

https://dspace.org/

Analysis of critical success factors for public private partnerships in the SA infrastructure development

Maseko, Mohlolo Morrison

2014-07-28
http://hdl.handle.net/10539/15044

Downloaded from a DSpace repository. https://dspace.org/

Analysis of Critical Success Factors for Public Private Partnerships in the SA infrastructure development

Mohlolo Morrison Maseko

A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration

Johannesburg, 2012

(VERSIONMARCH 2012)

ABSTRACT

Critical success factors for Public Private Partnership (PPP) projects in infrastructure development have been widely studied across the globe. PPPs provide governments across the globe with opportunities to develop public infrastructure by collaboration with private sector partners. The advantage for the public sector in this arrangement is that they are able to access resources that reside within private sector. PPPs also provide governments with opportunities to share investment risks with private partners. To ensure that PPPs are implemented successfully, governments are responsible for creating an environment that is attractive to the private sector.

Research shows that South African PPP environment lags behind those in developed economies; however it is progressing at a fast rate. This research demonstrates perceived shift in the factors that defines South African PPP environment. Factors investigated in this research reveals that PPP environment is SA is maturing. These findings are based on comparisons with research conducted in the early days of PPPs in South Africa.

Implementation of PPP approach in SA dates back to the late 1990s and early 2000. A number of research studies were conducted on these projects by contemporaries such as Fourie (2008), Hlala (1999), Ahwireng-Obeng and Mokgohlwa (2002). This research investigated similar Critical success factors (CSFs) in order to examine the changing environment of PPPs in South Africa.

The research is aimed at identifying wide a range of critical success factors for PPP projects in infrastructure development both in developed and developing economies. These factors would then be tested in the South African environment. A research sample was therefore South African based; targeting participants who had experience in PPP projects or alternatively were working in the sectors that have a strategic fit with the PPP approach for infrastructure projects. The participants were in sectors such as energy, transportation, mining and financial services. A survey questionnaire was developed and sent out by email and hand delivered where possible. The questionnaire had three sections; the first sections

addressed participant's demographic profiles, the second section had 20 critical success factors to be ranked on the level of importance and the last section requested participants to respond to three open ended questions.

The responses were analysed using quantitative statistical method known as Normal Distribution Fitting Algorithm. The tool was used to ultimately rank the critical success factors according to the perceived level of importance. Vital findings were that three critical success factors were found to be significantly more important than the other factors. The three factors were; first was project technical and financial feasibility; second was strong contract management control that ensures contract compliance; and the third was strong experienced private consortium with technical strength. These factors highlighted a shift from earlier studies where factors external to projects such as macro-economic or political stability factors were more important. The other crucial findings came through the open question where the participants unanimously shared a view that PPPs are central to the future of infrastructure development in South Africa as they allow the government to overcome challenges of skills shortage and budgetary constraints by collaborating with private sector.

The three factors demonstrate that the South African environment share similar challenges with those in developed economies. For successful implementation of PPP, it is important that primary stakeholders in the public and private sector align their objectives. They must cooperate to ensure a feasibility analysis of each project is conducted before committing to a PPP approach. They must put in place sound management systems for the full project life cycle. The primary stakeholder must apply thorough screening processes when forming a consortium and selecting one. These processes will ensure that the private sector participants have resources, both finance and technical skills to deliver the projects and the public sector sets clear objectives and is able to hold the private sector accountable and prevent unforeseen escalating capital and operational costs during the project life cycle.

DECLARATION

I, Mohlolo Morrison Maseko, 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 Business Administration in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Mohlolo Morrison Maseko

Signed at ……

On the …….. day of ……. 2012

DEDICATION

I dedicate this research report to all the people that supported me, especially my family, supervisor and colleagues at work.

ACKNOWLEDGEMENTS

My sincere appreciation and acknowledgements are extended to the following people:

- My wife Mmutsi Maseko, who stood by me throughout my MBA studies, carried my sons during the same period and through it all, her support was unwavering,
- My two boys Njabulo and Kosan, who were both born during my MBA experience,
- My mothers, Mamaseko and Mamosai, for their consistent prayers,
- All my friends and colleagues whose input whenever required was available,
- My Supervisor, Professor Eric Schaling whose guidance and insight was valuable,
- Dr Anthony Stacey, whose advice and assistance in performing statistical analysis was extremely valuable.

TABLE OF CONTENTS

ABSTRACT I

DECLARATION III

DEDICATION IV

LIST OF TABLES IX

LIST OF FIGURES IX

CHAPTER 1: INTRODUCTION 1

1.1 PURPOSE OF THE STUDY 1
1.2 CONTEXT OF THE STUDY 1
1.3 PROBLEM STATEMENT 3
1.3.1 MAIN PROBLEM 3
1.4 SIGNIFICANCE OF THE STUDY 3
1.5 DELIMITATIONS OF THE STUDY 4
1.6 DEFINITION OF TERMS 4
1.7 ASSUMPTIONS 5

CHAPTER 2: LITERATURE REVIEW 6

2.1 INTRODUCTION 6
2.2 DEFINITION OF TOPIC 9
2.3 PUBLIC PRIVATE PARTNERSHIPS 10
2.3.1 WHAT ARE PPP INFRASTRUCTURE PROJECTS 10
2.3.2 ROLES OF PPP 11
2.3.3 IMPLEMENTATION OF PPP 13
2.3.4 PPP CHALLENGES 15
2.4 SUCCESS FACTORS IN PPP 17
2.4.1 IDENTIFICATION OF CRITICAL SUCCESS FACTORS 17
2.4.2 WORLDWIDE CRITICAL SUCCESS FACTOR FROM PREVIOUS STUDIES 19
2.4.3 CRITICAL SUCCESS FACTORS IN SA PPP INFRASTRUCTURE PROJECTS 20
2.5 CONCLUSION OF LITERATURE REVIEW 22
2.5.1 RESEARCH PROPOSITIONS 23

CHAPTER 3: RESEARCH METHODOLOGY 25

3.1 RESEARCH METHODOLOGY/PARADIGM 25
3.2 RESEARCH DESIGN 26
3.3 POPULATION AND SAMPLE 27
3.3.1 POPULATION 27

3.3.2 Sample and sampling method 27
3.4 The research instrument 28
3.5 Procedure for data collection 29
3.6 Data analysis and interpretation 29
3.7 Limitations of the study 30
3.8 Validity and reliability 30
3.8.1 External validity 31
3.8.2 Internal validity 31
3.8.3 Reliability 31

CHAPTER 4: PRESENTATION OF RESULTS 33

4.1 Introduction 33
4.2 Demographic profile of respondents 33
4.2.1 Participants by PPP experience 34
4.2.2 Participants by Sector 34
4.2.3 Participants by Province 35
4.2.4 Participants by working experience 36
4.3 Participants by Field Specialisation 37
4.4 Results pertaining to Propositions 37
4.4.1 Project technical and financial feasibility 38
4.4.2 Strong contract management control that ensures contract compliance 39
4.4.3 Strong and experienced private consortium with technical strength 40
4.4.4 Training and Skills Transfer 41
4.4.5 Stable macro-economic environment 41
4.4.6 Involvement and cooperation with Trade Unions 42
4.5 Results pertaining from open questions 43
4.5.1 Other CSF's 43
4.5.2 Major Challenges in South African PPP environment 44
4.5.3 Future of PPP in SA 46
4.6 Summary of the results 47

CHAPTER 5: DISCUSSION OF THE RESULTS 48

5.1 Introduction 48
5.2 Demographic profile of respondents 48
5.2.1 Participants by PPP experience 48
5.2.2 Participants by Sector 49
5.2.3 Participants by Province 49
5.2.4 Participants by working experience 50
5.3 Participants by Field Specialisation 50
5.4 Discussion pertaining to Propositions 50
5.4.1 Project technical and financial feasibility 52
5.4.2 Strong contract management control 53
5.4.3 Strong and experienced private consortium with technical strength 54
5.4.4 Training and Skills Transfer 55
5.4.5 Stable macro-economic environment 56
5.4.6 Involvement and cooperation with Trade Unions 57
5.4.7 Other Factors 57
5.5 Responses from open questions 58

5.5.1 OTHER CSF'S SUGGESTED BY RESPONDENTS 58
5.5.2 MAJOR CHALLENGES IN SOUTH AFRICAN PPP ENVIRONMENT 59
5.5.3 FUTURE OF PPP IN SA 59
5.6 CONCLUSION 60

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS 62

6.1 INTRODUCTION 62
6.2 CONCLUSIONS OF THE STUDY 62
6.3 RECOMMENDATIONS 63
6.4 SUGGESTIONS FOR FURTHER RESEARCH 65
6.5 CONSISTENCY MATRIX 66

REFERENCES 67

APPENDIX A 70

LETTER TO RESPONDENTS: 71
ACTUAL RESEARCH INSTRUMENT 72

LIST OF TABLES

Table 1: Profile of respondents 28

Table 2: Results of Survey 38

Table 3: Normal DFA Results 51

Table 4: Consistency matrix 66

LIST OF FIGURES

Figure 1: PPP market maturity curve for the transportation sector 21

Figure 2: Participants by PPP Experience 34

Figure 3: Participants by Sector 35

Figure 4: Participants by Province 36

Figure 5: Participants by working experience 36

Figure 6: Participants by Speciality 37

Figure 7: Project technical and financial feasibility 39

Figure 8: Strong contract management control 39

Figure 9: Technically Strong and Experienced Consortium 40

Figure 10: Training and skills transfer 41

Figure 11: Stable macro-economic environment 42

Figure 12: Trade Unions Involvement 42

Figure 13: Ranking according to Standardised mean 52

Figure 14: Project technical and financial feasibility 53

Figure 15: Strong contract management control 54

Figure 16: Technically Strong and Experienced Consortium 55

Figure 17: Training and skills transfer 56

Figure 18: Stable macro-economic environment 56

Figure 19: Trade Unions Involvement 57

CHAPTER 1: INTRODUCTION

1.1 Purpose of the study

The purpose of this research study was to identify Critical Success Factors (CSFs) for Private Public Partnerships (PPP) in infrastructure development in South Africa, and to analyse these factors using statistical analysis to rank them based on the perceived level of importance. Twenty CSFs were identified and assessed by using a questionnaire as a survey tool, which was sent to 47 respondents, to draw responses. The responses were analysed using the Normal Distribution Fitting Algorithm, a research approach recommended by Stacey (2005). The approach was used to ultimately rank the critical success factors according to the perceived level of importance.The purpose of this research study was to use literature to identify CSFs, study them using a research methodology and use statistical tool to analyse them. The results of the analysis would contribute to research literature that can help the South African government and other interested stakeholder to prioritise factors that are crucial to infrastructure development (Bing et al 2005).

1.2 Context of the study

The context of this study is created by a worldwide shortage of resources to meet growing public infrastructure needs. This is compounded by a gap between growing service demand and diminishing service provision, especially in emerging economies where access is being expanded while infrastructure is ageing as a result (Zhang 2005; Banerjee et al 2006). Public private partnerships are therefore filling the gap by using human and financial resources from the private sector in partnership with resources from the public sector. Leveraging on government is beneficial for development because it allows the advancement of projects that benefit society, while at the same time creating profit opportunities for the private sector.

PPPs have been practiced worldwide with multiple objectives and outcomes, not only for promoting infrastructure development but to reduce public sector costs and improve operational efficiencies thus providing service quality by allowing partnerships with the private sector to maximise on knowledge, expertise, and capital that may not be accessible to the public sector (Xueqing 2006). In a PPP arrangement the public sector seeks to transfer or share projects risks. Some of these risks are time related, others are cost and quality related. Contrary to the public sector the private sector partners tend to be risk averse and in most cases they are attracted by opportunities that may lead to high rewards in the form of revenue generation, which are often associated with high risks (Jing-Feng, Skibniewski et al. 2010). A match is therefore created where a balanced allocation of risks and benefits will lead to a win-win partnership (Zhang 2005). PPP projects are funded in various ways, through private financial institutions; government guarantees or equity. Equity means stakeholders own a share of the infrastructure for any period of time. One or more of the stakeholders are often appointed to generate cash from the infrastructure for the period defined and this termed a concession (Hlala 1999).

The South African government has invested in a variety of innovations tested and refined in other countries in order to deliver services to its communities. These innovations includes long-term concessions, management and services contracts with private sector partners (Hlala 1999). A concession agreement requires a contractual agreement or an arrangement which allows a private party to take control over service provision from a public authority for an extended period called the concession period and it may include the entire project lifecycle from planning, investment and construction to the management of the operation. At the end of the concession period the asset is returned back to the government (Hlala 1999; Kwak 2002).

The South African government has therefore adopted a PPP policy as part of its efforts to improve project delivery (Hlala 1999). The country has gone through learning curves dating back to the early implementation of PPP in 1999 (Kotze et al 1999). The SA government and many other governments in the world will

benefit from identifying and understanding critical measures applicable within their own environment that would help in assessing and choosing PPP projects so that scarce resources can be allocated appropriately (Forrer et al 2010).

The first PPP projects in South Africa which were implemented in 1999 were Nelspruit's water and sanitation project, the N 4 toll-road and the Dolphin Coast's water supply projects (Kotze et al 1999). These projects gave the South African government an opportunity to partner with private sector consortiums and to provide services to communities and rollout infrastructure that is critical for economic development. A number of elements that came out of these projects reflected a lack of experience in SA, such as upholding contract negotiations and raising funding for the consortium (Hlala 1999). This lack of PPP knowledge and expertise among newcomers to the PPP approach is common worldwide. Vast information is however available, and it documents experience, expertise, knowledge and lessons learnt from evolving international PPP practices (Xueqing 2004) and these can be used to complement lack of experience among newcomers in PPPs.

1.3 Problem statement

1.3.1 *Main problem*

Analyse critical success factors (CSF) and rank them according to the level of importance in public private partnerships (PPP) for the development of infrastructure in South Africa.

1.4 Significance of the study

The research study extends the scope of existing international studies by analysing CSFs established worldwide and studies perceptions within South African infrastructure development. Certain thresholds need to be met in order for PPPs to be effective in delivering public infrastructure and services such as feasibility planning, effective procurement, selection of concessionaire, and

availability of funding. These thresholds are referred to in the research as critical success factors and are analysed for ranking according to the level of importance(Murphy 2008).

Many studies have developed different CSFs lists, and they tend to be project-specific and country-specific but these lists possess many similarities (Bing et al 2004; Zhang 2005). Many objectives have motivated various studies such as investigative relative importance of CSFs, mainly overseas (Bing et al 2004; Zhang 2005; Jing-Feng et al 2010) and less is known about South African critical success factors and their perceived relative importance.

The study provides guidance to stakeholders interested in pursuing PPP infrastructure projects in South Africa. Critical role players of PPP projects are primarily government and potential private sector partners. The above mentioned role players may use this research to adopt strategic measures to address project success and prioritize factors and resources for implementation of PPP projects.

Other stakeholders who may find this research useful include foreign investors and financiers whose interest is to understand the PPP environment in South Africa. These may include professionals and firms with expertise in infrastructure development. Academics and students may also find the research useful for knowledge and it may motivate future research in the field.

1.5 Delimitations of the study

The research focus was on PPP with respect to infrastructure projects in South Africa. The worldwide PPP environment was reviewed to share insights about the challenges of PPP projects. The research was limited to projects carried out within South Africa's borders at national, provincial or local government levels.

1.6 Definition of terms

Public private partnerships are contractual relationships or arrangements where operational control of the asset is transferred to the private sector in the form of a

concession while still allowing the public agency to maintain regulatory control (Xueqing 2006; Pagdadis et al 2008).

Concession agreements are arrangements whereby a private party leases assets for service provision from a public authority for an extended period and is involved in the entire project from planning to investment and construction to the management of operation. In South Africa it has a typical period of over 15 years (Hlala 1999; Kwak 2002).

A concessionaire is a private consortium responsible for negotiating a contract and executing the requirements for the project (Gupta and Biswas 2010).

Critical success factors (CSF) are factors that combine to determine the success of a PPP project and guide the efficient allocation of the resources (Zhang 2005).

Regulatory control is the role played by government that includes final authority on contractual, technical, and financial aspects of a project and methods of shared ownership for a PPP arrangement (Abdel-Aziz and Russell 2001).

Risk sharing and allocation is a process of minimizing risks by allocating risks according to the ability to bear them at the least possible costs (Ahwireng-Obeng and Mokgohlwa 2002).

1.7 Assumptions

The following assumptions were made regarding the research:

- The participants of this research represented sample of specialist knowledge,
- Information conveyed by participants was assumed to be honest and representative of true perception,
- The total number of respondent's was sufficient to draw conclusions, in the line of qualifying sample size for this research, which was a purposefully selected small sample.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This research study analyses, the critical success factors for PPP and their application in infrastructure development in South Africa. The research material for this study was drawn from both local and international literature that seeks to investigate similar factors. Key pointers for the literature review that appealed for the purpose of completing this research highlighted how the public sector partners with private sector to deliver public infrastructure projects effectively, through PPPs.

Zhang (2005) and Pillai (2008) makes a point about public infrastructure being vital for economic development across a range of sectors including power, transportation, water supply, telecommunications, oil, gas, mining, schools, hospitals, and military training facilities. They further elaborate that these developments impact directly on the country's economic growth.

Traditionally infrastructure development of a certain scale falls under the mandate and the responsibility of the state (Pillai 2008; Pavlova 2009; Gupta and Biswas 2010). It is government's responsibility to create an environment for economic development and to ensure that communities have basic services.

Governments across the globe are however increasingly faced with constraints in delivering on their infrastructure development mandate and responsibility. These constraints in government's ability to deliver on infrastructure needs are experienced by both developed and developing countries and it is elaborated in the following studies conducted in these countries: China (Jing-Feng et al 2010), India (Pillai 2008; Gupta and Biswas 2010) and United States (Pagdadis et al 2008).

Gupta and Biswas (2010) classified the nature of constraints faced by governments as financial, technical and human resource. These constraints hamper the governments to efficiently deliver services to their communities.

Financial constraints are boosted by escalating costs of construction which may lead to uncontrollable budgets deficits. Technical and human resource constraints leads to government having to face challenges of overcoming high inefficiencies due to bureaucracy, corruption, sometimes outdated technology and a shortage of skilled personnel with required expertise (Miao et al 2003).

In the effort to overcome these constraints governments have historically turned to the private sector for investment and involvement in order to fund economic development through public private partnership arrangements (Pagdadis et al 2008) which ensure governments acquires access to the finance and skills it does not already have.

Government initiatives to involve private players in public service delivery traditionally included privatisation of assets where the private sector gains the responsibility of a service previously delivered by a public organisation (Kwak 2002). In the 1970s and 1980s, privatisation developed as a means to improve public service efficiency (Reside Jr 2009). Privatisation of infrastructure requires the sale or transfer of government owned assets and of the transfer of the organization, function, activity, responsibility, or rights traditionally held by government in infrastructure project developments to the private sector (Kwak 2002). In privatization the government loses control and authority over the assets and the private sector entity gains the authority as well as all the risks and control over the asset or project. These arrangements tend to be uncomfortable to many governments as they have to deliver on the public mandate, while private sector is profit driven.

Literature shows that the last two decades have seen a different trend developing with the popularity of PPPs. Many economies in both the developed and developing worlds are increasingly turning towards the use of PPPs for the development and maintenance of public infrastructure (Jicai and Cheah 2009). Under this approach contractual relationships or arrangements requires participation of the public entity and the private sector entity for both development and operational control of the infrastructure asset or service (Xueqing 2006; Pagdadis et al 2008). While privatization transfers risks and responsibilities away

from the public sector, PPPs are partnerships that share risks and responsibilities with the private sector.

PPP by definition is a partnership that requires the involvement of both the private and the public sector. PPP is seen as an alternative solution to efficiently deliver social infrastructure which are critical to economic development and sustainability in both the developing and developed worlds (Gupta and Biswas 2010; Siemiatycki 2010). It is solution to overcome financial, technical and human resources by allowing governments to draw from private sector organisation.

PPPs therefore allow governments to employ a structure that may lead to them retaining ownership at the end of the relationship period. Implementation of PPP requires expertise and experience which are perfected over time. They involve multiple participants thus creating complexity that is usually absent in a straight forward government infrastructure development program.

Zhang (2005) cautions that the PPP approach presents alternative solutions with no guarantees for efficiency and its success or failure is driven by a methods of implementation and combination of underlying factors that are complicated in nature. Those underlying factors are related to the environment, the participants and the nature of the project.

Even though the literature shows that many of challenges are similar across various countries the underlying factors are project and environment specific (Chua and Kog 1999; Xueqing 2005; Zhang 2005; Jing-Feng et al 2010).

Literature shows that these factors also reflect the maturity expertise and experience of the role players in a PPP approach, hence other countries tend to be more active and experienced than others *(Deloitte Research 2006 and Public Works Financing 2008 cited by Siemiatycki 2010).*

A number of factors contribute to a country's readiness and capacity to implement PPP based infrastructure development projects. These factors include a stable macro-economic environment and a predictable legal regulatory regime (Reside Jr 2009). Other factor are contractual, technical, regulatory control and financial

aspects of a PPP structured project (Abdel-Aziz and Russell 2001). Additional factors that contribute to the successful implementation of a PPP project include transparent and competitive procurement, project technical and financial implement ability and favorable economic conditions (Zhang 2005).

These factors and many others combine to form Critical Success Factors (CSF) that are a subject of investigation in this research and if they are prioritised they may enable the government to efficiently allocate scarce resources.

The purpose of the literature review was to identify the CSFs for public private partnership projects in infrastructure development worldwide. These factors would then be tested in South African environment. As these were research propositions for a PPP project implementation in development of infrastructure in South Africa. International studies about PPP's factors have been reviewed through the sections of this chapter and they include the role implementation and challenges of PPP. Also reviewed were the studies that have identified CSFs. The literature review was completed using worldwide studies of critical success factors (CSF) and aimed to identify 21 critical success factors to be tested for the South African environment.

2.2 Definition of Topic

The main aim of this research is to analyse critical success factors to distinguish factors that contribute to the successful implementation of a PPP project. The following terms are defined as they are relevant to this research study and frequently used in this report.

Critical success factors (CSFs) are factors that ultimately combine to determine the success of a PPP project. If governments take cognisance of previous existing research studies the information can be used to prioritise and efficiently scarce allocate resources (Zhang 2005).

The advantages of PPP include provision of complementary skills from both the public and private sectors (Leung and Hui 2005). In the case where the public

sector does not have the required skills the private sector would then provide all or most of the required human resources. The public sector may use a PPP project to develop its own skills through skills transfer by strategically placing their resources within a PPP project to ensure that they gain the required experience and expertise.

In a PPP project Government is ultimately accountable for the contractual, technical, and financial aspects of a project. As such, it may choose to enter into any of the various structures of shared ownership including public or private ownership or both during the course of the project life; or concession where public ownership is deferred while the private partner owns the service for the period of the concession (Abdel-Aziz and Russell 2001). A concession is a contractual agreement that outlines the terms and conditions for the relationship during the concession period (Ahwireng-Obeng and Mokgohlwa 2002).

Examples of PPP project ownership includes a build-operate-transfer (BOT) arrangement which means the concessionaire will be responsible for building a new asset and operating it for the duration of the concession then transfer it back to the government at the end of the concession period. Another example of a project ownership is a rehabilitate operate-transfer (ROT) concession which gives the private concessionaire responsibility for upgrading an existing asset and then operates it and transfers it back to government at the end of the concession period.

2.3 Public Private Partnerships

2.3.1 *What are PPP Infrastructure Projects*

Public private partnerships are defined as contractual agreements between public and private sector for the purpose of delivering a public service where the private partner can form a consortium if they do not have all of the required elements to complete the scope of the project and it can be in a local or foreign country and it allows on-going participation in decision making, production and risk sharing

(Forrer et al 2010). The government in a PPP project trades off some of the decision making authority in order to gain risk sharing which means appropriate allocation of risks. This is not the complete transfer to the private sector but all participants in a PPP project share some of the risk (Ahwireng-Obeng and Mokgohlwa 2002).

Many governments run PPP through an independent department or an agency. The South African government has a PPP unit which is responsible for managing country wide PPP initiatives. The unit was formed as part of government's effort to improve the implementation of PPP projects by centralizing core resources required in these projects to ensure that government can supplement the shortage of skills which prevail at provincial and municipal level where most PPP projects are implemented. The unit defines a PPP as a contractual relationship between a public sector institution and a private party whereby a private party assumes substantial financial, technical and operational risk in the design, financing, building and operation of a project (SA Treasury, 2004). According to the National Treasury the private party should be able to capitalize/finance the project through equity or debt.

2.3.2 *Roles of PPP*

The role of public private partnerships has been credited across the globe for proving efficiencies by providing specialist skills and finance for governments in both developed and developing economies in their efforts to meet infrastructure needs for their societies (Banerjee et al 2006).

PPP's are instruments whereby public sector risks and rewards in the delivery of a public service can be shared with the private sector (Bing et al 2005). However, they are not merely vehicles for governments to be relieved of their responsibilities, they are rather solutions that help governments to efficiently deliver (Zhang 2005; Gupta and Biswas 2010), while it retains the ultimate accountability for the efficiency and cost of the public service to the communities. Governments therefore need to develop capabilities internally to be able to assess and manage the role, strengths and weaknesses in a prospective project (Forrer

et al 2010). A government remains a partner or regulator in a PPP project for the entire project life cycle to ensure that public resources are used to the benefit of its citizens (Jamali 2004) and that the project delivered at the end of the concession is in good condition for government to continue with the service. PPP's therefore require appropriate allocation and management of risks from both parties to avoid depletion and wastage of resources (Zhang 2005). In South Africa for example, like in many developing economies, there has been a lack of experienced resources and expertise in the initial period of PPP's, however as the partnerships have matured, the processes have developed experience and expertise.

Literature such as in Gupta and Biswas (2010) does show that the PPP's present unique opportunities for social development. It shows many benefits such as the opportunity for governments to build human capacity through skills transfer by strategic placement, while at the same time it is able to build and maintain assets that require specialised skills and greater budget that it does not have capacity for. And in this way, the government leverages on the private sector's expertise and funding, and creates business opportunities for private sector companies, especially during economic downturns. This relationship therefore enhances the social and economic improvement, stability and benefit to the society at large.

In developed economies such as the USA where infrastructure development suffers due to escalating construction costs, and where either tax payers resist tax increases or there is no political will to increase taxes, private sector investment and involvement has continued to provide alternative financing for infrastructure development and rehabilitating or upgrading of underutilised state assets (Pagdadis et al 2008). China has for many years continued implementing PPPs. Because of the characteristics of PPP's, these partnerships have enabled the Chinese government to reduce administrations costs and overcome budget constraints while delivering large scale projects on time (Jing-Fengi et al 2010).

The literature review has depicted that the role of PPP's in the development of infrastructure is increasing, and has brought advantages to the government's ability to deliver services. Appropriate risk allocation, private funding, resources

and expertise are some of the advantages realised by the public sector through PPP initiatives.

2.3.3 *Implementation of PPP*

Implementation of Public–private partnerships (PPP's) for infrastructure development in developed and developing countries have yielded mixed outcomes. Outcomes have either being successful or failed projects. Zhang (2005) points out that there has been improved delivery of infrastructure and services, while poor implementation has led to project delays and cost overruns.

Zhang (2005) further point out that for the successful implementation of a project, positive government economic policies are critical to creating favourable environment for macroeconomic stability. He points out that financiers pay attention to indicators such as inflation and tariffs, legal independence and predictability to provide guarantees for property rights.

An environment also need to be created for governments to intervene cautiously to ensure that procurement practices are transparent and competitive (Ahwireng-Obeng and Mokgohlwa 2002) and ensure that public infrastructure is affordable for citizens it was built for. For example, South Africa introduced the Municipal System Act (2000), which provided guidance for a municipality's involvement in a PPP. Although it gave municipalities the freedom to pursue PPP project for provision of services, but it introduced a capping of tariffs at municipal services. This was however viewed as government involvement and interference and therefore could have a negative impact on revenue generation of long term concessions, and as a result financiers stayed away from the PPP project while demanding the rectification of the law (Leigland 2003).

Many governments worldwide have played active roles in establishing and supporting PPP initiatives in their countries. In the United Kingdom (UK) PPPs' were first introduced in 1992 by the Conservative Party government, and were introduced as a Private Finance Initiative (PFI), and later under a PPP policy (Bing et al 2005). This model was hailed generally for its success, and in many

quarters it is the model for the PPP initiative. Its driving factors have been the subject of investigations by many researchers and cost savings from projects carried through this method have been significantly recognised (Bing et al 2004; Zhang 2005). Bing, Akintoye and Zhang (2005) have stated that projects carried out under this approach mainly involved big private sector players, adequate resources and funding. This is generally a different situation to what is found in the developing economies where small players are involved through consortiums.

India has also been among some of the active countries with PPP projects. In 20 Indian states, over 300 projects in sectors such as transport, power, ports, urban infrastructure, tourism and railways have been implemented and government have been instrumental through policy in creating an environment, that led to a flow of private sector funding (Gupta and Biswas 2010). Like South Africa, where the government established a PPP unit, the government of India has developed a scheme of support through the Ministry of Finance with a clear objective to drive costs down and efficiency up (Pillai 2008).

In China, the state plays a significant role laying economic plans, and Public-private partnerships have been practiced in China for many years to contribute to the national and local infrastructure development by providing investments, advanced technology, and management skills (Jing-Feng et al 2010). The Chinese metropolises have implemented PPP projects to close the gap of capital and lack of efficiency in project delivery (Yuan et al 2010). Examples include sewage treatment plants in the Long Tian and ShaTian townships of Shenzhen City. It was put on tender for operation and maintenance, and a 15 year concession was signed with two strong private companies, which reduced the financial strain on the government, through cost savings while the private partners were able to generate a profit (Miao et al 2003).

The PPP approach in infrastructure development is increasingly becoming popular in African countries as well, with South Africa being the leader on the continent. In South Africa, the Nelspruit water and sanitation concession, the N4 toll road and Dolphin Coast water supply projects were the first long term concession projects (Kotze et al 1999). However the Gautrain fast rail networks, the Humansdorp

District Hospital Project, as well as two privately-run prisons in Bloemfontein and Louis Trichardt are some of the few examples of PPP projects undertaken in the country. In the Democratic Republic of Congo the introduction of a water project in urban Brazzaville was hailed a success, with the biggest turnaround being water connections response-time having improved to 48 hours for the time it takes to lodge a request and to have a water connection installed, from prior to the PPP initiative, where it took between 6 months and two years for a water connection to be installed (Tati 2005).

2.3.4 *PPP Challenges*

When the Government enters into a PPP arrangement it is vital that benefits from the projects are identified, return on investment (RoI) is quantified, access to funding is outlined, feasibility of the project is done, and access to private sector resources such as human expertise and technology is prioritised since they form the basis of need for governments (Forrer et al 2010). Failure to complete proper planning will lead to governments committing to projects, with no prospects of success, and may lead to project delays due to lack of funding and unavailability of resources. A government is a public entity and it should be responsible for its actions and plans, as the society holds only government accountable in service delivery even in a PPP arrangement.

The implementation of PPP's has given rise to a number of challenges that result in many expectations that are not met. Challenges are due to a combination of factors, that need to be considered and managed during the project life cycle, and they are compounded by the inclusion of multiple role players in addition to the inherent challenges in projects (Zhang 2005; Jing-Feng et al 2010). Some of the project factors listed by the authors pertain to cost, quality, schedule, management ability and slow progress in the implementation of PPP's. Poor management of these factors leads to cost overruns, poor quality of products and late delivery. Some of these factors lead to unforeseen increases in capital and operating cost or higher than expected service delivery and maintenance costs (Bender and Gibson 2010; Jing-Feng et al 2010).

PPP is also accustomed to criticism from civil society organizations, public interest groups, media, and other stakeholders, due to the lack of trust in the role of the private sector in public service provision (Gupta and Biswas 2010), especially among trade unions. In South Africa, a number of PPP projects resulted in increased services tariffs such as in the Dolphin Coast water supply project, were the increase in some communities was 119% to the pre-concession tariffs (Farlam 2005). As a result the author identifies some of the concerns raised by critics of PPPs include tariff increases, layoffs and high procurement costs that deter small players, and faulty, rushed, non-competitive, and non-transparent application of PPP principles.

Literature shows that countries are often not clear about their expectation and objectives from a PPP initiative. In China the private sector faced stronger challenges in the development and successful implementation of PPP's in the metropolitan transportation systems (MTS). This was due to reliance on the objectives set by the public sectors, which tended to be inflated by social pressures and needed to justify public funds investment (Jing-Feng et al 2010).

Moreover both public and private sector organisations tend to lack public trust in most countries. This lack of trust creates a challenge for multi-sector delivery of public services, hence the need for a balanced approach to PPP, in order for public demands such as cost-effectiveness, risk sharing, innovation, reliability, timeliness, stakeholder participation, transparency, and security to be met (Zhang 2005). In public management, accountability is a critical factor (Forrer et al 2010), hence expectation and targets should be realistic from conception to completion. Inflated expectations create pressures that can be unbearable for the PPP initiative.

The complex range of issues arising when public infrastructure is delivered through partnerships between the public and private sectors varies over the lifespan of the partnership (Siemiatycki 2010). It is therefore vital for implementation plans to be extended to the whole life of PPP projects (Jing-Feng et al 2009). Vital management controls also need to be in place for the lifespan of the PPP project, such as sstrong contract management control that ensures

contract compliance (Bender and Gibson 2010). Author identifies a common problem among projects in South Africa as that this function tends to fade away as the concession continues, either due to negligence or shortage of skills.

2.4 Success Factors in PPP

PPP infrastructure projects successes are characterised by a combination of factors, such as PPP experience and expertise of role player, terms of contracts, economic and legislative environment, and management of the projects. In addition, a broad range of uncertainties describes the environment around their application especially if the legal frame is not stable (Zhang 2005). The author objectives three objectives that are often recognised as critical in project and they cost, time and quality. However, there a host of underlying factors that contribute, and the combination thereof has a bearable impact on efficient allocation of limited resources which is time, manpower and money (Chua and Kog 1999; Zhang 2005).

Even though PPP experiences are project and country specific, the public sector in all cases has the ultimate responsibility for the type of services or projects to pursue, and it ultimately determines the time, quality and cost requirements (Zhang 2005; Xueqing 2006). It is therefore vital that the public sector identifies the driving factors of PPP, which can be used as focal pointers for planning and implementation of PPP projects (Jing-Feng et al 2010). One of them is selecting the right private sector partner; “the private-sector partner must have the necessary skills, experience, and resources to manage these risks and provide quality and cost effective facilities and services” (Xueqing 2005).

2.4.1 *Identification of Critical Success Factors*

There are various methods through which CSFs have been identified worldwide. These methods include interviews with experts in the field and studies of the literature on the subject. In this research study, literature has been used to identify 20 critical success factors to be analysed for the South African environment.

These factors were tested against the perception of South African PPP practitioners and managers with strategic relation to PPP.

The exercise to determine CSF has been a subject of investigation by many researchers. As a source of information, international studies have targeted implemented PPP projects and have come up with mixed outcomes. Some of the measures used to identify CSFs have been determined through investigations of project outcomes, getting input from expert opinions through interviews, correspondence as well as literature reviewed from other researchers, in order to draw experience from successful projects and lessons learnt from failed ones (Chua and Kog 1999; Zhang 2005).

The process of identifying CSFs can be approached in a number of ways. Zhang's (2005) approach analysed the internal and external dynamics of what constitutes a successful PPP project implementation. He suggested a win-win principle that demands commitment from private and public participants to be equally responsible for the success of PPP projects. Each participant should place an effort to maximise each other's strengths, and ensure that an environment is created for success. He further contends that it is the public sector that should create a favourable environment, and that the private sector should deliver services of high quality and at an acceptable level. He describes this phenomenon as the composition of the internal critical factors. The author identified internal critical factors as project size, and pioneering status - such as whether a project is breaking new grounds or it is a standard project. He also identifies other factors that he considered as external critical factors and describes them as project characteristics such as funding or political and economic risks. The management of these factors is ultimately responsible for whether a PPP project is successful or not.

Siemiatycki (2010) holds the view that critical success factors are much deeper in description, in that they go beyond the conventional project evaluation criteria, such as reviewing project planning and monitoring progress with respect to planned targets. CSFs, in Siemiatycki's opinion holistically analyse the overall quality of the planning and monitoring processes used to achieve success and the

impacts on system users, the environment and the durability of the partnerships. According to this author, CSFs are the underlying factors that measure success.

2.4.2 *Worldwide Critical Success Factor from previous Studies*

Literature reviewed from international studies revealed similar factors both from developed and developing nations. Various methods were practised in these studies, including ranking and categorising (Bing et al 2004). For example, 18 potential critical success factors (CSF) for PPP/PFI construction projects in UK; were grouped into 5 five main factors: effective procurement, project implement ability, government guarantee, favorable economic conditions and available financial market. Similar factors were studied in China, where 67 success-related factors were considered and were grouped under four main project aspects, namely: project characteristics, contractual arrangements, project respondents, and interactive processes for project success (Chua and Kog 1999). Essentially the factors are the same from both developed and developing countries, but categorization or ranking may be different, due to the environment and prioritization.

Examples from another research study based in UK identified selection criteria for PPP projects and classified them into four evaluation packages for PPP projects in general: financial; technical; safety, health and environmental; and managerial (Xueqing 2005). A research study from Lebanon brought more moral integrity to the study in searching for the success and failure in PPP projects. The Lebanese experience highlighted conceptual ambiguity that often that has negative impact on implementation, and identified trust, openness and fairness as foundational underpinnings of a successful PPP (Jamali 2004). The author of the Lebanese study lists factors in the mainline, such as groundwork and preparation, including feasibility studies and economic evaluation, in an environment where legal and regulatory capacity is effective to foster participation in PPP's, as critical success factors for PPP's.

Zhang (2006), included project life span as one of the best-value contributing factors for PPP in general. He brought to attention the fact that in a defined

concession period, a longer span means that the service period will be longer after the project has been commissioned. This means that if the consortium continue to manage the project over long periods, good quality personnel and stable management of the consortium become more critical (Bender and Gibson 2010) as complacency and staff turnover becomes challenges.

A number of research studies analyses the relative importance of critical success factors (Chua and Kog 1999; Xueqing 2005; Zhang 2005; Jing-Feng et al 2010). In this case the CSFs are not ranked but rather compared. Previously many CSF's were identified with less attention to relative importance, thereby giving rise to a new research approach that tackles the relative importance of CSFs, and uses ranking to distinguish the most important factors (Bing et al 2004). This research study is continuation in tackling relative importance of CSFs.

2.4.3 *Critical Success Factors in SA PPP infrastructure projects*

The South African PPP environment has improved since 1999. When the initial PPP projects came into being, it improved government activities. This is reflected by a number of PPP projects listed in the PPP unit based at SA National Treasury. This list shows project that are either in progress or planned. Figure 1 shows the global position of SA in transportation PPP, and it shows a comparable position with a number of developing and developed countries. The PPP environment in SA is thus dynamic, changeable and uncertain because of the mixed experience levels among participants (Ahwireng-Obeng and Mokgohlwa 2002). Accordingly, the author of the above-mentioned study highlights South African requirements for black economic empowerment (BEE) as a factor that implies that some of the participants may not have the experience level required for a successful implementation, yet they should be considered, and this adds to the dynamic nature of the South African PPP's.

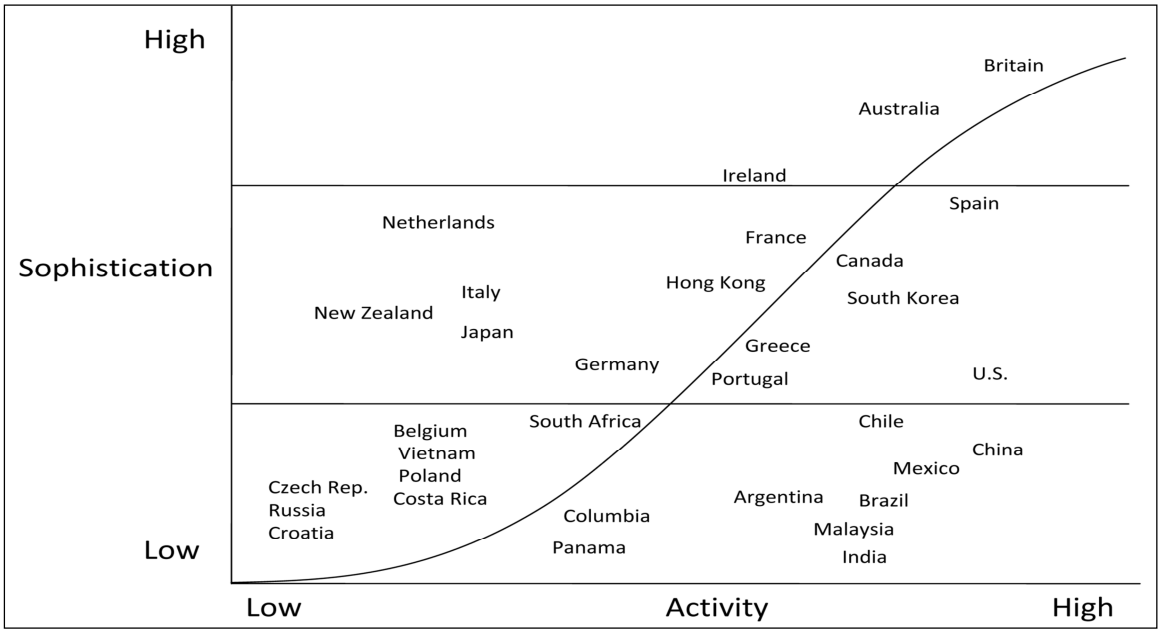

Figure 1: PPP market maturity curve for the transportation sector

(Deloitte Research 2006 and Public Works Financing 2008 cited by Siemiatycki 2010)

A research study in 2002 about South African critical success factors included factors such as socio-political, regulatory and legal environment, risk of lenders; improving common understanding among PPP respondents; enhancing the quality of procurement processes; and strengthening the commitment of participants (Ahwireng-Obeng and Mokgohlwa 2002). The author point out that risk allocation was based on the ability to manage risks allocated to each participant, given the composition and the experience level of the respondents. In 2002, the PPP field was very new in South Africa, and the government was under pressure to deliver on the needs for infrastructure development, while at the same time trying to deal with the unbalanced social state of the country. Thus, the authors of the 2002 study also suggested the entrepreneurship factor for development of entrepreneurship in the private sector which is vital for South African development.

Some of the lessons learnt in the initial days of PPP implementation in South Africa included a lack of experienced negotiators to protect the government's interest. This was demonstrated in the Humansdorp district hospital project and

the Dolphin Coast water supply projects, where the private participant made profits while government carried the burden of cost overruns and delayed completion dates (Hlala 1999). One other critical success factor for South Africa is the quality of delivery in infrastructure projects, but even more important is the maintenance of such infrastructure as highlighted by Fourie (2008). It is vital for South Africa to invest in improving infrastructure rather than focus only on laying out new infrastructure. Fourie outlines the importance of quality infrastructure rather than just increasing the quantity of infrastructure. Even though quantity is important in South Africa, quality is even more important in determining the durability of infrastructure developed, and ensuring benefits from the public are maximized.

2.5 Conclusion of Literature Review

The literature review has investigated the role of PPP in infrastructure development. The United Kingdom which is perceived to be a leader in the implementation of infrastructure development through PPP/PFI has provided literature for many researchers to work with, by investigating the applied model (Siemiatycki 2010). Other countries that were a source of information for researchers were China and India. Literature for these two nations has presented increased activities in PPP, and the driving factors behind this progression have been the subject of many research studies. The literature provided examples of PPP implementation in both developed and developing economies, studying both success and failures.

The literature further established that the popularity of PPP is in both developed and developing countries and also that increased activities is coupled with a share of challenges (Siemiatycki 2010). It is clear that PPP's have increased in sophistication over time, and that experience is vital in their implementation. Crucial challenges encountered in PPP infrastructure developments were centred on a lack of experience and a shortage of professional expertise in PPP fields. This creates an added problem, because the main reason PPP exists is to solve the skills and resource problems in the public sector.

The drive to improve the application of PPP's allowed for the overcoming of challenges posed by the use of multiple participants and a combination of factors that was used to lay the ground for identifying critical success factors (CSF), which governments and other stakeholders may use to appropriately allocate scarce resources. This research was primarily a South African case, with the goal of establishing critical success factors for PPP in infrastructure development. The 20 CSF's identified were investigated using a survey questionnaire. The 20 are listed below in no particular order:

2.5.1 *Research Propositions*

- Strong and experienced private consortium with technical strength (Bing et al 2004; Xueqing 2005);
- Black economic empowerment requirement on consortium (Bender and Gibson 2010);
- Involvement of Trade Unions (Tuman 2007; Bender and Gibson 2010);
- Strong contract management control that ensures contract compliance (Bender and Gibson 2010);
- Transparent and competitive procurement practices (Bing et al 2004);
- Appropriate risk allocation through concessionaire contract (Grant 1996; Xueqing 2005);
- Project technical and financial feasibility (Bing et al 2004);
- Socio-political environment (Ahwireng-Obeng and Mokgohlwa 2002; Xueqing 2005);
- Predictable independent regulatory and legal environment, (Ahwireng-Obeng and Mokgohlwa 2002);
- On-time or early project completion (Jing-Feng et al 2009);

- Transfer of risk from public to private sector (Xueqing 2006);
- Project design and construction execution (Xueqing 2005);
- Project revenue generation (Bender and Gibson 2010);
- Concession Period (Xueqing 2005);
- Benefits to local economy and strong public awareness (Xueqing 2006);
- Ability of each participant in the consortium to raise funding (Hlala 1999);
- Good quality personnel and stable management of consortium (Bender and Gibson 2010);
- Unforeseen increase in capital and operating cost or higher than expected service delivery and maintenance costs (Bender and Gibson 2010; Jing-Feng et al 2010);
- Stable macro-economic environment (Zhang 2005), and
- Training and skills transfer (Jing-Feng et al 2009).

CHAPTER 3: RESEARCH METHODOLOGY

This chapter discusses the research methodology used to gather information and data and for analysis. The research methodology chosen was quantitative, using a questionnaire as a tool to gather data. In this chapter literature was reviewed to describe the quantitative research method, including reviewing the research design and research instruments that were used. Similar studies were used for benchmarking and leveraging, to emphasize the approach for this research. The rest of the discussion was dedicated to the process followed for data collection and the analysis approach was adopted. The concepts of validity and reliability regarding the data gathered are also discussed.

3.1 Research methodology/paradigm

The aim of this research was to determine critical success factors in infrastructure development in South Africa, based on accumulative knowledge and judgments of experts in the industry (Chua and Kog 1999). A research approach was chosen with the aim of addressing the problem. Any one of the three research methodologies (quantitative, qualitative and mixed-method) would be used provided that it would best fit the objectives of the research.

In quantitative research, the researcher typically employs statistics to analyze the distribution of variables and from that they draw explanations, patterns and conclusions, using distributions to a certain degree of probability (Smeyers 2008). Data is generally numerical and is analyzed through statistical methods to arrive at certain outcomes that can be interpreted to infer certain conclusions. Quantitative methodology tends to be based on predictive and randomized controls to ultimately arrive at certain conclusion (Koro-Ljungberg and Douglas 2008).

With qualitative research, the researcher uses an enquiring approach, where the researcher tends to discuss the characteristics of a subject being studied in-depth in order to seek broad understanding of the subject, and to establish the point of

view of the participants (Tucker et al 1995; Koro-Ljungberg and Douglas 2008). Qualitative research has a tendency to utilize a few participants who are selected purposefully in order to exploit their experiences and expertise, to gain detailed input from them (Zawawi 2007; Koro-Ljungberg and Douglas 2008). Mixed method will be a combination of qualitative and quantitative research methodologies.

3.2 Research Design

A survey questionnaire was developed for this research that included open ended questions to draw more insight from the respondents. The questionnaire was developed to quantify attitudinal constructs using a numerical scale of equal intervals (Stacey 2005). The questionnaire consisted of 3 sections, with section 1 enquiring about the demographics of the respondents, section 2 presenting the main survey questions which included 20 questions about PPP critical success factor that required participants to rate each on a numerical scale. Section 3 included pre-determined questions for the participants to answer.

Disadvantages of the questionnaire method includes that biased interpretations often surface, where numerical scale allows two people with different inclinations to choose the same number regardless. The researcher has also already determined and restricted the participants to a certain choice, thus partially influencing the outcome of the research and the findings are then rather generalized in nature (Tucker et al 1995; Marecek et al 1997). Further disadvantages are highlighted as this method mainly presents a snapshot of what participants think, and the question structure channels the responses and therefore limits opinions. It is for this reason that Marecek et al (1997) suggest that researchers should have the moral standard, authority and responsibility, regardless of the method used to present data without prejudice, and avoid selective presentation, taking into consideration that they are essentially presenting the interests and perceptions of the participant, who have inspired their research, at the first place.

The advantage of this method is that it provides an environment for natural occurring phenomenon to be understood (Tucker et al 1995). It is easy to administer, with more controlled variables and allows for holistic analysis using a statistical approach.

3.3 Population and sample

3.3.1 *Population*

Population of this research was drawn from participants in various PPP projects in South Africa. They either are or have been involved in various public and private sector organizations responsible for the development of infrastructure in South Africa, or alternatively they have experiential knowledge in PPP. They have been employed or consulted for private companies or the public sector in PPP projects at national or provincial levels. Other participants were public sector representatives in governmental departments and PPP units based at the South African National Treasury. Some research participants were drawn from project financing institutions. Furthermore, academics involved in PPP research were beleaguered but no response was retrieved from any. Lastly, it is important to note that individuals with high involvement, expertise and experience, in these various organizations were targeted for the research study.

3.3.2 *Sample and sampling method*

A statistical sample is a subset of the larger population, selected for study and should be representative, meaning similar to the larger population (Wolverton 2009). The sample for this research was purposefully small and reasonable flexibility was allowed as the research progressed to ensure maximum interaction and to also allow for maximum input from participants with managerial experience and with strategic roles in the PPP environment (Tuckett 2004; Zawawi 2007; Koro-Ljungberg and Douglas 2008; Padgett 2009). A sample was initially planned for specialised groups in the field, but it was broadened to cover multiple disciplines and was still considered reasonable and acceptable as reflecting

expertise and experience of the population. The level of PPP implementation in South Africa is approximately 10 years.

The research sample intended to focus on experts and practitioners in PPP implementation, but this was broadened to include those whose fields do have some interaction with PPP environment. PPP practitioners with maximum exposure to PPP project implementation were also targeted for this research. Arrangements were made telephonically and by emails, with visits to potential participants in some cases to ensure maximum interaction and ensure that the best information was sourced from the respondents.

Table 1: Profile of respondents

Sector	No. of Respondents
Law	1
Power	1
Municipalities	2
Procurement	4
Risk Management	1
Financial Systems	2
Project Management	5
Economist	1
General Management	1
Marketing	1
Project Finance	2

3.4 The research instrument

To ensure that the participants were carefully limited in what they could do or say, structured questionnaires were used to provide only a few predetermined options for selection. However, to ensure that additional info was uncovered and the experience level of the participants was not suppressed, predetermined questions were added, and flexibility was allowed for other questions to emerge (Marecek et al 1997; Whiting 2008).

3.5 Procedure for data collection

A complete questionnaire was developed with first a section requesting a demographic profile of the participant where questions were also asked about the respondents' individual and organizational backgrounds. The second section of the questionnaire dealt with critical success factors in South African PPP projects. The third section sought further input or opinions on PPP projects emanating from direct experience and management roles (Bing et al 2004; Zhang 2005; Jing-Feng et al 2010). Data was therefore gathered through the questionnaire which was developed to return numeric data.

Potential Participants were established through referrals and were profiled. They were then approached by means of a telephone call to request an appointment and introduce them to the research subject and to explain what would be requested of them. The questionnaires were sent through by email, and most of the participants preferred to send the questionnaires back without participating in an interview and that was accepted.

3.6 Data analysis and interpretation

Data gathered through questionnaires was analyzed using are research approach called Normal Distribution Fitting Algorithm. The approach was chosen because of the nature of the research, and was developed by Stacey (2005). The research was based attitudinal constructs, interpreting attitudes and perceptions. The responses therefore are inclined to be ordinal as opposed to being interval level data as pointed by the author. In line with this research approach, in order for data to be quantified a continuous numerical scale was defined, following a view among researchers that response categories may be equally spaced, associating numerical values to ordinal response, as was the case with the developed questionnaire: "Strongly Agree"=5, "Agree"=4, "Neutral"=3 "Disagree"=2, "Strongly disagree"=1.

The distribution-fitting approach is an algorithm approach rather than an arithmetic approach and was found by Stacey (2005) to have superior accuracy and validity

to other comparable approaches. The distribution-fitting approach “estimates the values of the parameters (typically means and standard deviations) of distributions of underlying attitudes (for example normal or log-normal distributions) together with the attitudinal thresholds that would result in the best fit with the observed categorical response frequencies”.

$$f(x) = \frac{1}{\sqrt{2\pi\sigma^2}}\, e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$, (Stacey 2005).

The first step of the approach according to this research approach is to assign numerical values to ordinal data for numerical simplicity. Parameters of the distributions of responses are the mean (μ), standard deviation (σ) and the threshold values (t-values). The statistical analysis begins with guesses of the means, standard deviations and the threshold values. The expected response frequencies for each ordinal responses of the proposition were calculated. Then χ^2 value maybe calculated, and the algorithm approach determines the means, the standard deviations and the threshold values which minimises the value of χ^2.

3.7 Limitations of the study

The sample size targeted was 20 respondents, however questionnaires were sent to 47 people, with only 21 responding. The sample was broadened to include knowledgeable individuals in the subject, with lower degree of expertise as planned. Direct experience was also broadened to also include exposure. The average working experience of the sample was 12 years, and this was considered reasonable given that PPP implementation in South African only started 12 years ago. The sample was not randomly selected, thus it was not an unbiased representation of the population.

3.8 Validity and reliability

Validity and reliability form the foundation of any measurable construct, and reliability should be acceptably high depending on the subject of research in order to build credibility of the data, because threats to reliability and validity create

questions to the credibility of the sample and research (Wolverton 2009; Bodie and Worthington 2010). Validity analysis is an examination to determine whether what was to be measured has been measured, and whether the details and the conclusions of the research are a match (Xueqing 2006; Kalof et al 2008).

3.8.1 *External validity*

External validation is important when findings and conclusions are to be generalised from research findings and it is typical when characteristics of a random sample can be matched with the target population (Wolverton 2009). Qualitative research is always weak in terms of external validity due to purposeful selection of a research sample that is rarely randomly selected. As a result, generalisation is typically not a major feature of qualitative research (Johnson 1997).

In this research a representative sample will be purposefully selected, from organisations involved in the most successful PPP projects for infrastructure development in South Africa, drawing inference from the whole population.

3.8.2 *Internal validity*

Internal validity is concerned with the degree to which all other alternative explanations and causal relationships have been eliminated in order for the researcher to draw accurate conclusions about cause and effect (Johnson 1997; Wolverton 2009). The authors further elaborate on the importance of the interviews objectivities. Thus, for this research study the interview remained objective, thereby allowing the participant's perceptions to be fully reflected in the data.

3.8.3 *Reliability*

The opinions of the experts and experienced people are sometimes affected by the mood of the phase in the projects they are involved in (Reason and Bradbury, 2006). This can have an unbearable influence on the reliability of the data

collected. The internal consistency on the part of the researcher through consistent interviews and interpretation ensured that the reliability coefficient for this research is high as it is the statistic most used to evaluate internal consistency (Straub et al 2004; Xueqing 2006).

CHAPTER 4: PRESENTATION OF RESULTS

4.1 Introduction

This chapter consolidates all the results obtained from the questionnaires that were received. In total 21 responses were received out the 47 questionnaires sent. This was a response rate of 45%. The response rate was high enough for the responses to be accepted as data for statistical analyses.

The questionnaire was structured into three 3 sections, and there were a total of 26 questions. The selections of questions over the various sections were spread out as follows:

- Section 1: Background Information – 3 questions
- Section 2: Critical Success Factors – 20 questions
- Section 3: Opinions – 3 questions

The first section gathered information pertaining to demographic profile of the respondents. The second section required participants to choose the best answer, based on given ordinal responses, by rating each question on the level of importance, of each critical success factor (CSF). For computational simplicity the integer values were assigned to consecutive ordinal values, “Strong Agree”=5, “Agree”=4, “Neutral”=3 “Disagree”=2, “Strongly disagree”=1. The last section required worded responses to three questions. The responses were the opinions of the participants to the subjects.

4.2 Demographic profile of respondents

The demographics of the sample are detailed below, by experience, sector, and province, working experience and field specialisation.

4.2.1 *Participants by PPP experience*

The research sample differed from the initial profile that targeted experts with many years of experience in PPP projects, but it was broadened to include participants from across the industry, with a reasonable rated level of PPP experience. Section one of the questionnaire required the participants to rate their level of PPP experience, on a scale of one to five, with one being no experience, and five being highly experienced, and three being average. The sample experience profile is presented below. Of the participants represented; 38% were highly experienced, giving a combined experience level of participants in the survey of 62%. The plan was to have 100% of the experience.

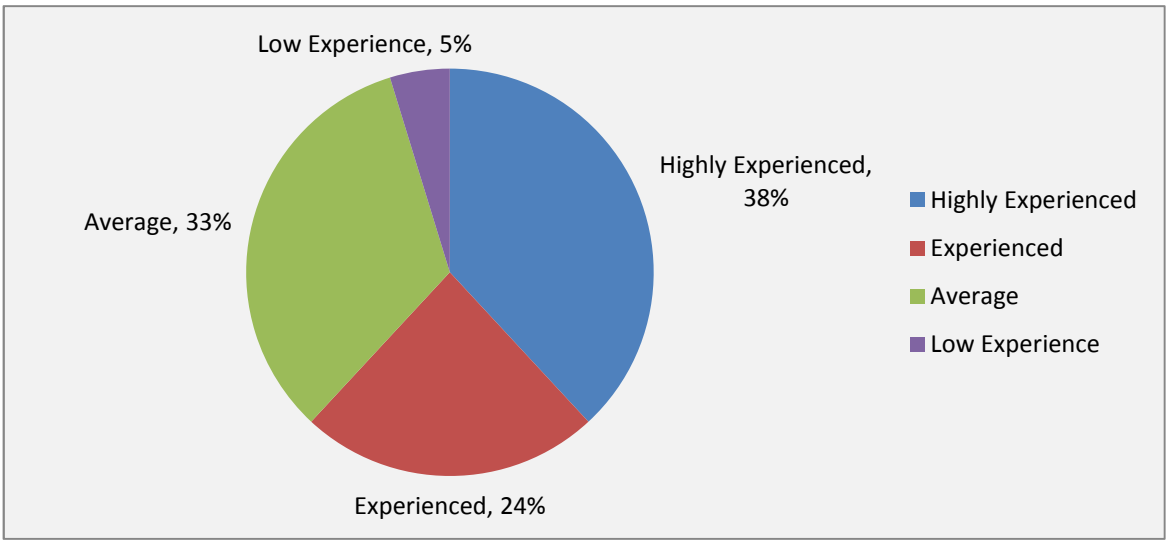

Figure 2: Participants by PPP Experience

4.2.2 *Participants by Sector*

In total 10 sectors where represented by the sample, representing a broadened range as opposed to specialised projects envisaged. The biggest representation in the sample came from finance, which was divided into two sectors, namely private sector finance and developmental finance. They collectively represented 34% of the sample composition. The rest of the sectors such as construction, consulting, energy and services had representation of between 10% and 15% of

the sample. Mining, telecommunications, legal and defence sectors were the least represented with 5% each.

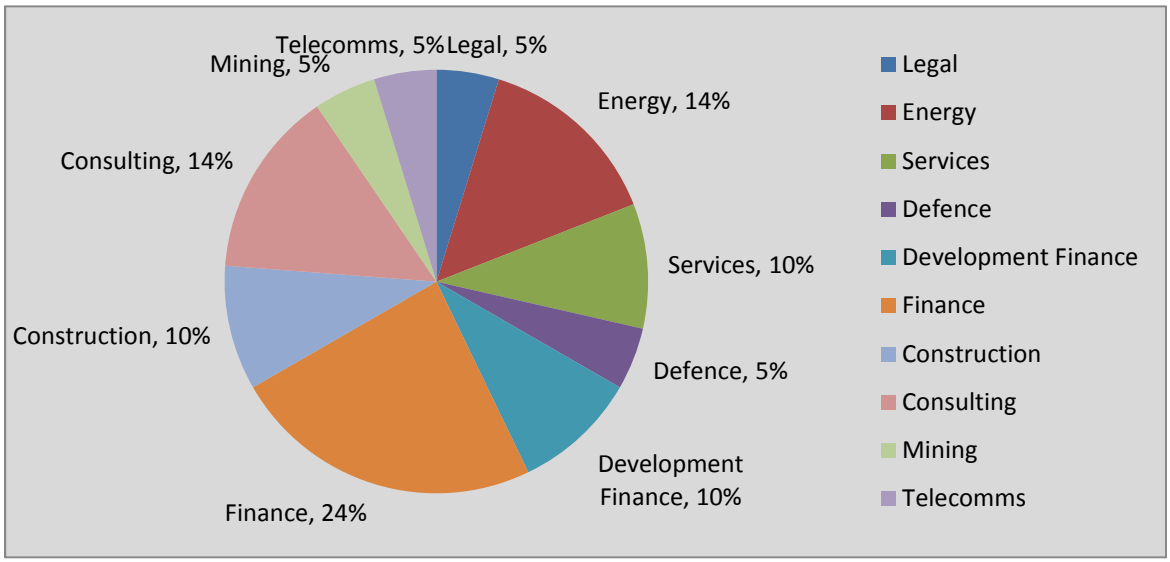

Figure 3: Participants by Sector

4.2.3 *Participants by Province*

Most participants came from Gauteng who represented 86% of the total sample, with other provinces not returning any questionnaires. Kwa-Zulu Natal, Mpumalanga and Eastern Cape each had one representation, equivalent to 5% for each of them.

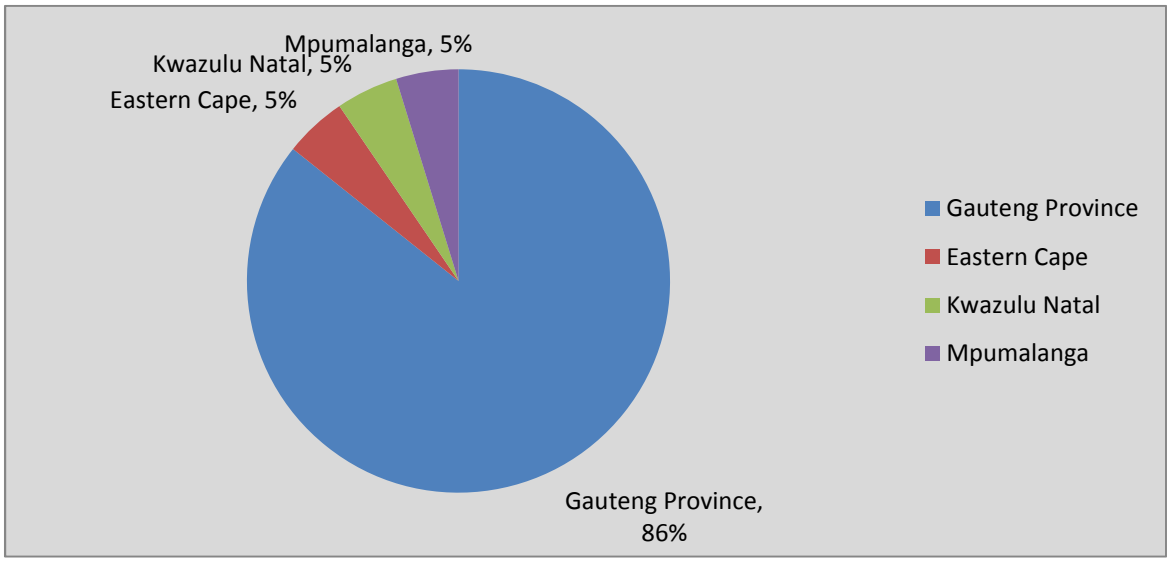

Figure 4: Participants by Province

4.2.4 *Participants by working experience*

In terms of working experience the largest portion of participants where those with between 10 and 15 years of working experience, representing 57% of the sample size. Generally the bulk of the participants (81%) had at least 10 years of working experience, with the most experienced participant at 33 years of working experience. The average working experience of the sample was 13 years.

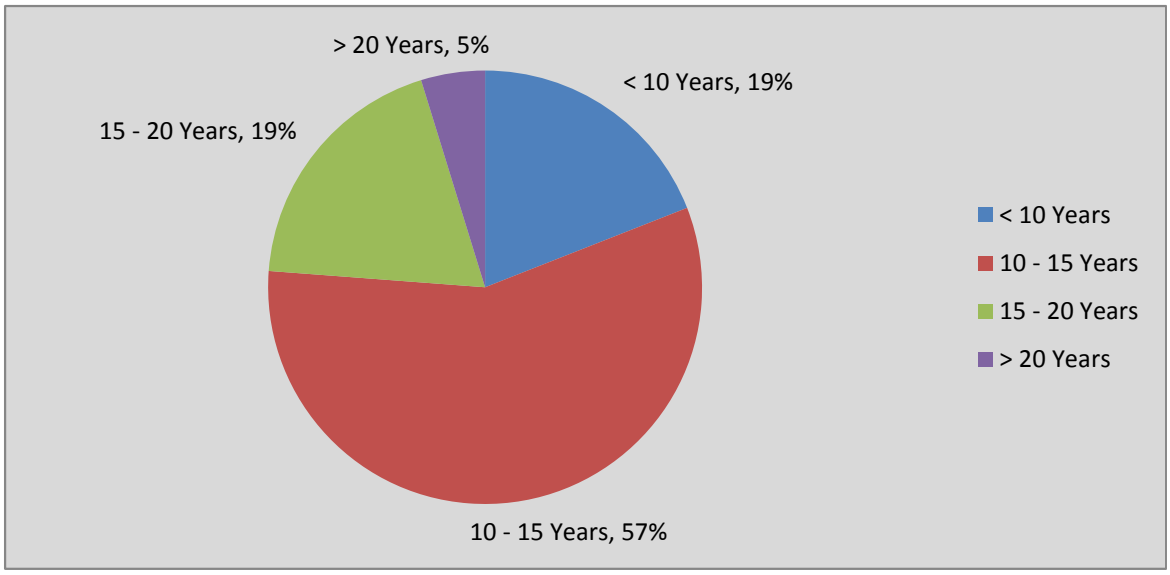

Figure 5: Participants by working experience

4.3 Participants by Field Specialisation

In terms of field specialisation the objective of the research was to seek to cover roles that are generally active in PPP setup and implementations. The highest represented specialisation was project management, representing 24% of the sample, followed by procurement at 19%. Project finance represented 10% of the sample, together with municipalities and financial systems. The least represented specialisation fields were marketing, general management, power (energy) and law.

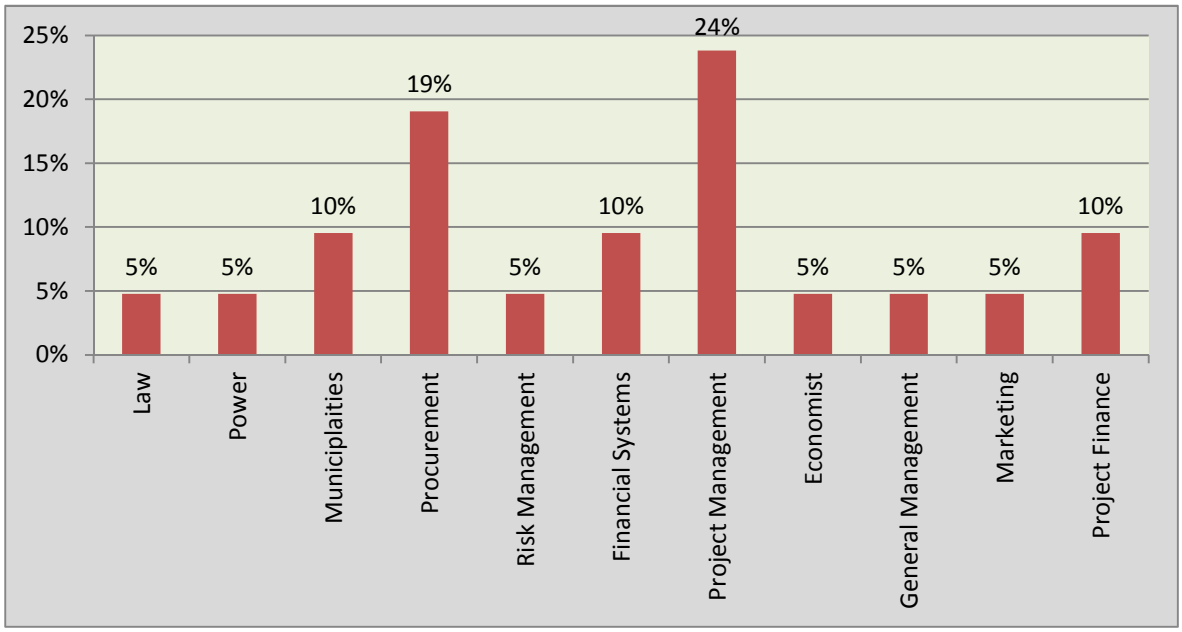

Figure 6: Participants by Speciality

4.4 Results pertaining to Propositions

The second section of the questionnaire consisted of 20 questions and the participants were required to choose the relative importance of each of the 20 CSF's. Data gathered from the survey was ordinal in nature, and for simplicity the integer values were assigned to consecutive ordinal values, "Strongly Agree"=5, "Agree"=4, "Neutral"=3 "Disagree"=2, "Strongly disagree"=1. The results of the survey are presented in table 2 below.

Table 2: Results of Survey

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
Project technical and financial feasibility	0	1	0	11	9
Strong contract management control that ensures contract compliance	0	6	7	4	4
Strong and experienced private consortium with technical strength	2	6	4	8	1
Potential project revenue generation	0	2	1	7	11
Appropriate risk allocation through concessionaire contract	0	5	2	5	9
Transparent and competitive procurement practices	0	1	5	7	8
Unforeseen increase in capital and operating cost or higher than expected service delivery and maintenance costs	0	0	1	7	13
Project design and construction execution	0	5	7	5	4
Benefits to local economy and strong public awareness	0	1	10	4	6
Transfer of risk from public to private sector	4	1	4	7	5
Concession Period or length of arrangement	1	4	2	7	7
Good quality personnel and stable management of consortium	0	1	5	10	5
Predictable independent regulatory and legal environment	0	3	1	8	9
Socio-political environment	0	2	7	6	6
Ability of each participant in the consortium to raise funding	0	3	3	9	6
On-time or early project completion	2	2	7	6	4
Black Economic Empowerment requirement on Consortium	0	0	9	6	6
Training and Skills Transfer	0	1	7	6	7
Stable macro-economic environment	0	5	9	6	1
Involvement and coorperation with Trade Unions	2	2	9	5	3

Selected critical success factors (CSF's) that represented statistical significance after the analysis was completed were highlighted. Out of a total of 20 CSF's, results of 6 factors are presented below as they were significantly more important than the mean, ranking the highest. The six are highlighted in pink on the table 2 above.

4.4.1 *Project technical and financial feasibility*

The critical success factor, technical and financial feasibility of a PPP project, obtained the highest rank from the analysis. Sixty-two per cent of the participants responded with the "strongly agree" response to its importance level. In total, 95% of the participants were convinced that it was an important CSF.

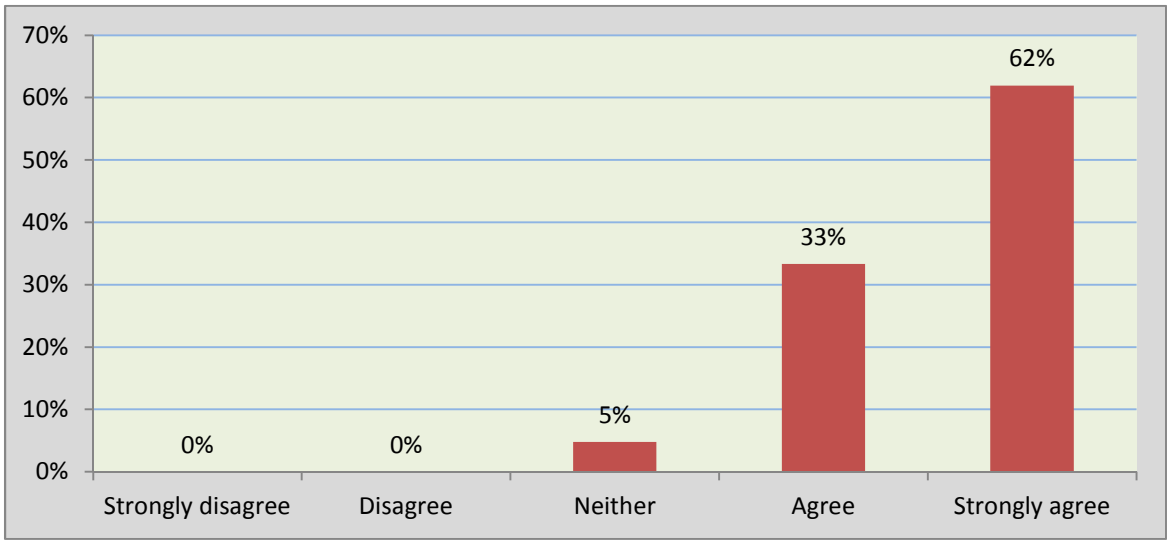

Figure 7: Project technical and financial feasibility

4.4.2 *Strong contract management control that ensures contract compliance*

The second highest ranking CSF had to do with strong contract management that ensured compliance from both the public and private partners. Fifty-two per cent of the participants "strongly agreed" that this was an important CSF, contributing to a total of 85% that believed it was important. 10% disagreed, with 5% opting to remain neutral.

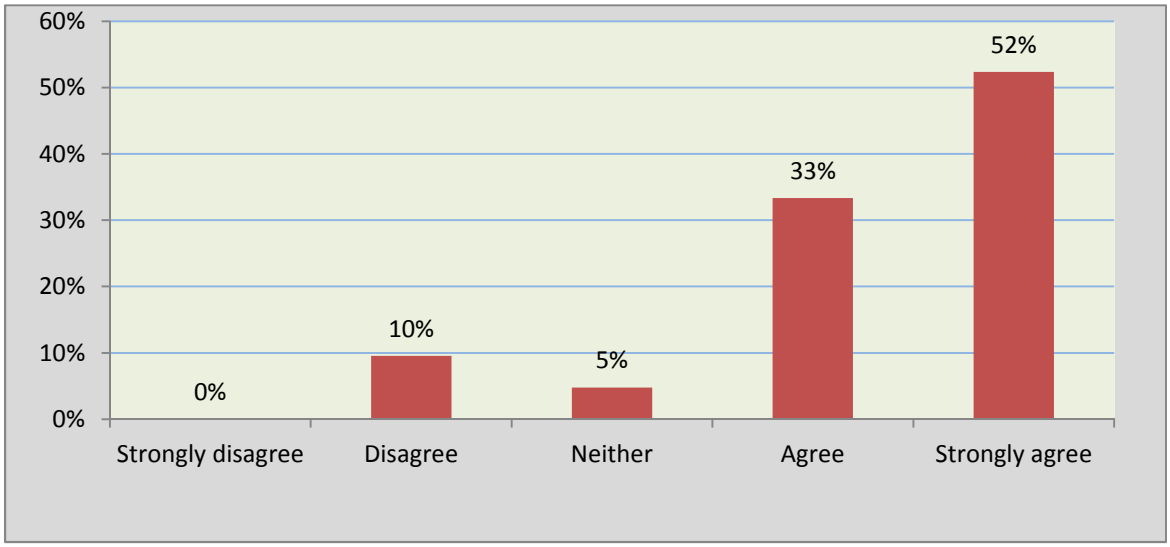

Figure 8: Strong contract management control

4.4.3 *Strong and experienced private consortium with technical strength*

The CSF that was ranked third was about the strength and experience of the private consortium. 43% of the participants strongly agreed that it was an important CSF. In total 95% agreed, while only 5% disagreed.

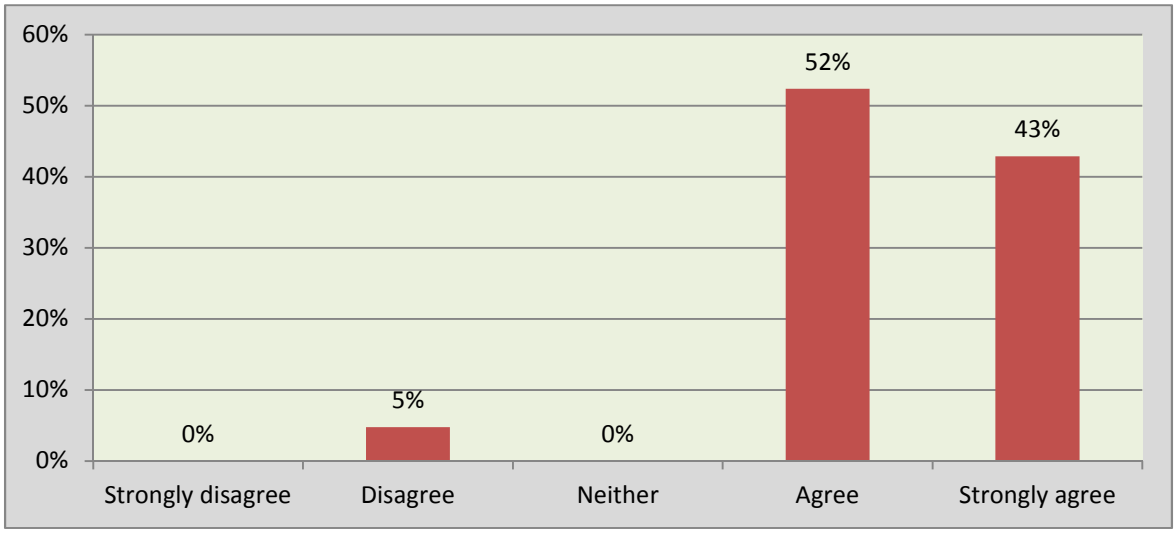

Figure 9: Technically Strong and Experienced Consortium

4.4.4 *Training and Skills Transfer*

Transfer of skills was ranked 18th, with 14% of participants strongly agreeing that it was an important CSF. In total 38% agreed, 20% disagreed, and 43% were neutral.

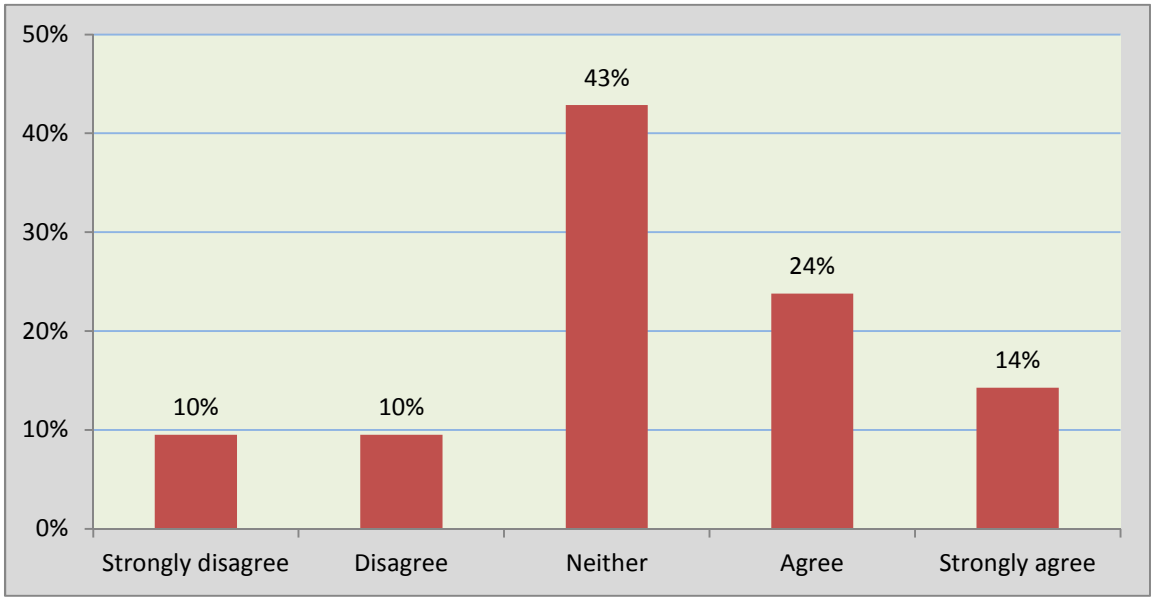

Figure 10: Training and skills transfer

4.4.5 *Stable macro-economic environment*

The 19th ranked CSF was macro-economic environment, for PPP implementation to flourish. The participants did not agree, ranking it second lowest. 5% strongly agreed, with a total of 34% agreeing, 24% disagreed and 43% were neutral.

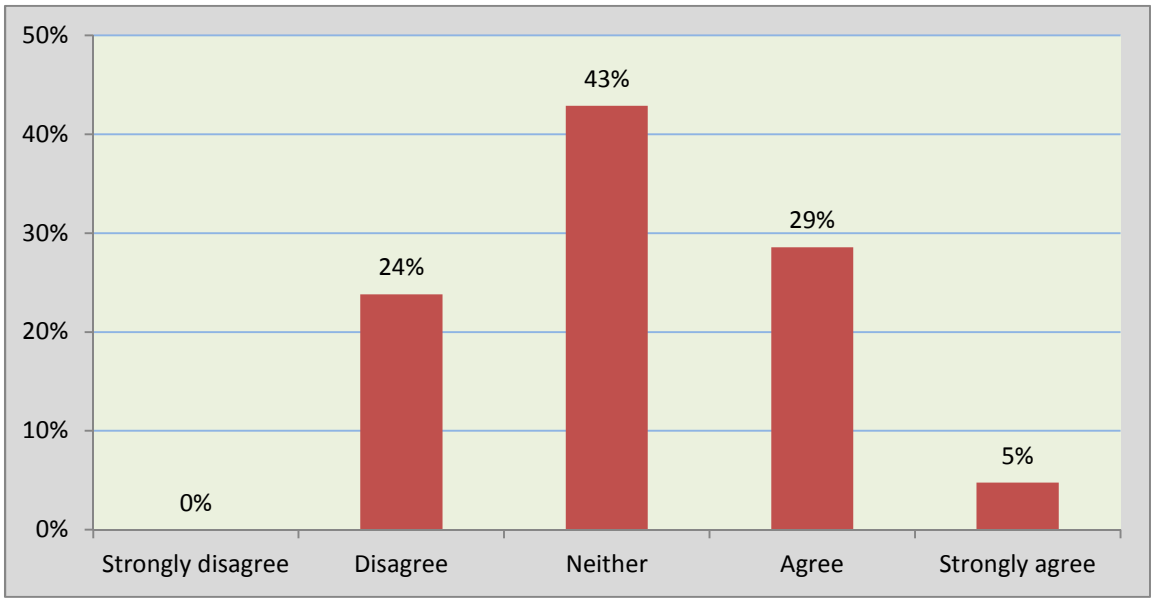

Figure 11: Stable macro-economic environment

4.4.6 *Involvement and cooperation with Trade Unions*

The lowest ranked CSF was about Trade Unions and their participation or cooperation with the PPP consortium. 5% strongly agreed that this was an important CSF for PPP implementation to be successful. In total 43% agreed, 19% were neutral, while 39% disagreed.

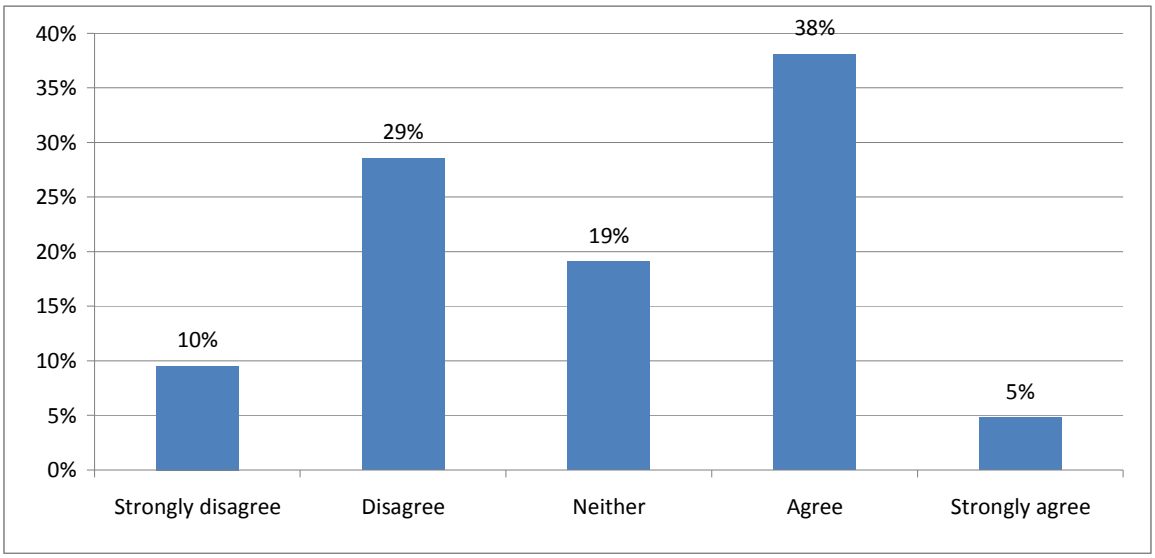

Figure 12: Trade Unions Involvement

4.5 Results pertaining from open questions

Three questions were posed to the participant in order for the researcher to gain more insight from the participant experiences. The first question queried whether there were any other CSF's that participants would have added to the list of 20 compiled factors. The second question requested the participant to suggest major problems, shortcomings or low points in South African PPP's, and to elaborate whether they attribute these shortcomings to, public or private organizations. And the final question requested an opinion on the respondents' view of the future of PPPs in South African infrastructure development.

4.5.1 *Other CSF's*

Participants suggested a total of 17 factors they considered critical, and they are listed below:

- Risk transfer can be mitigated rather than transferred;
- Opinion on the legitimacy and honesty of PPP's, especially with regard to corruption, should be measured;
- A measure of PPP governance should be addressed;
- PPP tends to receive much more high profile political support and community support and in most cases BEE element is satisfied by politically aligned partners;
- Counter-trade agreements on projects beyond a certain financial threshold especially for those that cross borders;
- Stakeholder management and strategy;
- Intellectual Property management strategy, including skills and technology transfer;
- Utility quantification strategy or business case;

- Conducive environment for PPP in both private and public to thrive which is based on acceptable best practices;
- PPP alignment with the policies of the government;
- Political Leadership that ensures willingness and readiness to drive projects to completion;
- Critical Stakeholder Management system to identify and manage issues and concerns that may have impacted the project;
- Job creation must be one of the key drivers for PPP;
- Adequate skills on the public side are essential;
- Differences of incentives between the private and the public sector members in a consortium;
- Reduced autonomy for the technical specialists, and
- Difference between political allegiance and commitment to technical competency, given that the public sector struggles to attract the right kind of skills.

4.5.2 *Major Challenges in South African PPP environment*

Addressing the question of shortcomings in the South African PPP environment, participants had a number of opinions based on their experience and these are listed below.

- Capacity and understanding of the process is still a major problem that faces South African PPP project;
- PPP's in South Africa are underutilized as a vehicle for infrastructural development. PPP's have been badly publicized and have created suspicion across broader society. Even though the primary objective is shared between both the public and private entities, synergies are

polarized with regard to other objectives, such as skills and social responsibilities;

- There are still problems in the process of concluding the legal transaction and concluding government's stake is inclined to take too long;

- Local Government and provincial government lack the capacity to identify potential PPP's or to create PPP's even on pure public service responsibilities;

- Poor negotiations, driven by fraud and corruption, lack of strategy and vision, poor or no intellectual property management strategy and no or lack of skills and technology transfer, lack of quality or skilled personnel, an environment not conducive for PPP's to thrive, lack of decisive transformation and too much biased political influence are still prevalent problems;

- Clarity on the part of Government in terms of principles governing PPP is still lacking. Objectives and expectations are not clearly set out at the conception of a project. Apart from PPP in road infrastructure development, there is a question of the availability of capacity within the country to run successful PPP's;

- Inefficient state-owned enterprises that have a monopoly on particular services rendered to the country are a stumbling block. Eskom is the classic example. The law must be changed to ensure more PPP's are prioritized to provide security of electricity supply for South Africa, and

- The three challenges mentioned earlier are incomparable salaries in the public sector; reduced autonomy for the technical specialists in the public sector and negative political interference. On the other hand, lack of transformation in the private sector as well as unwillingness to transfer skills has a negative impact.

4.5.3 *Future of PPP in SA*

Participants were requested to share their view on the future of PPP's in South African infrastructure development, and they responded as follows:

- There is considerable experience acquired by both public and private sectors and with the government seeking more involvement in various sectors of the economy, PPP will continue to be a huge imperative for the broader economic development in South Africa;

- There are emerging trends of non-political local based PPP participation. This would lead to increased stability in the external project environment;

- The simple answer is that PPP will have an important, perhaps critical space to play in the infrastructure development in SA. One just has to note the success of World Cup infrastructure development, the Gautrain, and many other examples to accept that when the public and private sector work together to deliver on projects execution, gains and delivery are much easier, and somehow unites the nation;

- PPP's have a place in South Africa and if Government is to deliver on the much needed infrastructure, there needs to be a great deal more effort put into ensuring that the country establishes working PPP models;

- PPP's are here to stay, given the huge capital funding requirements for many infrastructure development projects. Government alone is not able to deliver it, as it has many competing needs with limited resources. On the other hand for business to thrive it needs good infrastructure, such as telecommunications, transportation, water and sanitation, and energy infrastructure, etc. So it is imperative for both government and business to work together in infrastructure development as they both are the beneficiaries of good infrastructure environment;

- With current projections and the need for accelerated growth, PPP's will become the future of delivering services in South Africa. The reputational

risk though is if the PPP's are seen by the public by trade unions, as a means of privatizing public services or enriching private sector who can't risk their investment without government cushion and guarantees of shared risk, and

- The future of PPP's looks poor at this stage. If adequate controls, mechanisms and governance are put in place, the future of PPP's can be turned around.

4.6 Summary of the results

The results presented in this chapter represented results from the survey conducted over a period of six months among experts, practitioners, and strategic stakeholder in PPP projects in South Africa. The results obtained from the survey provided data for demographic profile of the respondents. The results also provided data for the propositions, the level of importance of critical success factors that were drawn from literature and sent through to the respondents. The third section of the questionnaire gave the participants an opportunity to express their opinions on the subject. Results were presented in this chapter, and the next chapter will discuss them further.

CHAPTER 5: DISCUSSION OF THE RESULTS

5.1 Introduction

This chapter discusses the results presented in the preceding chapter. The demographic profile of the participants is discussed and is then followed by the discussions pertaining to proposition. Thereafter, the conclusions will be conferred.

5.2 Demographic profile of respondents

5.2.1 *Participants by PPP experience*

The research aim was to target highly experienced experts in the field of public private partnerships in South Africa. This however proved difficult, mainly because South Africa is on a learning curve in the implementation of public private partnerships. The first PPP implemented project in infrastructure development took place a mere 12 years ago.

To make the research viable, the sample was widened to accept participants from across the industry, with a rated level of PPP experience. The sample was composed of 62% of participants who considered themselves experienced and this was accepted as reasonable for the research to proceed, even though it was below the envisaged 100%. Thirty-three per cent of the participants considered themselves to have average experience of PPP. The experienced participants have had involvement at any of the stages of PPP implementation. Of the experienced, 38% of the total sample was categorised as highly experienced. These are fulltime practitioners, and have had involvement across different stages, from conception to commissioning of infrastructure projects in South Africa. Those with average experience have been indirectly involved through operational activities, with no involvement in strategic issues. They were however considered for the research based on their knowledge and seniority in their

current capacity, and strategic positions should their companies choose to participate in the PPP field.

5.2.2 *Participants by Sector*

In total 10 sectors were represented by the sample, after considering a widened range as opposed to specialised PPP projects as envisaged. The research initially planned to have representation from selected PPP projects and organisations. The sample did have those participants with a profile that met the criteria outlined above, making up 38% of the sample as indicated in the preceding section.

Mining and telecommunications represented 10% of the sectors and they may be considered to be low PPP activity sectors. Mining representation is however justified by the shortage of power supply in SA and the sector is being forced to consider PPP initiatives to resolve this problem. The participants from the mining sector are responsible for formulating strategy toward joint production of power with the public sector, which constitutes to PPP activity. Finance was divided into two sectors, private sector finance and developmental finance. The objectives of the two are essentially different, and even though they both look for positive returns, their risk appetite in PPP projects is different. Other sectors such as construction, consulting, energy and services are considered have higher involvement PPP activities and each represented between 10% and 15% of the sample, therefore providing the sample a broad mix.

5.2.3 *Participants by Province*

The high representation of Gauteng is justified by the location of most company's head offices being in the province and the province being the economic centre of the country. The PPP project locations are widespread across the country. The respondents' projects exposure is therefore not localised to Gauteng regardless of the location, but across variety of project across South Africa, and this gives credibility and reliability to the research propositions.

5.2.4 *Participants by working experience*

The working experience among the participants was relatively acceptable for the research. An average working experience of 13 years is relatively low, compared to what the research study was aiming for, as experts in the field, with experience levels of over 20 years, were desired. But to get that level of experience the sample would have to be global.

5.3 Participants by Field Specialisation

The field specialisation of the sample was also broadened more than it was initially planned. This could have diluted the sample; however the fields that were chosen have strategic importance for the PPP field. The connection is either based on current projects or is based on familiarisation of the respective fields in relation to infrastructure development through PPP implementation.

The role of the each participant in the research was therefore important to reflect the strategic importance of their field's role in PPP projects. The bigger representation in terms of specialisation was project management with 24%, followed by procurement. These two fields together with project finance are of strategic importance in PPP implementation, as their involvement in PPP projects is from conception to handover.

5.4 Discussion pertaining to Propositions

The data gathered through questionnaires was ordinal level data. Stacey's (2005) distribution fitting approach that was used for analysis allows the ordinal values to be computationally rescaled to interval level data before applying statistical analysis for normalisation of data.

Table 3 below represents the results from the analysis showing the rescaled mean, standard deviation, threshold values and probabilities (alpha = 0.05), with the six survey items that are significantly more important than the mean and ranked highest highlighted in pink.

Table 3: Normal DFA Results

	μ	σ	t-value	p-value	Rank order
Project technical and financial feasibility	0.7343	0.5647	5.9585	0.0000	1
Strong contract management control that ensures contract compliance	0.5774	1.0427	2.5375	0.0201	2
Strong and experienced private consortium with technical strength	0.4044	0.6867	2.6989	0.0142	3
Potential project revenue generation	0.3209	1.0238	1.4363	0.1672	4
Appropriate risk allocation through concessionaire contract	0.2963	0.8057	1.6853	0.1083	5
Transparent and competitive procurement practices	0.1648	1.3526	0.5582	0.5832	6
Unforeseen increase in capital and operating cost or higher than expected service delivery and maintenance costs	0.1451	0.7952	0.8362	0.4134	7
Project design and construction execution	0.1245	0.6287	0.9071	0.3757	8
Benefits to local economy and strong public awareness	0.0894	0.8591	0.4770	0.6388	9
Transfer of risk from public to private sector	0.0498	1.1848	0.1927	0.8492	10
Concession Period or length of arrangement	0.0344	0.8272	0.1907	0.8508	11
Good quality personnel and stable management of consortium	0.0333	0.7096	0.2151	0.8320	12
Predictable independent regulatory and legal environment	-0.0368	0.7592	-0.2224	0.8264	13
Socio-political environment	-0.3097	0.8962	-1.5834	0.1298	14
Ability of each participant in the consortium to raise funding	-0.3342	1.0649	-1.4381	0.1667	15
On-time or early project completion	-0.3515	1.4375	-1.1207	0.2764	16
Black Economic Empowerment requirement on Consortium	-0.3961	0.9410	-1.9290	0.0688	17
Training and Skills Transfer	-0.4769	0.9549	-2.2889	0.0337	18
Stable macro-economic environment	-0.4941	0.6284	-3.6032	0.0019	19
Involvement and coorperation with Trade Unions	-0.5752	0.9333	-2.8240	0.0108	20

The above table is graphically illustrated in figure 14 below, depicting the ranking order from the highest mean to the lowest.

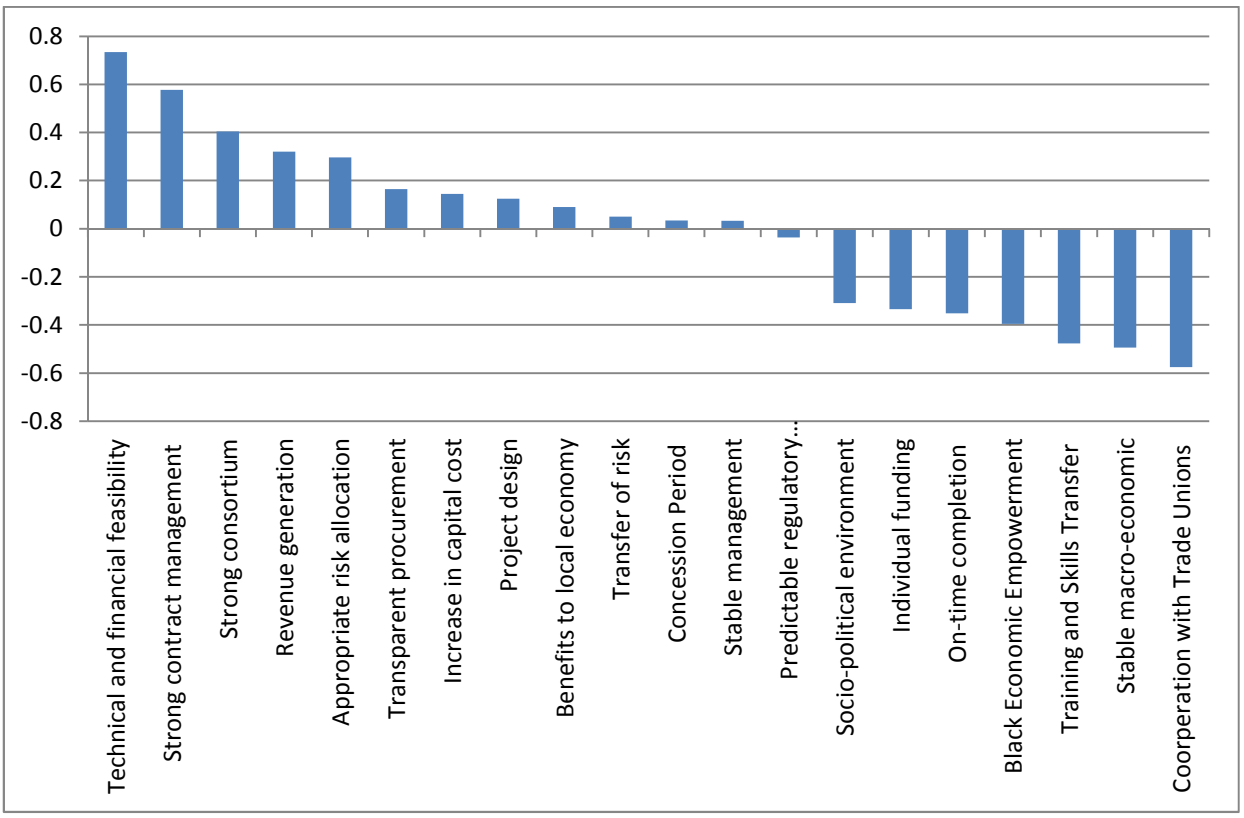

Figure 13: Ranking according to Standardised mean

5.4.1 *Project technical and financial feasibility*

The technical and financial feasibility of a PPP project was ranked highest, with the highest mean of 0.7343 and lowest p-value of 0. It is clear that in South Africa technical and financial risks are considered highly critical for success of a PPP project. A reason for this attentiveness from the participants is linked to the current challenges facing South Africa, skills shortages being one of them. Project management and technical skills are also currently scarce resources. For South Africa to be a recognisable force in the PPP environment, infrastructure development needs to be boosted and foreign investment needs to be attracted. This will solve the funding challenges, and the research suggests that skill shortage should also be attended to. If these two are resolved, PPP projects will then be feasible from a technical and financial perspective.

The finding is comparable with other international studies such as Zhang's (2005) study of the criteria for selecting private sector partner in PPP. He identified the

four criteria as (1) financial, (2) technical, (3) safety, health and environmental and (4) managerial. The first two are in line with findings in this study. The research also revealed a sign of maturity in the South African market, in that it is faced with similar challenges as the developed countries.

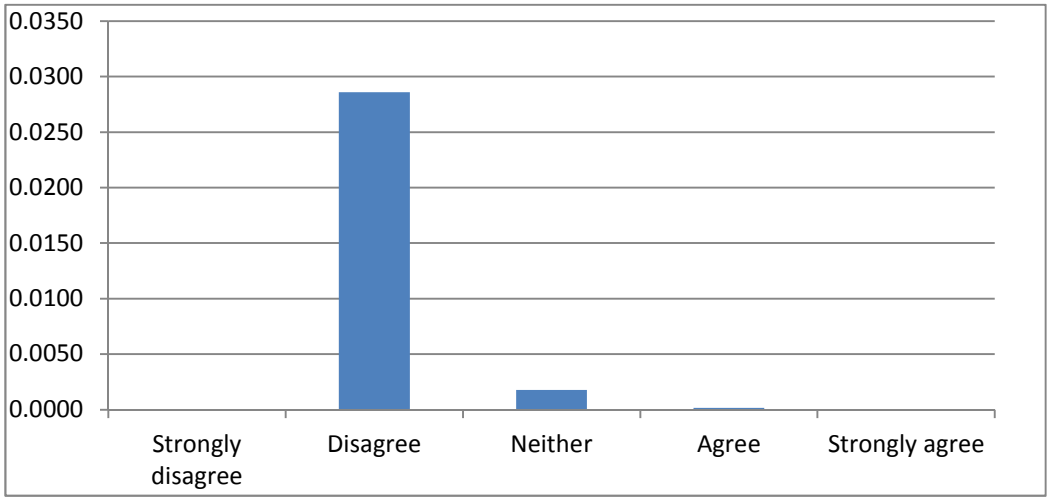

Figure 14: Project technical and financial feasibility

5.4.2 *Strong contract management control*

The second highest ranking CSF was strong contract management that ensured compliance from both the public and private partners. This factor is clearly derived from previous experience and this is evidenced by the fact that participants rated it high as an indication of its criticality. South African PPP projects are inclined to be characterised by variations of scope as the project progresses, both justified and unjustified. Justification of variations are driven by a lack of clear scoping at the beginning, while un-justification is mainly a result of poor control measures in place during implementation that leads to the contractor adding to the original scope. Both have a tendency to overrun budgets and time. According to the South African National Treasury PPP Unit case study Bedener and Gibson (2010) reviewed a 30 year concession that has already been operating for 10 years. The contract management in the Mbombela (Nelspruit) Water and Sanitation Concessionwas in place at the beginning of the project and it faded away with time. At the point of compiling the case study, 10 years later when the municipality

of Mbombela wanted to restore the functions of contract management, the challenge was skills shortage. It is clear from the Mbombela Concession that contract management is a critical success factor for the PPP participant to fulfil their side of the contract for the full length of a project.

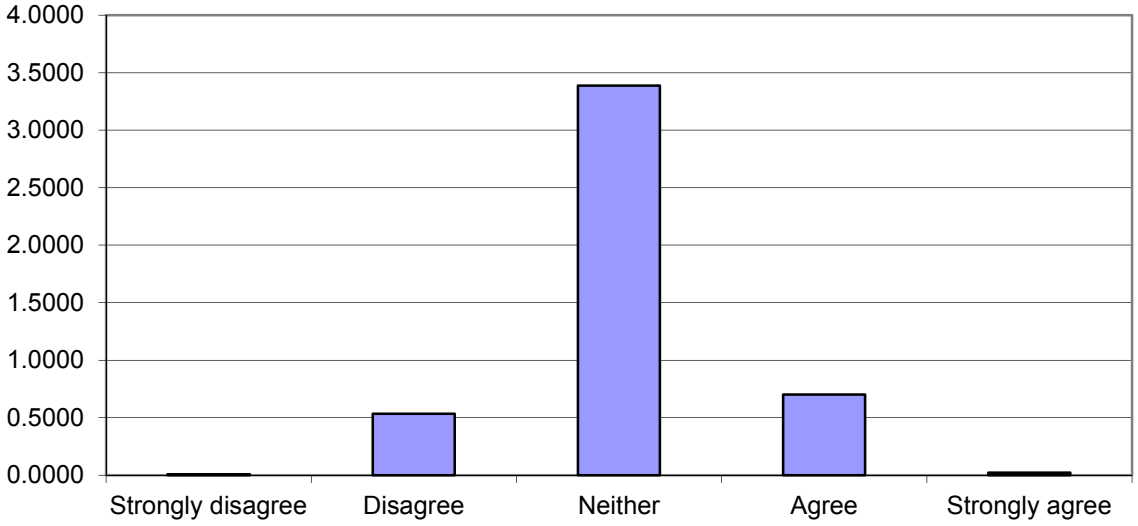

Figure 15: Strong contract management control

5.4.3 *Strong and experienced private consortium with technical strength*

According to Bing et al (2004), they investigated CSF's for PPP/PFI projects in the UK construction industry, and found that among the three most important factors in the UK PPP/PFI environment is a strong and good private consortium. This CSF received a high ranking in this specific research study as well; being ranked relatively highest.

In South Africa BEE legislation encourages companies wishing to participate in PPP to include companies with BEE credentials to boost the empowerment ratings of the consortium. This often implies that a company with low or no technical experience in the service to be offered is included in the consortium. Respondents' responses for this CSF suggest that companies will need to pay strategic attention to selecting partners, in order for the consortium to be

strengthened rather than weekend by requirement of South African BEE legislation.

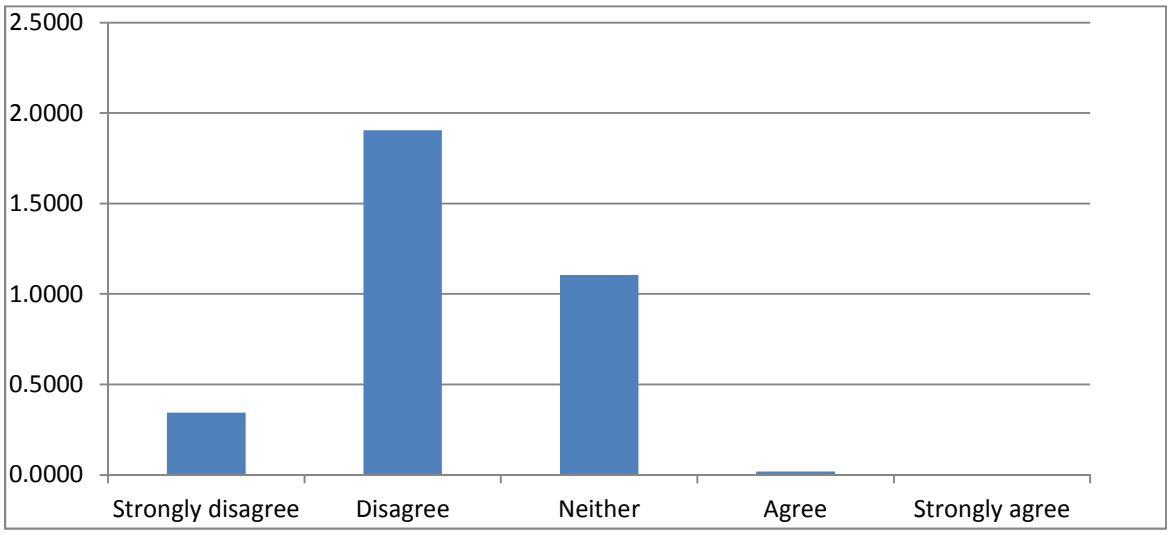

Figure 16: Technically Strong and Experienced Consortium

5.4.4 *Training and Skills Transfer*

The CSF that emphasised transfer of skills was ranked 18th, with 14% strongly agreeing that it was an important CSF. This was an interesting observation as training and skills transfer are on top of the South African Government's agenda, when they motivate the importance of PPP initiatives. The international studies did not rate this factor higher either; instead they reflected PPP private sector skill as leverage that governments uses to become efficient.

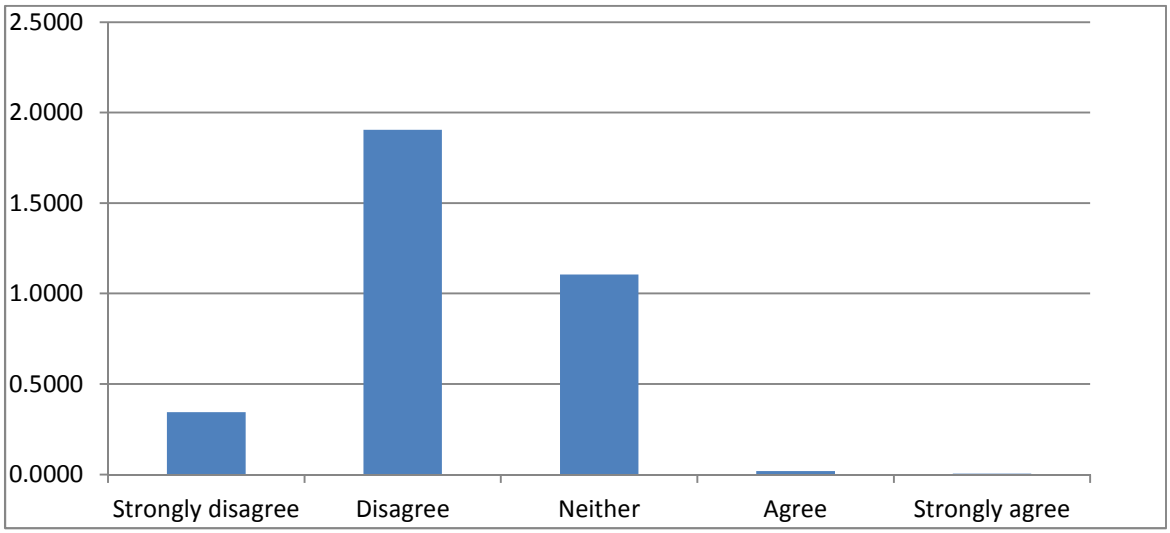

Figure 17: Training and skills transfer

5.4.5 *Stable macro-economic environment*

The 19th ranked macro-economic environment was also a surprise, mainly because foreign investors tend to worry about the stability of the African countries' macro-economic environment. From the South African perspective, this is a positive feature and sign of a maturing economy. The macro-economic environment is not considered an important critical success factor illustrates that participants are not concerned about instability.

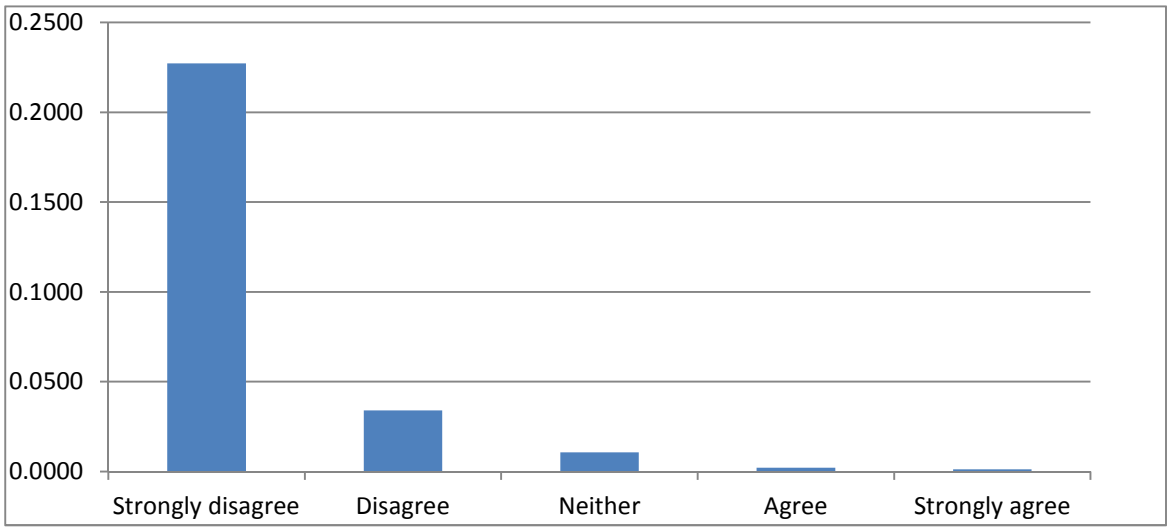

Figure 18: Stable macro-economic environment

5.4.6 *Involvement and cooperation with Trade Unions*

The lowest ranked CSF was the participation or cooperation of Trade Unions within the PPP approach. This was not a surprise as the sample profile represents people placed higher up on management hierarchy, who often find trade unions to be an irritation rather than an added value. The concern though is that even though the findings are in line with international studies, South Africa has a strong trade union movement with close ties to the Government and it is often the case that many projects are delayed as a result of strikes and poor employee relations. The research findings suggest that little attention is paid to ensuring that trade unions are involved to create cooperation, especially in PPP projects.

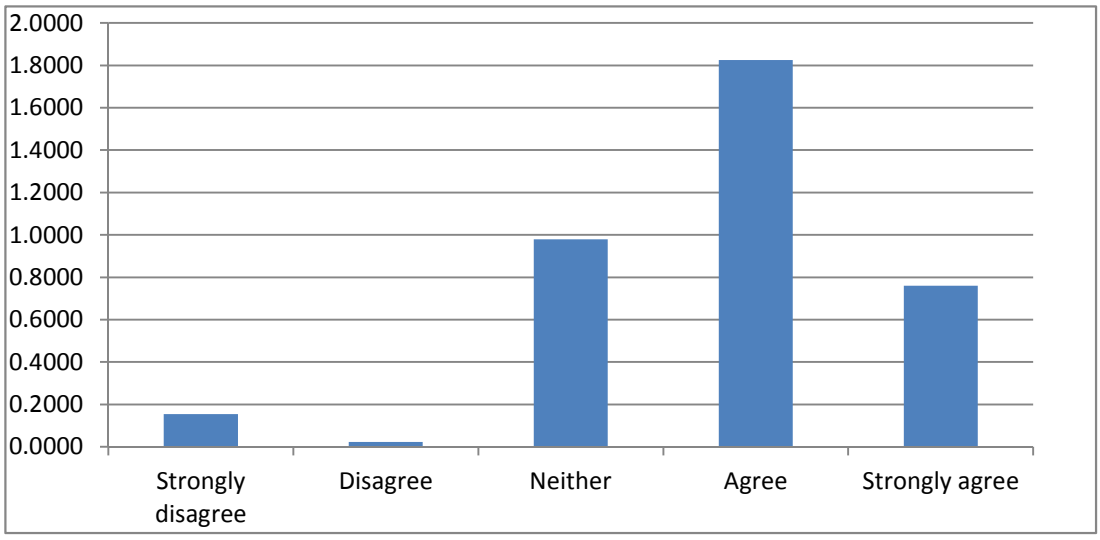

Figure 19: Trade Unions Involvement

5.4.7 *Other Factors*

There are interesting findings that have emerged from the analysis, such as Black Economic Empowerment requirement on the consortium which is ranked 17th, in contrast to South African Government policy of transforming business. The BEE factor does not feature in any of the international studies, as this is a unique feature or factor in doing business in SA. The participants suggest that the policy makers are overstate the BEE components. Some of the lessons learnt have

shown that often the BEE partner does not have the skills and finance to cover for their part of value. This was evident in Humansdorp District Hospital PPP project between the Eastern Cape Department of Health and the Life Healthcare Group, where the BEE partner could not raise funds and their commitment to the partnership was fading until the deal eventually fell apart (WBS 2007).

The 6th ranked factor was the transparent and competitive procurement practices. This factor has featured high in some of the international studies (Bing et al 2004). Citing from (Akiyntoye et al 2001a), Bing reported problems familiar to South Africa such as high costs in tendering, and differing or conflicting objectives among project stakeholders. In addition to that are problems associated with corruption, especially in the emerging economies, which often takes away the transparent and competitive elements from the procurement processes. All these underlying factors have come through in the participant's responses, hence the high ranking for this critical success factor.

5.5 Responses from open questions

The participants responded adequately to the open questions, allowing the research to draw in-depth analysis based on their expertise and experiences. The points raised in some cases differed completely with the direction the research study took, and in some cases there were similarities.

5.5.1 *Other CSF's suggested by respondents*

The first question in the open section requested the participants to suggest their own critical success factors, and these were presented in the preceding chapter. Views among participants were insightful and represented a wide range of issues – some of which were already addressed and others have not been addressed by the research. There were issues pertaining to the external environment such as intellectual property, where the participant thought to be a critical success factor as it deals with the ability of private partner to apply their ideas in secure

environment, and to not be vulnerable to infringement of the intellectual properties.

Political leadership and job creation where also highlighted, and these factors reflect the nature of South African government's challenges where there is political pressure to provide leadership and solve unemployment challenges. A concerning factor is that participant confidence on competitiveness both for consortium selection and procurement is very low and the participants viewed BEE as being misused for benefiting politically aligned partners. This view is reflected in the ranking where this factor was ranked 6th.

Factors about the autonomy of technical solutions and skills in the public sector came through as well, where participants felt this was a CSF and expressed doubts about public sector interference. It was also highlighted that the public sector has low morale and low commitment to technical competency, among other reasons, due to low incentives.

5.5.2 *Major Challenges in South African PPP environment*

In response to the second question participants shared insight into what they believed to be the low points of South African PPP environment. Internal factors to projects such as capacity, negotiations, clear objective and corruption were suggested as prevalent problems in the PPP environment in South Africa. One participant who is highly experienced in PPP's suggested that synergies are polarized, thus skills and technologies are not shared as the participants remain polarized. The responses reflect a learning environment in South Africa.

5.5.3 *Future of PPP in SA*

The participants were in agreement when it came to the future of PPP in South African infrastructure development. The current problems were viewed as considerable experience that is being gained and will be extremely useful in the future. There was a point made about an emerging trend of PPP's being driven by non-politically aligned motives, therefore becoming more and more professional

thus creating an environment for an opportunity to maximize deliverables PPP's are capable of. Another point that was made was that there is positive turn around on PPP based on observations during the 2010 FIFA World Cup infrastructure development, where government and private sector combined to deliver world class infrastructure over a limited time span, and that provided PPP's with much needed public relations. PPP is also mentioned as a tool to bridge cultural gaps in society.

Budget constraints were also mentioned in justifying the PPP role in the future of infrastructure deployment as the government has competing needs with limited resources. One participant suggested that a working model for PPP's in South Africa has to be developed for future projects. It was also cautioned that there is a reputational risk that has to be managed where PPP's are perceived as a strategy to privatize public services. Only one participant thought the future for PPP's is bleak in South Africa, and believed that interventions are required to save their future. In general, however, there was an overwhelming confidence that PPP's have a central role to play in future infrastructure development in SA.

5.6 Conclusion

The research results have drawn attention to the maturity level of the PPP environment in South Africa. They have brought to light some of the factors through ranking, and suggestions from respondents. PPP stakeholders are able to use the information developed to pursue PPP's with a broader perspective. First it has been clearly suggested that PPP's should be consolidated into future policy. But measures are needed to sell PPP's to the public as economically viable, and as alternatives to solve infrastructure backlog in South Africa.

The government has an opportunity to ensure a stable environment, with competitive and transparent procurement processes. These will go a long way in advancing success for PPP's in South Africa, and creating an attractive environment for both local and foreign investors. The crucial factors that came out in South African PPP environment are human resources and funding. Skills are

scarce in the current cycle of development and creating professionally managed projects will ensure that skills can be attracted to the PPP space.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The chapter draws conclusions from the research work and results, and is followed by recommendations for the various stakeholders. The research study is finally concluded with suggestions for future research.

6.2 Conclusions of the study

Ahwireng-Obeng and Mokgohlwa (2002) suggested that South African PPP's differed from global characteristics in a number of ways; mainly due to the wide experience gap. However, they suggested that in the future this could be different as most of the issues in their findings were transitional. In their findings, market, socio-political, regulatory, legal, financial and development factors were high on the agenda of most people.

With the exception of finance, the factors above were ranked relatively lower on the list as opposed to capability factors, these being those that reflect the ability of the consortium to deliver the project successfully. The study referenced above has projected correctly that the future will present a maturing of the PPP environment. The fact the socio-political factors are further down on the ranking list is evidence of the dynamics that have changed in the South African environment.

The experience gap seems to have been reduced certainly from an experience perspective, with the South African PPP environment having become more active and sophisticated. Challenges in PPP projects tend to be internal, such as those affected by project type, composition and capabilities of consortium, as well as management controls. These challenges are of a global nature, hence the assessment of the PPP environment in South Africa that shows that it has matured in PPP applications. Both comments from the participants and the questionnaire responses did not put higher emphasis on factors such as political

stability or macro-economic stability, alluding to a view that the South African environment is competitive and conducive to PPP projects implementation.

6.3 Recommendations

The study sought to provide guidance to stakeholders interested in pursuing PPP infrastructure projects in South Africa. The primary stakeholders were listed as the government or public sector representatives and the following recommendation are put forward for these stakeholders:

- Adequate feasibility analysis of technical capability and funds should be conducted before any PPP projects are approved for implementation;
- Negotiations and contract management skills should be sought by the public sector, to ensure that contracts that set up protect and benefit the public sector against abuses that can be perpetrated by participants in PPP projects;
- A criterion for selecting a private partner should include experienced and capable consortium, capable of delivering projects on time and within budget, with the required quality controls;
- Procurement and sourcing of private partners should be transparent and competitive to ensure that the costs of developing infrastructure are competitive;
- Objectives need to be clear in order to prevent variations to the initial scope. The public sector organisation should ensure that they have technical resources that are able through the feasibility analysis, to draw up detailed scope, and all legal requirements have been fulfilled before the project goes into implementation, and
- Projects that are carried out with a PPP approach should be viable for revenue generation without excessive tariffs being applied during operation of the asset, therefore causing a public outcry which sends a negative

sentiment to foreign investments as was the case with the Johannesburg and Pretoria toll fees in 2011.

Recommendations for Private Sectors organisations that desire to participate in PPPs for infrastructure development in South Africa are as follows:

- The private partner should ensure that they are well resourced both with human resources and funds, and that they understand the public sector requirement in order to prevent unforeseen increases in capital and operating costs while the project is underway, as this creates a negative image for PPP's;

- Stable management is important for Private Sector partners in a PPP project, to provide predictability and stability, and

- The BEE component is a strategic factor for the government goal of diversifying the economy and empowering certain sections of the society, therefore private partners should put an effort in screening for the right BEE partner who has both financial and human resource capacity, to ensure that their choice adds value.

Recommendations to foreign organisations that desire to participate in PPP's for infrastructure development in South Africa are as follows:

- The South African PPP environment shows growth and it is maturing, macro-economic and political stability are no longer priorities of the agenda, but skills, management control or project types are very important factors.

Recommendations to academics and students who want to participate in PPP's for infrastructure development in South Africa are as follows:

- Factors such as BEE, job creation and trade unions which are important to the public sector are not necessarily as important to the private sector, thereby creating a misalignment for primary partners in PPP, and research is recommended to find methods that will align these stakeholders.

6.4 Suggestions for further research

The participants listed a number of critical success factors that can be analysed in future as research propositions.

A similar research study can be conducted focusing on international participants in South African PPP's to be able to draw a different perspective, which will be probably be concerned about macro-economic factors and political stability.

BEE is a one of the critical policies of the government, but it was ranked very low in this research study, bringing the concept into questions regarding it as a business imperative. Research is suggested to analyse the role played by BEE companies in PPP implementation, and how that role has changed over time to be able to assess progress with respect to government goals.

Trade unions are always making headlines in the media for interrupting progress in projects or operations, and in this research the need for cooperation with trade unions was ranked very low. Therefore, research is proposed with respect to quantifying the impact of strikes in South African PPP projects and determining an assessment on the criticality of the unions in that environment.

6.5 Consistency matrix

Table 4: Consistency matrix

Analyse critical success factors (CSF) and rank them according to the level of importance in public private partnerships (PPP) for the development of infrastructure in South Africa.					
Sub-problem	**Literature Review**	**Research questions**	**Source of data**	**Type of data**	**Analysis**
The sub-problem is to identify critical success factors in South African PPPs and rank them to determine perceived level of importance.	(Chua and Kog 1999; Bing et al 2004; Xueqing 2005; Zhang 2005; Jing-Feng et al 2010)	What are the Critical success factors (CSF) in South African PPP's infrastructure projects, and how are they ranked in terms of perceived level of importance?	Literature review, Case Studies, Semi-structured interviews and questionnaire questions.	Quantitative Data	Normal Distribution Fitting Algorithm

REFERENCES

Abdel-Aziz, A. M. and A. D. Russell (2001). A structure for government requirements in public “private partnerships. Canadian Journal of Civil Engineering, Canadian Science Publishing. 28: 891-909.

Ahwireng-Obeng, F. and J. P. Mokgohlwa (2002). Entrepreneurial risk allocation in public-private infrastructure provision in South Africa. South African Journal of Business Management, Association of Professional Managers in South Africa. 33: 29.

Banerjee, S. G. et al., (2006). Private Provision of Infrastructure in Emerging Markets: Do Institutions Matter? Development Policy Review, Wiley-Blackwell. 24: 175-202.

Bender, P. and S. Gibson (2010). "Mbombela (Nelspruit) Water and Sanitation Concession South Africa." Case Study - Mbombela (Nelspruit) Water Concession.

Bing, L. et al., (2004). Critical success factors for PPP/PFI projects in the UK construction industry. Construction Management & Economics, Routledge. 23: 459-471.

Bing, L. et al., (2005). Critical success factors for PPP/PFI projects in the UK construction industry. Construction Management & Economics, Routledge. 23: 459-471.

Bodie, G. D. and Worthington D. L.; (2010). Revisiting the Listening Styles Profile (LSP-16): A Confirmatory Factor Analytic Approach to Scale Validation and Reliability Estimation. International Journal of Listening. 24: 69-88.

Chua, D. K. H. and Kog Y. C.; (1999). "Critical success factors for different project objectives." Journal of Construction Engineering & Management. 125(3): 142.

Forrer, J. et al., (2010). Public “Private Partnerships and the Public Accountability Question. Public Administration Review, Wiley-Blackwell. 70: 475-484.

Fourie, J. (2008). "A not on infrastructure quality in South Africa." Development Southern Africa. 25(4): 481-494.

Grant, T. (1996). "Keys to successful public-private partnerships." Canadian Business Review. 23(3): 27.

Gupta, O. and Biswas, N., (2010). Public Private Partnership: Indian Economy. SCMS Journal of Indian Management, SCMS Journal of Indian Management. 7: 44-53.

Hlala, M. (1999). "The Municipal Infrastructure Investment Unit: the government's PPP-enabling strategy." Development Southern Africa. 16(4): 565.

Jamali, D. (2004). "Success and failure mechanisms of public private partnerships (PPPs) in developing countries: Insights from the Lebanese context." The International Journal of Public Sector Management 17. 17(4/5): 414-430.

Jicai, L. I. U. and Cheah, C. Y. J., (2009). Real option application in PPP/PFI project negotiation. Construction Management & Economics, Routledge. 27: 331-342.

Jing-Feng, Y. et al., (2010). The driving factors of china's public-private partnership projects in metropolitian transportation systems: public sector's viewpoint, Vilnius Gediminas Technical University. 16: 5-18.

Jing-Feng, Y. et al., (2009). Selection of performance objectives and key performance indicators in public-private partnership projects to achieve value for money. Construction Management & Economics, Routledge. 27: 253-270.

Johnson, R. B. (1997). "Examining the validity structure of qualitative research." Education. 118(2): 282.

Kalof, L. et al., (2008). "Essentials of social research."

Koro-Ljungberg, M. and Douglas, E. P. (2008). State of Qualitative Research in Engineering Education: Meta-Analysis of JEE Articles, 2005-2006. Journal of Engineering Education, ASEE. 97: 163-175.

Kotze, R. et al., (1999). "Nelspruit and Dolphin Coast: lessons from the first concession contracts." Development Southern Africa. Vol 16, No 4.

Kwak, Y. H. (2002). Analyzing Asian Infrastructure Development Privatization Market. Journal of Construction Engineering & Management, American Society of Civil Engineers. 128: 110.

Leung, B. Y. P. and Hui, E. C. M., (2005). Evaluation approach on public-private partnership (ppp) urban redevelopments

International Journal of Strategic Property Management, International Journal of Strategic Property Management. 9: 1-16.

Marecek, J. et al., (1997). "Working Between Worlds: Qualitative Methods and Social Psychology." Journal of Social Issues. 53(4): 631-644.

Miao, C. et al., (2003). International Experience of Public-Private Partnerships for Urban Environmental Infrastructure, and its Application to China. International Review for Environmental Strategies, Institute for Global Environmental Strategies. 4: 223-248.

Murphy, T. J. (2008). The case for public-private partnerships in infrastructure. Canadian Public Administration, Wiley-Blackwell. 51: 99-126.

Padgett, D. K. (2009). Qualitative and Mixed Methods in Social Work Knowledge Development. Social Work: 101-105.

Pagdadis, S. A. et al., (2008). A Road Map to Success for Public-Private Partnerships of Public Infrastructure Initiatives. Journal of Private Equity, Euromoney Institutional Investor PLC. 11: 8-18.

Pavlova, V. (2009). Statistical analysis of the premises, factors, and barriers of development of public-private partnership in the republic of Bulgaria, Faculty of Economics Nis. 47: 99-111.

Pillai, M. (2008). Infrastructure Development and Economic Growth: The Public Private Partnership (PPP) Perspective. ICFAI Journal of Infrastructure, IUP Publications. 6: 24-31.

Reside Jr, R. E. (2009). Global determinants of stress and risk in public-private partnerships (ppp) in infrastructure. Journal of International Business Research, Dreamcatchers Group, LLC. 8: 43-59.

Siemiatycki, M. (2010). Delivering Transportation Infrastructure Through Public-Private Partnerships: Planning Concerns. Journal of the American Planning Association, Routledge. 76: 43-58.

Smeyers, P. (2008). Qualitative and quantitative research methods: old wine in new bottles? On understanding and interpreting educational phenomena. Paedagogica Historica, Routledge. 44: 691-705.

Stacey, A. G. (2005). The reliability and validity of the item means and standard deviation of ordinal level response data, Management Dynamics, 14 (3): 2-25.

Straub, D. et al., (2004). Validation guidelines for is positivist research Communications of AIS, Association for Information Systems. 2004: 380-427.

Tati, G. (2005). Public “private partnership (PPP) and water-supply provision in urban Africa: The experience of Congo-Brazzaville. Development in Practice, Routledge. 15: 316-324.

Tucker, M. L. et al., (1995). "Qualitative Hesearch in Business Communication: *A* Review and Analysis." *The Journal of Business Communication* 32: 383 - 399.

Tuckett, A. (2004). Qualitative research sampling: the very real complexities. Nurse Researcher, RCN Publishing Company. 12: 47-61.

Tuman, J. P. (2007). Comparing modes of privatisation: a study of the telecommunications sectors in Argentina and Mexico, 1990 “2000. Industrial Relations Journal, Wiley-Blackwell. 38: 155-177.

Whiting, L. S. (2008). Semi-structured interviews: guidance for novice researchers. Nursing Standard, RCN Publishing Company. 22: 35-40.

Wolverton, M. L. (2009). Research Design, Hypothesis Testing, and Sampling. Appraisal Journal, Appraisal Institute. 77: 370-382.

Xueqing, Z. (2004). Improving Concessionaire Selection Protocols in Public/Private Partnered Infrastructure Projects. Journal of Construction Engineering & Management, American Society of Civil Engineers. 130: 670-679.

Xueqing, Z. (2005). Criteria for Selecting the Private-Sector Partner in Publicâ€“Private Partnerships. Journal of Construction Engineering & Management, American Society of Civil Engineers. 131: 631-644.

Xueqing, Z. (2006). Factor Analysis of Public Clientsâ Best-Value Objective in Publicâ Privately Partnered Infrastructure Projects. Journal of Construction Engineering & Management, American Society of Civil Engineers. 132: 956-965.

Xueqing, Z. (2006). Public Clients Best Value Perspectives of Public Private Partnerships in Infrastructure Development. Journal of Construction Engineering & Management, American Society of Civil Engineers. 132: 107-114.

Xueqing, Z. (2006). Public Clientsâ Best Value Perspectives of Public Private Partnerships in Infrastructure Development. Journal of Construction Engineering & Management, American Society of Civil Engineers. 132: 107-114.

Yuan, J. F. et al., (2010). "the driving factors of china's public-private partnership projects in metropolitian transportation systems: public sector's viewpoint." pagrindiniai kinijos vieåojo ir privtaus bendradarbiavimo veiksniai metropoijos transporto sistemå projektuose vieåojo sektoriaus poåiåriu.16(1): 5-18.

Zawawi, D. (2007). "Quantitative versus qualitative methods in social sciences: bridging the gap." Integration & Dissemination1: 3-4.

Zhang, X. (2005). Critical Success Factors for Public Private Partnerships in Infrastructure Development. Journal of Construction Engineering & Management, American Society of Civil Engineers. 131: 3-14.

Zhang, X. (2005). Critical Success Factors for Public “Private Partnerships in Infrastructure Development. Journal of Construction Engineering & Management, American Society of Civil Engineers. 131: 3-14.

Zhang, X. (2005). Paving the Way for Public “Private Partnerships in Infrastructure Development. Journal of Construction Engineering & Management, American Society of Civil Engineers. 131: 71-80.

APPENDIX A

Letter to Respondents:

Dear Sir / Madam

I am currently conducting research for my MBA thesis at Wits Business School (WBS). My topic is the analysis of critical success factors (CSF) for public private partnerships (PPP) in the development of infrastructure in South Africa. I need to gather data from experienced participants in PPP projects, or experts in the field, in order for me to come to certain conclusions. I would appreciate it if you could respond to the questionnaire attached, and allow me a follow-up interview.

The questionnaire is divided into three sections; first, background information on your experience and the projects you have been involved in, at any capacity, second is the CSF ranking scale that weights the relative importance of CSF's on a level of 1 to 5, 1 being the least important and 5 being the most important. The last section contains questions for a 30 minute interview. If the latter is not possible, a response via email would be appreciated.

I am available to meet you at your convenience with respect to both time and location.

Your response is highly appreciated.

Kind regards

Morrison Maseko

mmmaseko@gmail.com

Cell: 082 706 2106

Actual Research Instrument

Questionaire					
Section 1: Background Question					
Position currently held					
PPP project you participated in (no. of years of your involvement)					
Capacity in that project					
No. of years as PPP expert					
Section 2: Importance level for Critical Success Factors					
Scale: 1 = Not Significant, 2 = Fairly Significant, 3 = Significant, 4 = Very Significant, 5 = Extremely Significant					
	Importance Level: 5 - Strongest				
	1	2	3	4	5
Strong and experienced private consortium with technical strength					
Black Economic Empowerment requirement on Consortium					
Involvement of Trade Unions					
Strong contract management control that ensures contract compliance					
Transparent and competitive procurement practices					
Appropriate risk allocation through concessionaire contract					
Project technical and financial feasibility					
Socio-political environment					
Predictable independent regulatory and legal environment					
On-time or early project completion					
Transfer of risk from public to private sector					
Project design and construction execution					
Potential project revenue generation					
Concession Period or length of arrangement					
Benefits to local economy and strong public awareness					
Ability of each participant in the consortium to raise funding					
Good quality personnel and stable management of consortium					
Unforeseen increase in capital and operating cost or higher than expected service delivery and maintenance costs					
Stable macro-economic environment					
Training and Skills Transfer					
Section 3: Open Questions					
Do you have any strong opinions on any of the CSFs above, on level of importance, Please Elaborate.					
Are there any other CSF that you have an opinion that they are critical in SA and have been left out in the list above, please elaborate.					
What are the major problems, shortcomings or low point in South African PPP, and who do you attribute them to, public or private organisations?					
What is the future of PPP in SA Infrastructure development?					