.

4.6.2 *Empirically verified Success Index Framework: Effective Procurement Factors*

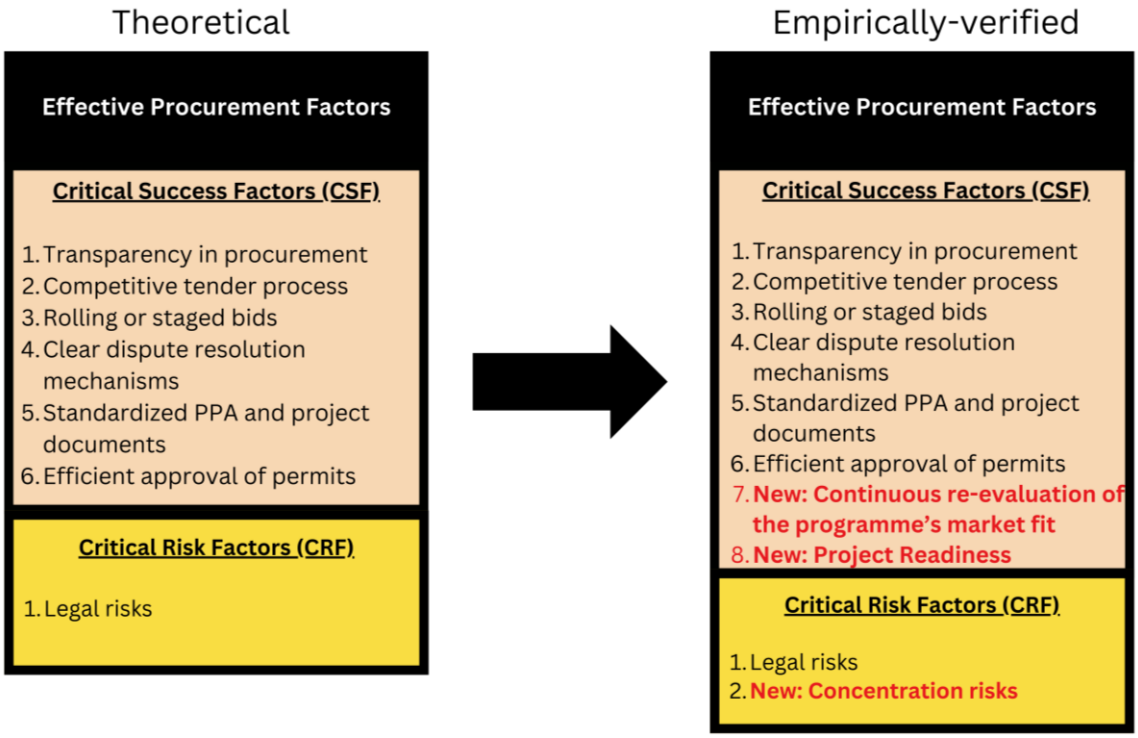


Figure 25. Theoretical vs empirically verified Success Index Framework component of Theme: Effective procurement factors

There were no changes concerning the theorized factors within the Success Index framework in the theme: Effective procurement factors – depicting alignment with the empirical data. However, there were two (2) new enabling factors, and one (1) additional risk that was identified for the context specifics of formal reverse auction PPP in the electricity generation sector of South Africa, as depicted in Figure 25.

4.6.3 *Empirically verified Success Index Framework: Project Feasibility Factors*

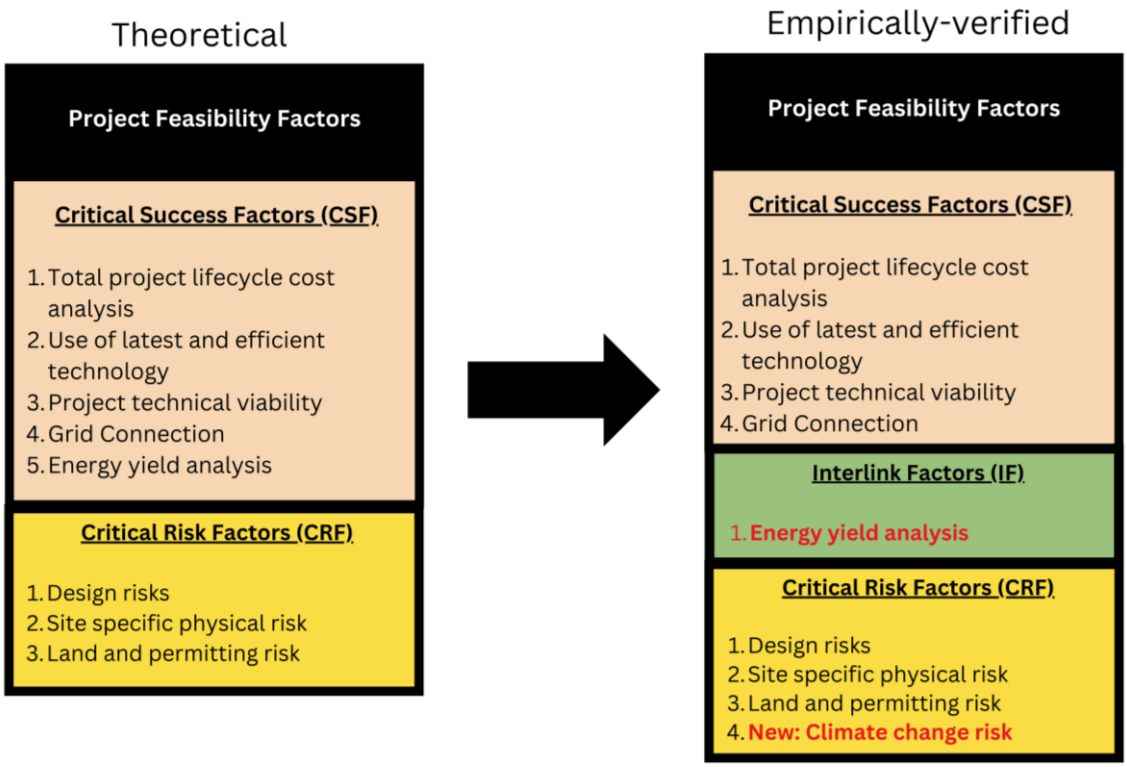


Figure 26. Theoretical vs empirically verified Success Index Framework component of Theme: Project Feasibility Factors

Figure 26, shows that from the empirical findings, the factor *Energy yield analysis* was found to be an Interlink Factor as opposed to a Critical Success Factor. The reason being participants raised the growing need to constantly ensure energy forecasts are correct (see details in section 4.4.3a). This aligns further with the new risk that was identified showing that Climate change risks are having direct impacts on energy yield and production profiles - specifically on non-dispatchable renewable energy plants such as solar and wind.

4.6.4 *Empirically verified Success Index Framework: Organizational Factors*

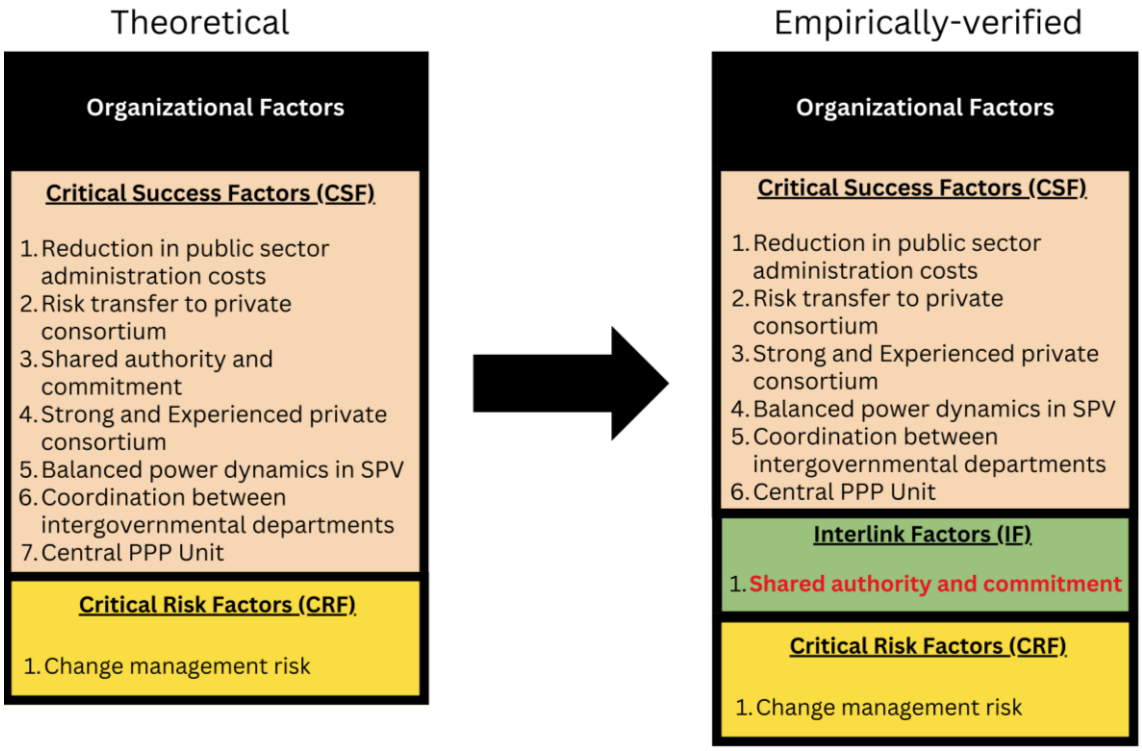


Figure 27. Theoretical vs empirically verified Success Index Framework component of Theme: Organizational Factors

Theoretically as shown in Figure 27 the theme: Organizational factors did not have any Interlink Factors. However, through the empirical findings, it was shown that the factor of *Shared authority and commitment* was a key enabler and measurement component tying together all other factors from the inception of the programmes until PPP Project delivery success as per Figure 1. Centred around alignment with the concept of New Public Governance (Casady, Eriksson, Levitt, & Scott, 2019) and the Altruism Theory (Berisha et al., 2019).

4.6.5 *Empirically verified Success Index Framework: Financial Factors*

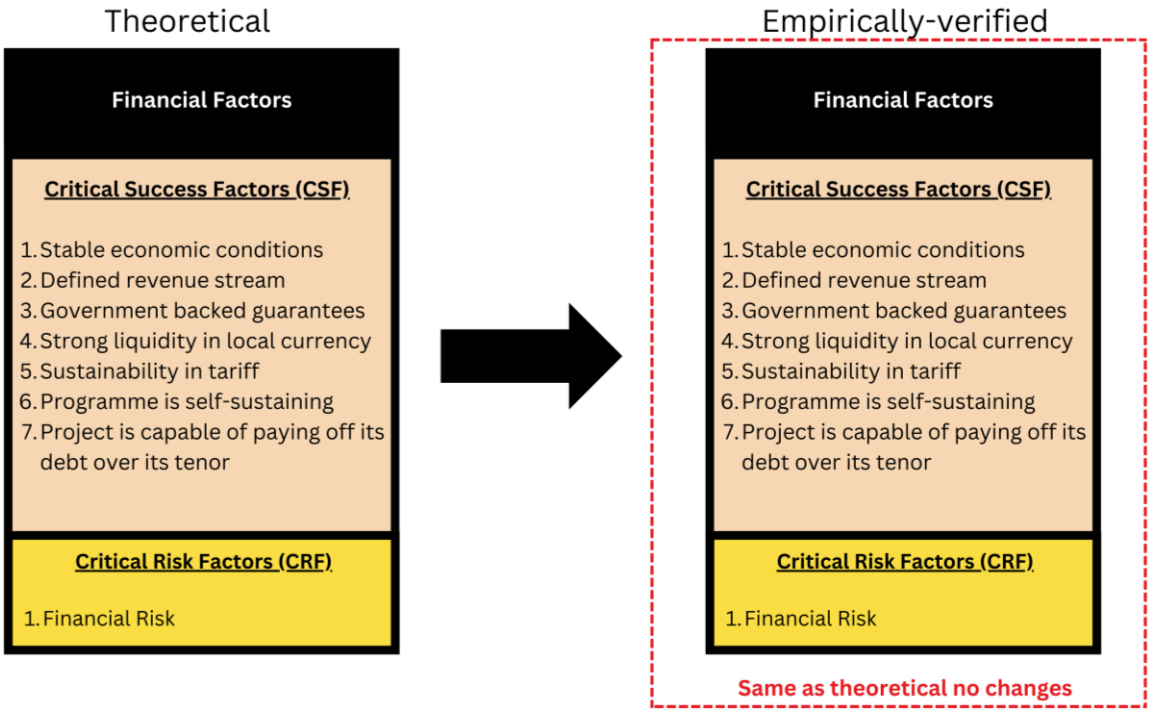


Figure 28. Theoretical vs empirically verified Success Index Framework component of Theme: Financial Factors

The empirical Success Index component related to the theme: Financial Factors aligned completely with the theoretical literature, as shown in Figure 28.

4.6.6 *Empirically verified Success Index Framework: Social Factors*

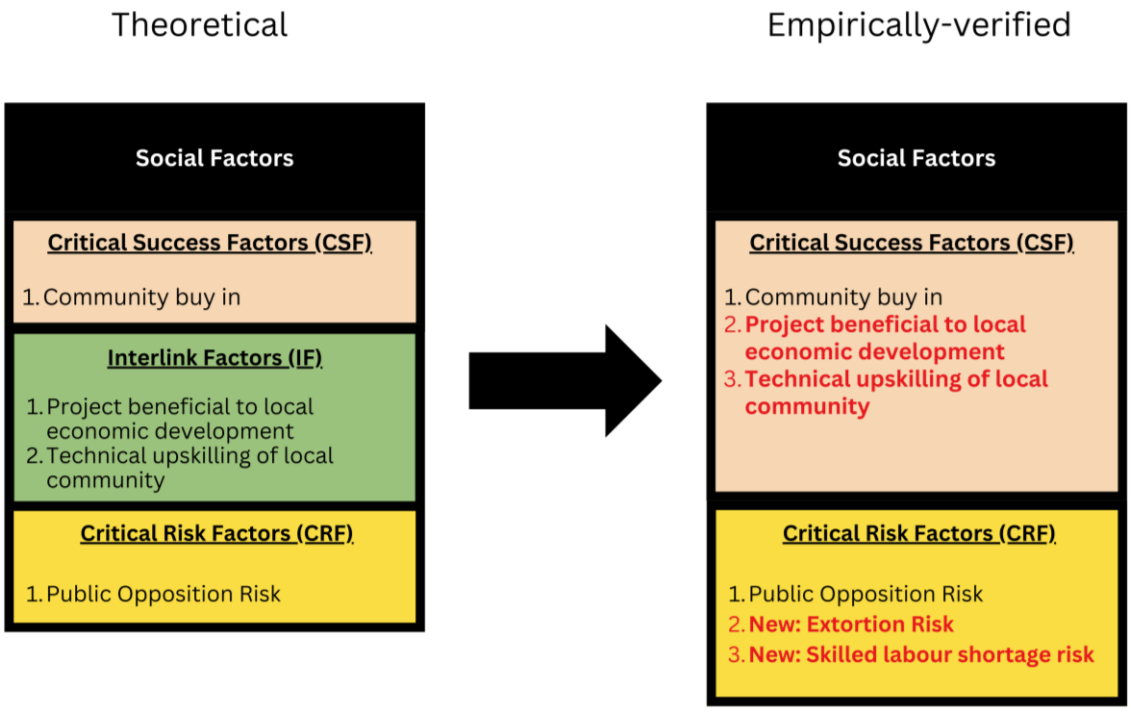


Figure 29. Theoretical vs empirically verified Success Index Framework component of Theme: Social Factors

From Figure 29, the factors of *technical upskilling of local community* and *Project beneficial to local economic development* were found empirically to be Critical Success Factors as opposed to Interlink Factors. This was found to be the case as often it was difficult to measure these components over and above compliance with the programme(s) requirements. Hence as stated in the following sub-section 4.6.7 and section 4.3.1c it was proposed that a new measure more focused on Social Impact be incorporated into the programmes design. Two (2) new risks were identified empirically being extortion risk and skilled labour shortage risk.

4.6.7 *Empirically verified Success Index Framework: PPP Measurement Specific Factors*

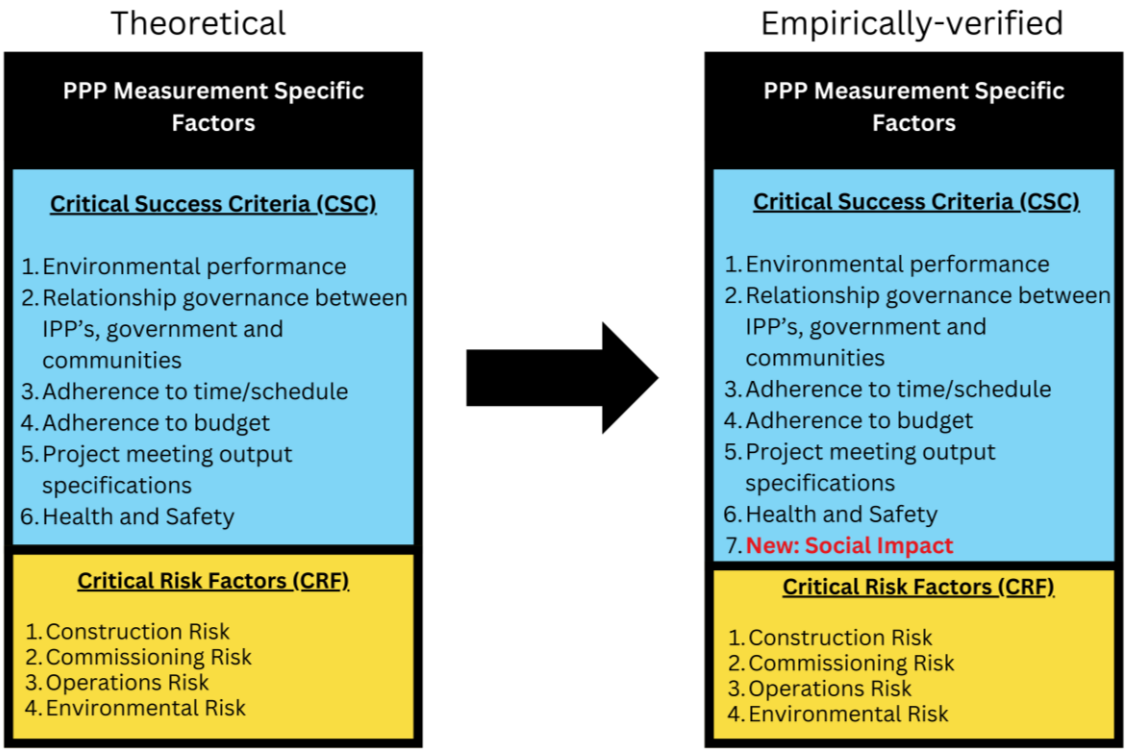


Figure 30. Theoretical vs Empirically verified Success Index Framework component of Theme: PPP Measurement Specific Factors

From Figure 30, there was only one new factor found from the empirical data, termed *Social Impact*. All other components were well aligned with the original theoretical framework.

4.7 Consolidated Empirically verified Success Index Framework

Figure 31 consolidates the findings and the empirical data to create a final Success Index framework context specific for the formal reverse auction PPP programmes in the electricity generation sector of South Africa.

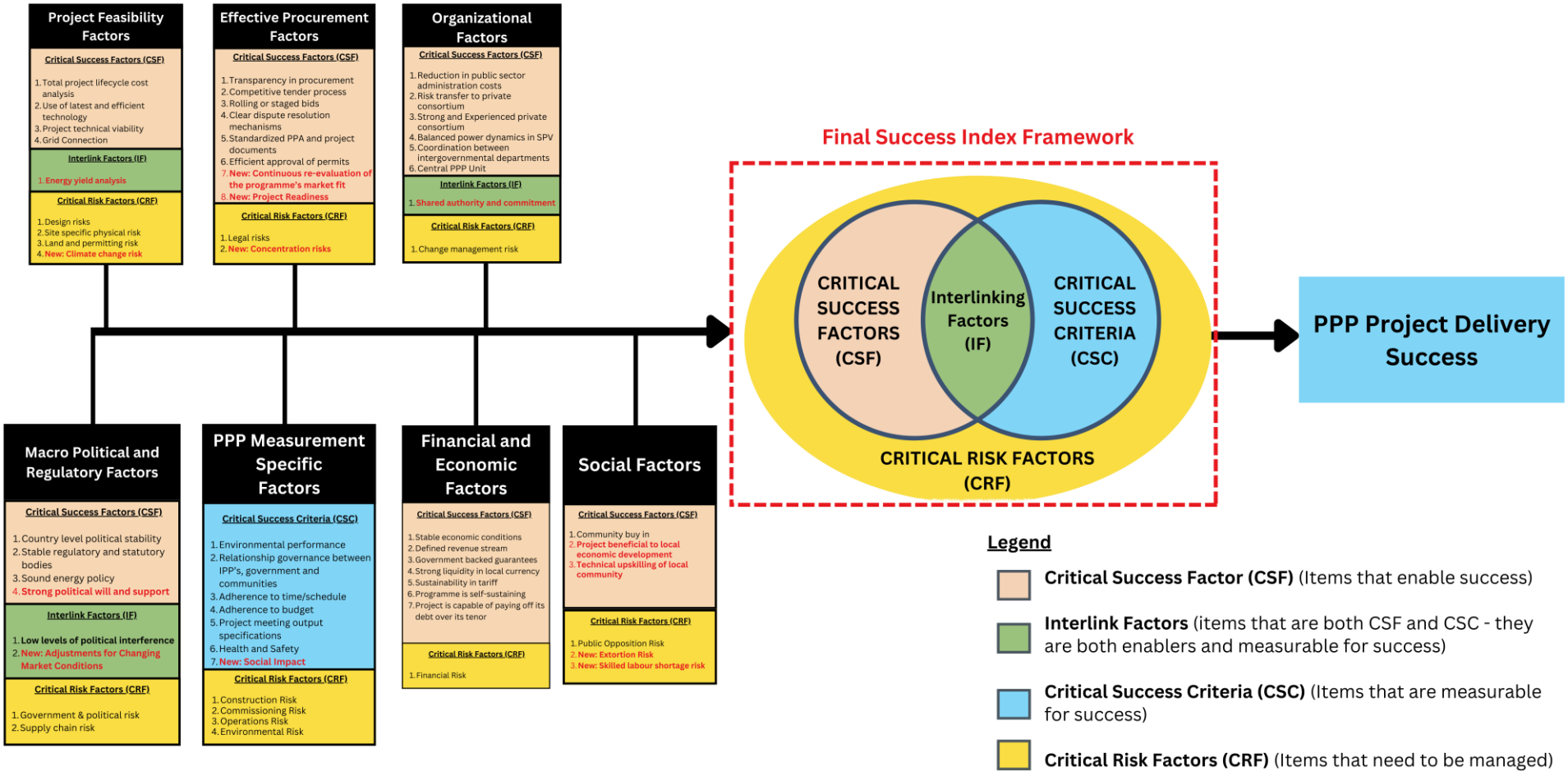


Figure 31. Final empirically verified Success Index framework

4.8 Comparison of literature review and own findings

Table 4 provides a final consistency table comparing the propositions to the research questions from the literature with those obtained from the findings.

Table 13. Comparison of literature review and findings

RQ #	**State Research Question**	**Prop #**	**State Proposition** (literature review response to RQ)	**Findings from own study**
1	What are the Critical Success Factors in enabling PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?	1	There are a total of twenty-nine (29) Critical Success Factors that enable PPP Project Delivery Success within the formal reverse auction electricity generation sector of South Africa. These Critical Success Factors can be captured into six themes, namely (1) Macro Political and Regulatory Factors, (2) Effective Procurement Factors, (3) Financial and Economic Factors, (4) Project Feasibility Factors, (5) Organizational Factors, and (6) Social Factors.	There are a total of twenty-nine (32) Critical Success Factors that enable PPP Project Delivery Success within the formal reverse auction electricity generation sector of South Africa. These Critical Success Factors can be captured into six themes, namely (1) Macro Political and Regulatory Factors, (2) Effective Procurement Factors, (3) Financial and Economic Factors, (4) Project Feasibility Factors, (5) Organizational Factors, and (6) Social Factors. Two new factors emerged from the findings namely: (a) Project readiness and (b) Continuous re-evaluation of the programme(s) market fit. Both were sub-factors of the Theme: Effective procurement factors.

RQ #	State Research Question	Prop #	State Proposition (literature review response to RQ)	Findings from own study
2	What are the Critical Success Criteria that could be used in measuring PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?	2	There are a total of six (6) Critical Success Criteria that include all the measurement specific items that could be used in measuring PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These combined all fall under the theme: PPP Measurement Specific Factors and include a combination of “hard” traditional project management factors, as well as “soft” environmental performance and relationship governance factors.	There are a total of seven (7) Critical Success Criteria that include all the measurement specific items that could be used in measuring PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These combined all fall under the theme: PPP Measurement Specific Factors and include a combination of “hard” traditional project management factors – such as time, cost and scope as well as “soft” ESG factors such as environmental performance, relationship governance, and a new factor termed (a) Social Impact.
3	How do the Critical Success Factor and Critical Success Criteria overlap (Interlink Factors) in driving PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?	3	There are a total of four (4) Interlink factors, which are an overlap of components that are both enabling (Critical Success Factors) and measurable (Critical Success Criteria) factors. These interlinks occur within the themes of Macro political and regulatory factors and theme of Social factors. The Interlink factors are namely: (1) low levels of political interference, (2) strong political will and	There are a total of four (4) Interlink factors, which are an overlap of components that are both enabling (Critical Success Factors) and measurable (Critical Success Criteria) factors. These interlinks occur within the themes of Macro political and regulatory factors, Organizational factors, and Project feasibility factors. The Interlink factors are namely: (1) low levels of

RQ #	State Research Question	Prop #	State Proposition (literature review response to RQ)	Findings from own study
			support, (3) project being beneficial to local economic development and (4) ensuring technical upskilling of local communities is prioritized within the programmes.	political interference, (2) shared authority and commitment, (3) Energy yield, and a new Interlink factor referred to as (a) Adjustments for changing market conditions.
4	What are the Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?	4	There are thirteen (13) Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These are namely (1) Design risks, (2) Site specific physical risks, (3) Land and permitting risks, (4) Government and political risks, (5) Supply chain risks, (6) Legal risks, (7) Change management risks, (8) Financial risks, (9) Public opposition risks, (10) Construction risks, (11) Commissioning risks, (12) Operations risks and (13) Environmental risks.	There are seventeen (17) Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These are namely (1) Design risks, (2) Site specific physical risks, (3) Land and permitting risks, (4) Government and political risks, (5) Supply chain risks, (6) Legal risks, (7) Change management risks, (8) Financial risks, (9) Public opposition risks, (10) Construction risks, (11) Commissioning risks, (12) Operations risks, (13) Environment risks. Furthermore, four new risks were identified empirically namely (a) Climate change risks, (b) Concentration risks, (c) Extortion risks, (d) Skilled labour shortage risks. These new risks have been specifically highlighted due to their context-specific impacts within the formal reverse auction PPP in electricity generation sector of South Africa.

4.9 Conclusion to findings and discussion

This chapter was a summary of the finding and discussions on the propositions as they pertain to the research questions. With the output an empirically verified context specific Success Index framework for Public Private Partnership programmes' in the electricity generation sector of South Africa. Furthermore, the seven (7) themes combined, namely (1) Macro political and regulatory factors, (2) Effective procurement factors, (3) Financial and economic factors, (4) Project feasibility factors, (5) Organizational factors, (6) Social factors and (7) PPP measurement specific factors captured a total of thirty-two (32) Critical Success Factors, seven (7) Critical Success Criteria, four (4) Interlink factors, and seventeen (17) Critical Risk Factors. A total of eight (8) new Success Index factors were identified.

Table 14. Eight (8) new Success Index factors from the empirical data

New factor descriptor	Associated theme	Component of Success Index
Project readiness	Effective procurement factors	Critical Success Factor
Continuous re-evaluation of the programme's market fit	Effective procurement factors	Critical Success Factor
Adjustments for changing market conditions	Macro political and regulatory factors	Interlink Factor
Social Impact	PPP Measurement specific factors	Critical Success Criteria
Climate change risks	Project feasibility factors	Critical Risk Factor
Extortion risks	Social factors	Critical Risk Factor
Skilled labour shortage risks	Social factors	Critical Risk Factor

CHAPTER 5. CONCLUSIONS & RECOMMENDATIONS

5.1 Introduction

The purpose of this study was to explore and identify the various factors that drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. Furthermore, the components of Critical Success Factors, Critical Success Criteria, Interlink Factors and Critical Risk Factors were collated into an integrated Success Index framework. The methodology utilized a deductive-inductive approach through which qualitative semi-structured interviews were held with 21 professional participants with the view of undertaking theoretical refinement of an integrated conceptual framework derived from the literature review. This chapter begins with conclusions to each of the research questions in the following sub-sections followed by recommendations and suggestions for future research. The final consistency Table 16, is provided setting out consolidated key findings and differences from the literature.

5.2 Conclusions regarding research question 1

The first research question was stated as *"What are the Critical Success Factors enabling PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?"*

From a thematic level, there was alignment between the literature and the empirical data showing that the Critical Success Factor components can be categorized into six (6) themes, namely (1) Macropolitical and regulatory factors, (2) Project feasibility factors, (3) Effective procurement factors, (4) Organizational factors, (5) Financial factors and (6) Social factors.

There were some key notable differences between the literature and the findings. Grid connection was found to be one of the most important enabling factors consistent within both the empirical findings and the literature (Ayamolowo et

al.,2022). The literature however heavily focuses on grid expansion efforts as the prime solution. The findings highlight differences - having shown that it is equally important to ensure (a) the modernization of the grid and grid code compliance requirements for key equipment, (b) improvements in reducing the uncertainty between the scope and costs of the Cost Estimate Letter and Budget Quote; and (c) Streamlining of grid accessibility rules through the implementation of Interim Grid Capacity Allocation Rules (IGCAR,2023).

Furthermore, within the findings, it was shown that the entire formal reverse auction programme could potentially benefit from RFP release dates that are set well in advance. The current haphazard nature of tender releases was shown to be adding unnecessary confusion in the market – disabling PPP Project Delivery Success. This potential “low-hanging fruit” change was noted as one of the simplest and immediately most impactful improvements that could be made to the programme(s). The findings recommend RFP releases at predetermined annual intervals, at specific times (a specific month), with regularity.

The empirical findings also showed that there is room and scope for a reduction in the government backed guarantees beyond the current 80%. Potentially to as low as 50% without material impact to the programme due to two primary reasons. (1) No history of government default within the programmes and (2) the inherent tension between the “*material uncertainty relating to the going concern status of Eskom*” (Eskom Holdings, 2024). However, simultaneously, Eskom has an impeccable track record of paying projects within these programmes on time consistently. This tension is evident in the findings with respect to the trade-offs developers take between using the latest in-class equipment and the most reliable, with the findings showing it taking care not to create uncertainty in revenue due to increased plant unavailability.

Two new enabling factors emerged from the findings namely (1) Continuous re-evaluation of the programmes. The findings state that it should be facilitated by the IPP Office, with more focused workshopping sessions regularly. Secondly (2), Project readiness. This highlighted the importance of ensuring that projects bid into the programmes were not only bid-compliant and at the lowest cost. But were

bid compliant with a sustainable tariff and able to reach Financial Close within the stipulated RFP timeframes upon Preferred Bidder selection. Interestingly both factors form part of the Theme: Effective Procurement Factors – showing the importance of focusing and re-evaluating the process and clauses driving procurement within these programmes.

5.3 Conclusions regarding research question 2

The second research question was stated as *"What are the Critical Success Criteria that could be used in measuring PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?"*

The literature and the empirical findings were aligned with six (6) Critical Success Criteria namely: (1) Adherence to time/schedule, (2) Adherence to budget, (3) Project meeting output specifications, and (4) Health and safety. These factors aligned with typical project management factors within construction projects with well-developed "hard" quantitative measures. The findings furthermore aligned with the literature in that there were "softer" qualitative measurement factors, namely: (1) Environmental performance, and (2) Relationship governance between IPPs, government and communities.

Key difference within the findings however was that aspects of relationship governance were often neglected with it being highlighted that the community engagement aspect required tangible measurable outcomes. Hence there was a new factor that was found empirically referred to as (a) Social Impact which was a "soft" qualitatively measurable item. Interestingly when combining the three "softer" qualitative measurement factors they align with the principle of ESG as per the Table 15 below:

Table 15. ESG components aligned with "softer" qualitative measurable items

Components of ESG	Aligning "softer" qualitative measurement factors
Environment	Environmental Performance

Social	Social Impact
Governance	Relationship governance between IPPs, government and communities

Hence from the findings, it can be shown that both project management factors and ESG factors were Critical Success Criteria in driving PPP Project delivery success.

5.4 Conclusions regarding research question 3

The third research question was stated as *"How do the Critical Success Factor and Critical Success Criteria overlap (Interlink Factors) in driving PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?"*

There are a total of four interlinking factors, namely (1) Adjustments for changing market conditions, (2) Political interference, (3) Shared authority and commitment, and (4) Energy yield.

One of the key differences between the literature and empirical data is that the Interlink factor energy yield was found to be both an enabler and a measurement factor for PPP Project Delivery Success due to the programmes scrutiny on ensuring energy yield values within projects have been forecast correctly. Furthermore, organizationally it was found that shared authority and commitment was both and enabling factor and a measurement factor in part due to the New Public Governance paradigm that is largely underpinned by altruistic behaviours of trust and commitment, coupled with a complex web of contractual documents (Casady et al. 2019).

A new factor emerged from the findings termed: Adjustments for changing market conditions. Private sector participants mentioned that mechanisms such as Value for Money did not provide adequate protection against unforeseeable material changes after Preferred Bidder status is awarded – such as the 10% increase in import duty taxes on modules. Many stated a need for a mechanism such as a financial equilibrium clause within the project documentation.

5.5 Conclusions regarding research question 4

The fourth research question was stated as *"What are the Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?"*

From the literature, there were thirteen (13) Critical Risk Factors identified. Empirically the same thirteen risks were presented in the findings. These were namely: (1) Design risks, (2) Site specific physical risks, (3) Land and permitting risks, (4) Government and political risks, (5) Supply chain risks, (6) Legal risks, (7) Change management risks, (8) Financial risks, (9) Public opposition risks, (10) Construction risks, (11) Commissioning risks, (12) Operations risks, (13) Environment risks.

However, four new risks were identified from the findings, namely (a) Climate change risks, (b) Concentration risks, (c) Extortion risks, (d) Skilled labour shortage risks. These new risks have been specifically highlighted due to their context-specific impacts within the formal reverse auction PPP in the electricity generation sector of South Africa.

There were key differences between the literature and the empirical data. It was made evident that the Climate change risk not only impacts on seasonality and energy forecasts but also has a construction impact due to the increased risks of extreme weather events at project sites.

It was also highlighted that selecting a single entity or consortium for a large portion of the allotted MW capacity each bidding window, potentially places the programme at a Concentration risk. With REIPPPP BW 5 being a prime example of how it may potentially go wrong if the single entity or consortium is unable to reach Financial Close.

Hence from the findings, it was proposed that an integrated view of risk is required which could be achieved by incorporating a risk matrix that looks at the project-by-project risks over the programmes.

5.6 Recommendations

This section proposes recommendations to each of the stakeholders mentioned in section 1.7 which the research was intended to benefit.

5.6.1 *Recommendations for policy makers*

Rolling or staged bids were found to be the lowest hanging fruit that did not require any structural changes to the programme's design. Policy makers could potentially mandate the IPP Office to only release tenders at specific periods annually, with this being communicated to the market well in advance.

The programmes can still operate under political instability (albeit at a cost on the weighted average cost of capital due to an increase in the country's risk premium). However, a lack of support politically may completely halt the programme. Hence policymakers could potentially seek to ensure that conflicts amongst the relevant government departments are not extended to the programme. This may be achieved by:

(1) Encouraging a capacitated "one-stop shop" as setup by National Energy Crisis Committee (NECOM); and

(2) By ensuring the purchaser of electricity is moved to the NTCSA as it is an entity that is already in the process of being unbundled from Eskom.

Localization and local content prescripts should be overhauled, with the principle of ensuring that items categorized for local content should be those where South Africa has a competitive advantage. Furthermore, this should not be limited to equipment, but the entire value chain should be synergized to maximize value creation for the country. Policymakers may ensure that the South African Renewable Energy Masterplan (SAREM, 2023) becomes a living document reviewed annually as a part of the statutory requirement for an annual Integrated Energy Plan (National Energy Act, 2008), to align the localization and local content prescripts between the different government entities as technology evolves.

Based on the findings, it is proposed that there is potential room for further reductions in the government guarantee. It is recommended this should be investigated thoroughly for its viability and potentially phased in slowly with reductions in each future round with a review after every bid on its overall impact on competitiveness, tariff, and government liabilities.

Furthermore, private and public respondents alike were aligned that there were key semi-skilled technical and construction skills that were lacking within the communities in which these projects were being built. Policymakers could develop a national database of skills required and mobilize TVET colleges and the Energy and Water SETA to deliver education and industry-specific training in line with the skills shortfall. Furthermore, policymakers should encourage project developers through policy incentives to hire people that take advantage of the training programmes and qualifications.

Lastly, investigation into the inclusion of financial equilibrium principles within the RFP and tender documents may be undertaken to understand the risk versus reward. Based on the findings, both public sector and private sector actors mentioned that they did not have the legislative tools to justifiably amend the tariffs of Preferred Bidder projects during an international crisis like COVID-19, which was unforeseeable.

5.6.2 *Recommendations for professionals*

a. *Private sector professionals*

For the private sector professionals and developers when selecting a site, a comprehensive risk management system should be undertaken and thoroughly scrutinized to fully understand physical surface and subsurface risks, as well as energy yield potential.

Dedicated and co-ordinated community engagement through a Community Liaison Officer was highlighted as an important aspect. This can aid in reducing the identified risks of extortion and public unrest, but at the same time allow the

IPP to fully understand local community needs. Thus, aiding in a higher probability of Economic Development spend leading to real Social Impact.

It was evident from the findings that ESG components are imperative to the success of the projects. IPP's should ensure that they have dedicated teams that are focused on ESG to better facilitate improved PPP Project Delivery Success.

Lastly, bidders should avoid submitting unrealistically low bids, rather they should focus on ensuring Project readiness to close and financial sustainability based on the approved tariff over the PPA term.

b. *Public sector professionals*

Public sector professionals operate within defined government institutions; hence the recommendations below align with their respective institutions.

The government sector should fast-track the operationalization of the National Energy Crisis Committee's plan for a One Stop Shop. This may reduce intergovernmental friction between departments. Public sector professionals within each of the various government departments could undertake intergovernmental workshops, led by the IPP Office, to ensure streamlining of dependencies and bottlenecks. Furthermore, alignment may assist in ensuring that there is no duplication of efforts.

Government should incorporate better mechanisms to measure and report on bottlenecks, including remedial measures.

a. *Academics*

The output of this study is qualitative, anchored around a qualitative Success Index model. Research into the causal relationships between the various factors within the Success Index could provide a deeper understanding of their interrelationships. Furthermore, a larger sample size could validate the findings.

5.7 Suggestions for further research

The following suggestions may be used to guide future research.

- Research may be undertaken to determine the optimal reduction in the government guarantee whilst maintaining competitive funding terms with respect to the discount rate inclusive of the country premium risk.
- Research may also be undertaken on the impact of competition between private/corporate PPAs and the formal reverse auction tender programmes, on the pace of grid expansion and modernization.
- A correlation study using structural equation modelling may be undertaken to determine which of the thematic groups carry the highest weighting in terms of their blended average impact within these programmes.
- A study may be undertaken to understand how the ESG components are impacted based on different technologies (wind/solar/battery).
- Research may be undertaken to determine the best method of technical skills development to bridge skills gaps within the formal reverse auction PPP programmes.

Table 16. Consistency table: research questions, conclusions and contribution to knowledge

RQ #	Research Question	Proposition	Conclusion based on findings	Key differences between initial propositions and findings
1	What are the Critical Success Factors in enabling PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?	There are a total of twenty-nine (29) Critical Success Factors that enable PPP Project Delivery Success within the formal reverse auction electricity generation sector of South Africa. These Critical Success Factors can be captured into six themes, namely (1) Macro Political and Regulatory Factors, (2) Effective Procurement Factors, (3) Financial and Economic Factors, (4) Project Feasibility Factors,	There are a total of thirty-two (32) Critical Success Factors that enable PPP Project Delivery Success within the formal reverse auction electricity generation sector of South Africa. These Critical Success Factors can be captured into six themes, namely (1) Macro Political and Regulatory Factors, (2) Effective Procurement Factors, (3) Financial and Economic Factors, (4) Project Feasibility Factors, (5) Organizational Factors, and (6) Social Factors. Two new	Two new Critical Success Factors that differed from the initial proposition were identified empirically. Firstly, (a) project readiness highlighted the heightened importance of ensuring preferred bidder projects are selected based on their readiness to reach financial close. This potentially being able to be incorporated into the bid compliance criteria. Secondly, (b) Continuous re-evaluation of the programme(s) market fit. Refers to the enabling impact of ensuring that the programme is evolving in line with the rapidly changing electricity supply industry in South Africa to remain relevant as the government's chosen electricity generation procurement mechanism.

RQ #	Research Question	Proposition	Conclusion based on findings	Key differences between initial propositions and findings
		(5) Organizational Factors, and (6) Social Factors.	factors emerged from the findings namely: (a) Project readiness and (b) Continuous re-evaluation of the programme(s) market fit. Both were sub-factors of the Theme: Effective procurement factors.	It was also found that a key enabler was to ensure that projects are developed with local community beneficiation as an imperative. It was also found that focus of the programme should be on local technical upskilling – such that long term value creation through employment may be created within the communities the projects are built. This differs from the initial proposition which had only highlighted community buy in as a key Social Factor enabler.
2	What are the Critical Success Criteria that could be used in measuring PPP Project Delivery Success in the formal reverse auction	There are a total of six (6) Critical Success Criteria that include all the measurement specific items that could be used in measuring PPP Project	There are a total of seven (7) Critical Success Criteria that include all the measurement specific items that could be used in measuring PPP Project Delivery Success in	Key difference within the findings was that aspects of relationship governance were often neglected with it being highlighted that the community engagement aspect required tangible measurable outcomes. Hence there was a new factor that was found empirically

RQ #	Research Question	Proposition	Conclusion based on findings	Key differences between initial propositions and findings
	electricity generation sector of South Africa?	Delivery Success in the formal reverse auction electricity generation sector of South Africa. These combined all fall under the theme: PPP Measurement Specific Factors and include a combination of “hard” traditional project management factors, as well as “soft” environmental performance and relationship governance factors.	the formal reverse auction electricity generation sector of South Africa. These combined all fall under the theme: PPP Measurement Specific Factors and include a combination of “hard” traditional project management factors – such as time, cost and scope as well as “soft” ESG factors such as environmental performance, relationship governance, and a new factor termed (a) Social Impact.	referred to as (a) Social Impact which was a “soft” qualitatively measurable item. The three qualitative measurements aligned with elements of ESG.
3	How do the Critical Success Factor and	There are a total of four (4) Interlink factors, which are	There are a total of four (4) Interlink factors, which are an	A new Interlink factor was revealed from the empirical data named (a) Adjustments for

RQ #	Research Question	Proposition	Conclusion based on findings	Key differences between initial propositions and findings
	Critical Success Criteria overlap (Interlink Factors) in driving PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?	an overlap of components that are both enabling (Critical Success Factors) and measurable (Critical Success Criteria) factors. These interlinks occur within the themes of Macro political and regulatory factors and theme of Social factors. The Interlink factors are namely: (1) low levels of political interference, (2) strong political will and support, (3) project being beneficial to local economic development and (4) ensuring technical upskilling of local communities is	overlap of components that are both enabling (Critical Success Factors) and measurable (Critical Success Criteria) factors. These interlinks occur within the themes of Macro political and regulatory factors, Organizational factors, and Project feasibility factors. The Interlink factors are namely: (1) low levels of political interference, (2) shared authority and commitment, (3) Energy yield, and a new Interlink factor referred to as (a) Adjustments for changing market conditions.	changing market conditions. It was proposed that financial equilibrium clauses be potentially investigated to allow for tariff adjustments between Preferred Bidder and Financial Close upon major unforeseeable events that have a material impact on costs. It was also found that factor: energy yield analysis (within the Theme: Project feasibility factors) although initially being viewed as a Critical Success Factor – was empirically verified to be an Interlink factor. This mainly because of the introduction from REIPPPP BW 5 of the Forecast Penalties associated with energy yield. Furthermore factor: shared authority and commitment (within Theme: Organizational factors) was also found to be an Interlink factor in line with the need to ensure both public and private sector actors enable the programme, with this being constantly measured throughout to

RQ #	Research Question	Proposition	Conclusion based on findings	Key differences between initial propositions and findings
		prioritized within the programmes.		maximise the likelihood of PPP Project Delivery Success.
4	What are the Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa?	There are thirteen (13) Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These are namely (1) Design risks, (2) Site specific physical risks, (3) Land and permitting risks, (4) Government and political risks, (5) Supply chain risks, (6) Legal risks, (7) Change management	There are seventeen (17) Critical Risk Factors that need to be managed to drive PPP Project Delivery Success in the formal reverse auction electricity generation sector of South Africa. These are namely (1) Design risks, (2) Site specific physical risks, (3) Land and permitting risks, (4) Government and political risks, (5) Supply chain risks, (6) Legal risks, (7) Change management risks, (8) Financial risks, (9)	Key differences between the literature and the empirical data were captured in the new risks revealed empirically, in which it was made evident that Climate change risk not only impacts on seasonality and energy forecasts, but also had an impact on construction. From a procurement perspective it was highlighted that selecting a single entity for a large number of the allotted MW was a risk, especially if their projects are not ready to close. It was communicated from the findings, that an integrated view on risk is required

RQ #	Research Question	Proposition	Conclusion based on findings	Key differences between initial propositions and findings
		risks, (8) Financial risks, (9) Public opposition risks, (10) Construction risks, (11) Commissioning risks, (12) Operations risks and (13) Environmental risks.	Public opposition risks, (10) Construction risks, (11) Commissioning risks, (12) Operations risks, (13) Environment risks. Furthermore, four new risks were identified empirically namely (a) Climate change risks, (b) Concentration risks, (c) Extortion risks, (d) Skilled labour shortage risks. These new risks have been specifically highlighted due to their context specific impacts within the formal reverse auction PPP in electricity generation sector of South Africa.	incorporating a risk matrix that looks at project by project risks.

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APPENDIX A – Participant Information Sheet

Good day

My name is Mogale Modisane, I am a Master of Management in Energy Leadership student at the University of the Witwatersrand, Johannesburg. My supervisor is Visiting Adjunct Professor Roderick Crompton. I am conducting a research study on the most pertinent factors that contribute to the success of the government's formal reverse auction public private partnership (PPP) tender programmes in the electricity generation sector within South Africa. The study is titled the Success Index for Public Private Partnership Programme Success in Electricity Generation Sector of South Africa

I would like to invite you to participate in a semi-structured interview for my study. If you decide to take part, your participation in this research study will last about sixty (60) minutes. The interview will take place at a location and time that is convenient for you.

With your permission, I would like to audio record the interview. This audio recording will be transcribed and sent back to you for confirmation/deletions or edits before being used in the study. The data will be stored in a password protected computer for five (5) years and deleted after five (5) years. Only I as the researcher will have access to the data.

The interview will be confidential and anonymous. When I share the results of the research study, I will not include your name or anything else that could identify you.

If you decide to take part in the research study, it should be because you want to volunteer. You do not have to take part. You can stop being in the study at any time. You do not have to answer any questions if you do not want to. You will not get any direct benefits if you choose to join the research study. You will not lose any services, benefits or rights you would normally have if you decide not to join. Taking part in the research study will not cost you anything. You will not be paid for being in this research study.

The risks for this research study are no more than what happens in everyday life for example some of the questions asked may make you feel sad or upset. If this happens, I will stop the interview and continue at another time if deemed necessary.

This research study will be written up as a research report. If you would like to receive a summary of this report, I will be happy to send it to you.

If you have any questions during or after the interview about this research study, feel free to contact me or my supervisor on the details listed below. If you have any concerns or complaints about the ethical procedures of this research study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone +27(0) 11 717 1408, email hrecnon-medical@wits.ac.za.

Yours sincerely,
Mogale Diagile Modisane

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APPENDIX B – Interview Guide

No	Interview Question *(Text Italics = Optional follow up questions)*	Purpose/ Research Question (RQ)
1	How many years of work experience do you have in total over your entire career?	Background info (qualifier)
2	From your unique experience which of the programmes below do you have working experience (directly or indirectly)? • REIPPPP BW1 BW2 BW3 BW3.5 BW4 BW5 BW6 BW7 • RMIPPPP Once-off • BESIPPPP BW1 BW2 How many years of work experience do you have on/within these programmes?	Background info (qualifier)
3	Which technologies in your unique experience have you worked on within the programmes above? - Wind - Solar - Battery Energy Storage (BESS) - CSP - Biomass - Hybrid Technology - Landfill/Biogas Gas - Small Hydro	Background info (qualifier)
4	Is your experience working on these programmes within the public sector (i.e. NERSA,IPPO,DFI,National Treasury, DMRE etc) or within private sector (IPPs,Consultant,Commercial Bank, Private Equity etc) or both?	Background info (qualifier)
5	Would you say you hold a mid-level management, senior management or executive position in your current role?	Background info (qualifier)
6	In your experience, what are the big macro level factors that need to be in place to enable governments formal reverse auction tender programmes (REIPPPP/RMIPPPP/BESIPPP) to be successful? ***(a) How important is political will in the success of the programmes?*** ***(b) Does it matter to the programmes success that there is country level political stability?*** ***(c) Does political interference have a big impact on the programmes?*** ***(d) How important would you say sound energy policy is to the programmes success?***	RQ3: How do the Critical Success Factor and Critical Success Criteria's overlap (Interlink Factors) in driving PPP project/programme success in electricity generation sector in South Africa.

		RQ1: What are the Critical Success Factors in enabling PPP project/programme success in electricity generation sector in South Africa.
7	What are the macro level risks that you have identified in your experience which need to be monitored to enable government's formal reverse auction tender programmes (REIPPPP/RMIPPPP/BESIPPP) to be successful? ***(a) Please elaborate on experiences (if any) where these risk were not managed correctly. And their ensuing impact on the programmes.***	RQ4: What are the Critical Risk Factors that contribute to the Success Index in relation to PPP project/programme Success in electricity generation sector in South Africa.
8	From the macro level factors you mentioned above, are there any that can or should be measured throughout to ensure Project Delivery Success?	RQ2: What are the Critical Success Criteria in measuring PPP project/programme success in electricity generation sector in South Africa.
9	What are the important factors with respect the structure of the actual tender process that enable the procurement of new generation capacity effectively? Please elaborate on specific examples (if any). ***(a) What is your views on the pace of new tender rounds being released?*** ***(b) Is transparency in the adjudication process important?*** ***(c) What are the benefits of standardized PPA and project documents?*** ***(d) In what ways is competition important for the success of the programmes?*** ***(e) Are the bid deliverables adequate/ to onerous/ not sufficient?***	RQ1: What are the Critical Success Factors in enabling PPP project/programme success in electricity generation sector in South Africa.

	(f) How important are clear dispute resolution mechanisms within contracts in driving procurement of new generation?	
10	What are the risks related to the structure of the programme(s) and the actual tender process that need to be managed? (a) ***Are there any Legal risks? Please elaborate on experiences (if any) where these risk were not managed correctly. And their ensuing impact on the programmes.***	RQ4: What are the Critical Risk Factors that contribute to the Success Index in relation to PPP project/programme Success in electricity generation sector in South Africa.
11	From the factors related to the structure of the actual tender you mentioned above, are there any that can or should be measured throughout to ensure Project Delivery Success?	RQ2: What are the Critical Success Criteria in measuring PPP project/programme success in electricity generation sector in South Africa.
12	What are the site-specific (technical and non-technical) factors that are important to consider when selecting a site? (a) ***How important is efficient approval of permits? Could it be improved?*** (b) ***How important is it to use latest and efficient technology for project?*** (c) ***What are the things that determine technical viability? Do these differ based on technology?*** (d) ***What is your view on the process of independently verifying the energy yield? Is it sufficient – do you think anything else should be independently verified?*** (e) ***How important is an analysis of total project lifecycle cost analysis in selecting a site?***	RQ1: What are the Critical Success Factors in enabling PPP project/programme success in electricity generation sector in South Africa.
13	What are the site-specific (technical and non-technical) risks that need to be mitigated/managed throughout a project until Project Delivery Success date (2 years post Commercial Operation). (a) ***Are there any design risks?***	RQ4: What are the Critical Risk Factors that contribute to the Success Index in relation to PPP

	(b) ***Are there any site-specific physical risks (surface or subsurface risks)*** (c) ***Are there any permitting or land risks*** ***Please elaborate on experiences (if any) where these risk were not managed correctly. And their ensuing impact on the programmes.***	project/programme Success in electricity generation sector in South Africa.
14	From the site-specific (technical and non-technical) factors you mentioned above, are there any that can or should be measured throughout to ensure Project Delivery Success?	RQ2: What are the Critical Success Criteria in measuring PPP project/programme success in electricity generation sector in South Africa.
15	What are the financial and economic factors that impact projects within the various programmes being able to reach Financial Close and Commercial Operation? (a) ***How important are government backed guarantees to the programme?*** (b) ***How important is it for local banks to be able to provide debt in local currency?*** (c) ***How important are defined revenues and tariffs over the PPA term to the project's success?*** (d) ***What are some of the key financial indicators and ratios that are used in sizing capital structure? Why are these important?*** (e) ***Should projects with the lowest price always be awarded Preferred Bidder status? Why?*** (f) ***How important are sustainable tariffs for the success of the programmes?*** (g) ***A percentage of the development fee is paid to the Project Development Fund to ensure the programmes are financially self-sustaining – what is your view on this funding model? Is it sufficient/hindering/ or inadequate to success of the programmes?***	RQ1: What are the Critical Success Factors in enabling PPP project/programme success in electricity generation sector in South Africa.

16	Are there any financial and economic risks that need to be managed throughout the process to ensure projects reach financial close, Commercial Operation (COD) and 2 years Operations post COD. ***(a) Is economic stability a risk to the success of the programme?*** ***Please elaborate on experiences (if any) where these risk were not managed correctly. And their ensuing impact on the programmes.***	RQ4: What are the Critical Risk Factors that contribute to the Success Index in relation to PPP project/programme Success in electricity generation sector in South Africa.
17	From the financial and economic factors, you mentioned above, are there any that can or should be measured throughout to ensure Project Delivery Success?	RQ2: What are the Critical Success Criteria in measuring PPP project/programme success in electricity generation sector in South Africa.
	We are about half way through, are you still comfortable to carry on?	[Yes/No] for continued Informed Consent
18	What are main factors that influence the success of the organizational interfaces between private entities (IPPs, Project Companies) and public sector institutions? (a) ***How important is the role of the Independent Power Producer Office (IPPO)?*** (b) ***How important are the interfaces between intergovernmental departments (i.e. NERSA interface with Eskom, interface with IPPO) in making the programmes work?*** (c) ***How important is it for the programme(s) to reduces public sector administration costs?*** (d) ***How important is it to have a strong and experienced private consortium?*** (e) ***How important is the transfer of Design Build Financing and Operating (DBFO) risk to the private consortium. Is this optimal for the programme in your experience?*** (f) ***How critical is it to have balanced power dynamics in within the structure of the Special Purpose Vehicle (SPV)?***	RQ3: How do the Critical Success Factor and Critical Success Criteria's overlap (Interlink Factors) in driving PPP project/programme success in electricity generation sector in South Africa. RQ1: What are the Critical Success Factors in enabling PPP project/programme success in electricity generation sector in South Africa.

	(g) ***How important are common goals in the interaction between private entities and public sector institutions in driving the success of the programme?*** (h) ***How important is it to have clear contracting structures and organograms in ensuring the success of the organizational interfaces?***	
19	What are the key organizational interface risks between public and private sector that can have an impact on project being successful. ***Please elaborate on experiences (if any) where these risk were not managed correctly. And their ensuing impact on the programmes.***	RQ4: What are the Critical Risk Factors that contribute to the Success Index in relation to PPP project/programme Success in electricity generation sector in South Africa.
20	From the organizational interfaces mentioned above, are there any that can or should be measured to ensure Project Delivery Success?	RQ2: What are the Critical Success Criteria in measuring PPP project/programme success in electricity generation sector in South Africa.
21	What are the social factors that need to be incorporated into a project that enable long term success? (a) ***What is your view on local community buy in on the projects and the programme?*** (b) ***Is it important that local communities benefit from the project via a community trust? Is it sufficient?*** (c) ***From your experience, how can technology and skills transfer be more beneficial to the local community?*** (d) ***What is your view on local content and localization on programme(s) success?***	RQ3: How do the Critical Success Factors and Critical Success Criteria's overlap (Interlink Factors) in driving PPP project/programme success in electricity generation sector in South Africa. RQ1: What are the Critical Success Factors in enabling PPP project/programme success in electricity

		generation sector in South Africa.
22	What are the key social risks that need to be monitored throughout the programme(s)? (a) ***Are community protests and strikes a risk?*** ***Please elaborate on experiences (if any) where these risk were not managed correctly. And their ensuing impact on the programmes.***	RQ4: What are the Critical Risk Factors that contribute to the Success Index in relation to PPP project/programme Success in electricity generation sector in South Africa.
23	From the social factors you mentioned above, are there any that can or should be measured throughout to ensure Project Delivery Success?	RQ2: What are the Critical Success Criteria in measuring PPP project/programme success in electricity generation sector in South Africa.
24	What are the risk of not having correct or accurate measures of progress throughout the project? (a) ***What's your view on project management throughout the entire process?*** (b) ***Do we have accurate social performance metrics and measurements?*** (c) ***Do we have adequate environmental performance measurements and controls?*** (d) ***How important is it that long term relationship between private consortium, public entities and local communities be measured to enable Project Delivery Success?*** (e) ***Do you think that Design Build Finance and Operate skills should be slowly transferred to the public sector over time to ensure programme success?***	RQ2: What are the Critical Success Criteria in measuring PPP project/programme success in electricity generation sector in South Africa. RQ4: What are the Critical Risk Factors that contribute to the Success Index in relation to PPP project/programme Success in electricity generation sector in South Africa.

25	What would you consider to be the overall measures of success for a project? (a) **How important is time and schedule?** (b) ***How important is it that projects are built within budget?*** (c) ***How important is it that a project meets it's environmental and social objectives?***	RQ2: What are the Critical Success Criteria in measuring PPP project/programme success in electricity generation sector in South Africa.
26	What are the key implementation risks after Financial Close (a) ***What are the key construction risks before Commercial Operation?*** (b) ***What are the commissioning risks to consider?*** (c) ***What are the key operational risks especially within the first two years of operation?*** (d) ***Do these risks differ depending on technology? If so how so?***	RQ4: What are the Critical Risk Factors that contribute to the Success Index in relation to PPP project/programme Success in electricity generation sector in South Africa.
	There are a few more questions, we are almost done, are you still comfortable to carry on?	[Yes/No] for continued Informed Consent
27	Any other factors that could impact programme(s) from delivering projects successfully? Please provide Specific examples (if any). (a) ***What is your view on grid issues' and their impact on the programme(s)?*** (b) ***How confident are you in the structure of the roll out of the Transmission Development Plan?*** (c) ***How confident are you in the regulatory and funding models proposed for grid expansion?*** (d) ***What is your view on curtailment and it's practicality?*** (e) ***What is your view of BBEEE requirements within the programme?***	Open Ended Questions
28	Is there anything more that should be measured within the programme to enable more projects reach Financial Close and Project Delivery Success?	Open Ended Questions

29	Last question - are there any other risks both macro or within the programmes that you would like to highlight? (a) **In your view does the emergence of private or corporate PPA's threaten the formal tender programmes?** (b) **Does the evolution of policy landscape strengthen or threaten the formal government programmes** (c) **Very Lastly, in your view what is the future of these formal government programmes from your professional perspective?**	Open Ended Questions

APPENDIX C – Participant Agreement Form

Title of project : Success Index for Public Private Partnership Programme Success in Electricity Generation Sector of South Africa

Name of researcher: Mogale Diagile Modisane

I, ……., agree to participate in this research project.

I agree to the following:

(Please circle the relevant options below)

The research study was explained to me. I understand what this study is about.	YES	NO
I understand that my participation is voluntary	YES	NO
I agree that the interview may be audio recorded and I will be afforded the opportunity to check the transcript	YES	NO
I agree that direct quotations from my interview may be used by the researcher in their research report	YES	NO
I agree that my participation will remain anonymous (my name or other identifying data will not be used by the researcher in their research report)	YES	NO

…… (signature)
…… (name of participant)
…… (date)

…… (signature)
…… (name of researcher/person seeking consent)
…… (date)

APPENDIX D - Proof of Ethics Clearance

Docusign Envelope ID: 16B39E15-84A8-4356-8C90-DA6A18646B48

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

Wits Business School

Wits Business School Ethics Committee
Constituted under the University Human Research Ethics Committee (Non-Medical)

Ethics Clearance Certificate

Ethics protocol number: WBS/EL454688/100
This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

Project title	A success index for public private partnership programmes' success in the electricity generation sector of South Africa
Investigator / Researcher	Mr Mogale Modisane
Nature of Project	MM (Energy Leadership)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed anonyr and confidentiality.
Issue Date of Certificate	07/10/2024
Expiry date	Date of submission of the project / research report
Chairperson	Dr Ayanda Magida ☎ +27 11 717 3953 ayanda.magida@wits.ac.za

Declaration by Researcher

One copy must be signed by the Researcher and returned to the Chairperson of the Wits Business School Ethi Committee.

I fully understand the conditions under which I am authorized to carry out the abovementioned research an guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I undertake to resubmit the protocol to the Committee.

DocuSigned by:
Mogale Modisane

	10/15/2024
Signature	Date:

APPENDIX E – Participant's Informed Consent and Member Checking of Transcripts

The purpose of this section is to provide results and transparency from member checking and Informed Consent that was undertaken. P27 stopped the interview at the first Informed Consent question.

Participant Attribute	Member Checking of Transcript	Informed Consent
P1	Yes	Yes
P2	Yes	Yes
P3	Yes	Yes
P4	Yes	Yes
P5	Yes	Yes
P6	Yes	Yes
P7	Yes	Yes
P8	Yes	Yes
P9	Yes	Yes
P11	Yes	Yes
P12	Yes	Yes
P14	Yes	Yes
P15	Yes	Yes
P16	Yes	Yes
P18	Yes	Yes
P19	Yes	Yes
P20	Yes	Yes
P21	Yes	Yes
P23	Yes	Yes
P24	Yes	Yes
P27	Yes	Stopped the interview at the first Informed Consent Check in question

APPENDIX F – Audit Trail and Extracts of Reflexivity Journal

Research Design
The items below provide a historical account of the researcher's approach to the development of the research design, processes and theoretical framework as detailed within this study. • Initial idea of investigating a theoretical framework for sustainability factor in renewable energy projects in South Africa; • Research evolved to qualitative study looking at both Critical Success Factors and Critical Success Criteria; • Upon identification in the literature of Critical Success Factors, the research design was overhauled to develop an integrated CSF, CSC and CRF Success Index for PPP Project Delivery Success using quantitative design with a conceptual framework as an output.
Sampling Strategy
• The initial sampling strategy focused purely on understanding private sector participants views on public private partnership success in the formal reverse auction programmes. • This was expanded to include private sector, public sector and participants with experience in both public and private sector. This was done to triangulate data (Stahl & King, 2020)
Data Collection
• The data collection method originally included purposive sampling via reaching out to the industry associations. • This was later refined to include purposive sampling, combined with snowball sampling levering professional networks.
Data Analysis
• Initially the data was due to be analysed using thematic analysis, however due to the strong theoretical conceptual framework a deductive – inductive five step approach was chosen (Kallio et al. 2020).
Reflexivity Journal extracts
This section consist of extracts from the researchers own reflections as they undertook the research. The extracts are presented in first person. *" I must say I found P1 quite interesting. Their experience from the beginning of the programme really gave me insights that were unique. Even though I work on this information daily. I also didn't know that NERSA's REFIT programme almost superseded REIPPPPP. I wonder how that would have worked out."* [Date: 08 November 2024, *Authors own thoughts]* *"The IPP Office has really great and competent people, but I still sense that if they had more developers, they could better understand that the market is super competitive nowadays. It is no longer like Bid Window 1. P3 and P27 also made me realize that this programme is not a technical procurement programme of renewable energy. However rather a special cog in the wheel of South Africa's future industrialization plans. However, I must say I am still convinced that a balanced energy mix prevails. South Africa is not fully ready for renewable energy at that scale. We have other pressing matters like energy security."* [Date 22 November 2024, Authors own thoughts]

APPENDIX G – Extracts from Code Book

Critical Success Factor (CSF) sub themes	Description with supporting quotations
Strong Political will and support	**Participants raised that a lack of political will and support was detrimental to the programme's continuity from 2014 – 2018. Hence disabling the programme.** *"If you recall a few years back, I mean the program started around 2011 when the IRP was promulgated and then I think the first project to be commercial was in 2013. And then there was a time when ESKOM was not willing to sign power purchase agreement." [P1]* *"I mean it was exemplified from 2014 to 2018. Everything stopped." [P15]* **Furthermore, participants mentioned that strong political will and support for the programme was a catalyst and strong enabler in galvanizing the start of the for was an enabler through the mechanism of policy adjusted Integrated Resource Plan** *"So, for the IRP 2010, the technical modelling outcomes were giving coal and no renewables, None whatsoever and because of the policy of South Africa's commitment to climate change and the white paper on energy policy, which wanted consideration of renewable energy in South Africa's energy mix, then there was a policy adjustment for renewable energy to be part of the outcomes of the IRP." [P9]*
Country level political stability	**Participant highlighted mixed responses to country level political stability although it's presence highlighted as an enabler.** *"I think it's important. Although you can do in a country where there's not a lot of political stability, you can do these projects. I think you're going to struggle a little bit more and it will be more expensive because you will pay for the political instability. But I think it is possible." [P27]* **International IPP's take a global portfolio view, and it was highlighted that countries with perceived levels of political stability enable favourable investment outlooks.** *"There's a country risk premium that's built into cost of capital, if political instability become difficult, it first influences your country risk premium. But then at a macro level, being a multinational or having an international multi-country portfolio, you have to look to see where is your money best placed. Globally." [P24]*
Low levels of Political interference	**Participants highlighted court cases based on allegations of political interference as stalling the programmes.** *"Risk mitigation. We have the court cases. Then you also had that injunction that was put in place that invested and that took another six months. Right? And that's, I mean you know where the corruption allegations were investigated by the presidency." [P24]* **Participants raised the issue of political interference in the selection of senior leadership at the state utility as a hinderance.** *"we've seen that throughout the life, the lifetime of Eskom, you know, where they change senior leadership all the time based on their political interference or political connections." [P11]*
Stable regulatory and statutory bodies	** You will recall that many years before the actual program started, NERSA tried several times to put it through in terms of the system. But because there was no certainty in terms of the policy framework, particularly in terms of guarantees, in terms of the PPA not being commercially acceptable, the program could not start even though they wanted to do it. [P1] **
Sound Energy Policy	**Regular updates of the Integrated Resource Plan aids in providing certainty to market participants** *"I think the formal government programmes have been great… and creates certainty in the market and hopefully when the IRP 2023/24 comes out, it will create that same amount of confidence, stability and certainty" [P20]* **Participants raised care should be taken to ensure that Electricity Regulation Act Amendment to accelerate private/corporate projects are aligned with governments formal PPP programmes and act as enablers.** *"I think that one of the things that we've been missing and that I think now we have with the, with the ERA amendment bill that came through that was promulgated this year in March, I think it was March, May this year. We have now that policy which provides guidance to the energy sector on REIPPPP programs which now opens up as well the sector not only to the private, to the, to the public RFP process with the government as counterparty, but rather it also gives opportunity for the development of private PPAs for renewable energy projects." [P18]* Participants raised an issue of policy alignment with changes from DMRE to Electricity Ministry *"I mean there's these two ministries now whether we are going gas, we're going coal, we go, we. There's no proper plan that brings all of this together".* [P1]

Identified Critical Success Factor (CSF)	Quotation
Reduction in public sector administration costs	**Participants caution that the use of transactional advisors as per the RFP is an enabler.** "Absolutely. So the program obviously uses a lot of transactional advisors and they use a lot of transactional advisors based on what they are asking for in the documents. So I think if they simplify to solve what they are asking for it will simplify and reduce the number of transactional advisors." [P6]
Risk transfer to private consortium	**Participants raised the concern that the current structure of the government entities is not designed to procure, construction and operate renewable energy projects within the programmes.** *"So, I think, I think if there is no Design Finance Build and Operate model, there's no, there is no IPP program to be honest" [P21]*
Shared authority and commitment	**Participants raised that common goals and/or alignment between government and private entities can act as enablers to the programmes.** *"Yes, yes, there should be some common goals. I think ultimately, we want to see the infrastructure develop. We want to see the economy grow…Yeah, we all are working towards that common goal. And everybody has a path to play in that common goal." [P11]* *"if not goals, then at least an alignment in how does the program work?...We [IPP] are in it to make money. ESKOM is not in it to make money. ESKOM is in it to make sure that they can meet it's public service obligation of supplying power." [P15]*
Strong and experienced private consortium	**Participants noted this as being vital to ensure long term project success especially during the risking construction phase, in case issues emerge.** *"However, financial strength is important for a consortium. In the event that these risks that are not covered by contracts, then they can be able to use their financial resources to resolve any issues that may arise." [P5]* *"It's firstly important that you have a very strong industrial player in that SPV and then supported by other entities which could be, you know, funds or investment vehicles, etc. Which are typically more passive and don't have the know-how for power generation operation maintenance." [P8]* **Participants noted that healthy competition and development of BBBEE partners within the consortium is an enabler of programmes success** *"I think it is important to have a strong and experienced private consortium, but I think it's also important not to have a very closed selection of them. So the market still needs to remain open." [P20]*
Balanced power dynamics in Special	Participants noted that it is difficult to have this given the nature of the shareholding structure which is unbalanced. xxx

Identified Critical Success Factor (CSF)	Quotation
Transparency in procurement	**Participants highlighted credibility and fairness in adjudication and clear requirements as key enabler to programmes success.** *"So the evaluation is also performed by external parties. It is then presented to the IPP office staff or leadership and it then also goes through a process to the department. But the department does not have any influence in the evaluation process." [P12]* *"I mean the transparency there is. There you have the adjudication formula. You need, you know, you know that you need to be bid compliant." [P21]*
	"Not once have I sensed that anyone from the IPP office or the advisors for that matter, are leaking prices." [P15]
Competitive tender	**Participants have highlighted that competition enabled refining of prices from the various rounds.** *"Competition, that's another success of the program in that from bid window one up until bid window five prices had gradually reduced" [P12]* **Participants however cautioned that competition is a double-edged sword and could encourage unsustainable bidding practices if it is not adequate or if it is perceived to be too much.** *"Competition extremely important because ultimately, we need not to lose sight of the fact that we need to provide clean and affordable energy to the people of South Africa. So, I think the reality is that if you don't have competition, you have risk of collusion and that's detrimental to all of us." [P21]* *"I think competition is important, but it needs to be the right level of competition. You know, we saw this again, I'm Going to use Round five as an example where again, by the design of the rules, it did not limit one company being awarded, you know what, 50% of their allocation, but the drivers that that company used to derive that tariff was not sustainable" [P6]*
Rolling or staged bids	**Participants highlighted foreknowledge of RFP release dates annually is an enabler to programme success.** *"If you know, for example, that an RFP is going to be released every year in March, you can prepare towards that, mobilize resource towards that, you know, and you have that momentum on an annual basis." [P8]* *"But we should know the RFPs are coming" [P4]* **Participants also highlighted that the timing of award for Preferred Bidder** *"If you know, right when the holidays start, that's a very bad time to announce preferred bidder. You can't mobilize until next year when everybody's back" [P19]* **Participants highlighted that having simulataneous programmes stretches the market and is a disabling factor** *"we see that at the current moment having to adjudicate bit window 7 plus BESS window 2 creates a bit of a bottleneck." [P21]*
Clear dispute resolution mechanisms	**Participants raised that disputes mechanisms are clear upfront and this enables programme success.** *"because it's outlined out upfront and it's indicated. They indicate what jurisdiction will have if you go for arbitration…yeah, so they are quite clear" [P1]*
Standardized PPA and project documents	**Participants raised that standardized documents create a level of certain across market participants.** *"Yeah, I do think that it's beneficial because it does create certainty in the market. It also creates certainty for the IPP that creates certainty for the lenders as well." [P18]* *"The fact that it is standardized [project documents] makes our financing easier. We spend very little time with banks." [P5]* **Participants raised that standardized PPP and project documents enable by reducing challenges of open negotiation** *"benefit of that is that the parties bidding into the program has clear sight of what they will be on what basis they will be contracting on. So there's no scope for negotiations. If you enter into negotiations on a program or a project, it is likely to take years in order to reach finality." [P12]*