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INVESTIGATING PUBLIC SECTOR CLIENT PERFORMANCE IN SOUTH AFRICAN CONSTRUCTION PROCUREMENT

A thesis submitted to the Faculty of Engineering and Built Environment, University of the Witwatersrand in fulfilment of the requirements for the degree of Doctor of Philosophy in Building

By

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October, 2017

DECLARATION

I declare that this thesis is my own unaided work. It is being submitted for the degree of Doctor of Philosophy at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

Mohammed Mustapha Saad

October, 2017.

ABSTRACT

This study proceeds from the premise that the dissatisfaction of the clients with the outcomes of the construction projects stems from their objectives not being met by the industry. The study aimed at investigating public sector clients' performance in the South African construction procurement with a view to establishing how their efficiency and effectiveness could be improved during procurement processes. The specific research objectives are to: identify the key performance indicators (KPIs) for public sector clients in their procurement process; assess and analyse the weaknesses and strengths associated with public sector clients' performance in the construction procurement process; develop a methodical approach to the measurement of public sector clients' performance in their procurement processes; and recommend implementable approaches to improving client performance in the public sector procurement process.

A qualitative and quantitative mixed method research design was adopted in carrying out the study. This involved the use of interviews and structured questionnaire survey. Data were collected from National and Provincial Departments of Public Works as public sector client representatives in South Africa. Based on the analysis of the organogram, a total of six functional units involved in the procurement process were identified and targeted for the purpose of data collection. The purposive sampling technique was adopted for the study. These are Heads of Departments, Deputy Directors General responsible for construction projects, Chief financial officers, Heads of supply chain management, Heads of human resources management, and senior project managers. Information collected included issues leading to uncovering of public sector key performance indicators (KPIs) and strengths and weaknesses associated with public sector clients' performance.

Data collected were analysed using content analysis to determine the themes and constructs leading to the identification of public key performance indicators. Further analysis was carried out using mean ranking analysis of factors associated with the strengths and weaknesses associated with public sector clients' performance.

The results of the research show project delivery process as good, not excellent; no detailed template for clarifying project briefs; legislative and administrative procedures lead to time and cost overruns; lack of adequate capabilities within in-house trained professionals and technical expertise to supervise all projects, insufficient in-house professionals to be represented on each project site; lack of mechanism to monitor in-house professionals' participation on project sites; low participation of end users' agents due to high incapacitation of User Department organisation; DPW are highly incapacitated because of lack of standard documentations; lack of professional training and short courses to enhance the skills and expertise of technical professionals. Other results show that delayed/late payment to contractors and end user agents due to cash flow challenges; weak or neglect of project monitoring and supervision; disputes between project managers and consultants as a result of quality of work done by

contractors; bureaucratic bottlenecks and long decision making processes; design changes and variation due to contingent events, unforeseen circumstances due to weather, earthworks, disasters, changes in User Department briefs and challenges due to administration and political issues. The findings could also be drawn from challenges in descending order of importance from the human resources management units, the financial management units, the supply chain management units, project management units, decision making processes, planning units, design, briefing, documentation and policy issues.

The study concluded that 137 public sector key performance indicators are identifiable for assessing public sector client performance in South African procurement. It also concluded that out of several challenges, the human resources, financial management, supply chain management, and project management challenges are the most severe challenges that beset the National and Provincial Department of Public Works, while the documentation and policy issues are less severe. Implementable recommendations were made to specific user departments.

The human resources management units in the South African National and Provincial Departments of Public Works should adopt the recommendation suggested in this study to improve the effectiveness and efficiency of professionals during their project delivery process.

Keywords: client, construction procurement, effectiveness, efficiency, National, performance, Provincial, public sector, South Africa.

DEDICATION

To the Almighty Allah who grants knowledge and wisdom to mankind

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Finally, my profound gratitude goes to my interviewees and participants who consented to participate in this research.

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LIST OF ABBREVIATIONS

APM	Association of Project Managers
BBBEE	Broad Black Based Economic Empowerment
CDs	Chief Directors
CFO	Chief Financial Officer
CIDB	Construction Industry Development Board
CII	Construction Industry Institute
COT	Commission On Turnover
CPD	Continuing Professional Development
CV	Curriculum Vitae
DDG	Deputy Director General
DID	Department of Infrastructural Development
DPW	Department of Public Works
EIA	Environmental Impact Analysis
EPSS	Electronic Performance Support System
EPWP	Expanded Public Work Program
EU	European Union
HDIs	Historically Disadvantage Individuals
HEA	Higher Education Act
HOD	Head of Department
HR	Human Resource
HRM	Human Resources Management
ICE	Institute of Civil Engineers
IDMS	Infrastructure Delivery Management System
IDPs	Infrastructure Development Plans
IPMP	Infrastructure Programme Management Plan
KPAs	Key Performance Areas
KPIs	Key Performance Indicators
LED	Local Economic Development
MEC	Member of Executive Council
MFMA	Municipal Finance Management Act
MTEF	Medium Term Expenditure Framework
NAO	National Audit Office
NEDO	National Economic Development Office
OGC	Office of Government Commerce
PAYE	Pay As You Earn
PBPS	Performance Based Procurement Systems

PFMA	Public Finance Management Act
PMBOK	Project Management Body of Knowledge
PMU	Project Monitoring Unit
PPP	Public-Private Partnership
PPPFA	Preferential Procurement Policy Framework Act
PRAM	Project Risk Analysis and Management
PSA	Public Service Act
QS	Quantity Surveyor
RAMP	Risk Analysis Management for Projects
RAMS	Road Assets Management Systems
RSA	Republic of South Africa
SCM	Supply Chain Management
SIPDM	Standard for Infrastructure Procurement and Delivery Management
SMMEs	Small, Micro and Medium Enterprises
SPM	Senior Project Manager
SOC's	State-Owned Corporations
SOE's	State-Owned Enterprises
SPSS	Statistical Package for the Social Sciences
UMPs	User Management Plans
UNCITRAL	United Nation Commission of International Trade Law
VFM	Value For Money
VO	Variation Order
WTO	World Trade Organisation

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

The South African construction industry plays an important role in the overall improvement of the country's infrastructure at large. In construction projects, there are processes and activities that are carried out to ensure that the outcomes of these projects satisfy construction clients. These are complex processes as the client and the rest of the supply and project chains must be in agreement for the delivery of these projects. However, research indicates that at the end of these projects, clients show dissatisfaction with the procurement outcomes (CIDB, 2015). Furthermore, the challenges associated with public sector client performance (i.e. effectiveness and efficiency in their roles) in the South African context in these processes and activities have not been adequately investigated (Hanson, 2006; CIDB, 2015; CIDB, 2016). Therefore, this study investigates the performance of public sector clients with a view to improving the efficiency and effectiveness during the procurement process in the South African public sector construction procurement.

Construction is driven by the supply chain, and the client is one of the most vital stakeholders in the chain. As opined by Ofori (1990), the client is called by many names, such as, the initiator of the construction process, the individual or group financing the project, the building owner (used by some practitioners and often in legislation), the employer (used in contract documents) and the developer (usually used to refer to those building for sale or letting on a speculative basis). Similarly, clients also vary in size, interests and motivation and are therefore classified into four groups: public sector clients, private occupiers, property companies, and investors (Ofori, 1990).

Consequently, the change in the client body has been identified by Newcombe (1994) as a move from an individual to a corporation, from a unitary body or single person to a series of stakeholders. However, the client is certainly not a unitary body and may take the nature of a multi-organisation. The multi-organisation may be temporary or permanent; therefore, understanding the nature of the client in this context and the legal, contractual and

organisational obligations of the client is an important aspect of the procurement system (Rowlinson and McDermott, 1999).

It is important to realise that the responsibility and obligation of the construction client is paramount during the procurement process and is essential because of the responsibility of selecting the procurement strategy (Mohsini and Botros, 1990). It is the responsibility of the client to understand the characteristics of the project (Ambrose and Tucker, 2000) and also to be familiar with the external factors arising from the construction environment (Alhamzi and McCaffer, 2000).

The client body sets the objectives and the construction industry turns those objectives into reality. As such, the strategic decisions made at the very outset of a project are the most crucial and so procurement systems and procurement strategy must be critically reviewed and evaluated by the client (Morledge, Smith and Kashiwagi, 2006). More emphasis on the strategic phase of the project processes, as emphasised by Chandler's (1966) axiom of 'structure follows strategy,' is the key to organisational design in the procurement processes.

The effectiveness and efficiency of public sector clients during the delivery processes, however, needs to be measured from procurement outcomes to know whether the clients are achieving continuous improvements or not. The major reason why an organisation needs to measure its performance is to know whether the organisational objectives or goals are met. The procurement outcomes are measured by key performance indicators (KPIs) (KPI Working Group, 2000). Project outcomes are measured using the clients' KPIs. The roles and duties of public sector clients, from briefing stage, pre-construction stage, construction stage, and to handing over stage are measured and analysed to come up with client weaknesses and strengths during the procurement processes.

The public sector's aim is for public accountability in the design and procurement of goods and services in the administration of projects which endeavour to provide value for money for tax payers. Public sector projects range from purely social projects to those meant to earn a profit and the purposes for which they are built (Ofori, 1990). In terms of client expectations, before attempting to advise a client on an appropriate procurement strategy, it is essential that the client's priorities, such as cost, time and quality are set out and should be achieved at the end of the project (Rowlinson and McDermott, 1999). The client also needs advice in

identifying those elements of the procurement processes which will bring about performance which matches the client's objectives (Morledge *et al.*, 2006).

Drawing from the foregoing suggests that a study of clients' performance is crucial in the public sector procurement for current and future development of the South African construction industry. It is essential, therefore, to measure public sector clients' performance in construction projects to determine whether planned improvements in the efficiency and quality of facilities are being achieved, and to learn lessons for future projects (Egbu and Ilozor, 2007). Improving client performance requires more than learning from the client's own perspective; it includes learning from the experiences of others (Egbu and Ilozor, 2007). It is therefore important that the client performance in procuring construction projects is studied carefully and systematically. The knowledge and awareness of the client's effectiveness and efficiency in the stated areas in the public sector procurement is crucial for this study. It then becomes important to advance the knowledge of construction procurement that would consequently improve the overall construction procurement processes and outcomes (Hanson, 2006).

Five theories were utilised in this research to evaluate the performance improvement process in public sector organisations (i.e. the South African National and Provincial Departments of Public Works). These theories are:

- Behavioural Engineering Model (Gilbert's Human Competence Model)
- Cognitive-motivational theory (Goal-Setting Theory)
- Technological Model (Electronic Performance Support Systems (EPSS)).
- Organisation theory (The Strategic Systems Theory)
- Supply chain management theory

1.2 MOTIVATION FOR THE STUDY

This study proceeds from the premise that the dissatisfaction of clients with the outcomes of construction projects stems from their objectives not being met by the industry. This is due to Department of Public Works (DPW) professionals not adhering to their roles and obligations during the procurement processes, thereby contributing notably to poor project outcomes. However, the performance of public sector clients during their procurement processes in

relation to project parameters of cost, health and safety, time, and quality is poor in the South African construction industry (Manthe, 2008).

Findings from the survey of projects (CIDB 2015):

- *The contractors were dissatisfied with the overall performance of their employers for 8% of regional / district council projects.*
- *The contractors were dissatisfied with the overall performance of the agents for 76% of public private partnership projects.*
- *Contractors expressed their dissatisfaction with the quality of documentation and specifications of public sector projects for only 2 to 6% of projects completed. Contractors were satisfied with the documentation for only 74% of the metropolitan council projects.*
- *The dissatisfaction with the management of variation orders (VO's) seemed to be problematic for regional / district council (13%) and for national (9%) and provincial (7%) department projects. Projects where the contractors expressed their lowest satisfaction with the management of VO's were for national department (70%) and regional / district council (70%) projects.*
- *For management of claims, contractors were satisfied with only 69% of provincial department projects. They were dissatisfied with 13% of regional / district council and with 12% of national department projects.*
- *Grade 9 contractors expressed their dissatisfaction with the overall performance of their employers (11%) and agents (14%) for the largest percentage of projects.*
- *Only 42% of all contractors were paid on time (within 30 days). This performance was worse than the 44% and 48% results of the previous two surveys. Therefore, the problem is even growing.*
- *With regard to early payment, the regional / district councils performed the best, with payments made within 30 days on 52% of their projects. The public corporations and public private partnerships performed worst with early payment as only 35 and 32% of their contractors were paid within 30 days respectively.*
- *The worst very late payers were the national and provincial departments who respectively paid 24 and 28% of their contractors only after 60 days or more.*
- *There was an indication of some form of political intervention, manipulation of results or corrupt / fraudulent practices in the tender adjudication procedures of some employer bodies.*

- *Only 50% of agents were paid on time within 30 days. The regional / district councils were the worst on time payers (27%). The national department paid 35% of their agents only after more than two months.*
- *Employer bodies have very little in-house capacity.*

Furthermore, the CIDB (2016) report shows that:

- *Around 85% of South Africa's construction tenders are in fact evaluated on the basis of functionality, but according to construction industry indicator's (CII) report, the recommendations of the tender committee were overruled in the award of around 12% of public sector projects, with overruling of tender recommendations highest in Limpopo province.*
- *Contractors were not satisfied with the performance of public sector clients on around 20% of the work surveyed. This included dissatisfaction with the quality of tender documents and specifications, management of variation orders, and delayed payments to service providers.*
- *Around 40% of payments to service providers were made in 30 days or longer after invoicing. The typical contractual period for payments is 30 days. Delayed payment is one of the biggest challenges facing the contracting sector and in particular, the small and medium sized contractors. It often results in the bankruptcy of some contractors.*

The critical review of literature has also raised the following challenges that hinder the optimum performance of public sector clients' organisations:

- According to SIPDM (2015/2016), the Infrastructure Delivery Management System (IDMS) realised that the following issues hinder the optimum performance of public sector clients during delivery of construction projects in South Africa: delay with material from the supplier, change in material request, delay with payment to service providers (contractor and consultants), deficiency in cost allocation, delays with tendering process, delay during construction process, unrealistic project schedules and delays with project reports (SIPDM, 2015/2016).
- The so called '*lowest tender syndrome*' could be responsible for client dissatisfaction at the end of the development phase (Kumaraswamy, 1999; CIDB, 2015; CIDB, 2016).
- "Around 85% of South Africa's construction tenders are in fact evaluated on the basis of functionality, but according to the CIIs report, the recommendations of the tender

committee were overruled in the award of around 12% of public sector projects, with overruling of tender recommendations highest in Limpopo. Contractors were not satisfied with the performance of the client on around 20% of the work surveyed. This included dissatisfaction with the quality of tender documents and specifications, management of variation orders, and delayed payments. Around 40% of payments to contractors were made in 30 days or longer after invoicing. The typical contractual period for payment is 30 days. Delayed payments process is the biggest challenge facing the contracting sector and in particular, the small and medium sized contractors" (CIDB, 2014/2015, P. 23).

- According to Maizon (1996), one of the causes of poor project outcomes might come from the client's inability to choose the best procurement and contract strategy for a project. "The construction industry faces a major challenge of failure by client departments to pay contractors and consultants on time. This is a key blockage in the infrastructure delivery chain that undermines economic growth, infrastructure delivery as well as the developmental and transformational objectives of the country. The CIDB will continue to work closely with industry stakeholders to develop meaningful and holistic interventions to address this scourge" (CIDB, 2012/2013, P. 39)

- "On the other hand, the CIIs show that contractors were neutral or dissatisfied with the performance of clients on 21% of the projects surveyed, and were neutral or dissatisfied with the quality of tender documents and specifications obtained from clients on around 22% of the projects surveyed. Of ongoing concern is delayed payments within the industry, and 43% of payments to contractors were made in 30 days or longer after invoicing. The ongoing delayed payments in the construction industry impacts negatively on the development and sustainability of the construction industry. In response to this the CIDB is preparing Regulation amendments to encourage prompt payment" (CIDB, 2013/2014, P. 28).

- Causes of poor project performance are: "Contractors were paid within the contractual 30 days after invoicing in only 40% of the projects. This marks deterioration in prompt payment practices over the survey period 2013 to 2015. Delayed payments are one of the biggest challenges facing the contracting sector, and in particular the small

and medium sized contractors – which often results in the bankruptcy of a contractor" (CIDB, 2016 P. 28).

- Lack of qualified professionals and inconsistent client's representation for the supervision of projects is one of the challenges that lead to poor project performance (Egbu and Ilozor, 2007).

- Inefficient and ineffective communication between the client/client representatives with the rest of the supply chain creates an inability to resolve each other's problems that are due to different perceptions (CIDB, 2015; CIDB, 2016).

- Client inability to pull in the contractors' wealth of knowledge and expertise in construction methods and buildability at the initial stages of the construction project is seen as contributing to poor project outcomes (Dulaimi and Dalziel, 1994).

- It has been shown that a major contributor of the failure of the project has been an inadequate or misunderstood briefing process (Williams, 1989).

- However, Rwelamila (2000) found that in some Southern African countries (including South Africa), failure to consider the culture of the nations in choosing project procurement arrangements, contributes to the poor performance on construction projects.

- The reactive evolutions of *modus operandi* procurement practices have caused many problems that are still affecting construction project efficiency and performance in the South African construction industry (Rwelamila, 2000).

- High levels of adversarial behaviours in construction industries have led to the poor performance of the project delivery process (Latham, 1994; Egan, 1988, 2002). The widespread acceptance of partnering and alliancing and the collaborative working advised by Latham was fully accepted by the professionals in the construction industry. Latham (1994) stated that by using or adopting the collaborative procurement approaches, such as partnering and alliancing, could lead to about 30% reduction in cost saving within the span of five years. Latham also shows the important role clients could play to achieving successful project outcomes. There were some weaknesses in the recommendations which hindered the public sector

procurement rules. Furthermore, it is not always true that all construction projects would improve performance if partnering and collaborative procurement systems are adopted. It is also shown that public sector clients could improve performance by adopting traditional procurement systems. Therefore, whatever procurement system is adopted, the most important issues to be considered are the characteristics of the project, the environmental factors, the client readiness to lead the supply chain management for the delivery of projects.

- Construction projects have been characterised by disputes, cost and time overruns (Latham, 1994). Contractors faced challenges with releasing of cash flow and financial issues (CIDB, 2015; CIDB; 2016).

- There is still a paucity of research that allows one to better understand the key role of public sector clients in the construction procurement (Egbu and Ilozor, 2007).

- The challenges associated with public sector clients' roles and obligations during construction procurement process have not been adequately investigated in the South African context (Adams, 1997; Hanson, 2006; CIDB, 2015; CIDB, 2016).

Based on the reported cases of dissatisfaction of public sector clients with the procurement outcomes in the South African construction industry (Mbachu, 2002; Hanson, 2006) and the low performance of public sector clients (CIDB, 2016; Kometa *et al.*, 1994)), further research in terms of effectiveness and efficiency of public sector clients' roles and obligations in the South African construction procurement is necessary. This might help to uncover the strengths and weaknesses (Walker, 1994) of public sector client organisations in the construction procurement processes. This might help to improve the performance of the supply chain, and hence improve the overall project outcomes (NOA, 2004).

1.3 PURPOSE OF THE STUDY

Despite the fact that client performance and improvement in the public sector construction procurement is crucial for successful project delivery, little research has been done in the South African situation (Mbachu, 2002; Hanson, 2006; CIDB, 2015; CIDB, 2016). It is on this basis that this study explores the influence and impact of the public sector client performance in the construction procurement processes (Lowe and Leiringer, 2006). The

study provides a basis for client performance improvement in the procurement processes (Latham, 1994; Walker, 1994; Egan, 1998, 2002). This might ultimately lead to greater success in procurement processes and subsequently improve the performance of the public sector clients, the supply chain and the construction industry at large (Karna, 2014).

1.4 STATEMENT OF THE PROBLEM

Technical and financial professionals in the South African National and Provincial Departments of Public Works do not adhere properly to their roles and obligations in the construction procurement process thereby contributing notably to poor project outcomes.

1.5 JUSTIFICATION FOR CHOICE OF CLIENT GROUP

The CIDB (2011/2012, P. 54) survey has raised the following challenges on the performance of public sector clients: "Contractors were neutral or dissatisfied with the performance of clients on 21% of the projects surveyed; Contractors were neutral or dissatisfied with the quality of tender documents and specifications obtained from clients on around 22% of the projects surveyed; Contractors were neutral or dissatisfied with the management of variation orders on 26% of the projects surveyed; 65% of payments to contractors were made within 30 days or longer after invoicing; Quality (or functionality) was not taken into account in the adjudication of tenders on around 65% of public sector projects; Around 16% of the recommendations of the tender committee were overruled in the award of public sector projects; Around 8% of projects surveyed in the public sector were undertaken using contract documents other than those recommended in the CIDB's Standard for Uniformity; Safety on building and construction sites as well as transportation to the sites remains a concern".

1.6 MAIN RESEARCH QUESTION

What improvement based on defined key performance indicators (KPIs) is required by public sector clients to achieve best practice in their procurement process?

1.6.1 Sub-questions

1. What are public sector clients' key performance indicators (KPIs) in the procurement process?
2. How could public sector clients' key performance indicators (KPIs) and improvements be systematically assessed in the procurement process?

3. How could public sector clients' performance in procurement processes be improved?
4. How do public sector clients' key performance indicators relate to project delivery outcomes?

1.7 AIM AND SPECIFIC OBJECTIVES

1.7.1 Aim

The aim of this study is to investigate public sector clients' performance in the South African construction procurement with a view to establishing how their efficiency and effectiveness could be improved during procurement processes.

1.7.2. Specific research objectives

The specific research objectives are to:

1. Identify the key performance indicators (KPIs) for public sector clients in their procurement process.
2. Assess and analyse the weaknesses and strengths associated with public sector clients' performance in the construction procurement process.
3. Develop a methodical approach to the measurement of public sector clients' performance in their procurement processes.
4. Recommend implementable approaches to improving client performance in the public sector procurement process.

1.8 ASSUMPTIONS

- That the target participants for the study would cooperate and allow access to their premises, sites, documents and records, as required by the study.
- That the records from the projects documentation on performance of public sector clients in the procurement processes fairly reflect project outcomes.
- That the target participants would provide valid information for the study.
- That the public sector clients' performance in the public procurement is measurable on identified construction projects during the field data gathering period.

1.9 SCOPE AND DELIMITATIONS

This study examines public sector client performance in procurement processes in the South African construction industry. The survey sample comprised the heads of operational units in the public sector clients at National and Provincial spheres of Government. The State-owned enterprises (SOE's) and State-owned corporation/companies (SOC's) were not considered for this study. Municipalities and Municipal entities were not considered in this study. Private sector clients were also excluded from this study. The study examined previous projects, completed or on-going, for the assessment of clients' performance in meeting their obligations during the procurement processes. Only the performances of the public sector clients during the procurement processes (among the supply chain) were considered during this study. Semi-structured interviews were conducted; structured and open-ended questionnaires were administered to participants on new projects where information regarding various aspects of clients' performance in the procurement processes was gathered. Renovation and refurbishment works were also excluded from this study. Only new construction works were considered.

1.10 OUTLINE OF LITERATURE REVIEW

Literature was reviewed to establish the extent of research work already accomplished in this area, and what type of data should be collected to meet the stated research objectives. The literature review was carried out to identify issues relating to client performance and improvement in the construction procurement process. A review of literature related to different procurement options was also undertaken to put the South African construction industry in context. This review included studies related to performance of public sector clients during procurement processes so that the strengths and weaknesses associated with client roles and obligations during the construction procurement processes would be elicited. The theory and philosophy of supply chain management was also reviewed. The review helped to analyse the complexities and challenges in the public sector construction projects (i.e. South African National and Provincial Departments of Public Works).

1.11 QUALITY ASSURANCE

Whichever research methodology or design or strategy is adopted by the researcher, success depends on the validity (quality) of the approach adopted (Leedy and Ormrod, 2014). Quality checks adopted in this research include: correctness and completeness of questionnaires, especially the open-ended questions; quality of data collection and data capturing; correctness in the use of formulae for calculation; quality in data interpretation and analysis; and non-interference with the data collected by the researcher, especially where the researcher is not part of the research instrument (e.g. positivism paradigm), such as in quantitative studies.

1.12 STRUCTURE OF THE CHAPTERS

Chapter Two: Literature review: This chapter is devoted to the review of related literature to surface the nature and concept of performance improvement in public sector client organisations. The chapter situates the present study in the literature and theory related to construction procurement and the role of the public client in construction procurement processes. This is to surface the nature and concepts of performance improvement in public sector client organisations in the construction procurement.

Chapter Three: The chapter addresses the development of a **"client performance improvement process framework"** for improving the performance of public sector clients. The chapter dwells on the performance improvement theories that could assist professionals.

Chapter Four: Research Design and Methods: This chapter reports on the methodology employed in this study. It comprises the research philosophy, research design and planning, research strategies, mixed methods design, research methods, sampling methods, sample size, survey samples, selection of participants, and method of data gathering. All are presented for both the qualitative and quantitative phases of the study. Validity and reliability of data and research findings are also considered.

Chapter Five: Qualitative data presentation and analysis: This chapter presents the qualitative data analysis and interpretation gathered at the preliminary interviews and semi-structured interviews during the early stage of the research study. It covers the preliminary interviews conducted with senior project managers at the initial stage of the study. Semi-structured interviews were conducted with Chief Accounting Officers from three provincial

Departments of Public Works in South Africa. Content analysis was used with a view to identifying the themes and constructs to be used for the questionnaire design, which was meant to gather data from the nationwide survey. Analysis of the results is presented, commented on and summarised.

Chapter Six: Quantitative data presentation and analysis: This chapter presents the data obtained from the structured questionnaire. It presents the statistical tools and methods used for the analysis of the ordinal scale data obtained from the structured questionnaire. It also presents the data analysis and interpretation. In addition, thematic content analysis was used with a view to identifying the themes and constructs emanating from the respondents' responses from the open-ended section of the questionnaire. This is to explain the challenges and complexities that hinder the optimum performance of public sector clients during their procurement process. Analysis of the results is presented, commented on and summarised.

Chapter Seven: Findings and Discussions: This chapter discusses both the qualitative and quantitative findings obtained from chapters 5 and 6. The results obtained from the content analysis, the hierarchical statistical analysis and the thematic content analysis are discussed in conjunction with the literature. The outcome of the integrated and synthesised results should address the research problem, answer the research questions and achieve the stated research objectives.

Chapter Eight: Conclusions and Recommendations: Conclusions are based on the findings from data analysis, linking them to the problem statement, research questions, and research objectives of the subject under investigation. Recommendations for further study and improvement are stated.

CHAPTER 2

REVIEW OF LITERATURE

2.1 INTRODUCTION

This chapter situates the present study in the literature and theory related to construction procurement and the role of public sector clients in the construction procurement process. This is to surface the nature and concepts of performance improvement in public sector client organisations in construction procurement. In doing so, the complexities and challenges of construction procurement are discussed.

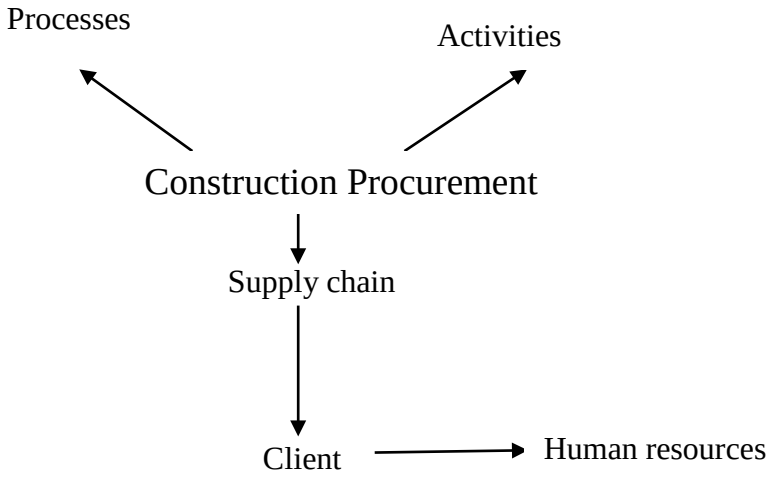


Figure 2.1: Concept of construction procurement

2.2 THE PROCUREMENT FRAMEWORK IN THE SOUTH AFRICAN CONSTRUCTION INDUSTRY

The South African Constitution (Act 108 of 1996) stipulates the primary and secondary aims of the South African public sector procurement system. In it, are procurement objectives provisions, stipulations of requirements for the lawful and fair awarding of contracts and policy for preferencing. In tandem with the provisions of the Constitution, the legal framework for procurement is further stipulated in a number of Acts of Parliament (CIDB, 2016). More specifically, the construction procurement is subsumed under the Construction Industry Development Board Act (Act 38 of 2000). Fairness, equity, transparency,

competitiveness, and cost effectiveness of the procurement system are requirements from the South African legislative framework. The National Treasury through the Public Finance Management Act (PFMA) of 1999, and the Local Government: Municipal Finance Management Act (MFMA) of 2003 regulates procurement in South Africa.

Therefore, the guideline approach informs all public sector procurement in South Africa. The Construction Industry Development Board (CIDB) and the CIDB Standard for Uniformity in Construction Procurement, nevertheless regulate construction procurement. The alignment of the CIDB Construction Procurement requirements with the MFMA and PFMA is shown in Figure 2.2.

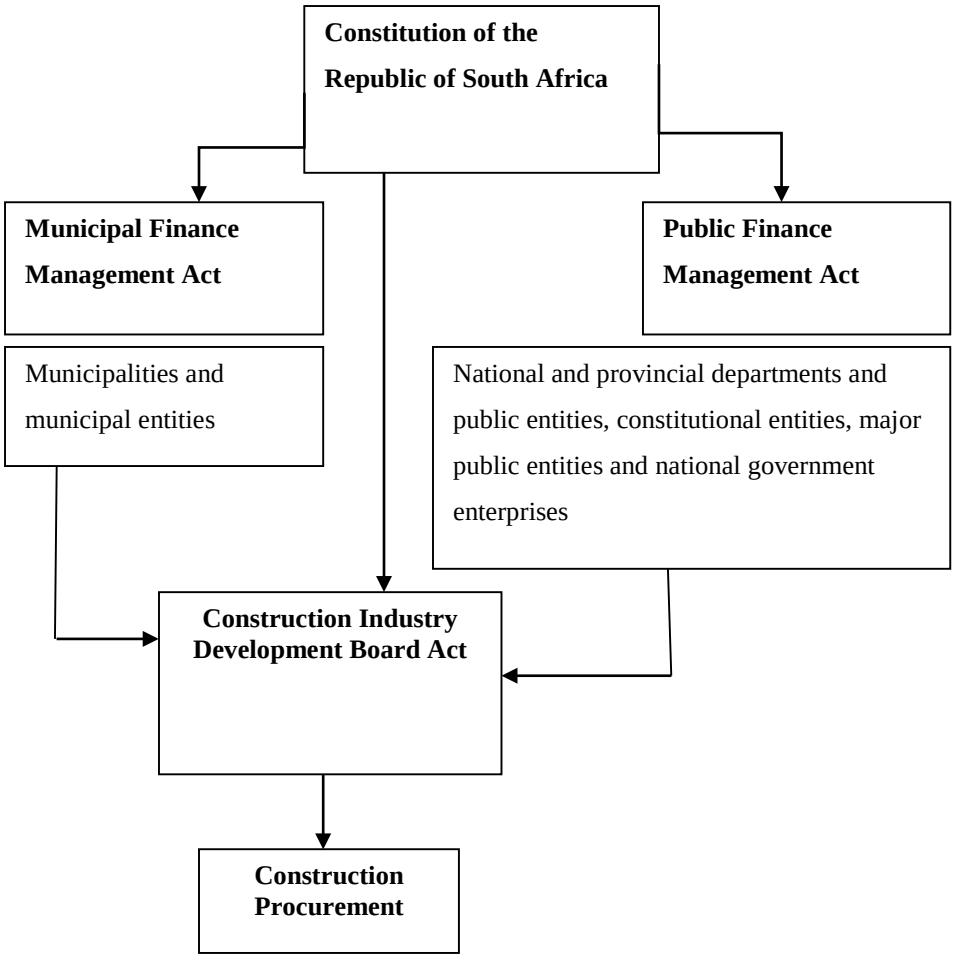


Figure 2.2: Alignment of PFMA, MFMA and CIDB Act (Adapted from CIDB, 2016)

According to the CIDB (2016), the administrative procedures and financial management related to procurement at National, Provincial, and Municipal spheres of government are guided by the South African Legal Framework Act. The latter governs the attainment of

socio-economic objectives through procurement, and gives some guidelines to the behaviour of parties involved in the procurement and provision of goods and services involving government entities (CIDB, 2016).

Backed by Act 38 0f 2000, CIDB is responsible for checking the following activities (CIDB, 2016):

- Contracts for engineering and construction works
- Supply contracts for the procurement of construction materials and equipment
- Service contracts for construction, as well as professional services, and
- The disposal of excess materials, equipment and demolitions.

Since this study investigates the public sector clients' performance in the construction industry in South Africa, a proper implementation of construction procurement in the South African construction sector is crucial. This is prompted by the National Treasury Pillars of Procurement which has mandated the CIDB to take charge of construction procurement (CIDB, 2016). The National Treasury Pillars of Procurement are: overt and effective competition, value for money, ethics and just dealings, accountability and feedback, and equity. The CIDB Act mandates the CIDB (2016) to:

- Promote the standardisation of the procurement processes
- Kick-start, promote and execute national programmes and projects intended toward the standardisation of purchasing documentation, practices and methods
- Determine and establish best practice that promotes procurement and delivery management reform.

2.3 PERSPECTIVE OF CONSTRUCTION PROCUREMENT

For Hibberd (1991), the definition and classification of procurement approaches are elusive, hence none of the definitions adequately explain the concept properly; the reason is that there is no consensus acceptance. In addition, the degree of scientific rigour implied by the term 'procurement system' does not exist. Consequently, Hibberd (1991) argues that either the term 'procurement path' or 'procurement approach' would be better. The difficulties of

apprehending the inherent virtues and characteristics of procurement paths that Hibberd (1991) points out however could be a result of what Ireland (1984) and Mohsini and Davidson (1989) refer to as virtually meaningless qualifications between nominally different procurement processes. The OGC (2003) terms all this E-Procurement. It further asserts that e-procurement can be further categorised into three areas: e-Sourcing is for contractual processes, e-Procurement is for transactional processes while e-Payment Tools are for invoicing and self-billing (OGC, 2003).

2.4 CONSTRUCTION PROCUREMENT SYSTEMS

Organised processes and procedures for clients to acquire construction products (buildings) are known as construction procurement systems (Gidado (1996; Masterman, 1996). For Masterman (1996), project procurement is the prerequisite organisational structure for the designing and building of construction projects for target clients. This is congruent with Ofori's (1990) assertion that the process of obtaining a building by a client involves various actors who form a collective and organise themselves systematically according to their roles, duties, responsibilities, obligations, capabilities, and the interconnectedness between them.

Following Masterman (1996), the various procurement systems are catergorised thus: (i) separated and cooperative system (ii) integrated systems and (iii) management oriented system. The categories of procurement strategies/methods are shown in Figure 2.3.

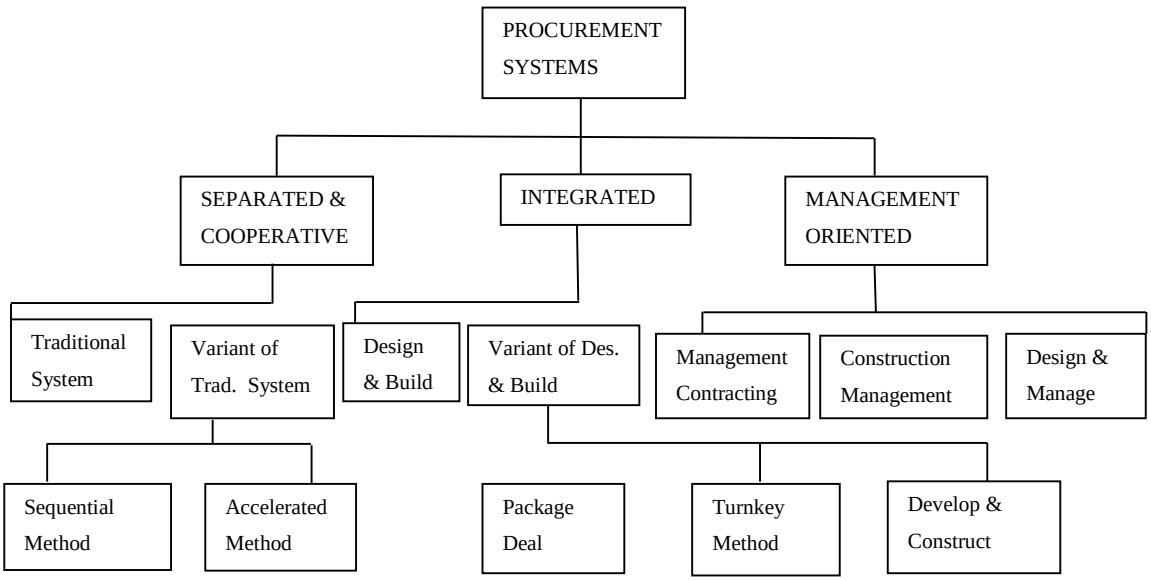


Figure 2.3: Building procurement systems (Sources: Masterman, 1996)

2.5 SEPARATED AND COOPERATIVE PROCUREMENT SYSTEMS

According to Masterman (1996), under the **sequential method** or a single stage tendering approach, a team of consultants produce construction drawings, specification and tender documents on behalf of the owner of the building. The team of consultants also handles the tendering process in order to select the best contractor/bidder for the construction of proposed project.

The **accelerated method**, according to Masterman (1996), is considered as a pragmatic approach to hasten the selection of the highest bidder for the project to kick start at an early stage. This allows the project to start earlier by ensuring negotiation during tendering stages and at the same time, selecting the contractor with cost negotiation as the project is going on.

2.6 INTEGRATED PROCUREMENT SYSTEMS

According to Rosli *et al.* (2006) and Masterman (1996), such systems that combine the contractor's contractual obligations of project design and construction enhance the early commencement of construction. The integrated procurement systems are divided into package deal, turnkey contract, and develop and construct systems.

***Package deal*:** Also termed "all-in" contracting. In this delivery method, the responsibility for the design and construction of the facility rest with the package contractor. The responsibility of getting the brief from client, planning, design and contracting the facility is the responsibility of the contracting company as a package dealer (Masterman, 1996).

***Turnkey contract*:** An American version for "all-in" or package contract. According to Masterman (1996), the contractor is responsible the design and construction of the facility. It is the responsibility of the contracting company to get the brief from client, internal planning, design and contracting the facility, and thus hand over the keys to the client or the owner, hence called turnkey contract (Masterman, 1996).

***Develop and construct*:** Another variant of the integrated procurement mode, the difference is that the client consultant prepares the sketch design and hand it over to the construction company for detailed design and subsequent completion of the project (Masterman, 1996).

The contractor will construct the facility by following the template designed by the client consultants at the initial stage.

2.7 MANAGEMENT ORIENTED PROCUREMENT SYSTEMS

According to Masterman (1996), three types of procurement processes fit into the class of management systems viz: Construction management, Management contracting and Design and manage system (Rwelamila and Meyer, 1999; Ambrose and Tucker, 1999; Sharif and Morledge, 1994).

Management contracting and ***Construction management*** are forms of "fast-tracking" the delivery process. A contractor is recruited to supervise and monitor the construction process from the initial stage until completion. The latter is contracted out to many specialised contractors. In *construction management*, the subcontractors are directly recruited by the client while in *management contracting*; the domestic subcontractors are directly recruited by the main contractor.

According to Masterman (1996), *the* ***design and manage system*** entails the commissioning of a single firm to assume sole responsibility both for designing and managing the construction of the project. The firm does not execute the task itself.

According to SIPDM (2015/2016), the Infrastructure Delivery Management System (IDMS) realised that the following issues hinder the optimum performance of public sector clients: delay with material from the supplier, change in material request, delay with payment to service providers (e.g. contractor and consultants), deficiency in cost allocation, delays during tendering stages, delay during construction process, unrealistic project schedules and delays with project reports (SIPDM, 2015/2016).

2.8 FACTORS CONSIDERED FOR SELECTION OF PROCUREMENT SYSTEMS

According to Skitmore and Marsden (1988), factors affecting the choice of procurement systems are tied with the client's primary and secondary objectives, such as time, cost, value, client satisfaction on the buildability and constructability of the facility.

2.8.1 Time Certainty

According to Masterman (1996), time is one of the objectives that construction clients need to achieve during the delivery of projects. Peck (2006) realises that time is an important factor that needs to be considered from start to finish. Alhazmi and McCaffer (2000) point to the significance of the completion date, either in terms of generation of revenue from the facility and meeting the completion time or target agreed at the initial stage. Time may not be the most important factor to public clients since their core objective is public accountability (Masterman, 1996). Public sector clients are accountable to tax payers for the delivery of construction projects. By contrast, the most important criterion for private clients is completion on time (Masterman, 1996). According to Masterman (1996), time is one of the objectives that construction clients need to achieve during the delivery of projects. It is important that client' needs are identified before embarking on construction projects.

2.8.2 Controllable Variation

According to Turner (1990), variation is the change order that occurs during the construction process. This could be due to the change order in the client's initial briefing during the delivery of the project or change of scope of work due to unforeseen events. Changes during construction process have shown to be expensive to the client, especially if a traditional method of construction is adopted. Contract information may need to be modified based on variations arising principally from the design team (Masterman, 1996). Variation can also occur if the design is not detailed at the inception of the construction phase (Masterman, 1996). Variation may also occur with increased demand from the client requirements during the construction phase (Morledge *et al.*, 2006). Further changes in project scope or specifications might increase the construction cost that is justified by increased profits to the contractor, especially where a traditional method of procurement systems is employed. Variation can also occur if the design is not detailed at the inception of the construction phase (Masterman, 1996). Variation may also occur with increased demand from the client requirements during the construction phase (Masterman, 1996).

2.8.3 Complexity

It is to be noted that project complexity is not how complicated the procurement processes are, but how construction activities are interrelated with each other, taking into consideration the environmental, economic, cultural aspects and the nature of a temporary multi-organisation of construction industry (Gidado, 1996; Skitmore and Marsden, 1988). Research has shown that the construction industry is the second largest risk and complex industry in the world (Gidado, 1996, 2004; Ofori, 1990; Songer and Molenaar, 1996).

2.8.4 Quality Level

According to Keith (1982), quality is one of the primary objectives of construction clients that need to be achieved at the end of the project. Both the public and private clients need quality as value of their money, hence, the advent of “best value procurement”.

2.8.5 Price Certainty

Certainty in price is one of the client priorities for embarking on construction projects. Therefore, it is an important factor to be considered before construction starts. Masterman (1996) further asserts that public sector clients consider price as a significant factor because of the accountability for tax payers’ money. Private clients give precedence to price certainty since they can control their financial budgets (Masterman, 1996). Competition on price is also important for the competitive tendering where the best contractor could be selected.

2.8.6 Competition

Crowley and Hancher (1995) show the importance of competition on pricing construction projects. Construction projects need to be priced so that the client would have some sense of how much the project could cost at the completion of the project. Particularly, in the South African National Department of Public Works, they are mandated by the National Treasury and Construction Industry Development Board to adhere to competitive tendering in order to get the best bidder during the tendering process. The public sector clients need competitive tendering because the public sector uses tax payers’ money. Meanwhile, according to Tuner (1990), private clients need competition because of various alternative reasons.

2.8.7 Responsibility

Both the client and the contractor have responsibilities during procurement processes. It is the responsibility of the client to choose the procurement and contracting strategies during the contract administration. The client has the responsibility to appoint a consultant to check the performance of the contractor during the delivery of the project. It is the contractor's responsibility to adhere strictly to the specification agreed on in the contract document (Ambrose and Tucker, 2000). The contractor should make sure that the standard of workmanship and quality of material during the construction process are maintained as indicated in the contract document. Clients have responsibility before and during the construction processes. Some of the responsibility of client is payments to service providers (e.g. consultants and contractors) during the construction processes.

2.8.8 Risk Avoidance

Public sector clients consider risk as an important requirement, especially when the traditional procurement method is adopted. Meanwhile, for private sector clients, risk avoidance is an important factor towards project success; especially where a design and build method of procurement is adopted, where the whole risk is shifted to the contractor with the responsibility of the design and construction. Elimination and reduction of financial risk is considered as a crucial need by private clients (Turner, 1990). Therefore, the selection of procurement approaches or strategies should reflect the project characteristics, the client priority and objectives, and the environmental characteristics of the proposed project. Since risk cannot be totally avoided in the construction industry, it is to be noted that risk should be shared, minimised or transferred to the party that can best handle the risk. According to Ofori (1990), Figure 2.4 illustrates the factors contributing to high risk during the construction procurement process.

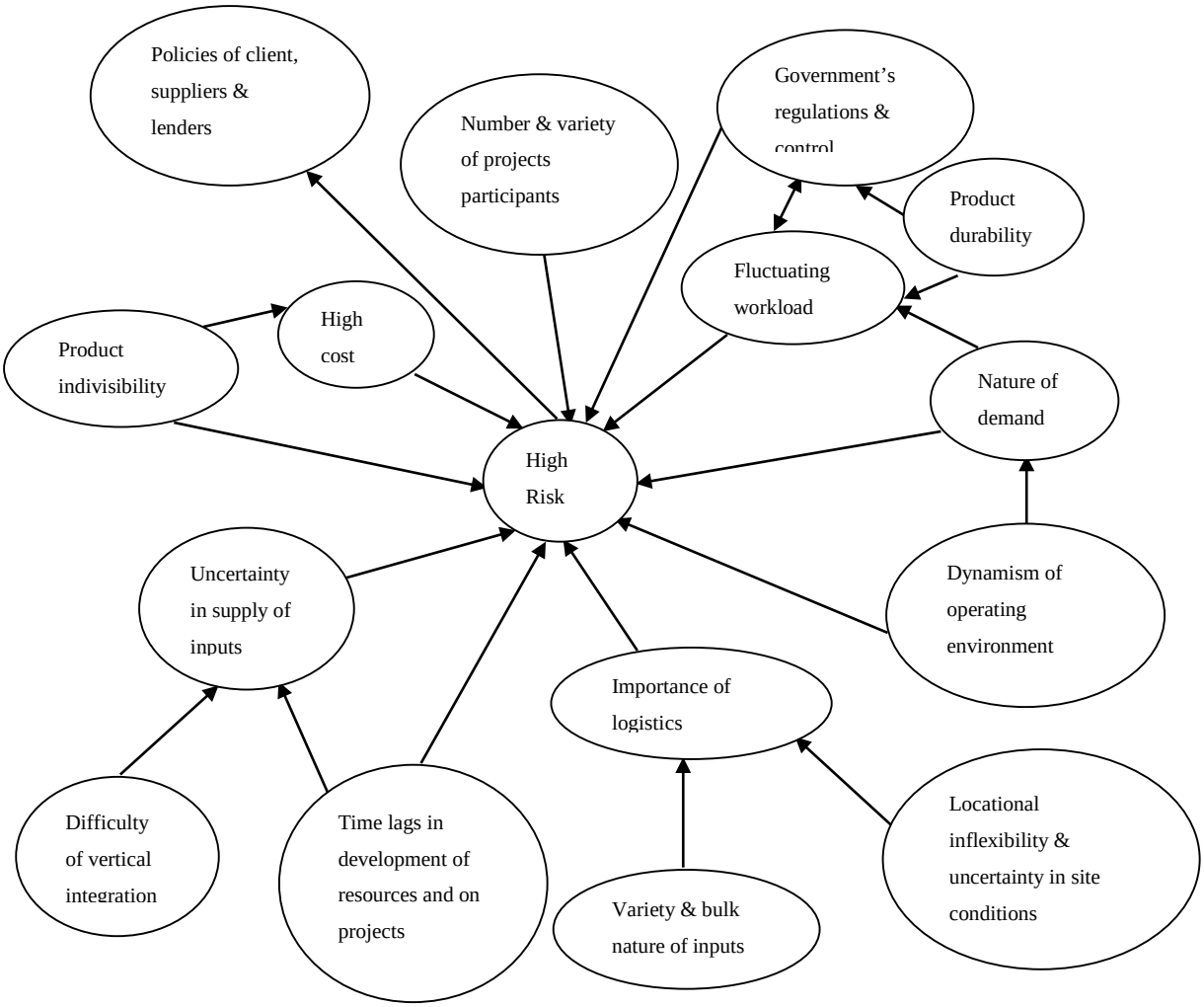


Figure 2.4: Factors Contributing to Risks in Construction Activity (Sources: Ofori, 1990)

According to the Project Management Institute, PMBOK (Project Management Body of Knowledge) (2008, p.113), "risks associated with the products of the project are often described in terms of their cost and schedule impact, which involve work breakdown structure, cost estimates and duration of estimates, staffing plan, procurement management plan, project files, commercial databases, and project team knowledge" (PMBOK, 2008, p. 113). Luu et al. (2003) also raised issues arising from lack of finance.

A comprehensive assessment of risk in the construction projects comes with unforeseen situation and comprising probability and consequence or aftermath of events is highly noted and recognised in construction procurement processes (Chapman, 2001). The top major risks identified to be put into consideration in the risk process include: "currency price changes, unforeseen circumstances, change in client brief or requirement during construction process,

and force majeure (Shen, Wu and Ng, 2001). According to Akintoye, and Malcolm (2017) projects suffered newly identified risk probabilities that resulted from change of plans from the clients' perspective, political, economic and social cultural variables during construction projects.

2.8.9 Risk Management

It is important to note that risk management cannot eliminate risk, but risk management techniques can be used to reduce the impact of events that may cause failure to reach the desired targets (Morledge *et al.,* 2006). It is widely recognised that deficiencies in the project brief could lead to uncertainty and greater risk during the contract (Egan, 1998; Morledge, *et al*., 2006).

2.8.10 Risk Management Strategies

Risk management strategies have been developed by various organisations, and widely used models in construction industry include the Association of Project Management 'Project Risk Analysis and Management' (PRAM) (APM, 1997) and the Institute of Civil Engineers 'Risk Analysis and Management for Projects' (RAMP) (ICE, 1998).

Risk identification and the distribution of risk between those who are best suited to control it are seen as the most critical criteria for the selection of appropriate procurement systems (Turner, 1990). Risks do not generally occur in isolation, they have one or more causes and one or more effects, and it is important that these should be considered as part of the risk identification process (Turner, 1990; Luu *et al.,* 2003). A single risk may have only minor consequences, but a combination of 'minor' risks could have serious consequences (Morledge, *et al.,* 2006) for the project. It should be noted that risk events may only occur at certain stages in the construction process (Gidado, 1996), for example, during the design stage, or during various stages of the construction process (Morledge, *et al.,* 2006).

2.8.11 Risk and Uncertainty

It is important to distinguish between events that are 'risky' and events that are 'certain'. According to Morledge, *et al*. (2006) risk events are events the occurrence of which can be predicted to at least some degree, generally based upon historical data or experience and a

decision made according to the probability of a particular event occurring. In other words, a forecast is made on the basis of past data and therefore within some degree of certainty. While uncertain events are random events which defy prediction, risk events can be managed while uncertain events cannot (Morledge, *et al.,* 2006). It should therefore be a fundamental rule of risk management to reduce uncertainties to a minimum.

2.8.12 Price Competition

The reason is that public sector clients are accountable to taxpayers for the value of their money; therefore price certainty is very important factor in the selection of the procurement system. Public sector clients are accountable to taxpayers for the value of their money; therefore competition on price is very important factor in the selection of the procurement system. The client should make a decision on issue of risk-sharing in the procurement process.

2.8.13 Use to Method of Procurement

Many clients adopt construction procurement methods they are used to and do not want to take risks in adopting a new procurement route during construction projects. Hence, public sector clients in the South African National and Provincial Departments of Public Works adhere strictly to using the traditional method of procurement as instructed by Parliament.

2.8.14 Flexibility

Client needs differs and consequently for each project meeting those needs have unique characteristics (Rwelamila and Meyer, 1999). The client should make a decision on the issue of risk-sharing in the procurement process. This is a complex issue (Gidado, 1996) and is at the heart of the consideration of an appropriate contract strategy (Masterman, 1996). The client must also be aware of the increased cost that stems from building flexibility (the opportunity to change the project parameters) into the procurement system.

2.8.15. Summaries of factors considered for selection of procurement systems

One of the main aims of selecting amongst the different procurement approaches is to balance the client's objectives of cost, scope, time and quality, in order to derive an optimal agreement between the parties (Luu *et al.,* 2003; Rwelamila, 2000).

2.9 PREFERENTIAL PROCUREMENT

According to Watermayer (2004), since the official end of apartheid in1994, there has been the enactment of policies that promote the improvement of the material and socio-political conditions of the historically disadvantaged individuals (HDIs). By and large, these policies also aim to grow and improve the overall economy (Hodgson *et al*., 2003). In keeping with this empowerment drive, Ayandibu (2010) notes that many developing states have, with some great measure of efficacy, employed the construction sector in poverty reduction through employment creation.

South African law provides sanctions for the local authorities to engage in Local Economic Development (LED) to "*promote social and economic development structure and manage its administration and budgeting and planning process to give priority to the basic needs of the community, and to promote the social and economic development of the community*" (RSA, 1996, sec 153 (a) & (c)). The Municipal Systems Bill states that *"Municipalities are to move progressively towards the social and economic upliftment of communities and ensure universal access to quality services"* (Municipality Systems Bill, 1999).

The public-private partnerships (PPP) have been used by the South African Government in this context as an instrument to empower and sustain the growth of BBBEE (CIDB, 2016). Most Government infrastructural projects are encouraged to have socio-economic objectives tied to them, to alleviate the high unemployment rate present in the country (Ayandibu, 2010). These objectives mainly emphasise the procurement of services and materials from BBBEE.

The BBBEE Act of 2004 stipulates that *"economic empowerment of all black people including women, workers, youth, people with disabilities and people living in rural areas through diverse but integrated socio-economic strategies"*.

The objectives of the BBBEE Act are in line with the PPPFA which is also to promote the participation of black people in the economic environment by offering preference to BBBEE companies during the construction procurement (Watermeyer, 2000). In doing so, the government also promotes the involvement of SMMEs in the economy by providing preferential procurement to black owned entities (Watermeyer, 2004).

2.10 THE GENERAL GUIDELINE FOR PROCUREMENT PROCESSES

Pillars of procurement (specific main principles of action) are at the centre of proper and successful procurement (OGC, 2003; New South Wales Government Procurement Method, 2002). They are analogous to pillars because should any one of them break, the whole procurement system collapses. The Public Finance Management Act, South African Government, (1999) identifies these core pillars (principles) as:

Value for money

It is a litmus test for Departments, a test against which they must account for a procurement outcome. Best value for money (VFM) entails the most favourable outcome, notably after consideration of all the available benefits over the procurement cycle. It is noteworthy that sustained focus only on the price can be deceiving. As a result, concerned departments should be wary of romanticising lowest price offers as always translating to value for money. Beyond lowest price offers, they must focus on the *best value* that resonates with the specific demands of clients.

Open and effective competition

Such competition can be realised through the embodiment of procurement procedures in an ethically-oriented framework. A framework whose laws, policies, practices and procedures are enshrined in values such as transparency, efficacy and compliancy. More specifically, a procurement model that promotes: overtness in the procurement processes; efficacy through methods aligned to market conditions; and procurement procedures that subscribe to the guidelines of the Preferential Procurement Policy Framework Act.

Ethics and fair dealing

This entails compliance of all parties to the procurement process, with specific ethical standards, with a view to building an enduring culture of mutual trust and reverence, team solidarity, integrity and fair business dealings.

Accountability and reporting

Accountability is epitomised by administrative transparency**,** not to mention submission (by individuals and firms) to public audits through public feedback/reporting. In other words,

accountability is a claim of responsibility by various stakeholders in the procurement process which makes them answerable for their decisions, plans, actions and results.

Equity

In this context, the Preferential Procurement Policy Framework Act equity entails adherence to and operating within the boundaries of state policies whose main import is to avail more privileges, property and power to social classes or class fractions disadvantaged by discriminatory practices. The overarching objective is creating employment, vouching for local production, promoting local people in specific disadvantaged geographical spaces such as rural areas, and promoting specific regions with specific geo-political circumstances of deprivation.

2.11 THE PROCESS OF VARIOUS CONSTRUCTION PROCUREMENT SYSTEMS

It is appropriate and important to view the flow of activities of the different procurement systems during the construction procurement process. It does indicate, to some extent, the effect of the different procurement systems on the project performance due to the different responsibilities within the procurement process. For comparative purposes, Figure 2.5, 2.6 2.7 and 2.8 are shown (Adapted from Rosli *et al.* (2006).

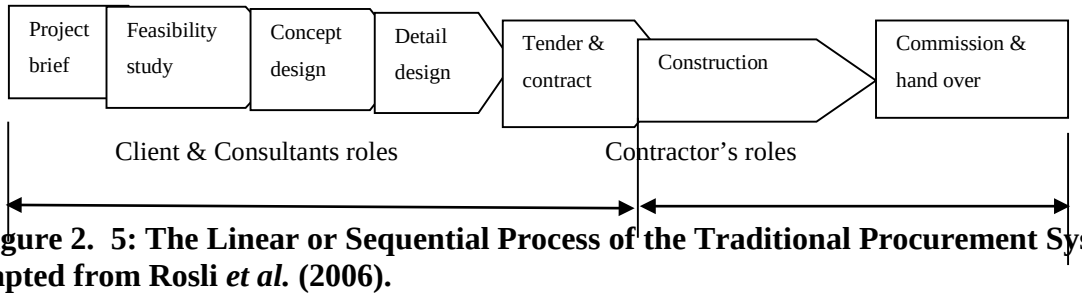


Figure 2. 5: The Linear or Sequential Process of the Traditional Procurement System Adapted from Rosli *et al.* (2006).

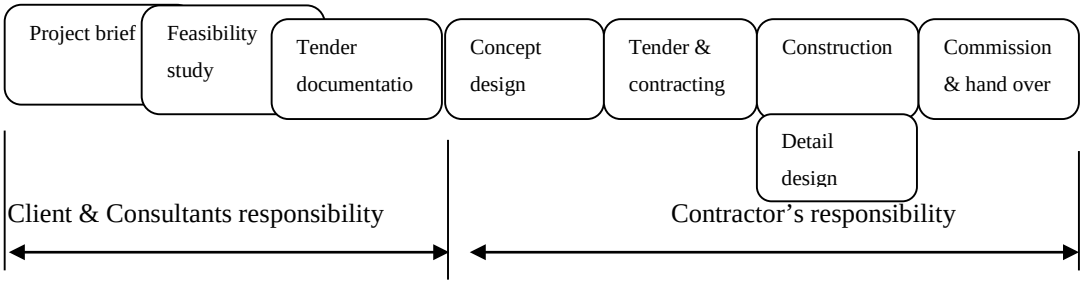


Figure 2. 6: The Integrated Process of Project Designing and Construction in the Design and Build Procurement System. Adapted from Rosli *et al.* (2006).

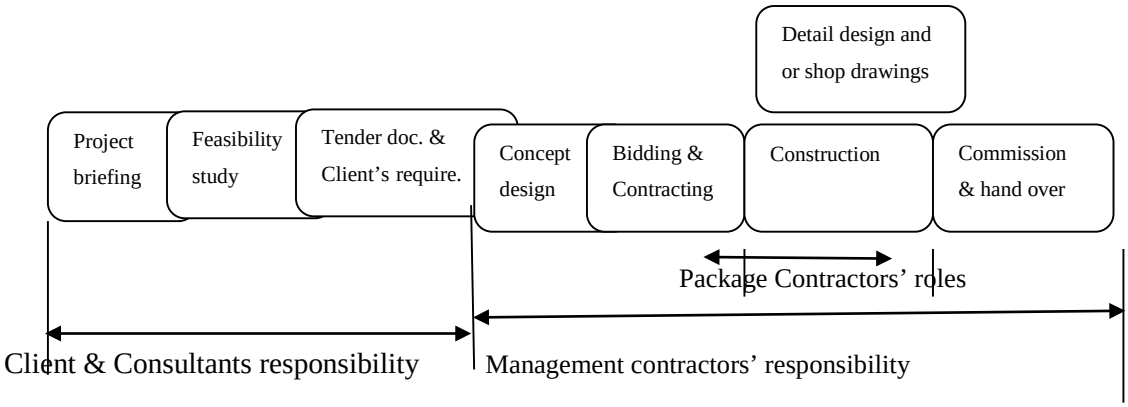


Figure 2. 7: The Process of Project Designing and Construction in the Management Contracting & Professional Construction Management Procurement System. Adapted from Rosli *et al.* (2006).

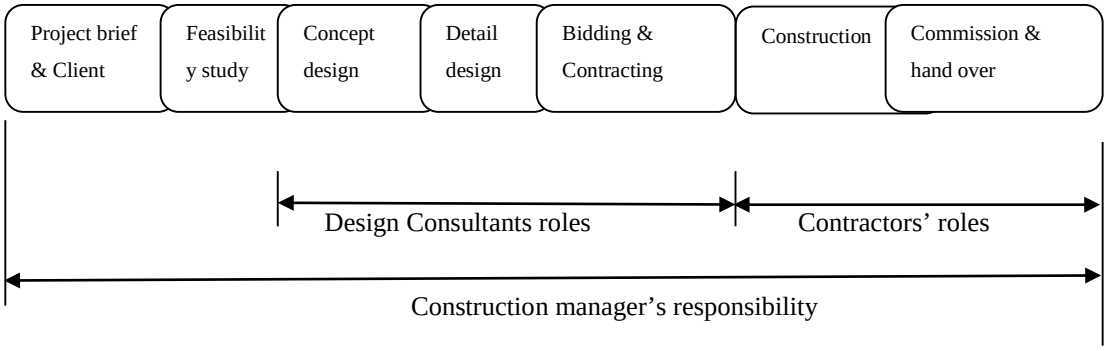


Figure 2. 8: The Process of Project Design and Construction in the Design and Manage Procurement System. Adapted from Rosli *et al.* (2006).

The following elements are used to check project success (Kumaraswamy and Dissanayaka, (1998; NEDO, 1985; Rowlinson, 1999)

1. ***Time certainty*:** time is considered as one of the primary objectives of the client.
2. ***Cost***: the client needs to know the cost of procuring the facility.
3. ***Competition in price***: price in competition using open tendering during the tendering stages to select the best bidder.
4. ***Flexibility***: variations could arise during the delivery of projects emanating mostly from unforeseen circumstances.

5. ***Complexity***: construction project by its nature is complex. The complexity could arise due to interrelated processes taking place on site, especially in mega projects. It should be noted that the complexity of construction projects is not how complicated projects are, but because of the interdependent nature of projects (Gidado, 1996, 2004).

6. ***Quality****:* quality of construction projects could be achieved through specification during contract documentation (quality of material from the supplier and standard of workmanship from the contractor).

7. ***Responsibility*****:** both the client and the contractor would have specific responsibility during the delivery of projects. This is independent of procurement and contracting strategies adopted for the delivery of the proposed projects.

8. ***Risk***: there is risk in terms of transferring responsibility and roles either from the client's side or the contractor's side.

2.12 PROCUREMENT PROCESSES, PROCEDURES AND METHODS

For progression from one task to another, Watermeyer (2004) deduces that there are six critical procurement tasks and numerous generic steps that have to be taken. According to Watermeyer and Jacquet (2004), the generic steps are to: (i) establish what is to be procured (ii) decide on procurement strategies (iii) solicit tender offers (iv) evaluate tender offers (v) award contract and (vi) administer contracts and confirm compliance with requirements.

Determination of the main objectives for a procurement system has to be given some precedence before its creation (Watermeyer, 2000). In keeping with this principle, a synopsis of the procurement objectives of three entities, namely, the World Bank, the World Trade Organisation (WTO), and the United Nations Commission on International Trade Law (UNCITRAL), is evident in Section 217(1) of South Africa's Constitution (Act 108 of 1996). The latter also captures the centrality of fairness, equity, transparency, competitiveness and cost-effectiveness as vitally important attributes of any procurement system (*Green Paper on Public Procurement Reform in South Africa*, 1997).

2.13 PROCUREMENT DOCUMENTATION

Acquisition and possession of procurement documents serve both as the passport to a contractual obligation and the attendant solicitation for tender offers (Watermeyer, 2004). By illustration, according to Watermeyer (2004), procurement documents are a form of ammunition that tenderers ought to possess, which subsequently qualifies them for the compilation of their tender submissions. Provisions attached to procurement can form a general basis for its categorisation. In numerous procurement systems which include those of the World Bank and the European Union, Watermeyer and Jacquet (2004) highlight that each section of procurement is shown in detail and is grouped.

2.14 INNOVATIVE PROCUREMENT STRATEGIES IN PROJECTS

2.20.1 Partnering as an innovative procurement strategy

Partnering brings in an efficient and effective way of delivering projects with less adversarial relations between client and contractor (Lambe *et al.,* 2000; Lee and Cavusgil, 2006; Ross, 2003b). Partnering enhances collaboration, cooperation and good communication between the supply chains during procurement processes (Egan, 1998; Sanders and Moore, 1992). Chan and Chan (2004) show how success of a partnering arrangement could improve the outcomes of project as shown in Figure 2.9.

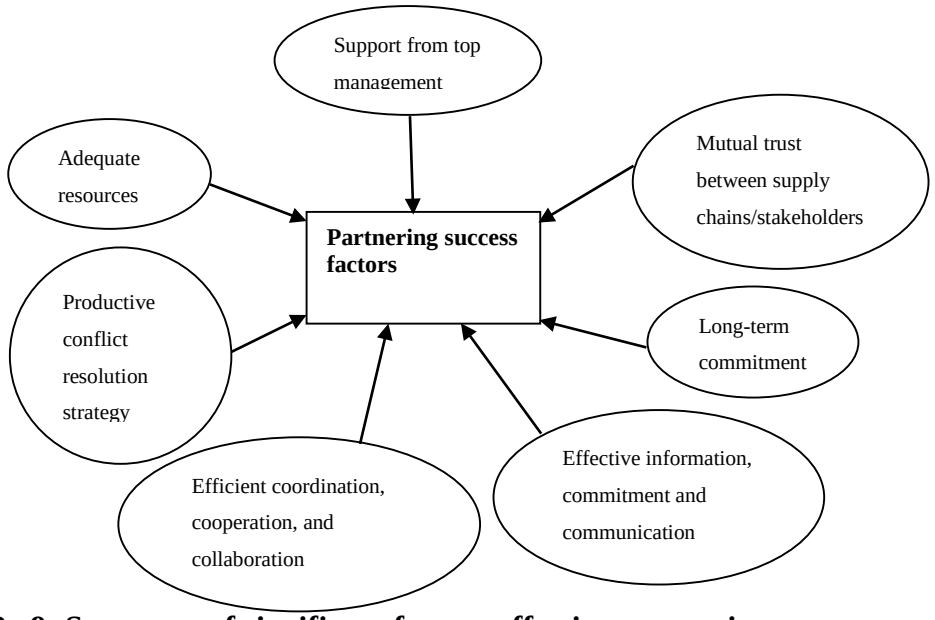


Figure 2. 9: Summary of significant factors affecting partnering success (Adopted from Chan and Chan (2004)

2.20.2 Best value as an innovative procurement strategy

The 'best value' imposes upon public bodies a duty to demonstrate that they are achieving 'best value' for the taxpayers, in accordance with published and auditable criteria (Morledge, *et al*., 2006). For instance, in the case of property and construction, the EU Government, (2010a) emphasis on best value states that:

- Procurement based on price as the only choice criterion is unlikely to secure best value.
- Overall value for money should be assessed based on whole-life cost not initial capital cost.
- Project delivery mechanisms should encourage innovation by all concerned in the search for more flexible and cost-effective project delivery mechanisms.
- Delivery mechanisms should incorporate partnering principles supported by good risk and value management.

The imposition of a 'best value' regime has given rise to considerable changes in the way construction work is procured, and has led directly to the development of projects based upon partnering, target cost contracts, the use of initiative and gain/pain share strategies, and the use of benchmarking and key performance indicators (KPIs) to promote continuous improvement (Morledge, *et al*., 2006).

2.20.3 Framework agreements as an innovative procurement strategy

A framework agreement is an "umbrella agreement' that sets out the terms (particularly, relating to price, quality and quantity) under which individual contracts (call-offs) can be made throughout the period of the agreement (normally a maximum of four years)" (OGC, 2008, P. 3). A framework agreement has been defined as: "an agreement or other arrangement between one or more contracting authorities and one or more economic operators which establishes the terms (in particular the terms as to price and, where appropriate, quantity) under which the economic operator will enter into one or more contracts with a contracting authority in the period during which the framework agreement applies" (OGC, 2008, P. 3).

2.20.4 Performance-based procurement strategy (PBPS) as an innovative procurement strategy

The construction industry structure shown in Figure 2.10 demonstrates how contractor's performance meets the client objectives (Kashiwagi, 1996). From Figure 2.10, Kashiwagi shows that the greater the competition, the lower the price (Quadrant I), the greater the performance, the higher the price (Quadrant II). Kashiwagi also indicated that to manage the two constraints, the construction industry has divided into four segments: the low-bid sector (Quadrant I); the performance sector (Quadrant II); the negotiated bid sector (Quadrant III) and the unstable sector characterised by low competition and low performance (Quadrant IV) (Kashiwagi, 1996, P. 198).

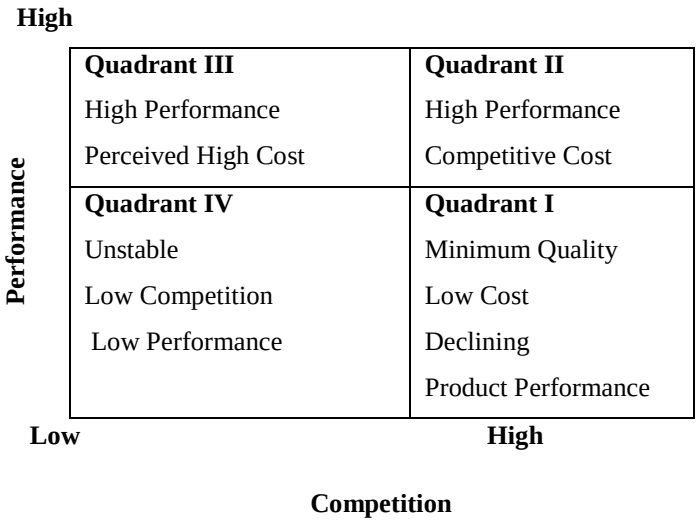


Figure 2. 10: Construction Industry Structure (Kashiwagi, 1996)

2.15 SUMMARY

This chapter has dealt with literature and theory related to construction procurement and the role of public sector clients in the construction procurement process. It has demonstrated the nature and concepts of public sector client organisations in construction procurement in South Africa. In doing so, the complexities and challenges of construction procurement were discussed. This chapter has reviewed the literature on the key aspects of construction procurement. There were challenges with procurement processes, procedures, methods and documentation adopted by the construction client, especially in public sector projects. It was observed that innovative procurement strategies, such as partnering, alliancing, best value

procurement, early contractor involvement, and performance based procurement systems and gain share pain share performed better than traditional method. This is because of the collaborative, cooperative and sister and brother relationships that exist between the client and the contractor. This does not mean that the traditional method does not perform well, but that issues arise from adversarial relationships, which keep the client and the contractor apart. The next chapter presents the conceptualisation of client performance improvement process framework.

CHAPTER 3

CONCEPTUALISATION OF CLIENT PERFORMANCE IMPROVEMENT

3.1 INTRODUCTION

Chapter three proposes the conceptualisation of professionals performance in South African public sector construction projects. The theories underpinning the performance improvement are discussed. The theories are Behavioural Engineering Models (Thomas Gilbert Model**)**, Cognitive-motivational models (Goal-setting theory), and Technological models (electronic performance support systems (EPSS). The operational performance in this study relates to the effectiveness and efficiency of public sector clients during their procurement process (Chitkara, 2005; Project Management Institute, 2004). *Performance* is "the value and level of service provided to meet the requirement of the end user as defined by the end user" (Kashiwagi, 1996, P. 198).

3.2 PERFORMANCE CONCEPT

Literature on the performance approach as it pertains to building and construction, suggests that it is possible to apply the performance concept to a variety of circumstances and people (Cole, 1999). It also promotes the need to establish uniform demanding target performance levels in an international building assessment system (Copper, 1999). The assessment system has to provide consistency, be feasible and practical within a specific country or region (Cole, 1999; Copper, 1999). According to Kashiwagi and Ryan (1995), the development of building standards that are performance-based has drawn international interest as a result of some of the difficulties presented by deemed-to-comply or prescriptive codes and standards. According to Morledge *et al*. (2006), these difficulties arise from the need to:

- Make building construction more cost effective;
- Allow for easier introduction of product or system and process innovation; and
- Establish fair international trading agreements

Since the construction industry is a significant sector in the economy of many countries, the performance approach to improve the economy is necessary for developing countries like South Africa. Performance improvement, as conceptualised by Geis (1986) and Kashiwagi (1992) is a process that improves and increases the outcomes or products by using the feedback system that solve the problem in an organisation or at an individual level of performance. The American Institute of Performance Improvement has conducted research where 400 organisations (both private and public) were involved and concluded that only at maximum of 25% improvement that training of personnel would contribute to the performance of personnel (Gies, 1986). Therefore, factors other than knowledge and training could also influence workforce performance in organisational settings (Gery, 1991). Hence, the adoption of performance improvement theories, such as behavioural, cognitive-motivational and technological in this study, to improve the performance of public sector clients during the procurement process in the South African National and Provincial Department of Public Works. It is also recognised that feedback, incentives and raises/promotion assist in performance improvement of personnel at work places (Gery, 1991).

3.2.1 Feedback

According to Pershing (2006), feedback is information designed to assist workers at their work places. This is to enhance the performance of teams of technical and financial professionals in order to improve their effectiveness and efficiency and thus check the progress of work (Gery, 1991). Feedback serves as a mechanism for workers to enhance their weaknesses (Gery, 1991). Therefore, feedback is one of the performance improvement mechanisms used to improve worker effectiveness and efficiency at work place.

3.2.2. The effects of feedback on performance

Kluger and DeNisi (1996) have carried out empirical studies and confirm that feedback increases workers' performance. Kluger and DeNisi used the theory of feedback based on meta-analysis of 607 used in 131 persons from 23,663 observations. Furthermore, Gies (1986) observe that the feedback Kluger and DeNisi used showed that 70% of the feedback mechanism increases worker performance in relation to their efficiency and effectiveness at the work place. The adoption of feedback as one of the performance improvement

mechanisms for energising and the improvement of professionals at work places has yielded good result.

3.2.3 Incentives

Incentives to workers have shown that their performance could increase at work places (Rothwell, 1996). Stajkovic and Luthans (2003) carried out research and found that the combination of feedback, incentives and promotion or raises increase workers performance at their work places. Stajkovic and Luthans (2003 then hypothised that by using the three reinforcers (feedback, incentives and promotion) together during the delivery process would lead to the optimum project outcome, rather than using them independently.

The opportunity cost are: manufacturing cost, inventory-related cost, transportation cost, project acceleration cost, cost of liquidated damages and other relevant costs such as administrative costs during delivery of projects (Coyle *et al.*, 2003).

3.3 THE EVOLUTION OF BEHAVIOURAL ENGINEERING MODEL (GILBERT'S HUMAN COMPETENCE MODEL)

Thomas Gilbert (1978) is celebrated as one of the pioneers and seminal thinkers of the behavioural performance improvement approach.

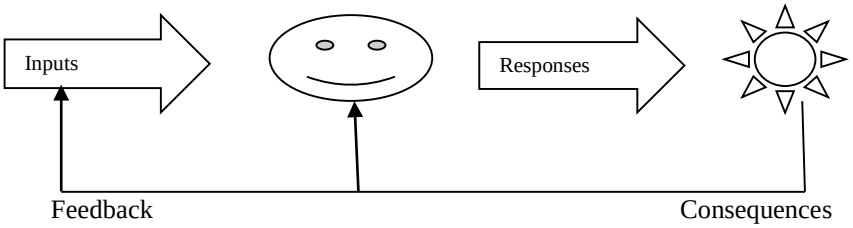


Figure 3. 1: A basic systems model of performance (Thomas Gilbert's Model, 1978)

Table 3.1 shows how Gilbert used performance improvement elements to optimise the performance of workers at places of work.

Table 3. 1: Gilbert's six-cell performance factors (Gilbert, 1978)

	Information	Instrumentation	Motivation
Environment	Data • Direction • Feedback	Instruments • Tools • Procedures • Time	Incentives • Compensation
Person	Knowledge • Training • Work aids	Capacity • Selection	Motives • Individual motivators

3.3.1 Interventions in Behavioural Engineering Models

Gery (1991) asserts that the behavioural engineering model intervention either involves the removal of barriers that hinder the progress of workers at work or the addition of the enablers of performance improvement that could assist in integration of individual, organisation, teams of workers, management and organisational performance. Furthermore, Gies (1986) opines that Gery's intervention would include the understanding of the organisational structure, the decision making processes, right from management to site/operation levels, and the integration and differentiation of professionals at places of work.

3.4 THE EVOLUTION OF THE COGNITIVE-MOTIVATIONAL MODELS

3.4.1 Cognitive-motivational models (Goal-setting theory)

The goal setting theory is designed to increase the performance of workers through motivation by setting specific targets/goals and working very hard to meet the desired goals (Locke and Latham, 2002). Goal setting theory assists workers to predict, focus and pre-empt the positive outcomes envisaged by working hard to meet their desired target (Geis, 1996). According to Gery (1991), cognitive models address performance factors, notably, performance standards, feedback, and incentives. Goal-setting theory is a guideline for optimising worker performance at work places (Locke and Latham, 2002).

3.5 THE EVOLUTION OF THE TECHNOLOGICAL MODELS

3.5.1. Technological models (electronic performance support systems (EPSS)

According to Geis (1986), EPSS is an electronic device that provides assistance to workers in optimising and increases performance electronically. It also improves organisation performance as team work for individual or cooperate entities in an organisation (Kaski and Vartiainen, 2000). By using electronic devices, an individual could increase his/her performance through on-line access, unlike training which needs an individual to be at a place of work (Brush *et al*., 1993; Gery, 1991).

3.6 PERFORMANCE MEASUREMENT IN THE CONSTRUCTION INDUSTRY

Procurement processes and procurement outcomes are two different things entirely (Euske, 1984). Procurement processes deal with the delivery processes in relation to the activities that take place right from client brief to the handing over of the facility, while procurement outcomes are the outputs or products of those activities that took place during the procurement processes. However, the performance of public sector clients during the procurement processes needs to be measured from the procurement outcomes to establish whether the clients are achieving continuous improvement or not. The procurement processes are measured using client key performance indicators (KPIs). Therefore, it is not a surprise to find that, traditionally, performance measurement in construction is approached in two dimensions: (a) in relation to the product as a facility (procurement outcomes), and (b) in relation to the creation of the product as a process (procurement process) (Coyle *et al*., 2003; Sadeh, 2002).

Client key performance indicators (KPIs) could be used through objective and subjective means to measure the performance of public sector clients during the procurement processes and also to predict the project outcomes as shown in Figure 3.2.

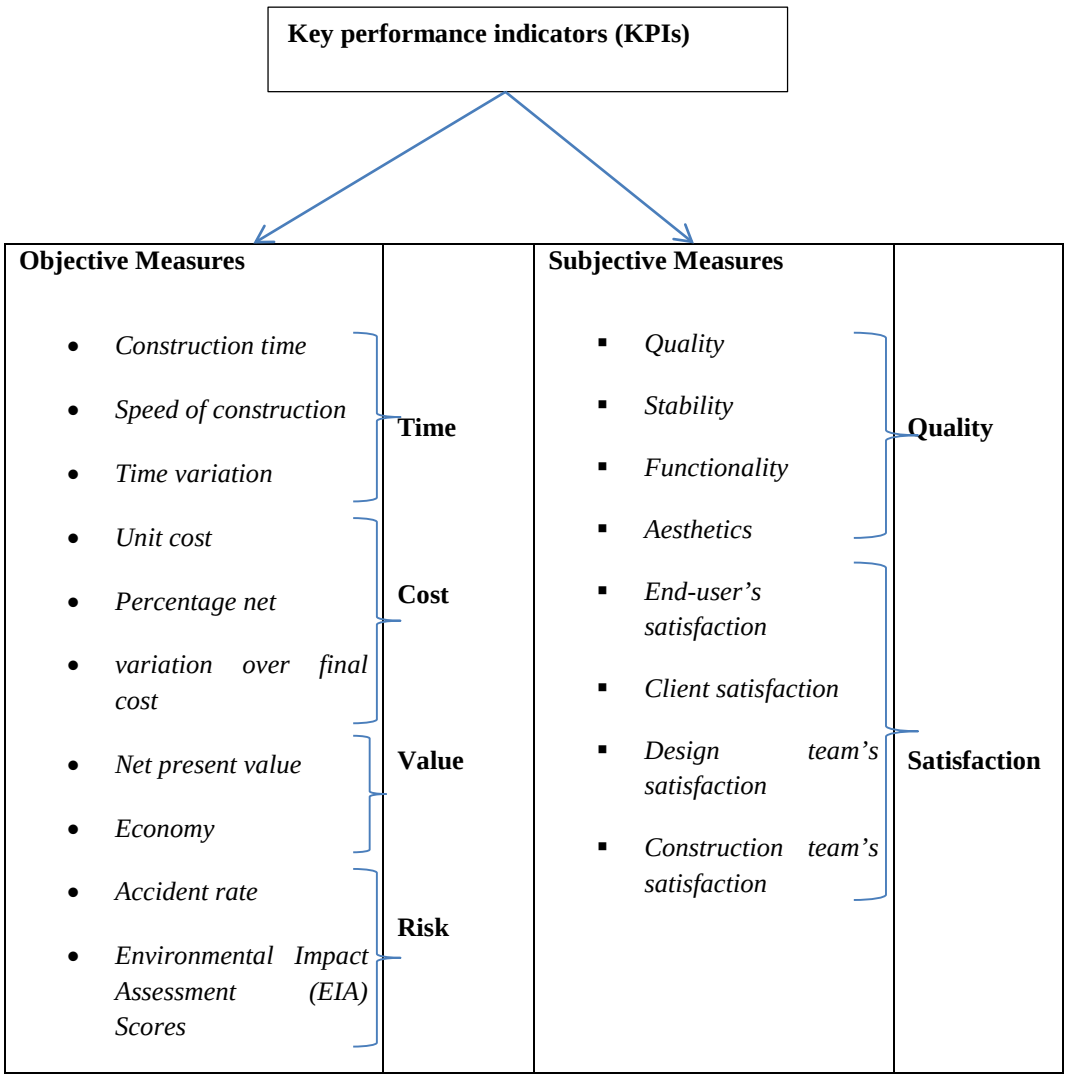


Figure 3. 2: Objective and subjective measures of project success (Chan and Chan (2004)

Figure 3.3 demonstrates key variables to be considered for achieving project success. The factors needed to be considered for the success of projects are illustrated in Figure 3.3

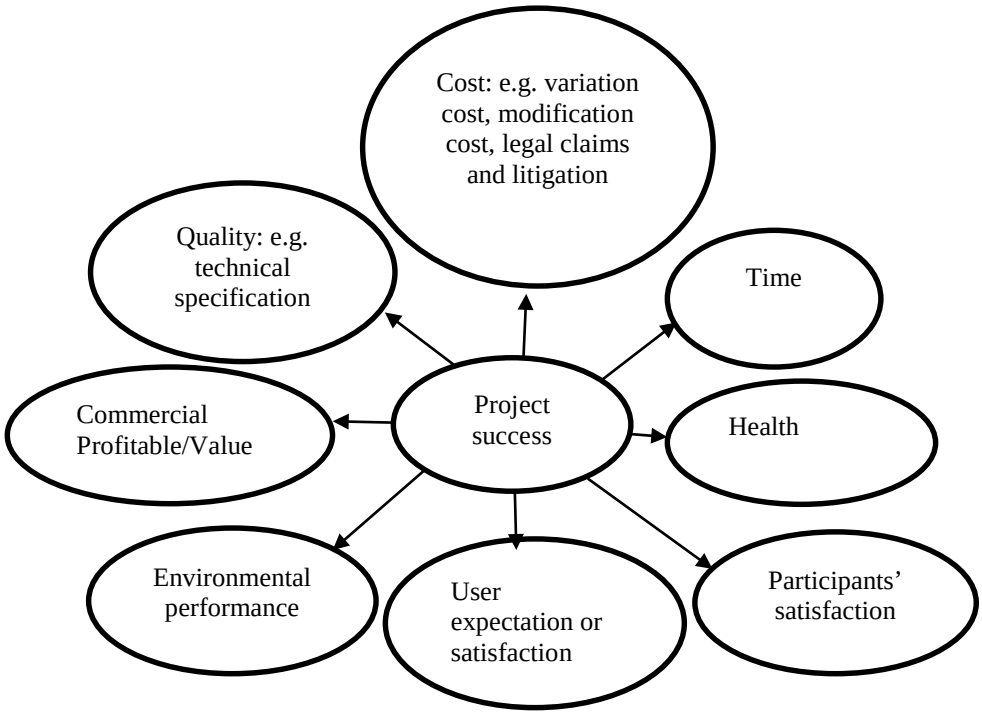


Figure 3. 3: Consolidated framework for measuring project success Adopted from Chan and Chan (2004)

Figure 3.4 shows the client performance improvement framework for improving the performance of public sector clients during the procurement process.

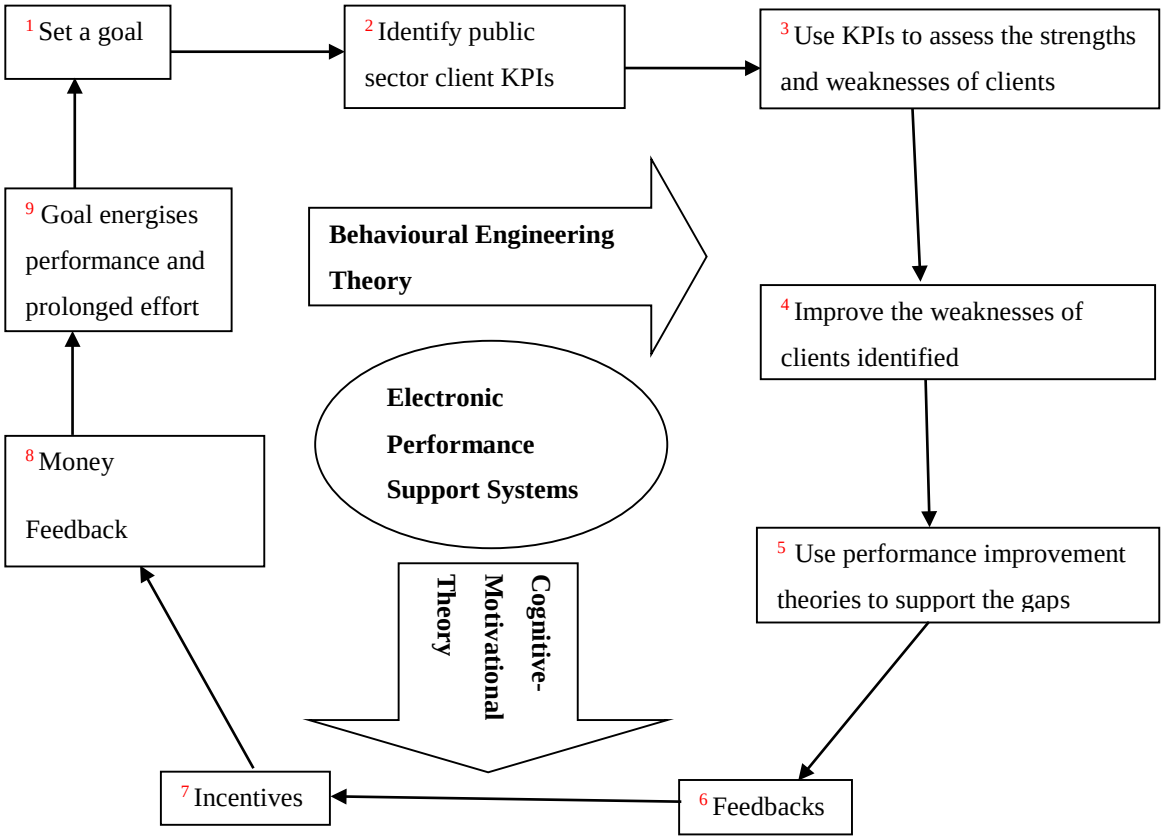


Figure 3. 4: The client performance improvement process framework

3.7 SUMMARY

This chapter addressed the conceptualisation of performance improvement to assist public sector clients in their procurement process. This might address poor project outcomes envisaged during construction procurement in DPW projects. Performance improvement theories were adopted to improve the effectiveness and efficiencies of professionals in public sector projects. These theories are behavioural engineering model (e.g. Gilbert model), cognitive-motivational model (e.g. goal setting theory) and technological model (e.g. electronic performance support system). The performance improvement theories were utilised in addressing the effectiveness and efficiency of professionals through feedback mechanism and incentives (i.e. through money, feedback or social recognition/promotion). Performance management and performance measurement of projects through procurement processes and procurement outcomes were reviewed. The objective and subject parameters are considered in determining project success. The strategic systems theory was utilised in understanding the

organisation structure and decision making process. The supply chain management theory was utilised in integrating the supply chain during the delivery of the project. The next chapter presents the research design and methods adopted in this study.

CHAPTER 4

RESEARCH DESIGN AND METHODS

4.1 INTRODUCTION

This chapter review on the methodology employed in this study. In this chapter, the following aspects of the research are discussed: research philosophy, research paradigm, research planning and implementation, research design, research methods, research strategy, sampling methods, method of data gathering and method of data analysis. The methodological issues are discussed for both the qualitative and quantitative phases of the study. The issues concerning validity and reliability of data and findings are also discussed in the concluding section of this chapter.

4.2 PHILOSOPHICAL ISSUES IN MANAGEMENT AND SOCIAL SCIENCES RESEARCH

Philosophical issues can seriously affect the quality of management research, and should be considered an important factor while conducting research (Easterby-Smith *et al.,* 2015). It shows how the philosophical underpinning affects the study (Easterby-Smith *et al.,* 2015), based on the characteristics of the research philosophy adopted in the study. This study adopted the pragmatic research philosophy from the illustration and explanation of research philosophy (James, 1907; Dewey, 1916; Brandi and Elkjaer, 2008; Lincoln *et al*., 2011; Saunders *et al.,* 2016).

4.2.1 Adoption of 'Pragmatism' as a Research Philosophy

"Pragmatism is a valuable perspective in management research because it focuses on processes that are particularly relevant to studies of knowledge and learning" (Easterby-Smith *et al*., 2015, p. 61). Furthermore, all the research questions posed in this study used "**what**" and "**how**" questions, which concurred with one of the basic principles and characteristics of the pragmatic approach. Consequently, the main reason why multiple methods of data collection were employed was to adequately address the research questions in the study, where one method of data collection would not adequately address or fully

answer the research questions posed and also to validate (Saunders *et al.*, 2016) the data collected from respondents and research findings.

The main reason for adopting a pragmatic paradigm was to contribute to the existing body of knowledge both theoretically (Easterby-Smith *et al.*, 2015) and also through the implications in practice (Patton, 2002), since the research investigates the public sector clients' effectiveness and efficiency during the delivery of construction projects. The pragmatic paradigm focuses rather on the problem being studied and how to answer the practical questions being studied, not focusing on the type of method adopted for solving the problem (Cherryholmes, 1992; Creswell, 2013; Morgan, 1997; Patton, 1990; Rossman and Wilson, 1985). It is based on addressing the problem and asking questions that would solve the practical problem that pragmatic philosophy was adopted in this study.

4.2.2 Logical Reasoning in this Research

In this research work, two broad approaches to logical reasoning were used: ***deductive logic and inductive reasoning***. Deductive logic moves away from general principles to specific conclusions, while inductive reasoning, in contrast, begin with specifics and then works towards broader generalisations (Creswell, 2013). Deductive logic can be seen in methods that begin with theory, propose hypotheses, engage in observations, and then draw conclusions (Creswell, 2013). In contrast, inductive reasoning is evident in methods that begin without such a theory, but instead start with the observations, assemble them into patterns, and ultimately derive a theory or generalisation as a result (Creswell, 2013). Such a triangulation of methodologies often produces results that are richer and more insightful than either approach alone (Creswell, 2013).

4.2.3 Research as a Scientific Method

Data that are assembled and studied objectively and systematically may yield previously undiscovered insights (Leedy and Ormrod, 2014), and hence a scientific method. According to Leedy and Ormrod (2014), the scientific method is a means whereby insights into the unknown are sought by (1) identifying a problem that defines the goal of one's quest; (2) positing an hypothesis that, if confirmed, resolves the problem; (3) gathering data relevant to

the hypothesis; and (4) analysing and interpreting the data to see whether they support the hypothesis and solve the question that initiated the research.

4.3 RESEARCH DESIGN

Generally, in research process, once the research philosophy of the study is adopted, then the next step is the research design. The philosophy adopted will help which research design to adopt in terms of organisation of data collection and analysis. Table 4.1 shows the alternative research designs by Creswell (2013) that are commonly used in social and management research.

Table 4. 1: Alternative research designs

Quantitative	Qualitative	Mixed methods
Experimental design	Narrative research	Divergent
Quasi-experimental design	Phenomenology	Convergent
Non-experimental design, such as surveys	Grounded theory	Explanatory sequential
	Ethnography	Exploratory sequential
Correlation research	Case study	Transformative, embedded, or multiphase
Structured observation	Action research	
	Participant observation	

Sources: Adapted from Creswell (2013)

Good research design is fundamental to achieving high-quality research with analysis of design principles (Easterby-Smith *et al.,* 2015). Table 4.2 shows the research design adopted for this study.

Table 4. 2: The research design for the study

RESEARCH DESIGN	CHOICES
Research philosophy	Pragmatism
Research approach	Deductive and inductive
Methodological choice	Sequential mixed methods design
Research strategy	Mixed methods research strategy
Time horizon	Cross sectional
Techniques and procedures	Sequential data collection and data analysis

Figure 4.2 shows the research process adopted for the study

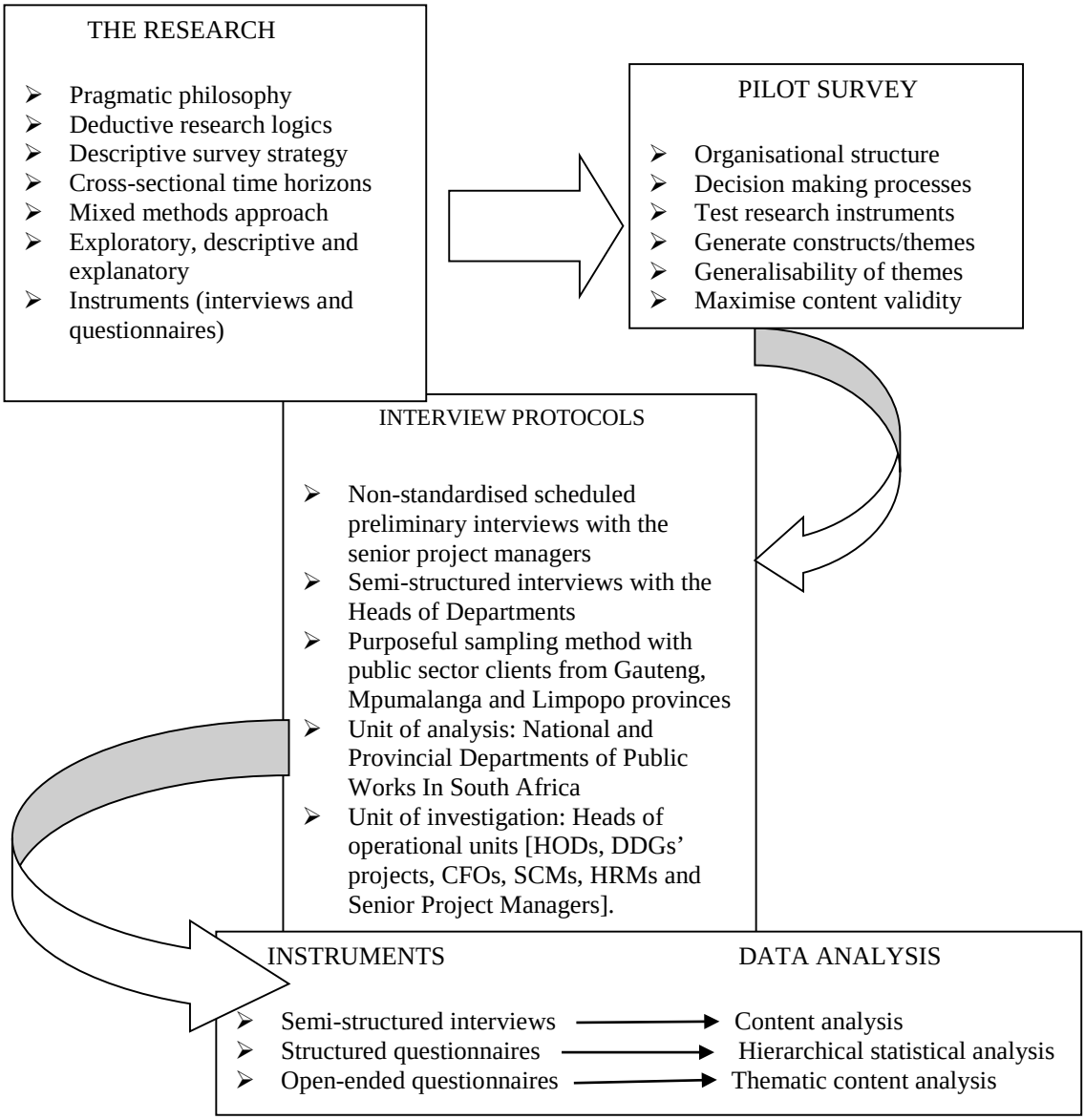


Figure 4.1: The research process

4.3.1 Overall Research Strategy

Saunders *et al.* (2016) and Leedy and Ormrod (2014) see strategy in conducting research as a designed process and procedure to be followed to answer the research question and eventually solve the research problem. The qualitative inquiry was followed by the development of constructs and themes from the semi-structured interviews' transcripts using content analysis for the design of the structured questionnaire and identification of themes from respondents' responses from the open-ended section of the questionnaire. The quantitative inquiry was followed by the use of a structured questionnaire to elicit the views, perceptions, opinion and experiences of public sector clients during procurement process and

identification of themes from respondents' responses from the open-ended questionnaire. Figure 4.3 illustrates the relationship between the key aspects of the research processes in this study.

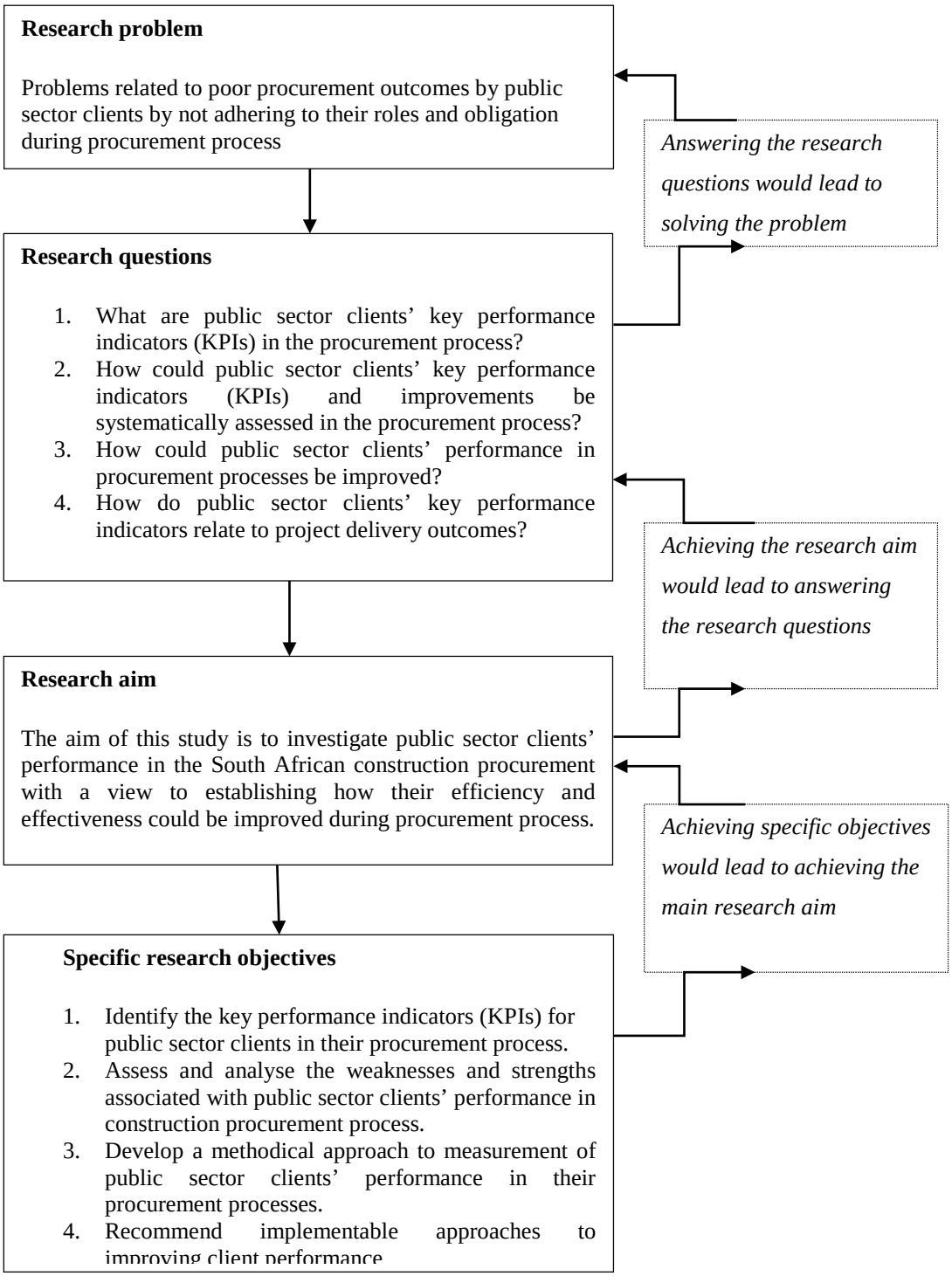


Figure 4.2: Illustration of the relationship between the key aspects of the research process

Figure 4.4 illustrates the overall research planning and strategy in this research. The research planning started with the preliminary studies, then the research process were categorised into qualitative and quantitative inquiry.

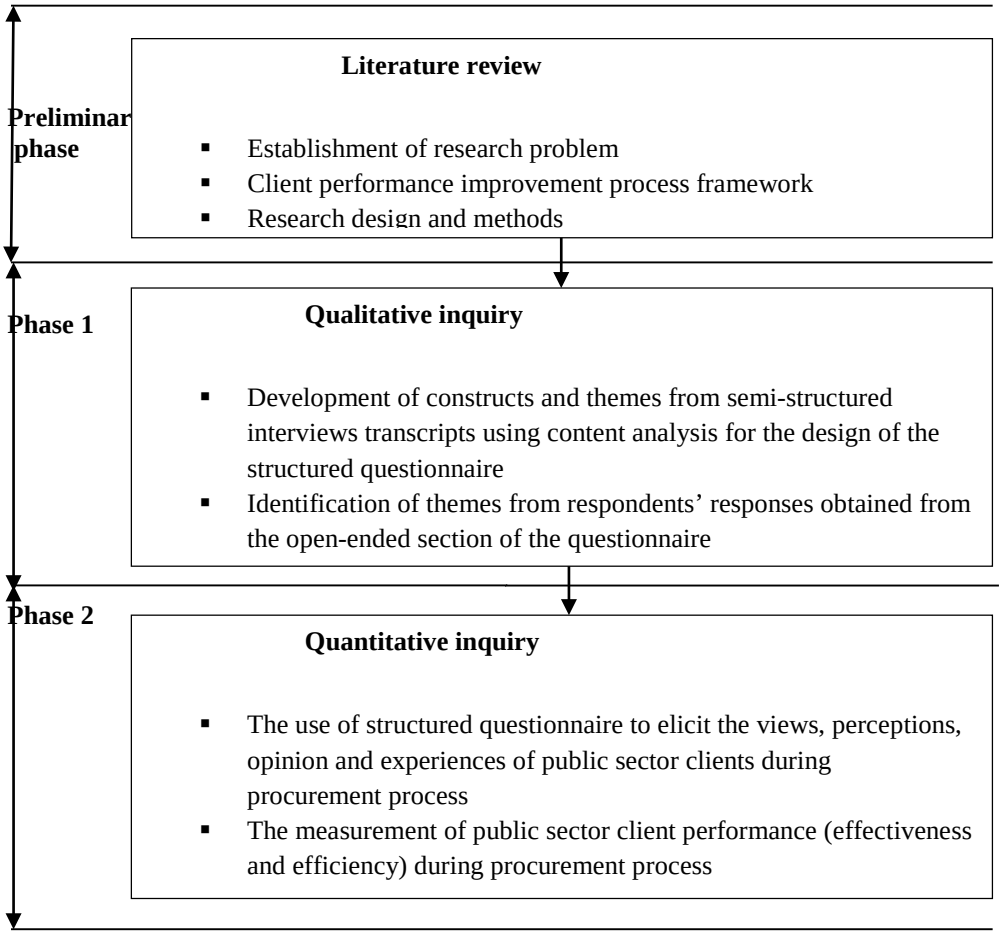


Figure 4.3: Overall research planning and strategy

4.3.2 Mixed Methods Research Design

Mixed methods research is a type of research design that adopts both the qualitative and quantitative research methodologies (Bryman, 2006; Creswell, 2003; Creswell and Plano Clark, 2011; Green, 2007; Green *et al.*, 1989; Molina-Azorin, 2010; Nastasi *et al.*, 2010; Ridenour and Newman, 2008; Saunders *et al.*, 2016; Teddlie and Tashakkori, 2009). Thus, the purpose of adopting the mixed methods research designs in this study is to validate the data to be collected

through objective and subjective judgement (Morgan, 1997) in the same research framework.

The main reason of adopting mixed methods research designs in this study are: firstly, to overcome the limitations of a single design or method (Creswell, 2012). Secondly, the research questions posed in this study could only be answered appropriately and adequately by using mixed methods design to address the problem stated in this research work. Thirdly, by using a range of different methods within the same study framework, it will increase the validity and generalisability of results and the potential theoretical contribution (Easterby-Smith *et al*., 2015). Fourthly, mixed methods have the potential to throw new perspectives on research questions, to increase the credibility of results, to demonstrate generalisability, and to provide deeper insights that explain why things take place (Bryman and Bell, 2007; Creswell, 2003; Easterby-Smith *et al*., 2015; Jick, 1979; Molina-Azorin (2010; Saunders *et al.,* 2015; Tashakkori and Teddlie, 2010; Teddlie and Tashakkori, 2009). Saunders et al. (2016) illustrates the difference between quantitative and qualitative data in Table 4.3 as a mixed method research design.

Table 4. 3: Harmonising Qualitative and Quantitative Data

Quantitative data	Qualitative data
▪ Meanings are derived from numbers ▪ Numerical and standardised data are used ▪ Diagrams and statistics are used as data analysis techniques ▪ The inquiry is wide and shallow in nature ▪ Put more emphasis on quantitative data	▪ Meanings are expressed through words ▪ Non-standardised data are classified into themes and categories ▪ The researcher derives meaning out of the participants' views and opinions ▪ The study is specific and in-depth in nature ▪ Put more emphasis on qualitative data

Adapted from Saunders et al. (2016)

The sequential exploratory research design, as opined by Creswell (2012), is employed in this study where initial qualitative (semi-structured interviews) were combined with follow-up questions or probing the interviewees; this was followed by the administration of the structured and open-ended questionnaires. The overall purpose of this research emphasises the use of qualitative and quantitative

research methodologies (is a sequential research which commences with a qualitative, exploratory phase, followed by a quantitative, descriptive phase and which is completed by a further qualitative, explanatory phase) (Saunders *et al.*, 2016). The convergent design is used because the questionnaire design is composed of structured and open-ended questions (Saunders *et al.,* 2016). The main reason why the convergent design was used is to obtain different but complementary data on the same topic (Morse, 1991) to best understand the research problem.

4.3.3 Research Methods

A preliminary research approach comprising a qualitative method of data gathering was adopted to generate new constructs or themes from the target population of public sector clients from the Provincial Departments of Public Works in Gauteng, Limpopo and Mpumalanga Provinces. Figure 4.4 illustrates how public sector client key performance indicators were identified during the procurement process.

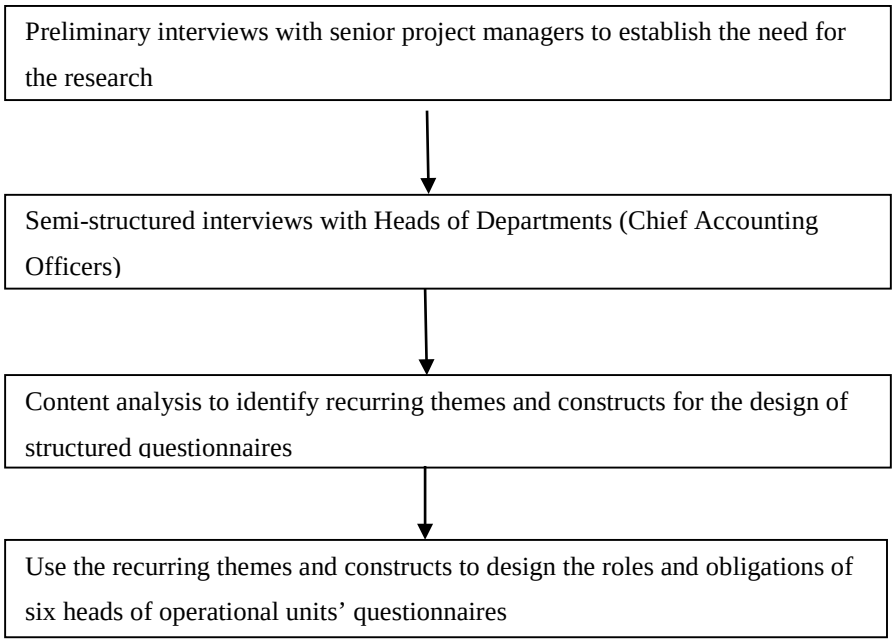


Figure 4.4: Methodology for identifying Public Sector Client Key Performance Indicators (KPIs)

The main reason why opinion or knowledge are referred to is to be able to use the instruments (interviews and questionnaires) adequately in order to answer the research questions and address the research objectives of this study.

This approach involved the use of non-standardised scheduled preliminary interviews of a purposeful sample (Saunders *et al.,* 2016) of public sector clients. The interviews served as the basis for the quantitative data gathering. The investigation conducted used both qualitative and quantitative (*mixed-method design*) methods in the following ways:

- Literature related to the area of research was extensively reviewed to uncover the strengths and weaknesses of public sector client performance (efficiency and effectiveness) in the construction procurement processes. The findings of this study provided the basis for the quantitative study.
- A preliminary study was conducted through semi-structured interviews about the organisation structure (organogram) and decision making processes (see chapter five) of public sector clients (National and Provincial Departments of Public Works) in relation to their roles and obligations during the construction procurement processes. This is to identify and examine the causes of poor project outcomes.
- An initial survey using semi-structured interviews was conducted with the Heads of Departments who are the Chief Accounting Officers of Provincial Departments of Public Works from Gauteng, Limpopo and Mpumalanga Provinces (see chapter five). A purposeful sampling strategy was adopted.
- The data collected through the semi-structured interviews were analysed using content analysis (see chapter five) to identify themes and constructs that were not apparent from the review of literature.
- Furthermore, both the structured and the open-ended questionnaire was administered to the relevant senior management staff which comprised Heads of Departments (HODs), Deputy Directors Generals (DDGs) responsible for construction projects, Chief Financial Officers (CFOs), Chief Directors (CDs) Supply Chain Management, Chief Directors (CDs) Human Resources Management, and some Senior Project Managers. Self-

administered surveys formed the basis of the research methodology. The data and information gathered through the structured questionnaire were ordinal in nature and were analysed using hierarchy analysis tools (see chapter six). The open-ended section of the questionnaire was analysed using thematic content analysis (see chapter six).

- Conclusions were drawn from the analysed data and recommendations for further study and improvement were stated.

4.4 QUALITATIVE RESEARCH: PLANNING AND IMPLEMENTATION

In qualitative research, research cannot be seen as an activity independent of the researcher (Creswell, 2013). As Denzin and Lincoln (2011, p.3) opine that:

> *Qualitative research is a situated activity that locates the observer in the world. Qualitative research consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them.*

4.4.1 Qualitative research process

This section presents the preliminary interview conducted with three senior project managers in Gauteng Provincial Departments of Public Works between 25th of January, 2012 and 19th of March, 2012 at the initial stage of this study. The major reason for the preliminary interview was to understand the organisational structural settings (organogram) of the Departments, the decision making processes (i.e. the integration and differentiation in terms of division of labour/job description) and work and process flows from the management level down to the project level. This section also presents the semi-structured interviews held with the Heads of Departments (HODs) as Chief Accounting Officers in the Departments of Public Works in Gauteng, Limpopo, and Mpumalanga Provinces. The interviews were conducted between the 21st of January, 2013 and 30th of

June, 2013. The aim of the interview was to generate constructs and themes to be inputted in the design of the structured questionnaire, which was subsequently used for gathering quantitative data in the nation-wide survey.

4.4.2 Conduct of preliminary interviews with three senior project managers in Gauteng province

As earlier stated, the interviews with the senior project managers were to establish the challenges and problems besetting the South African public sector projects that were worth researching. The first interview took place on the 25th January, 2012, about 14:00 to 14:55 with the first senior project manager. The interviewer arrive the Department at exactly 13:00 and proceeded to the interviewee's secretary office to confirm about the certainty of the time for the interview. Luckily, the time was still 14:00 for the interview. The interviewer waited for the time and the interviewee appeared exactly at 14:00, and the interview commenced at 14:00 and ended at 14:55. The interview took place at the interviewee's office in the Department. All the questions the interviewer asked the interviewee were basically to unpack the challenges that the Department faces during the procurement processes. The issues that severely contributed to the poor project outcomes were discussed.

The second interview took place on the 24th February, 2012 at lunch time (i.e. 13:00 to 14:00). This interviewee was very busy that was the reason why the interview took place during lunch time after many appointments had been postponed because of his busy schedule. The interviewer was at the Department at exactly 11:45 to confirm whether the interview would hold. The interviewee granted the interview. The interview commenced at exactly 13:00 as promised by the interviewee and ended at exactly 14:00. The same questions were asked and similar issues were raised by the second interviewee. The issues raised were challenges that affect the optimum performance of the public sector professionals during the procurement process which usually lead to poor procurement outcomes.

The third interview took place on the 19th of March, 2012 between 11:00 to 12:45. The interview took place in a hotel. The interviewee gave a call to the interviewer to come and meet him in the hotel. The interviewer went to the hotel as instructed by the interviewee at exactly 10:30 and the interview took place. The duration of the interview was longer than the first and the second interview. The interview took 1:45h because the interviewee discussed in detailed the issues and challenges militating against the optimum performance of public sector clients during the procurement process. The same questions were asked during the interview.

4.4.3. Conduct of semi-structured interviews with the Heads of Departments

Semi-structured interviews were conducted with three Heads of Departments from Provincial Departments of Public Works in Gauteng, Mpumalanga and Limpopo provinces. The three interviews were conducted between the 21st of January, 2013 and 30th of June, 2013. It took the interviewer six months to be able to interview the three Heads of Departments. This is because of their busy schedules in performing their job description. The Heads of Departments are the chief accounting officers of their Department and therefore held the responsibility of overseeing the performance of the entire operational units in their Departments. Many appointments were postponed because of the busy schedules of the Heads of Departments. The interview schedule is attached (see Appendix E). The major aim of the semi-structured interview was to develop some constructs and themes for the design of the structured questionnaire for the wide coverage of data collection from the National and all the Provincial Departments of Public Works professionals that are involved in the construction procurement process.

The first interview took place on the 21st January, 2013 at exactly 13:00 to 13: 55 in the Head of Department's office. The interview commenced at exactly 13:00 as promised and ended at exactly 13:55, because the interviewee had to go for other meetings that had earlier commenced even before the interviewer's arrival. Most of the questions asked were predominately dominated towards understanding the Department's organisational structure, decision making processes, processes and work flows, and the integration and differentiation in terms of supply chain

management delivery systems. Issues and challenges militating against the maximum performance of project outputs were discussed, which gave more understanding of the root causes of poor project outcomes.

The second interview took place on 9th April, 2013 about 16:00 to 17:15. The interview took place after the day's meeting was over and most of the staff had left, since it was closing time. The interviewer arrived in Limpopo province (i.e. Polokwane) a day before the interview day. The interviewer left Johannesburg at about 8:30 in the morning and arrived at Polokwane at about 11:30. The interviewer went straight to locate the Provincial Department of Public Works head office on the day of arrival since the permission letter given by the Head of Departments contained the physical address of the Department. Then the interviewer went to look for a hotel for a night. In the morning of the interview day, the interviewer went to the Department as early as 7:45 and proceeded directly to the HOD's secretary to confirm whether the HOD was even around and ready for the interview. The interviewer sat and was waiting for the arrival of the interviewee. Immediately, the interviewee arrived, the interviewer was introduced, but the interview could not be held until after the closing hours because of a series of meetings. Fortunately, the interview took place after closing hours. The same sets of questions were asked and related issues were raised during their procurement process.

The third interview took place on 30th of June, 2013 in Johannesburg between 17:00 to 18: 45. The interviewee came right from Mpumalanga province (i.e. Nelspruit) to Johannesburg and granted the interview in a hotel. The interviewer located the hotel and met the interviewee at 10:30 where introduction were made between the interviewer and the interviewee. The interview was supposed to start by 11:00, but was interrupted because the interviewee had to attend an emergency meeting with the Premier. The interview were shifted to 17:45 and ended at exactly 19:30 the same day. The same interview questions were asked and issues were raised about the challenges the Department had. This interview took about 1:45h where the interviewee started by explaining the structural and institutional

arrangements in the Department. Detailed on how decisions were made from top management down to project level were discussed.

4.4.4 Interview Scope

The preliminary interviews were conducted with the senior project managers. The semi-structured interviews were conducted with the Chief Accounting Officers (i.e. Heads of Departments) in the Provincial Departments of Public Works in Gauteng, Limpopo, and Mpumalanga Provinces, who granted the requests for participation in the interviews. The reason why the Heads of Departments (H.O.Ds) were selected for the interviews because of the experience they have built over the years in the Department of Public Works, and at the same time they are Chief Accounting Officers of their Departments. All the heads of operational units report to the H.O.Ds, and therefore, they would have sufficient experience to answer the interview questions adequately.

4.4.5 Interview Strategy

Semi-structured interviews were used to generate constructs and themes underlying the research questions, which subsequently formed the basis for the design of questionnaires used at the quantitative data gathering stage. The causes of poor project outcomes and the challenges envisaged at the preliminary interviews with the senior project managers are presented in Table 5.1. The constructs and themes sought from the Heads of Departments for the measurement of public sector clients' performance (effectiveness and efficiency) in the National and Provincial Department of Public Works during procurement processes through the semi-structured interviews are presented in Table 5.2 to Table 5.24.

For instance, instead of posing direct questions to the interviewees on the factors that cause delay or late payment to contractors, suppliers and consultants, an indirect or general question is posed, such as, *"what are the main factors that lead to contractors, suppliers and consultants receiving their payments between 30 to 90 days from public sector organisations?"* In this way, the interviewee's

responses were assumed to be projections of their own experiences, though attributions were made to clients in general (Saunders *et al.,* 2016). The integration of the pilot survey within the overall research framework was very important to encapsulate these issues.

4.4.6 Interview Sample Frame

A purposeful sampling method was adopted for the semi-structured interviews in these provinces. The sampling frame was used to select individuals to yield the most information about the topic under investigation (Leedy and Ormrod, 2014). The Heads of Departments (HODs) from Gauteng, Limpopo, and Mpumalanga in the Provincial Departments of Public Works were selected during the semi-structured interviews because of the years of experiences they had built working in these Departments. The semi-structured questions posed could best be answered by the Chief Accounting Officers, who are the Heads of Departments in the Provincial Departments of Public Works. Asking respondents who can best answer the research questions posed (Leedy and Ormrod, 2014) would increase the validity and reliability of the obtained data (Saunders *et al.,* 2016). Table 5.1 to Table 5.24 show the emerging themes and constructs identified in terms of frequency in the transcripts obtained from the preliminary interviews conducted with the senior project managers and the semi-structured interviews conducted with the Heads of Departments from three provincial DPW.

4.5 QUESTIONNAIRE SURVEY: PLANNING AND IMPLEMENTATION

Descriptive survey research was adopted in this study primarily to assess the public sector clients' opinions, perceptions and views. It was used in this study to gather information from senior management staff in the National and Provincial Departments of Public Works in South Africa about their beliefs, attitudes, opinions, perceptions and values. This is to identify the problems with construction procurement in the public sector projects. The structured and open-ended questionnaire was designed to assess the weaknesses and strengths of public sector clients during procurement processes. There were six categories of questionnaire to be administered to six heads of operational units that consisted of

the Heads of Department, Deputy Director General responsible for construction projects, Chief Financial Officer, the head of Supply Chain Management unit, the head of Human Resources Management unit and the senior project managers.

4.5.1 Selection of Participants

The Chief Accounting Officers (i.e. Heads of Departments) from Departments of Public Works in Gauteng, Limpopo and Mpumalanga Provinces were purposefully selected for the face-to-face interviews after they were approached and agreed to assist with the preliminary phase of the research. However, participants were also selected using *purposeful* sampling techniques (Neuman, 2005) for the administration of the questionnaire. Questionnaires were administered to the senior management staff.

The complexities and challenges faced by the public sector clients during the procurement processes in the National and Provincial Departments of Public Works could be addressed properly by senior management as the heads of operational units that deal directly with project delivery. Gidado (1996) opines that the complexities of construction projects at the management level are higher than at the project level. The questionnaire was distributed to the units or cases relevant in procurement/project delivery processes in the South African National and Provincial Departments of Public Works.

4.5.2 Population and Sample Sizes

Table 4.4 presents the population of the senior management staff. The senior management staff consisted of Heads of Departments (HODs), Deputy Directors General (DDGs), Chief Directors (CDs), and Senior Project Managers (SPMs). The population size was derived from the organisational structure (organogram) of the National and each Provincial Department of Public Works. A request was made to the various Departments for their organisation structure (organogram) so that the numbers of the senior management staff could be obtained. After the numbers of the senior staff were recorded, phone calls were made to the Heads of Human Resources Management units of all nine (9) Departments to ensure

correctness of headcount captured before it was adopted for the study. This is to ensure that all the relevant operational units that are involved with procurement process in these Departments were covered and represented for the study. By doing so, **content validity** would be assured since all the relevant units in the Departments that deal with the delivery (procurement) of construction projects were covered and taken into consideration for the overall study. The heads of relevant operational units were the target of the chosen sample size. The sample sizes of the population were also indicated in Table 4.4.

Table 4. 4: Population and sample sizes of senior management staff

S/N	National & Provincial Departments	Population (No.)	Sample size (No.)
1	Gauteng	36	12
2	Mpumalanga	40	12
3	North West	36	12
4	Free State	34	11
5	Kwa-Zulu Natal	36	14
6	Limpopo	39	15
7	Western Cape	45	12
8	Eastern Cape	45	12
9	Pretoria	54	15
	Total	**365**	**115**
	Rate (%)	**100**	**32**

4.5.3 Choosing a Sample size in a Descriptive Survey Study

Saunders et al. (2016) opined that the sample size should be chosen based on the representativeness of the population considered for the study. The main aim of choosing a representative sample size is to make inferences for the generalisation of the research findings to the wider population. Here, the **external validity** of the research study is considered since the result can be generalised to the wider population. The total population is 365 (100%) and the sample size is 115 (32%) of the population size. Therefore, the sample size consisted of one third (1/3) of the population size as shown in Table 4.4.

4.5.4 Questionnaire administration across National and Provincial Departments

Questionnaire administration in Province E

The researcher left Johannesburg at about 7:30 on 1st of June 2014 to Province E and arrived at 11:30. The researcher secured accommodation close to the Department. The next morning, the researcher proceeded to the Department for the administration of the questionnaires. Questionnaires were distributed to respondents through their secretaries on the 2nd of June. None of the respondents attended to the questionnaires on the first day. On the second day (i.e. 3rd of June), the head of human resources was the first and only one who filled and returned the questionnaire through his secretary. It took the researcher 12 days (i.e. from 1st of June to 12th of June) to collect all the questionnaires distributed in the province.

Questionnaire administration in Province F

The researcher left province A at 14:23 on 12th of June and arrived province F at exactly 23:30 same day. The researcher proceeded to the Provincial Department of Public Work on 13th June at 7:30 in the morning. The secretary to the Head of Department assisted the researcher with the distribution of the questionnaires to the six heads of units via their secretaries. Questionnaires were filled and returned back to the researcher within two working days (i.e. 13th and 14th) from the head of construction projects, chief financial officer, head of supply chain management and head of human resources management. This was possible because the Head of Department pleaded with them to assist and fill the questionnaires. The Head of Department questionnaire was later e-mailed to the researcher. The researchers had to wait to collect the senior project managers' questionnaires as they were not in their offices but were distributed to various construction projects within the province. The researcher collected all the questionnaires distributed in this province. The researcher left Province F at about 14:45 on 22nd June, 2014 and arrived in Johannesburg at 17:33.

Questionnaire administration in Province G

The researcher left Johannesburg the next morning (i.e. 23rd June, 2014 at 7:00) to Province G. The researcher arrived at Province G at 12:20, and located the office of the Department of Public Works. On arrival at the Head of Departments, the secretary to HOD received the researcher but the Head of Department was absent as he has travelled to a conference. The secretary assisted the researcher by showing the six operational units offices and the questionnaires were distributed through their secretaries. Unfortunately, no senior project managers were found in their offices as they were working on different building projects across the province. The researcher had to travel to the various project sites on the 24th and 25th to locate the senior project managers with the assistance of a member of staff from the Department where questionnaires were distributed. The researcher took nine days to collect all the questionnaires distributed in this province, only one senior project manager did not return his questionnaire and there was no explanation on his inability to participate. The researcher left province G on 2nd July at 7:00 and arrived in Johannesburg at exactly 11:05 the same day.

Questionnaire administration in Province D

The researcher left Johannesburg the next morning (3rd July) at 6:00 and arrived in province D at about 15:10 then proceeded to locate the Department of Public Work in the province. The researcher secured accommodation very close to the Department. The researcher arrived at the Department the next morning at 7:30 and proceeded to the Head of Department office and was welcomed since the researcher had phone calls with the HOD's secretary. The researcher took the whole day (4th July) for the distribution of the five operational unit questionnaires because the offices were not located in one building. In this province the senior project managers were distributed in four zonal offices (north, east, south and west) within the province. It took the researcher four days (5th, 6th, 7th, and 8th of July) to distribute the questionnaires to the senior project managers in the zonal offices. All the questionnaires administered were filled and returned to the

researcher. The researcher left province D on the 12th of July, 2014 at 10:15 and arrived in Johannesburg at exactly 19:26 the same day.

Questionnaire administration in Province B

The researcher left Johannesburg on the 13th of July, 2014 at 7:05, to province B and arrived at 13:05 (lunch time) and located the Department of Public Works in the province. The researcher then proceeded to the Head of Department's office and was received by the Secretary. The Director of Research of the Department was called to attend to the researcher's request. The Director took the researcher to each office of the six operational units where all the questionnaires were administered on the day of arrival. Some of the senior project managers were found in their offices in the Departments but some of them were on various projects in the zonal offices. 14th and 15th of July were used to locate other remaining senior project managers in the zonal offices and questionnaires were administered. Some filled and submitted the questionnaires to the researcher and some promised to return them through the Head Office. The researcher left province B on the 24th of July at 8:30 and arrived in Johannesburg at 14:34 the same day.

Questionnaire administration in Province I

The researcher left Johannesburg (O.R. Tambo internal airport) on 25th July, 2014 at 13:40 to province I and arrived at 15:30. The researcher was not able to locate the Department of Public Works office on the day of arrival. On 26th July the researcher was able to locate the office at 12:00 because the office was very far from the researcher's lodge. On arrival at the Head of Department office, the researcher was received by the secretary to the HOD and all the questionnaires were distributed to the various operational units with the assistance of the HOD's secretary on the arrival day. All the questionnaires were filled and returned via the HOD's office after six days, only the HOD's questionnaire was not returned, as the HOD was out of the country at the time of the exercise, but promised through his secretary to do so, on arrival. The researcher left Province I on the 31st of July, 2014 at about 18:45 and arrived at province A at 8:00 on 1st August, 2014.

Questionnaire administration in Province A

The researcher arrived at the Department of Public Works in Province A at 9:30 on 1st of August, 2014 and proceeded to the HOD's office. The secretary to the HOD took the researcher to the Director of Research and was assisted with the administration of the questionnaires to the six operational units. Some of the senior project managers were around because of the meeting held by the Head of construction projects, but some had left to their various duty posts in the zonal offices. The researcher with the assistance of the secretary to the Chief Director Construction Projects went to the zonal offices and project sites where some of the remaining senior project managers were located. Questionnaires were administered (on 3rd and 4th of August) and some filled and returned to the researcher while others promised to submit through the Director's office at the head office at the provincial office. All questionnaires were filled and returned back to the researcher except the Chief financial officer's own and there was no explanation as to the inability of the respondent to participate. The researcher left province A on the 10th of August at about 16:10 and proceeded to Johannesburg. The researcher arrived at Johannesburg at 7:00 on 11th August.

Questionnaire administration in Province C

On arrival, on the 11th of August, 2014, the researcher proceeded on same day to the Department of Infrastructure Development (i.e. Province C) and was welcomed by the secretary to the HOD. Questionnaires were administered the same day, with the assistance of the HOD's secretary. It took the researcher nine days to collect all the questionnaires administered in Province C. The Deputy Director General responsible for construction project's questionnaire was not returned and there was no explanation of the inability of the respondent to participate in the research. The researcher left province C on the 20th August, 2014.

Questionnaire administration in Province H

The researcher left from Johannesburg to Province H on the 21st of August and was received by the secretary to the Director General of the Department. The secretary to the Director General assisted the researcher with office addresses of the six heads of operational units. The Questionnaires were administered on the same day. The researcher came in daily to the Department from Johannesburg to follow up with the secretaries of these heads of units. It took the researcher 10 days (from 21st August to 1st of September) to collect all the questionnaires administered in this province. The Head of supply chain management unit's questionnaire was not returned and there was no information about the inability of the respondent to participate. Table 4.5 shows the responses obtained from the pilot and primary surveys.

Table 4. 5: Responses to pilot and primary surveys

Respondent group	**Pilot survey (No.)**	**Primary survey (No.)**
Heads of Departments (HODs)	1	8
Deputy Directors General (DDGs) for projects	1	8
Chief Financial Officers (CFOs)	1	8
Heads of Supply Chain Management (SCMs) units	1	8
Heads of Human Resources Management (HRMs) units	1	9
Senior Project Managers (SPMs)	8	69
Sample size	15	115
Questionnaires returned	13	110
Response rate (%)	86.7	95.7

4.5.5 Pilot Testing and Primary Survey

Saunders et al. (2016) and Creswell (2013) have insisted that a pilot study must be conducted for any type of scientific research in order to test the validity of the research instruments. Bell (2010) also advised that the questionnaire should be given a trial run in order to know whether the questionnaire will succeed or not.

As indicated in Table 4.5, the pilot survey questionnaires were categorised into six different types. Each questionnaire was designed for specific units that are involved with construction procurement in the National and Provincial Department of Public Works.

Table 4.5 shows that out of the 15 pilot survey questionnaires self-administered to the respondents in the National Department of Public Works Regional Office A, 13 were returned at the end of the survey period of three weeks. However, two uncompleted questionnaires were not returned and there was no feedback stating the main reasons for the inability of respondents to participate in the survey.

Similarly, during the primary data collection period, a total of 115 questionnaires were distributed to the respondents in the National and Provincial Departments of Public Works, 110 valid responses were returned in the primary survey. However, five uncompleted questionnaires were not returned and there was no feedback stating the main reasons for the inability of respondents to participate in the survey.

4.5.6 Response Rate

Table 4.6 shows the overall response rate of 95.7% obtained in the primary survey. It is shown that members of the Human Resources Management units responded the most as they are perceived to be involved in public sector construction projects given the reported cases of scarcity, shortage of skills and expertise of construction professionals within the National and Provincial Departments of Public Works in South Africa. Table 4.6 indicates the response rate during the conduct of the primary survey.

Table 4. 6: Response Rate During Primary Survey

Respondent group	**Sample Size (No.)**	**Response (No.)**	**Response Rate (%)**
Heads of Departments	9	8	88.9
Deputy Directors General	9	8	88.9
Chief Financial Officers	9	8	88.9
Heads of Supply Chain Management units	9	8	88.9
Heads of Human Resources Management units	9	9	100
Senior Project Managers	70	69	98.6
Total	**115**	**110**	**95.7**

4.5.7 Effort to Improve the Response Rate

Generally, because of the low response rate from respondents in relation to survey research, precautions were taken right at the initial stage. Questionnaires were

distributed face-to-face, from one Provincial Department to another (from 02/06/2014 to 01/09/2014) to increase the response rate. The questionnaires were sent through the e-mail addresses of the participating respondents two weeks prior to the face-to-face meetings to enable respondents to study the structured questionnaire. E-mail addresses of the various respondents were obtained from the Heads of Human Resources Management units with the permission of the Heads of Departments (HODs) as Chief Accounting Officers of each Provincial Department. Since all the respondents received the written questionnaires via e-mail two weeks prior to the face-to-face meetings, the response rate obtained was very high (95.7%), which enhances confidence in the response data, since only the heads of the operational units were targeted for the study.

The major reason why the heads of departments were targeted for the study is due to the experiences they have built over the years. Similarly, the challenges and complexities of issues that led to poor project outcomes in these departments needed personnel with a wealth of experience to be able to give accurate responses to the questions in the questionnaire. The procedure followed in the pilot and primary data collection process is indicated in Table 4.7.

Table 4. 7: Data collection procedure and duration during the conduct of the study

Research activity	Pilot survey (Date)	Primary survey (Date)	Provinces
One-on-one survey initiated	05/05/2014	02/06/2014 --- 12/06/2014	Limpopo
1st e-mail reminder sent	12/05/2014	13/06/2014 --- 22/06/2014	Mpumalanga
2nd e-mail reminder sent	19/05/2014	23/06/2014 --- 02/07/2014	North West
3rd e-mail reminder sent	26/05/2014	03/07/2014 ----12/07/2014	Kwa-Zulu Natal
		13/07/2014 --- 24/07/2014	Free State
		25/07/2014 --- 31/07/2014	Western Cape
		01/08/2014 --- 10/08/2014	Eastern Cape
		11/08/ 2014 ---20/08/2014	Gauteng
		21/08/2014 --- 01/09/2014	Pretoria

4.5.8 Interpretation of the Results

The results could be obtained from the structured questionnaire are interpreted and discussed by using descriptive statistics (Leedy and Ormrod, 2014). The Likert-scale type questionnaire is discussed based on the measurement scale; percentages are used where appropriate during the descriptive statistical analysis

of the data (Saunders *et al.,* 2016) obtained from the respondents. It is also important to identify the ranges in the percentages used to describe the data (Easterby-Smith *et al.,* 2015) for more in-depth understanding of what the data entails. Table 4.8 discusses the percentages around the terms used in this research.

Table 4. 8: Terms used to discuss percentage ranges

Range	Meaning
≥ 80% ≤ 100%	Most
≥ 60% < 80%	Majority
≥ 40% < 60%	Less than half to more than half
≥ 20% < 40%	Less than half
≥ 1% < 20%	Minority

The ordinal data obtained from the respondents during the questionnaire administration is analysed since the Likert-scale type questions are discussed based upon the measurement scale indicated in Table 4.9. Though ordinal data are ranked, they should not be treated as interval data because the difference between values cannot be assumed to be equal (Creswell, 2012).

Table 4. 9: Terms used in Likert scale of measurement

	LIKERT RATINGS				
TERMS	**1**	**2**	**3**	**4**	**5**
	Not satisfied	Fairly satisfied	Slightly satisfied	Satisfied	Highly satisfied
	Never	Rarely	Sometimes	Often	Always
	Limited	Below average	Average	Above average	Sufficient
	Totally disagree	Disagree	Neutral	Agree	Totally agree
	Poor	Fair	Good	Very good	Excellent
	Not important	Less than important	Important	More than important	Very important

4.5.9 Responses to Open-ended Section of the Questionnaire

The sampling frame was constituted by National and Provincial Departments of Public Works senior management staff. This comprised the heads of the six operational units that deal directly with the procurement of construction projects. This sampling frame was based on the *purposeful* sampling technique. All the six operational units have a specific questionnaire designed using structured questions

relating to the activities or roles that each unit plays during procurement processes (see Appendices B1, B2, B3, B4, B5, and B6). At the end of each unit questionnaire an open-ended question was incorporated that asked ***"Do you have any comments in general regarding the performance of DPW professionals?"*** This particular question generated open-ended responses from the respondents across National and Provincial Departments of Public Works. These open-ended responses were analysed using **thematic content analysis** to identify emerging patterns, concepts, themes and categories. **'Thematic content analysis'** refers to finding recurring subject matter or content (Leedy and Ormrod, 2014). It starts by identifying this **recurring material or subject matter** as well as identifying content that is **noticeably different from the rest** (Saunders *et al*., 2016).

4.5.10 Non-Sampling Error

According to Creswell (2013), non-sampling could cause error and that would result in bias in survey research. Biemer and Lyberg (2003) have identified five potential sources of non-sampling error which was critically taken under consideration while administering the questionnaires nation-wide:

- ***Specification error*** occurs when the measurement instrument is not properly aligned with the construct that is measured. In other words, the construct validity of the instrument is weak. In this study, the constructs were identified as the roles and responsibilities of each operational unit which reflect their obligation during project delivery.

- ***Coverage or frame error*** occurs when the sampling frame is a biased representation of the target population. In this study, the respondents were selected and represented equally from each province. Six heads of operational units were selected from each province.

- ***Non-response error*** occurs when some members of the sample do not respond. It is noted that a high response rate is essential to reliable statistical inference. In this study, 115 questionnaires (both structured and

open-ended) were distributed while 110 were returned, only five questionnaires were not returned.

- ***Measurement error*** occurs when data collection is not reliable. Instrument reliability as well as inter-and intra-rater reliability were used to help protect against measurement error.

- ***Processing error*** occurs as a result of editing mistakes, coding errors, data entry errors, programming errors, etc. during data analysis. To minimise or reduce the processing error, data entry was checked several times, data cleaning was used, and open and secondary coding was done, especially on the open-ended responses obtained from the open-ended section of the questionnaire.

4.5.11 Acknowledging Bias in Survey Research

Since bias cannot be eliminated totally in research, particularly in survey research, Rogelberg and Luong (1998) have suggested several strategies for identifying possible bias in questionnaire research. Two strategies were adopted in this study to avert or to reduce the intensity of bias since it cannot be totally avoided. These are the two issues raised by Rogelberg and Luong (1998) which the researcher looked at critically during the study:

- Careful scrutiny of the questionnaire for items that might be influenced by one's educational level, interest in the topic, or other factors that frequently distinguish respondents from non-respondents

- Compare the responses on questionnaires that were returned quickly with responses on those that were returned later, perhaps after a second reminder letter or after the deadline imposed. The reason is that significant differences between the early and the late questionnaires may probably indicate bias in the results.

4.6 INSTRUMENT FOR DATA COLLECTION

Instruments used for data collection in this study are:

(1) **Semi-structured interviews**: the initial study was conducted using semi-structured interviews **(Appendix E)** to generate constructs and themes for the design of questionnaires which were used for the wider coverage of data collection.

(2) **Structured questionnaire**: structured questionnaires **(Appendix B1 to B6)** were administered to elicit the views, perception, opinion and experiences of the six heads of operational units from National and Provincial Departments of Public Works professionals for wider coverage.

(3) **Open-ended questionnaire**: open-ended questionnaires **(Appendix B1 to B6)** were administered to elicit the open-ended responses in order to uncover the challenges and weaknesses that hindered the optimum performance of public sector clients in the National and Provincial Departments of Public Works in South Africa.

4.7 METHOD OF DATA COLLECTION

Both qualitative and quantitative (mixed methods) were used to collect data from the target participants. The mixed methods adopted for data collection were aimed at maximising the validity, reliability, and the quality of data collected for the study (Leedy and Ormrod, 2014; Saunders *et al.,* 2016). The data collected from the target participants should address the research questions posed, relate to the objectives and should be able to address either the whole problem or part of the problem stated in the study (Saunders *et al*., 2016).

4.8 METHOD OF DATA ANALYSIS

There are four methods of data gathering and data analyses adopted in this study. Firstly, the preliminary interviews conducted with the senior project managers

were analysed using content analysis in Table 5.1. Secondly, the semi-structured interviews conducted with the Heads of Departments from three Provincial Departments of Public Works were analysed using content analysis for the themes and constructs for the design of the questionnaire. Thirdly, the data obtained from the structured questionnaires were analysed using SPSS statistical analysis (frequency and mean). Fourthly, the open-ended responses obtained from the open-ended questionnaires were analysed using thematic content analysis in order to explain the causes of poor project performance from the South African National and Provincial Departments of Public Works.

4.9 TARGET SAMPLES

The target participants for this research were the senior management cadres that deal with construction procurement in the National and Provincial Departments of Public Works, Roads and Transport which comprised: Heads of Departments (Chief Accounting Officers) of the Departments, Deputy Directors General (DDGs) responsible for construction projects, Chief Financial Officers (CFOs), Heads of Supply Chain Management (SCM) units, Heads of Human Resources Management (HRM) units, and Senior Project Managers (SPMs). The said procedure was conducted irrespective of age distribution, level of education, socio-economic status, gender or creed. This is done to avert bias during sampling procedures.

4.10 VALIDITY IN MEASURING INSTRUMENTS

The validity of measuring instruments deals with the accuracy, meaningfulness, and credibility of the research project as a whole (Saunders *et al.*, 2016). Therefore, pre-testing the instruments (i.e. structured and open-ended questionnaire) as insisted on by Leedy and Ormrod (2014) and Creswell (2013) were done before it was adopted for primary data collection.

4.10.1 Internal Validity

In a questionnaire-based survey, internal validity would be established where a set of questions can be shown to be statistically associated with an analytical factor or outcome (Saunders *et al.*, 2016). In this research, threats to internal validity were taken into consideration during the conduct of this study in order to avert the logic leaps, flaws and false assumptions (Saunders *et al.*, 2016) in research design which might sacrifice the quality of research findings and conclusions (Cook and Campbell, 1979). Raimon (1993, 128) advises the researcher to "stand back from your research (design) and take a critical, objective view of it, as though you are a detached observer". The threats to internal validity are past and recent events, testing, instrumentation, mortality, maturation and ambiguity about causal direction (Saunders *et al.*, 2016).

4.10.2 External Validity

In contrast, the external validity was addressed in the sampling design, which involved the following:

- The participants' views, opinions, perceptions, experiences, weaknesses and challenges from the heads of six operational units in the National and the Provincial Departments of Public Works in South Africa relating to the delivery of public sector projects were captured.
- Computation of required sampling sizes to ensure representation, and for generalisation purposes (Saunders *et al.*, 2016); the National and the Provincial Departments of Public Works heads of operational units were covered that deal with procurement process/delivery of construction projects.
- Nation-wide coverage of the surveys where the National and Provincial Departments of Public Works were covered with questionnaires administered to the senior management personnel who head the operational units and directly deal with procurement processes.

4.11 RELIABILITY IN QUANTITATIVE RESEARCH

"Reliability refers to whether a data collection techniques and analytical procedures would produce consistent findings if they were repeated on another occasion or if they were replicated by a different researcher" (Leedy and Ormrod, 2010, p. 29). *Reliability is a necessary but insufficient condition for validity* (Leedy and Ormrod, 2010, p. 29).

4.11.1 Determining the Reliability of Measuring Instruments

To avoid threats to reliability of research findings and conclusions, a methodological rigour was adopted to ensure that the research process is clearly thought through and evaluated and does not contain logic leaps and false assumptions (Saunders *et al.,* 2016) in carrying out the research. The threats to reliability are participants' error, participants' bias, researcher's error and researcher's bias (Saunders *et al.,* 2016).

4.12 VALIDATION STRATEGIES ADOPTED IN THIS STUDY

Validation strategies adopted in this study include: triangulation; clarification of researchers' bias; in member checking. In addition, the following were used:

- The use of mixed methods approach which validates the objective and subjective judgement (Creswell, 2013)
- Pilot interviews to ensure that relevant constructs and themes are incorporated within interview protocols and questionnaire design (Creswell, 2012, 2013)
- The pre-testing of the questionnaire in order to test the research instruments.
- In triangulation, multiple and different sources, methods, strategies, investigators and theories (Lincoln *et al.,* 2011) were used to provide corroborating evidence in this research work.

- The use of four sequential methods of data gathering (i.e. preliminary interviews, semi-structured interviews, structured and open-ended questionnaire)
- The use of four sequential methods of data analysis (i.e. content analysis on the preliminary interviews conducted with the senior project managers, content analysis on the semi-structured interviews conducted with the Heads of Departments, statistical hierarchy analysis for the ordinal data obtained from the structured questionnaire and thematic content analysis for the responses obtained from the open-ended section of the questionnaire.

4.13 ETHICAL CONSIDERATIONS

The university's rule guiding the ethical issues was strictly adhered to during the conduct of the interviews and the administration of questionnaires to the target participants. The names of participants' organisation and individuals were not recorded on the research instruments for anonymity and confidentiality (Saunders *et al.,* 2016).

4.14 SUMMARY

This chapter discussed the research process from research philosophy, research design, and data collection methods, instruments for data collection, sampling techniques, to pilot testing and primary survey. It discussed the different types of data sources, locations and sampling frame adopted in the study. The research is sequential in nature, starting from the exploratory interviews, then descriptive (structured question) and concluding with explanatory (open-ended question). The initial preliminary interviews were conducted with three senior project managers from Gauteng Province. The semi-structured interviews were conducted with three Heads of Departments from Gauteng, Limpopo and Mpumalanga Provincial Departments of Public Works. The questionnaires were distributed to the six operational units in the National and Provincial Departments of Public Works, who are Heads of Departments, the Deputy Director Generals on construction

projects, the Chief Financial Officers, The Heads of Supply Chain Management units, the Heads of Human Resources Management units, and the Senior Project Managers. The next chapter presents the preliminary and semi-structured interviews conducted with the senior project managers and the Heads of Departments for the identification of themes and constructs for the design of questionnaires for a nation-wide survey.

CHAPTER 5

QUALITATIVE DATA PRESENTATION AND ANALYSIS

5.1 INTRODUCTION

Whilst chapter 4 presented the research design and methods for the conduct of this study, the main purpose of chapter 5 is to develop constructs and themes for the design of structured questionnaire for nation-wide survey. This chapter presents the analysis of qualitative data obtained from: (i) the preliminary interviews conducted by the three senior project managers and (ii) the semi-structured interviews conducted by the three Heads of Departments in the Provincial DPW. The data set from preliminary and semi-structured interviews were aimed at answering the first and the second research questions of this study that was detailed in chapter 1 and in the discussion of the research design and methods in chapter 4. The preliminary interviews were conducted with three senior project managers at the initial stage of the research in 2012. The main reason for the preliminary interviews was to surface the nature of the problems besetting the National and Provincial Departments of Public Works, which have contributed to poor project outcomes.

The second data source – the semi-structured interviews was conducted with three purposefully selected Heads of Departments (i.e. the Chief Accounting Officers) in the South African Provincial Departments of Public Works in 2013. The aim of the semi-structured interviews was to identify the themes and constructs that would be used for the design of structured questionnaire for the wider coverage of data collection from the six heads of operational units. The semi-structured interview covered areas such as: organisational structure (organogram), decision making processes (from management level down to site-specific levels), and the process and work flows (the integration and differentiation in roles) and processes involved in the South African public sector construction projects.

Information generated from the semi-structured interviews was to complement what was known in the literature in the design of the questionnaire that generated the quantitative data, which sought to elicit the views, opinion, perceptions and experiences of the public sector clients (DPW professionals). The reason for interviewing Heads of Departments was because of their years of experience built up in the system and at the same time they are the chief accounting officers of the various operational units of the Department of Public Works. In governance procedures, all the operational units escalate their problems for further feedback on issues that are above their levels to the Heads of Departments. The recurring themes and constructs emerged from the analysis of the semi-structured interviews were incorporated into the design of structured questionnaire used for the quantitative data gathering at the second stage of the research.

From the semi-structured interviews conducted with the Heads of Departments, 137 constructs emerged from the content analysis obtained from the interview transcripts. The constructs were used as public sector client KPIs in the design of the structured questionnaires administered nation-wide for the measurement of public sector clients' effectiveness and efficiency in the procurement process. The content analyses were conducted based on the roles and obligations of the six operational units that are involved in the procurement process. The constructs are shown in Table 5.2 to Table 5.24.

The semi-structured interviews also disclosed challenges that beset the optimum performance of public sector clients in the National and Provincial Departments of Public Works in South Africa. Content analysis was used to analyse the semi-structured interviews. Although content analysis is an interpretive, qualitative method, its underlying positivist framework (Easterby-Smith *et al.*, 2015) makes it possible to introduce some elements of quantification into the process, for instance, counting in terms of the occurrences of certain words, phrases, or ideas as part of the analysis. Most approaches to qualitative data analysis frame data in a way that allows for a systematic reduction of their complexity (Easterby-Smith *et al.*, 2015). This facilitates the incremental development of theories about the phenomenon under research (Leedy and Ormrod, 2014; Saunders *et al.*, 2016).

However, the ways in which *complexity is reduced* (i.e. which window or frame is chosen) and how *theories are developed* (i.e. how data are organised and interpreted to achieve meaningful conclusions) vary between different approaches (Easterby-Smith *et al.*, 2015).

The choice of the two sources of qualitative data that was used in this chapter was in line with the philosophical and methodological assumptions that underpin this study, which is pragmatic in nature (Easterby-Smith *et al.*, 2015). In the following sections, the detail analysis of each of the two qualitative data is presented.

5.2 RESPONSES TO THE PRELIMINARY INTERVIEWS

Three senior project managers from Gauteng Departments of Public Works were interviewed regarding their performance and challenges experienced during procurement processes. The main reason for selecting the senior project managers for the preliminary interview was because they were charged with the responsibility of liaising between the management and the project level. Hence, they were found suitable to provide information on issues at management level as well as at site-specific level. The senior project managers were asked this specific question: **What challenges do you experience during procurement process?** Content analysis was used to analyse the participants' responses to the above question. The recurring challenges cited collectively by the three senior project managers are presented in Table 5.1.

Table 5. 1: Challenges experienced by DPW senior project managers during procurement processes

S/N	Procurement Challenges	*Response
1.	*Rating of project delivery process as good, not excellent or poor*	3
2.	*No detailed template for clarifying project briefs*	3
3.	*Legislative and administrative procedures lead to time and cost overruns*	3
4.	*Lack of enough capabilities within in-house trained professionals and technical expertise to supervise all projects*	3
5.	*Insufficient in-house professionals to be represented on each project site*	3
6.	*Lack of mechanism to monitor in-house professionals' participation on project sites*	3
7.	*Low participation of end users' agents due to high incapacitation of User Department organisation*	3
8.	*DPW are highly incapacitated because of lack of standard documentations*	3
9.	*Lack of professional training and short courses to enhance the skills and expertise of technical professionals*	3
10.	*Delayed/late payment to contractors and end user agents due to cash flow challenges*	3
11.	*Weak or neglect of project monitoring and supervision*	3
12.	*Disputes between project managers and consultants as a result of quality of work done by contractors*	3
13.	*Bureaucratic bottlenecks and long decision making processes*	3
14.	*Design changes and variation due to contingency, unforeseen circumstances due to weather, earthworks, disasters, changes in User Department briefs and due to administration and political issues.*	3

Table 5.1 showed the 14 recurring challenges that emerged from the participants' responses at the preliminary interviews, and which are worthy of further investigation.

5.3 RESPONSES TO SEMI-STRUCTURED INTERVIEWS

The second data source of the qualitative inquiry is semi-structured interviews conducted with the Heads of Provincial Departments of Public Works from Gauteng, Limpopo and Mpumalanga Provinces (see Appendix E for the interview schedule). Content analysis was used for the analysis of semi-structured interviews. The constructs and themes that emerged from the content analysis are presented in Table 5.2 to Table 5.24. The constructs and themes identified were in relation to the following: the organisation (organogram) structure, decision making processes, and the work flows from management level down to the project level during the procurement processes.

Some of the issues that were not raised by the Heads of Departments and were mentioned in the literature were also presented to them for consideration in order to test the relevance of the issues (Leedy and Ormrod, 2014) in the local context. As mentioned already, the aim of the semi-structured interviews was to generate themes and constructs in the design of the structured questionnaires for the six heads of operational units in the National and Provincial DPW. Hence, the constructs and themes obtained from the HOD's responses were categorised and presented based on the six operational units responsible for the delivery of construction projects are:

i. the Heads of Departments (HODs) as the Chief Accounting Officers of their Departments,
ii. the Deputy Directors General (DDGs) responsible for construction projects,
iii. the Chief Financial Officers (CFOs),
iv. the Heads of Supply Chain Management (SCMs) units,
v. the Heads of Human Resources Management (HRMs) units, and
vi. the Senior Project Managers (SPMs)

The frequencies of the constructs that emerged from the three HOD's responses are presented in the relevant tables. However, only constructs that were mentioned by all the three HODs (i.e. having the frequency of 3) were incorporated into the design of the structured questionnaire. These constructs are presented in italics form in the tables.

5.3.1 Roles and obligations of the Heads of Departments (Chief Accounting Officers)

The constructs and themes in italics obtained from Table 5.2 to Table 5.5 were used for the design of structured questionnaire for the Heads of Departments which reflects their roles during the procurement processes. Chief accounting officers' responsibilities are to supervise the activities of the operational units that are responsible for project delivery.

5.3.1.1 Organisation of internal and external units

The organisation of internal and external units that are linked with delivery of projects in the National and Provincial Departments of Public Works was considered as enhancing the delivery of projects. Internal units are units within the DPW (capital project unit, internal planning unit, finance unit, human resources unit and supply chain management unit) that deal with procurement processes or delivery of construction projects while the external units are units outside the DPW but are directly linked with the delivery of projects. The external units are: Treasury unit, Project Monitoring unit, User Departments (National and Provincial Departments of Health and Education) and the Acts of Parliaments as an external input. The organisation of internal and external units in the semi-structured interviews for effective project delivery is presented in Table 5.2. This is to elicit the Heads of Departments' views for overseeing the performance of the operational units. The organisation of internal and external units for effective delivery of projects is presented in Table 5.2.

Table 5. 2: Organisation of internal and external units for effective project delivery

Internal or external to your organisation	***Response frequency**
1. *Capital project unit*	3
2. *Internal planning unit*	3
3. *Finance unit*	3
4. *Human resources management unit*	3
5. *Supply chain management unit*	3
6. *Treasury unit*	3
7. *Project management unit*	3
8. *User Departments (e.g. Departments of Health and Education)*	3
9. Member of Executive Council governed by Public Service Act on administrative matters	1
10. The public service Act looks after the administration and human resources issues	1
11. The public finance management Act (PFMA) looks at matters of finance, procurement and acquisitions	1
12.The structural and the institutional arrangements within DPW and User Departments (Departments of Health and Education)	1

5.3.1.2 Roles of operational units

The efficiency and effectiveness of operational units during the procurement process is vital for successful project outcomes. The performance in terms of operational units' roles and duties is presented in Table 5.3.

Table 5. 3: Roles of operational units

Operational units' roles	***Response frequency**
1. *The role of Treasury unit in releasing cash flows to DPW*	3
2. *The role of Finance unit in payments to contractors and consultants*	3
3. *The internal planning unit for high level planning of projects*	3
4. *The professional services unit for development of various designs*	3
5. The project management unit for the implementation of various operations at project sites	3
6. The HRM unit for recruitment and training of personnel	1
7. The SCM unit for posting of technical professionals and internal project managers to specific project sites	1

5.3.1.3 Performance of project management unit

The satisfaction of the chief accounting officers with the performance of project management unit in the DPW are elicited. This seeks the opinion and perceptions of the Heads of Departments in relation to the performance of project management unit for the overall performance of the DPW. The ability of project management unit during procurement process is presented in Table 5.4.

Table 5. 4: Ability of project management unit

Project management unit ability	***Response frequency**
1. *The ability to translate design on paper to end product*	3
2.*The ability to monitor in-house professionals' participation during site construction*	3
3. *The ability to monitor internal project managers' operations on site*	3
4. *The ability to set up work process flow for the implementation of proposed projects*	3
5. *The ability to work closely with relevant other internal units to share information and advice during construction processes*	3
6. The ability to monitor the performance of contractor to adhering to the specification outlined in the contract documents during construction process	1
7. The ability to work with other external consultants during project supervision	1

5.3.1.4 Procurement challenges

Challenges and weaknesses related to procurement were sought from the Heads of Departments within the wider context (i.e. National and Provincial DPW). The issues raised are presented in Table 5.5.

Table 5. 5: Procurement challenges during procurement processes

Procurement challenges	***Response frequency**
1. *User Departments' insufficient briefing on project needs/requirements*	3
2. *Insufficient capacity of DPW in-house technical professionals to supervise their projects*	3
3.*Ineffective monitoring & supervision of projects by DPW in-house professionals on their project sites*	3
4. *Delayed response to variation orders by DPW internal project management*	3
5.*Ineffective and insufficient training and development of DPW in-house professionals*	3
6.*Ineffective project monitoring and supervision by DPW internal project managers*	3
7.*Insufficient capacity of DPW appointed (external) professionals to supervise projects effectively*	3
8. *Ineffective supervision of projects by DPW appointed (external) professionals on their projects sites*	3
9. *Insufficient briefing (needs) from DPW planning unit to the architect for design purposes*	3
10. *Decision makers in contractor organisations not attending compulsory tender briefing session during tendering sessions*	3
11. *Incomplete documentation during the tendering stage by DPW procurement committees*	3
12. *Delayed cash transfer from Treasury for payments to service providers (i.e. contractors, suppliers and consultants)*	3
13. *Neglect of supervision and monitoring of projects by the DPW internal project managers*	3
14. *Ineffective handling of contingencies by DPW internal project managers*	3
15. *Delayed payments of approved variation orders by the Treasury or User Departments (Departments of Health and Education)*	3

5.3.2 Roles and obligation of Deputy Directors General responsible for construction projects

The constructs in italics from HODs' interviews presented in Table 5.6 to Table 5.12 were used for the design of structured questionnaire for the Deputy Directors General responsible for construction projects. It reflects their roles during the procurement processes.

5.3.2.1 Project request

The responsibility of DPW to deliver construction projects to User Departments has necessitated the DPW to advise and request the needs of User Departments to guide them on how to achieve their project objectives. The DPW ability to project requests from User Departments is presented in Table 5.6.

Table 5.6: DPW ability to project requests from User Departments

The ability of DPW to	***Response frequency**
1. *Advise the User Departments on the cost of the projects in relation to the budgetary allocation*	3
2. *Advise User Departments on the completion duration/time of the projects*	3
3. *Guide User Departments on their technical needs relative to the project execution plan*	3
4. *Using standardised briefing schedule to reach a common understanding with User Departments on their briefs (needs)*	3
5. *Apply user management plans (UMPs) during planning sessions on User Departments' need*	3
6. *Use the infrastructure development plans (IDPs) for planning of proposed projects*	3

5.3.2.2 Tendering processes

Adhering to the tendering processes and procedures by the DPW in the appointment of successful bidder by following the pillars of procurement during the selection processes was considered. Table 5.7 shows the activity of procurement officials during tendering stages and presents the DPW ability during tendering processes and procedures.

Table 5.7: DPW performance during tendering processes and procedures

DPW ability during tendering processes and procedures	***Response frequency**
1. *The ability of DPW compliance committee to comply with pillars of procurement during tendering processes as legislated*	3
2. *The input of procurement committee to tender advertising for contractor selection*	3
3. *The ability of bid evaluation committee to include professionals' reports in the adjudication processes*	3
4. *The ability of DPW to form a steering committee comprising User Departments, the community and DPW in-house professionals and consultants to oversee the delivery of projects*	3

5.3.2.3 DPW planning unit performance

The ability of the DPW planning unit for high level planning of projects for the proposed project execution during the planning stages is highlighted. The elements enhancing the DPW planning unit during planning sessions are presented in Table 5.8.

Table 5.8: Roles of DPW planning unit during planning sessions

Elements enhancing DPW planning unit	***Response frequency**
1. *Arrange for feasibility studies including the viability of project site*	3
2. *The ability of planning unit to establish a budget for the proposed projects*	3
3. *Identify government land for siting of projects*	3
4. *Develop a schedule for site planning*	3
5. *Check for outcome of environmental impact analysis (EIA) on the projects*	3
6. *Use the Medium Term Expenditure Framework (MTEF) for planning of proposed projects*	3
7.*The role of Premier's budgeting committee in project planning for the proposed projects*	3
8. *The use of infrastructure development plans (IDPs) for local government and other government institutions*	3
9. Two-year planning period for building projects	1
10. The three-year planning cycle for government infrastructural projects	1
11. 11. Responsibility for programmes and planning a particular number of projects	1
12. The use of roads assets management systems (RAMS) for planning purposes	1

5.3.2.4 DPW project managers' performance

Project performance depends as much on the performance of project manager specific to project site. The ability of project managers to adhere to their responsibility during site supervision is vital to the successful project outcomes. The DPW project managers' roles and duties during construction processes are presented in Table 5.9.

Table 5. 9: DPW project managers' roles and duties during construction processes

Project managers' ability to	*Response frequency
1. *Monitor site development processes and programmes*	3
2. *Attend to all queries raised during site meetings*	3
3. *Escalate issues raised that are beyond the internal project manager's capability to the senior project manager for deliberation*	3
4. *Check, verify and analyse the issues and forward to the senior management for further considerations*	3
5. *Develop daily and weekly reports from the project for monthly management meetings*	3
6. Be clued up with what is happening on the ground at project site	1
7. Be on site for the duration of the project execution	1
8. Be able to avert cost and time overruns during construction processes	1

5.3.2.5 DPW briefing elements

The elements enhancing DPW briefing were incorporated during the strategic planning sessions at the pre-contract stages for effective and sound project delivery. The DPW briefing elements were considered important for achieving good design production. The DPW briefing elements on effective project outcomes are presented in Table 5.10.

Table 5. 10: DPW briefing elements for effective project outcomes

Elements enhancing DPW briefing	*Response frequency
1. *The capability of DPW planning unit in advising User Departments on the needs/requirements for design and implementation purposes*	3
2. *The approach of DPW planning unit to work closely with the User Departments to understand their needs/requirements*	3
3. *The approach of DPW planning unit to receiving project request from User Departments during briefing stages*	3
4.*The ability of DPW planning unit using the Infrastructure Development Plans (IDPs) to incorporate User Departments' needs*	3
5. *The ability of DPW planning unit to implementing User Management Plans*	3

5.3.2.6 User Departments briefing element

User Departments briefing elements is one of the major contributors the User Departments can make to successful project design. The User Department briefing elements for effective project outcomes are presented in Table 5.11.

Table 5. 11: User Department briefing elements for effective project success

Elements enhancing User Departments briefing	*Response frequency
1. The ability of User Departments to establish and confirm funding through the Provincial Treasury for implementation of projects	3
2. *The ability of User Departments to explain their needs/requirements to DPW during planning sessions*	3
3.*The ability of User Departments to identify land owned by government for project development*	3
4. *The ability of User Departments to incorporate Municipalities' requirements in their briefing*	3
5. *The ability of User Departments to indicate to DPW planning unit the size of proposed projects during planning sessions*	3
6. *The ability of User Departments to identify their needs through working closely with Municipalities and Councillors*	3

5.3.2.7 Causes of design changes and variations

Design changes and variations emanate either from User Departments or DPW or both and are based on either deficiency of briefing from the User Departments at initial briefing stages or from additional needs/requirements arising during the construction processes. Thus, design changes and variations always come from either change in User Department requirements or changes during construction processes which could be due to mistakes during the briefing and planning sessions. Design changes during construction processes have been acknowledged to be expensive for the construction clients especially if the traditional procurement method is employed. The causes of design changes and variations from DPW and User Departments' perspectives are presented in Table 5.12.

Table 5. 12: Causes of design changes and variations

Design changes and variations due to	*Response frequency
1. *Additional out-of-predefined scope of items required by User Departments to be incorporated into the design during construction processes*	3
2. *Increase in User Departments' need*	3
3. *Poor design and costing solutions by external consultants*	3
4. *Poor briefing by User Departments to DPW planning unit*	3
5. *Appointment of new decision maker/political heads (e.g. 'MEC')*	3
6. *Poor interpretation of briefing (requirements) by DPW planning unit*	3
7. Due to occurrence of unforeseen circumstances during construction processes	1

5.3.3 Roles and obligation of Chief Financial Officers

The constructs and themes in italics obtained from Table 5.13 to Table 5.16 were used for the design of structured questionnaire for the Chief Financial Officers which reflect their roles during procurement processes.

5.3.3.1 Late payment factors

Late or delayed payments to service providers are considered as a major constraint that militates against the optimum performance, especially, of the main contractor. The underlying factors leading to late payment to service providers (i.e. contractors, consultants and suppliers) are presented in Table 5.13.

Table 5. 13: Factors leading to late payment to service providers

Late payment factors	***Response frequency**
1. *DPW internal project managers in dispute with consultants on payment certificate*	3
2. *Disputes as a result of quality of work done by contractors*	3
3. *Weak monitoring and supervision of projects by DPW internal project managers*	3
4. *Bureaucratic bottle necks*	3
5. *DPW internal project managers delayed processing of invoices*	3
6. *Delay in cash flows processing by the Treasury unit.*	3
7. Delay/late release of funds by the Provincial Department of Finance	1
8. Delay/late release of funds by the National Department of Finance	1
9. Delay with budget amendments and approvals due to legislative processes	1
10.Late/delay with releasing of budget by legislators	1

5.3.3.2 Budgets monitoring and controlling

Monitoring and controlling of budget is important to achieving successful project delivery. The DPW financial officers' roles during monitoring and controlling of budgets are presented in Table 5.14.

Table 5. 14: DPW financial officers' roles during monitoring of budgets

Monitoring and controlling of budgets	***Response frequency**
1. *Monthly and quarterly reviews of expenditure and income*	3
2. *Releasing cash flows that actually originate from the project team*	3
3. *Comparing expenditure on each project to the initial cash flow earlier submitted*	3
4. *Electronic payment to service providers (i.e. contractors, suppliers, etc.) by User Departments or the Treasury*	3
5. *Releasing funding based on each project's cash flow projection*	3

5.3.3.3 Project financing issues

It is acknowledged that the financial issues occurring during construction process affects the progress of works. The DPW financial issues identified during procurement processes are presented in Table 5.15.

Table 5. 15: Financing issues identified during procurement processes

Financial issues	***Response frequency**
1. *Financial issues identified during integrated (DPW and User Departments) planning sessions*	3
2. *Deficit/unforeseen mistakes in costing of projects*	3
3. *Delay with budget submission from DPW & User Departments to Department of Finance*	3
4. *Premier's cabinets delay with project approvals for funding purposes*	3
5. *Late disbursement of funds by the Treasury unit to DPW*	3

5.3.3.4. Financial challenges

The frequencies of financial challenges occurring during procurement processes could seriously affects the financial and budget performance, especially, the payment to service providers. The frequencies of financial challenges occurring during project delivery processes are presented in Table 5.16.

Table 5. 16: Frequency of financial challenges occurring in procurement processes

DPW financial challenges	***Response frequency**
1. *Insufficient number of professionals in Finance unit*	3
2. *Lack of training and development programmes*	3
3. *Shortage of professionals' skills and expertise in Finance unit*	3
4. *Poor audit results or records*	3
5. *A lack of qualification for effective performance*	3
6. *Limited knowledge management*	3
7. *Non-adherence to legislation*	3
8. *Non-adherence to Public Finance Management Act (PFMA)*	3
9. *Unauthorised expenditure by finance officers*	3
10. Late/delay payment to contractors and suppliers	1
11. Delay with contractors' cash flows	1
12. Cost overruns during project delivery	1
13. Time overruns during project delivery	1
14. Dispute between the contractor and project manager/consultants	1
15. Unforeseen circumstances (e.g. weather, earthworks, disasters)	1
16. Changes in User Departments briefs during construction processes	1

5.3.4 Roles and obligation of Heads of Supply Chain Management units

The constructs and themes in italics obtained from Table 5.17 to Table 5.19 were used for the design of structured questionnaire for the Heads of Supply Chain Management units which reflect their roles during the procurement processes.

5.3.4.1 Procurement committees' performance

Table 5.17 highlights procurement and supply chain management capability, which comprises of performance of procurement committees during tendering stage. The procurement committees' roles and duties during tendering processes are presented in Table 5.17.

Table 5. 17: Procurement committees' roles and duties during tendering processes

Ability of procurement officials to	***Response frequency**
1. *Comply with competitive tendering processes as legislated*	3
2. *Adherence to 21-days advertisement period in the media*	3
3. *The ability of bid adjudication committee to adjudicate the appointment of a suitable contractor*	3
4. *The ability of bid evaluation committee to adjudicate the appointment of a suitable contractor*	3
5. *The ability of specification committee in checking specified quality of materials and standard of workmanship*	3
6. *The ability of approval and recommendation committee to check, regulate and approve design for project implementation*	3
7. Follow detailed documentation processes during the selection of contractor	1
8. Adhere to method 4 provided by CIDB for the selection of best contractor	1
9. Award contracts based on contractor grading specified by CIDB	1

5.3.4.2 DPW performance during tendering stages

The DPW performance during tendering stage in choosing the highest bidder/contractor is an important contributor in making the construction process successful by adhering to the project specification stated in the contract documents. The DPW roles and duties during tendering processes and procedures are presented in Table 5.18.

Table 5. 18: DPW roles and duties during tendering processes and procedures

DPW roles and duties during tendering processes and procedures	*Response frequency
1.The ability of bid evaluation committee to include professionals' report in the adjudication processes	3
2. *The ability of DPW to form a steering committee comprising User Departments, the community and DPW in-house professionals and consultants to oversee delivery of projects*	3
3. *The ability of DPW compliance committee to comply with pillars of procurement during tendering processes as legislated*	3
4. *The input of procurement committees to tender advertising for contractor selection*	3
5. Design committee to check quality and compliance with required standards	1
6. Contractors' adherence to required standards for infrastructural projects	1

5.3.4.3 Supply chain challenges

Challenges and weaknesses related to supply chain were sought from the Heads of Departments within the wider context (i.e. National and Provincial DPW). The supply chain management challenges are presented in Table 5.19.

Table 5. 19: Challenges within the supply chain management unit

Supply chain management (SCM) challenges	*Response frequency
1. *Lack of training, education on & communication of the relevant SCM processes and procedures*	3
2.*Gaps in the implementation of SCM policies and procedures*	3
3. *Shortages in the application of the SCM policies, procedures and controls*	3
4. *Lack of thorough and comprehensive SCM documentations*	3
5. *Financial mismanagement in SCM processes*	3

5.3.5 Roles and obligation of Heads of Human Resources Management units

The constructs and themes in italics obtained from Table 5.20 to Table 5.22 were used for the design of structured questionnaire for the Heads of Human Resources Management units which reflect their roles during the procurement processes.

5.3.5.1 In-house professionals' performance

The performance of in-house professionals in DPW for effective delivery of project during procurement process is vital to successful project outcomes. The performance of in-house professionals during project supervision is presented in Table 5.20.

Table 5. 20: Performance of in-house professionals during project supervision

In-house professionals (e.g. engineers, QS, etc.)	*Response frequency
1. *Qualification of technical professionals*	3
2. *Remuneration packages for in-house technical professionals (e.g. engineers, QS, etc.)*	3
3. *Representation of internal project managers on each project site*	3
4. *Representation of in-house professionals on each project site*	3
5. *Possession of appropriate skills and technical expertise by in-house engineers, architects, QS*	3
6. *Number of in-house skilled professionals*	3

5.3.5.2 Satisfaction with performance of professionals

One of the responsibilities of the human resources management unit is to give sufficient training on skills and technical expertise to professionals so that their performance could be enhanced during the procurement process. The ability of DPW in-house technical professionals during project delivery is presented in Table 5.21.

Table 5. 21: Ability of DPW in-house technical professionals

DPW technical professional ability to	*Response frequency
1. *Go for professional training and short courses for performance improvement*	3
2. *Engage with design teams during design processes*	3
3. *Work closely with external consultants to acquire skills and technical expertise*	3
4. *Work closely with internal project managers on project site for enhancement of skills and technical expertise*	3
5. Be able to work on different types of projects	1
6. Be able to work under different climatic conditions	1

5.3.5.3 DPW professional representativeness

The DPW technical professionals need to be represented fully on project sites for effective delivery of projects. The representativeness of DPW in-house technical professionals on project sites are presented in Table 5.22.

Table 5. 22: DPW in-house professionals' representativeness on project sites

DPW in-house professionals' representativeness	*Response frequency
1. Allocation of internal project managers on specific project site	3
2. Maximum number of projects per in-house professionals	3
3. DPW in-house professional representation on project sites	3
4. Representation of professionals in all professional services fields	3

5.3.6 Roles and obligation of Senior Project Managers

The constructs and themes in italics obtained from Table 5.23 to Table 5.24 were used for the design of structured questionnaire for the Senior Project Managers which reflect their roles during the procurement processes.

5.3.6.1 Satisfaction with professional service unit

The responsibility of the professional service unit is to provide various in-house designs for National and Provisional DPW. Table 5.23 presents the data and frequencies of the interviewees' responses on technical professionals in professional service unit.

Table 5. 23: Performances of technical professionals in professional services unit

Technical professionals performance	*Response frequency
1. *Quantity Surveyors*	3
2. *Architects*	3
3. *Civil/Structural engineers*	3
4. *Electrical engineer.*	3
5. *Mechanical engineer*	3
6. Land surveyors	1
7. Town planners	1
8. Geo-technical engineers	1

5.3.6.2 Architect ability

The ability of architects to consider all requirements during design production is a vital criterion for achieving good design for the proposed project**.** Table 5.24 presents the data and frequencies of the interviewees' responses to aspects of architects' ability to meet requirements during design processes.

Table 5. 24: Architects' ability to meet requirements during design processes

Architects' ability with regards to	*Response frequency
1. *Functionality*	3
2. *Durability*	3
3. *Aesthetics*	3
4. *Economy*	3
5. Clients' satisfaction	2
6. Contractors' satisfaction	1
7. Design teams' satisfaction	1
8. Consultants' satisfaction	1
9. Suppliers' satisfaction	1

5.4 SUMMARY

This chapter has presented the challenges that emerged from the preliminary interviews conducted with the senior project managers at the earliest part of the study. The chapter also presented the semi-structured interviews conducted with the Heads of Departments at the later stage for development of themes and constructs for the design of the structured questionnaire. A total of 6 operational units that are responsible for the delivery of construction procurement were identified in this Chapter. The 6 operational units were responsible for construction procurement in the National and Provincial DPW, 24 key performance areas, and 137 key performance indicators that were used for the design of questionnaires for nation-wide survey. The questionnaire elicited the views, perception, opinion and experiences of the six heads of operational units on the issues and challenges that led to poor project outcomes. The next chapter presents the quantitative data.

CHAPTER 6

QUANTITATIVE DATA PRESENTATION AND ANALYSIS

6.1 INTRODUCTION

Whilst chapter 5 presented the development of structured questionnaires for a survey of public sector clients' performance in the South African construction procurement, the main purpose of chapter 6 is to analyse the responses to the ordinal-scale data obtained from the structured questionnaires. The chapter presents the quantitative data obtained from the primary surveys (structured questionnaire) using the six operational units that were responsible for the delivery of projects in the National and Provincial DPW. It also presents the analysis of the data and interpretations of the results. The recurring themes obtained from the content analysis of semi-structured interviews were incorporated into the questionnaire designed for the quantitative data gathering at the second stage of the research. The structured questions posed in the questionnaires were used to elicit the views, perceptions, opinions and experiences of the respondents in relation to their job description described in their roles and obligations during the procurement processes. The open-ended responses helped to explain or support the challenges and weaknesses envisaged by the respondents in the survey. The explanatory purpose helped in deductive approaches (Saunders *et al.*, 2016) because of the intention to explain why challenges and weaknesses occur during procurement processes.

From the semi-structured interviews conducted with the Heads of Departments, 137 constructs emerged from the content analysis obtained from the interview transcripts. The constructs were used as public sector client KPIs in the design of the structured questionnaires administered nation-wide for the measurement of public sector clients' effectiveness and efficiency in the procurement process. The content analyses were conducted based on the roles and obligations of the six operational units that are

involved in the procurement process. The constructs are used in Table 6.1 to Table 6.24.

6.2 RESULTS OF THE PRIMARY SURVEY

The data obtained from the administration of the structured questionnaire in the National and the Provincial Departments of Public Works were coded and analysed using the SPSS statistical analysis tool (see Appendix F1, F2, F3, F4, F5 and F6).

Table 6.1 indicates the respondents' ratings relative to the extent to which the indicated units were internally or externally organised to facilitate project delivery processes on a scale of 1 (poor) to 5 (excellent), and derived mean scores ranging between 1.00 and 5.00. It is observed that all the five units were rated above the mid-point score of 3.00, which suggests that in general the respondents agree that all the five units have contributed *positively* during the project delivery processes, although the performance of the capital project unit, internal planning unit and finance unit were rated *highest* with mean scores of 3.57.

Table 6. 1: Perceived impact of operational units on project delivery processes for effective project

Internal or external to your organisation **No of respondents = 8**	**Responses %** **Poor……..Excellent**							
	Unsure	**1**	**2**	**3**	**4**	**5**	**MS**	**Rank**
Capital project unit	22.2	0.0	11.1	22.2	33.3	11.1	3.57	1
Internal planning unit	22.2	0.0	11.1	22.2	33.3	11.1	3.57	1
Finance unit	22.2	0.0	11.1	22.2	33.3	11.1	3.57	1
Human resources management unit	22.2	0.0	22.2	22.2	22.2	11.1	3.29	4
Supply chain management unit	22.2	0.0	22.2	22.2	33.3	0.0	3.14	5

The finding from Table 6.2 shows that respondents were *satisfied* with all the five operational units' performances as they were all rated above mean score of 3.00. The respondents perceived that the role of Treasury unit in releasing cash flows to the DPW and the role of Finance unit for payments to service providers were rated *higher*

with mean scores of 3.86 each, and thus contribute *positively* during project delivery processes.

Table 6. 2: Perceived satisfaction levels with the performance of operational units

Operational units **No of respondents = 8**	**Responses %** **Not satisfied……Highly satisfied**							
	Unsure	**1**	**2**	**3**	**4**	**5**	**MS**	**Rank**
The role of Treasury unit in releasing cash flows to DPW.	22.2	0.0	0.0	22.2	44.4	11.1	3.86	1
The role of Finance unit in payments to contractors and consultants.	22.2	0.0	11.1	22.2	11.1	33.3	3.86	1
The internal planning unit for high level planning of projects.	22.2	0.0	11.1	44.4	11.1	11.1	3.29	3
The project management unit for the implementation of various operations at project sites.	22.2	0.0	11.1	44.4	11.1	11.1	3.29	3
The professional services unit for development of various designs.	22.2	0.0	22.2	22.2	22.2	11.1	3.29	3

Table 6.3 presents the respondents' ratings of the level of satisfaction with the performance of the project management unit for achieving success in project delivery. It shows that all the project management unit's performances were rated above mean score of 3.00, which indicates that in general the respondents were *satisfied* with the performances of all five project management units for achieving success in project delivery.

The finding shows that, based on the ranking, the respondents are *most satisfied* with the ability of the project management unit to work closely with relevant other internal units to share information and advice during construction processes.

Table 6. 3: Perceived satisfaction levels with the performance of project management unit

Project management unit performance No of respondents = 8	Responses % Not satisfied……Highly satisfied							
	Unsure	1	2	3	4	5	MS	Rank
The ability to work closely with relevant other internal units to share information and advice during construction processes.	33.3	0.0	0.0	33.3	22.2	11.1	3.67	1
The ability to translate design on paper to end product.	33.3	0.0	0.0	44.4	11.1	11.1	3.50	2
The ability to monitor in-house professionals' participation during site construction.	33.3	0.0	11.1	22.2	22.2	11.1	3.50	2
The ability to monitor internal project managers' operations on site.	33.3	0.0	11.1	33.3	11.1	11.1	3.33	4
The ability to set up work process flow for the implementation of proposed projects.	33.3	0.0	11.1	44.4	0.0	11.1	3.17	5

Table 6.4 shows the respondents' ratings of frequency at which procurement challenges occur during procurement processes. It is shown that six out of the fifteen procurement challenges were ranked from 3.00 and above, which indicates that in general the respondents agree with the procurement challenges *always occurring* during the delivery of public sector projects.

The finding from Table 6.4 suggests that insufficient briefing on project needs/requirements by User Departments, insufficient capacity of DPW in-house technical professionals to supervise their projects, ineffective monitoring and supervision of projects by DPW in-house professionals on their projects sites, delayed response to variation orders by DPW internal project management, ineffective and insufficient training and development of DPW in-house professionals and ineffective project monitoring and supervision by DPW internal project managers are the *most critical* and *severe* challenges envisaged by public sector clients during project delivery processes. Moreover, these challenges should be taken seriously because they were rated higher by the Heads of Departments, who are the chief accounting officers of their Departments and based on their years of experience in terms of understanding the challenges and weaknesses that hinder the optimum performance

of project outcomes. The procurement challenges ranked from 1 to 6 are considered relevant for further analysis.

Table 6. 4: Perceived procurement challenges during procurement processes

Procurement challenges	**Responses %**							
	Never……...Always							
No of respondents = 8	**Unsure**	**1**	**2**	**3**	**4**	**5**	**MS**	**Rank**
User Departments' insufficient briefing on project needs/requirements.	22.2	0.0	0.0	66.7	11.1	0.0	3.14	1
Insufficient capacity of DPW in-house technical professionals to supervise their projects.	22.2	11.1	0.0	33.3	33.3	0.0	3.14	1
Ineffective monitoring & supervision of projects by DPW in-house professionals on their projects sites.	22.2	11.1	0.0	33.3	33.3	0.0	3.14	1
Delayed response to variation orders by DPW internal project management.	22.2	11.1	0.0	44.4	22.2	0.0	3.14	1
Ineffective and insufficient training and development of DPW in-house professionals.	22.2	11.1	0.0	44.4	11.1	11.1	3.14	1
Ineffective project monitoring and supervision by DPW internal project managers.	22.2	11.1	0.0	44.4	22.2	0.0	3.00	6
Insufficient capacity of DPW appointed (external) professionals to supervise projects effectively.	22.2	11.1	0.0	55.6	11.1	0.0	2.86	7
Ineffective supervision of projects by DPW appointed (external) professionals on their projects sites.	22.2	11.1	0.0	55.6	11.1	0.0	2.86	7
Insufficient briefing (needs) from DPW planning unit to the architect for design purposes.	22.2	11.1	0.0	55.6	11.1	0.0	2.86	7
Decision makers in contractor organisations not attending compulsory tender briefing session during tendering sessions.	22.2	0.0	22.2	55.6	0.0	0.0	2.71	10
Incomplete documentation during the tendering stage by DPW procurement committees.	22.2	11.1	0.0	66.7	0.0	0.0	2.71	10
Delayed cash transfer from Treasury for payments to service providers.	22.2	11.1	11.1	44.4	11.1	0.0	2.71	10
Neglect of supervision and monitoring of projects by the DPW internal project managers.	22.2	22.2	0.0	33.3	22.2	0.0	2.71	10
Ineffective handling of contingencies by DPW internal project managers.	22.2	22.2	0.0	33.3	22.2	0.0	2.71	10
Delayed payments of approved variation orders by the Treasury or User Departments (Health and education).	22.2	11.1	22.2	44.4	0.0	0.0	2.42	15

Table 6.5 shows the ratings of aspects of DPW response to project requests from User Departments and derived mean scores ranging between 1.00 and 5.00. It can be seen from the results that all the six DPW abilities were rated above 3.00. The finding suggests that all the rated aspects contributed *optimally* to the project request from

User Departments. It is notable that DPW advice to the User Departments on the cost of the projects in relation to their budget allocation and DPW advice to the User Departments on the completion duration/time of the projects contributed *prominently* with mean scores of 4.33 and 4.00.

Table 6. 5: Perceived DPW response to project requests from User Departments

The ability of DPW to **No of respondents = 8**	**Responses %** **Poor……...Excellent**							
	Unsure	**1**	**2**	**3**	**4**	**5**	**MS**	**Rank**
DPW advice to the User Departments on the cost of the projects in relation to their budgetary allocation.	0.0	0.0	0.0	11.1	44.4	44.4	4.33	1
DPW advice to the User Departments on the completion duration/time of the projects.	0.0	11.1	0.0	11.1	44.4	33.3	4.00	2
Guide User Departments on their technically needs relative to the project execution plan.	0.0	0.0	11.1	22.2	44.4	22.2	3.78	3
Using standardised briefing schedule to reach a common understanding with User Departments on their briefs.	0.0	0.0	0.0	66.7	11.1	22.2	3.56	4
Apply user management plans (UMPs) during planning sessions on User Departments' need.	0.0	0.0	11.1	33.3	44.4	11.1	3.56	4
Use the infrastructure development plans (IDPs) for planning of proposed projects.	0.0	11.1	22.2	33.3	11.1	22.2	3.11	6

Table 6.6 shows that the respondents agree that all tendering processes and procedures are *important* contributors to the DPW project delivery process, with three factors rated above the mean score of 3.00. The ability of DPW compliance committees to comply with pillars of procurement during tendering processes as legislated was ranked *highest*, thus the best contributor with a mean score of 4.22. However, it is notable that the ability of DPW to form a steering committee comprising of User Departments, the community and DPW in-house professionals and consultants to oversee the delivery of projects was only *fairly* rated by the DPW. This in turn might have contributed to the low performance of public sector clients during tendering processes.

Table 6. 6: Perceived DPW performance during tendering processes and procedures

Tendering processes and procedures **No of respondents = 8**	**Responses %** **Poor…….Excellent**							
	Unsure	**1**	**2**	**3**	**4**	**5**	**MS**	**Rank**
The ability of DPW compliance committee to comply with pillars of procurement during tendering processes as legislated.	0.0	0.0	11.1	0.0	44.4	44.4	4.22	1
The input of procurement committee to tender advertising for contractor selection.	0.0	0.0	11.1	33.3	22.2	33.3	3.78	2
The ability of bid evaluation committee to include professionals' reports in the adjudication processes.	0.0	11.1	11.1	22.2	22.2	33.3	3.56	3
The ability of DPW to form a steering committee comprising User Departments, the community and DPW in-house professionals and consultants to oversee the delivery of projects.	0.0	44.4	0.0	11.1	33.3	11.1	2.67	4

Table 6.7 shows the respondents' ratings of the performance of the planning unit during planning sessions for effective project outcomes. The finding suggests that six out of seven planning unit actions were rated above the mean score of 3.00, and in general the respondents agree that the performance of planning units contribute meaningfully to the planning sessions for effective project delivery. The analysis suggests that the ability of the DPW planning unit to arrange for feasibility studies including the viability of project site was *best contributor* during the planning sessions with a mean score of 4.56. However, the ratings suggest that the role of Premier's budgeting committee in project planning for proposed projects performed *poorest* with mean score of 2.33.

Table 6. 7: Perceived performance of planning unit during planning sessions

DPW planning unit ability to No of respondents = 8	Responses % Poor……..…Excellent							
	Unsure	1	2	3	4	5	MS	Rank
Arrange for feasibility studies including the viability of project site.	0.0	0.0	0.0	33.3	44.4	22.2	4.56	1
The ability of planning unit to establish a budget for the proposed projects.	0.0	0.0	11.1	11.1	55.6	22.2	3.89	2
Identify government land for sitting of projects.	0.0	0.0	0.0	77.8	0.0	22.2	3.44	3
Develop a schedule for site planning.	0.0	0.0	0.0	66.7	22.2	11.1	3.44	3
Check for outcome of environmental impact analysis (EIA) on the projects.	0.0	0.0	11.1	55.6	22.2	11.1	3.33	5
Use the Medium Term Expenditure Framework (MTEF) for planning of proposed projects.	0.0	0.0	11.1	55.6	22.2	11.1	3.33	5
The role of Premier's budgeting committee in project planning for the proposed projects.	0.0	22.2	44.4	11.1	22.2	0.0	2.33	7

Table 6.8 suggests that two out of five internal project managers' actions during construction processes were ranked above the mean score of 3.00, which indicates that these are the two areas where the performance of DPW internal project managers are seen as *good*. The low ratings in the other three actions might explain *poor* project outcomes.

Table 6. 8: Perceived DPW project managers' performance during construction processes

Project managers' ability to No of respondents = 8	Responses % Poor……. Excellent							
	Unsure	1	2	3	4	5	MS	Rank
Monitor site development processes and programmes.	0.0	0.0	0.0	55.6	44.4	0.0	3.44	1
Attend to all queries raised during site meetings.	0.0	11.1	22.2	11.1	55.6	0.0	3.11	2
Escalate issues raised that are beyond the internal project manager's capability to the senior project manager for deliberation.	0.0	22.2	22.2	22.2	33.3	0.0	2.67	3
Checking, verifying and analysing the issues and forward to the senior management for further considerations.	0.0	22.2	22.2	22.2	33.3	0.0	2.67	3
Develop daily and weekly reports from the project for monthly management meetings.	0.0	22.2	22.2	33.3	22.2	0.0	2.56	5

Table 6.9 shows the respondents' ratings of elements enhancing DPW briefing for effective project outcomes. It shows that all the five briefing elements were rated above the mean score of 3.00. The finding shows that in general the respondents agree that all five elements contribute *importantly* to enhancing effective project brief for effective project outcomes in the public sector. However, the capability of DPW planning unit in advising User Departments on their needs/requirements for design and implementation purposes is ranked the *highest* enhancing element.

Table 6. 9: Impact of DPW briefing elements on effective project outcomes

Elements enhancing DPW briefing **No of respondents = 8**	**Responses %** **Not important……..…… Very important**							
	Unsure	**1**	**2**	**3**	**4**	**5**	**MS**	**Rank**
Capability of DPW planning unit in advising User Departments on their needs/requirements for design and implementation purposes.	0.0	0.0	11.1	0.0	55.6	33.3	4.11	1
The approach of DPW planning unit to working closely with the User Departments to understand their needs/requirements.	0.0	0.0	0.0	22.2	55.6	22.2	4.00	2
The approach of DPW planning unit to receiving project request from User Departments during briefing stages.	0.0	0.0	11.1	22.2	22.2	44.4	4.00	2
The ability of DPW planning unit using the Infrastructure Development Plans (IDPs) to incorporate User Departments' needs.	11.1	0.0	0.0	22.2	44.4	22.2	4.00	2
The ability of DPW planning unit to implementing User Management Plans (UMPs) to incorporate all needs/requirements during planning stages.	0.0	11.1	11.1	22.2	33.3	22.2	3.44	5

Table 6.10 indicates the respondents' ratings of the contribution of the User Departments briefing elements to effective project outcomes. It shows that all the six briefing elements were rated above the mid-point of 3.00, which indicates that the respondents agree that all the six rated elements contributed *importantly* to improving User Department briefing for successful project outcomes in public sector projects. The analysis suggests that the ability of User Departments to establish and confirm funding through the Provincial Treasury for implementation of projects and the ability of User Departments to explain their needs/requirements to DPW during

planning sessions are the *most important* contributors to the User Department briefing with mean scores of 4.33 and 4.11.

Table 6. 10: Respondents perception on User Department briefing elements for effective project success

Elements enhancing Client Departments briefing	**Responses %**							
	Not important……. … Very important							
No of respondents = 8	**Unsure**	**1**	**2**	**3**	**4**	**5**	**MS**	**Rank**
The ability of the User Departments to establish and confirm funding through the Provincial Treasury for implementation of projects.	0.0	0.0	0.0	22.2	22.2	55.6	4.33	1
The ability of the User Departments to explain their needs/requirements to DPW during planning sessions.	0.0	0.0	0.0	22.2	44.4	33.3	4.11	2
The ability of User Departments' to identify land owned by government for project development.	0.0	0.0	11.1	11.1	55.6	22.2	3.89	3
The ability of User Departments to incorporate Municipalities' requirements in their briefing.	0.0	11.1	11.1	11.1	22.2	44.4	3.78	4
The ability of User Departments to indicate to DPW planning unit the size of proposed projects during planning sessions.	0.0	11.1	0.0	22.2	44.4	22.2	3.67	5
The ability of User Departments to identify their needs through working closely with Municipalities and Councillors.	0.0	11.1	0.0	22.2	44.4	22.2	3.67	5

Table 6.11 shows the respondents' ratings on the causes of design changes and variations from User Department and DPW perspectives. The finding shows that the respondents agree with all the six factors contributing to design changes and variations.

Table 6. 11: Respondents perception on causes of design changes and variations during procurement processes

Design changes and variations due to No of respondents = 8	Responses % Totally disagree……..…… Totally agree Unsure	1	2	3	4	5	MS	Rank
Additional out-of-predefined scope of items required by User Departments to be incorporated into the design during construction processes.	11.1	0.0	0.0	22.2	22.2	44.4	4.25	1
Increase in DPW or User Departments' need.	11.1	11.1	0.0	22.2	22.2	33.3	4.25	1
Poor design and costing solutions by external consultants.	11.1	11.1	11.1	0.0	44.4	22.2	4.25	1
Poor briefing by User Departments to DPW planning unit.	11.1	0.0	0.0	22.2	33.3	33.3	4.13	4
Appointment of new decision maker/political heads (e.g. MEC).	11.1	22.2	0.0	11.1	11.1	44.4	3.63	5
Poor interpretation of briefing (requirements) by DPW planning unit.	11.1	33.3	11.1	22.2	0.0	22.2	2.75	6

Table 6.12 indicates the respondents' ratings of factors leading to late payments to service providers by the DPW professionals. The analysis shows that four out of six factors were rated between 2.56 and 2.89, which indicates that late payment factors *sometimes* delay payment to service providers. However, the analysis shows that delays in cash flow processing by the Treasury unit *rarely* lead to late payment to service providers.

Table 6. 12: Respondents perception of factors leading to late payment to service providers

Late payment factors No of respondents = 8	Responses % Never…….……. ……. Always Unsure	1	2	3	4	5	MS	Rank
DPW internal project managers in dispute with consultants on payment certificate.	0.0	11.1	55.6	33.3	0.0	0.0	2.89	1
Disputes on quality of work done by contractors.	0.0	0.0	33.3	55.6	11.1	0.0	2.78	2
Weak monitoring and supervision of projects by DPW internal project managers.	22.2	11.1	0.0	33.3	33.3	0.0	2.75	3
Due to bureaucratic bottle necks.	0.0	22.2	22.2	33.3	22.2	0.0	2.56	4
DPW internal project managers delayed processing of invoices.	22.2	11.1	44.4	11.1	11.1	0.0	2.29	5
Delay in cash flows processing by the Treasury unit.	0.0	44.4	44.4	11.1	0.0	0.0	1.67	6

Table 6.13 shows the respondents' ratings of the monitoring and controlling of budgets by financial officers during projects delivery processes. The ratings suggest that three out of five subsidiary activities with mean scores of 3.00 or higher contributed *optimally* to the monitoring and controlling of project budgets. The analysis indicates that monthly and quarterly reviews of expenditure and income contributed *positively* to the monitoring and controlling of budgets with a mean score of 3.56. However, the analysis shows that releasing funding based on each project's cash flow projection contributed *poorest.*

Table 6. 13: Perceived DPW financial officers' role during monitoring and controlling of budgets

Monitoring and controlling of budgets **No of respondents = 8**	**Responses %** **Poor…… Excellent**							
	Unsure	**1**	**2**	**3**	**4**	**5**	**MS**	**Rank**
Monthly and quarterly reviews of expenditure and income.	0.0	0.0	11.1	55.6	0.0	33.3	3.56	1
Releasing cash flows that actually originate from the project team.	0.0	11.1	11.1	33.3	33.3	11.1	3.22	2
Comparing expenditure on each project to the initial cash flow earlier submitted.	0.0	0.0	44.4	33.3	0.0	22.2	3.00	3
Electronic payment to contractors, suppliers, etc. by User Departments or the Treasury.	0.0	11.1	22.2	55.6	0.0	11.1	2.78	4
Releasing funding based on each project's cash flow projection.	11.1	0.0	33.3	33.3	0.0	22.2	2.44	5

Table 6.14 shows the respondents' ratings of financial issues identified during project delivery processes on a scale of 1 (never) to 5 (always). The finding suggests that financial issues identified during integrated (DPW and User Departments) planning sessions could lead to *adverse* challenges to project delivery. However, it is notable that late disbursement of funds by the Treasury unit to DPW was *not rated high* as a financial issue.

Table 6. 14: Respondents perception of DPW responses to financial issues during procurement processes

Financial issues No of respondents = 8	Responses % Never……..……. ……. …. Always							
	Unsure	1	2	3	4	5	MS	Rank
Financial issues identified during integrated (DPW and User Departments) planning sessions.	0.0	0.0	11.1	22.2	22.2	44.4	4.00	1
Deficit/unforeseen mistakes in costing of projects.	0.0	11.1	44.4	33.3	11.1	0.0	2.78	2
Delay with budget submission from DPW & User Departments to Department of Finance.	0.0	22.2	44.4	11.1	22.2	0.0	2.33	3
Premier's cabinet delay of project approvals for funding purposes.	0.0	44.4	22.2	33.3	0.0	0.0	2.33	3
Late disbursement of funds by the Treasury unit to DPW.	0.0	22.2	55.6	22.2	0.0	0.0	2.00	5

The finding from Table 6.15 shows that there are insufficient numbers of professionals in Finance unit, lack of training and development programmes and shortage of professionals' skills and expertise in Finance unit *always* contribute to financial challenges during project delivery processes. However, it is notable that non-adherence to PFMA and unauthorized expenditure by finance officers *rarely* contribute to DPW financial challenges.

Table 6. 15: Perceived frequency of occurrence of financial challenges during project delivery processes

DPW financial challenges No of respondents = 8	Responses % Never……..……. ……. Always							
	Unsure	1	2	3	4	5	MS	Rank
Insufficient number of professionals in Finance unit.	0.0	11.1	11.1	44.4	11.1	22.2	3.22	1
Lack of training and development programmes.	0.0	0.0	33.3	33.3	33.3	0.0	3.00	2
Shortage of professional skills and expertise in Finance unit.	0.0	11.1	22.2	33.3	22.2	11.1	3.00	2
Poor audit results or records.	0.0	11.1	11.1	55.6	22.2	0.0	2.89	4
A lack of qualification for effective performance.	11.1	11.1	22.2	55.6	0.0	0.0	2.50	5
Limited knowledge management.	0.0	11.1	33.3	55.6	0.0	0.0	2.44	6
Non-adherence to legislation.	0.0	22.2	22.2	55.6	0.0	0.0	2.33	7
Non-adherence to PFMA.	0.0	22.2	66.7	11.1	0.0	0.0	1.89	8
Unauthorised expenditure by finance officers.	0.0	44.4	55.6	0.0	0.0	0.0	1.56	9

Table 6.16 shows the respondents' ratings on the ability of procurement committees during procuring of construction projects. The ratings suggest that five out of six elements with mean scores above 3.00 contributed *positively* to the performance of procurement officials during procurement process. The finding suggests that compliance with competitive tendering processes as legislated is the *best contributor* with a mean score of 4.22. However, it is noted that the ability of approval and recommendation committees to check, regulate and approve design for project implementation contributed only *moderately.*

Table 6. 16: Perception of procurement committee performance during tendering processes

Ability of procurement officials to **No of respondents = 8**	**Responses %** **Poor……Excellent**							
	Unsure	**1**	**2**	**3**	**4**	**5**	**MS**	**Rank**
Comply with competitive tendering processes as legislated.	0.0	11.1	0.0	22.2	0.0	66.7	4.22	1
Adherence to 21-days advertisement period in the media.	0.0	22.2	0.0	22.2	0.0	55.6	3.89	2
The ability of bid adjudication committee to adjudicate the appointment of a suitable contractor.	0.0	0.0	22.2	33.3	0.0	44.4	3.67	3
The ability of bid evaluation committee to adjudicate the appointment of a suitable contractor.	0.0	22.2	0.0	55.6	0.0	22.2	3.22	4
The ability of specification committee in checking specified quality of materials and standard of workmanship.	0.0	55.6	0.0	11.1	0.0	33.3	3.11	5
The ability of approval and recommendation committee to check, regulate and approve design for project implementation.	0.0	22.2	0.0	33.3	0.0	44.4	2.56	6

Table 6.17 shows that the ability of bid evaluation committee to include professionals' reports in the adjudication processes was the *best contributor* with a mean score of 3.00. However, the other three factors that were rated below 3.00 contributed *averagely.*

Table 6. 17: Perceived DPW performance during tendering processes and procedures

Tendering processes and procedures No of respondents = 8	Responses % Poor……Excellent							
	Unsure	1	2	3	4	5	MS	Rank
The ability of bid evaluation committee to include professionals' reports in the adjudication processes.	0.0	11.1	22.2	44.4	0.0	22.2	3.00	1
The ability of DPW to form a steering committee comprising User Departments, the community and DPW in-house professionals and consultants to oversee delivery of projects.	22.2	0.0	22.2	33.3	0.0	22.2	2.88	2
The ability of DPW compliance committee to comply with pillars of procurement during tendering processes as legislated.	0.0	22.2	0.0	22.2	0.0	55.6	2.78	3
The input of procurement committees to tender advertising for contractor selection.	0.0	22.2	0.0	22.2	0.0	55.6	2.78	3

Table 6.18 indicates the respondents' ratings of the frequency of challenges experienced by the supply chain management unit during project delivery processes. It is noted that all the five challenges were rated *below* mean score of 2.50. However, it is notable that financial mismanagement in SCM processes was *rarely* experienced as a supply chain management challenge.

Table 6. 18: Perceived challenges within the supply chain management unit

Supply chain management (SCM) challenges No of respondents = 8	Responses % Never…… Always							
	Unsure	1	2	3	4	5	MS	Rank
Lack of training, education on & communication of the relevant SCM processes and procedures.	0.0	22.2	22.2	55.6	0.0	0.0	2.33	1
Gaps in the implementation of SCM policies and procedures.	0.0	44.4	22.2	33.3	0.0	0.0	2.33	1
Shortages in the application of the SCM policies, procedures and controls.	0.0	22.2	66.7	11.1	0.0	0.0	1.89	3
Lack of thorough and comprehensive SCM documentations.	0.0	33.3	55.6	0.0	11.1	0.0	1.89	3
Financial mismanagement in SCM processes.	0.0	55.6	33.3	11.1	0.0	0.0	1.56	5

Table 6.19 presents the respondents ratings in relation to in-house professionals in project supervision. It is notable that most respondents agree that qualification of technical professionals has *sufficient* impact on project supervision, with a mean

score of 3.89. However, it is notable that there is *limited* number of in-house professionals in DPW to supervise projects effectively and efficiently.

Table 6. 19: Perceived impact of in-house professionals during project supervision

In-house professionals (e.g. engineers, QS, etc.) **No of respondents = 9**	**Responses %** **Limited…….. ……. Sufficient**							
	Unsure	**1**	**2**	**3**	**4**	**5**	**MS**	**Rank**
Qualification of technical professionals.	0.0	0.0	22.2	0.0	44.4	33.3	3.89	1
Remuneration packages for in-house technical professionals (e.g. engineers, QS, etc.).	0.0	0.0	11.1	55.6	11.1	22.2	3.44	2
Representation of internal project managers on each project site.	0.0	0.0	11.1	66.7	11.1	11.1	3.22	3
Representation of in-house professionals on each project site.	0.0	11.1	11.1	55.6	11.1	11.1	3.22	3
Possession of appropriate skills and technical expertise by in-house engineers, architects, QS.	11.1	11.1	0.0	55.6	11.1	11.1	3.13	5
Number of in-house skilled professionals.	11.1	33.3	22.2	33.3	0.0	0.0	2.00	6

Table 6.20 shows that all the four DPW technical professionals' abilities were rated above the mid-point of 3.00. The finding suggests that most respondents are *satisfied* that all the four DPW technical professionals' abilities are invested in projects. It is notable that going for professional training and short courses for performance improvement is done *satisfactorily* with a mean score of 4.45.

Table 6. 20: Perceived satisfaction levels with DPW in-house technical professionals during project delivery

DPW technical professional ability to **No of respondents = 9**	**Responses %** **Not satisfied……Highly satisfied**							
	Unsure	**1**	**2**	**3**	**4**	**5**	**MS**	**Rank**
Go for professional training and short courses for performance improvement.	0.0	11.1	11.1	22.2	44.4	11.1	4.45	1
Engage with design teams during design processes.	11.1	0.0	0.0	33.3	44.4	11.1	3.33	2
Work closely with external consultants to acquire skills and technical expertise.	0.0	11.1	11.1	33.3	33.3	11.1	3.22	3
Work closely with internal project managers on project site for enhancement of skills and technical expertise.	0.0	11.1	11.1	44.4	22.2	11.1	3.11	4

Table 6.21 depicts the respondents' ratings on the DPW in-house professional representativeness on project sites. It is notable that the respondents are *satisfied* with the allocation of internal project managers on specific project sites with a mean score of 3.15. However, the DPW in-house professionals' representation on project sites and representation of professionals in all professional services fields are *limited.*

Table 6. 21: The impact of DPW in-house professionals' representativeness on project sites

DPW in-house professionals' representativeness **No of respondents = 69**	**Responses %** **Limited……. ……. Sufficient**							
	Unsure	**1**	**2**	**3**	**4**	**5**	**MS**	**Rank**
Allocation of internal project managers on specific project site.	1.5	7.4	22.1	33.8	19.1	16.2	3.15	1
Maximum number of projects per in-house professional.	13.2	17.6	23.5	25.0	8.8	11.8	2.70	2
DPW in-house professional representation on project sites.	0.0	17.6	41.2	23.5	14.7	2.9	2.44	3
Representation of professionals in all professional services fields.	1.5	30.9	33.8	17.6	8.8	7.4	2.19	4

Table 6.22 suggests that in general, majority of respondents' ratings with regards to satisfaction levels with the performance of professional services unit for project success ranges between *fairly satisfied* and *slightly satisfied* ($2.26 \leq$ mean scores ≤ 2.77). It shows that the performance of technical professionals in the professional service unit (quantity surveyors, architects, civil/structural engineers, mechanical engineers and electrical engineers) are *below average satisfaction levels*, since all the five professional service performances were rated below the mean score of 3.00. This in turn, might affect the optimum performance of DPW professionals in delivering project to client satisfaction.

Table 6. 22: Perceived satisfaction levels with the performance of professional services unit

Professional services unit performance No of respondents = 69	Responses % Not satisfied…….……Highly satisfied							
	Unsure	1	2	3	4	5	MS	Rank
Quantity Surveyors.	4.3	18.1	19.6	29.4	21.4	5.4	2.77	1
Architects.	5.9	19.1	20.6	30.9	20.6	2.9	2.66	2
Civil/Structural engineers.	8.8	20.6	26.5	25.0	17.6	1.5	2.48	3
Electrical engineer.	10.3	22.1	27.9	22.1	14.7	2.9	2.43	4
Mechanical engineer.	19.1	26.5	23.5	16.2	13.2	1.5	2.26	5

Table 6.23 indicates the respondents' ratings regarding the ability of architects to include the following requirements (functionality, durability, aesthetics, and economy) at design stages. It is notable that all the four architects' abilities were rated *below* the mid-point of 3.00. In summary, most respondents rated architect ability with regards to functionality, durability and aesthetics at *slightly below average*. However, the ability of the architects to consider economy during design processes was rated as *fair*. This in turn, might be the reason why DPW outsources most of their architectural designs to external consultants because the architectural unit is incapacitated in terms of design production.

Table 6. 23: Perceived Architects' ability with regards to requirements during design processes

Architects' ability with regards to No of respondents = 69	Responses % Poor……. ….……. Excellent							
	Unsure	1	2	3	4	5	MS	Rank
Functionality.	16.2	11.8	16.2	29.4	20.6	4.4	2.88	1
Durability.	16.2	10.3	23.6	23.5	20.6	4.4	2.82	2
Aesthetics.	17.6	14.7	22.1	20.6	17.6	5.9	2.73	3
Economy.	19.1	13.2	27.9	20.6	11.6	5.9	2.42	4

Table 6.24 shows respondents' ratings of the occurrences of factors that lead to late payment to contractors and consultants. It is notable that bureaucratic bottle necks and disputes about the quality of work done by contractors *often* lead to late payment

to service providers. However, the analysis shows that DPW internal project managers' delayed processing of invoices *sometimes* contributed as a late payment factor.

Table 6. 24: Perceived factors leading to late payment to service providers

Late payment factors **No of respondents = 69**	**Responses %** **Never……. ……. Always**							
	Unsure	**1**	**2**	**3**	**4**	**5**	**MS**	**Rank**
Due to bureaucratic bottle necks.	16.2	5.9	10.3	19.1	19.1	29.4	3.60	1
Disputes as a result of quality of work done by contractor.	14.7	8.8	17.6	32.4	17.6	8.8	3.00	2
DPW internal project manager in dispute with consultants on payment certificate.	14.7	10.3	20.6	35.3	13.2	5.9	2.81	3
Delay with cash flows processing by the Treasury unit.	14.7	17.6	13.2	20.6	11.8	22.1	2.58	4
Weak monitoring and supervision of projects by DPW internal project managers.	4.4	20.6	22.1	22.1	13.2	17.6	2.46	5
DPW internal project managers' delayed processing of invoices.	16.2	30.9	20.6	14.7	11.8	5.8	2.25	6

Table 6.25 shows the public sector clients' key performance areas (KPAs) during the procurement processes. The key performance indicators (KPIs) shown in Table 6.1 to Table 6.24 were derived from the key performance areas (KPAs) shown in Table 6.25 and show public sector clients' areas of responsibilities during the procurement processes (i.e. from briefing to the project close-out).

Table 6. 25: Public Sector Clients Key Performance Areas (KPAs)

Public Sector Clients Key Performance Areas (KPAs)
1. The organisation of internal or external units in enhancing successful project delivery
2. Level of satisfaction with the performance of operational units for delivery of projects
3. Extent of satisfaction levels with the performance of the project management unit
4. Frequency of procurement challenges occurring during project delivery processes
5. DPW response to project requests from User Departments
6. DPW performance during tendering processes and procedures
7. Performance of planning unit during planning sessions for effective project outcomes
8. Performance of DPW project managers during construction processes
9. DPW briefing elements to effective project outcomes
10. User Departments' briefing elements for effective project success
11. Causes of design changes and variations during procurement processes
12. Factors that lead to late payment of contractors, suppliers and consultants
13. DPW processes in monitoring and controlling of budgets
14. Occurrences of financial issues during procurement processes
15. Frequency of financial challenges occurring during project delivery processes
16. Ability of procurement committees during procuring of services in DPW
17. DPW performance during tendering processes and procedures
18. Frequency of challenges experienced within the supply chain management units
19. Parameters in relation to in-house professionals in supervising DPW projects
20. Satisfaction level with DPW in-house technical professionals in projects delivery
21. DPW in-house professionals' representativeness on project sites
22. Satisfaction with the performance of professional services unit for project success
23. Architects' ability with regards to requirements during design processes
24. Occurrences of the factors that lead to late payment to contractors and consultants

6.3 ANALYSIS OF RESPONSES OBTAINED FROM THE OPEN-ENDED SECTION OF THE QUESTIONNAIRE

A specific questionnaire was designed and targeted to each of the head of six operational units using structured questions relating to the activities or roles that the unit plays during procurement processes. At the end of each unit's questionnaire, an open-ended question was incorporated: ***"Do you have any comments in general regarding the performance of DPW professionals?"*** This question generated open-ended responses from the respondents relating to challenges and weaknesses besetting the optimum performance of DPW professionals in their procurement processes which might have led to the poor project outcomes experienced by the User Departments (e.g. Departments of Health and Education). These open-ended

responses were analysed using thematic content analysis to identify emerging patterns, themes and categories. The initial step is to identify any recurring material or subject matter as well as content that are noticeably different from the rest (Saunders *et al*., 2016).

For coding purposes, the open-ended responses are presented per the six categories of operational units in the National and Provincial Departments of Public Works. It is also presented across each Province for easy identification of patterns and themes (See Appendices CI, C2, and C3,). A code is a word or a short phrase that summarizes the meaning of a chunk of data. A code is a statement, a sentence, or an element in a picture (Charmaz, 2014; Saldana, 2009). However, as Miles et al. (2014, p.93) note, "a code is more than a filing system". This suggests that coding is an interpretive exercise; it involves not merely labelling data but also linking them, thereby allowing movement from "data to the idea and from the idea to all the data pertaining to the idea" (Richards and Morse, 2013).

Open coding was used at the first analytical step in coding the open-ended responses. Such codes are usually *descriptive or aid the organisation of the data* (Easterby-Smith *et al*., 2015, p.194). The open codes were used to break up long texts into manageable chunks, by assigning a code to every single sentence of a text (i.e. sentence-by-sentence coding). Based on thorough examination of all codes created in the open coding, codes were also organized and synthesised into more analytical secondary codes (Saldana, 2009) to give more meaning from the obtained data. The second-cycle coding technique was used at comparing codes to other codes and categories (Easterby-Smith *et al*., 2015). This helped in developing a more elaborated 'cognitive map' of the participants' responses to the open-ended questionnaire (Miles *et al.*, 2014).

6.3.1 Findings from the open-ended responses

Table 6.26 presents findings relating to the number of the participants that responded to the open-ended section of the questionnaire. Table 6.26 presents the percentages of

the number of responses made to the open-ended questionnaire. It was observed that 52% (57 out of 110) of the respondents nation-wide responded to the open-ended section of the questionnaire administered.

Table 6. 26: Open-ended comments relative to performance of DPW professionals during primary survey

Number of questionnaires returned to the researcher	110	100%
Number of questionnaires returned with comments	57	52%

Table 6.27 presents the number of responses per each province in relation to each of the six operational units in the South African National and Provincial Departments of Public Works. Table 6.27 indicates the heads of operational units in each province and the number of respondents per province that responded to the open-ended questionnaire. There are 115 respondents in total in the entire nine provinces surveyed. The respondents consisted of HODs, DDGs, CFOs, SCMs, HRMs and SPMs. Table 6.27 showed that Province E had the highest number of respondents (12) to the open-ended questions followed by provinces H and I with 8 respondents each. It could be seen that these provinces might have more issues or challenges in their provinces that relate to the delivery of projects.

Table 6. 27: Numbers of Respondents in Provincial Departments

Heads of operational units	Number of respondents per province	Province A	Province B	Province C	Province D	Province E	Province F	Province G	Province H	Province I	Total No. of respondents
HODs	9	1	1	0	0	1	1	0	0	0	4
DDGs	9	0	1	0	0	1	0	1	0	1	4
CFOs	9	0	0	0	0	1	1	0	1	1	4
SCMs	9	1	1	0	0	1	0	0	0	1	4
HRMs	9	0	1	1	1	1	1	0	1	0	6
SPMs	70	4	2	2	1	7	2	6	6	5	35
TOTAL	**115**	**6**	**6**	**3**	**2**	**12**	**5**	**7**	**8**	**8**	**57**

Table 6.28 indicates that out of 115 questionnaires distributed to the respondents nationwide 110 were returned. It could be seen that 52% of the respondents (i.e. Heads of operational units) made comments with highest response rate from heads of Human Resource Management units at 67% (6 out of 9). Furthermore, 141 challenges were raised by respondents in total, with 65 comments dominated by the Senior Project Managers followed by 25 comments made by Deputy Directors General responsible for construction projects.

Table 6.28 also showed that 55 out of 141 challenges on human resources dominated the comments made by the respondents, followed by 20 and 19 responses on financial management challenges and supply chain management respectively. There were 14 responses on project delivery challenges. It could be argued that the most severe and challenging problems besetting the National and Provincial Departments of Public Works relate to human resources management, financial management, supply chain management, and project management issues while the documentation and policy issues were less severe since there were only 3 and 2 related comments.

Table 6. 28: Number of persisting issues rose in each Provincial Department

			Persisting challenges raised by heads of operational units										
Heads of operational units	Total No. of respondents	Response from National and the Provinces	Briefing challenges	Design challenges	Planning challenges	Project challenges	Financial challenges	Human resources challenges	Supply chain challenges	Decision making challenges	Documentation challenges	Policy challenges	No. of challenges raised per operational unit
HODs	8	4	1	0	0	2	2	1	2	1	0	0	9
DDGs	8	4	2	0	2	3	1	12	2	1	2	0	25
CFOs	8	4	2	0	2	1	6	4	2	0	0	0	17
SCMs	8	4	0	1	1	2	1	2	4	2	0	2	15
HRMs	9	6	0	0	0	1	1	7	0	0	0	0	9
SPMs	69	35	0	4	3	5	9	29	9	6	1	0	66
TOTAL	**110**	**57**	**5**	**5**	**8**	**14**	**20**	**55**	**19**	**10**	**3**	**2**	**141**

6.3.2 Coding of open-ended responses

The open-ended section of the questionnaire was aimed at eliciting the respondents' perception and views regarding the effectiveness and efficiency of public sector clients during procurement processes in the National and Provincial Department of Public Works. The respondents stated the challenges/weaknesses that hinder their performances during procurement processes. Emerging themes were then derived from the coding obtained from the open-ended responses and are grouped under categories in Table 6.29 to Table 6.38. The themes are presented in descending order of importance.

Human resource management

Table 6.29 shows the concepts obtained from open-ended responses on human resources management challenges. These challenges are: insufficient in-house professionals, recruitment challenges, lack of mentoring of professionals, incompetent personnel, project overloading due to understaffing, and the use of inexperienced external consultants.

Table 6. 29: Human Resources Management

Concepts obtained from open coding	Recurring	Category
-Insufficient in-house professionals **[SPMA6]** -DPW heavily relies on the external consultants **[SPMA7]** -Candidates are still aspiring professionals **[HRMB]** -Ensure continuous professional development **[HRMB]** -Candidates' are mentored by professionals **[HRMB]** -Need qualified personnel in public sector **[SPMC4]** -The HOD is not a construction specialist **[DDGE]** -Need training to improve service delivery **[HRME]** -Capacitate DPW with qualified professional **[SPME10]** -DPW do not have capacity in-house **[SPME9]** -Need attraction of the appropriate skilled people **[SPME9]** -DPW do not have internal project managers **[SPME6]** -Few DPW professionals have qualifications **[SPME6]** -Few DPW professional are registered personnel **[SPME6]** -Engineer not registered with professional body **[SPME6]** -Project managers need further training **[SPME6]** -The Department has no enough professionals **[SPME6]** -Insufficient personnel delays project delivery **[SPME3]** -User Departments take advantage of inefficiencies in DPW **[HODF]** -Lack of training of professionals **[CFOF]** -Lack of skills transfer mechanism **[CFOF]** -The issue of shortage of professionals **[CFOF]** -Lack of technical skills affect project quality **[CFOF]** -No attraction and retaining of professionals **[HRMF]** -The HOD is not a construction professional **[DDGG]** -Vacant professionals post for a longer period **[HRMF]** -Insufficient technical capacity of professionals **[DDGG]** -DPW struggled to recruit and retain personnel **[DDGG]** -Always overworking of personnel in DPW **[DDGG]** -Insufficient technical skills transfer in DPW **[DDGG]** -Project managers lack educational development **[DDGG]** -In short of technical professionals in DPW **[SPMG1]** -Insufficient registered professional (technical) in DPW**[SPMG2]** -DPW need technical managers **[SPMG6]** -HRM unit send professionals for skills transfer **[HRMH]** -Professional registration for project managers **[HRMH]** -Overloading of projects due to incapacitation **[DDGG]** -Technical professionals need more training **[SPMH2]** -High shortage of technical skilled personnel **[SPMH2]** -DPW professionals cannot handle projects **[SPMH1]** -There is shortage of professional in DPW **[CFOI]** -Insufficient professionals to manage project **[SPMI5]** -Lack of capacity from consultants **[SPMI4]** -Engagement of external consultants in DPW **[SPMI3]** -Increase capacity of professional service **[SPMI2]** -We do not have adequate professionals **[SPMI5]** -Our organogram is heavily understaffed **[SPMA6]** -Consultants manage projects for DPW **[DDGG]** -Young inexperienced consultants **[DDGG]** -Shortage of Supply Chain Management cadres **[SCMB]** -Project implementation with project managers **[SPMA6]** -Lack of human resources personnel **[SPMA5]** -Project managers not developing themselves **[DDGG]** -Insufficient human resources in the DPW **[SPMH1]** -Project managers lack skills transfer **[DDGG]**	55	Human resources challenges

Financial management challenges

Table 6.30 presents the concepts generated from open coding. The challenges besetting the optimum performance of DPW are: inadequate budgetary allocations, late/delayed payment to service providers, inadequate project funding, delays with cash flows, auditing deficiency, salary and compensation issues, late release of invoices and payment certificates by DPW internal project managers, and poor project funding.

Table 6. 30: Financial Management

Concepts obtained from open coding	Recurring	Category
-Insufficient User Departments budgets for projects **[HODB]** -Insufficient funds for training of professionals **[SCMB]** -DPW pays for registration of professionals **[HRMB]** -User Departments are let down by cash flow problems **[SPMC2]** -DPW had a disclaimer audit opinion last year **[CFOE]** -Need enough salary to stay in public sector **[SPME10]** -User Department projects do not align with their budgets **[SPMC7]** -The DPW do not have funds (budgets) **[SPME3]** -Need for proper funding of projects **[CFOF]** -Late payment occurs during payment process **[SPMGI]** -Ineffective tracking system of payments **[SPMG3** -Late payments to contractors delay projects **[SPMG4]** -Late release of invoices by the project manager **[CFOH]** -Delay cash flows impact negatively on projects **[SPMI4]** -Funding is released based on cash flows **[CFOI]** -Delay with User Departments' budget to the DPW **[SPMG3]** -Late funding delays progress of projects **[CFOI]** -User Departments responsibility for payments **[HODB]** -User Departments unrealistic budgets**[DDGI]** -Late release of payment certificates **[CFOH]**	20	Financial management challenges

Supply chain management challenges

Table 6.31 shows the concepts obtained from the open-ended responses on supply chain management challenges. The supply chain management challenges include: insufficient SCM cadre, procurement challenges, long SCM processes, contractual inequality, and lack of internal control measures in PFMA. Others are: lack of skilled service providers, undefined service providers' roles, unclear project specification and weak procurement strategies.

Table 6. 31: Supply Chain Management

Concepts obtained from open coding	Recurring	Category
-DPW is faced with procurement challenges **[HODA]** -DPW does not meet the SCM requirements **[SCMA]** -Procurement processes take long time **[SPMA5]** -Need to establish a specialist procurement unit **[HODB]** -To improve on procurement processes **[SPMG3]** -SCM decision difficulty with User Department **[SCMD]** -Contracts favours the private sector not DPW **[SPME10]** -Lengthy SCM processes should be evaluated **[SPME8]** -Need to shorten the long SCM processes **[SPME7]** -Government objective not a procurement burden **[SCMI]** -Need balance between personnel roles **[SCMI]** -Need improvement regarding control measures **[SPMI1]** -No internal control measures in PFMA **[SPMI1]** -Duties of service providers should be defined **[CFOF]** -Appoint skilled contractors and consultants **[SPMH7]** -Non adherence to tendering processes and procedures **[DDGB]** -Procurement strategies need to be improved **[SPMI1]** -SCM committees slow project implementation **[DDGG]** -Need for clear specifications to be outlined **[CFOF]**	19	Supply chain challenges

Project management challenges

Table 6.32 shows that all the operational units made comments regarding project management issues. Most of the issues raised by the respondents dwelled on lack of project implementation, lack of management of professionals on construction site, lack of project monitoring, delay in project approvals, partial implementation of IDMS, opportunistic behaviours from DPW professionals because of DPW incapacitation and lack of project management units in some provinces. All these issues contributed to poor project outcomes envisaged by the construction clients. The National and Provincial Department of Public Works are beset with project management challenges that militate against the optimum performance of project outcomes.

Table 6. 32: Project Management

Concepts obtained from open coding	Recurring	Category
-Project allocation influence project performance **[SPMA3]** -To improve on construction project processes **[SCMD]** -Implement project with external consultant **[SPMF4]** -No technical expertise in projects supervision **[HRMC** -DPW is accountable for projects delivery **[SCMD]** -DPW lack management of professionals on site **[CFOE]** -Lack of monitoring of projects by professionals **[DDGG]** -Partial implementation of IDMS in DPW **[DDGB]** -User Department demands more projects **[SPME5]** -User Departments benefit due to inefficiencies in DPW **[HODF]** -User Department late approval of projects **[SPMF5]** -Overloading of projects on professionals **[SPMH8]** -Slow implementation of various projects **[DDGG]** -We do not have project management unit **[HODA]**	14	Project management challenges

Decision making challenges

Table 6.33 shows the concepts obtained from the open-ended responses on decision making challenges. These challenges include: bureaucratic bottle necks, decision making difficulties, delay project approvals, and community disputes were raised as the major decision making challenges during the delivery of projects in the National and Provincial DPW.

Table 6. 33: Decision Making

Concepts obtained from open coding	Recurring	Category
-Too many signatures for approvals of projects **[SPMB6]** -Delays in dual decision making **[SPMB4]** -User Departments decision making problems **[SCMD]** -Bureaucracy (long decision making processes) **[SPMD3]** -DPW vision in terms of performance in all units **[HODB]** -Performance is hampered by bureaucratic issues **[SCME]** -Too many signatures delay approvals **[SPMG5]** -DPW difficulty with decision making **[SPMH6]** -User Departments do not approve projects within time **[SPME5]** -Community disruption also causes problems **[DDGG]**	10	Decision making challenges

Planning challenges

Table 6.34 shows the concepts obtained from the open-ended responses on planning challenges. These challenges relate to lack of internal and integrated planning

sessions, planning delays, planning mistakes, improper and long planning sessions. The analysis shows that there are issues and challenges with both the internal planning sessions from DPW and integrated planning sessions from User Departments (e.g. Departments of Health and Education).

Table 6. 34: Planning

Concepts obtained from open coding	Recurring	Category
-User Department planning process delay project execution **[SCMD]** -Planning could reduce project delivery problems **[CFOF]** -Working in silos during planning sessions **[DDGG]** -Planning mistakes where projects are omitted **[DDGG]** -Lack of submission of infrastructural plan **[SPMG3]** -Time spent during planning phase is too long **[SPMI5]** -Asset Management unit for planning purposes **[CFOE]** -To reduce the time spend during planning stages **[SPMI5]**	8	Planning challenges

Design challenges

Table 6.35 shows the concepts obtained from the open-ended responses on design challenges. These challenges are long design approvals process, design changes and variation during construction process coupled with outsourcing of design to external consultants because of lack of capacity in the National and Provincial DPW.

Table 6. 35: Design

Concepts obtained from open coding	Recurring	Category
-The processes for design approvals are too long **[SPMI5]** -User Departments change of scope during construction **[SCMD]** -DPW outsource design aspect to consultants **[SPMF4]** -DPW do not engage in complete project design **[SPMF5]** -The time spent in design approval is too long **[SPMI5]**	5	Design challenges

Briefing challenges

It is important to realise that briefing is one of the most critical contributions a client can make to the optimum performance of project outcomes (Latham, 1994). It is to be noted that whenever there are defects in briefing it automatically translates to design defects and eventually manifest on the project outcomes. Table 6.36 presents the briefing challenges emerging from the open coding of the open-ended responses.

Table 6.36 shows the concepts obtained from the open-ended responses on briefing challenges. These challenges are: insufficient User Department briefing, unclear User Department needs and coupled with weak strategic briefing sessions during the briefing stages.

Table 6. 36: Briefing

Concepts obtained from open coding	Recurring	Category
-User Departments do not always communicate exact needs **[HODB]** -User Departments needs are not fully understood **[DDGI]** -User Departments mostly have high project demand **[CFOE]** -User Departments needs should be properly defined **[CFOF]** -User Departments weak strategic briefing **[DDGI]**	5	Briefing challenges

Documentation challenges

Table 6.37 shows the concepts obtained from the open-ended responses on documentation challenges. These challenges are: User Departments' documentation mistakes, delay with User Departments' documentation processes and DPW long documentation processes.

Table 6. 37: Documentation

Concepts obtained from open coding	Recurring	Category
-The end-users send documents with mistakes **[DDGG]** -The end-users documentation delays **[DDGG]** -Long documentation processes **[SPMI5]**	3	Documentation challenges

Policy challenges

Table 6.38 shows the concepts obtained from the open-ended responses on policy challenges. These challenges relate to poor policy interpretation. Misalignment of National policies and strategies emerged as the major policy challenges in the delivery of projects.

Table 6. 38: Policies

Concepts obtained from open coding	Recurring	Category
-Lack of interpretation of National policies **[SCMI]** -National Policies and Strategies are not aligned **[SCMI]**	2	Policy issues

6.4 SUMMARY

This chapter has presented the structured questionnaire designed to elicit the views, perceptions, opinion and experiences of the head of six operational units that are involved in the procurement of construction projects. The ordinal-scale data were analysed using mean scores (between 1.00 and 5.00) and were ranked from highest to lowest. The weaknesses and strengths of technical and financial professionals were assessed and analysed. The challenges hindering the optimum performance of professionals were identified through the open-ended section of the questionnaire. Table 6.29 to Table 6.38 summarised the challenges obtained from the open-ended section of the questionnaire. The most severe challenges hindering the maximum performance of DPW professionals emanated from human resources management, financial management, supply chain management and project management, while the documentation and policy issues were less severe. The next chapter presents the findings and discussions of the synthesized outcomes from the content analysis obtained from semi-structured interviews, hierarchical statistical analysis obtained from structured questionnaire and thematic content analysis obtained from open-ended section of the questionnaire.

CHAPTER 7

FINDINGS AND DISCUSSIONS

7.1 INTRODUCTION

In the previous chapters a sequential exploratory mixed method research strategy underpinned by a pragmatic world view was adopted for the investigation of public sector client performance in the South African construction procurement in the National and Provincial DPW. The sequential mixed methods with initial semi-structured interviews followed by the administration of both the structured and open-ended questionnaires were adopted. In this chapter, the qualitative and quantitative findings obtained from chapters 5 and 6 are discussed. The findings obtained from the content analysis, the hierarchical statistical analysis and the thematic content analysis would be discussed in conjunction with the literature. The outcome of the integrated and synthesized results should address the research problem, answer the research questions and help to achieve the stated research objectives. It should be noted that this study was aimed at investigating the performance of public sector clients in the South African construction procurement with a view to improving their effectiveness and efficiency during the procurement process. Therefore, the findings of this chapter would be discussed in relation to the statement of the problem, the research questions and research objectives in order to achieve the overall research aim. Table 7.1 shows the distribution of the 137 constructs in the six operational units.

Table 7. 1: Constructs from the six operational units

TABLE	OPERATIONAL UNITS	CONSTRUCTS
Table 5.2 ----Table 5.5	Heads of Departments (chief accounting officer)	33
Table 5.6-----Table 5.12	Deputy Director General construction projects	41
Table 5.13---Table 5.16	Chief Financial Officers	25
Table 5.17---Table 5.19	Heads of Supply Chain Management units	15
Table 5.20---Table 5.22	Heads of Human Resources Management units	14
Table 5.23---Table 5.24	Senior Project Managers	9
TOTAL NUMBER OF CONSTRUCTS		137

The discussions of the findings are based on the category of themes obtained from the open-ended responses, namely: human resources management, financial management, supply chain management, project management, decision making, planning, design, briefing, documentation and policy. Therefore, the discussions of findings are presented thematically in descending order of importance.

7.2 HUMAN RESOURCES MANAGEMENT

The purpose of human resources management services units in the South African National and Provincial DPW are to provide the following functions (Gauteng Department of Public Works, 2016): advertise posts; provide support with selection processes; administer appointments; provide condition of services; provide HR Registry services; administer termination of services; conduct HR audits; develop and manage data base and systems regarding HR information; manage HR reports and staff establishment; manage HR communications; manage the staff establishment; manage organisation development services; manage human resources planning and reporting; deal with service benefits; implement employee assistance programme; handle leaves; facilitate transfers; handle human resources training and development matters and manage employees' wellness. Other functions are to provide labour relations services, such as: manage collective bargaining, manage and coordinate grievances, discipline and processes resolution facilitation.

The survey results (Table 6.19) show that the qualification of technical professionals; remuneration packages for in-house technical professionals (e.g. engineers, QS, etc.); representation of internal project managers on each project site; representation of in-house professionals on each project site; and possession of appropriate skills and technical expertise by in-house engineers, architects, and QS were *averagely* ($3.13 \leq$ mean scores ≤ 3.89) rated. However, the number of in-house skilled professionals to be represented on project sites were *very low* (mean score of 2.00).

The survey results (Table 6.21) show that the human resources issues, such as: maximum number of projects per in-house professionals; DPW in-house professional representation on project sites; and representation of professionals in all professional services fields were rated *below average* ($2.19 \leq$ mean scores ≤ 2.70).

The survey results (Table 6.22) show that the performance of technical professionals (i.e. quantity surveyors, architects, civil/structural engineers, mechanical engineers and electrical engineers) are *below average satisfaction levels*, since all the five technical professional performances were rated between *fairly satisfied* and *slightly satisfied* ($2.26 \leq$ mean scores ≤ 2.77).

The analyses of interviewees' responses show that human resources management challenges dominated the overall responses. Human resources issues contributed majorly to poor project outcomes envisaged. The major contribution to poor procurement outcomes dwelled on lack of sufficient and qualified in-house technical professionals to supervise DPW projects. In fact, the National and all the provincial DPW raised issues about human resources challenges. Below is an interviewee's response in relation to insufficient professionals in DPW, which concurred with the finding from the survey outcomes in Table 6.19, Table 6.21 and Table 22:

> *"Look, I think, including even the administrative staff, we don't have. I think that is why there are many people attracted in the Department, just being honest, to come and actually work. But the problem is once we have appointed, I would say qualified, but qualification doesn't mean you have any experience to actually deliver. That's where the dynamic is; you need new people qualified to be able to assist. I would say let's say ten percent, and the ninety percent that we have, yes, they have qualification but they have no experience."* **[Chief Accounting Officer K]**

The analysis of interviewees' responses shows that the human resources management issues were the most *severe* and *challenging* issue that beset the National and Provincial DPW. Below are some interviewees' views regarding the lack of expertise and insufficient technical professionals to supervise projects in-house which concurred with the challenges from survey results in Table 6.21. Below are the views

of three chief accounting officers regarding insufficient technical professionals in DPW:

> *"No, we do not have enough in terms of expertise and in terms of numbers of professionals. It is only now that we have appointed but it is not yet sufficient."* **[Chief Accounting Officer B]**

> *"No, we don't have enough professionals. We have shortage of engineers, and what compound this again is young guys aspires to be engineers; once someone gets qualified or has registered as a professional, rather than working for government they prefer to actually work for themselves independently as contractors or consultants. So then you have problems. So what we do, we actually try to balance, and then whatever that we can do in-house, we do it in-house, but we still heavily rely on external contractors and consultants to actually assist us on certain projects. More especially complicated projects to actually work with us. But the ones which are very small, very minor, we can actually do them in-house."* **[Chief Accounting Officer K]**

> *"We do not have capacity in terms of technical professionals to supervise our project successfully. It is a serious capacity issue; it is a serious challenge. The reasons are: number one, the salaries that people get within government are such in the professional or technical areas is such that discourages qualified professionals to join government as a province, they would rather prefer to go for consulting, so that is the major issue. The salary compensation issue as a result then will attract technical people who may not necessarily be at the required qualifications."* **[Chief Accounting Officer M]**

This finding was consistent with the opinion of Egbu and Ilozor (2007) that: "lack of qualified technical professionals and inconsistent clients' representation for the supervision of projects has been identified as one of the major causes of poor project performance. There are also challenges with lack of incentive in retaining these professionals in their departments for longer period of time". This is also consistent with an interviewee's view and the open-ended responses from the heads of operational units:

> *"We do not have enough capacity in terms of qualifications and we do not have sufficient capacity in terms of number of technical professionals, but the*

numbers of professionals are not enough for the number of projects." **[Chief Accounting Officer M]**

"Currently within the Department we don't have enough professionals to manage the current workload which increases on yearly bases due to the demand being placed on health and education infrastructure." **[SPMI5]**

"There are insufficient human resources in the Department of Public Works." **[SPMH1]**

"In-house projects are difficult to earn as the Department has no enough professionals. External consultants are engaged to manage projects due to insufficient registered professionals in-house." **[SPMA6]**

"We rely heavily on the external consultants due to insufficient professionals in-house." **[SPMA7]**

"Department of Public Works does not have capacity in-house to perform its mandate because of limited professionals." **[SPME9]**

"There are issues of shortage of professionals in DPW." **[CFOF]**

"There is insufficient technical capacity within in-house professionals/project managers." **[DDGG]**

"Lack of professional personnel delays the process of project delivery." **[SPME3]**

"There is shortage of professional staffs in the built and financial environments." **[CFOI]**

There are serious challenges and problems with the representation of technical professionals on each project site, coupled with lack of mechanism/template to monitor their participation on project sites. This shows that the DPW do not have technical professionals with sufficient skills and expertise required to supervise their projects. This concurred with the interviewees' view and some open-ended responses:

"Firstly, we do not have sufficient skills and expertise in our technical and administrative employees. We are not sufficiently capacitated. I would say we are incapacitated internally in terms of numbers and in terms of level of qualification in our staff. Secondly, I believe that the internal project managers need to be capacitated, for example, by way of going for training from time to time for fresh courses, etc., in order to enhance their knowledge. Of course to admonish the consulting teams and the professional teams to actually adhere to

their blueprint, because it is very clear of what we are challenged for, but many at times because themselves will be lacking capacity to handle too many projects or whether they have the tendency to neglect their responsibilities. Thirdly, there is big issue in the South African public service. The Public Service Act (PSA) recruitment regulations do not talk to, or not in line with the Higher Education Act (HEA), which is a major problem which needs to be looked at if performance is the priority of this Department." **[Chief Accounting Officer M]**

"Not fully, we do not have enough skills and expertise required in our employees." **[Chief Accounting Officer B]**

"There is lack of human resources personnel in DPW." **[SPMA5]**

"We are in short of technical professionals in our Department including project managers." **[SPMG1]**

"We do not have any registered professional (technical) in our Department." **[SPMG2]**

"There is high shortage of technical skilled personnel." **[SPMH2]**

The analysis of interviewees' responses shows that one of the weaknesses of DPW is dependence on the external consultants for design and supervision of projects because of lack of capacity in National and Provincial DPW. Based on that, the external consultants are always engaged to assist with the design and supervision of projects on behalf of the DPW, but the consultants are not doing their work as required. Some of the weaknesses from consultants are delay with designs and supervision of projects because they take the advantage of incapacitation in DPW. Below are the views of the interviewees and open-ended responses regarding the performance of the consultants.

"From my personal view, not at all and I'll tell you why. There is a big problem with the way consultants approach and do their work when it comes to government Vis-a-Vis when it does business for private sector; let's say consultant to Ned bank or ABSA bank. They don't do justice to us. They take all the time in the world. Yes, its government, and again with contractors, the same contractor who can do a building in eighteen months, or twelve months for private, but with government will take them years. The same consultant, who can complete the designs in three months, will do it for a year for government. Because that's where the difference comes, that's what I can tell you up front, those external consultants with government they take long time to do their work." **[Chief Accounting Officer K]**

"In many instances, I'm not satisfied with the performance of the consultants. Consultants have realised that there are issues of incapacitation in our Department. Firstly, they are not performing because they are taking advantage of the fact that Department of Public Works is highly incapacitated. With the representation of one implementation project manager have a tendency to relax. That is number one, Number two; their documentation gets so substandard, because they have realised that there is no enough mechanism to actually monitor their performance. So much depends on them (the consultants) for us to be able to perform, because they are not being closely checked, because we do not have enough in-house professionals. So, we only have few consultants who do their work in a satisfactory manner." **[Chief Accounting Officer M]**

"Lack of capacity from consultants and inexperienced in-house professionals therefore affects the delivery and quality of projects." **[SPMI4]**

"The project management unit (PMU) may appoint young technicians and engineers who still need some training and experience." **[DDGG]**

The issues besetting the DPW optimum performance during procurement process include lack of in-house technical training and professional development. Most of these professionals are not qualified with their professional bodies for practicing, and coupled with lack of sending these professionals for training and development contributed to poor supervision of projects because of lack of skills and technical expertise. This concurred with some respondents' open-ended views:

"A number of candidates are still aspiring professionals." **[HRMB]**

"In general, our Department is delivering, but more training needs to be done to improve service delivery." **[HRME]**

"Most of the Department professionals have few preferred qualifications (degrees). To have the drawings approved is very hard, e.g. even the qualified electrical engineer is not registered with his professional body. Project managers need to be taken for further training to be able to manage projects." **[SPME6]**

"The issue of training and skills transfer is also very critical. Lack of technical skills also sacrifices the quality of some projects." **[CFOF]**

"Technical professionals need more extensive training." **[SPMH2]**

"The project managers lack learning from each other's skills. There is reluctance of project managers to further educational development. Project managers sometimes get to a mistake of not further developing themselves (comfort zone). Insufficient technical skills transfer from the external service providers towards professional registration of in-house personnel." **[DDGG]**

The analyses of the interviewees' responses show that recruitment of professionals is one of the most *crucial* challenges that beset DPW. This is mostly attributed to lack of motivation and morale of professionals, such as lack of good emolument/salary, lack of incentives, and lack of promotion. The analyses of interviewees' responses show that even when the young professionals are recruited, trained and become qualified, the DPW cannot retain them because of poor salary structure in the public sector organisations. The qualified professionals would rather decide to become either independent consultants or contractors, which pay them better than to remain in DPW. Below are excerpts from the open-ended responses which concurred with the interviewees' views:

"The inadequate pool of the built environment professionals is the most critical challenge in attracting and retaining professionals. A number of professionals post remain vacant for a longer period and this impacts negatively on infrastructure delivery performance." **[HRMF]**

"Attraction of the appropriate skilled people is a concern." **[SPME9]**

"The Department has over time (more than 5 years) struggled to recruit and retain suitably qualified and professionally registered technical personnel. Poor morale and unmotivated staff: The personnel are always over worked since most of the posts on the organizational structure are vacant." **[DDGG]**

"Our organogram is heavily understaffed. The Department does not have professional internal project managers." **[SPME6]**

"I believe once the post of the new structure is adequately filled then production of and execution of projects would double up." **[SPMI5]**

Table 7.2 shows some of the heads of operational units' open-ended responses which concurred with the survey results in Table 6.19 and the interviewees' views on human resources challenge:

Table 7. 2: Excerpts of human resources challenges from open-ended responses

Human resources challenges
"Yes, we ensure continuous professional development." **[HRMB]**
"Candidates' professions are placed with registered mentors –both internal and external depending on availability." **[HRMB]**
"A lot of qualified personnel are needed to engage with public sector employees." **[SPMC4]**
"The HOD is not a construction specialist but rather an accountant by profession." **[DDGE]**
"To capacitate the Department or Public Works with the built environment qualified registered professionals." **[SPME10]**
"Only a handful of Department professionals are registered with their professional bodies." **[SPME6]**
"User Departments tend to take advantage of inefficiencies in DPW by trying to benefit more from projects." **[HODF]**
"The Department should have managers who are technically and financially enlightened for procurement." **[SPMG6]**
"The human resources management (HRM) unit is constantly sending professionals (e.g. project managers) for courses, summits and workshops to develop their skills and acquire continuing professional development (CPD) points." **[HRMH]**
"Project managers should work towards registering with their professional bodies like the South African Council for the Project and Construction Management Professions." **[HRMH]**
"There is an overload of projects per in-house professional as our Department is understaffed in terms of construction industry professionals." **[DDGG]**
"The professionals within the Department are not sufficiently resourced to handle projects in-house and have to rely on professional service providers to execute projects on their behalf." **[SPMH1]**

7.3 FINANCIAL MANAGEMENT

The purpose of financial management services units in the South African National and Provincial DPW are to provide the following functions (Gauteng Department of Public Works, 2016): develop financial policies, processes and procedures; conduct medium term and long term financial planning; compile budget estimates and monthly forecasts; the planning and controlling of budget; the collection of revenue; handle salary matters; provide inputs to annual performance plans; advice and effect adjustments and roll overs; manage financial accounting services; manage financial

information systems; provide PAYE, and related debt management services; provide reconciliation and accounting services. Others are to submit monthly financial reports; prepare quarterly and annual financial statements; analyse expenditure and provide financial support to responsibility Managers; provide support to District Maintenance Hub in terms of expenditure against budgets; certify payroll and processing of employee costs, advances, claims and transfers; allocate and approve payments on systems; deal with payment related queries; coordinate the implementation of audit recommendations; provide financial systems and support services; establish integrated internal control policies and systems; establish a delegation framework and retain financial information.

Survey results (Table 6.12) indicated that the respondents' perception relating to factors leading to late payment to service providers, such as: DPW internal project managers in dispute with consultants on payment certificate; disputes as a result of quality of work done by contractors; weak monitoring and supervision of projects by DPW internal project managers; and bureaucratic bottle necks during legislative and administrative procedures contributed *averagely* ($2.56 \leq$ mean scores ≤ 2.89) to late/delayed payments to service providers. This in turn might indicate that there is delayed payment to service providers, and that could affect the performance of service providers during the construction process, especially the contractor's performance and hence lead to poor project outcomes or extension of project duration.

The survey results (Table 6.13) indicated that the respondents' perceptions relating to DPW financial officers' role during monitoring and controlling of budgets, such as: monthly and quarterly reviews of expenditure and income; releasing cash flows that actually originate from the project team and comparing expenditure on each project to the initial cash flow earlier submitted were rated as *moderate* ($3.00 \leq$ mean scores $\leq$ 3.56), which concurred with the interviewees responses that there were delays with the release of cash flows. While electronic payment to contractors, suppliers, etc. by User Departments or the Treasury and releasing funding based on each project's cash

flow projection *fairly* contributed (2.44 ≤ mean scores ≤ 2.78) to the monitoring and controlling of budgets.

The survey results (Table 6.14) indicated that the respondents' perception of DPW financial issues identified during procurement processes, such as: financial issues identified during integrated (DPW and User Departments) planning sessions was rated *very high* with mean score of 4.00. While deficit/unforeseen mistakes in costing of projects; delay with budget submission from DPW & User Departments to Department of Finance; Premier's cabinet's delay with project approvals for funding purposes and late disbursement of funds by the Treasury unit to DPW were rated *moderate* (2.00 ≤ mean scores ≤ 2.78). This finding concurred with the interviewees' views and the open-ended responses regarding financial management challenges inherent in DPW.

The survey results (Table 6.15) indicated that the respondents' perceptions relating to the frequency of financial challenges occurring during project delivery processes, such as: insufficient number of professionals in Finance unit, lack of training and development programmes; shortage of professionals' skills and expertise in Finance unit and poor audit results or records *often* contributed (2.89 ≤ mean scores ≤ 3.22) to financial challenges. The other factors such as: lack of qualification for effective performance; limited knowledge management; non-adherence to legislation; non-adherence to PFMA; and unauthorised expenditure by finance officers *sometimes* (1.56 ≤ mean scores ≤ 2.50) contributed to financial challenges during procurement process. Below are the views of a chief accounting officer and some open-ended responses regarding late/delayed payment challenges, which concurred with the finding from the survey results in Table 6.12:

> *"Late payment occurs mainly due to long processes during payment stages."* **[SPMGI]**
>
> *"Late payments to contractors delay progress of ongoing projects."* **[SPMG4]**
>
> *"Late payment factors should relate to before and after the submission of the invoices or payment certificates."* **[CFOH]**

> *"The late payment factors should not be asked at management level (Chief Financial Officer) only, but also at project level (Senior Project Manager). The invoices or payment certificates are raised at project level by the Senior Project Managers, while payments are done by the Chief Financial Officers at the management level."* **[Chief Accounting Officer M]**

Another major financial challenge that beset the performance of the public sector clients is delay with cash flows to service providers (contractors, consultants, suppliers). The cash flows issues have negatively affected the optimum performance of public sector clients. Below are the interviewees' views and two open-ended responses from operational units:

> *"Time and cost overruns also lead to delays at time in releasing cash flows for payment to contractors, suppliers and consultants. The major challenge we have in DPW is cash flows, cash flow is a major culprit which actually interrupts the delivery of projects. There is a problem of cash flows for contractors. Sometimes, they do not have resources, remember, the policy of government is to try and uplift those that were previously disadvantaged (PPPFA). And when they come on board, if they won those contracts, you find that they do not have sufficient resources financially."* **[Chief Accounting Officer M]**

> *"There is delay with contractors' cash flows and that impact negatively on the delivery of projects."* **[SPMI4]**

> *"Public sector clients are let down by cash flow problems and in most instances by the communities they work in."* **[SPMC2]**

Another contentious issue that contributed to the poor project outcomes is either insufficient or late disbursement of budgets. Late release of budget or insufficient budgets affects the continuous and smooth construction processes, especially, the performance of contractors. Below are the views of interviewees and some respondents' open-ended responses which concurred with the findings from the survey results in Table 6.14:

> *"The budget comes to the DPW very late, and they get confirmed and captured very late, hence we start work late. After year end there is a process where everything is to be reconciled which buys more time and budgets gets confirmed very late, but our finances are coming from the Treasury. DPW finances and User Department all come from the Treasury."* **[Chief Accounting Officer B]**

"Lack of enough budgets for training of professionals in the procurement profession" **[SCMB]**

"There is problem with the political committees at times in approving budgets to Department of Public Works for the delivery of proposed project." **[Chief Accounting Officer M]**

"Budgets from User Departments (Health & Education) are frequently unrealistic." **[DDGI]**

"Normally at National Department of Finance there is no delay with budget but at the Provincial Department of Finance there are always delays. Available budgets of User Departments are sometimes insufficient for infrastructure needs." **[Chief Accounting Officer B]**

Financial challenges during the procurement processes have contributed to cost and time overruns during the construction processes. Below is an interviewee's view regarding the major causes of financial challenges during procurement processes which concurred with survey results in Table 6.14 and Table 6.15:

"Okay, most of our financial challenges are: (i) due to the dispute between the project manager and the consultant on the payment certificate, (i.e. I have done this much of work and this is how much I need to be paid and somebody else will come and say no, I do not think this is what you need to be paid, that is the primary issue (ii) might be due to bureaucracy in approving the invoice (iii) might be the payment processes, for example, in this province B, we are interdependent to another Department between Department B and the Department of Finance, because payment gets approved to that side (iv) project manager might be seating on the invoice and brings it during the eleventh hour. So, these are some of the reasons for poor project outcomes from us (DPW)." **[Chief Accounting Officer B]**

The analysis of interviewees' responses shows that the financial management challenges contributed to the poor project outcomes which need to be looked at critically for improving the performance of public sector clients in the National and Provincial Departments of Public Works. For instance, delayed/late payment to service providers (contractors and consultants) hindered the performance of service providers during the procurement process, especially, the contractor.

Table 7.3 presents the Heads of operational units' open-ended responses regarding financial management challenges which support the findings obtained from the survey results in Table 6.15:

Table 7. 3: Excerpts of financial management challenges from open-ended responses

Financial management challenges
"The Department of Public Works had a disclaimer audit opinion in the last financial year, but it has improved continuously and we have to improve the processes and systems (audit opinion)." **[CFOE]**
"DPW need to pay their personnel enough salary not to be attracted by the private sector." **[SPME10]**
"User Departments should learn that all projects are budgeted for a specific period with specific scope." **[SPMC7]**
"The Department of Public Works does not have funds (budgets). Budget is sitting with the User Departments (Health and Education)." **[SPME3]**
"Proper funding of projects is very critical." **[CFOF]**
"Tracking system of payments for service providers must be in place and effective." **[SPMG3]**
"Funding is released by the Provincial Treasury approximately every second week only. If certificates of payments are received late, a payment date can be missed due to verification processes of the payment leading to payments after 30 days. Funding is released based on the cash flows forecast for the vote as a whole taking account of all projects. Funding is therefore not released per individual project." **[CFOI]**

7.4 SUPPLY CHAIN MANAGEMENT

The construction projects may be defined as the management of upstream and downstream relationships involving clients and other project partners in order to achieve greater project value at lesser cost (Rimmer, 2009, p.138). Therefore, the application of supply chain management in construction procurement offers opportunity for improvement of the construction process. Supply chain management unit responsibilities in DPW, for instance, are to (Gauteng Department of Public Works, 2016): manage supplier data base; compile and implement procurement plan; compile acquisition management plan; provide bid and contract administration; ensure the implementation of the preferential procurement Act as secondary objective; develop, maintain and implement procedures regarding demand, acquisition and contract management; render secretariat for the bid committee; render risk analysis and management services; render performance monitoring and management services; manage supply chain of goods and services and manage supply

chain for construction procurement. Others are to: identify SCM needs; identify procurement priorities and finalise procurement plans; manage preparation of bids; manage acquisition of goods and services; manage functioning of Bid Evaluation and Award Committee; manage tender processes; administer contracts; manage supplier performance; and manage movable assets, logistics and disposals.

The survey results (Table 6.6) show that with the exception of the ability of DPW compliance committee to comply with pillars of procurement during tendering processes as legislated which was *highly* rated with a mean scores of 4.22, the other elements were *averagely* ($2.67 \leq$ mean scores ≤ 3.78) rated, such as: the input of procurement committee to tender advertising for contractor selection; the ability of bid evaluation committee to include professionals' reports in the adjudication processes; the ability of DPW to form a steering committee comprising User Departments, the community, the DPW in-house professionals and consultants to oversee the delivery of projects. This in turn might have been one of the reasons why the procurement committees find it difficult to even conduct a perfect tendering process for the selection of best contractor.

The survey results (Table 6.16) suggest that the following elements were *averagely* ($2.56 \leq$ mean score ≤ 3.78) rated, such as: adherence to 21-days advertisement period in the media; the ability of bid adjudication committee to adjudicate the appointment of a suitable contractor; the ability of bid evaluation committee to adjudicate the appointment of a suitable contractor; the ability of specification committee in checking specified quality of materials and standard of workmanship; the ability of approval and recommendation committee to check, regulate and approve design for project implementation.

The survey results (Table 6.17) show that the ability of bid evaluation committee to include professionals' reports in the adjudication processes; the ability of DPW to form a steering committee comprising User Departments, the community, the DPW in-house professionals and consultants to oversee delivery of projects; the ability of

DPW compliance committee to comply with pillars of procurement during tendering processes as legislated and the input of procurement committees to tender advertising for contractor selection were *averagely* ($2.78 \leq$ mean scores ≤ 3.00) rated. The low rating might be the major reason why there were problems with tendering processes and procedures, because of the ineffectiveness of the procurement committees to conduct the tendering process successfully. This indicates that the procurement officials were not able to adhere to their roles and obligation during tendering stages. The procurement committees did not adhere to their duties effectively and that could have contributed to poor tendering processes and procedures.

The survey results (Table 6.18) show that the supply chain management challenges, such as: lack of training of SCM cadres; lack of education on & communication of the relevant SCM processes and procedures; gaps in the implementation of SCM policies and procedures; shortages in the application of the SCM policies, procedures and controls; lack of thorough and comprehensive SCM documentations and financial mismanagement in SCM processes *sometimes* ($1.56 \leq$ mean scores ≤ 2.33) contributes to SCM challenges. The fact that these challenges do exist could be a threat to the optimum performance of SCM cadres which could affect the performance of SCM unit in DPW. The survey results in Table 6.18 concurred with the interviewees' views in relation to SCM challenges.

The analyses of interviewees' responses show that there are substantial challenges and weaknesses besetting the performance of the public sector clients during the procurement process. There are issues of lack of qualified supply chain carders and lack of skills and expertise to adhere to their roles and responsibilities as required. Below are some of the excerpts from the interviewee's transcripts and from open-ended responses that are consistent with the survey findings in Table 6.18:

> *"Procurement is one of the serious challenges the Department is faced with."* **[HODA]**

> *"There is no tighter adherence to procurement guide lines in terms of functionality which is essential."* **[Chief Accounting Officer M]**

"Sincerely, procurement unit is not taken very serious and even the supply chain unit. You find people who are not yet qualified in the procurement and supply chain units. It is now that the departments are serious in re-structuring the procurement and supply chain units for better performance. For example, if you look up, what I'm having here, 90% of the staffs in procurement and supply chains are on contract, they are not permanent staffs. Furthermore, when you look at their skills and CV's most of them are not procurement specialist and supply chain qualified." **[Chief Accounting Officer B]**

The major issue of concern is non adherence to the CIDB regulations on the delivery of projects. The lack of adherence to method 4 brought by the CIDB and lack of implementing the current infrastructure delivery management system (IDMS) also contributed to poor project outcomes experienced by User Departments. Below is an interviewee's view with an open-ended response:

"DPW do not adhere to construction industry development board (CIDB) procurement guide lines, the Act is very clear and the guidelines are very clear on the selection of chain of contractors. There is a so called method 4 in the procurement of construction services. The DPW must strictly adhere to, and follow to the letter the method 4 brought by CIDB for the successful delivery of construction projects in South Africa. There is problem with the implementation of method 4 by DPW." **[Chief Accounting Officer M]**

"IDMS need to be implemented fully to define professionals' roles and responsibilities to ensure project flow." **[DDGB]**

The analyses of interviewees' responses show that there are challenges with shortage of technical professionals in the supply chain management units, which contributes to poor project supervision and could also contribute to poor project outcomes. This is because of the DPW inability to manage and oversee the performance of SCM unit during procurement process due to shortages of SCM professionals. Below are the views of two respondents regarding the shortage of technical professionals in SCM units:

"*There is shortage of skilled Supply Chain Management cadres."* **[SCMB]**

"*Yes, our organogram does not meet the new Supply Chain Management structural requirements."* **[SCMA]**

One of the major challenges in SCM unit is the long process it takes to award contracts and make necessary decisions during tendering stages. These are some of the open-ended responses from the respondents that concurred with the supply chain management issues, for instance, contract awarding coupled with delay by the procurement committees. Below are the four respondents' comments:

> "*Procurement processes sometimes take long time.*" **[SPMA5]**
>
> "*Need to improve on procurement process.*" **[SPMG3]**
>
> "*Supply Chain Management processes should also be evaluated due to the lengthy time it takes to award projects.*" **[SPME8]**
>
> "*Review of Supply Chain Management process in order to shorten the process, as it takes long time in current situation.*" **[SPME7]**

The analyses of interviewees' responses show that DPW do employ the traditional method of procurement and competitive tendering process in the selection of main contractor. DPW professionals believed that by using the traditional method, better monitoring of contractors' performance during the construction process would be achieved by monitoring the performance of the contractor and the progress of work. Another reason is that the legislation from the Parliament always encourages DPW to use the traditional method of procurement with competitive tendering strategy for transparency during tendering process. Below are the views of two chief accounting officers regarding the encouragement from the Parliament to use the traditional method of procurement and competitive tendering procedures during tendering stages:

> *"Okay, we predominantly use traditional method or route and is also legislated by an Act (PFMA) but there are exceptions when the project is needed urgently, then you got an option of deviating from traditional and to come with a close tender method to use either design and build or turnkey but otherwise the legislation is to strictly use traditional method through competitive tendering procedures. The method we use is the open competitive tendering in selecting our contractor and that is what the legislation says and we must follow strictly. It is legislated. Remember, procurement is highly legislated like I said earlier on. It is encouraged that each time you must use competitive tendering processes with traditional*

procurement strategy for all government projects. For example, when you go by competitive tendering processes, when the tender is closed, most time there will be issues, instead to go out and tender again, we might invite those who tendered before to discuss the issues." **[Chief Accounting Officer B]**

"We will firstly advertise to the public. The general rule for procurement of services in Government setting is that every service rendered should be given out there to the public to compete for. Yes, competitive tendering. Only in certain instances can you go for solicited tendering or selected or negotiated tendering, under very stringent conditions. In all our projects, we are employing a traditional method of procurement. For the reason that we believe it is less risky, you are able to check on progress. If you make a comparison, in design and build, there is not much scope for people to be able to monitor. A lot is left to the contractor for arguments sake, but we use the traditional one because we would like to have our checks and balances, and that with government legislation is very clear. We need to realise value for money for taxpayers." **[Chief Accounting Officer M]**

Table 7.4 shows the heads of operational units' open-ended responses regarding supply chain management challenges in the National and Provincial Departments of Public Works.

Table 7. 4: Excerpts of supply chain challenges obtained from open-ended responses

Supply chain management challenges
"Specialists' construction unit to be established for procurement." **[HODB]**
"User Departments want to dictate which buildings they want to rent and the Department of Public Works has to follow the due Supply Chain Management processes to secure accommodation." **[SCMD]**
"To look into contracts that are used in infrastructure in a public sector that always favours the private sector." **[SPME10]**
"In Supply Chain Management section, many a time's blame is laid on Supply Chain Management committees where there is lack of or slow performance in implementation of various infrastructure projects." **[DDGG]**
"Secondly, all government objectives cannot become a "procurement burden". It causes the cost of compliance to sky rocket. Compliance requires time; time has a cost implication, and thus an efficiency implication." **[SCMI]**
"There must be a balance between compliance, overregulation and performance." **[SCMI]**
"There must be an improvement regarding control measures with regards to procurement processes in terms of appointing service providers, however, investigation exercise must be undertaken before appointing service providers, by so doing will eliminate a number of cancellations and will improve service delivery. Internal control measures are inexistence regarding PFMA." **[SPMI1]**
"Both the duties of contractors and consultants should be clearly defined." [**CFOF]**
"The Department should always appoint skilled contractors and consultants." **[SPMH7]**

7.5 PROJECT MANAGEMENT

The management of construction projects could be seen at two levels (i.e. management and organisational level, and operational and site-specific level). Firstly, projects are coordinated from management level, which includes the supply chain management unit, capital project unit, the planning unit, the professional service unit all indirectly relate to the project management unit which is normally monitored by the Deputy Directors General responsible for construction projects or Chief Directors in some Provinces. The technical professionals' responsibility is to monitor the main contractor and the sub-contractors in compliance with the project specification (quality of materials and standard of workmanship) in the contract documentations during the construction process. The project monitoring unit is external consultants that monitor the performance of contractors and sub-contractors activities on behalf of the User Departments (e.g. Departments of Health and Education). The Heads of

Departments are the Chief Accounting Officers who are saddled with the responsibility and obligation of supervising and monitoring the performance of the operational units during the procurement processes. The purpose of project management units in the National and Provincial DPW are to provide project/programme management support services, such as to (Gauteng Department of Public Works, 2016): map property and infrastructure processes and make continuous recommendations for improvements; determine the definition, methodology and design of portfolio, programme and project governance standards; develop and maintain project and document management systems and built records; provide portfolio, programme and project mentoring, coaching, skills development and planning support; determine quality and safety standards; determine uniform cost norms and standards prices in line with National cost norms; provide professional services to EPWP in terms of contractors and skills development; and coordinate the construction industry in terms of supplies, professional service providers and contractors.

The survey results (Table 6.3) indicates that the ability of project management unit to perform in the following roles: the ability to work closely with relevant other internal units to share information and advice during construction processes; the ability to translate design on paper to end product; the ability to monitor in-house professionals' participation during site construction; the ability to monitor internal project managers' operations on site and the ability to set up work process flow for the implementation of proposed projects are rated as *good* ($3.17 \leq$ mean scores ≤ 3.67). Hence, the survey results in this regard concurred with the interviewees' views on the overall performance of public sector clients during project management.

The survey results (Table 6.5) show that the ability of DPW to advise the User Departments on the cost of the projects in relation to their budget allocation and the ability of DPW to advise the User Departments on the completion duration/time of the projects were rated *very good* ($4.00 \leq$ mean scores ≤ 4.33). Meanwhile, guiding User Departments on their technically needs relative to the project execution plan;

using standardised briefing schedule to reach a common understanding with User Departments on their briefs (needs); applying user management plans (UMPs) during planning sessions on User Departments' need and using the infrastructure development plans (IDPs) for planning of proposed projects were rated as *good* (3.11 ≤ mean scores ≤ 3.78), which supports the views of the Chief Accounting Officers who rated their project performance as *good* during the interview sessions**.**

The survey results (Table 6.8) show that monitoring site development processes and programmes and attending to all queries raised during site meetings were rated as *good* (3.11 ≤ mean scores ≤ 3.44) while escalating issues raised that are beyond the internal project manager's capability to the senior project manager for deliberation; verifying and analysing the issues and forwarding to the senior management for further considerations and developing daily and weekly reports from the project for monthly management meetings were *averagely* (2.56 ≤ mean scores ≤ 2.67) rated. Below are three chief accounting officers' views regarding management of project which concurred with the senior project managers views during the preliminary interviews and survey results in Table 6.3, Table 6.5 and Table 6.8:

> *"Rating of project delivery process as good not excellent or poor."* **[Chief Accounting Officer M]**
>
> *"I rate it as good."* **[Chief Accounting Officer K]**
>
> *"We are not doing well. I can say we are average. It is not excellent because of number of issues; firstly, the contractors do not deliver these projects on time. Secondly, we are not paying the contractors on time."* **[Chief Accounting Officer B]**

This suggests that the internal project managers are ineffective in discharging their duties and hence contributed to poor project supervision that leads to poor project outcomes. Below are the interviewees' views which concurred with the survey results in Table 6.3, Table 6.5 and Table 6.8 and open-ended responses regarding lack of adequate supervision and monitoring of project during project management:

> *"In view of the fact that our project outcomes fluctuate, and would want to improve our delivery processes, I would not say it is excellent because of issues/challenges that we have in this Department. On the negative side, there are a number of impediments."* **[Chief Accounting Officer M]**

> *"It is informed by the number of complains either of non-performance from contractors' side or non-payment from our side, e.g. not paying the contractors on time, and because of these issues our projects are not delivered excellently."* **[Chief Accounting Officer B]**

> *"No detailed template for clarifying project briefs."* **[SPMC1]**

> *"There is lack of mechanism to monitor in-house professionals' participation on project sites."* **[SPMC2]**

The analyses of interviewees' responses show that senior project manager and the chief accounting officer alluded that the legislative procedures leads to cost and time overruns during the procurement process. These are respondents' views regarding legislative issues that cause time and cost overruns. There are divergent opinions; some agreed that legislative procedures leads to cost and time overruns, but some disagree with the statement. The views of the chief accounting officer and the senior project manager from province M is that:

> *"Legislative and administrative procedures lead to time and cost overruns."* **[SPMC3]**

> *"Legislative processes and procedures lead to time and cost overruns during delivery of projects. These lead to time and cost overruns as the result of extension of time, and management issues that are taken into account as a result of taking longer time to now complete the projects."* **[Chief Accounting Officer M]**

The views of the senior project manager and the chief accounting officer alluded that the legislative processes and procedures lead to time and cost overruns during delivery of projects. However, the chief accounting officers in Provinces B and K do not agree that legislative processes do cause time and cost overruns in their provinces. The chief accounting officers views from provinces B and K is that:

> *"No time and cost overruns caused by legislative processes and procedures, we even do them faster than we actually used to do them before."* **[Chief Accounting Officer K]**

> *"No, I don't think so. Legislative procedures are there and they need to be complied with. So, I don't believe that there is a legislative procedure that actually makes the project to have cost overrun and time overrun. The problem that led to cost and time overrun is during the internal planning from us as a department which needs to be corrected. What causes time and cost overruns are, for example, you might find a contractor who has been awarded a contract and do not have capacity to deliver either financially or technically, or who do not have cash flows to run the project. From our side, we have issues of non-payment. The variations sometime come from User Departments."* **[Chief Accounting Officer B]**

The literature also support that construction projects have been characterized by disputes, cost and time overruns (Latham, 1994), which might lead to poor project outcomes. Below is an interviewee's view regarding the causes of poor project outcomes from project management perspectives:

> *"What leads to poor project outcomes from project management perspectives are: firstly, there is weak monitoring and supervision of projects. Secondly, there is a tendency by the consultants to increase the scope of works, which needs to be checked. Thirdly, there is tendency from internal project managers to neglect monitoring and supervision of projects. Fourthly, there is tendency by the contractors to cut corners and not deliver quality works, especially, when they know there is no one monitoring them. Fifthly, disputes as a result of quality of work done by the contractors."* **[Chief Accounting Officer M]**

Table 7.5 shows some of the heads of operational units' open-ended responses which concurred with the interviewees' views on project management challenges envisaged within the DPW and the User Departments.

Table 7. 5: Excerpts of project management challenges obtained from open-ended responses

Project management challenges
"The number of projects allocated to an internal project manager will have an influence on overall performance of the projects." **[SPMA3]**
"In-house Quantity Surveyors monitor projects implementation in conjunction with external project managers." **[SPMF4]**
"Work being done by professionals is more focused on project management as compared to actual technical aspects of the projects. This has negative consequences when technical staffs in the public sector apply for Professional Registration with their Professional Bodies or Councils." **[HRMC]**
*"Management and coordination of professionals is non-existent***." [CFOE]**
"Ineffective monitoring and supervision of projects by professionals on site: to contractual issues such as claims, the use of contingency funds, variation orders, extension on time, increase of scope, etc." **[DDGG]**
"Community disruption also causes problems and delays on various projects: These would be mostly in the form of job-seekers complaining of pay-rates, unfair treatment by the contractors, lack of training on the projects, payment/compensation and the use of borrow materials, etc." **[DDGG]**
"User Departments should understand that all projects are budgeted for a specific period with specific scope. User Departments are having high expectation and demand more than what the scope is calling for." **[SPME5]**
"User Department professionals tend to take advantage of inefficiencies in DPW by trying to benefit more from the project." **[HODF]**
"User Departments do not approve some of the projects within the stipulated time (21 working days) and this result on contractors claiming C.O.T. because of the delays." **[SPMF5]**
"There is an overloading of projects per in-house professionals as the Department is understaffed in terms of professionals. Professionals are not keen to work for the government." **[SPMH8]**
"There is slow performance in implementation of various infrastructure projects." **[DDGG]**

7.6 DECISION MAKING

The analyses of interviewees' responses show that one of the major challenges is for the committees to make decision. There are decision making delays during the delivery process in DPW. The analyses of interviewees' responses show that there are delays with decision making during the following: design stages; construction process; supply chain process; approval of invoices and payment certificates by internal project managers; variation orders by procurement committees; change of

briefs especially when new political heads, e.g. MEC is appointed; payment processes; cash flows to service providers (contractors and consultants). Others are: difficulty with taking decisions; bureaucratic bottle necks during budget approvals and delays with release of funds by Provincial Department of Finance. Below is a chief accounting officer's view and open-ended responses from six operational units regarding decision making issues:

> *"On the negative side, one of the impediments is the process of making decisions, and I will give you an example, if for instance you want to build up a hospital, you begin to excavate against a rock, for you to begin to make up allowances and variations in order to cover that cost for the blasting rock, etc. It needs a certain decision to be made by committees, and the process of going through committees can delay matters. Our problem is long decision making processes and is a major challenge for us. Generally, there is bureaucracy. Sometimes the Departments would make decisions and then other decision makers came on board later. There is a political head (e.g. Member of Executive Council) that comes in as a new captain of the ship and they assess what has been planned and decide that there has to be certain changes."* **[Chief Accounting Officer M]**

"Too many signatures for payments approvals and that delays projects." **[SPMB6]**

"Delays in dual decision making (i.e. on extension of time and variation orders) results in project delays and that increases the cost of the projects." **[SPMB4]**

"A lot of bureaucracy (i.e. long decision making) process." **[SPMD3]**

"The Department is having a vision in terms of capacitation, restructuring and performance in all units." **[HODA]**

"Performance is hampered by bureaucratic environment." **[SCME]**

"Too many signatures delay payments to service providers." **[SPMG5]**

"Sometimes, User Departments have difficulty with decision making." **[SPMH6]**

"User Departments do not approve some of the projects within the stipulated time (21 working days) and these results on contractors claiming C.O.T. because of the delays." **[SPME5]**

7.7 PLANNING

There are two planning sessions that take place during pre-construction stage in the delivery of construction project in the DPW with the User Departments (Gauteng Department of Public Works, 2016). Firstly, there is what is called the integrated briefing session, where the DPW request the User Departments' needs and requirements. Secondly, the internal planning sessions, where the DPW interpret the needs and requirements received from the User Departments internally within the DPW. The analyses of interviewees' responses show that there are challenges with the integrated and internal planning as generally viewed by interviewees as a result of planning challenges. However, there are major problems envisaged during the integrated planning stage between the DPW and User Departments.

The survey results (Table 6.7) show that with the exception of arrangement for feasibility studies including the viability of project site during internal planning session which was rated as *excellent* (mean scores of 4.56), the other factors were *averagely* rated which supports the open-ended responses regarding the weaknesses and challenges inherent in DPW planning unit. The ability of internal planning unit to establish a budget for the proposed projects; identify government land for siting of projects; develop a schedule for site planning; check for outcome of environmental impact analysis (EIA) on the projects and the use of Medium Term Expenditure Framework (MTEF) for planning of proposed projects were *averagely* ($3.33 \leq$ mean scores ≤ 3.89) rated. The role of Premier's budgeting committee in project planning for the proposed projects was *poorly* (mean score of 2.33) rated. This indicates that there are challenges with the internal planning sessions and weaknesses inherent in the DPW during internal planning sessions. The delays emanating from Premier's budgeting committee during planning of proposed projects prolong decision making

during pre-construction stages (i.e. briefing and planning stages). The interviewee's view concurred with the planning challenges cited in Table 7.7 and the survey results in Table 6.7. Below is an interviewee's comment regarding planning deficiencies within the DPW and User Departments (Departments of Health and Education):

> "*We have two folds of problems; one is internal planning (i.e. within the Department of Public Works) and two is the User Departments (i.e. Departments of Health and Education). The planning sessions are not harmonised to yield positive responses that would improve our delivery or procurement processes."* ***[Chief Accounting Officer M]***

The Chief Accounting Officer's comments regarding planning challenges are generic in nature and did not actually portray specific areas where the problems exist within DPW. The Chief Accounting Officers oversee the performance of the entire DPW including monitoring and supervision of the operational units. The interviewees' views also revealed that there are major weaknesses with integrated planning, which concurred with the respondents' views during the qualitative enquiry:

> *"Our User Departments (Departments of Health & Education) tend not to plan their projects which then cause delays and put pressure on Department of Public Works."* **[SCMD]**

> *"I think all the challenges that we encountered during the project delivery processes can be averted through proper planning during or before the procurement phase."* **[CFOF]**

"Working in silos: there are some activities that are of a nature that decisions should be made by a collective one, such activity is planning." **[DDGG]**

"Sometimes mistakes do happen where projects are omitted or budgets erroneously omitted in the plans since the planning circle is not taken seriously or left until the last minute then forcing the responsible person to send a plan that was not carefully perused just for compliance purposes." **[DDGG]**

"There is lack of submission of infrastructure programme management plan (IPMP) on time to enable the Department of Public Works to start with feasibility study." **[SPMG3]**

"The amount of time spent during planning session/phase is too long." **[SPMI5]**

"There is need to introduce the Asset Management Section (immovable and movable assets) i.e. User Management Plan and Custodian Management Plan." **[CFOE]**

"If we can reduce the amount of time spent during planning stages, we can move ahead." **[SPMI5]**

7.8 DESIGN

The function of the professional services units in the South African National and Provincial DPW are to provide professional service, advice and to render the following services: architectural services; civil engineering services; mechanical engineering service; electro technical engineering services and quantity survey services (Gauteng Department of Public Works, 2016).

The literature shows that design changes emanated mostly from User Departments. These design changes emanated due to the deficiency in User Departments' initial briefing. However, the genesis of these changes also came from User Departments' additional needs that arise during construction processes. It also happens with the DPW during internal planning sessions, especially, if the User Departments' briefing is not comprehensively stated.

The survey results (Table 6.11) show that the following elements are the *major* causes of design changes and variation as they are *always occurring* ($4.13 \leq$ mean scores ≤ 4.25): additional out-of-predefined scope of items required by User Departments to be incorporated into the design during construction processes; increase in DPW or User Departments' need; poor design and costing solutions by external consultants and poor briefing by User Departments to DPW planning unit. It is evident, therefore, that the causes of design changes and variation are mostly caused by the User Departments' inability to explain their needs/requirements to DPW during the integrated briefing sessions, although poor design and costing solution emanating from external consultants also contributed. Poor interpretation of

briefing (requirements) by DPW planning unit also contributed *moderately* to the design changes and variations.

The survey results (Table 6.22) show that the performance of in-house civil/structural engineers in DPW for design production and the performance of in-house electrical engineers in DPW for design production performed *poorly*. The ability of Architects with regards to economic consideration during design processes and the performance of in-house mechanical engineers in DPW for design production were rated *below average*. The Chief Accounting Officer's view and the survey results (Table 6.11) concurred with the views of the senior project managers during the preliminary interviews. The senior project managers opined that there are design changes and variation due to contingency; unforeseen circumstances (e.g. weather, earthworks, and disasters); changes in User Departments' briefs and also due to administration and political issues, especially, when new member of executive council (MEC) is appointed to head the Department of Public Works politically.

The survey results (Table 6.23) show that all the design criteria such as functionality, durability, aesthetics, and economy considered during design process were rated *fairly satisfied* ($2.42 \leq$ mean scores ≤ 2.88). This in turn, might be the reason why DPW outsources most of their architectural designs to external consultants because of lack of capacity from architectural unit in the DPW. Below is a respondent's view on design changes and variation caused by the User Departments (e.g. Departments of Health and Education):

> *"At times you find User Departments after approving plan tend to make changes to a construction project that has already started which then creates a challenge for Department of Public Works to now make fresh plan and implement these changes via a variation order."* **[SCMD]**

The design changes and variation during the construction process contribute to time and cost overruns and subsequently increase the cost of the project (Latham, 1994). This extends the period of project completion (Egan, 2002), especially where

traditional method of procurement is used as mostly adopted in the South African National and Provincial Departments of Public Works. Below is an interviewee's experience regarding the causes of design changes and variation during construction processes:

> *"The causes of design changes might be coming from User Departments in identifying their need, for example, I need a school and forgetting that the school might need offices for teachers or school need toilet, and then when service provider or contractor has been appointed and they come with additional items and they say we also need 1, 2, 3, things to be incorporated into the design. It also happens with our Department (DPW) when the User Department requirements have not factored in what the User Department was looking for by mistake. But it always happens when User Departments did not disclose their requirements fully at the briefing and planning stages, which is done at the early stage of the processes. It only happened with our Department when the User Departments like Health and Education mistakenly or otherwise did not state all their requirements."* **[Chief Accounting Officer B]**

The analyses of interviewees' responses show that there is delay with the production of design. This is because the DPW had to rely on external consultants to produce the design, which sometimes takes too long because consultants take advantage of lack of capacity in DPW. The major reason for the delay of design approval by the consultants is because of the incapacitation of professionals in DPW to sanction the consultants. The in-house professionals in DPW do not have the capability to check the design because of lack registered technical professionals in-house. The view of a senior project manager is that:

> *"The processes for design approvals are too long because we outsource the design aspect to external consultants and they take a lot of time to produce the design for us."* **[SPMI5]**

Some of the problems stated by the interviewees relate to time overruns due to design changes and variation caused by the changes in the earlier User Department briefing. These changes sometimes emanate from political heads, for instance, changes due to new member of executive council ('MEC'). Below is an interviewee's view regarding the causes of design changes and variations:

> *"There is problem with the political committees at times in terms of briefing issues in the Department of Public Works for the delivery of proposed projects. This causes time and cost overruns, and at times even changes in the design and the proposed project sites."* **[Chief Accounting Officer M]**

One of the major challenges besetting DPW is the lack of capacity of in-house professionals especially the technical professionals in the professional services units, whose main responsibility is the production of all designs in-house. It is acknowledged from the interviewees' views that some DPW do not have any registered professional architect in-house and rely heavily on the external consultants to produce architectural designs for the entire DPW. The design challenges in DPW are emphasized in an open-ended response regarding design deficiencies:

> *"The reason why the architects' ability with regards to functionality, stability, aesthetics and economy is unsure is because the Department of Public Works outsources the architectural design to external consultants due to incapacitation in the Department of Public Works. In section C of the Questionnaire, project design is an outsourced function as such the Department of Public Works does not fully engage in complete project designs, but, however, they are involved in project reviews and checks."* **[SPMF4]**

Regarding the causes of design changes and variation it is acknowledged that the civil engineering contracts normally have more of unforeseen circumstance and contingencies that contribute significantly to design changes and variation during the construction process than the building contracts. Below are two chief accounting officer views and perceptions about the causes of design changes and variations:

> *"The major problem DPW is suffering from is the issue of design changes and variations. Firstly, it is important to remind ourselves that we basically have two types of contracts, we have a civil contract and we have a building contract. You would know that the civil contracts are predominantly provisional for obvious reasons that the fact that you are going to do the works on the ground, and I mean literally on the ground. You would not know what is beneath it. Unforeseen circumstances and contingencies is one of the major reasons, if you go to building, 90% of the time you are going to build or put up as per the design and you must have the time as previously agreed to implement. You know the building contracts have very few provisional items. These are the ones responsible for any changes. You have some bid off*

projects, when you come to convention, etc. and that can be responsible for any changes of scope or change of whatever. There can be other aspects, obviously unforeseen circumstance as in inclement weather, disasters, and issues like that, but, there can also be a change of brief from the User Departments." **[Chief Accounting Officer M]**

"Because if brief is not properly specified and clear, very clear, and detailed, that's where you'll miss it. I will tell you, for argument sake, to say, fine, we have done, let's say for argument sake, your hospital, but based on the hospital you've done and they forgot something that is a necessity in a hospital. Say, look, we forgot to put a theatre room in a hospital, there are doctors, you want to do an operation, but you forgot to put a theatre room. You see? That's where the changes and the variation come. That's where the actual design change comes, because now you are looking at it and saying, yes, we didn't provide a theatre room but let's knock and change this area and turn it into a theatre room. That's where the changes come from." **[Chief Accounting Officer K]**

It is encouraged that the User Departments with the DPW architects should learn from the earlier researchers on design challenges to improve on poor project outcomes. Tuner (1990), for example, advised Architects that, "one of your most important roles should be to endeavour to give a client what he wants….It is no doubt often the case that a client has but a dim notion as to how his ideas can be carried out, and it is then the architect's privilege to guide him with expert advice".

In summary, the major challenges besetting the DPW in relation to design are as follows: the processes for design approvals are too long, User Departments change of scope during construction processes, DPW outsource design aspect to external consultants due to lack of capacity in-house, and DPW do not engage in complete project design due to lack of qualified and registered architects and engineers in-house.

7.9 BRIEFING

User Departments' briefing is the first responsibility the User Departments (Departments of Health and Education) offer during the procurement of construction

projects. It is the responsibility of User Departments to state their needs and requirements to DPW during integrated briefing sessions where needs and requirements of the User Departments are discussed with the DPW. The DPW proceeds to interpret the needs and requirements during the internal briefing sessions where the professional service units in the DPW take the responsibility of transferring the User Departments needs and requirements to design by the architects, structural, and service engineers (mechanical and electrical) (Gauteng Department of Public Works, 2016).

The survey results (Table 6.11) show that the public sector clients' roles and obligation related to briefing such as: additional out-of-predefined scope of items required by User Departments to be incorporated into the design during construction processes; increase in DPW requirements or User Departments' need and poor briefing by User Departments to DPW planning unit contributed *severely* to major causes of poor briefing as these elements were rated *very high* (mean scores of 4.25 each). Also contributing *averagely* ($2.75 \leq$ mean scores ≤ 3.63) to poor briefing are: User Departments' insufficient briefing on project needs and requirements; insufficient briefing (needs) from DPW planning unit to the architect for design purposes; poor design and costing solutions by external consultants; poor briefing by User Departments to DPW planning unit; appointment of new decision maker/political heads (e.g. 'MEC') and poor interpretation of briefing (requirements) by DPW planning unit. The Chief Accounting Officer view during the interview concurred with the survey results in Table 6.11. This is evident in an interviewee's view during the qualitative enquiry:

> *"There is User Departments' insufficient briefing on project needs/requirements."* **[Chief Accounting Officer B]**

However, the survey results (Table 6.9) show some areas where DPW contributed *positively* ($3.44 \leq$ mean scores ≤ 4.11) during briefing sessions: capability of DPW planning unit in advising User Departments on their needs/requirements for design and implementation purposes; the approach of DPW planning unit to working

closely with the User Departments to understand their needs/requirements; the approach of DPW planning unit to receiving project request from User Departments during briefing stages; the ability of DPW planning unit using the Infrastructure Development Plans (IDPs) to incorporate client's needs and the ability of DPW planning unit to implementing User Management Plans (UMPs) to incorporate all needs/requirements during planning stages.

The survey results (Table 6.10) show some areas where User Departments contributed *positively* ($3.67 \leq$ mean scores ≤ 4.33) during briefing sessions: the ability of User Departments to establish and confirm funding through the Provincial Treasury for implementation of projects; the ability of User Departments to explain their needs/requirements to DPW during planning sessions; the ability of User Departments to identify land owned by government for project development; the ability of User Departments to incorporate Municipalities' requirements in their briefing; the ability of User Departments to indicate to DPW planning unit the size of proposed projects during planning sessions and the ability of User Departments to identify their needs through working closely with Municipalities and Councillors.

Findings from the literature show that there are weaknesses and challenges that beset the User Departments' performance. For instance, lack of efficient communication at the briefing stages between the User Department and User Department representatives with the rest of the supply chain creates an inability to resolve each other's problems that are due to different perceptions (Egbu and Ilozor, 2007). It is also observed that the analysis of interviewees' responses concurred with the literature regarding the briefing challenges. The finding also concurred with the literature on briefing challenges envisaged in DPW and User Departments. For instance, it has been revealed that a major contributor to the failure of the project has been an inadequate briefing (Morledge *et al.,* 2006). Below are some of the open-ended responses regarding briefing challenges which support the survey results in Table 6.11 and the interviewees' views:

> *"The key weaknesses of the User Departments lie in the quality and comprehensiveness of strategic briefs."* **[DDGI]**
>
> *"User Departments mostly are having high expectations and demand more than what the scope is calling for."* **[CFOF]**
>
> *"User Departments' needs are not fully understood."* **[DDGI]**

As noted by Egan (1998, 2002), the User Departments briefing is the most important decision the User Departments can contribute to successful project outcomes. The major reason why briefing contributes to the successful project delivery is because the User Departments' briefing helps to translate the needs and requirements into design by the architects and engineers. The analysis of interviewees' responses shows that most of the briefs prepared by DPW do not align with the User Departments' needs and requirements. There is also lack of good and comprehensive briefing during the integrated briefing sessions, where DPW do not properly harness the User Departments' needs and requirements during integrated briefing sessions.

Heads of Departments (HODs) are the Chief Accounting Officers, and therefore have the responsibility of overseeing the performance of the operational units. Out of the 9 HODs surveyed, 4 responded to the open-ended questionnaire. One of their responses focused on briefing. As opined by one of the Chief Accounting Officers:

> "*User Departments do not always communicate exact infrastructure needs.*" **[Chief Accounting Officer B]**

This means that there is ineffective communication between DPW and User Departments during integrated briefing sessions. The lack of effective communication between the DPW and User Departments could lead to design changes and variation during the construction stages due to defects in briefing which has been established to be very expensive (Latham, 1994), especially where the traditional method of procurement is adopted. The major challenge with User Departments' briefing lies with the User Departments (i.e. Departments of Health and Education). The lack of comprehensive User Department briefing during strategic briefing stages with DPW is

one of the major causes of poor briefing. Briefing is the most important aspect of construction process that the User Departments could contribute to achieving successful project outcomes (Walker, 1994). The analyses of interviewees' responses show that there is lack of good communication from User Departments about their needs and requirements to DPW during strategic briefing session. The literature also supports the briefing challenges and weaknesses envisaged in both DPW and User Departments. For instance, it has been shown that a major contributor of the failure of the project has been misunderstood briefing process (Williams, 1989). Furthermore, Stephenson (1996) opined that lack of good statement of the owner's and users' needs is one of the most frequent causes of flawed and troublesome construction efforts, and Latham (1994) and Egan (1998) considered the briefing process to be crucial to the effective delivery of projects.

The analysis of interviewees' responses shows that User Department briefing is not fully understood by the DPW, therefore, the project outcome might not reflect the needs and requirements of the User Departments as stated earlier. Once there are defects in briefing it translates into design and eventually leads to design changes and variation which always causes time and cost overruns. This eventually dissatisfies the User Departments because of the inability of User Departments to achieve their primary objectives, especially of time and cost. Below is an interviewee's view:

> *"The issue is that we prepare the briefs ourselves internally with the assistance of the consultants most times, because we are incapacitated in-house. Most of the briefs prepared by our Department (DPW) do not speak to public needs/requirements. The cause is lack of harnessing good User Department briefing during planning sessions."* **[Chief Accounting Officer M]**

In summary, the major problems that *severely* contributed to poor briefing are: insufficient User Departments briefing, unclear User Department briefings, weak User Department strategic briefing and lack of internal briefing sessions by DPW professionals.

7.10 DOCUMENTATION

The analyses of interviewees' responses show that there are problems with documentation, most especially, during the tendering processes. No wonder that the tendering process in relation to selection of the best contractor is not comprehensively done. The Parliament regulation in collaboration with the CIDB encourages that competitive tendering processes should be used for any proposed project in public sector organisation. The procurement committees do not adhere to the guidelines and therefore select contractors that do not meet most of the requirements or award contracts to contractors that do not have capacity (both technically and financially) to handle the projects. Below is an interviewee's view with open-ended responses in this regard:

> *"You see what CIDB did was not correct. Some of these contractors were placed on higher grading based on the cash flows but they do not have the experience or you have a problem where you see a contractor is placed on grade 8 and only to find out that he/she has never ever completed a 20 million project and is being given a 60 million project to handle."* **[Chief Accounting Officer B]**

> *"There are problems with documentation during tendering processes and procedures, there are many ways put in writing to actually improve project delivery*." **[Chief Accounting Officer M]**

> *"The amount of time spent in producing documentation is too long."* **[SPMI5]**

> *"The User Departments equally carry the blame because they send documents with a lot of mistakes. The end-users take unnecessary documentation delays instead of compliance with necessary Supply Chain Regulations."* **[DDGG]**

7.11 POLICY

There is lack of interpretation of policy by the technical professionals in DPW. Some professionals assumed that policy implementation and strategies are the same, and that becomes a problem and lead to lack of full understanding from personnel perspectives. Below is an interviewee's excerpt regarding policy interpretation:

"There is a common presumption that National policies and strategies are aligned and synchronised, this is not the case. Firstly, provinces need to interpret these policies and then apply the rules. This causes lack of uniformity in the implementation process. Secondly, all government objectives cannot become a procurement burden. It causes the cost of compliance to sky rocket. Compliance requires time; time has a cost implication, and thus an efficiency implication. There must be a balance between compliance, over regulation and performance." **[SCMI]**

7.12 SUMMARY

The findings and discussions are presented thematically in descending order of importance. It shows that the human resources, financial management, supply chain management, and project management challenges are the most severe challenges lead to poor project outcomes, while the documentation and policy issues are less severe. It shows that most of issues raised from the ordinal data concurred with the outcomes from semi-structured interviews and open-ended responses from the respondents. Most of the findings from the interviews concurred with the views of the respondents from the survey outcomes and the literature. The findings confirm that DPW professionals do not adhere properly to their roles and obligations during the procurement processes, and therefore lead to poor project outcomes. The next chapter presents the conclusions and recommendations drawn from these findings.

CHAPTER 8

CONCLUSIONS AND RECOMMENDATIONS

8.1 INTRODUCTION

This study investigated the performance (i.e. effectiveness and efficiency) of National and Provincial Department of Public Works professionals. This is to improve the effectiveness and efficiency of professionals during procurement processes. The study aims to provide solution to the research problem (section 1.4) and answer to the research question (section 1.6).

Four research objectives (section 1.7.2) were set to achieve the stated research aim. Key assumptions (section 1.8) were set to guide the data gathering and analysis, and interpretation of results in line with stated research objectives to achieve the overall aim (section 1.7.1) of the study.

The descriptive research strategy was adopted for the study, which involved four stages of data gathering. These are: preliminary interviews conducted with senior project managers to surface the nature of the challenges and problems that beset the National and Provincial DPW; semi-structured interviews were conducted with the Heads of Departments as Chief Accounting Officers of the Departments to generate constructs and themes for the design of structured questionnaire for wider data gathering; administration of the structured questionnaires which were designed to elicit the views, perceptions, opinions and experiences of DPW professionals; and request for responses to open-ended questions to explain the causes of poor project outcomes from the heads of six operational units.

Since this study was set to investigate the performance of public sector clients in the South African construction procurement, a pragmatic approach was adopted for both data collection and data analysis. This approach led to the identification of public sector clients' Key Performance Indicators (KPIs) for measuring the public sector

clients' efficiency and effectiveness during the procurement processes. These KPIs were later used in the study to examine the extent of public sector clients' performance by eliciting responses from the six heads of operational units in the South African National and Provincial DPW.

8.2 RESEARCH FOCI

This study had two main foci; the first focus was to identify public sector clients' KPIs that can suitably be used in the South African context for assessing the performance of public sector clients (i.e. DPW professionals') during construction procurement process. The main aim of the KPIs is to serve as a tool for measuring the effectiveness and efficiency of public sector clients during the procurement process. This led to the adoption of the mixed method methodological approach to develop a suitable instrument with which public sector clients' KPIs could be adopted and used to investigate the complexities of the organisational structure and decision making processes in the South African construction procurement. To identify these KPIs, a semi-structured interview was conducted with Heads of Departments in three selected Provincial Department of Public Works (DPW). From the analyses of the semi-structured interviews together with the KPIs drawn from the interviews, six categories of questionnaires for the six heads of operational units in the DPW were developed.

The second focus relates to the first, in that the study further used the instrument developed in this study as detailed in Chapter 5 to investigate the views, perceptions and experiences of the six heads of operational units on their roles and obligations contained in the KPIs, towards improving optimum performance in project outcomes in the South African National and Provincial Departments of Public Works. It is important to note that the rationale for these two foci was as a result of the poor project outcomes, traceable to the procurement process. This has resulted into time overruns, cost overruns and disputes, which have led to poor project outcomes. Other studies conducted in this area, however, were focused mostly on the performance of

either the contractors or the consultants (Adams, 1997), while the performance of clients in adhering to their roles and obligations during the procurement process have not been adequately investigated (Hanson, 2006; CIDB, 2016). This is a gap in the South African construction procurement literature base that this research explores. Therefore, researching public sector clients' roles and obligation is likely to provide insight for finding ways of improving the supply chain which might improve the overall performance of the procurement outcomes.

8.3 SUMMARY OF THE KEY FINDINGS

There are three interrelated key findings that emanated from this study. Firstly, public sector clients' KPIs were identified and used in the development of six categories of questionnaires, each for the six heads of operational units in the South African National and Provincial Department of Public Works. Secondly, the weaknesses and strengths of public sector clients during the procurement processes were identified, assessed and analysed. Thirdly, the challenges and problems besetting South African National and Provincial Departments of Public Works during construction procurement processes were identified.

8.4. GENERAL CONCLUSIONS

The most evident challenge to project delivery was found to be human resources management issues including: recruitment and training challenges; shortage of in-house professionals with skills and expertise; lack of professional development; lack of qualified and registered in-house professionals; lack of mentoring of personnel; lack of skills transfer mechanism; lack of furthering of education especially by the internal project managers; incompetent personnel and insufficient in-house professionals dominated the comments made by the respondents. Respondents were of the opinion that the human resources management challenges were the most *severe* challenges that negatively affected the performance of National and Provincial DPW

professionals during procurement process which eventually contributed to poor project outcomes.

Another serious issue is financial management challenges such as: insufficient budgetary allocation for projects; insufficient funds for training of technical personnel; audit deficiencies; lack of financial incentives to employees to boost their morale at work places; poor project funding; late payment to service providers; late release of invoices and payment certificates by the internal project managers; delay with cash flows from either the Provincial Department of Finance or the Provincial Treasury or the User Departments (Departments of Health or Education); delay with User Departments budgets; and delays with release of project funding from Provincial Departments of Finance. These financial challenges affected the performance of supply chain during the procurement process, especially, the performance of service providers (contractors and consultants) which led to time and cost overruns that eventually extended the duration and cost of projects.

Another issue is challenges besetting the supply chain management (SCM) units. These challenges are: insufficient SCM cadres; SCM decision making difficulty; contractual inequality; long SCM processes; and difficulty with selection of skilled service providers during tendering process. The supply chain management challenges contributed to poor performance of DPW professionals during procurement process. Supply chain management used the project delivery chain during the procurement processes.

There are project management challenges that affected the procurement processes. They are: poor project performance; ineffective project implementation; lack of project accountability; lack of professional management during construction process; partial implementation of infrastructure delivery management system (IDMS) mandated by the South African construction industry development board (CIDB); opportunistic behaviours experienced from in-house professionals because of lack of

capacity in DPW; delays with project approvals; project overloading; slow project implementation; and lack of project management units in some provincial DPW. The project management challenges have direct effect on the overall performance of project outcomes. The project management unit oversees the performance right from briefing, designing, planning, professional service unit and the capital project unit in the DPW. Therefore, the project management challenges have affected many units and contributed to a large extends to poor project outcomes.

It is obvious that the delay with decision making process contributed to time overruns which eventually extends the duration of the projects. Lengthy decision making by committees; bureaucratic bottle necks during legislative processes and procedures; delays with tendering processes and procedures; decision making difficulty with procurement committees (bid adjudication, bid evaluation, compliance, etc.); delay project approvals due to long process and community disputes. Others are: delays with decision making during design process; delays during internal and integrated planning sessions; delays by procurement officials during tendering stages; and delays with decisions during design approvals. Lack of taking decisions at the right time during project delivery process have contributed to time overruns that eventually contributed to cost overruns of the projects.

The other challenge that contributed to poor procurement outcomes is internal and integrated planning sessions. Both the integrated and internal planning has negatively affected the performance of DPW personnel during procurement process. The planning challenges such as: lack of integrated planning sessions (DPW technical professionals with the User Departments); improper internal planning sessions within the DPW; fragmented planning; planning mistakes; late submission of plans; lengthy planning sessions; and lack of planning in the asset management unit have contributed to poor project outcomes.

Defective or insufficient User Departments briefing is one of the major contributors to the poor project outcomes due to design changes and variation that occurs during construction process because of deficiency in the initial User Department briefing. Briefing challenges such as: insufficient User Department briefing; lack of clarity of User Departments' briefing and weak strategic briefing by DPW professionals have contributed to poor project outcomes.

There are challenges with the architectural, structural and service (mechanical and electrical) designs in the National and Provincial DPW. The professional service unit in DPW is saddled with the responsibility of producing designs in-house. The major challenges with design are: long design approvals during the planning sessions; design changes/variation during the procurement process and outsourcing of design to external consultants due to lack of capacity in the National and Provincial DPW.

Documentation challenges are among the contributors of poor project outcomes. The documentation challenges that affected the optimum performance of public sector clients are: User Departments send documents with mistakes; User Departments' documentation delays and long documentation processes by DPW officials.

Policy challenges were experienced in the Provincial DPW. The major challenge was policy interpretation and the difference between policy and strategy. There was lack of interpretation of these policies for proper understanding between policy implementation and strategies among the DPW professionals.

8.4.1 Conclusions Relative to the Research Problem Statement

The research problem statement states that *"DPW professionals do not adhere properly to their roles and obligations in the construction procurement process, thereby contributing notably to poor project outcomes"*. The major problem that contributed to poor project outcomes are: lack of DPW professionals' adherence to

the challenges related to human resources management, financial management, supply chain management and project management during their procurement process. Other problems are: non-adherence to decision making process, integrated and internal planning sessions, briefing, and design issues.

In summary, findings arising from the study supported the problem statement as poor performance of National and Provincial DPW processionals during the procurement process relative to weaknesses and challenges experienced by the senior project managers during preliminary interviews (Table 5.1), challenges identified by the Heads of Departments during the semi-structured interviews (Table 5.5), procurement challenges experienced by the Heads of Departments as Chief Accounting Officers of the National and Provincial Departments of Public Works (Table 6.4), causes of design changes and variations experienced during construction process (Table 6.11), late payment factors identified by the Chief Financial Officers from National and Provincial DPW (Table 6.12), financial issues emanating during procurement process (Table 6.14), financial challenges experienced by Financial Officers (Table 6.15), supply chain management challenges experienced in the SCM units (Table 6.18), insufficient in-house professionals in DPW (Table 6.21), professional service unit challenges (Table 6.22), design requirements challenges (Table 6.23) and challenges identified by the heads of six operational units (Table 6.29 to Table 6.38) have shown that the problem stated in this study was adequately addressed.

8.4.2 Conclusions Relative to the Research Objectives

This study was conducted with the aim to investigate the performance of public sector clients in the South African construction procurement with the view to improving their efficiency and effectiveness during project delivery process. This aim would not be achieved without the consideration of the primary objectives of this research as earlier stated in chapter 1. The primary objectives of this study was to identify the

KPIs for public sector clients in their procurement process, assessing and analysing the weaknesses and strengths associated with public sector clients' performance in construction procurement process and to develop a methodical approach to measurement of public sector clients' performance in their procurement processes with the view to improving the public sector client KPIs. In addition, to recommend implementable approaches to improving public sector client performance in the public sector procurement process formed part of the research objectives that this study envisaged to achieve.

8.4.2.1. Research objective one:

> *To identify the key performance indicators (KPIs) for public sector clients in their procurement processes*

Findings to the research objective one are aimed at answering research question one stated in section 1.6. Details of the investigation, analysis and answers are discussed as summarised. The first research objective was successfully achieved as indicated in Table 5.2 to Table 5.24. There are 137 KPIs that emerged from the content analysis.

33 KPIs were identified from the Heads of Departments roles. These are: the organisation of internal units (capital project units, internal planning units, finance units, human resources management units, supply chain management units and project management units) and external units (Treasury units, User Departments and the Parliament) indicated in section 5.3.1.1 (i.e. Table 5.2), roles of the operational units indicated in section 5.3.1.2 (i.e. Table 5.3), project management unit performance indicated in section 5.3.1.3 (i.e. Table 5.4), and procurement challenges indicated in section 5.3.1.4 (i.e. Table 5.5).

41 KPIs were identified from the roles of Deputy Director Generals responsible for construction projects. These are: project request from User Departments indicated in section 5.3.2.1 (i.e. Table 5.6), tendering processes and procedures indicated in section 5.3.2.2 (Table 5.7), DPW planning unit roles (integrated and internal

planning) indicated in section 5.3.2.3 (Table 5.8), DPW project managers' roles indicated in section 5.3.2.4 (Table 5.9), DPW briefing elements indicated in section 5.3.2.5 (Table 5.10), User Departments briefing elements indicated in section 5.3.2.6 (Table 5.11), and causes of design changes and variations during construction processes indicated in section 5.3.2.7 (Table 5.12).

25 KPIs were identified from Chief Financial Officers' roles. These are: late payment factors emanating during construction processes indicated in section 5.3.3.1 (Table 5.13), budgets monitoring and controlling indicated in section 5.3.3.2 (Table 5.14), project funding issues identified during procurement process indicated in section 5.3.3.3 (Table 5.15) and financial challenges indicated in section 5.3.3.4 (Table 5.16).

15 KPIs were identified from the roles of Supply Chain Management units in the National and Provincial DPW. These are: procurement committees' roles (bid evaluation, bid adjudication, specification committees, and approval and recommendation committees) indicated in section 5.3.4.1 (Table 5.17), DPW roles (compliance committees, steering committees, procurement committees) during tendering stages indicated in section 5.3.4.2 (Table 5.18) and supply chain challenges indicated in section 5.3.4.3 (Table 5.19).

14 KPIs were identified from the roles of Human Resources Management units. These are: in-house professionals' roles (technical professionals' qualification, remuneration packages, representation of internal project managers and in-house professionals, appropriate skills and technical expertise and number of technical professionals) indicated in section 5.3.6.1 (Table 5.20), performance of technical professionals indicated in section 5.3.5.2 (Table 5.21) and DPW professional representativeness on project sites indicated in section 5.3.5.3 (Table 5.22).

9 KPIs were identified from Senior Project Managers roles. These are: satisfaction with professional services unit performance (Quantity Surveyors, Architects,

Civil/Structural engineers, Electrical and Mechanical engineers) indicated in section 5.3.6.1 (Table 5.23) and Architects ability with regard to functionality, durability, aesthetics and economy) during design process indicated in section 5.3.6.2 (Table 5.24).

The 137 KPIs were identified from the public sector clients' roles and responsibilities during procurement process (i.e. from client briefing to project close-out). The KPIs were derived from the roles and obligations of the Heads of operational units. The Heads of operational units are: Heads of Departments, Heads of Constructions Projects, and Chief Financial Officers, Heads of Supply Chain Management units, Heads of Human Resources Management units and Senior Project Managers.

8.4.2.2. Research objective two:

> *To assess and analyse the weaknesses and strengths associated with public sector clients' performance in construction procurement process.*

Findings to research objective two are aimed at answering research question two and part of research question three stated in section 1.6. Details of investigation, analysis and answer are discussed as summarised. The second research objective was successfully achieved with part of research objective three as indicated in Table 6.1 to Table 6.24. The quantitative analysis of the ratings of the heads of operational units during the administration of the structured questionnaire are summarised based on the rating from mean scores (1.00 to 5.00).

The areas where DPW professionals performed *very good* ($4.00 \leq$ mean scores ≤ 4.56) are: arrangement for feasibility studies including the viability of the project site; advising User Departments on the cost of the project in relation to their budgets; the ability of DPW compliance committee to comply with pillars of procurement during tendering processes as legislated; compliance with competitive tendering processes as

legislated; and advising User Departments on the completion duration/time of the project.

However, these are areas where the DPW professionals performance was *average* (2.56 ≤ mean scores ≤ 2.67) during the procurement process which include: escalating issues that are beyond the internal project managers' capacity for further deliberation; checking, verifying and analysis, and forwarding to the senior project managers for further consideration; the ability of the DPW to form a steering committee comprising User Departments, the community and DPW in-house professionals and consultants to oversee the delivery of the projects; and developing daily and weekly reports from the project for monthly management meetings. Consequently, the following aspects performed *poorly* (2.33 ≤ mean scores ≤ 2.44): the ability of approval and recommendation committee to check, regulate and approve design for the project implementation; the ability of Architects to consider economy during design process and the role of Premier budgeting committee in project planning for the proposed projects.

Areas where DPW performed *satisfactorily* (3.50 ≤ mean scores ≤ 4.45) are: going for professional training and short courses for performance improvement; the role of Treasury unit in releasing cash flows to DPW; the role of Finance unit in payments to contractors and consultants; the ability to work closely with relevant other internal units to share information and advice during construction processes; the ability to translate design on paper to end product and the ability to monitor in-house professionals' participation during site construction. However, the areas where DPW performed *averagely* (2.66 ≤ mean scores ≤ 2.77) are: the performance of in-house Quantity Surveyors in DPW and the performance of in-house Architects in DPW. The performance of the following aspects performed *unsatisfactorily* (2.26 ≤ mean scores ≤ 2.48): the performance of in-house Civil/Structural engineers in DPW; the performance of in-house Electrical engineers in DPW and the performance of in-house Mechanical engineers in DPW.

DPW challenges and problems *always occurring* (3.00 ≤ mean scores ≤ 4.00) during the project delivery process in: financial issues identified during integrated (DPW and User Departments) planning sessions; long decision making during legislative processes; delays with decision making processes; insufficient number of professionals in Finance unit; User Departments' insufficient briefing on project needs/requirements; insufficient capacity of DPW in-house technical professionals to supervise their projects; ineffective monitoring and supervision of projects by DPW in-house professionals on their project sites; delay response to variation order by DPW internal project management. Other areas are ineffective and insufficient training and development of DPW in-house professionals; ineffective project monitoring and supervision by DPW internal project managers; lack of training and development programmes; shortage of professionals' skills and expertise in Finance unit and disputes on the quality of work done by contractors.

The DPW considers the following as *important* (3.44 ≤ mean scores ≤ 4.11) in enhancing DPW briefing: capability of DPW planning unit in advising User Departments on their needs/requirements for design and implementation purposes; the approach of DPW planning unit to working closely with the User Departments to understand their needs/requirements; the approach of DPW planning unit to receiving project request from User Departments during briefing stages; the ability of DPW planning unit using the Infrastructure Development Plans (IDPs) to incorporate User Departments' need and the ability of DPW planning unit to implementing User Management Plans (UMPs) to incorporate all needs/requirements during planning stages.

DPW respondents considered the following aspects as *important* (3.67 ≤ mean scores ≤ 4.33) in enhancing User Department briefing: the ability of User Departments to establish and confirm funding through the Provincial Treasury for implementation of projects; the ability of User Departments to explain their needs/requirements to DPW during planning sessions; the ability of User Departments to identify land owned by government for project development; the ability of User Departments to incorporate

Municipalities' requirements in their briefing; the ability of User Departments to indicate to DPW planning unit the size of proposed projects during planning sessions; and the ability of User Departments to identify their needs through working closely with Municipalities and Councillors.

DPW officials *fully agree* ($4.11 \leq$ mean scores ≤ 4.25) that the following factors are the most *severe* challenges hindering the optimum performance of public works professionals during the project delivery process: additional out-of-predefined scope of items required by the User Departments to be incorporated into the design during construction process; increase in DPW or User Departments' need; poor design and costing solutions by external consultants and poor briefing by User Departments to DPW during planning services.

DPW officials were rated *above average* ($3.13 \leq$ mean scores ≤ 3.89) in the following areas: qualification of technical professionals; remuneration package for in-house technical professionals; representation of internal project managers on each project site; representation of in-house professionals on each project site; allocation of internal project managers on specific project site and possession of appropriate skills and technical expertise by in-house professionals.

DPW officials were rated *limited* ($2.00 \leq$ mean scores ≤ 2.70) in the following areas: maximum number of project per in-house professionals; DPW in-house professionals' representation on project sites; representation of professionals in all professional service fields and number of in-house skilled professionals.

8.4.2.3. Research objective three:

To develop a methodical approach to measurement of public sector clients' performance in their procurement processes.

The use of sequential exploratory research method helped to unpack the causes of poor procurement outcomes that emanated from the poor procurement processes. Preliminary interviews were used to surface the nature of challenges that beset the performance of DPW professionals during procurement processes. Three senior project managers from Gauteng Departments of Public Works were interviewed regarding their performance and challenges experienced during procurement processes. The senior project managers were asked this specific question: **What challenges do you experience during procurement process?** Content analysis was used to analyse the participants' responses to the above question. The recurring challenges cited collectively by the three senior project managers are presented in Table 5.1, and which are worthy of further investigation.

The adoption of semi-structured interviews helped to identify the themes and constructs for the design of the questionnaire from the Heads of Departments as Chief Accounting Officers. The semi-structured interviews held with the Heads of Departments (HODs) (section 4.4.3) as Chief Accounting Officers in the Departments of Public Works in Gauteng, Limpopo, and Mpumalanga Provinces are presented. Content analysis was used for the analysis of semi-structured interviews. The constructs and themes that emerged from the content analysis are presented in Table 5.2 to Table 5.24. These are: Organisation of internal and external units indicated in section 5.3.1.1 (Table 5.2); roles of operational units indicated in section 5.3.1.2 (Table 5.3); performance of project management unit indicated in section 5.3.1.3 (Table 5.4); procurement challenges indicated in section 5.3.1.4 (Table 5.5); project request indicated in section 5.3.2.1 (Table 5.6); tendering processes indicated in section 5.3.2.2 (Table 5.7); DPW planning unit performance indicated in section 5.3.2.3 (Table 5.8); DPW project managers' performance indicated in section 5.3.2.4 (Table 5.9); DPW briefing elements indicated in section 5.3.2.5 (Table 5.10); User Departments briefing element indicated in section 5.3.2.6 (Table 5.11); causes of design changes and variations indicated in section 5.3.2.7 (Table 5.12); late payment factors indicated in section 5.3.3.1 (Table 5.13); budgets monitoring and controlling

indicated in section 5.3.3.2 (Table 5.14); project financing issues indicated in section 5.3.3.3 (Table 5.15); financial challenges indicated in section 5.3.3.4 (Table 5.16); procurement committees' performance indicated in section 5.3.4.1 (Table 5.17); DPW performance during tendering stages indicated in section 5.3.4.2 (Table 5.18); supply chain challenges indicated in section 5.3.4.3 (Table 5.19); in-house professionals' performance indicated in section 5.3.5.1 (Table 5.20); satisfaction with performance of professionals indicated in section 5.3.5.2 (Table 5.21); satisfaction with professional service unit indicated in section 5.3.6.1 (Table 5.22) and Architect ability indicated in section 5.3.6.2 (Table 5.23).

Structured questionnaires were used to assess the weaknesses and strengths of the DPW professionals during the procurement processes. Table 6.1 indicates that all the five units were rated above the mid-point score of 3.00, which suggests that in general the respondents agree that all the five units have contributed *positively* during the project delivery processes, although the performance of the capital project unit, internal planning unit and finance unit were rated *highest* with mean scores of 3.57.

The finding from Table 6.2 shows that respondents were *satisfied* with all the five operational units' performances as they were all rated above the mean score of 3.00. The respondents rated that the role of Treasury unit in releasing cash flows to the DPW and the role of Finance unit for payments to service providers *highest* with mean scores of 3.86 each, indicating that these contribute *positively* during project delivery processes.

Table 6.3 presents the respondents' ratings of the level of satisfaction with the performance of the project management unit for achieving success in project delivery. It shows that all the project management unit's performances were rated above mean score of 3.00, which indicates that in general the respondents were *satisfied* with the performances of all five project management units for achieving success in project delivery. The finding shows that, based on the ranking, the respondents are *most*

satisfied with the ability of the project management unit to work closely with relevant other internal units to share information and advice during construction processes.

Table 6.4 shows the respondents' ratings of the frequency at which procurement challenges occur during procurement processes. It is shown that six out of the fifteen procurement challenges were ranked from 3.00 and above, which indicates that in general the respondents agree with the procurement challenges *always occurring* during the delivery of public sector projects in the South African National and Provincial Departments of Public Works.

Table 6.5 shows the ratings of aspects of DPW response to project requests from User Departments and derived mean scores ranging between 1.00 and 5.00. It can be seen from the results that all the six DPW abilities were rated above 3.00. The finding suggests that all the rated aspects contributed *positively* to the project request from User Departments. It is notable that DPW advice to the User Departments on the cost of the projects in relation to their budget allocation and DPW advice to the User Departments on the completion duration/time of the projects contributed *prominently* with mean scores of 4.33 and 4.00.

Table 6.6 shows that the respondents agree that all tendering processes and procedures are *important* contributors to the DPW project delivery process, with three factors rated above the mean score of 3.00. The ability of DPW compliance committees to comply with pillars of procurement during tendering processes as legislated was ranked *highest*, thus the best contributor with a mean score of 4.22. However, it is notable that the ability of DPW to form a steering committee comprising of User Departments, the community and DPW in-house professionals and consultants to oversee the delivery of projects was only *fairly* rated by the DPW. This in turn might have contributed to the low performance of public sector clients during tendering processes.

Table 6.7 shows the respondents' ratings of the performance of the planning unit during planning sessions for effective project outcomes. The finding suggests that six

out of seven planning unit actions were rated above the mean score of 3.00, and in general the respondents agree that the performance of planning units contribute meaningfully to the planning sessions for effective project delivery. The analysis suggests that the ability of the DPW planning unit to arrange for feasibility studies including the viability of project site was *best contributor* during the planning sessions with a mean score of 4.56. However, the ratings suggest that the role of Premier's budgeting committee in project planning for proposed projects performed *poorest* with mean score of 2.33.

Table 6.8 suggests that two out of five internal project managers' actions during construction processes were ranked above the mean score of 3.00, which indicates that these are the two areas where the performance of DPW internal project managers are seen as *good*. The low ratings in the other three actions might explain *poor* project outcomes.

Table 6.9 shows the respondents' ratings of elements enhancing DPW briefing for effective project outcomes. It shows that all the five briefing elements were rated above the mean score of 3.00. The finding shows that in general the respondents agree that all five elements contribute *importantly* to enhancing effective project brief for effective project outcomes in the public sector. However, the capability of DPW planning unit in advising User Departments on their needs/requirements for design and implementation purposes is ranked the *highest* enhancing element.

Table 6.10 indicates the respondents' ratings of the contribution of the User Departments briefing elements to effective project outcomes. It shows that all the six briefing elements were rated above the mid-point of 3.00, which indicates that the respondents agree that all the six rated elements contributed *importantly* to improving User Department briefing for successful project outcomes in public sector projects. The analysis suggests that the ability of User Departments to establish and confirm funding through the Provincial Treasury for implementation of projects and the ability of User Departments to explain their needs/requirements to DPW during

planning sessions are the *most important* contributors to the User Department briefing with mean scores of 4.33 and 4.11.

Table 6.11 shows the respondents' ratings on the causes of design changes and variations from User Department and DPW perspectives. The finding shows that the respondents agree with all the six factors contributing to design changes and variations.

Table 6.12 indicates the respondents' ratings of factors leading to late payments to service providers by the DPW professionals. The analysis shows that four out of six factors were rated between 2.56 and 2.89, which indicates that late payment factors *sometimes* delay payment to service providers. However, the analysis shows that delays in cash flow processing by the Treasury unit *rarely* lead to late payment to service providers.

Table 6.13 shows the respondents' ratings of the monitoring and controlling of budgets by financial officers during projects delivery processes. The ratings suggest that three out of five subsidiary activities with mean scores of 3.00 or higher contributed *optimally* to the monitoring and controlling of project budgets. The analysis indicates that monthly and quarterly reviews of expenditure and income contributed *positively* to the monitoring and controlling of budgets with a mean score of 3.56. However, the analysis shows that releasing funding based on each project's cash flow projection contributed *poorest.*

Table 6.14 shows the respondents' ratings of financial issues identified during project delivery processes on a scale of 1 (never) to 5 (always). The finding suggests that financial issues identified during integrated (DPW and User Departments) planning sessions could lead to *adverse* challenges to project delivery. However, it is notable that late disbursement of funds by the Treasury unit to DPW was *not rated high* as a financial issue.

The finding from Table 6.15 shows that insufficient number of professionals in Finance unit, lack of training and development programmes and shortage of professionals' skills and expertise in Finance unit *always* contribute to financial challenges during project delivery processes. However, it is notable that non-adherence to PFMA and unauthorized expenditure by finance officers *rarely* contribute to DPW financial challenges.

Table 6.16 shows the respondents' ratings on the ability of procurement committees during procuring of construction projects. The ratings suggest that five out of six elements with mean scores above 3.00 contributed *positively* to the performance of procurement officials during procurement process. The finding suggests that compliance with competitive tendering processes as legislated is the *best contributor* with a mean score of 4.22. However, it is noted that the ability of approval and recommendation committees to check, regulate and approve design for project implementation contributed only *moderately.*

Table 6.17 shows that the ability of bid evaluation committee to include professionals' reports in the adjudication processes was the *best contributor* with a mean score of 3.00. However, the other three factors that were rated below 3.00 contributed *averagely.*

Table 6.18 indicates the respondents' ratings of the frequency of challenges experienced by the supply chain management unit during project delivery processes. It is noted that all the five challenges were rated *below* mean score of 2.50. However, it is notable that financial mismanagement in SCM processes was *rarely* experienced as a supply chain management challenge.

Table 6.19 presents the respondents ratings in relation to in-house professionals in project supervision. It is notable that most respondents agree that qualification of technical professionals has *sufficient* impact on project supervision, with a mean

score of 3.89. However, it is notable that there is *limited* number of in-house professionals in DPW to supervise projects effectively and efficiently.

Table 6.20 shows that all the four DPW technical professionals' abilities were rated above the mid-point of 3.00. The finding suggests that most respondents are *satisfied* that all the four DPW technical professionals' abilities are invested in projects. It is notable that going for professional training and short courses for performance improvement is done *satisfactorily* with a mean score of 4.45.

Table 6.21 depicts the respondents' ratings on the DPW in-house professional representativeness on project sites. It is notable that the respondents are *satisfied* with the allocation of internal project managers on specific project sites with a mean score of 3.15. However, the DPW in-house professionals' representation on project sites and representation of professionals in all professional services fields are *limited.*

Table 6.22 suggests that in general, majority of respondents' ratings with regards to satisfaction levels with the performance of professional services unit for project success ranges between *fairly satisfied* and *slightly satisfied* ($2.26 \leq$ mean scores ≤ 2.77). It shows that the performance of technical professionals in the professional service unit (quantity surveyors, architects, civil/structural engineers, mechanical engineers and electrical engineers) are *below average satisfaction levels*, since all the five professional service performances were rated below the mean score of 3.00. This in turn, might affect the optimum performance of DPW professionals in delivering project to client satisfaction.

Table 6.23 indicates the respondents' ratings regarding the ability of architects to include the following requirements (functionality, durability, aesthetics, and economy) at design stages. It is notable that all the four architects' abilities were rated *below* the mid-point of 3.00. In summary, most respondents rated architect ability with regards to functionality, durability and aesthetics at *slightly below average*. However, the ability of the architects to consider economy during design processes

was rated as *fair*. This in turn, might be the reason why DPW outsources most of their architectural designs to external consultants because the architectural unit is incapacitated in terms of design production.

Table 6.24 shows respondents' ratings of the occurrences of factors that lead to late payment to contractors and consultants. It is notable that bureaucratic bottlenecks and disputes about the quality of work done by contractors *often* lead to late payment to service providers. However, the analysis shows that DPW internal project managers' delayed processing of invoices *sometimes* contributed as a late payment factor.

The adoption of open-ended questions helped in explaining the causes of procurement challenges inherent in the South African National and Provincial DPW. The open-ended section of the questionnaire was aimed at eliciting the respondents' perception and views regarding the effectiveness and efficiency of public sector clients during procurement processes in the National and Provincial Department of Public Works. The respondents stated the challenges/weaknesses that hinder their performances during procurement processes. Emerging themes were then derived from the coding obtained from the open-ended responses and are grouped under categories in Table 6.29 to Table 6.38. The themes are presented in descending order of importance.

Human resource management

Table 6.29 shows the concepts obtained from open-ended responses on human resources management challenges. These challenges are: insufficient in-house professionals, recruitment challenges, lack of mentoring of professionals, incompetent personnel, project overloading due to understaffing, and the use of inexperienced external consultants.

Financial management challenges

Table 6.30 presents the concepts generated from open coding. The challenges besetting the optimum performance of DPW are: inadequate budgetary allocations, late/delayed payment to service providers, inadequate project funding, delays with

cash flows, auditing deficiency, salary and compensation issues, late release of invoices and payment certificates by DPW internal project managers, and poor project funding.

Supply chain management challenges

Table 6.31 shows the concepts obtained from the open-ended responses on supply chain management challenges. The supply chain management challenges include: insufficient SCM cadre, procurement challenges, long SCM processes, contractual inequality, and lack of internal control measures in PFMA. Others are: lack of skilled service providers, undefined service providers' roles, unclear project specification and weak procurement strategies.

Project management challenges

Table 6.32 shows that all the operational units made comments regarding project management issues. Most of the issues raised by the respondents dwelled on lack of project implementation, lack of management of professionals on construction site, lack of project monitoring, delay in project approvals, partial implementation of IDMS, opportunistic behaviours from DPW professionals because of DPW incapacitation and lack of project management units in some provinces. All these issues contributed to poor project outcomes envisaged by the construction clients. The National and Provincial Department of Public Works are beset with project management challenges that militate against the optimum performance of project outcomes.

Decision making challenges

Table 6.33 shows the concepts obtained from the open-ended responses on decision making challenges. These challenges include: bureaucratic bottle necks, decision making difficulties, delay project approvals, and community disputes were raised as the major decision-making challenges during the delivery of projects in the National and Provincial DPW.

Planning challenges

Table 6.34 shows the concepts obtained from the open-ended responses on planning challenges. These challenges relate to lack of internal and integrated planning sessions, planning delays, planning mistakes, improper and long planning sessions. The analysis shows that there are issues and challenges with both the internal planning sessions from DPW and integrated planning sessions from User Departments (e.g. Departments of Health and Education).

Design challenges

Table 6.35 shows the concepts obtained from the open-ended responses on design challenges. These challenges are long design approvals process, design changes and variation during construction process coupled with outsourcing of design to external consultants because of lack of capacity in the National and Provincial DPW.

Briefing challenges

Table 6.36 shows the concepts obtained from the open-ended responses on briefing challenges. These challenges are: insufficient User Department briefing, unclear User Department needs and coupled with weak strategic briefing sessions during the briefing stages.

Documentation challenges

Table 6.37 shows the concepts obtained from the open-ended responses on documentation challenges. These challenges are: User Departments' documentation mistakes, delay with User Departments' documentation processes and DPW long documentation processes.

Policy challenges

Table 6.38 shows the concepts obtained from the open-ended responses on policy challenges. These challenges relate to poor policy interpretation. Misalignment of National policies and strategies emerged as the major policy challenges in the delivery of projects.

8.4.2.4. Research objective four:

> *To recommend implementable approaches to improving client performance in the public sector procurement processes.*

Findings to research objective four are aimed at answering research question four stated in section 1.6. To adequately answer research objective four, recommendations for improving the efficiency and effectiveness of technical and financial professionals during procurement process in the South African National and Provincial DPW are considered. In addition, the internal and external units that are involved in the delivery of DPW projects are also considered. These are: the National and Provincial Department of Public Works, the User Departments (i.e. National and Provincial Departments of Education and Health), and the National and Provincial Treasury.

Recommendation to the National and Provincial Departments of Public Works

Based on the above reported challenges with project briefing raised by the interviewees, the following recommendations are made. The DPW professionals need to adopt the following elements to enhancing and improving their briefing during the internal briefing sessions:

- working closely with the User Departments to understand their needs and requirements;
- advising User Departments on their needs and requirements for design and implementation purposes;
- receiving project request from User Departments during briefing stages;
- using the Infrastructure Development Plans (IDPs) to incorporate User Departments' need;
- implementing User Management Plans (UMPs) to incorporate all needs and requirements during planning stages;

- advising the User Departments on the cost of the projects in relation to their budgetary allocation;
- advising User Departments on the completion duration/time of the projects;
- guiding User Departments on their technical needs relative to the project execution plan and to use standardised briefing schedule to reach a common understanding with User Departments on their briefs (needs).

Other recommendations to the National and Provincial DPW are:

(a) Since most of the designs in DPW are outsourced to external consultants because of lack of capacity in the professional service units, DPW technical professionals should be able to check and approve design in time as it takes long time in current situation and delays execution of proposed projects.

(b) The planning sessions should be fastened by DPW technical professionals to avert delays to commencement to construction process. One of the major contributors to time overruns in DPW projects is the long time spent during the planning sessions/phase (i.e. inception stage).

(c) Some Provincial DPW does not have project management units in their Departments. This should be addressed through the programme managers.

(d) Internal project managers should manage and coordinate technical professionals during project delivery process to address contractual issues, such as: claims, the use of contingency funds, variation orders, extension on time, increase of scope of works, etc.

(e) Infrastructural delivery management systems (IDMS) devised by the construction industry development board (CIDB) (Act 38 of 2000) for uniformity in public sector delivery process need to be implemented fully to define the roles and responsibilities of part-takers or stakeholders to ensure smooth project flow.

(f) The National and Provincial DPW need to recruit more technical professionals to fill the gap in the human resources units as it is the most

severe challenges the DPW are facing. The insufficient human resources have resulted in overloading the DPW internal project managers and technical professionals on project sites.

(g) DPW need to have sufficient budgetary allocation for constant training of in-house internal project managers and technical professionals.

(h) To pay public sector clients enough salary and emoluments to stay in DPW and not be attracted by the private sector because of high pay and condition of service.

(i) DPW needs to improve on audit challenges to be able avert corruption and financial misappropriation of government funds.

(j) DPW internal project managers should send payment certificates in time to facilitate payment approximately every second week to service providers, especially, the contractor to avoid stoppage of projects.

(k) The finance units in the National and Provincial DPW should monitor the financial and budget performance per project to check expenditure.

(l) As the matter of urgency the DPW organogram should meet the new supply chain management structural requirements for delivery of projects within time, cost and quality to meeting the primary objectives of construction clients.

(m) To improve on procurement process as it takes longer time to deliver project in current situation.

(n) Check the current contract used in infrastructure in public sector as it always favours the private sector.

(o) A proper tendering processes and procedures are needed urgently to improve the current control measures with regards to procurement processes in terms of appointing service providers. An investigation need to be taken before appointing service providers. By doing so will lead to selecting the best contractor and will eventually improve service delivery.

(p) Since DPW predominately use traditional method of procurement where adversarial behaviours are experienced, therefore, the duties of consultants,

clients and contractors should be clearly defined in the contract documents to avoid opportunistic behaviours from any contracting party. Specification to be clearly outlined to avoid poor standard of workmanship or poor quality of materials which mostly contributes to poor project outcomes.

(q) To reduce the bureaucratic bottle necks in public sector process that most times delay project delivery.

(r) DPW should endeavour to approve projects within the stipulated time (21 working-days). This will stop contractors claiming C.O.T. because of the delays.

(s) Government policies should be interpreted to the understanding of DPW professionals for uniformity in the implantation processes.

It is also recommended that the following issues be addressed by the National and Provincial Departments of Public Works as a matter of urgency:

(a) the ability of approval and recommendation committee to check, regulate and approve design for the project implementation is poor

(b) the ability of Architects to consider economy during design process is poor

(c) the role of Premier budgeting committee in project planning for the proposed projects is poor

(d) the performance of in-house Civil/Structural engineers, Electrical engineers in Mechanical engineers in DPW is poor

(e) financial issues always identified during integrated (DPW and User Departments) planning sessions

(f) delays with decision making processes from procurement committees

(g) insufficient number of professionals in Finance unit

(h) insufficient capacity of DPW in-house technical professionals to supervise projects

(i) ineffective monitoring and supervision of projects by DPW in-house professionals on their project sites

(j) delay response to variation order by DPW internal project management

(k) ineffective and insufficient training and development of DPW in-house professionals

(l) ineffective project monitoring and supervision by DPW internal project managers

(m) lack of training and development programmes

(n) shortage of professionals' skills and expertise in Finance unit

(o) disputes on the quality of work done by contractors

(p) increase in National and Provincial DPW need

(q) low representation of DPW in-house professionals on project sites

(r) low representation of professionals in all professional service fields

(s) low number of in-house skilled professionals to be represented on project sites

Lastly, the DPW should have vision of capacitation, restructuring and improving performance in all its units, especially the supply chain management units, human resources management units, finance units, professional service units, project delivery units and capital project units.

Recommendation to the User Departments (i.e. National and Provincial Departments of Health and Education)

The User Departments also need to incorporate the following elements in order to enhance their strategic briefing sessions with DPW:

- explain their needs and requirements to DPW during integrated planning sessions;
- incorporate Municipalities' requirements in their briefing;
- indicate to DPW planning unit the site of proposed projects during integrated planning sessions;
- identify their needs through working closely with Municipalities and Councillors

It is also recommended that User Departments should:

(a) Ensure that there are specific and detailed roles and responsibilities of each contracting party within the delivery chain. This should be independent of the contracting and procurement strategies adopted for the proposed projects.

(b) Endeavour to provide sufficient, quality, comprehensive and detailed briefing (needs and requirements) during integrated planning sessions with DPW.

(c) Propose project within their budgetary allocation. User Department should understand that all projects are budgeted for a specific period with specific scope. Mostly, User Departments are having high expectation and demand more than what the scope is calling for.

(d) As a matter of urgency reduces to the minimum if possible stop making changes to a construction that has already commenced. This could be possible only if User Departments give detail and comprehensive brief during integrated briefing session with DPW.

(e) Provincial DPW should plan their proposed projects in collaboration with Municipalities needs before approaching DPW during integrated planning sessions/phase. This will reduce delays and pressure on DPW in their internal planning session during project implementation phase. This will fasten the internal planning sessions in DPW which always takes long time because of insufficient and defective needs and requirements.

(f) Approve their proposed projects within the stipulated time (21 working-days) to avoid contractors' claiming C.O.T because of the delays.

(g) Adhere to their responsibility of paying the service providers (especially, contractors and consultants) in time to avoid stoppage of project delivery.

(h) Avail their available budgetary allocation for infrastructural projects to DPW.

(i) Send their budgets to DPW to avoid long payment process to service providers (especially contractors) even if on quarterly basis to speed up the payment process as it delays because of lengthy payment processes (i.e. from DPW to User Departments then to Provincial Treasury). Late payment occurs mainly due to long processes during payment stages. Alternatively, employ the use of tracking system of payments for service providers that is more effective.

(j) Allow the DPW to follow due supply chain management processes to secure accommodation for their office allocations.

(k) Avoid delays with approval of variation orders raised by DPW internal project managers.

(l) Compensate the land owners on the land acquired by the Department fully to stop community disrupting the proposed projects in their communities.

(m) Submit the infrastructural programme management plan (IPMP) on time to enable the DPW to start with feasibility studies in time for the proposed projects.

(n) Endeavour to produce complete documentation during tendering process.

(o) User Departments should stop sending documents with mistakes.

(p) User Departments' insufficient briefing on project needs/requirements

(q) poor briefing by User Departments to DPW during planning services
(r) increase in User Departments' need during construction processes

Recommendation to the Treasury

(a) Endeavour to release cash flows for service providers at when due to facilitate construction processes**.**
(b) Alternatively, to adopt an effective digital system for payment to service providers.

8.5 CONTRIBUTION TO THE EXISTING BODY OF KNOWLEDGE

This study has made several contributions in advancing the understanding of public sector clients' performance in the South African construction procurement. As noted already, a gap in the literature predominantly examined the poor project outcome through the lens of contractors' and consultants' performance.

This study has unveiled new insight into a dialogue for examining causes of poor project outcomes in the public sector, and for measuring project performance of representatives or agents of the public sector clients. These are clear departures from the approaches adopted in previous studies which focused on the actions or inactions of the service providers in the procurement process.

The key contribution rests on the development of a survey instrument from a qualitative analysis of semi-structured interviews that led to categorising different roles and responsibilities of the heads of six operational units. This study has made significant contribution to the body of knowledge by providing valuable information on public sector key performance indicators for assessing public sector clients' performance in the South African construction procurement.

The weaknesses and strengths of public sector clients during the procurement process were assessed and analysed through the use of the structured questionnaire designed for nation-wide quantitative data gathering. It provided valuable information regarding the weaknesses and strengths associated with public sector clients' performance in the construction procurement processes which led to implementable recommendations.

The identification of challenges and problems besetting South African National and Provincial Departments of Public Works professionals during construction procurement processes was accomplished through the thematic content analysis of the open-ended responses obtained from the open-ended section of the questionnaires.

The study contributed to the existing body of knowledge and to the procurement, administration and management of State resources; the recommendations regarding procurement and development of physical infrastructure are noteworthy.

Significant positive contribution regarding the establishment of procedure, by the study, to ensure that critical performance areas are identified and honoured; these could and should influence State Departments' performance aimed at improvements regarding procurement, project and implementation management, systems design, production, good governance and effective communication as illustrated. The recommendation aimed at an approach that should be followed is presented in a practical manner.

Development areas that departments should attend to are provided and the critical performance areas proposed. Both contribute to the value of the research. This may lead to overall improvement of procurement by the State.

8.6 METHODOLOGICAL CONTRIBUTIONS

The use of sequential exploratory research helped to unpack the causes of poor procurement outcomes that emanated from the poor procurement processes. Firstly, preliminary interviews were used to surface the nature of challenges that beset the performance of DPW professionals during procurement processes. Secondly, the adoption of semi-structured interviews helped to identify the themes and constructs for the design of the questionnaire from the Heads of Departments as Chief Accounting Officers. Thirdly, structured questionnaires were used to assess the weaknesses and strengths of the DPW professionals during the procurement processes. Fourthly, the adoption of open-ended questions helped in explaining the causes of procurement challenges inherent in the South African National and Provincial DPW.

8.7 LIMITATIONS OF THE STUDY

The empirical data was not directly collected from State Owned Enterprises (SOEs), State-owned Corporation/Companies (SOC's), Municipalities and Municipal entities. Analyses of such data could create a more robust picture of the challenges of public sector project performance.

The sample size is relatively small (i.e. only 115 samples in total, 9 for Heads of Departments, 9 for Deputy Directors General responsible for construction projects, 9 for Chief Financial Officers, 9 for Heads of Supply Chain Management units, 9 for Heads of Human Resources Management units, and 70 for Senior Project Managers) thereby limiting the possibility of applying sophisticated inferential statistical analyses. Therefore, the limitation is that findings of this study should not be generalised beyond the study scope because of issues around the representativeness and relatively small sample size.

The empirical data did not capture the views, opinion and perceptions of the junior staff, both at management and site/project levels.

The study was designed as a cross sectional view of public sector performance. A longitudinal study could yield more robust, depth analyses of the performance of public sector clients.

8.8 SUGGESTIONS FOR FURTHER STUDY

Further research could investigate the effectiveness, efficiency, weaknesses and challenges in the public sector projects at the Municipalities, Municipal entities and Local Government Councils.

Research could be conducted with the User Departments (e.g. National and Provincial Departments of Education and Health) to capture their views and perceptions on the projects delivered on their behalf.

Further research could be conducted with stakeholders (suppliers, consultants, contractors, manufacturers, sub-contractors (domestic, nominated and specialist)) for comparison with the outcomes obtained from this study.

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Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Saad

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER H13/11/17**
PROJECT TITLE	Investigating public sector client performance in South African construction procurement
INVESTIGATOR(S)	Mr M Saad
SCHOOL/DEPARTMENT	Construction Economics and Management
DATE CONSIDERED	22 November 2013
DECISION OF THE COMMITTEE	Approved Unconditionally
EXPIRY DATE	12/05/2016
DATE 13/05/2014	**CHAIRPERSON** (Professor T Mlani)

cc: Supervisor : Prof R Nkado

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10000, 10th Floor, Senate House, University.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to completion of a yearly progress report.**

Signature

02, 06, 2014
Date

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

APPENDIX B1 Questionnaire for Heads of Departments (HODs)

Section A. On a scale of **1 (poor)** to **5 (excellent),** to what extent are the following units in your establishment internally organised to facilitate project delivery processes **(please, note the Unsure option)?**

S/N	Internal or external to your organisation	Unsure	Poor……Excellent				
			1	**2**	**3**	**4**	**5**
1.1	Internal planning unit	U	1	2	3	4	5
1.2	Capital project unit	U	1	2	3	4	5
1.3	Human resources management unit	U	1	2	3	4	5
1.4	Supply chain management unit	U	1	2	3	4	5
1.5	Finance unit	U	1	2	3	4	5

Section B: On a scale of **1 (not satisfied)** to **5 (highly satisfied),** please, indicate your level of satisfaction with the performance of the following operational units in terms of delivery of projects **(please note the 'Unsure' option)**

S/N	Operational units	Unsure	Not satisfied …Highly satisfied				
			1	**2**	**3**	**4**	**5**
2.1	The internal planning unit for high level planning of projects	U	1	2	3	4	5
2.2	The professional services unit for development of various designs (e.g. architectural, services, structural, etc.)	U	1	2	3	4	5
2.3	The project management unit for the implementation of various operations at project sites	U	1	2	3	4	5
2.4	The role of Treasury unit in releasing cash flows to DPW	U	1	2	3	4	5
2.5	The role of finance unit for payments to service providers (e.g. contractors, consultants, or suppliers)	U	1	2	3	4	5

Section C. On a scale of **1 (not satisfied)** to **5 (highly satisfied),** to what extent are you satisfied with the performance of the project management unit for achieving success in project delivery **(please, note the Unsure option)?**

S/N	Project management unit performance	Unsure	Not satisfied …..Highly satisfied				
			1	**2**	**3**	**4**	**5**
3.1	The ability to translate design on paper (e.g. architectural, engineering designs, etc.) to end product	U	1	2	3	4	5
3.2	The ability to set up work process flow for the implementation of proposed projects	U	1	2	3	4	5
3.3	The ability to work closely with relevant other internal units to share information and advice during construction processes	U	1	2	3	4	5
3.4	The ability to monitor internal project managers' operations on site (e.g. to be able to make prompt/timely decisions on site issues)	U	1	2	3	4	5
3.5	The ability to monitor the in-house professionals (e.g. engineers, etc.) participation during site construction	U	1	2	3	4	5

Section D. On a scale of **1 (never)** to **5 (always**), how frequently do the following challenges occur in your department during project delivery (**please, note the 'Unsure' option)?**

S/N	Procurement challenges	Unsure	Never……Always				
			1	**2**	**3**	**4**	**5**
4.1	Decision makers in contractor organisations not attending compulsory tender briefing session during tendering sessions	U	1	2	3	4	5
4.2	Neglect of supervision and monitoring of projects by the DPW internal project managers	U	1	2	3	4	5
4.3	Insufficient briefing (needs/requirements) from DPW planning unit to the architect for design purposes	U	1	2	3	4	5
4.4	User Departments' insufficient briefing on project needs/requirements	U	1	2	3	4	5
4.5	Insufficient capacity of DPW in-house technical professionals (e.g. architects, engineers, etc.) to supervise their projects	U	1	2	3	4	5
4.6	Delayed cash transfer from Treasury	U	1	2	3	4	5

	for payments to service providers (e.g. contractors, suppliers, or consultants)						
4.7	Ineffective handling of contingencies by DPW internal project managers	U	1	2	3	4	5
4.8	Delayed response to variation orders by DPW internal project management	U	1	2	3	4	5
4.9	Delayed payment of approved variation orders by the Treasury or end user department	U	1	2	3	4	5
4.10	Ineffective monitoring and supervision of projects by DPW in-house professionals (e.g. engineers, etc.) on their project sites	U	1	2	3	4	5
4.11	Incomplete documentation during the tendering stage by DPW procurement committees	U	1	2	3	4	5
4.12	Ineffective project monitoring and supervision by DPW internal project managers	U	1	2	3	4	5
4.13	Ineffective and insufficient training and development of DPW in-house professionals (e.g. architects, engineers, QS, project managers)	U	1	2	3	4	5
4.14	Insufficient capacity of DPW appointed (external) technical professionals (e.g. architects, engineers, etc.) to supervise projects effectively	U	1	2	3	4	5
4.15	Ineffective supervision of projects by DPW appointed (external) professionals (e.g. architects, engineers, etc.) on their project sites	U	1	2	3	4	5

5. Do you have any comments in general regarding the performance of DPW professionals?

APPENDIX B2 Questionnaire for Deputy Director Generals responsible for projects

Section A. On a scale of **1 (poor)** to **5 (excellent),** rate the following aspects of your department's response to project requests from user departments **(please, note the 'Unsure' option)**

S/N	The ability of DPW to	Unsure	Poor……Excellent				
			1	**2**	**3**	**4**	**5**
1.1	Using standardised briefing schedule to reach a common understanding with user departments on their briefs (needs/requirements)	U	1	2	3	4	5
1.2	Use the infrastructure development plans (IDPs) for planning of proposed projects	U	1	2	3	4	5
1.3	Apply user management plans (UMPs) during planning session on client departments needs/requirements	U	1	2	3	4	5
1.4	Guide user departments on their technically needs/requirements relative to the project execution plan	U	1	2	3	4	5
1.5	Advise the user departments on the cost of the proposed projects in relation to their budget allocation	U	1	2	3	4	5
1.6	Advise user department on the completion duration/time of the projects	U	1	2	3	4	5

Section B. On a scale of **1 (poor)** to **5 (excellent**), rate your department performance during tendering processes and procedures **(please, note the 'Unsure' option)?**

S/N	Tendering processes and procedures	Unsure	Poor……..Excellent				
			1	**2**	**3**	**4**	**5**
2.1	The ability of DPW compliance committee to comply with pillars of procurement (fair, equitable, transparent, competitive and cost effective) during tendering processes as legislated	U	1	2	3	4	5
2.2	The input of procurement committees to tender advertising for contractor selection	U	1	2	3	4	5
2.3	The ability of bid evaluation committee to include professionals' reports (e.g. architects, engineers, etc.) in the adjudication processes	U	1	2	3	4	5
2.4	The ability of DPW to form a steering committee comprising user departments,	U	1	2	3	4	5

	the community and DPW in-house professionals and consultants to oversee the delivery of projects						

Section C. On a scale of **1 (poor)** to **5 (excellent**), rate the performance of your planning unit during planning sessions for effective project outcomes **(please, note the 'Unsure' option)**

S/N	DPW Planning unit ability to	Unsure	Poor……..……Excellent				
			1	**2**	**3**	**4**	**5**
3.1	Check for outcome of environmental impact analysis (EIA) on the project	U	1	2	3	4	5
3.2	Develop a schedule for site planning	U	1	2	3	4	5
3.3	Identify government land (e.g. National, Provincial or Municipality) for siting of projects	U	1	2	3	4	5
3.4	Use the Medium Term Expenditure Framework (MTEF) for planning of proposed projects	U	1	2	3	4	5
3.5	Arrange for feasibility studies including the viability of project site	U	1	2	3	4	5
3.6	The ability of the planning unit to establish a budget for the proposed projects	U	1	2	3	4	5
3.7	The role of Premier's budgeting committee in project planning for the proposed projects	U	1	2	3	4	5

Section D On a scale of **1 (poor)** to **5 (excellent**); rate the performance of your project managers during construction processes for project delivery (**please, note the 'Unsure' option)**

S/N	Project manager's ability to	Unsure	Poor……..…Excellent				
			1	**2**	**3**	**4**	**5**
4.1	Attend to all queries raised during site meetings	U	1	2	3	4	5
4.2	Monitor site development processes and programmes	U	1	2	3	4	5
4.3	Develop daily and weekly reports from the project for monthly management meetings	U	1	2	3	4	5
4.4	Escalate issues raised that are beyond the internal project manager's capability to the senior project manager for deliberation	U	1	2	3	4	5
4.5	Check, verify and analyse the issues and	U	1	2	3	4	5

	forward to the senior managements for further consideration						

Section E. On a scale of **1 (not important)** to **5 (very important**), rate the contribution of the following briefing elements to effective project outcomes **(please, note the 'Unsure' option)**

S/N	**Elements enhancing DPW briefing**	**Unsure**	**Not important……Very important**				
			1	**2**	**3**	**4**	**5**
5.1	The approach of DPW planning unit to receiving project request from user departments during briefing stages	U	1	2	3	4	5
5.2	The approach of DPW planning unit to working closely with the user departments to understand their needs/requirements	U	1	2	3	4	5
5.3	Capability of DPW planning unit in advising user departments on their needs/requirements for design and implementation purposes	U	1	2	3	4	5
5.4	The ability of DPW planning unit to using the Infrastructure Development Plans (IDPs) to incorporate client's needs	U	1	2	3	4	5
5.5	The ability of DPW planning unit to implementing User Management Plans (UMPs) to incorporate all needs/requirements during planning stages	U	1	2	3	4	5

Section F. On a scale of **1 (not important)** to **5 (very important**), rate the contribution of the following elements to enhancing user departments' briefing for project success **(please, note the 'Unsure' option)**

S/N	Elements enhancing user departments briefing	Unsure	Not important…..Very important				
			1	**2**	**3**	**4**	**5**
6.1	User departments' ability to explain their needs/requirements to DPW during planning sessions	U	1	2	3	4	5
6.2	The ability of user departments to incorporate Municipalities' needs/requirements in their briefing	U	1	2	3	4	5
6.3	The ability of user departments to identify land owned by government (e.g. National, Provincial or Municipality) for project development	U	1	2	3	4	5
6.4	User departments' ability to indicate to DPW planning unit the size of proposed projects during planning sessions	U	1	2	3	4	5
6.5	The ability of user departments to identify their needs through working closely with Municipalities and Councillors	U	1	2	3	4	5
6.6	User departments ability to establish and confirm funding through the Provincial Treasury unit for implementation of projects	U	1	2	3	4	5

Section G. On a scale of **1 (totally disagree)** to **5 (totally agree**), rate the following causes of design changes and variations from user departments' perspective (**please, note the 'Unsure' option)**

S/N	Design changes and variations due to	Unsure	T. disagree……..T. agree				
7.1	Poor interpretation of briefing (needs/requirements) by DPW planning unit	U	1	2	3	4	5
7.2	Poor briefing by user departments to DPW planning unit	U	1	2	3	4	5
7.3	Increase in DPW or user departments requirements	U	1	2	3	4	5
7.4	Appointment of new decision maker/political heads (e.g. 'MEC')	U	1	2	3	4	5
7.5	Additional out-of-predefined scope of items required by user departments to be incorporated into the design during construction processes	U	1	2	3	4	5
7.6	Poor design and costing solutions by external consultants	U	1	2	3	4	5

Section H. On a scale of **1 (never)** to **5 (always**), how frequent do these challenges occur during project delivery processes (**please, note the 'Unsure' option)?**

S/N	Procurement challenges	Unsure	Never……Always				
			1	**2**	**3**	**4**	**5**
8.1	Decision makers in contractor organisations not attending compulsory tender briefing session during competitive tendering procedures	U	1	2	3	4	5
8.2	Neglect of supervision of projects by the DPW internal project managers	U	1	2	3	4	5
8.3	Insufficient briefing (needs/requirements) from DPW planning unit to the design team for design development	U	1	2	3	4	5
8.4	User departments insufficient briefing (needs/requirements) to DPW planning unit	U	1	2	3	4	5
8.5	Insufficient capacity of DPW in-house technical professionals (e.g. architects, engineers, etc.) to supervise projects effectively	U	1	2	3	4	5
8.6	Insufficient capacity of DPW appointed (external) technical professionals (e.g. architects, engineers, etc.) to supervise projects effectively	U	1	2	3	4	5
8.7	Delay with cash flows from Treasury unit for payment to service providers (e.g. contractors, consultants, etc.)	U	1	2	3	4	5
8.8	Ineffective handling of contingencies by DPW internal project managers	U	1	2	3	4	5
8.9	Delayed response to variation orders by DPW internal project managers	U	1	2	3	4	5
8.10	Ineffective supervision of projects by DPW in-house professionals (e.g. architects, engineers, etc.) on their project sites	U	1	2	3	4	5
8.11	Ineffective supervision of projects by DPW appointed external professionals (e.g. architects, engineers, etc.) on their project sites	U	1	2	3	4	5
8.12	Weak monitoring and supervision of projects by DPW internal project managers	U	1	2	3	4	5
8.13	Ineffective and insufficient training and development of DPW in-house professionals (e.g. architects, Q/S, project managers)	U	1	2	3	4	5

8.14	Ineffective strategic planning of works/activities by DPW planning unit	U	1	2	3	4	5
8.15	Incomplete documentation during tendering processes by DPW procurement committees	U	1	2	3	4	5

9. Do you have any comments in general regarding the performance of DPW professionals?

APPENDIX B3 Questionnaire for Chief Financial Officers (CFOs)

Section A. On a scale of **1 (never)** to **5 (always**), rate the occurrences of the following factors that lead to late payment of contractors and consultants (**please, note the 'Unsure' option)**

S/N	Late payment factors	Unsure	Never……Always				
			1	**2**	**3**	**4**	**5**
1.1	Delay in cash flow processing by the Treasury unit	U	1	2	3	4	5
1.2	Weak monitoring and supervision of projects by DPW internal project managers	U	1	2	3	4	5
1.3	Disputes as a result of quality of work done by contractors	U	1	2	3	4	5
1.4	DPW internal project manager in dispute with consultants on certificate	U	1	2	3	4	5
1.5	DPW internal project managers delayed processing of invoices	U	1	2	3	4	5
1.6	Due to bureaucracy (long decision making processes), e.g. payments gets approved by DPW, then Provincial Department of Finance and then to the Treasury	U	1	2	3	4	5

Section B. On a scale of **1 (poor)** to **5 (excellent**), rate the following processes in monitoring and controlling budgets in your department (**please, note the 'Unsure' option)**

S/N	Monitoring and controlling of budget	Unsure	Poor……Excellent				
			1	**2**	**3**	**4**	**5**
2.1	Monthly and quarterly reviews of expenditure and income	U	1	2	3	4	5
2.2	Electronic payment to contractors, suppliers, etc. by user departments or the Treasury	U	1	2	3	4	5
2.3	Releasing funding based on each project cash flow projection	U	1	2	3	4	5
2.4	Comparing expenditure on each project to the initial cash flows earlier submitted	U	1	2	3	4	5
2.5	Releasing cash flows that actually originate from the project team	U	1	2	3	4	5

Section C. On a scale of **1 (never)** to **5 (always**), rate the occurrence of the following financial implications during procurement processes **(please, note the 'Unsure' option)**

S/N	Financial implications	Unsure	Never……..Always				
			1	**2**	**3**	**4**	**5**
3.1	Financial issues identified during integrated (DPW and user departments) planning sessions	U	1	2	3	4	5
3.2	Deficit/unforeseen mistakes in costing of projects	U	1	2	3	4	5
3.3	Late disbursement of funds by the Treasury unit to DPW	U	1	2	3	4	5
3.4	Delay with budget submission from DPW and user departments to provincial department of finance	U	1	2	3	4	5
3.5	Premiers' cabinet's delay with project approvals for funding purposes	U	1	2	3	4	5

Section D. On a scale of **1 (never)** to **5 (always**), how frequently do the following financial challenges occur during project delivery processes (**please, note the 'Unsure' option)?**

S/N	DPW financial challenges	Unsure	Never……..Always				
			1	**2**	**3**	**4**	**5**
4.1	Shortage of professional skills and expertise in finance unit	U	1	2	3	4	5
4.2	Insufficient number of professionals in finance unit	U	1	2	3	4	5
4.3	A lack of qualification for effective performance	U	1	2	3	4	5
4.4	Lack of training and development programmes	U	1	2	3	4	5
4.5	Limited knowledge management	U	1	2	3	4	5
4.6	Non-adherence to legislation	U	1	2	3	4	5
4.7	Poor audit results or records	U	1	2	3	4	5
4.8	Unauthorised expenditure by finance officers	U	1	2	3	4	5
4.9	Non-adherence to PFMA	U	1	2	3	4	5

5. Do you have any comments in general regarding the performance of DPW professionals?

APPENDIX B4 Questionnaire for heads of Supply Chain management (SCM) units

Section A. On a scale of **1 (poor)** to **5 (excellent**), rate the ability of procurement committees during procuring of services in your department (**please, note the 'Unsure' option)**

S/N	Ability of procurement officials to	Unsure	Poor……..…...Excellent				
			1	**2**	**3**	**4**	**5**
1.1	Comply with competitive tendering processes as legislated	U	1	2	3	4	5
1.2	Adherence to 21-day advertising period in media	U	1	2	3	4	5
1.3	The ability of specification committee in checking specified quality of materials and standard of workmanship	U	1	2	3	4	5
1.4	Ability of bid evaluation committee to check and evaluate the tender documents	U	1	2	3	4	5
1.5	The ability of bid adjudication committee to adjudicate the appointment of a suitable contractor	U	1	2	3	4	5
1.6	The ability of approval and recommendation committee to check, regulate and approve design for project implementation	U	1	2	3	4	5

Section B. On a scale of **1 (poor)** to **5 (excellent**), rate your department performance during tendering processes and procedures **(please, note the 'Unsure' option)?**

S/N	Tendering processes and procedures	Unsure	Poor……..…...Excellent				
			1	**2**	**3**	**4**	**5**
2.1	The ability of DPW compliance committee to comply with pillars of procurement (fair, equitable, transparent, competitive and cost effective) during tendering processes as legislated	U	1	2	3	4	5
2.2	The input of procurement committees to tender advertising for contractor selection	U	1	2	3	4	5
2.3	The ability of bid evaluation committee to include professionals' reports (e.g. architects, engineers, etc.) in the adjudication processes	U	1	2	3	4	5
2.4	The ability of DPW to form a steering committee comprising user departments, the community and DPW in-house professionals and consultants to oversee	U	1	2	3	4	5

	the delivery of projects						

Section C. On a scale of **1 (never)** to **5 (always**), how frequently are the following challenges experienced within the supply chain management (SCM) unit (**please, note the 'Unsure' option)?**

S/N	**Supply chain management (SCM) challenges**	**Unsure**	**Never…….Always**				
			1	**2**	**3**	**4**	**5**
3.1	Financial mismanagement in SCM processes	U	1	2	3	4	5
3.2	Shortcomings in the application of the SCM policies, procedures and controls	U	1	2	3	4	5
3.3	Lack of thorough and comprehensive SCM documentations	U	1	2	3	4	5
3.4	Lack of training, education on and communication of the relevant SCM processes and procedures	U	1	2	3	4	5
3.5	Gaps in the implementation of SCM policies and procedures	U	1	2	3	4	5

4. Do you have any comments in general regarding the performance of DPW professionals?

APPENDIX B5 Questionnaire for heads of Human Resources management (HRM) units

Section A. On a scale of **1 (limited)** to **5 (sufficient**), rate the following parameters in relation to in-house professionals in supervising your projects **(please, note the 'Unsure' option)**

S/N	In-house professionals (e.g. engineers, QS, etc.)	Unsure	Limited…….Sufficient				
			1	**2**	**3**	**4**	**5**
1.1	Possession of appropriate skills and technical expertise by in-house engineers, architects, QS, etc.	U	1	2	3	4	5
1.2	Number of in-house skilled professionals	U	1	2	3	4	5
1.3	Remuneration packages for in-house technical professionals (e.g. engineers, QS, etc.)	U	1	2	3	4	5
1.4	Qualification of technical professionals (e.g. engineers, architects, QS, project managers, etc.)	U	1	2	3	4	5
1.5	Representation of in-house professionals (e.g. architects, engineers, etc.) on each project site	U	1	2	3	4	5
1.6	Representation of internal project managers on each project site	U	1	2	3	4	5

Section B. On a scale of **1 (not satisfied)** to **5 (highly satisfied),** how satisfied are you with your in-house technical professionals in delivering projects successfully **(please, note the 'Unsure' option)?**

S/N	DPW professional (architects, engineers, etc.) ability to	Unsure	Not satisfied…...Very satisfied				
			1	**2**	**3**	**4**	**5**
2.1	Work closely with external consultants to acquire skills and technical expertise	U	1	2	3	4	5
2.2	Engage with design teams during design process	U	1	2	3	4	5
2.3	Work closely with internal project manager on project site for enhancement of skills and technical expertise	U	1	2	3	4	5
2.4	Go for professional training and short courses for performance improvement	U	1	2	3	4	5

3. Do you have any comments in general regarding the performance of DPW professionals?

APPENDIX B6 Questionnaire for Senior Project Managers (SPMs)

Section A. On a scale of **1 (limited)** to **5 (sufficient**), rate the DPW in-house professionals representativeness on project sites **(please, note the 'Unsure' option)**

S/N	DPW in-house Professionals representativeness	Unsure	Limited……..……Sufficient				
			1	**2**	**3**	**4**	**5**
1.1	Allocation of internal project managers on specific project site	U	1	2	3	4	5
1.2	DPW in-house professionals (e.g. architects, engineers, etc.) representation on project sites	U	1	2	3	4	5
1.3	Maximum number of projects per in-house professional (e.g. architects, engineers, QS, etc.)	U	1	2	3	4	5
1.4	Representation of professionals in all professional service fields	U	1	2	3	4	5

Section B. On a scale of **1 (not satisfied)** to **5 (highly satisfied**), to what extent are you satisfied with the performance of professional services unit for project success (**please, note the 'Unsure' option)?**

S/N	Professional services unit performance	Unsure	Not satisfied…Highly satisfied				
			1	**2**	**3**	**4**	**5**
2.1	Architect	U	1	2	3	4	5
2.2	Civil/Structural engineer	U	1	2	3	4	5
2.3	Mechanical engineer	U	1	2	3	4	5
2.4	Electrical engineer	U	1	2	3	4	5

Section C. On a scale of **1 (poor)** to **5 (excellent**), rate the ability of in-house architects in considering the following requirements during design processes (**please, note the 'Unsure' option)**

S/N	Architects' ability with regards to	Unsure	Poor……..……..Excellent				
			1	**2**	**3**	**4**	**5**
3.1	Functionality	U	1	2	3	4	5
3.2	Durability	U	1	2	3	4	5
3.3	Aesthetics	U	1	2	3	4	5
3.4	Economy	U	1	2	3	4	5

Section D. On a scale of **1 (never)** to **5 (always**), rate the occurrences of the following factors that lead to late payment of contractors and consultants (**please, note the 'Unsure' option)**

S/N	Late payment factors	Unsure	Never…….……Always				
			1	**2**	**3**	**4**	**5**
4.1	Delay in cash flow processing by the Treasury unit	U	1	2	3	4	5
4.2	Weak monitoring and supervision of projects by DPW internal project managers	U	1	2	3	4	5
4.3	Disputes as a result of quality of work done by contractors	U	1	2	3	4	5
4.4	DPW internal project manager in dispute with consultants on certificate	U	1	2	3	4	5
4.5	DPW internal project managers delayed processing of invoices	U	1	2	3	4	5
4.6	Due to bureaucracy (long decision making processes), e.g. payments gets approved by DPW, then Provincial Department of Finance and then to the Treasury	U	1	2	3	4	5

5. Do you have any comments in general regarding the performance of DPW professionals?

APPENDIX C1 Open-ended responses from Heads of Departments in the provinces

TABLE I

RESPONSES TO OPEN-ENDED QUESTIONAIRE FROM HEADS OF DEPARTMENTS (HODs) AT NATIONAL AND THE PROVINCES

Responses to open-ended questionnaire	Emerging patterns/concepts	Broder category of themes
User Department do not always communicate exact infrastructure needs. **[HODB]**	INSUFFICIENT USER DEPARTMENT BRIEFING	**BRIEFING CHALLENGES**
We do not have project management unit in our Department. **[HODA]**	LACK OF PROJECT MANAGEMENT UNIT	**PROJECT CHALLENGES**
Procurement is one of the serious challenges constantly the Department is faced with, and improvement to such will make a huge difference. **[HODA]**	CHALLENGES WITH PROCUREMENT PROCESSES	**SUPPLY CHAIN CHALLENGES**
Specialists' construction unit to be established for procurement. **[HODB]**	NEED FOR A PROCUREMENT UNIT	
Available budgets of User Departments are sometimes insufficient for infrastructure needs. **[HODB]**	INSUFFICIENT CLIENT BUDGETS FOR INFRASTRUCTURAL NEEDS	**FINANCIAL CHALLENGES**
User Departments are responsible for payments of contractors, consultants, etc. not DPW. **[HODB]**	USER DEPATMENT RESPONSIBILITY FOR PAYMENT TO SERVICE PROVIDERS	
The Department is having a vision in terms of capacitation, restructuring and performance in all units. **[HODE]**	VISION FOR PERFORMANCE IMPROVEMENT AND CAPACITATION	**HUMAN RESOURCES CHALLENGES**
Public sector clients tend to take advantage of inefficiencies in government by trying to benefit more from projects. **[HODF]**	OPPORTUNISTIC BEHAVIOUR	

TABLE II

RESPONSES TO OPEN-ENDED QUESTIONAIRE FROM DEPUTY DIRECTORs GENERAL (DDGs) ON PROJECTS AT NATIONAL AND THE PROVINCES

Responses to open-ended questionnaire	Emerging patterns/concepts	Broder category of themes
The key weakness of the User Departments lies in the quality and comprehensiveness of strategic briefs. **[DDGI]** User requirements are not fully understood. **[DDGI]**	USER DEPARTMENTS WEAK STRATEGIC BRIEFING UNCLEAR USER DEPARTMENT REQUIREMENTS	**BRIEFING CHALLENGES**
Working in silos: there are some activities that are of a nature that decisions should be made by a collective one, such activity is planning. **[DDGG]** Sometimes mistakes do happen where projects are omitted or budgets erroneously omitted in the plans since the planning circle is not taken seriously or left until the last minute then forcing the responsible person to send a plan that was not carefully perused just for compliances purposes. **[DDGG]**	LACK OF STRATEGIC AND INTERNAL PLANNING SESSIONS PLANNING DEFFICIENCIES	**PLANNING CHALLENGES**
"IDMS" need to be implemented fully to define approach and deliverables for any and every part-taker's roles and responsibilities to be adapted to ensure project flow. **[DDGB]** Ineffective monitoring and supervision of projects by professionals on site: to contractual issues such as claims, the use of contingency funds, variation orders, extension on time, increase of scope, etc. **[DDGG]**	NEED FULL IMPLEMENTATION OF 'IDMS' TO DEFINE CLIENTS' ROLES INEFFECTIVE PROJECT SUPERVISION AND MONITORING BY IN-HOUSE PROFESSIONALS	**PROJECT CHALLENGES**

In supply chain management section, many a times blame is laid on supply chain management committees where there is lack of or slow performance in implementation of various infrastructure projects. **[DDGG]**	SLOW PROJECT IMPLEMENTATION	**PROJECT CHALLENGES**
The HOD is not a construction related professional but an accountant by training. **[DDGG]**	INCOMPETENT STAFFING	
The HOD is not a construction related professional. **[DDGE]**	INCOMPETENT STAFFING	
Lack of or insufficient technical capacity of in-house professionals/project managers. **[DDGG]**	LACK OF CAPACITATED IN-HOUSE TECHNICAL PROFESSIONALS AND PROJECT MANAGERS	
The Department has over time (more than 5 years) struggled to recruit and retain suitably qualified and professionally registered technical personnel. **[DDGG]**	"DPW" CHALLENGES WITH RECRUITMENT AND RETAINTION OF SUITABLE QUALIFIED PERSONNEL	**HUMAN RESOURCES CHALLENGES**
Poor morale and unmotivated staff. The personnel are always over worked since most of the posts on the organizational structure are vacant. Sometimes one has to carry out duties of 4 to 5 people since we operate on a skeletal structure. **[DDGG]**	OVER WORKING OF PERSONNEL DUE TO UNDERSTAFFING	
Lack of technical skills transfer from the external service providers towards professional registration of in-house personnel (despite the activity forming part of the terms of reference of the external service provider/consultant). **[DDGG]**	LACK OF TECHNICAL SKILLS TRANSFER FROM EXTERNAL CONSULTANTS TO 'DPW' PROFESSIONALS	
	LACK OF EDUCATIONAL	

Reluctance for further educational development. **[DDGG]**	DEVELOPMENT	
Lack of learning from each other's skills. **[DDGG]**	LACK SKILLS TRANSFER MECHANISM	
Project managers sometimes get to a mistake of not further developing themselves (comfort zone) thinking that because they are long in the position and they are well-experienced. **[DDGG]**	EXPERIENCE PREFERED TO CONTINUOUS PROFESSINAL DEVELOPMENT	**HUMAN RESOURCES CHALLENGES**
The Department is using external service providers (consulting firms) to manage projects and programmes. By so doing, it is to close the gaps in the project and programme management. **[DDGG]**	EXTERNAL CONSULTANTS INGAGEMENT DUE TO INCAPACITATION IN 'DPW'	
The project management unit (PMU) may have professional people in their structure (1 or 2) and generally also appoints young technicians and engineers who still need some training and experience. **[DDGG]**	LACK OF TRAINED AND EXPERIENCED EXTERNAL CONSULTANTS	
This makes decision taking long process since this young person cannot decide immediately and has to consult first with his/ her supervisor. **[DDGG]**	LONG DECISION MAKING PROCESS	**DECISION MAKING CHALLENGES**
User department budgets are frequently unrealistic. **[DDGI]**	END-USERS UNREALISTIC BUDGETS	**FINANCIAL CHALLENGES**
The end-users equally carry the blame because they send documents with a lot of mistakes. **[DDGG]**	END-USERS DOCUMENTATION MISTAKES	**DOCUMENTATION CHALLENGES**
The end-users unnecessary delay documentation corrections instead of compliance with necessary supply	END-USERS DOCUMENTATION DELAYS	

chain regulations. **[DDGG]** Community disruption also causes problems and delays on various projects. These would be mostly in the form of job-seeking complaining of pay-rates, unfair treatment by the contractors, lack of training on the projects, payment/compensation to and owners for the use borrow materials, etc. **[DDGG]**	DPW DECISION MAKING DIFFICULTIES WITH THE COMMUNITIES	**DECISION MAKING CHALLENGES**

TABLE III

RESPONSES TO OPEN-ENDED QUESTIONAIRE FROM CHIEF FINANCIAL OFFICERS (CFOs) AT NATIONAL AND THE PROVINCES

Responses to open-ended questionnaire	**Emerging Patterns/concepts**	**Broder categories of themes**
The NEED ANALYSIS should be properly defined. **[CFOF]**	DEFINE CLIENTS NEED AND REQUIREMENTS	**BRIEFING CHALLENGES**
The Department had a disclaimer audit opinion in the last financial year, but it has improved continuously and we have to improve the processes and systems (audit opinion). **[CFOE]**	AUDIT DEFICENCIES	
Proper funding of projects is very critical. **[CFOF]**	PROJECT FUNDING	**FINANCIAL CHALLENGES**
Late payment factors should relate to before and after the submission of invoices or payment certificates. **[CFOH]**	LATE PAYMENT DUE TO LATE INVOICE AND PAYMENT CERTIFICATE	
Funding is released by the Provincial Treasury approximately every second week only. If certificates of payments are received late, a payment date can be missed due to verification process of the payment leading to payments after 30 days. Funding is released based on the cash flow forecast for the vote as a whole taking account of all projects. Funding is therefore not released per individual project. The finance unit is not part of the project team. The project team consists of professional technical staff (architects, quantity surveyors, engineers, etc.). The finance unit pays the invoices prepared by the project team. **[CFOI]**	PROJECT FUNDING PROCEDURES	

The finance unit monitors financial and budget performance per project. **[CFOI]**	MONITORING OF FINANCIAL AND BUDGET PERFORMANCE	
The Department does provide bursaries to professionalise the financial and built environment, and also has a bursary programme for underprivileged students. **[CFOI]**	BURSARIES FOR EDUCATIONAL AND PROFESSIONAL DEVELOPMENT	**FINANCIAL CHALLENGES**
I think all of the challenges that are encountered during the project delivery processes can be averted through proper planning during or before the procurement phase. **[CFOF]**	NEED STRATEGIC AND INTERNAL PLANNING SESSIONS	**PLANNING CHALLENEGS**
To introduce the Asset Management Section (immovable and movable assets). **[CFOE]**	NEED ASSET MANAGEMENT UNIT	
Both the duties of contractors and consultants should be clearly defined. **[CFOF]**	DEFINE SERVICE PROVIDERS' ROLES	**SUPPLY CHAIN CHALLENGES**
The issue of training and skills transfer is also very critical. **[CFOF]**	LACK OF TRAINING AND SKILLS TRANSFER	
The issue of shortage of professionals. **[CFOF]**	SHORTAGES OF PROFESSIONALS	**HUMAN RESOURCES CHALLENGES**
Lack of technical skills also sacrifices the quality of some projects. **[CFOF]**	LACK OF TECHNICAL SKILLS	
There is shortage of professional staff in the built and financial environment. **[CFOI]**	SHORTAGE OF PROFESSIONALS IN BUILT AND FINANCIAL UNIT	
Need for clear specifications to be outlined for contractors. **[CFOF]**	OUTLINE QUALITY OF MATERIAL AND STANDARD OF WORKMANSHIP	**SUPPLY CHAIN CHALLENGES**

TABLE IV

RESPONSES TO OPEN-ENDED QUESTIONAIRE FROM SUPPLY CHAIN MANAGEMENT (SCM) UNITS AT NATIONAL AND THE PROVINCES

Responses to open-ended questionnaire	Emerging Patterns/concepts	Broder categories of themes
At times you find User Departments after approving plan tend to make changes to a construction that has already started which then creates challenges for Department of Public Works to now make fresh plan and these changes via a variation order. **[SCMD]**	DESIGN CHANGES/VARIATION	**DESIGN CHALLENGES**
Our User Departments tend not to plan their projects which then cause delays and put pressure on Department of Public Works. **[SCMD]**	LACK OF STRATEGIC PLANNING BY USER DEPARTMENTS	**PLANNING CHALLENGES**
Lack of enough budgets for training professionals in the procurement profession. **[SCMB]**	INSUFFICIENT BUDGETS FOR PROCUREMENT TRAINING	**FINANCIAL CHALLENGES**
Department of Public Works is mandated to provide construction and property management for Provincial Clients Departments. **[SCMD]**	'DPW' ACCOUNTABILITY FOR PROJECT DELIVERY TO CLIENT DEPARTMENTS	**PROJECT CHALLENGES**
The organogram is heavily understaffed. There are no enough professionals in the department. **[SPMA6]**	ORGANOGRAM IS HEAVILY UNDERSTAFFED	**HUMAN RESOURCES CHALLENGES**
There is a common presumption that National Policies and Strategies are aligned and synchronised. This is not the case. **[SCMI]**	MISUNDERSTANDING OF NATIONAL POLICIES AND STRATEGIES	**POLICY CHALLENGES**
Firstly, Provinces need to interpret these Policies and then apply the rules. This causes lack of uniformity in the implementation process. **[SCMI]**	CHALLENGES WITH POLICY IMPLEMENTATION AND STRATEGIES	

Shortage of skilled Supply Chain Management cadre. **[SCMB]** Also with regard to User Departments for request of office accommodation, User Departments want to dictate which buildings they want to rent hence the Department of Public Works has to follow the due supply chain management processes to secure accommodation. **[SCMD]** Secondly, all government objectives cannot become a "procurement burden". It causes the cost of compliance to sky rocket. Compliance requires time; time has a cost implication, and thus an efficiency implication. **[SCMI]** There must be a balance between compliance, "overregulation and performance. **[SCMI]** Performance is hampered by bureaucratic environment. **[SCME]** User Departments also tend to want to be included in the decision making in seeking for an accommodation; the Department does not allow this and lacks the permanent process on that act. In general, public sector clients need to start running their Departments as business which will result in quickly turning their needs pending better service to the public. **[SCMD]**	INSUFFICIENT SUPPLY CHAIN MANAGEMENT CADRES DPW CHALLENGES WITH SUPPLY CHAIN PROCESSES PROCUREMENT BURDEN NEED BALANCE IN CLIENT ROLES BUREAUCRATIC BOTTLE NECKS User DEPARTMENT DECISION MAKING CHALLENGES	**HUMAN RESOURCES CHALLENGES** **SUPPLY CHAIN CHALLENGES** **DECISION MAKING CHALLENGES**

TABLE V

RESPONSES TO OPEN-ENDED QUESTIONAIRE FROM HUMAN RESOURCES MAMANGEMENT (HRM) UNITS AT NATIONAL AND THE PROVINCES

Responses to open-ended questionnaire	Emerging Patterns/concepts	Broder category of themes
A number of candidates are still aspiring professionals. **[HRMB]**	ASPIRING FOR SKILLS DEVELOPMENT	
Yes, we ensure continuous professional development. **[HRMB]**	PROFESSIONAL DEVELOPMENT	
Candidates' profession are placed with registered mentors –both internal and external depending on availability. **[HRMB]**	MENTORING OF CANDIDATES	
In general the Department is delivering, but more training has to be done to improve service delivery. **[HRME]**	NEED MORE PROFESSIONAL TRAINING	**HUMAN RESOURCES CHALLENGES**
The inadequate pool of the built environment professionals is the most critical challenge in attracting and retaining professionals. **[HRMF]**	CHALLENGES WITH ATTRACTING AND RETAINING OF PROFESSIONALS	
A number of professionals post remain vacant for a longer period, and those impacts negatively on infrastructure delivery performance. **[HRMF]**	SOME VACANT PROFESSIONAL POST ON THE ORGANOGRAM	
The HRM unit is constantly sending professionals (project managers) for courses, summits and workshops to develop their skills and acquire continuing professional development (CPD) points. **[HRMH]**	PROJECT MANAGERS' TECHNICAL SKILLS DEVELOPMENT	

Projects managers should work towards registering with their professional bodies like the South African Council for the Project and Construction Management Professions. **[HRMH]**	PROJECT MANAGERS' PROFESSIONAL DEVELOPMENT	**HUMAN RESOURCES CHALLENGES**
Work being done by professionals is more focused on project management as compared to actual technical aspects of the projects. This has negative consequences when technical staff in the public sector applies for professional registration with professional bodies (Councils). **[HRMC]**	LACK TECHNICAL ASPECT OF PROJECT MANAGEMENT	**PROJECT CHALLENGES**
The Department pays for registration of professionals. **[HRMB]**	FINANCING PROFESSIONAL DEVELOPMENT	**FINANCIAL CHALLENGES**

TABLE VI

RESPONSES TO OPEN-ENDED QUESTIONAIRE FROM SENIOR PROJECT MANAGERS (SPMs) AT NATIONAL AND THE PROVINCES

Responses to open-ended questionnaire	Emerging Patterns/concepts	Broder category of themes
In section C, project design is an outsourced function and as such the Department do not fully engage in complete project designs, but, however, they are involved in project reviews and checks. The reason why the architects' ability with regards to functionality, stability, aesthetics and economy is unsure because the Department outsources the architectural design to external consultants due to incapacitation in the Department. **[SPMF4]**	INCOMPLETE PROJECT DESIGN	**DESIGN CHALLENGES**
Also the process of design approvals is too long. Even though there is a significant amount of changes made during the construction phase. **[SPMI5]**	LONG DESIGN APPROVAL PROCESSES	
Also the amount of time spent in design approved during the design session/phase is too long. **[SPMI5]**	LENGHTY DESIGN APPROVALS	
Therefore, if we can reduce the amount of time spend during planning stages, we can move ahead. **[SPMI5]**	LONG PLANNING PROCESSES	**PLANNING CHALLENGES**
Also the amount of time spent during the planning session/phase is too long. **[SPMI5]**	LENGHTY PLANNING PROCESSES	
Also the amount of time spent in producing documentation is too long. **[SPMI5]**	LENGHTY DOCUMENTATION PROCESS	**DOCUMENTATION CHALLENGES**

Lack of submission of infrastructure programme management plan (IPMP) on time to enable the Department to start with feasibility study. **[SPMG3]**	LACK OF INTERNAL PLANNING SESSION	**PLANNING CHALLENGES**
The number of projects allocated to an internal project manager will have an influence on overall performance of the project. The contexts of some of your questions I think are more relevant to programme managers. This is because they have an overview of programmes (as projects are allocated/ grouped into units, which we call programmes). All professional service report to these programme managers, therefore, they might have a clear view of reasons of poor/good project performance**. [SPMA3]**	PROJECT PERFORMANCE DEPENDS ON PROJECT ALLOCATION	**PROJECT CHALLENGES**
Management and coordination of professionals is non-existent. **[SPME9]**	LACK OF COORDINATION AND MANAGEMENT OF PROFESSIONALS	
Clients Departments do not approve some of the projects within the stipulated time (21 working days) and this result on contractors claiming C.O.T. because of the delays. **[SPMF5]**	LATE PROJECT APPROVALS	
There is an overload of projects per in-house professionals as the Department is understaffed in terms of professionals. Professionals are not keen to work for the government. **[SPMH8]**	PROJECTS OVERLOADING DUE TO UNERSTAFFING	**HUMAN RESOURCES CHALLENGES**
Too many signatures delay payments to the contractors and consultants. **[SPMI2]**	LONG DECISION MAKING PROCESS	**DECISION MAKING CHALLENGES**
Delay in dual decision making (i.e. on extension of time and variation orders results in project delays and added project cost in certain instances. **[SPMB4]**	DELAY WITH DECISION ON EXTENSION OF TIME AND VARIATION ORDERS	

A lot of bureaucracy in decision making processes. **[SPMD3**	BUREAUCRATIC BOTTLE NECKS IN DECISION MAKING	
Too many signatures for payments approvals and that delays projects. **[SPMB6]**	CHALLENGES WITH DECISION MAKING PROCESSES	**DECISION MAKING CHALLENGES**
The public sector clients are helpful and reliable in terms of making it easy for service providers to perform their duties. Sometimes, it is difficult to deal with in terms of decision making. **[SPMH6]**	DIFFICULTY WITH DECISION MAKING	
Procurement processes sometimes takes long time. **[SPMA5]**	LENGTHY PROCUREMENT PROCESSES	
Review of supply chain process in order to shorten the process, as it takes long time in current situation. **[SPME7]**	LONG SUPPLY CHAIN PROCESSES	**SUPPLY CHAIN CHALLENGES**
Supply chain processes should also be evaluated due to the lengthy time it takes to award projects. **[SPME8]**	LENGTHY SUPPLY CHAIN PROCESSES	
To look into contracts that are used in infrastructure in a public sector that always favours the private sector. **[SPME10]**	CONTRACTUAL INEQUALITY	
To improve on project procurement process. **[SPMG3]**	NEED IMPROVEMENT DURING PROCUREMENT PROCESSES	**SUPPLY CHAIN CHALLENGES**
Internal control measures are inexistence regarding PFMA. However, procurement strategies must be improved in the light of key prerequisites of the built environment service providers to protect the industry. **[SPMI1]**	LACK OF INTERNAL CONTROL MEASURES DURING PROCUREMENT PROCESSES	

The Department should always appoint skilled contractors and consultants. **[SPMH7]**	NEED TO APPOINT SKILLED SERVICE PROVIDERS	
There must be an improvement regarding control measures with regards to procurement processes in terms of appointing service providers. However, investigation exercise must be undertaken before appointing service providers, by so doing will eliminate a number of cancellations and will improve service delivery. **[SPMI1]**	LACK OF CONTROL MEASURES DURING SERVICE PROVIDERS' APPOINTMENT	**SUPPLY CHAIN CHALLENGES**
However, procurement strategies must be improved in the light of key prerequisites of the built environment service providers to protect the industry. **[SPMI1]**	NEED TO IMPROVE PROCUREMENT STRATEGIES	
There must be an improvement regarding control measures with regards to procurement processes in terms of appointing service providers. However, investigation exercise must be undertaken before appointing service providers, by so doing will eliminate a number of cancellations and will improve service delivery. **[SPMI1]**	NEED CONTROL MEASURES DURING APPOINTMENT OF SERVICE PROVIDERS	
Public sector clients are generally well-resourced, knowledgeable and are able to deliver, but are let down by cash flow problems and in most instances by the communities they work in. **[SPMC2]**	CASH FLOW PROBLEMS	**FINANCIAL CHALLENGES**
The Department of Public Works does not have funds (budget). Budget is sitting with the Client Departments. **[SPME3]**	BURGETS ALLOCATION TO CLIENT DEPARTMENTS	

Late payment occurs mainly due to the processes up till payment stage. **[SPMG1]** To pay them enough salary not to be attracted by the private sector. **[SPME10]** Tracking system of payments for service providers must be in place and be effective. **[SPMG3]** Budget for all projects done by the Department on behalf of User Departments must be forwarded to the Department of Public Works and Roads to minimise the delays. **[SPMG3]** Late payments to contractors delay progress of ongoing projects. **[SPMG4]** Delay with contractors' cash flows impact negatively on the delivery of projects. **[SPMI4]** Insufficient numbers of human resources development, training and recruitment in our staff. Due to insufficient registered professionals in-house, external registered professionals are engaged to manage projects as an extended arm. **[SPMA6]** In-house Quantity Surveyors monitor projects implementation in conjunction with external project managers. **[SPMA6]** We do not have sufficient professionals in the following fields (architecture, civil/structural engineering) to supervise our projects and therefore	LATE PAYMENT PROCESSES INSUFFICIENT SALARY/WAGES NEED EFFECTIVE PAYMENT SYSTEMS REDUCE BUDGET PROCESSES LATE PAYMENTS TO CONTRACTORS DELAY WITH CONTRACTORS' CASH FLOWS INSUFFICIENT HUMAN RESOURCES DEVELOPMENT AND TRAINING MONITORING PROJECT IMPLEMENTATION INSUFFICIENT IN-HOUSE TECHNICAL PROFESSIONALS	**FINANCIAL CHALLENGES** **HUMAN RESOURCES CHALLENGES**

we rely heavily on the external professionals. **[SPMA7]** A lot of qualified personnel are needed to engage with public sector employees. **[SPMC4]** Lack of professional personnel delays the process. **[SPME3]** The Department does not have professional internal project managers. The in-house project managers are just people who are assigned to run the projects. **[SPME6]** Most of the Department professionals have diplomas and few have Department preferred qualifications (degrees). Only a handful of professionals are registered personnel with their professional bodies. The Department has only one registered architect and same person has to manage drawings for all projects and is too much to handle. To have the drawings approved is very hard, e.g., even the qualified electrical engineer is not registered with his professional body. **[SPME6]** Project managers need to be taken for further training to be able to manage projects. **[SPME6]** In-house projects are difficult to earn as the Department has no enough professionals (especially, Quantity Surveyors). **[SPME6]** The Department of Public Works do not have capacity in-house to perform its mandate because of limited professionals. **[SPME9]**	NEED RECRUITMENT OF QUALIFIED PERSONNEL LACK OF IN-HOUSE PROFESSIONALS LACK OF INTERNAL PROJECT MANAGERS INSUFFICIENT QUALIFIED TECHNICAL PROFESSIONALS TRAINING FOR INTERNAL PROJECT MANAGERS DIFFICULTY WITH RECRUITMENT OF IN-HOUSE PROFESSIONALS LIMITED IN-HOUSE PROFESSIONALS LACK OF ATTRACTION OF SKILLED PERSONNEL	**HUMAN RESOURCES CHALLENGES**

Attraction of the appropriate skilled people is a concern. **[SPME9]** To capacitate the Department of Public Works or public sector with the built environment qualified registered professionals with different built environment council employees. **[SPME10]** We are in short of technical professionals in our Department including project managers. **[SPMG1]** We do not have any registered professional in our Department. **[SPMG2]** The Department should have managers who are technically enlightened as well as financial managers for procurement. **[SPMG6]** The professionals within the Department are not sufficiently resourced to handle projects in-house and have to really on professional service providers to execute projects on their behalf. **[SPMH1]** Need more extensive training. **[SPMH2]** There is high shortage of skilled personnel. **[SPMH2]** The professionals within the Department are not sufficiently resourced to handle projects in-house and have to really on professionals' service providers to execute projects on their behalf. **[SPMH9]**	LACK OF IN-HOUSE CAPACITY INSUFFICIENT TECHNICAL PROFESSIONALS/PROJECT MANAGERS UNQUALIFIED PROFESSIONALS LACK OF TECHNICAL AND FINANCIAL MANAGERS INSUFFICIENT HUMAN RESOURCE PERSONNEL NEED TRAINING OF PROFESSIONALS SHORTAGES OF SKILLED PERSONNEL INSUFFICIENT PROFESSIONALS	**HUMAN RESOURCES CHALLENGES**

Increase capacity of professional service component. **[SPMI2]** Government failed to attract new engineers and other professionals to the public service because they are hired on contract/temporary basis and this result in government loosing these professionals to the private sector. New engineers, Quantity Surveyors, etc., must be permanently hired to motivate workers to stay in government. **[SPMI3]** Lack of capacity from consultants and inexperienced in-house professionals thereof affects the delivery and quality of projects. **[SPMI4]** Efficiency due to the yearly project load and the even distribution of team members within the Department is most often the cause of projects being executed. I believe once the post of the structure is adequately filled then production and execution of projects would double up. **[SPMI5]** Currently within the Department we don't have enough professionals to manage the current workload which increases on yearly bases due to the demand being placed on health and education infrastructure. Until the staffing issue is addressed, we will always be lacking behind in terms of production. **[SPMI5]**	SERVICE PROVIDERS' CAPACITY SERVICE PROVIDERS ENGAGEMENT DUE TO INCAPACITATION IN 'DPW' CONSULTANTS/ IN-HOUSE PROFESSIONALS INCAPACITATION LACK OF PERSONNEL TO FILL IN THE 'DPW' ORGANOGRAM INSUFFICIENT PROFESSIONALS	**HUMAN RESOURCES CHALLENGES**

APPENDIX C2 Open-ended responses from the Heads operational units in the provinces

TABLE I

RESPONSES TO OPEN-ENDED QUESTIONAIRE FROM HEADS OF OPERATIONAL UNITS IN PROVINCE A

Responses to open-ended questionnaire	Emerging patterns/concepts	Broder category of themes
We do not have project management unit in our Department. **[HODA]**	LACK OF PROJECT MANAGEMENT UNIT	**PROJECT CHALLENGES**
The number of projects allocated to an internal project manager will have an influence on overall performance of the project. **[SPMA3]**	OVERLOADING OF PROJECT TO MANAGERS PROJECT	
Procurement is one of the serious challenges constantly the Department is faced with currently. Improvement to such will make a huge difference. **[HODA]**	PROCUREMENT CHALLENGES	**SUPPLY CHAIN CHALLENGES**
Procurement processes sometimes takes long time. **[SPMA5]**	LENGHTY PROCUREMENT PROCESSES	
Lack of human resources personnel. **[SPMA5]**	LACK OF HUMAN RESOURCES PERSONNEL	**HUMAN RESOURCES CHALLENGES**
Due to insufficient registered professionals in-house, external registered professionals are engaged to manage projects as an extended arm. In-house Quantity Surveyors monitor projects implementation in conjunction with external project managers. **[SPMA6]**	CONSULTANTS INGAGEGMENT DUE TO INCAPACITATION OF IN-HOUSE PROFESSIONALS	
We do not have sufficient professionals in the following	INSUFFICIENT IN-HOUSE TECHNICAL PROFESSIONALS	

fields (architecture, civil/structural engineering) to supervise our projects and therefore we really heavily on the external professionals. **[SPMA7]**		

TABLE II

RESPONSES TO OPEN-ENDED QUESTIONAIRE FROM HEADS OF OPERATIONAL UNITS IN PROVINCE B

Responses to open-ended questionnaire	Emerging patterns /concepts	Broder category of themes
Public sector clients do not always communicate exact infrastructural needs. **[HODB]**	INCOMPLETE CLIENT BRIEFING	**BRIEFING CHALLENGES**
User Departments are responsible for payments of contractors, consultants, etc. not DPW. **[HODB]**	PAYMENT RESPONSIBILITY BY CLIENTS' DEPARTMENTS	
Available budgets of User Departments are sometimes insufficient for infrastructure needs. **[HODB]**	USER INSUFFICIENT BUDGET FOR INFRASTRUCTURAL NEEDS	
Lack of enough budgets for training of professionals in the procurement profession. **[SCMB]**	INADEQUATE BUDGETS FOR PROFESSIONAL TRAINING	**FINANCIAL CHALLENGES**
Too much signatures for payments approvals and that delays projects. **[SPMB6]**	LONG PAYMENT APPROVAL PROCESSES	
The Department pays for registration of professionals. **[HRMB]**	PAYMENT FOR PROFESSIONAL REGISTRATION	
Specialists' construction unit to be established for procurement. **[HODB]**	NEED FOR A PROCUREMENT UNIT	**SUPPLY CHAIN CHALLENGES**
IDMS need to be implemented fully to define approach and deliverables for any and every part-taker's roles and responsibilities to be adapted to ensure project flow. **[DDGB]**	PARTIAL IMPLEMENTATION OF 'IDMS' TO DEFINE ROLES	

Delays in dual decisions making (i.e. on extension of time and variation orders) results in project delays and added project cost in certain instances. **[SPMB4]** Shortage of skilled supply chain management cadre. **[SCMB]** A number of candidates are still aspiring professionals. **[HRMB]** Yes, we ensure continuous professional development. **[HRMB]** Candidates' profession are placed with registered mentors – both internal and external depending on availability. **[HRMB]**	LONG DECISION MAKING ON EXTENSION OF TIME AND VARIATION ORDERS SHORTAGES OF SUPPLY CHAIN PROFESSIONALS ASPIRING PROFESSIONALS PROFESSIONAL DEVELOPMENT MENTORING OF CANDIDATES	**DECISION MAKING CHALLENGES** **HUMAN RESOURCES CHALLENGES**

TABLE III

RESPONSES TO OPEN-ENDED QUESTIONAIRE FROM HEADS OF OPERATIONAL UNITS IN PROVINCE C

Responses to open-ended questionnaire	Emerging patterns/concepts	Broder category of themes
Works done by professionals are more focused on project management as compared to actual technical aspects of the projects. This has negative consequences when technical staffs in the public sector apply for Professional Registration with professional bodies (councils). **[HRMC]**	LACK OF TECHNICAL MANAGEMENT EXPERTISE	**PROJECT CHALLENGES**
Public sector clients are generally well-resourced, knowledgeable and are able to deliver, but are let down by cash flow problems and in most instances by the communities they work in. **[SPMC2]**	CASH FLOW ISSUES	**FINANCIAL CHALLENGES**
A lot of qualified personnel are needed to engage with public sector employees. **[SPMC4]**	NEED QUALIFIED IN-HOUSE PERSONNEL	**HUMAN RESOURCES CHALLENGES**

TABLE IV

RESPONSES TO OPEN-ENDED QUESTIONAIRE FROM HEADS OF OPERATIONAL UNITS IN PROVINCE D

Responses to open-ended questionnaire	**Initial patterns/concepts**	**Broder category of themes**
Department of Public Works is mandated to provide construction and property management for Provincial Clients Departments. **[SCMD]**	ACCOUNTABILITY FOR PROJECT DELIVERY	**PROJECT CHALLENGES**
Our User Departments tend not to plan their projects which then cause delays and put pressure on Department of Public Works. **[SCMD]**	LACK OF STRATEGIC PROJECT PLANNING SESSIONS	**PLANNING CHALLENGES**
At times you find User Departments after approving plan tend to make changes to a construction that has already started which then creates a challenge for Department of Public Works to now make fresh plan and these changes via a variation order. **[SCMD]**	ALTERATION AND DESIGN CHANGES	**DESIGN CHALLENGES**
Also with regard to User Departments for request of office accommodation, User Departments want to dictate which buildings they want to rent hence the Department of Public Works has to follow the due supply chain management processes to secure accommodation. User Departments also tend to want to be included in the decision making processes in seeking for an accommodation; the Department does not allow this and lacks the permanent process on that act**. [SCMD]** A lot of bureaucracy. **[SPMD3]**	DECISION MAKING CHALLENGES WITH CLIENT DEPARTMENTS COMPLICATED ADMINISTRATIVE PROCEDURE	**DECISION MAKING CHALLENGES**

TABLE V

RESPONSES TO OPEN-ENDED QUESTIONAIRE FROM HEADS OF OPERATIONAL UNITS IN PROVINCE E

Responses to open-ended questionnaire	Emerging patterns/concepts	Broder category of themes
User Departments mostly are having high expectations and demand more than what the scope is called for. **[SPME5]**	CLIENT HIGH DEMAND FOR PROJECT	**PROJECT CHALLENGES**
To introduce the Asset Management Section (immovable and movable assets) i.e. User Management Plan and Custodian Management Plan. **[CFOE]**	NEED ASSET MANAGEMENT PLANNING	**PLANNING CHALLENGES**
The Department is having a vision in terms of capacitation, restructuring and performance in all units. **[HODE]**	VISION FOR IMPROVEMENT AND PERFORMANCE	
User Department should learn that all projects are budgeted for a specific period with specific scope. **[SPME5]**	END USERS' HIGH PROJECT DEMAND	**PROJECT CHALLENGES**
Management and coordination of professionals is non-existent. **[SPME9]**	LACK OF PROFESSIONAL MANAGEMENT AND COORDINATION	
The Department had a disclaimer audit opinion in the last financial year, but it has improved continuously and we have to improve the processes and systems (audit opinion). **[CFOE]**	AUDITING DEFICENCIES	
To pay them enough salary not to be attracted by the private sector. **[SPME10]**	INSUFFICENT SALARY TO DPW PROFESSIONALS	**FINANCIAL CHALLENGES**
The Department does not have funds (budget). Budget is sitting with the Client Departments. **[SPME3]**	BUDGET ALLOCATION TO CLIENT DEPARTMENTS	

In general the Department is delivering, but more training has to be done to improve service delivery. **[HRME]**	MORE STAFF TRAINING	**HUMAN RESOURCES CHALLENGES**
The HOD is not a construction specialist but rather an accountant by profession. **[DDGE]**	INCOMPETENT PROFESSIONALS	
Lack of professional personnel delays the processes. **[SPME3]**	LACK OF IN-HOUSE PROFESSIONALS	
The Department does not have professional internal project managers. The in-house project managers are just people who are assigned to run the projects. **[SPME6]**	INEXPERIENCED INTERNAL PROJECT MANAGERS	
Most of the Department professionals have diplomas and few have preferred qualifications (degrees). Only a handful of Department professionals are registered personnel with their professional bodies. **[SPME6]**	UNQUALIFIED PERSONNEL	
The Department has only one registered architect and same person has to manage drawings for all projects and is too much to handle. **[SPME6]**	INSUFFICIENT IN-HOUSE ARCHITECTS	
To have the drawings approved is very hard, e.g. even the electrical engineer is not registered with his professional body. **[SPME6]**	LACK OF QUALIFIED IN-HOUSE REGISTERED ENGINEERS	
Project managers need to be taken for further training to be able to manage projects. **[SPME6]**	PROJECT MANAGERS' TRAINING	
In-house projects are difficult to earn as the Department has no in-house professionals (especially, Quantity Surveyors). **[SPME6]**	LACK OF IN-HOUSE PROFESSIONALS	

The Department of Public Works does not have capacity in-house to perform its mandate because of limited professionals. **[SPME9]**	INSUFFICIENT IN-HOUSE PROFESSIONALS	**HUMAN RESOURCES CHALLENGES**
Attraction of the appropriate skilled people is a concern. **[SPME9]**	ATTRACTION OF SKILLED PROFESSIONALS	
To capacitate the Department or public sector with the built environment qualified registered professionals with different built environment council employees.**[SPME10]**	LACK OF RECRUITMENT OF QUALIFIED PROFESSIONALS	
To look into contracts that are used in infrastructure in a public sector that always favours the private sector. **[SPME10]**	UNBALANCE CONTRACTUAL ARRANGEMENTS	
Review of supply chain process in order to shorten the process, as it takes a long time in current situation. **[SPME7]**	LONG SUPPLY CHAIN PROCESSES	**SUPPLY CHAIN CHALLENGES**
Supply chain processes should also be evaluated due to the lengthy time it takes to award projects. **[SPME8]**	LENGHTY SUPPLY CHAIN PROCESSES	
Performance is hampered by bureaucratic environment. **[SCME]**	COMPLICATED ADMINISTRATIVE PROCEDURE	**DECISION MAKING CHALLENGES**

TABLE VI

RESPONSES TO OPEN-ENDED QUESTIONAIRE FROM HEADS OF OPERATIONAL UNITS IN PROVINCE F

Responses to open-ended questionnaire	**Emerging patterns /concepts**	**Broder category of themes**
Public sector clients (DPW) tend to take advantage of inefficiencies in government by trying to benefit more from projects. **[HODF]**	'DPW' OPPORTUNISTIC BEHAVIOURS	**PROJECT CHALLENGES**
I think all of the challenges that are encountered during the project delivery processes can be averted through proper planning during or before the procurement phase. **[CFOF]**	LACK OF STRATEGIC AND INTERNAL PLANNING SESSIONS	**PLANNING CHALLENGES**
In section C, project design is an outsourced function and as such the Department does not fully engage in complete project designs, but, however, they are involved in project reviews and checks. The reason why the architects' ability with regards to functionality, stability, aesthetics and economy is unsure because the Department outsources the architectural design to external consultants due to incapacitation in the Department. **[SPMF4]**	LACK OF IN-HOUSE ARCHITECTS/DESIGNERS	**DESIGN CHALLENGES**
NEEDS ANALYSIS should be properly defined **[CFOF]**	IDENTIFICATION OF HUMAN ELEMENTS ON REQUIREMENTS	**BRIEFING CHALLENGES**
Define clear specifications outlined. **[CFOF]**	NEED CLEAR SPECIFICATION	**SUPPLY CHAIN CHALLENGES**
Both the duties of contractors and consultants should be clearly defined. **[CFOF]**	OUTLINE SERVICE PROVIDERS' ROLE	

Proper funding of projects is very critical. **[CFOF]**	INSUFFICENT PROJECT FUNDING	**FINANCIAL CHALLENGES**
The issue of training and skills transfer is also very critical. **[CFOF]**	LACK OF TRAINING/SKILLS' TRANSFER	
The issue of shortage of professionals **[CFOF]**	SHORTAGE OF PROFESSIONALS	
Lack of technical skills also sacrifices the quality of some projects. **[CFOF]**	LACK OF TECHNICAL SKILLS	
The inadequate pool of the built environment professionals is the most critical challenge in attracting and retaining professionals. **[HRMF]**	LACK OF RECRUITMENT OF BUILT ENVIRONMENT PROFESSIONALS	**HUMAN RESOURCES CHALLENGES**
A number of professionals post remain vacant for a longer period, and that impact negatively on infrastructure delivery performance. **[HRMF]**	VACANT PROFESSIONAL POSTS ON DPW ORGANOGRAM	
User Departments do not approve some of the projects within the stipulated time (21 working days) and this result on contractors claiming C.O.T. because of the delays. **[SPMF5]**	DELAY WITH PROJECT APPROVALS	**DECISION MAKING CHALLENGES**

TABLE VII

RESPONSES TO OPEN-ENDED QUESTIONAIRE FROM HEADS OF OPERATIONAL UNITS IN PROVINCE G

Responses to open-ended questionnaire	Emerging patterns/concepts	Broder category of themes
Working in silos: there are some activities that are of a nature that decisions should be made by a collective one, such activity is planning. Sometimes mistakes do happen where projects are omitted or budgets erroneously omitted in the plans since the planning circle is not taken seriously or left until the last minute then forcing the responsible person to send a plan that was not carefully perused just for compliances purposes. **[DDGG]**	PLANNING DEFICENCIES	**PLANNING CHALLENGES**
The HOD is not a construction related professional but an accountant by training. **[DDGG]**	IMPROPER PLACEMENT OF PROFESSIONALS	**HUMAN RESOURCES CHALLENGES**
Lack of or insufficient technical capacity of in-house professionals/project managers. **[DDGG]**	INSUFFICIENT IN-HOUSE PROFESSIONALS	
The Department has over time (more than 5 years) struggled to recruit and retain suitably qualified and professionally registered technical personnel. **[DDGG]**	LACK OF RECRUITMENT OF QUALIFIED PROFESSIONALS	
Poor morale and unmotivated staff. The personnel are always over worked since most of the posts on the organizational structure are vacant. Sometimes one has to carry out duties of 4 to 5 people since we operate on a skeletal structure. **[DDGG]**	OVERWORKING OF PERSONNEL	
We are in short of technical professionals in our department including project managers. **[SPMG1]**	SHORTAGES OF TECHNICAL PROFESSIONALS/ PROJECT MANAGERS	

We do not have any registered professional in our department. **[SPMG2]**	LACK OF QUALIFIED PROFESSSIONALS	
Lack of technical skills transfer from the external service providers towards professional registration of in-house personnel (despite the activity forming part of the terms of reference of the external service provider or consultant). **[DDGG]**	LACK OF TECHNICAL SKILLS' TRANSFER FROM EXTERNAL CONSULTANTS TO DPW PROFESSIONALS	
Reluctance for further educational development and learning from each other's skills. Project managers sometimes get to a mistake of not further developing themselves (comfort zone) thinking that because they are long in the position and they are well-experienced. The department is using external service providers (consulting firms) to manage projects and programmes. By so doing, it is to close the gaps in the project and programme management. **[DDGG]**	EXPERIENCE PREFERED THAN EDUCATIONAL DEVELOPMENT	**HUMAN RESOURCES CHALLENGES**
The project management unit (PMU) may have professional people in their structure (1 or 2) and generally also appoints young technicians and engineers who still need some training and experience. This makes decision taking a long process since this young person cannot decide immediately and has to consult first with his/ her supervisor. **[DDGG]**	USE OF INEXPERIENCED EXTERNAL CONSULTANTS	
The Department should have managers who are technically enlightened as well as financial managers for procurement. **[SPMG6]**	NEED SKILLED TECHNICAL AND FINANCIAL MANAGERS	
To improve on project process. **[SPMG3]**	IMPROVING PROJECT PROCESS	**PROJECT CHALLENGES**

Lack of submission of infrastructure programme management plan (IPMP) on time to enable the Department to start with feasibility study. **[SPMG3]** In supply chain management section, many a times blame is laid on supply chain management committees where there is lack of or slow performance in implementation of various infrastructure projects. **[DDGG]** Ineffective monitoring and supervision of projects by professionals on site: to contractual issues such as claims, the use of contingency funds, variation orders, extension on time, increase of scope, etc. **[DDGG]** Community disruption also causes problems and delays on various projects. These would be mostly in the form of job-seeking complaining of pay-rates, unfair treatment by the contractors, lack of training on the projects, payment/compensation to and owners for the use borrow materials, etc. **[DDGG]** Late payment occurs mainly due to the processes up till payment stage. **[SPMG1]** Tracking system of payments for service providers must be in place and be effective. **[SPMG3]** Budget for all projects done by the Department on behalf of Client Departments must be forwarded to the Department of Public Works and roads to minimise the delays. **[SPMG3]** Late payments to contractors delay progress of ongoing	LACK OF INTERNAL PLANNING SESSION TO FACILITATE FEASIBILITY STUDY SLOW PROJECT IMPLEMENTATION INEFFECTIVE PROJECT MONITORING AND SUPERVISION CONFLICT OF INTEREST WITH THE COMMUNITY LATE PAYMENT PROCESS INEFFECTIVE PAYMENT SYSTEMS LONG PAYMENT PROCESS LATE PAYMENT FACTOR	**PLANNING CHALLENGES** **PROJECT CHALLENGES** **FINANCIAL CHALLENGES**

projects. **[SPMG4]** Too many signatures delay payments to the contractors. **[SPMG5]** The end-users equally carry the blame because they send documents with a lot of mistakes and when they are sent back to effect corrections; people take it as a reason for unnecessary delays instead of compliance with necessary supply chain regulations. **[DDGG]**	LONG DECISION MAKING PROCESS POOR DOCUMENTATION BY END-USERS	**DECISION MAKING CHALLENGES** **DOCUMENTATION CHALLENGES**

TABLE VIII

RESPONSES TO OPEN-ENDED QUESTIONAIRE FROM HEADS OF OPERATIONAL UNITS IN PROVINCE H

Responses to open-ended questionnaire	Emerging patterns /concepts	Broder category of themes
There is an overload of projects per in-house professionals as the Department is understaffed in terms of construction industry professionals. Professionals not keen to work for the government. **[SPMH8]**	PROJECT OVERLODDING	**PROJECT CHALLENGES**
Late payment factors should relate to before and after the submission of the invoices or payment certificates. **[CFOH]**	LATE PAYMENT FACTORS DUE TO LATE INVOICES AND CERTIFICATES	**FINANCIAL CHALLENGES**
The HRM unit is constantly sending professionals (project managers) for courses, summits and workshops to develop their skills and acquire continuing professional development (CPD) points**. [HRMH]**	PROJECT MANAGERS' PROFESSIONAL DEVELOPMENT	
Projects managers should work towards registering with their professional bodies like the South African Council for the Project and Construction Management Professions). **[HRMH]**	THE NEED FOR PROFESSIONALISM	**HUMAN RESOURCES CHALLENGES**
The professionals within the Department are not sufficiently resourced to handle projects in-house and have to really on professional service providers to execute projects on their behalf. **[SPMH1]**	INSUFFICIENT IN-HOUSE HUMAN RESOURCES	
Need more extensive training. **[SPMH2]**	NEED STRATEGIC TRAINING	
There is high shortage of skilled personnel. **[SPMH2]**	SHORTAGES OF SKILLED PERSONNEL	

The Department should always appoint skilled contractors and consultants. **[SPMH7]** The public sector clients (DPW) are helpful and reliable in terms of making it easy for service providers to perform their duties. Sometimes, it is difficult to deal with in terms of decision making. **[SPMH6]**	NEED TO APPOINT SKILLED SERVICE PROVIDERS DECISION MAKING CHALLENGES WITH SERVICE PROVIDERS	**SUPPLY CHAIN CHALLENGES** **DECISION MAKING CHALLENGES**

TABLE IX

RESPONSES TO OPEN-ENDED QUESTIONAIRE FROM HEADS OF OPERATIONAL UNITS FROM PROVINCE I

Responses to open-ended questionnaire	Emerging patterns/concepts	Broder category of themes
The key weaknesses of the User Departments lie in the quality and comprehensiveness of strategic briefs. **[DDGI]**	WEAK CLIENT STRATEGIC BRIEFING	**BRIEFING CHALLENGES**
User requirements are not fully understood. **[DDGI]**	UNCLEAR CLIENTS' BRIEFING	
Funding is released by the Provincial Treasury approximately every second week only. If certificates of payments are received late, a payment date can be missed due to verification process of the payment leading to payments after 30 days. Funding is released based on the cash flow forecast for the vote as a whole taking account of all projects. Funding is therefore not released per individual project. The financial unit is not part of the project team. The project team consists of professional technical staff (architects, quantity surveyors, engineers, etc.). The financial unit pays the invoices prepared by the project team and monitors financial and budget performance per project. **[CFOI]**	PROJECT FUNDING PROCEDURES	**FINANCIAL CHALLENGES**
The Department does provide bursaries to professionalise the financial and built environment, and also has a bursary programme for underprivileged students. **[CFOI]**	BURSARIES FOR PROFESSIONAL DEVELOPMENT	
User departments' budgets are frequently unrealistic. **[DDGI]**	END-USER UNREALISTIC BUDGETS	
The delay in contractors' cash flows impact negatively on the delivery of projects. **[SPMI4]**	DELAY WITH CONTRACTORS' CASH FLOW	

There is a common presumption that National Policies and Strategies are aligned and synchronised. This is not the case. **[SCMI]**	MISUNDERSTANDING OF NATIONAL POLICIES AND STRATEGIES	**POLICY CHALLENGES**
Firstly, Provinces need to interpret these Policies and then apply the rules. This causes lack of uniformity in the implementation process. **[SCMI]**	LACK OF UNIFORMITY IN POLICY IMPLEMENTATION PROCESSES	
Secondly, all government objectives cannot become a "procurement burden". It causes the cost of compliance to sky rocket. Compliance requires time; time has a cost implication, and thus an efficiency implication. There must be a balance between compliance, overregulation and performance. **[SCMI]**	LACK OF BALANCE BETWEEN ROLES AND PERFORMANCE	
There must be an improvement regarding control measures with regards to procurement processes in terms of appointing service providers. However, investigation exercise must be undertaken before appointing service providers, by so doing will eliminate a number of cancellations and will improve service delivery. **[SPMI1]**	LACK OF CONTROL MEASURES DURING SERVICE PROVIDERS' APPOINTMENT	**SUPPLY CHAIN CHALLENGES**
Internal control measures are inexistence regarding PFMA. However, procurement strategies must be improved in the light of key prerequisites of the built environment service providers to protect the industry. **[SPMI1]**	LACK OF INTERNAL CONTROL MEASURES DURING PROCUREMENT PROCESSES	
Also the amount of time spent in producing documentation and getting the design approved during the planning session/phase is too long. **[SPMI5]**	LENGHTY DOCUMENTATION PROCESSES	**DOCUMENTATION CHALLENGES**
Also the process of design approvals is too long **[SPMI5]**	LONG DESIGN APPROVALS PROCESS	**DESIGN CHALLENGES**

Therefore, if we can reduce the amount of time spend during planning stages, we can move ahead. **[SPMI5]**	LONG PLANNING PROCESSES	**PLANNING CHALLENGES**
There are shortages of professional staff in the built environment and financial environment. **[CFOI]**	SHORTAGES OF BUILT ENVIRONMENT PROFESSIONALS	
Increase capacity on professional service component. **[SPMI2]**	SERVICE PROVIDERS' CAPACITY	
Government failed to attract new engineers and other professionals to the public service because they are being hired on contract/temporary basis and this result in government loosing these professionals to the private sector. New engineers, QS, etc. must be permanently hired to motivate him/her to stay in government. **[SPMI3]**	LACK OF MOTIVATION FOR PROFESSIONALS TO JOINT PUBLIC SERVICE	
Lack of capacity from consultants and inexperienced in-house professionals thereof affects the delivery and quality of projects. **[SPMI4]**	CONSULTANTS AND IN-HOUSE PROFESSIONALS INCAPACITATION	**HUMAN RESOURCES CHALLENGES**
Efficiency due to the yearly project load and the even distribution of team members within the Department is most often the cause of projects being executed. I believe once the post of the new structure is adequately filled then production of and execution of projects would double up. **[SPMI5]**	INADEQUATE STAFF ON 'DPW' ORGANOGRAM	
Currently within the Department we don't have enough professionals to manage the current workload which increases on yearly bases due to the demand being placed on health and education infrastructure. Until the staffing issue is addressed we will always be lacking behind in terms of production. **[SPMI5]**	INSUFFICIENT IN-HOUSE PROFESSIONALS	

APPENDIX C3 Challenges/issues emanating from from open-ended responses

Table I Briefing issues

Respondents comments	Emerging concepts	Category of theme
Public sector clients do not always communicate exact infrastructure needs. **[HODB]**	INSUFFICIENT CLIENT BRIEFING	**BRIEFING CHALLENGES**
The key weaknesses of the User Departments lie in the quality and comprehensiveness of strategic briefs**. [DDGI]**	CLIENT DEPARTMENTS WEAK STRATEGIC BRIEFING	
Users' needs are not fully understood. **[DDGI]**	UNCLEAR USERS' BRIEFING	
User Department mostly are having high expectations and demand more than what the scope is called for**. [CFOF]**	USERS' HIGH PROJECT DEMAND	
NEEDS ANALYSIS should be properly defined. **[CFOF]**	IDENTIFICATION OF HUMAN ELEMENTS ON REQUIREMENTS	

Table II Design issues

Respondents comments	Emerging concepts	Category of theme
The processes for design approvals are too long. Even though there is a significant amount of changes made during the construction phase. **[SPMI5]**	LONG DESIGN APPROVAL PROCESSES	**DESIGN CHALLENGES**
At times you find User Departments after approving plan tend to make changes to a construction that has already started which then creates a challenge for Department of Public Works to now make fresh plan and these changes via a variation order**. [SCMD]**	DESIGN CHANGES/VARIATION	
The reason why the architects' ability with regards to functionality, stability, aesthetics and economy is unsure because the Department of Public Works outsources the architectural design to external consultants due to incapacitation in the Department. **[SPMF4]**	OUTSOURCING OF ARCHITECTURAL DESIGN	
In section C of the Questionnaire, project design is an outsourced function as such the Department of Public Works does not fully engage in complete project designs, but, however, they are involved in project reviews and checks. **[SPMF4]**	DESIGNS ARE OUTSOURCED	
Also the amount of time spent in getting the design approved is too long. **[SPMI5]**	LENGHTY DESIGN APPROVALS	

Table III Planning issues

Respondents comments	Emerging concepts	Category of theme
Our User Departments (Health & Education) tend not to plan their projects which then cause delays and put pressure on Department of Public Works**.** **[SCMD]**	LACK OF CLIENTS' STRATEGIC PLANNING SESSIONS	**PLANNING CHALLENGES**
I think all of the challenges that are encountered during the project delivery processes can be averted through proper planning during or before the procurement phase**.** **[CFOF]**	LACK OF STRATEGIC AND INTERNAL PLANNING SESSIONS	
Working in silos: there are some activities that are of a nature that decisions should be made by a collective one, such activity is planning. **[DDGG]**	LACK OF STRATEGIC AND INTERNAL PLANNING SESSIONS	
Sometimes mistakes do happen where projects are omitted or budgets erroneously omitted in the plans since the planning circle is not taken seriously or left until the last minute then forcing the responsible person to send a plan that was not carefully perused just for compliance purposes**.** **[DDGG]**	PLANNING DEFICIENCIES	
Lack of submission of infrastructure programme management plan (IPMP) on time to enable the Department to start with feasibility study**.** **[SPMG3]**	DELAY WITH INTERNAL PLANNING	
The amount of time spent during planning session/phase is too long. **[SPMI5]**	LENGHTY PLANNING PROCESSES	
To introduce the Asset Management Section (immovable and movable assets) i.e. User Management Plan and Custodian Management Plan. **[CFOE]**	NEED ASSET MANAGEMENT UNIT	
If we can reduce the amount of time spend during planning stages, we can move ahead. **[SPMI5]**	LONG PLANNING PROCESSES	

Table IV Project management issues

Respondents comments	Emerging concepts	Category of theme
We do not have project management unit in our Department. **[HODA]**	LACK OF PROJECT MANAGEMENT UNIT	**PROJECT MANAGEMENT CHALLENGES**
The number of projects allocated to an internal project manager will have an influence on overall performance of the projects. **[SPMA3]**	PROJECT PERFORMANCE	
To improve on project processes. All professional services report to these programme managers, therefore, they might have a clear view of reasons of poor/good project performance. **[SCMD]**	PROJECT PROCESSES	
In-house Quantity Surveyors monitor projects implementation in conjunction with external project managers. **[SPMF4]**	MONITORING PROJECT IMPLEMENTATION	
Work being done by professionals is more focused on project management as compared to actual technical aspects of the projects. This has negative consequences when technical staffs in the public sector apply for Professional Registration with their Professional Bodies or Councils. **[HRMC]**	LACK OF TECHNICAL ASPECT OF PROJECT MANAGEMENT	
Department of Public Works (DPW) is mandated to provide construction and property management for Provincial Clients Departments. **[SCMD]**	ACCOUNTABILITY FOR PROJECT DELIVERY	
Management and coordination of professionals is non-existent. **[CFOE]**	MANAGEMENT OF PROFESSIONALS	

Ineffective monitoring and supervision of projects by professionals on site: to contractual issues such as claims, the use of contingency funds, variation orders, extension on time, increase of scope, etc**. [DDGG]** "IDMS" need to be implemented fully to define approach and deliverables for any and every part-taker's roles and responsibilities to be adapted to ensure project flow**. [DDGB]** Community disruption also causes problems and delays on various projects: These would be mostly in the form of job-seekers complaining of pay-rates, unfair treatment by the contractors, lack of training on the projects, payment/compensation to and owners for the use borrow materials, etc. **[DDGG]** Client should understand that all projects are budgeted for a specific period with specific scope. Mostly clients are having high expectation and demand more than what the scope is called for. **[SPME5]** Public sector clients tend to take advantage of inefficiencies in government by trying to benefit more from the project. **[HODF]** Client department do not approve some of the projects within the stipulated time (21 working days) and this result on contractors claiming C.O.T. because of the delays. **[SPMF5]** There is an overloading of projects per in-house	INEFFECTIVE MONITORING AND SUPERVISION OF PROJECTS IMPLEMENTATION OF "IDMS" CONFLICT WITH THE COMMUNITY PROJECT DEMAND OPPORTUNISTIC BEHAVIOUR LATE PROJECT APPROVALS PROJECT OVERLODDING	

professionals as the department is understaffed in terms of professionals. Professionals are not keen to work for the government. **[SPMH8]** There is slow performance in implementation of various infrastructure projects. **[DDGG]**	SLOW PROJECT IMPLEMENTATION	

Table V Financial management issues

Respondents comments	Emerging concepts	Category of theme
Available budgets of User Departments are sometimes insufficient for infrastructure needs**. [HODB]**	INSUFFICIENT CLIENTS' BUDGETS	**FINANCIAL MANAGEMENT CHALLENGES**
User Departments are responsible for payments to service providers not DPW**. [HODB]**	USER PAYMENT RESPONSIBILITY	
Lack of enough budgets for training of professionals in the procurement profession**. [SCMB]**	LACK OF ENOUGH BUDGETS	
The Department of Public Works pays for registration of professionals**. [HRMB]**	FINANCING PROFESSIONAL DEVELOPMENT	
Public sector clients are let down by cash flows problems and in most instances by the communities they work in**. [SPMC2]**	CASH FLOWS PROBLEMS	
The Department of Public Works had a disclaimer audit opinion in the last financial year, but it has improved continuously and we have to improve the processes and systems (audit opinion**). [CFOE]**	AUDIT DEFICIENCIES	
To pay public sector clients enough salary not to be attracted by the private sector**. [SPME10]**	NEED FOR SALARY INCREASE	
Users should learn that all projects are budgeted for a specific period with specific scope. **[SPMC7]**	USERS' BUDGETS DETERMINES PROJECT SCOPE	
The Department of Public Works do not have funds (budgets). Budget is sitting with the User Departments	BUDGETS IS WITH CLIENT DEPARTMENTS NOT 'DPW'	

(Health and Education**). [SPME3]**		
Proper funding of projects is very critical**. [CFOF]**	NEED PROPER PROJECT FUNDING	
Late payment occurs mainly due to long processes during payment stages. **[SPMGI]**	LATE PAYMENT PROCESSES	
Tracking system of payments for service providers must be in place and effective**. [SPMG3]**	NEED EFFECTIVE PAYMENT SYSTEM	
Budgets for all projects done by the Department of Public Works on behalf of User Departments must be forwarded to the Department of Public Works to minimise delays. **[SPMG3]**	MINIMISE BUDGET DELAYS	
Late payments to contractors delay progress of ongoing projects**. [SPMG4]**	LATE PAYMENT PROCESSES	
Late payment factors should relate to before and after the submission of the invoices or payment certificates**. [CFOH]**	LATE PAYMENT FACTORS	
Funding is released by the Provincial Treasury approximately every second week only. If certificates of payments are received late, a payment date can be missed due to verification processes of the payment leading to payments after 30 day. **[CFOI]**	PROJECT FUNDING PROCESSES	
The Department of Public Works does provide bursaries to professionalize the financial and built environments, and also has a bursary programme for underprivileged students**. [CFOI]**	BUSARIES FOR PROFESSIONAL DEVELOPMENT	
The delay with contractors' cash flows impact negatively	DELAY WITH CASH FLOWS	

on the delivery of projects**. [SPMI4]**		
Funding is released based on the cash flows forecast for the vote as a whole taking account of all projects. Funding is therefore not released per individual project. **[CFOI]**	FUNDING RELEASE BASED ON CASH FLOWS FORECAST	
Budgets from User Departments (Health & Education) are frequently unrealistic**.[DDGI]**	CLIENT UNREALISTIC BUDGET	
The finance unit monitors financial and budget performance per project. **[CFOI]**	FINANCE AND BUDGET MONITORING	

Table VI Supply chain management issues

Respondents comments	Emerging concepts	Category of theme
Procurement is one of the serious challenges the Department is faced with. **[HODA]**	PROCUREMENT CHALLENGES	SUPPLY CHAIN MANAGEMENT CHALLENGES
Yes, our organogram does not meet the new Supply Chain Management structural requirements. **[SCMA]**	INSUFFICIENT SUPPLY CHAIN MANAGEMENT CADRES	
Procurement processes sometimes take long time. **[SPMA5]**	LONG PROCUREMENT PROCESSES	
Specialists' construction unit to be established for procurement**.** **[HODB]**	NEED TO ESTABLISH PROCUREMENT UNIT	
To improve on procurement process. **[SPMG3]**	IMPROVE PROCUREMENT PROCESS	
User Departments want to dictate which buildings they want to rent and the Department of Public Works has to follow the due Supply Chain Management processes to secure accommodation. **[SCMD]**	CHALLENEGS WITH SUPPLY CHAIN MANAGEMENT PROCESS	
To look into contracts that are used in infrastructure in a public sector this always favours the private sector. **[SPME10]**	CONTRACTURAL INEQUALITY	
Supply Chain Management processes should also be evaluated due to the lengthy time it takes to award projects. **[SPME8]**	LENGHTY CONTRACT AWARDING PROCESSES	
Review of Supply Chain Management process in order to shorten the process, as it takes long time in current situation. **[SPME7]**	LENGHTY SUPPLY CHAIN MANAGEMENT PROCESS	
In Supply Chain Management section, many a time's	SLOW PROJECT IMPLEMENTATION	

blame is laid on Supply Chain Management committees where there is lack of or slow performance in implementation of various infrastructure projects. **[DDGG]** Secondly, all government objectives cannot become a "procurement burden". It causes the cost of compliance to sky rocket. Compliance requires time; time has a cost implication, and thus an efficiency implication. **[SCMI]** There must be a balance between compliance, overregulation and performance. **[SCMI]** There must be an improvement regarding control measures with regards to procurement processes in terms of appointing service providers, however, investigation exercise must be undertaken before appointing service providers, by so doing will eliminate a number of cancellations and will improve service delivery. **[SPMI1]** Internal control measures are inexistence regarding PFMA. However, procurement strategies must be improved in the light of key prerequisites of the built environment service providers to protect the industry. **[SPMI1]** Both the duties of contractors and consultants should be clearly defined. **[CFOF]** The Department should always appoint skilled contractors and consultants. **[SPMH7]**	PROCUREMENT BURDEN LACK OF BALANCE IN PERSONNEL ROLES LACK OF CONTROL MEASURES DURING SERVICE PROVIDERS' APPOINTMENT LACK OF INTERNAL CONTROL MEASURES REGARDING 'PFMA' DEFINE SERVICE PROVIDERS' DUTIES APPOINT SKILLED SERVICE PROVIDERS	

'IDMS' need to be implemented fully to define approach and deliverables for any per-taker's roles and responsibilities to be adopted to ensure project flow. **[DDGB]** Need for clear specifications to be outlined for contractors. **[CFOF]** However, procurement strategies must be improved in the light of key prerequisites of the built environment service providers to protect the industry. **[SPMI1]**	PARTIAL IMPLEMENTATION OF "IDMS" OUTLINE QUALITY OF MATERIAL AND STANDARD OF WORKMANSHIP NEED TO IMPROVE PROCUREMENT STRATEGIES	

Table VII Decision making issues

Respondents comments	Emerging concepts	Category of theme
Too many signatures for payments approvals and that delays projects. **[SPMB6]**	LONG PAYMENT APPROVAL PROCESSES	**DECISION MAKING CHALLENGES**
Delays in dual decision making (i.e. on extension of time and variation orders) results in project delays and cost. **[SPMB4]**	DECISION MAKING DELAYS	
User Departments also tend to want to be included in the decision making processes in seeking for an accommodation; the Department does not allow this and lacks the permanent process on that Act. **[SCMD]**	DECISION MAKING CHALLENGES	
A lot of bureaucracy (long decision making processes). **[SPMD3]**	BUREAUCRACY	
The Department is having a vision in terms of capacitation, restructuring and performance in all units. **[HODA]**	VISION FOR IMPROVEMENT	
Performance is hampered by bureaucratic environment. **[SCME]**	BUREAUCRATIC ISSUES	
Too many signatures delay payments to service providers. **[SPMG5]**	DELAY WITH PAYMENT PROCESS	
Sometimes, User departments have difficulty with decision making. **[SPMH6]**	DECISION MAKING DIFFICULTIES	
User Departments do not approve some of the projects within the stipulated time (21 working days) and these results on contractors claiming C.O.T. because of the delays. **[SPME5]**	DELAY PROJECT APPROVALS	

Community disruption also causes problems and delays on various projects. These would be mostly in the form of job-seeking complaining of pay-rates, unfair treatment by the contractors, lack of training on the projects, payment/compensation to and owners for the use borrow materials, etc. **[DDGG]**	DECISION MAKING DIFFICULTIES	

Table VIII Documentation issues

Respondents comments	Emerging concepts	Category of theme
The amount of time spent in producing documentation is too long. **[SPMI5]**	LONG DOCUMENTATION PROCESSES	**DOCUMENTATION CHALLENGES**
The end-users equally carry the blame because they send documents with a lot of mistakes. **[DDGG]**	END-USERS' DOCUMENTATION MISTAKES	
The end-users take unnecessary documentation delays instead of compliance with necessary Supply Chain Regulations. **[DDGG]**	END-USERS' DOCUMENTATION DELAYS	

Table IX Policy issues

Respondents comments	Emerging concepts	Category of theme
There is a common presumption that National Policies and Strategies are aligned. **[SCMI]**	MISALIGNMENT OF NATIONAL POLICIES AND STRATEGIES	**POLICY CHALLENGES**
Lack of interpretation of Policies leads to lack of uniformity in the implementation processes. **[SCMI]**	LACK OF UNIFORMITY IN POLICY INTERPRETATION AND IMPLEMENTATION	

APPENDIX D1 Covering letter for survey questionnaires

COVER LETTER – SURVEY QUESTIONNAIRE

PROJECT TITLE**: INVESTIGATING PUBLIC SECTOR CLIENT PERFORMANCE IN SOUTH AFRICAN CONSTRUCTION PROCUREMNT**

Primary investigator: Mr. M. M. SAAD, BSc. Hons (Building), MSc (Construction Technology). Supervisor: PROF. RAYMOND NKADO, School of Construction Economics and Management, Faculty of Engineering and Built Environment, University of the Witwatersrand, Johannesburg. South Africa.

Dear research Participants

I wish to request your permission to take part in this research work.

This study proceeds from the premise that the dissatisfaction of public sector clients with the outcomes of construction projects stems from their objectives not being met by the industry. The South African construction industry plays a vital role in the economy and the overall development of the country's infrastructure at large. Specific objectives of this study are to:

1. Identify the key performance indicators for public sector clients in their procurement processes.
2. Assess and analyse the weaknesses and strengths associated with public sector clients' performance in project procurement.
3. Develop a methodical approach to measurement of client performance in the procurement processes, and ways of improving the client performance approaches.
4. Recommend implementable approaches to improving client performance in the public sector procurement processes.

If you decide to take part in the study, you will be required to complete the paper-based/on-line on the effectiveness and efficiency of public sector client performance during construction procurement processes. You will be asked to respond to questions regarding your opinions and experiences during delivery of construction projects. It should not take more than 20 minutes to complete it.

.The primary investigator, Mr. M.M. SAAD, can be contacted during office hours at Tel (011) 717- 7647, or on his cellular phone at 0722014999 or 0748659455. The supervisor, PROF. RAYMOND NKADO, can be contacted at 0824550637 or 0878088237.

APPENDIX D2 Formal consent letter

FORMAL CONSENT FORM

If you decide to take part in the study, you would be required to kindly do the following:

- Sign the informed consent form.
- Complete a questionnaire. You will be asked to respond to questions regarding your general experience on performance (i.e. effectiveness and efficiency) during procurement of construction projects. You will complete the questionnaire at your convenient time and place. It should not take you more than 20 minutes to complete the questionnaire.
- Participate in face to face interview. The structured interviews would be use and may have follow up questions where necessary. You will be required to provide your opinions and/or insights of the study theme during the discussion that will last for approximately 45 minutes. The researcher would like to audio-record the interview with your permission.

The interview transcript would be sent back to you for correction and approval before the data would officially be used by the researcher. The interviews and the questionnaire will be distributed to management staff (i.e. HODs, DDGs, CDs and Senior Project Managers) at National and all the 9 Provincial Departments of Public Works.

Please tick Questionnaire Yes ☐ No ☐ Interview Yes ☐ No ☐

Audio - record Yes ☐ No ☐

Research participant's name:
…….

Research participant's signature: …….....

Date: …….

APPENDIX E Semi- structured interview questions

SEMI-STRUCTURED INTERVIEWS CONDUCTED WITH THE HEADS OF DEPARTMENTS (HODs)

1. Could you describe your organisation structure, including the decision making processes?
2. How your organisation is internally organised to handle projects?
3. How do you receive project request from User Departments (e.g. Health and Education)?
4. Can you briefly explain your organisation's project delivery processes?
5. How would you rate your projects delivery processes? Excellent/Good/Poor?
6. What informed your rating?
7. Do legislative procedures lead to time and cost overruns during the project delivery processes? If yes, how?
8. Who prepares your briefs?
9. How do you receive the briefs from User Departments?
10. How your financial challenges are identified during the delivery processes?
11. Do you have sufficient in-house trained professionals and technical expertise to oversee or supervise all your projects?
12. Are these professionals fully represented on each project site? Is there a mechanism/template to monitor their participation on projects?
13. Do you think you have enough skills and expertise in your employees? Please explain.
14. What leads to delayed or late payment to service providers (contractors and your agents)?
15. Are you satisfied with the performance of your agents/representatives (e.g. consultants)?
    If not, please explain.
16. What are the causes of design changes and variations?
17. What procurement strategy or method do you implement on your projects and why?
18. What criteria do you use in choosing the most appropriate procurement strategy or method?
19. How do you choose procurement strategy or method (in-house or through experts' advice?

20. Can you explain how you receive your finances/budgets for projects?
21. Can you describe how you monitor and control your budgets?
22. How do you manage your financial risk during delivery processes?
23. What challenges generally do you experience during delivery processes?
24. Could you suggest generally the performance parameters of clients?
25. Could you suggest ways of improving your performance during delivery processes?
26. What areas do you think clients should put more effort on during the delivery processes

APPENDIX F1 SPSS statistical frequency analysis for HODs

Frequency Table

Province

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	National - RSA	1	11.1	11.1	11.1
	Gauteng	1	11.1	11.1	22.2
	Western Cape	1	11.1	11.1	33.3
	KwaZulu-Natal	1	11.1	11.1	44.4
	Mpumalanga	1	11.1	11.1	55.6
	Free State	1	11.1	11.1	66.7
	North West	1	11.1	11.1	77.8
	Limpopo	1	11.1	11.1	88.9
	Eastern Cape	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Internal planning unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	1	11.1	14.3	14.3
	good	2	22.2	28.6	42.9
	very good	3	33.3	42.9	85.7
	excellent	1	11.1	14.3	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Capital project unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	1	11.1	14.3	14.3
	good	2	22.2	28.6	42.9
	very good	3	33.3	42.9	85.7
	excellent	1	11.1	14.3	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Human resources management unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	2	22.2	28.6	28.6
	good	2	22.2	28.6	57.1
	very good	2	22.2	28.6	85.7
	excellent	1	11.1	14.3	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Supply chain management unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	2	22.2	28.6	28.6
	good	2	22.2	28.6	57.1
	very good	3	33.3	42.9	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Finance unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	1	11.1	14.3	14.3
	good	2	22.2	28.6	42.9
	very good	3	33.3	42.9	85.7
	excellent	1	11.1	14.3	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

The internal planning unit for high level planning of projects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	fairly satisfied	1	11.1	14.3	14.3
	slightly satisfied	4	44.4	57.1	71.4
	satisfied	1	11.1	14.3	85.7
	highly satisfied	1	11.1	14.3	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

The professional services unit for development of various designs (e.g. architectural, services, structural, etc.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	fairly satisfied	2	22.2	28.6	28.6
	slightly satisfied	2	22.2	28.6	57.1
	satisfied	2	22.2	28.6	85.7
	highly satisfied	1	11.1	14.3	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

The project management unit for the implementation of various operations at project sites

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	fairly satisfied	1	11.1	14.3	14.3
	slightly satisfied	4	44.4	57.1	71.4
	satisfied	1	11.1	14.3	85.7
	highly satisfied	1	11.1	14.3	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

The role of Treasury unit in releasing cash flows to DPW

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	slightly satisfied	2	22.2	28.6	28.6
	satisfied	4	44.4	57.1	85.7
	highly satisfied	1	11.1	14.3	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

The role of finance unit for payments to contractors, consultants, or suppliers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	fairly satisfied	1	11.1	14.3	14.3
	slightly satisfied	2	22.2	28.6	42.9
	satisfied	1	11.1	14.3	57.1
	highly satisfied	3	33.3	42.9	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

The ability to translate design on paper (e.g. architectural, engineering designs, etc.) to end product

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	slightly satisfied	4	44.4	66.7	66.7
	satisfied	1	11.1	16.7	83.3
	highly satisfied	1	11.1	16.7	100.0
	Total	6	66.7	100.0	
Missing	System	3	33.3		
Total		9	100.0		

The ability to set up work process flow for the implementation of proposed projects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	fairly satisfied	1	11.1	16.7	16.7
	slightly satisfied	4	44.4	66.7	83.3
	highly satisfied	1	11.1	16.7	100.0
	Total	6	66.7	100.0	
Missing	System	3	33.3		
Total		9	100.0		

The ability to work closely with relevant other internal units to share information and advice during construction processes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	slightly satisfied	3	33.3	50.0	50.0
	satisfied	2	22.2	33.3	83.3
	highly satisfied	1	11.1	16.7	100.0
	Total	6	66.7	100.0	
Missing	System	3	33.3		
Total		9	100.0		

The ability to monitor internal project managers' operations on site (e.g. to be able to make prompt/timely decisions on site issues)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	fairly satisfied	1	11.1	16.7	16.7
	slightly satisfied	3	33.3	50.0	66.7
	satisfied	1	11.1	16.7	83.3
	highly satisfied	1	11.1	16.7	100.0
	Total	6	66.7	100.0	
Missing	System	3	33.3		
Total		9	100.0		

The ability to monitor the in-house professionals (e.g. engineers, etc.) participation during site construction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	fairly satisfied	1	11.1	16.7	16.7
	slightly satisfied	2	22.2	33.3	50.0
	satisfied	2	22.2	33.3	83.3
	highly satisfied	1	11.1	16.7	100.0
	Total	6	66.7	100.0	
Missing	System	3	33.3		
Total		9	100.0		

Decision makers in contractor organisations not attending compulsory tender briefing session during tendering sessions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2	22.2	28.6	28.6
	good	5	55.6	71.4	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Neglect of supervision and monitoring of projects by the DPW internal project managers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	2	22.2	28.6	28.6
	good	3	33.3	42.9	71.4
	very good	2	22.2	28.6	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Insufficient briefing (needs/requirements) from DPW planning unit to the architect for design purposes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	1	11.1	14.3	14.3
	good	5	55.6	71.4	85.7
	very good	1	11.1	14.3	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

User departments' insufficient briefing on project needs/requirements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	good	6	66.7	85.7	85.7
	very good	1	11.1	14.3	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Insufficient capacity of DPW in-house technical professionals (e.g. architects, engineers, etc.) to supervise their projects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	1	11.1	14.3	14.3
	good	3	33.3	42.9	57.1
	very good	3	33.3	42.9	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Delayed cash transfer from Treasury for payments to contractors, suppliers, or consultants.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	1	11.1	14.3	14.3
	very poor	1	11.1	14.3	28.6
	good	4	44.4	57.1	85.7
	very good	1	11.1	14.3	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Ineffective handling of contingencies by DPW internal project managers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	2	22.2	28.6	28.6
	good	3	33.3	42.9	71.4
	very good	2	22.2	28.6	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Delayed response to variation orders by DPW internal project management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	1	11.1	14.3	14.3
	good	4	44.4	57.1	71.4
	very good	2	22.2	28.6	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Delayed payment of approved variation orders by the Treasury or end user department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	1	11.1	14.3	14.3
	very poor	2	22.2	28.6	42.9
	good	4	44.4	57.1	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Ineffective monitoring and supervision of projects by DPW in-house professionals (e.g. engineers, etc.) on their project sites

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	1	11.1	14.3	14.3
	good	3	33.3	42.9	57.1
	very good	3	33.3	42.9	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Incomplete documentation during the tendering stage by DPW procurement committees

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	1	11.1	14.3	14.3
	good	6	66.7	85.7	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Ineffective project monitoring and supervision by DPW internal project managers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	1	11.1	14.3	14.3
	good	4	44.4	57.1	71.4
	very good	2	22.2	28.6	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Ineffective and insufficient training and development of DPW in-house professionals (e.g. architects, engineers, QS, project managers)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	1	11.1	14.3	14.3
	good	4	44.4	57.1	71.4
	very good	1	11.1	14.3	85.7
	excellent	1	11.1	14.3	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Insufficient capacity of DPW appointed (external) technical professionals (e.g. architects, engineers, etc.) to supervise projects effectively

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	1	11.1	14.3	14.3
	good	5	55.6	71.4	85.7
	very good	1	11.1	14.3	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

Ineffective supervision of projects by DPW appointed (external) professionals (e.g. architects, engineers, etc.) on their project sites

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	1	11.1	14.3	14.3
	good	5	55.6	71.4	85.7
	very good	1	11.1	14.3	100.0
	Total	7	77.8	100.0	
Missing	System	2	22.2		
Total		9	100.0		

APPENDIX F2 SPSS statistical frequency analysis for DDGs

Frequency Table

Province

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	RSA National	1	11.1	11.1	11.1
	Gauteng	1	11.1	11.1	22.2
	Western Cape	1	11.1	11.1	33.3
	Kwa-Zulu Natal	1	11.1	11.1	44.4
	Mpumalanga	1	11.1	11.1	55.6
	Free State	1	11.1	11.1	66.7
	North West	1	11.1	11.1	77.8
	Limpopo	1	11.1	11.1	88.9
	Eastern Cape	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Using standardised briefing schedule to reach a common understanding with user departments on their briefs (needs/requirements)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	1	11.1	11.1	11.1
	good	3	33.3	33.3	44.4
	very good	4	44.4	44.4	88.9
	excellent	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Use the infrastructure development plans (IDPs) for planning of proposed projects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	11.1	11.1	11.1
	poor	2	22.2	22.2	33.3
	good	3	33.3	33.3	66.7
	very good	1	11.1	11.1	77.8
	excellent	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Apply user management plans (UMPs) during planning session on user departments needs/requirements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	good	6	66.7	66.7	66.7
	very good	1	11.1	11.1	77.8
	excellent	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Guide user departments on their technically needs/requirements relative to the project execution plan

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	1	11.1	11.1	11.1
	good	2	22.2	22.2	33.3
	very good	4	44.4	44.4	77.8
	excellent	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Advise the user departments on the cost of the proposed projects in relation to their budget allocation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	good	1	11.1	11.1	11.1
	very good	4	44.4	44.4	55.6
	excellent	4	44.4	44.4	100.0
	Total	9	100.0	100.0	

Advise user department on the completion duration/time of the projects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	good	1	11.1	11.1	11.1
	very good	4	44.4	44.4	55.6
	excellent	3	33.3	33.3	88.9
	44.00	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

The ability of DPW compliance committee to comply with pillars of procurement (fair, equitable, transparent, competitive and cost effective) during tendering processes as legislated

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	1	11.1	11.1	11.1
	very good	4	44.4	44.4	55.6
	excellent	4	44.4	44.4	100.0
	Total	9	100.0	100.0	

The input of procurement committees to tender advertising for contractor selection

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	1	11.1	11.1	11.1
	good	3	33.3	33.3	44.4
	very good	2	22.2	22.2	66.7
	excellent	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

The ability of bid evaluation committee to include professionals' reports (e.g. architects, engineers, etc.) in the adjudication processes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	1	11.1	11.1	11.1
	poor	1	11.1	11.1	22.2
	good	2	22.2	22.2	44.4
	very good	2	22.2	22.2	66.7
	excellent	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

The ability of DPW to form a steering committee comprising user departments, the community and DPW in-house professionals and consultants to oversee the delivery of projects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	4	44.4	44.4	44.4
	good	1	11.1	11.1	55.6
	very good	3	33.3	33.3	88.9
	excellent	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Check for outcome of environmental impact analysis (EIA) on the project

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	1	11.1	11.1	11.1
	good	5	55.6	55.6	66.7
	very good	2	22.2	22.2	88.9
	excellent	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Develop a schedule for site planning

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	good	6	66.7	66.7	66.7
	very good	2	22.2	22.2	88.9
	excellent	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Identify government land (e.g. national, provincial or municipality) for siting of projects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	good	7	77.8	77.8	77.8
	excellent	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Use the Medium Term Expenditure Framework (MTEF) for planning of proposed projects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	1	11.1	11.1	11.1
	good	5	55.6	55.6	66.7
	very good	2	22.2	22.2	88.9
	excellent	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Arrange for feasibility studies including the viability of project site

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	good	3	33.3	33.3	33.3
	very good	4	44.4	44.4	77.8
	excellent	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

The ability of the planning unit to establish a budget for the proposed projects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	1	11.1	11.1	11.1
	good	1	11.1	11.1	22.2
	very good	5	55.6	55.6	77.8
	excellent	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

The role of Premier's budgeting committee in project planning for the proposed projects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	22.2	22.2	22.2
	very poor	4	44.4	44.4	66.7
	good	1	11.1	11.1	77.8
	very good	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Attend to all queries raised during site meetings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	1	11.1	11.1	11.1
	poor	2	22.2	22.2	33.3
	good	1	11.1	11.1	44.4
	very good	5	55.6	55.6	100.0
	Total	9	100.0	100.0	

Monitor site development processes and programmes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	good	5	55.6	55.6	55.6
	very good	4	44.4	44.4	100.0
	Total	9	100.0	100.0	

Develop daily and weekly reports from the project for monthly management meetings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	2	22.2	22.2	22.2
	poor	2	22.2	22.2	44.4
	good	3	33.3	33.3	77.8
	very good	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Escalate issues raised that are beyond the internal project manager's capability to the senior project manager for deliberation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	2	22.2	22.2	22.2
	poor	2	22.2	22.2	44.4
	good	2	22.2	22.2	66.7
	very good	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

Check, verify and analyse the issues and forward to the senior managements for further consideration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	2	22.2	22.2	22.2
	poor	2	22.2	22.2	44.4
	good	2	22.2	22.2	66.7
	very good	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

The approach of DPW planning unit to receiving project request from user departments during briefing stages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than important	1	11.1	11.1	11.1
	important	2	22.2	22.2	33.3
	more than important	2	22.2	22.2	55.6
	very important	4	44.4	44.4	100.0
	Total	9	100.0	100.0	

The approach of DPW planning unit to working closely with the user departments to understand their needs/requirements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	important	2	22.2	22.2	22.2
	more than important	5	55.6	55.6	77.8
	very important	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Capability of DPW planning unit in advising user departments on their needs/requirements for design and implementation purposes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than important	1	11.1	11.1	11.1
	more than important	5	55.6	55.6	66.7
	very important	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

The ability of DPW planning unit to using the Infrastructure Development Plans (IDPs) to incorporate client's needs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	unsure	1	11.1	11.1	11.1
	important	2	22.2	22.2	33.3
	more than important	4	44.4	44.4	77.8
	very important	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

The ability of DPW planning unit to implementing user Management Plans (UMPs) to incorporate all needs/requirements during planning stages

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not important	1	11.1	11.1	11.1
	less than important	1	11.1	11.1	22.2
	important	2	22.2	22.2	44.4
	more than important	3	33.3	33.3	77.8
	very important	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

User departments' ability to explain their needs/requirements to DPW during planning sessions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	important	2	22.2	22.2	22.2
	more than important	4	44.4	44.4	66.7
	very important	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

The ability of user departments to incorporate Municipalities' needs/requirements in their briefing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not important	1	11.1	11.1	11.1
	less than important	1	11.1	11.1	22.2
	important	1	11.1	11.1	33.3
	more than important	2	22.2	22.2	55.6
	very important	4	44.4	44.4	100.0
	Total	9	100.0	100.0	

The ability of user departments to identify land owned by government (e.g. national, provincial or municipality) for project development

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than important	1	11.1	11.1	11.1
	important	1	11.1	11.1	22.2
	more than important	5	55.6	55.6	77.8
	very important	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

User departments' ability to indicate to DPW planning unit the size of proposed projects during planning sessions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not important	1	11.1	11.1	11.1
	important	2	22.2	22.2	33.3
	more than important	4	44.4	44.4	77.8
	very important	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

The ability of user departments to identify their needs through working closely with Municipalities and Councillors

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not important	1	11.1	11.1	11.1
	important	2	22.2	22.2	33.3
	more than important	4	44.4	44.4	77.8
	very important	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

User departments ability to establish and confirm funding through the Provincial Treasury unit for implementation of projects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	important	2	22.2	22.2	22.2
	more than important	2	22.2	22.2	44.4
	very important	5	55.6	55.6	100.0
	Total	9	100.0	100.0	

Poor interpretation of briefing (needs/requirements) by DPW planning unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	unsure	1	11.1	11.1	11.1
	totally disagree	3	33.3	33.3	44.4
	disagree	1	11.1	11.1	55.6
	neutral	2	22.2	22.2	77.8
	totally agree	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Poor briefing by user departments to DPW planning unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	unsure	1	11.1	11.1	11.1
	neutral	2	22.2	22.2	33.3
	agree	3	33.3	33.3	66.7
	totally agree	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

Increase in DPW or user departments requirements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	unsure	1	11.1	11.1	11.1
	neutral	2	22.2	22.2	33.3
	agree	2	22.2	22.2	55.6
	totally agree	4	44.4	44.4	100.0
	Total	9	100.0	100.0	

Appointment of new decision maker/political heads (e.g. 'MEC')

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	unsure	1	11.1	11.1	11.1
	totally disagree	2	22.2	22.2	33.3
	neutral	1	11.1	11.1	44.4
	agree	1	11.1	11.1	55.6
	totally agree	4	44.4	44.4	100.0
	Total	9	100.0	100.0	

Additional out-of-predefined scope of items required by user departments to be incorporated into the design during construction processes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	unsure	1	11.1	11.1	11.1
	neutral	2	22.2	22.2	33.3
	agree	2	22.2	22.2	55.6
	totally agree	4	44.4	44.4	100.0
	Total	9	100.0	100.0	

Poor design and costing solutions by external consultants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	unsure	1	11.1	11.1	11.1
	totally disagree	1	11.1	11.1	22.2
	disagree	1	11.1	11.1	33.3
	agree	4	44.4	44.4	77.8
	totally agree	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Decision makers in contractor organisations not attending compulsory tender briefing session during competitive tendering procedures

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	4	44.4	44.4	44.4
	sometimes	2	22.2	22.2	66.7
	always	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

Neglect of supervision of projects by the DPW internal project managers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	3	33.3	33.3	33.3
	rarely	2	22.2	22.2	55.6
	sometimes	3	33.3	33.3	88.9
	often	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Insufficient briefing (needs/requirements) from DPW planning unit to the design team for design development

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	2	22.2	22.2	22.2
	rarely	1	11.1	11.1	33.3
	sometimes	6	66.7	66.7	100.0
	Total	9	100.0	100.0	

User departments insufficient briefing (needs/requirements) to DPW planning unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	11.1	11.1	11.1
	sometimes	2	22.2	22.2	33.3
	often	6	66.7	66.7	100.0
	Total	9	100.0	100.0	

Insufficient capacity of DPW in-house technical professionals (e.g. architects, engineers, etc.) to supervise projects effectively

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	11.1	11.1	11.1
	rarely	1	11.1	11.1	22.2
	sometimes	4	44.4	44.4	66.7
	often	2	22.2	22.2	88.9
	always	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Insufficient capacity of DPW appointed (external) technical professionals (e.g. architects, engineers, etc.) to supervise projects effectively

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	unsure	1	11.1	11.1	11.1
	never	2	22.2	22.2	33.3
	rarely	1	11.1	11.1	44.4
	often	3	33.3	33.3	77.8
	always	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Delay with cash flows from Treasury unit for payment of contractors, consultants, etc.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	2	22.2	22.2	22.2
	rarely	2	22.2	22.2	44.4
	sometimes	1	11.1	11.1	55.6
	often	1	11.1	11.1	66.7
	always	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

Ineffective handling of contingencies by DPW internal project managers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	11.1	11.1	11.1
	rarely	2	22.2	22.2	33.3
	sometimes	6	66.7	66.7	100.0
	Total	9	100.0	100.0	

Delayed response to variation orders by DPW internal project managers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	11.1	11.1	11.1
	rarely	1	11.1	11.1	22.2
	sometimes	4	44.4	44.4	66.7
	often	1	11.1	11.1	77.8
	always	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Ineffective supervision of projects by DPW in-house professionals (e.g. architects, engineers, etc.) on their project sites

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	11.1	11.1	11.1
	rarely	4	44.4	44.4	55.6
	sometimes	3	33.3	33.3	88.9
	often	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Ineffective supervision of projects by DPW appointed external professionals (e.g. architects, engineers, etc.) on their project sites

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	2	22.2	22.2	22.2
	rarely	1	11.1	11.1	33.3
	sometimes	5	55.6	55.6	88.9
	often	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Weak monitoring and supervision of projects by DPW internal project managers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	11.1	11.1	11.1
	rarely	3	33.3	33.3	44.4
	sometimes	3	33.3	33.3	77.8
	often	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Ineffective and insufficient training and development of DPW in-house professionals (e.g. architects, Q/S, project managers)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	11.1	11.1	11.1
	rarely	4	44.4	44.4	55.6
	sometimes	1	11.1	11.1	66.7
	often	1	11.1	11.1	77.8
	always	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Ineffective strategic planning of works/activities by DPW planning unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	2	22.2	22.2	22.2
	rarely	4	44.4	44.4	66.7
	sometimes	1	11.1	11.1	77.8
	often	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Incomplete documentation during tendering processes by DPW procurement committees

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	11.1	11.1	11.1
	rarely	3	33.3	33.3	44.4
	sometimes	4	44.4	44.4	88.9
	often	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

APPENDIX F3 SPSS statistical frequency analysis for CFOs

Frequency Table

Province

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	RSA National	1	11.1	11.1	11.1
	Gauteng	1	11.1	11.1	22.2
	Western Cape	1	11.1	11.1	33.3
	Kwa-Zulu Natal	1	11.1	11.1	44.4
	Mpumalanga	1	11.1	11.1	55.6
	Free State	1	11.1	11.1	66.7
	North West	1	11.1	11.1	77.8
	Limpopo	1	11.1	11.1	88.9
	Eastern Cape	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Delay in cash flow processing by the Treasury unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	4	44.4	44.4	44.4
	rarely	4	44.4	44.4	88.9
	sometimes	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Weak monitoring and supervision of projects by DPW internal project managers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	unsure	2	22.2	22.2	22.2
	never	1	11.1	11.1	33.3
	sometimes	3	33.3	33.3	66.7
	usually	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

Disputes as a result of quality of work done by contractors

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	3	33.3	33.3	33.3
	sometimes	5	55.6	55.6	88.9
	usually	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

DPW internal project manager in dispute with consultants on certificate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	11.1	11.1	11.1
	rarely	5	55.6	55.6	66.7
	sometimes	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

DPW internal project managers delayed processing of invoices

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	unsure	2	22.2	22.2	22.2
	never	1	11.1	11.1	33.3
	rarely	4	44.4	44.4	77.8
	sometimes	1	11.1	11.1	88.9
	usually	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

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Due to bureaucracy (long decision making processes), e.g. payments gets approved by DPW, then Provincial Department of Finance and then to the Treasury

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	2	22.2	22.2	22.2
	rarely	2	22.2	22.2	44.4
	sometimes	3	33.3	33.3	77.8
	usually	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Monthly and quarterly reviews of expenditure and income

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	neutral	1	11.1	11.1	11.1
	good	5	55.6	55.6	66.7
	excellent	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

Electronic payment to contractors, suppliers, etc. by end user departments or the Treasury

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	1	11.1	11.1	11.1
	neutral	2	22.2	22.2	33.3
	good	5	55.6	55.6	88.9
	excellent	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Releasing funding based on each project cash flow projection

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	unsure	1	11.1	11.1	11.1
	poor	3	33.3	33.3	44.4
	good	3	33.3	33.3	77.8
	excellent	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Comparing expenditure on each project to the initial cash flows earlier submitted

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	neutral	4	44.4	44.4	44.4
	good	3	33.3	33.3	77.8
	excellent	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Releasing cash flows that actually originate from the project team

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	1	11.1	11.1	11.1
	poor	1	11.1	11.1	22.2
	neutral	3	33.3	33.3	55.6
	good	3	33.3	33.3	88.9
	excellent	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Financial issues identified during integrated (DPW and user departments) planning sessions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	1	11.1	11.1	11.1
	sometimes	2	22.2	22.2	33.3
	usually	2	22.2	22.2	55.6
	always	4	44.4	44.4	100.0
	Total	9	100.0	100.0	

Deficit/unforeseen mistakes in costing of projects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	11.1	11.1	11.1
	rarely	4	44.4	44.4	55.6
	sometimes	3	33.3	33.3	88.9
	usually	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Late disbursement of funds by the Treasury unit to DPW

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	2	22.2	22.2	22.2
	rarely	5	55.6	55.6	77.8
	sometimes	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Delay with budget submission from DPW and user departments to provincial department of finance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	2	22.2	22.2	22.2
	rarely	4	44.4	44.4	66.7
	sometimes	1	11.1	11.1	77.8
	usually	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Premiers' cabinet's delay with project approvals for funding purposes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	4	44.4	44.4	44.4
	rarely	2	22.2	22.2	66.7
	sometimes	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

Shortage of professional skills and expertise in finance unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	11.1	11.1	11.1
	rarely	2	22.2	22.2	33.3
	sometimes	3	33.3	33.3	66.7
	usually	2	22.2	22.2	88.9
	always	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Insufficient number of professionals in finance unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	11.1	11.1	11.1
	rarely	1	11.1	11.1	22.2
	sometimes	4	44.4	44.4	66.7
	usually	1	11.1	11.1	77.8
	always	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

A lack of qualification for effective performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	unsure	1	11.1	11.1	11.1
	never	1	11.1	11.1	22.2
	rarely	2	22.2	22.2	44.4
	sometimes	5	55.6	55.6	100.0
	Total	9	100.0	100.0	

Lack of training and development programmes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	3	33.3	33.3	33.3
	sometimes	3	33.3	33.3	66.7
	usually	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

Limited knowledge management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	11.1	11.1	11.1
	rarely	3	33.3	33.3	44.4
	sometimes	5	55.6	55.6	100.0
	Total	9	100.0	100.0	

Non-adherence to legislation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	2	22.2	22.2	22.2
	rarely	2	22.2	22.2	44.4
	sometimes	5	55.6	55.6	100.0
	Total	9	100.0	100.0	

Poor audit results or records

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	11.1	11.1	11.1
	rarely	1	11.1	11.1	22.2
	sometimes	5	55.6	55.6	77.8
	usually	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Unauthorised expenditure by finance officers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	4	44.4	44.4	44.4
	rarely	5	55.6	55.6	100.0
	Total	9	100.0	100.0	

Non-adherence to PFMA

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	2	22.2	22.2	22.2
	rarely	6	66.7	66.7	88.9
	sometimes	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

APPENDIX F4 SPSS statistical frequency analysis for SCM units

Frequency Table

Province

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	RSA National	1	11.1	11.1	11.1
	Gauteng	1	11.1	11.1	22.2
	Western Cape	1	11.1	11.1	33.3
	Kwa-Zulu Natal	1	11.1	11.1	44.4
	Mpumalanga	1	11.1	11.1	55.6
	Free State	1	11.1	11.1	66.7
	North West	1	11.1	11.1	77.8
	Limpopo	1	11.1	11.1	88.9
	Eastern Cape	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Possession of appropriate skills and technical expertise by in-house engineers, architects, QS, etc.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	unsure	1	11.1	11.1	11.1
	limited	1	11.1	11.1	22.2
	average	5	55.6	55.6	77.8
	above average	1	11.1	11.1	88.9
	sufficient	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Number of in-house skilled professionals (e.g. engineers, project managers, QS, architects, etc.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	unsure	1	11.1	11.1	11.1
	limited	3	33.3	33.3	44.4
	below average	2	22.2	22.2	66.7
	average	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

Remuneration packages for in-house technical professionals (e.g. engineers, QS, project managers, architects, etc.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	below average	1	11.1	11.1	11.1
	average	5	55.6	55.6	66.7
	above average	1	11.1	11.1	77.8
	sufficient	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Qualification of technical professionals (e.g. engineers, architects, QS, project managers, etc.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	below average	2	22.2	22.2	22.2
	above average	4	44.4	44.4	66.7
	sufficient	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

Representation of in-house professionals (e.g. architects, engineers, QS, etc.) on each project site

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	below average	1	11.1	11.1	11.1
	average	6	66.7	66.7	77.8
	above average	1	11.1	11.1	88.9
	sufficient	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Representation of internal project managers on each project site

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	limited	1	11.1	11.1	11.1
	below average	1	11.1	11.1	22.2
	average	5	55.6	55.6	77.8
	above average	1	11.1	11.1	88.9
	sufficient	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Work closely with external consultants to acquire skills and technical expertise

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not satisfied	1	11.1	11.1	11.1
	fairly satisfied	1	11.1	11.1	22.2
	slightly satisfied	3	33.3	33.3	55.6
	satisfied	3	33.3	33.3	88.9
	highly satisfied	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Engage with design teams during design process

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	unsure	1	11.1	11.1	11.1
	slightly satisfied	3	33.3	33.3	44.4
	satisfied	4	44.4	44.4	88.9
	highly satisfied	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Work closely with internal project manager on project site for enhancement of skills and technical expertise

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not satisfied	1	11.1	11.1	11.1
	fairly satisfied	1	11.1	11.1	22.2
	slightly satisfied	4	44.4	44.4	66.7
	satisfied	2	22.2	22.2	88.9
	highly satisfied	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

Go for professional training and short courses for performance improvement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not satisfied	1	11.1	11.1	11.1
	fairly satisfied	1	11.1	11.1	22.2
	slightly satisfied	2	22.2	22.2	44.4
	satisfied	4	44.4	44.4	88.9
	highly satisfied	1	11.1	11.1	100.0
	Total	9	100.0	100.0	

APPENDIX F5 SPSS statistical frequency analysis for HRM units

Frequency Table

Province

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Gauteng	10	16.1	16.1	16.1
	Western Cape	7	11.3	11.3	27.4
	Kwa-Zulu Natal	9	14.5	14.5	41.9
	Mpumalanga	7	11.3	11.3	53.2
	Free State	6	9.7	9.7	62.9
	North West	6	9.7	9.7	72.6
	Limpopo	10	16.1	16.1	88.7
	Eastern Cape	7	11.3	11.3	100.0
	Total	62	100.0	100.0	

Allocation of internal project managers on specific project site

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.6	1.6	1.6
	limited	5	8.1	8.1	9.7
	below average	15	24.2	24.2	33.9
	average	19	30.6	30.6	64.5
	above average	13	21.0	21.0	85.5
	sufficient	9	14.5	14.5	100.0
	Total	62	100.0	100.0	

DPW in-house professionals (e.g. architects, engineers, etc.) representation on project sites

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	limited	12	19.4	19.4	19.4
	below average	28	45.2	45.2	64.5
	average	13	21.0	21.0	85.5
	above average	7	11.3	11.3	96.8
	sufficient	2	3.2	3.2	100.0
	Total	62	100.0	100.0	

Maximum number of projects per in-house professional (e.g. architects, engineers, QS, etc.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	8	12.9	12.9	12.9
	limited	12	19.4	19.4	32.3
	below average	16	25.8	25.8	58.1
	average	14	22.6	22.6	80.6
	above average	5	8.1	8.1	88.7
	sufficient	7	11.3	11.3	100.0
	Total	62	100.0	100.0	

Representation of professionals in all professional service fields

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.6	1.6	1.6
	limited	21	33.9	33.9	35.5
	below average	21	33.9	33.9	69.4
	average	10	16.1	16.1	85.5
	above average	5	8.1	8.1	93.5
	sufficient	4	6.5	6.5	100.0
	Total	62	100.0	100.0	

Architect

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	3	4.8	4.8	4.8
	not satisfied	13	21.0	21.0	25.8
	fairly satisfied	14	22.6	22.6	48.4
	slightly satisfied	17	27.4	27.4	75.8
	satisfied	13	21.0	21.0	96.8
	highly satisfied	2	3.2	3.2	100.0
	Total	62	100.0	100.0	

Civil/Structural engineer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	4	6.5	6.5	6.5
	not satisfied	14	22.6	22.6	29.0
	fairly satisfied	18	29.0	29.0	58.1
	slightly satisfied	15	24.2	24.2	82.3
	satisfied	10	16.1	16.1	98.4
	highly satisfied	1	1.6	1.6	100.0
	Total	62	100.0	100.0	

Mechanical engineer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	13	21.0	21.0	21.0
	not satisfied	18	29.0	29.0	50.0
	fairly satisfied	14	22.6	22.6	72.6
	slightly satisfied	9	14.5	14.5	87.1
	satisfied	7	11.3	11.3	98.4
	highly satisfied	1	1.6	1.6	100.0
	Total	62	100.0	100.0	

Electrical engineer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	7	11.3	11.3	11.3
	not satisfied	15	24.2	24.2	35.5
	fairly satisfied	18	29.0	29.0	64.5
	slightly satisfied	12	19.4	19.4	83.9
	satisfied	9	14.5	14.5	98.4
	highly satisfied	1	1.6	1.6	100.0
	Total	62	100.0	100.0	

Functionality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	11	17.7	18.0	18.0
	not satisfied	8	12.9	13.1	31.1
	fairly satisfied	11	17.7	18.0	49.2
	slightly satisfied	16	25.8	26.2	75.4
	satisfied	12	19.4	19.7	95.1
	highly satisfied	3	4.8	4.9	100.0
	Total	61	98.4	100.0	
Missing	System	1	1.6		
Total		62	100.0		

Durability

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	11	17.7	18.0	18.0
	not satisfied	7	11.3	11.5	29.5
	fairly satisfied	15	24.2	24.6	54.1
	slightly satisfied	13	21.0	21.3	75.4
	satisfied	13	21.0	21.3	96.7
	highly satisfied	2	3.2	3.3	100.0
	Total	61	98.4	100.0	
Missing	System	1	1.6		
Total		62	100.0		

Aesthetics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	12	19.4	19.7	19.7
	not satisfied	9	14.5	14.8	34.4
	fairly satisfied	15	24.2	24.6	59.0
	slightly satisfied	12	19.4	19.7	78.7
	satisfied	10	16.1	16.4	95.1
	highly satisfied	3	4.8	4.9	100.0
	Total	61	98.4	100.0	
Missing	System	1	1.6		
Total		62	100.0		

Economy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	12	19.4	19.7	19.7
	not satisfied	9	14.5	14.8	34.4
	fairly satisfied	18	29.0	29.5	63.9
	slightly satisfied	11	17.7	18.0	82.0
	satisfied	8	12.9	13.1	95.1
	highly satisfied	3	4.8	4.9	100.0
	Total	61	98.4	100.0	
Missing	System	1	1.6		
Total		62	100.0		

Delay in cash flow processing by the Treasury unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	9	14.5	17.3	17.3
	never	12	19.4	23.1	40.4
	rarely	6	9.7	11.5	51.9
	sometimes	13	21.0	25.0	76.9
	often	7	11.3	13.5	90.4
	always	5	8.1	9.6	100.0
	Total	52	83.9	100.0	
Missing	System	10	16.1		
Total		62	100.0		

Weak monitoring and supervision of projects by DPW internal project managers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	3	4.8	5.8	5.8
	never	12	19.4	23.1	28.8
	rarely	15	24.2	28.8	57.7
	sometimes	12	19.4	23.1	80.8
	often	8	12.9	15.4	96.2
	always	2	3.2	3.8	100.0
	Total	52	83.9	100.0	
Missing	System	10	16.1		
Total		62	100.0		

Disputes as a result of quality of work done by contractors

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	5	8.1	9.6	9.6
	rarely	10	16.1	19.2	28.8
	sometimes	20	32.3	38.5	67.3
	often	12	19.4	23.1	90.4
	always	5	8.1	9.6	100.0
	Total	52	83.9	100.0	
Missing	System	10	16.1		
Total		62	100.0		

DPW internal project manager in dispute with consultants on certificate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	7	11.3	13.5	13.5
	rarely	13	21.0	25.0	38.5
	sometimes	21	33.9	40.4	78.8
	often	8	12.9	15.4	94.2
	always	3	4.8	5.8	100.0
	Total	52	83.9	100.0	
Missing	System	10	16.1		
Total		62	100.0		

DPW internal project managers delayed processing of invoices

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.6	2.0	2.0
	never	18	29.0	35.3	37.3
	rarely	13	21.0	25.5	62.7
	sometimes	9	14.5	17.6	80.4
	often	8	12.9	15.7	96.1
	always	2	3.2	3.9	100.0
	Total	51	82.3	100.0	
Missing	System	11	17.7		
Total		62	100.0		

Due to bureaucracy (long decision making processes), e.g. payments gets approved by DPW, then Provincial Department of Finance and then to the Treasury

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	3	4.8	5.9	5.9
	never	4	6.5	7.8	13.7
	rarely	6	9.7	11.8	25.5
	sometimes	11	17.7	21.6	47.1
	often	12	19.4	23.5	70.6
	always	15	24.2	29.4	100.0
	Total	51	82.3	100.0	
Missing	System	11	17.7		
Total		62	100.0		

APPENDIX F6 SPSS statistical frequency analysis for SPMs

Frequency Table

Questionnaire number

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	PM1	9	13.2	13.2	13.2
	PM10	2	2.9	2.9	16.2
	PM2	9	13.2	13.2	29.4
	PM3	9	13.2	13.2	42.6
	PM4	9	13.2	13.2	55.9
	PM5	9	13.2	13.2	69.1
	PM6	9	13.2	13.2	82.4
	PM7	6	8.8	8.8	91.2
	PM8	3	4.4	4.4	95.6
	PM9	3	4.4	4.4	100.0
	Total	68	100.0	100.0	

Province

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	National - RSA	10	14.7	14.7	14.7
	Gauteng	6	8.8	8.8	23.5
	Western Cape	7	10.3	10.3	33.8
	Kwa-Zulu Natal	9	13.2	13.2	47.1
	Mpumalanga	7	10.3	10.3	57.4
	Free State	6	8.8	8.8	66.2
	North West	6	8.8	8.8	75.0
	Limpopo	10	14.7	14.7	89.7
	Eastern Cape	7	10.3	10.3	100.0
	Total	68	100.0	100.0	

Allocation of internal project managers on specific project site

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.5	1.5	1.5
	limited	5	7.4	7.4	8.8
	below average	15	22.1	22.1	30.9
	average	23	33.8	33.8	64.7
	above average	13	19.1	19.1	83.8
	sufficient	11	16.2	16.2	100.0
	Total	68	100.0	100.0	

DPW in-house professionals (e.g. architects, engineers, etc.) representation on project sites

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	limited	12	17.6	17.6	17.6
	below average	28	41.2	41.2	58.8
	average	16	23.5	23.5	82.4
	above average	10	14.7	14.7	97.1
	sufficient	2	2.9	2.9	100.0
	Total	68	100.0	100.0	

Maximum number of projects per in-house professional (e.g. architects, engineers, QS, etc.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	9	13.2	13.2	13.2
	limited	12	17.6	17.6	30.9
	below average	16	23.5	23.5	54.4
	average	17	25.0	25.0	79.4
	above average	6	8.8	8.8	88.2
	sufficient	8	11.8	11.8	100.0
	Total	68	100.0	100.0	

Representation of professionals in all professional service fields

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.5	1.5	1.5
	limited	21	30.9	30.9	32.4
	below average	23	33.8	33.8	66.2
	average	12	17.6	17.6	83.8
	above average	6	8.8	8.8	92.6
	sufficient	5	7.4	7.4	100.0
	Total	68	100.0	100.0	

Architect

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	4	5.9	5.9	5.9
	not satisfied	13	19.1	19.1	25.0
	fairly satisfied	14	20.6	20.6	45.6
	slightly satisfied	21	30.9	30.9	76.5
	satisfied	14	20.6	20.6	97.1
	highly satisfied	2	2.9	2.9	100.0
	Total	68	100.0	100.0	

Civil/Structural engineer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	8.8	8.8	8.8
	not satisfied	14	20.6	20.6	29.4
	fairly satisfied	18	26.5	26.5	55.9
	slightly satisfied	17	25.0	25.0	80.9
	satisfied	12	17.6	17.6	98.5
	highly satisfied	1	1.5	1.5	100.0
	Total	68	100.0	100.0	

Mechanical engineer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	13	19.1	19.1	19.1
	not satisfied	18	26.5	26.5	45.6
	fairly satisfied	16	23.5	23.5	69.1
	slightly satisfied	11	16.2	16.2	85.3
	satisfied	9	13.2	13.2	98.5
	highly satisfied	1	1.5	1.5	100.0
	Total	68	100.0	100.0	

Electrical engineer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	7	10.3	10.3	10.3
	not satisfied	15	22.1	22.1	32.4
	fairly satisfied	19	27.9	27.9	60.3
	slightly satisfied	15	22.1	22.1	82.4
	satisfied	10	14.7	14.7	97.1
	highly satisfied	2	2.9	2.9	100.0
	Total	68	100.0	100.0	

Quantity surveyor

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	7	4.3	10.3	10.3
	not satisfied	15	18.1	22.1	32.4
	fairly satisfied	19	19.6	27.9	60.3
	slightly satisfied	15	29.4	22.1	82.4
	satisfied	10	21.4	14.7	97.1
	highly satisfied	2	5.4	2.9	100.0
	Total	68	100.0	100.0	

Functionality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	11	16.2	16.4	16.4
	not satisfied	8	11.8	11.9	28.4
	fairly satisfied	11	16.2	16.4	44.8
	slightly satisfied	20	29.4	29.9	74.6
	satisfied	14	20.6	20.9	95.5
	highly satisfied	3	4.4	4.5	100.0
	Total	67	98.5	100.0	
Missing	System	1	1.5		
Total		68	100.0		

Durability

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	11	16.2	16.4	16.4
	not satisfied	7	10.3	10.4	26.9
	fairly satisfied	16	23.5	23.9	50.7
	slightly satisfied	16	23.5	23.9	74.6
	satisfied	14	20.6	20.9	95.5
	highly satisfied	3	4.4	4.5	100.0
	Total	67	98.5	100.0	
Missing	System	1	1.5		
Total		68	100.0		

Aesthetics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	12	17.6	17.9	17.9
	not satisfied	10	14.7	14.9	32.8
	fairly satisfied	15	22.1	22.4	55.2
	slightly satisfied	14	20.6	20.9	76.1
	satisfied	12	17.6	17.9	94.0
	highly satisfied	4	5.9	6.0	100.0
	Total	67	98.5	100.0	
Missing	System	1	1.5		
Total		68	100.0		

Economy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	13	19.1	19.4	19.4
	not satisfied	9	13.2	13.4	32.8
	fairly satisfied	19	27.9	28.4	61.2
	slightly satisfied	14	20.6	20.9	82.1
	satisfied	8	11.8	11.9	94.0
	highly satisfied	4	5.9	6.0	100.0
	Total	67	98.5	100.0	
Missing	System	1	1.5		
Total		68	100.0		

Delay in cash flow processing by the Treasury unit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	10	14.7	17.2	17.2
	never	12	17.6	20.7	37.9
	rarely	9	13.2	15.5	53.4
	sometimes	14	20.6	24.1	77.6
	often	8	11.8	13.8	91.4
	always	5	7.4	8.6	100.0
	Total	58	85.3	100.0	
Missing	System	10	14.7		
Total		68	100.0		

Weak monitoring and supervision of projects by DPW internal project managers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	3	4.4	5.2	5.2
	never	14	20.6	24.1	29.3
	rarely	15	22.1	25.9	55.2
	sometimes	15	22.1	25.9	81.0
	often	9	13.2	15.5	96.6
	always	2	2.9	3.4	100.0
	Total	58	85.3	100.0	
Missing	System	10	14.7		
Total		68	100.0		

Disputes as a result of quality of work done by contractors

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	6	8.8	10.3	10.3
	rarely	12	17.6	20.7	31.0
	sometimes	22	32.4	37.9	69.0
	often	12	17.6	20.7	89.7
	always	6	8.8	10.3	100.0
	Total	58	85.3	100.0	
Missing	System	10	14.7		
Total		68	100.0		

DPW internal project manager in dispute with consultants on certificate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	7	10.3	12.1	12.1
	rarely	14	20.6	24.1	36.2
	sometimes	24	35.3	41.4	77.6
	often	9	13.2	15.5	93.1
	always	4	5.9	6.9	100.0
	Total	58	85.3	100.0	
Missing	System	10	14.7		
Total		68	100.0		

DPW internal project managers delayed processing of invoices

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	1.5	1.8	1.8
	never	21	30.9	36.8	38.6
	rarely	14	20.6	24.6	63.2
	sometimes	10	14.7	17.5	80.7
	often	8	11.8	14.0	94.7
	always	3	4.4	5.3	100.0
	Total	57	83.8	100.0	
Missing	System	11	16.2		
Total		68	100.0		

Due to bureaucracy (long decision making processes), e.g. payments gets approved by DPW, then Provincial Department of Finance and then to the Treasury

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	3	4.4	5.3	5.3
	never	4	5.9	7.0	12.3
	rarely	7	10.3	12.3	24.6
	sometimes	13	19.1	22.8	47.4
	often	13	19.1	22.8	70.2
	always	17	25.0	29.8	100.0
	Total	57	83.8	100.0	
Missing	System	11	16.2		
Total		68	100.0		