MODELLING TARGETED PROCUREMENT STRATEGIES AND RELATIONSHIP QUALITY CRITERIA INFLUENCING THE DEVELOPMENT OF SMALL CONTRACTORS IN SOUTH AFRICA

By

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Thesis Presented for the Degree of

DOCTOR OF PHILOSOPHY

in the

Department of Construction Economics and Management

UNIVERSITY OF CAPE TOWN
Faculty of Engineering and the Built Environment

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May, 2018

ABSTRACT

Targeted Procurement strategies are widely used in government contracts to achieve contractor performance and development objectives in the South African construction industry. However, there have been reports of poor performance and high attrition rate of contractors in contractor development programmes. There is little or no objective empirical evidence informing the implementation of SMC-friendly policies in South Africa. The study fundamentally set out to empirically validate the pre-existing assumption that targeting small and medium-sized contractors, and increasing their participation in government contracts stimulates their growth performance and development. The research further examines whether the quality of relationships in the project supply chain mediates the relationship between targeted procurement strategies used and contractor development.

An embedded mixed methods research approach was adopted, that primarily employed quantitative (survey) means of data collection, and supported by secondary qualitative data (focus group interview) which was conducted concurrently. A sample size of 307 contractors registered on Grades 3 to 6 of the Construction Industry Development Board (cidb) Register of Contractors that have executed targeted procurement projects and been part of a cidb-registered contractor development programme within a five-year period (2011 – 2015) constituted the focus of the research. Data collected was subjected to both descriptive and inferential statistical analyses. The empirical model developed was validated using partial least squares structural equation modelling (PLS-SEM) technique.

Findings from the study reveal that Targeted Procurement strategies influences the quality of relationships in the project supply chain, and is a statistically significant predictor of the growth performance and development of targeted contractors. Moreover, relationship quality emerged to be an important mediator of the relationship between Targeted Procurement strategies and contractor development. These findings demonstrate that Targeted Procurement has the potential to achieve its intended results of improving the performance and development of historically disadvantaged contractors where the quality of relationships in the project supply chain has significant elements of trust, communication, collaboration, joint problem-solving and risk allocation.

The study contributes to the existing body of knowledge recognizing the importance of social and relational dimensions of inter-firm relationships within the context of project management

and particularly relating to public-sector procurement and small contractor development. The findings imply that the government as a key construction sector client should continue to invest in Targeted Procurement or affirmative action policies that benefit historically disadvantaged SME contractors. The recommendations made calls for the establishment of a framework on Targeted Procurement for ease of application by the government and accountability. This also implies further research into more measurable criteria for the proposed Targeted Procurement framework. The policy implication of the findings from this study is the need for policymakers, state entities, and public-sector client departments to recognise their role in shaping construction supply chains. They should encourage the design and implementation of strategies and policies that enable adequate relationship management to be entrenched in the supply chain, and consider including relationship management as a relevant criterion for participating in public contracts.

DECLARATION STATEMENT

I declare that the contents of this thesis signify my own work, except for the specific and acknowledged references to the published work of others made in the text. I declare that it contains neither material previously published, nor material submitted in parts or whole for the award of any other degree or qualification.

Signed: Signed by candidate

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(ADDABD001)

DEDICATION

This thesis is dedicated to God, Whose knowledge is all-encompassing and infinite…

ACKNOWLEDGEMENTS

PUBLICATIONS ARISING FROM THE THESIS

Five research articles have so far been produced from this PhD study, one journal article and four international conference papers. Adediran and Windapo (2016a) is a concept paper that ties together the research constructs and presents a conceptual framework for the PhD study, proposing a direct relationship between targeted procurement strategies (independent variable) relationship quality (intervening variable) and SMC development (dependent variable), as well as an indirect relationship between targeted procurement strategies and SMC development. Adediran and Windapo (2016b) examines the compliance of public sector client's contractor development programmes (CDPs) to the National Contractor Development Programme framework and concludes that there is low but rising compliance levels among the CDPs, with contributing factors ranging from internal technical and administrative factors to external political influences. The study served as a preliminary step towards selecting contractors within compliant CDPs – the population for the larger PhD study. Adediran and Windapo (2017a) examines the concept of relationship quality within the supply chain of construction projects, and established that a quantitative approach towards measuring the quality of relationship involves four relationship quality maturity levels (RQ1 to RQ 4) and 13 sub-criteria which was used as an evaluation tool for measuring relationship quality between SMCs and other project supply chain parties, towards addressing Research Objective One.

Adediran and Windapo (2017b) is exploratory and examines whether the type of relationship quality experienced by SMCs on targeted procurement projects interact with the implemented targeted procurement strategy to predict SMC development. Adediran and Windapo (2017b) revealed that relationship quality has a conditional effect on the targeted procurement–SMC development relationship, implying that varying levels of relationship quality (low or high) interacts with targeted procurement strategies to predict SMC development. The study also presented the first attempt to model causal relationships between Targeted Procurement strategies, SMC development, and relationship quality towards addressing Research Objectives Three and Four. Adediran and Windapo (2017c) presents the first empirical results emanating from the PhD research. Primarily addressing Research Objectives One and Two, the study established the associations between targeted procurement strategies, SMC development, and the relationship quality between SMCs and other project supply chain parties; and concluded that government intervention through targeted procurement has the potential to achieve its intended results of improving the position of historically disadvantaged SMCs in the

construction industry in South Africa, however targeted procurement strategies are implemented inappropriately by government clients to the detriment of the SME contractors.

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LIST OF ABBREVIATIONS AND ACRONYMS

AEC	Architectural, Engineering and Construction
AHP	Analytical Hierarchy Process
AMMR	Ambiguous Mixed Methods Research
AVE	Average Variance Extracted
B-BBEE	Broad-Based Black Economic Empowerment
BEE	Black Economic Empowerment
BIS	Department for Business, Innovation & Skills
BPiPG	Best Practice in Partnering Group
CB-SEM	Covariance-Based Structural Equation Modelling
CDP	Contractor Development Programme
CE	Civil Engineering
CETA	Construction Education and Training Authority
CFI	Comparative Fit Indices
cidb	Construction Industry Development Board
CIDB Malaysia	Construction Industry Development Board Malaysia
CII	Construction Industry Institute
DPW	Department of Public Works
DTI	Department of Trade and Industry
ECC	Engineering and Construction Contract
ECDP	Emerging Contractor Development Programme
EPWP	Expanded Public Works Programme
FIDIC	French Acronym For "International Federation of Consulting Engineers"
FLR	Full Likelihood Ratio Test
GB	General Building
GCC	General Conditions of Contract
GDP	Gross Domestic Product
GoF	Global Fit Measures
HDE	Historically Disadvantaged Enterprise
HDI	Historically Disadvantaged Individual

HRD	Human Resource Development
IMF	International Monetary Fund
IO	Industrial Organisation
JBCC	Joint Building Contracts Committee®
JV	Joint Venture
KMO MSA	Kaizer-Meyer-Olkin Measure of Sampling Adequacy
KPIs	Key Performance Indicators
MR	Multinomial Regression
MS	Mean Score
NCDP	National Contractor Development Programme
NEC	New Engineering Contract
NEP	New Economic Policy
OECD	Organisation for Economic Co-Operation and Development
OLR	Ordinal Logistic Regression
OLS	Ordinary Least Squares
PBA	Principal Building Agreement
PCA	Principal Components Analysis
PLS	Partial Least Squares
PLS-SEM	Partial Least Squares Structural Equation Modelling
PO	Proportional Odds
PPPFA	Preferential Procurement Policy Framework Act
PwC	PricewaterhouseCoopers
RDP	Reconstruction and Development Programme
RMSEA	Root Mean Square Error of Approximation
RO	Research Objectives
RoC	Register of Contractors
RQ	Relationship Quality
RSA	Republic of South Africa
SANS	South African National Standards
SCP	Structure-Conduct-Performance
SD	Standard Deviation
SEM	Structural Equation Modelling

SETA	Sector Education and Training Authorities
SFfC	Strategic Forum for Construction
SMC	Small and Medium-Sized Contractor
SME	Small and Medium-Sized Enterprise
SMME	Small, Micro and Medium-Sized Enterprise
SNA	Social Network Analysis
SOEs	State-Owned Enterprises
SPSS	Statistical Package for Social Sciences
StatsSA	Statistics South Africa
TFI	Tucker-Lewis Fit Indices
TPS	Targeted Procurement Strategies
UK	United Kingdom
UNCHS	United Nations Centre for Human Settlements - Habitat
UNCITRAL	United Nations Commission for International Trade Law
UNDP	United Nations Development Programme
US	United States
VIF	Variance Inflation Factor

CHAPTER ONE: GENERAL INTRODUCTION

1.1   INTRODUCTION

This chapter introduces the concepts and approach to the broader research theme, and sets the argument as the basis for the subsequent chapters. It first introduces the research constructs – Targeted Procurement, supply chain relationship quality, and company growth performance and development. A broad background to the study is then presented, and the contextual research problem is established. The research questions are posited, and the aim of the research with supporting objectives is presented as the main driver of the study. Study propositions, justification of the study, an overview of the methodology, and thesis structure are also presented.

1.2   BACKGROUND TO THE RESEARCH

Interacting with almost all spheres of human endeavour and having strong links with other sectors of the economy, the construction sector and its activities occupy a critical position that influences national strategic socio-economic development and improvement in the quality of life (Rwelamila, 2012). The construction industry in South Africa accounts for about 4% gross domestic product, R109 billion (real prices) value-added, and employs more than 1.38 million people (Statistics South Africa [StatsSA], 2016; 2017). Investment in infrastructure contributes to not only economic growth but also human development (Hawkins, 2012). Government's understanding of the construction industry's significant role in the economy is well-documented in the literature (London, 2008; Rwelamila, 2012; Shakantu, 2012). Implicitly, there has also been an increasing understanding of the need for the government to intervene in the construction industry that is largely dominated by albeit specialized, underperforming small and medium-sized enterprises (Latham, 1994; Egan, 1998; Wolstenholme, 2009; Department for Business, Innovation & Skills, [BIS], 2013).

There is considerable disparity to what constitutes a small and medium-sized enterprise (SME) in the literature. SMEs have generally been defined in terms of size – number of employees, annual turnover, and value of fixed assets (Elaian, 1996; Jordan et al., 1998; López and Aybar, 2000; Michaelas et al., 1999). SME definitions suffer from lack of universal applicability (Weston and Copeland 1998) with different definitions for industrialized and developing nations (Elaian, 1996). In South Africa, the most widely adopted framework is the definition of the National Small Business Amendment Act, No. 26 of 2003 which uses the number of

employees per enterprise size, combined with the annual turnover and the gross assets excluding fixed property. SMEs (excluding micro enterprises) in the construction industry in South Africa can be regarded as an actively trading business with 5 to 200 employees, an annual turnover of R200,000 to R26 million, and/or gross asset value of R100,000 to R5 million (National Small Business Amendment Act, No. 26 of 2003, 2003).

SMEs have long been recognised to play an important role as key drivers of economic growth (Abor and Quartey, 2010; Shakantu, 2012; Vosloo, 1994). For example, the South African architectural, engineering and construction (AEC) subsector, accounts for about 34.2% of total small business employment (Schüssler 2012), making it the second largest employer among SMEs. The sustained significance of construction SMEs (referred to henceforth as small and medium-sized contractors – SMCs) has led to the focus of government policies on promoting the advent of capable SMCs and supporting their continuous development and sustainability (Adediran and Windapo, 2016; Egan, 1998). Government presumes that the growth of an enterprise is related, to a large extent, to the opportunity and experience gained over time in the execution of works (South African National Standards [SANS], 2003). Consequently, targeting SMCs and increasing their contract participation rate, and by extension their rate of gain of experience, is one of the primary means of stimulating the growth of SMCs in the construction industry.

Preferential procurement policies such as Targeted Procurement are an important government intervention strategy for stimulating the development of SMEs in many countries including South Africa (Hawkins 2012; Watermeyer et al. 2001). By their definition, they promote secondary objectives additional to those associated with the immediate objective of the procurement itself, such as creating demand for the participation of targeted local enterprises and labour on public contracts in response to the objectives of the preferential procurement policy such as increased use of local resources, poverty alleviation and job creation (South African National Standards, 2003). However, these efforts do not guarantee increased organisational performance and success (cidb, 2012). Watermeyer (2003) and Letchmiah (2001) are of the view that certain types of prescriptive instruments that are available to government, for example, legislation, regulations, conditions of contract and set-aside schemes are not necessarily efficient, with questions being raised regarding their legitimacy and effectiveness. Moreover, reports suggest that such interventions have not improved the position of SMCs in a competitive construction industry (Dlungwana and Rwelamila 2004; Greyling

2012). Other relational aspects within the (targeted) procurement process are considered important, for example, the contracting parties' attitudes, and quality of working relationships (Ke et al. 2013; Sedita and Apa 2015).

Relationship quality provides an indication of the strength and effectiveness of relationships in project management (Jelodar et al. 2016). It is the degree of appropriateness of inter-firm relationships which can fulfil the end needs of construction companies in a project organisation. Construction industry projects can be viewed as a network of relationships between firms that make up the project supply chain (Pryke, 2006), and the Targeted Procurement process is made up of a network of supply chain relationships between targeted SMCs and other entities in the project supply chain. SMCs face many challenges, including difficulty in forging and managing multi-partner collaborations (Hoffmann and Schlosser, 2001) as well as genuine quality contracting relationships, which limit their ability to develop organisational and operational capacities (Kajimo-Shakantu, 2007). Relationship problems include lack of trust, onerous contract conditions and unfair loading of risk, unfair selection procedures, unfair payment procedures and failure to accept subcontractors as equal project partners, and the perceived poor status of specialist contractors (Fewings, 2005).

The Construction Industry Development Board (cidb) South Africa (2013) reported poor working relationships between subcontractors and prime contractors driven by tight profit margins, unfavourable payment practices, and lack of continuous work. This emphasizes the importance of proactively managing relationships in a construction project supply chain (Smyth and Edkins, 2007) to promote better working relationships among SMCs and other project stakeholders. However, despite the increasing use of relational contracting methods in the construction industry, Emuze and Smallwood (2014), Zou et al. (2014) and Wolstenholme (2009) reported that the problem of collaboration and poor working relationship still persist.

A large and growing body of literature (Davis, 2014; Jelodar et al. 2016; Jelodar et al. 2015; Meng, 2012; Mir and Pinnington, 2014; Svejvig and Andersen, 2015; Williams et al. 2015; Zou et al., 2014) in construction and project management research have examined the influence of relationship quality elements on project performance. Svejvig and Andersen (2015) and Davis (2014) found that projects are dynamic systems requiring agile and reciprocal relationships between stakeholders; Jelodar et al. (2015) and Meng (2012) established that systems, procedures, and methods thrive in suitable levels of relationship quality; Jelodar et al. (2016) posited that relationship quality and its attributes can be developed and enhanced

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through the procurement strategy in the construction industry; Mir and Pinnington (2014) also found that inter-organisational teamwork was an important project success factor; Williams et al. (2015) highlighted that effective agile project management is based on high levels of interaction, collaboration, responsiveness, and joint problem solving, and further contended that relationship quality is important for the development of such relational norms and behaviours throughout a project; Zou et al. (2014) reported that active client relationship management leads to better project performance as the relationship changed across project phases. The role of relationship quality in a firm's performance have also received some attention (Matinheikki et al. 2016). London and Kenley (2001) contend that improved relationships and integration of key construction stakeholders are critical to addressing the challenges of an "underperforming, inefficient, unproductive, fragmented and wasteful industry" (London and Kenley, 2001). However, most of the existing body of research emphasizes the importance of social and relational dimensions of inter-firm relationships and project networks in project management, with limited attention paid to the firm itself.

Moreover, most of the relevant studies previously undertaken in South Africa have generally focused on preferential procurement policy (for example, Gounden, 2000; Kajimo-Shakantu, 2007; Letchmiah, 2012), and there is substantial evidence to suggest that this policy has (a) successfully opened up the construction industry to SMCs with their contract-winning rate and market share increasing significantly (Letchmiah,, 2012; London, 2012; Manchidi and Harmond, 2002); and (b) promoted the development of business linkages between historically empowered firms and historically disadvantaged SMCs (Manchidi and Harmond, 2002). However, the implications of government intervention and support on the performance of individual firms remain to be fully explored, and attempts to measure the impact of Targeted Procurement on the growth and development of individual SMCs in South Africa remain inconclusive.

1.3   STATEMENT OF THE PROBLEM

Despite significant government efforts through demand side interventions such as Targeted Procurement to stimulate SMC development in South Africa, three out of five do not become established firms, thus failing to fulfil their developmental role in the economy. SMC-friendly policies are often implemented on the basis of anecdotal presumptions rather than empirical evidence. In addition, SMCs continue to find it difficult to form genuine quality relationships, which limits their ability to develop organisational and operational capacities. The impact of

government intervention through Targeted Procurement strategies on the development of SMCs is not known; and how and whether relationship quality influences the Targeted Procurement strategy–SMC development relationship is also not known. This creates an opportunity for further studies that fill the knowledge gap and provides objective empirical evidence on the relationship between Targeted Procurement strategies and SMC development, and whether the corresponding quality of relationships plays a mediating role in this relationship.

1.4   RESEARCH QUESTIONS

The main Research Question to be investigated in this study is:

What Targeted Procurement strategies influence the development of SMCs in the South African construction industry, and what contribution does the quality of supply chain relationships make to this development?

Further relevant Research Questions to be answered include:

1.   What Targeted Procurement strategies are commonly used as a mechanism for contractor development?

2.   What type and quality of supply chain relationships exist between SMCs and other project parties in the Targeted Procurement process?

3.   To what extent is there an association between the Targeted Procurement strategies, SMC development, and the relationship quality between SMCs and other project supply chain parties?

4.   What influence do Targeted Procurement strategies have on SMC development and on the relationship quality between SMCs and other project supply chain parties?

5.   What influence does the relationship quality between SMCs and other project supply chain parties have on SMC development?

What is the indirect influence of Targeted Procurement strategies on SMC development, through supply chain relationship quality as a mediating construct?

1.5   AIM AND OBJECTIVES OF THE RESEARCH

The aim of the study is to determine the Targeted Procurement strategies that influence the development of SMCs in the South African construction industry, and whether the quality of supply chain relationships between SMCs and other project parties play a mediating role in that development.

To achieve the above stated aim, the following Research Objectives (RO) are to be met:

RO1. Identify the Targeted Procurement strategies commonly used as a mechanism for contractor development and determine the quality of supply chain relationships between SMCs and other project parties in the Targeted Procurement process.

RO2. Establish the associations between Targeted Procurement strategies, SMC development, and the relationship quality between SMCs and other project supply chain parties.

RO3. Examine whether Targeted Procurement strategies have an influence on SMC development, and on the relationship quality between SMCs and other project supply chain parties.

RO4. Examine whether the relationship quality between SMCs and other project supply chain parties has an influence on SMC development.

RO5. Determine the indirect effect of Targeted Procurement strategies on SMC development, through supply chain relationship quality as a mediator.

RO6. Develop and validate a predictive causal model for the relationships between Targeted Procurement strategies, SMC development, and supply chain relationship quality criteria, using the partial least squares structural equation modelling (PLS-SEM) technique.

1.6   JUSTIFICATION FOR THE STUDY

Public procurement has been shown to be an effective vehicle for achieving a broad range of socio-economic objectives, such as supporting local and domestic small firms, assisting historically disadvantaged or minority businesses (Erridge, 2004). Until the last three decades, public procurement has been a neglected area of academic research, with much of the published material being government reports (Thai, 2001). Moreover, despite its widespread use, there is limited research on the impact of public procurement as instrument of social policy (McCrudden, 2004; Watermeyer, 2000). According to Chatterji et al. (2014) and Letchmiah (2012), little is known about the actual effectiveness of preferential procurement in promoting the growth performance and development of SMCs, and only a handful of studies have attempted to analyse whether these programmes have met their goals in the construction industry. There is little or no objective empirical evidence informing the implementation of SMC-friendly policies in South Africa. Therefore, the paucity of empirical research on preferential procurement in relation to contractor development in the South African context is a significant motivation for the study.

Ling et al. (2014) and Meng (2010) acknowledged that the project-based nature of the construction industry does not allow a culture of evaluating working relationships, because relationships are considered once-off, ending after project completion. Hence, there is a limited research and understanding into the nature and development of relationships in the construction industry (Bygballe et al., 2010; Jelodar et al., 2016). In addition, there is a paucity of research and knowledge on the nature and quality of supply chain relationships between SMCs and other project parties; and to the best of the author's knowledge, there are no previous studies that have explicitly examined the mediating role of relationship quality on the preferential procurement policy – SMC development relationship.

This study differs from any previous studies in that it examines the mediating role of supply chain relationship quality on the relationship between Targeted Procurement strategies used by the public-sector and SMC development. Moreover, these relationships are empirically validated and modelled using PLS-SEM, which is particularly useful for theory development or exploratory causal modelling (Lowry and Gaskin, 2014). The validated PLS-SEM model results are expected to contribute to theory-building on the use of Targeted Procurement strategies to stimulate the development of SMCs in South Africa.

This research is long overdue since many governments in Southern Africa have expressed frustration at the poor returns on their investment in improvement programmes, such as granting of tendering preferences to local SMCs (Dlungwana and Rwelamila, 2004). Explorative in nature, the study looks to provide a better understanding of the role of preferential procurement regimes and relationship quality, in stimulating the growth performance and development of SMCs in the construction industry in South Africa, during the period 2011 to 2015.

1.7   OVERVIEW OF RESEARCH METHODOLOGY

Construction management research draws on knowledge from a wide range of disciplines for example, social sciences, management, and engineering, to provide context, depending on the requirement of particular research (Dainty, 2008; Fellows and Liu, 2008). Moreover, firm growth researchers agree that growth is a complex phenomenon requiring a combination of research strategy (McKelvie and Wiklund, 2010). This study falls into the "growth as an outcome" research stream. Consequently, a pragmatic philosophy was deemed most relevant to the study, since pragmatism provides justification for the combination of both quantitative

and qualitative approach in a research (Bryman, 2012). To achieve the aim of the study which is to examine the influence of Targeted Procurement strategies on SMC growth performance, and establish the nature of the relationships between the study constructs, the study primarily adopted a positivist paradigm, which is known to be efficient in explaining behavioural aspects as well as measuring the descriptive aspects of built-environment research (Amaratunga et al., 2002). Furthermore, an interpretivist paradigm has been proven to be suitable in addressing the complex issue of organisational performance (Amaratunga et al., 2002).

Dainty (2008) and Love et al. (2002) argued that to unravel the inherent complexities of the construction industry, construction management researchers need to adopt a multi-methodology approach which draws from the strength of an interpretivist qualitative approach and a positivist quantitative approach. This study therefore adopted an embedded mixed-methods approach (within a transformative framework) that primarily relied on quantitative (survey) means of data collection, and supported by secondary qualitative data (focus group interview and document analysis) which was conducted concurrently. The chosen approach was considered appropriate for this study as it would enhance the confidence in and credibility of findings reported, and its validity (Easterby-Smith et al., 2012), thus providing a better understanding of the phenomenon being investigated.

The research was initiated by an in-depth review of extant literature relating to the study constructs – preferential targeted procurement, supply chain relationship quality, and firm growth performance and development; which provided a theoretical background for the study and from which the research conceptual framework was developed. The review of literature further guided the development of research instruments for data collection. Data was collected via a structured self-administered and online questionnaire survey, as well as a focus group interview. A combination of targeted sampling and stratified sampling techniques was used in the selection of SMCs for survey. The study focussed on SMCs listed on Grades 3 to 6 on the cidb register.

The sample frame for the study consisted of a list of 1,007 contractors that are part of a registered CDP, obtained from the cidb in May 2016, and they were invited to participate in the survey using Survey Monkey, an online tool. The online survey was conducted between August 2016 and February 2017; follow-up reminder emails were sent during this period. A smaller group of 43 SMCs within the sample frame, who agreed to participate in self-administered survey, were surveyed face-to-face. At the end of the survey period, a total of 360

(35.4%) completed responses were received, out of which 307 responses from contractors that met the criteria for the study (for example, those classified as an SME and registered on cidb Grades 3 to 6) were identified and extracted for the empirical study. For the focus group interview, out of twelve contractors invited, seven participated in the interview session, which was conducted on 28th November 2016 at the offices of a state-owned entity in Port Elizabeth, Eastern Cape, South Africa. Furthermore, a representative of a state-owned entity was surveyed to further validate the information obtained from the focus group interview.

The collected data was subjected to descriptive and non-parametric inferential statistical techniques using the Statistical Package for Social Sciences (SPSS) software to enhance the presentation and interpretation of research results that allow valid conclusions to be drawn. Descriptive statistics employed (mainly used to analyse the background information of the respondents) employed included frequencies, percentiles and mean scores. The inferential statistics used included Spearman rank-order correlation, and multinomial regression. Principal components analysis was also used to reduce and further classify variables of the research constructs for model development. Furthermore, PLS-SEM technique was used to validate the conceptual model developed in Chapter Three. Analytical hierarchy process was also performed to determine the distribution (weight) of each relationship quality assessment criterion on the relationship quality construct. Further details of the research methodology and methods are presented in Chapter Four of the thesis.

1.8   SCOPE OF THE STUDY

It was important to set boundaries to the extent of this study because the area being researched was vast. Boundaries were set along the units being investigated, namely: SMCs and public-sector construction projects. Projects were limited to construction public-sector projects where targeted procurement was implemented. SMCs for the purpose of this study were limited to contractors listed on Grades 3 to 6 of the cidb register who had executed Targeted Procurement projects and been part of a cidb-registered CDP within the five-year period of observation (2011 – 2015), and this target population constituted the focus of this study. Grades 1 to 2 contractors were excluded because they were unlikely to reflect the growth performance and development being sought, while Grades 7 to 9 contractors were also excluded because these were considered large established contractors (Windapo and Cattell, 2011). The study was also limited to contractors providing construction services/works, thus excluding labour-only

contractors. SMCs that had grown and developed through acquisitions and mergers were also excluded.

1.9   THESIS STRUCTURE

The thesis is comprised of eight chapters; their outlines are described below.

Chapter One: Introduction

Chapter One introduces the research constructs and approach to the broader research theme. A broad background to the study is presented, and the contextual research problem is established. The research questions are posited, and the aim of the research and supporting objectives are presented as the main drivers of the study.

Chapter Two: Literature Review

Chapter Two presents a holistic examination of extant literature relating to the study constructs – preferential targeted procurement, supply chain relationship quality, and firm growth performance and development. This literature provides a theoretical background for the study.

Chapter Three: Theoretical and Conceptual Framework

Chapter Three presents the theoretical perspectives adopted for the study, which formed the basis, along with reviewed literature, for developing the research conceptual framework. The chapter also outlines the research hypotheses which were tested, to answer the research objectives.

Chapter Four: Research Design and Methodology

Chapter Four comprehensively describes the philosophical underpinnings and justifies the research methodology and techniques employed by this research to achieve the aim of the study. The embedded mixed methods research approach as well as method of data collection, sample selection and data analysis techniques are presented.

Chapter Five: Data Presentation, Analysis and Results

Chapter Five presents and describes the results and findings from the data analysis. Findings presented include: a summary of the general profile and information on the SMCs and responding officers; results from underlying attributes of the variables of the research constructs and a series of tests of hypotheses.

Chapter Six: Validation of Conceptual Model

Chapter Six presents the results of the validation of the conceptual model using PLS-SEM technique, which computed a series of structural equations estimating all direct causal paths simultaneously and produced an overall goodness of fit measure for the model.

Chapter Seven: Discussion of Results and Findings

Chapter Seven presents the interpretation and discussion of empirical results and findings in relation to existing literature.

Chapter Eight

Chapter Eight presents the overall summary of research findings from the thesis, demonstrating the extent to which the research objectives were met. Appropriate conclusions are also drawn and the contribution to knowledge is established while considering the research limitations. Recommendations and indications for future research are also outlined.

CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

The chapter establishes the potential of public procurement as an instrument to promote socio-economic objectives in the specific context of the construction industry. Motivations and driving factors influencing the introduction of preferential procurement policies and practices in other countries and locally in South Africa is also explored holistically. Furthermore, relationship quality concept within the construction industry is examined. It further establishes the approaches and measures of firm growth performance and development.

2.2 CONCEPTUALIZING (PUBLIC) PROCUREMENT

According to the International Standards Organisation, procurement is the process which creates, manages and fulfils contracts (International Standards Organisation, 2010). Procurement is concerned with activities before and after the signing of a contract (Watermeyer et al., 2000), and involves the "overall process of acquiring goods, civil works and services including all functions from the identification of needs, selection and solicitation of suppliers, preparation and award of the contract, and all phases of contract administration through the end of a services' contract or the useful life of an asset" (United Nations Development Programme [UNDP], 2006:3). In the construction industry, procurement can be referred as the "process that creates, manages and fulfils contracts relating to the provision of supplies, services or engineering and construction works" and may also include the disposal of a facility, hiring of anything and acquisition of any rights and concessions (Watermeyer, 2003:2). Hawkins (2012) further adopted a broad definition of procurement which includes: project identification, planning and design; procurement strategy; tender and selection; contract implementation; and operations and maintenance. A sound procurement system places significant emphasis on the procurement process (Harink, 1999). However, public procurement transcends more than just the process, and should consist of important components including strategy and policy of the organisation, methods and procedures, personnel and organisation, and information (Harink, 1999:15).

Public procurement is regarded as a significant function of the government due to the large size of public procurement expenditure (Fee et al., 2002; Thai, 2001; Watermeyer, et al., 1998). This averages 12% gross domestic product (GDP) in the Organisation for Economic Co-operation and Development (OECD) countries (OECD, 2017); up to 30% GPD in developing

countries (International Monetary Fund, [IMF], 2014; Roos, 2012); and up to 50% of entire domestic construction expenditure in South Africa (Ncwadi and Dangalazana, 2006). Public procurement is also an important instrument for achieving socio-economic objectives (McCrudden, 2004; Arrowsmith, 1995), providing government with opportunities for implementing selected national policies (Thai, 2001). However, the analysis by Schapper et al. (2009) showed that public procurement is subject not only to divergent political, managerial, and regulatory objectives but also to key performance measures associated with these divergent objectives that introduce conflicts between and even within government agencies themselves.

Public procurement has two broad objectives – primary procurement objectives and secondary non-procurement objectives (Thai, 2001; McCrudden, 1995; Arrowsmith, 1995; United Nations Commission for International Trade Law [UNCITRAL], 1995). Primary objectives relate to good governance and often include aspects of quality, time, cost, minimisation of risk, maximisation of competition and maintenance of integrity and transparency (Thai, 2009). Secondary objectives usually comprise economic objectives (for example, preferencing domestic or local firms); social objectives (for example, supporting minority-owned businesses); environmental protection or green procurement goals (for example, promoting use of recycled goods) and international relations objectives (for example, bilateral and/or multi-lateral support) (Evenett and Hoekman, 2005; Thai, 2001). Public procurement officials are often faced with the challenge of finding a balance between competing socio-economic objectives, national economic interests, and global competition as required by regional and international trade agreements; while satisfying maintaining the requirements of fairness, equity, and transparency. As a result, procurement officials must constantly weigh the trade-offs between conflicting procurement objectives to make an optimum decision (Thai, 2009). The lack of clear public procurement objectives in some developing countries has resulted in the underutilisation of the potential of procurement in supporting government's socio-economic development goals (Sahle, 2002).

Public procurement has been the focus of successive waves of management reform worldwide, in the last two decades. These reforms have been driven by an imperative to improve the performance and cost-effectiveness of the public service (Self, 1993). From a development perspective, achieving value for money while attaining other socio-economic objectives requires the efficient utilisation and maximisation of available scarce state resources (Evenett & Hoekman, 2005). This has been a major driver of public procurement reforms in developing

countries (Harland et al., 2005; Kajimo-Shakantu, 2007), a significant step welcomed by global development agencies recognising the social and economic costs (Schapper and Malta, 2004) of the weaknesses and inefficiencies in public procurement governance (Thai, 2009).

Procurement reforms in developing countries have largely been preceded by recommendations from assessments of the existing system, either by consultants or by external donor agencies, particularly the World Bank through country procurement reports (Akech, 2006; Basheka, 2009; Hawkins et al., 2006). For example, Kenya, Indonesia and Nigeria adopted recommendations to establish legal frameworks for public procurement based on UNCITRAL's model law on procurement of goods, construction and services (Hawkins. et al., 2006). Kenya and Nigeria also adopted the recommendation to establish a central authority to oversee formulating public procurement policy and monitoring its implementation (Basheka, 2009). Other salient findings from country procurement reports include: a limited number of social objectives in national bidding regulations and documents, difficulties in enforcing social objectives contained in standard multilateral development bidding documents, and an emergence of new procurement strategies and increasing social objectives as a result of greater private sector participation (Hawkins et al., 2006).

2.3   PUBLIC PROCUREMENT AS AN INSTRUMENT OF SOCIAL POLICY

Public procurement, accounting for approximately 12% of OECD GDP, represents a crucial share of government expenditure (OECD, 2017). In developing economies, government spending has also risen during the past few decades, and represents about 30% of GDP in emerging market economies and 25% in low-income countries (IMF, 2014). According to South Africa's Estimates of National Expenditure, total government spending is estimated to reach R1.56 trillion for the 2017/18 financial year; accounting for 35.9% GDP (National Treasury, 2017). These figures demonstrate the significant ongoing purchasing power of the public-sector globally, and more importantly, the potential for public expenditure to be leveraged to support South Africa's broader economic, social and environmental objectives.

Procurement has often been perceived and justified by many governments as a tool for pursuing social and economic policies (Gounden, 2000; McCrudden, 2004; Rogerson, 2004; Thai, 2001). The use of procurement to advance social policy can be traced back to the 19th century with the linking of fair wages and labour conditions to procurement in the United States (US) and Great Britain (McCrudden, 2004:2). The concern for the unemployed and the working man

also resulted in the use of public works to address sudden rises in unemployment (McCrudden, 2004). Preferences in government contracting were also extended to the employment and provision of business opportunities for disabled and marginal workers (Arrowsmith, 1995; McCrudden, 2004; 1995). This set the tone for the type of social opportunities pursued by countries during the majority of the 20th century.

Since the early days of linking procurement to social development, there has been a growing interest and appreciation in the socio-economic aspects of public procurement and its regulation (Cook, 2006; McCrudden, 2004; Rogerson, 2004; Thai, 2001). More recent and more explicit linkages between procurement and the settlement of major constitutional disputes are apparent in Canada, relating to the treatment of aboriginal peoples; in Northern Ireland, relating to the respective position of the two religiously defined communities; and in South Africa relating to the end of apartheid and the development of democratic government (McCrudden, 2004). In many countries such as the Netherlands and Belgium, the use of procurement as a tool to address unemployment continues (Hessel et al., 2000; McCrudden, 2004). In India, public procurement policies provide that certain products must be purchased exclusively from the small business sector provided prices are within 15% of those offered by the closest competitor (Morand, 2003; Srivastava, 2003). Until the late 1980s, Singapore had a preferential margin scheme of up to 5% in favour of local contractors in government procurement (Ofori, 1995; 1991).

McCrudden (2004) emphasized three relatively distinct models of procurement–social development linkage, namely: the use of procurement as a method of enforcing anti-discrimination law in the employment context; the use of procurement to advance a wider conception of distributive justice for example, affirmative action in employment; and the use of 'preferential' procurement as a method to help stimulate increased entrepreneurial activity by disadvantaged groups for example, 'set-asides' for minority or historically disadvantaged businesses. In these broad contexts, procurement serves a mechanism to address important quasi-constitutional problems; for example, historical imbalances and racial inequality in the United States and South Africa, ethnic inequality in Malaysia, and unfair treatment of aboriginals in Canada (McCrudden, 2004). In each of these situations, although in somewhat different ways, linkage to procurement has become part of these countries' constitutional arrangements.

2.4 ROLE OF THE CONSTRUCTION INDUSTRY IN SOCIO-ECONOMIC DEVELOPMENT

The construction industry has been strongly linked with the process of economic growth and development (Lopes, 2012). Construction is considered to be one of the most important industries in the economy (Rwelamila, 2012) contributing to the three objectives of development in developing countries which include: increase the availability, and widen the distribution, of basic life sustaining goods such as food, shelter, health, and protection; raise standard of living; and expand the range of economic and social choices available to individuals and nations (Todaro, 2000).

The importance of the construction industry in economic growth in the developing world has long been recognised. The World Bank (1984) ranked the construction industry in developing countries as 4th out of 20 sectors of the economy in terms of inter-sectoral linkages. In addition to contributing 44% of the total cost of projects approved for assistance in the three-year period fiscal 1980–1982 to construction work, the World Bank further proposed a set of measures for all levels of construction industry activities (demand-side, supply-side, institutional set-up and research activities) to improve the efficiency of this important sector of the national economy in developing countries of Africa and Asia. Earlier and further works commissioned or supported by other international development agencies addressed the same issue, with particular focus on developing economies. For example, Moavenzadeh and Rossow (1976) and United Nations Centre for Human Settlements - Habitat (UNCHS) (1982) addressed the contribution of construction to socio-economic growth and development.

Turin (1966, 1973, as cited in Lopes, 2012) was one of the first authors to analyse the relationship between the construction industry and the macro-economy in economic development. Using cross-country comparisons (85 countries from all continents representing all stages of economic development), Turin (1973) found that there exists a direct relationship between the level of GDP per capita and the level of the construction industry activity (measured by the share of construction value added in GDP). A later study by Wells (1986) corroborated the findings of Turin's study and reported that the construction output as a percentage of GDP is related to GDP per capita in an increasing form of income level. Han and Ofori (2001) cited Strassman (1970) as one of the pioneers in the study of the macroeconomics of the construction industry and its role in socio-economic development. Strassman (1970) argued that construction was a major force replacing the manufacturing industry to drive economic growth after the initial stage of development of the economy.

Later studies have challenged Turin's, Wells and the World Banks assertion of the position of the construction industry. For example, Han and Ofori (2001) cited Drewer (1997) and suggested that, at best, construction could be an effective motor of economic growth in a limited context, and over a short period, whereas, at the other extreme, economic growth led by uncontrolled expansion of the construction industry might lead to disastrous economic consequences. Bon (1990) analysed the relationship between the construction industry and the national economy, and further developed the changing role of the construction industry at various stages of economic development (Bon, 1992). These studies suggested that at some stage, construction volume will decline, not only relatively, but also absolutely. However, Ruddock and Lopes (2006) found that there was no clear evidence of an absolute decline of construction activity in advanced industrialised countries. Lopes (2012) also reported that the rate of growth of the volume of construction follows that of the national economy in sub-Saharan countries.

In more recent longitudinal country studies of the relationship between the construction industry and macro-economy: Han and Ofori (2001) reported a positive correlation between economic growth and growth rate of construction value added, and an inverse relationship between the growth of GDP and the share of construction in GDP in China; Yiu et al. (2004) found that, for Hong Kong, the real growth of the aggregate economy leads the real growth of the construction output and not vice versa, at least in the short term; on the other hand, Wong et al. (2008) concluded that the direction of the causality is from the Hong Kong construction sector, particularly the civil engineering sub-sector, to GDP; Anaman and Osei-Amponsah (2007) found that the construction industry leads to economic growth in Ghana; PricewaterhouseCoopers (PwC) (2016) reported that the construction sector in South Africa contributes significant value-added to the country.

The construction industry contributes to a nation's GDP and the employment of skilled and unskilled workers. Construction industry GDP contribution is estimated at 5 to 8% and 3 to 5% in developed and developing countries respectively (Osabutey et al., 2012). In Singapore, the construction industry accounts for about 8.5% GDP and 8 to 9% employment (Debrah and Ofori, 2001b as cited in Lopes, 2012). Similarly, Ng et al. (2009) observed that the construction industry contributes about 6% GDP in Hong Kong, employing 4 to 5% of the population. The construction industry is also a significant contributor to employment and growth in South Africa (Industry Insight, 2012; PwC, 2016). Statistics South Africa (StatsSA) (2016; 2017) also

estimate that the construction industry in South Africa accounts for about 4% GDP, R109 billion (real prices) value-added, and employs more than 1.38 million people which is about 2.5% of the population. Although the direct contribution of the construction industry to economic growth is significant, the role of construction in the economy goes beyond its share in national output as it also contributes to the basic objectives of development including employment creation and income generation and redistribution (Lopes, 2012).

The construction industry has also historically been linked with the process of industrialisation and development of different regions of Europe, North America and some parts of Latin America (Lopes, 2012). For example, the construction industry played a key role in the reconstruction of war-ravaged Europe, and transport infrastructure enhanced trade and inter-regional co-operation among sub-Saharan countries (Organisation of African Unity, 2001) and also facilitated the diffusion of technical innovations from the most advanced to the less advanced areas of the globe.

The complementary empirical reports from cross-sectional and longitudinal country studies on the relationship between the growth of the construction industry and that of the national aggregate suggests that the construction sector and its activities occupy a critical position that influences national strategic socio-economic development. Moreover, researchers generally tend to agree on the need for the construction sector to grow (Ofori, 1993). Some of the authors focus on the issue of employment creation (1994); others emphasise the multiplier effect on other sectors of the economy (Bon, 1991) for example the SME sector (as cited in Lopes, 2012). Therefore, the performance of the construction industry is essentially linked to national development and prosperity (Osabutey et al., 2012); and an efficient and effective construction industry that is largely dominated by SMEs is a vital component of every country's socio-economic development.

2.4.1 Promoting social opportunities in the procurement of construction projects

Investment in infrastructure contributes to not only economic growth but also human development. The lack of basic infrastructure in many countries especially in low-income countries is a major contributing factor to the developmental challenges experienced in these countries. Despite the challenges, Hawkins (2012) noted that this presents a major opportunity for the construction sector to maximise the incorporation of social opportunities in the infrastructure procurement process; thereby increasing the contribution which investment in infrastructure can make towards economic growth and human development (Hawkins et al.,

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2006). Hawkins (2012) further classified the social opportunities incorporated into the procurement of infrastructure into industrial, environmental, and societal. Industrial involves increasing the input of local workforce, training and skills development, employment creation, and improved working conditions; environmental involves adopting sustainable procurement solutions and managing the impact of construction processes on the environment; while societal involves empowering community groups for example, women, and managing the social impact of the project such as resettling affected people.

Researchers and policymakers agree that the practice of increasing the input of local content – people, goods and services in the delivery of construction projects can foster national economic growth. Such practices open up opportunities for the economically disadvantaged to participate in public contracts thereby contributing to the growth process through employment creation and development of indigenous (small) enterprises in the construction industry (Wells and Hawkins, 2008). Long-term development outcomes of promoting local content include poverty alleviation, inclusive growth and wealth distribution.

Social development objectives stem from socio-economic policies which are set at a macro level and implemented at a micro level with procurement officials tasked with balancing competing primary project objectives and secondary social opportunities. Hawkins (2012) and Watermeyer (2005) posited that there is a concern among procurement researchers that the pursuit of social opportunities could potentially compromise the primary purpose of delivering the infrastructure asset. However, Hawkins (2012) further argued that social development opportunities can be attained by following a sequence of actions at each stage of the procurement cycle from project planning through to contract implementation and into operations and maintenance.

Osabutey et al. (2012) suggested that efforts should be made towards committing resources to programmes that enhances the industry's performance, growth and development. Historically, the lack of appreciation of the importance of construction in the development process has led to only a small number of systematic efforts being made in developing countries to create sizeable, efficient and effective national construction industries. However, there has been some efforts recently to implement initiatives for improving the performance of local construction contracting firms, either as part of, or in isolation from, comprehensive programmes for improving the capacity and capability of the construction industry (Shakantu, 2012). Hawkins

(2012) argued that few countries have clear policies for such, and they experience some difficulty implementing them.

2.4.2 Public procurement and SME (contractor) development goals

Previous sections have described the significant role of the construction industry, both directly and indirectly to national economic growth and sustainable development. The procurement of construction works has also been shown to provide governments with economic, regulatory and public-sector policy and capacity delivery mechanisms which can be used to achieve various broad socio-economic objectives (Fellows et al., 2002; Hillebrandt, 2000; van Wyk, 2003). The importance of adequate construction capacity for national development is well-documented in the literature. Government's understanding of the construction industry's significant role in the economy has led to the increasing need to intervene in the construction industry that is largely dominated by albeit specialized, underperforming small and medium-sized enterprises (Wolstenholme, 2009; BIS, 2013). For instance, an estimated 99.7% of construction firms in the United Kingdom (UK) can be classified as small and medium-sized businesses (Cabinet Office, 2011; BIS, 2013). In South Africa, Grades 2 to 6 SME contractors account for 89% of the total registrations in Grades 2 to 9 (cidb, 2017a).

Based on the classification of the National Small Business Amendment Act, No. 26 of 2003 (2003), SMEs in the construction industry are categorised into three broad groups: very small, small and medium enterprise. Very small and small contractors are businesses that employ 6 to 50 people, generate between R200,001 and R6 million turnover per annum and/or have gross assets valued between R500,001 and R1 million. They are usually owner-managed and are likely to operate from business or industrial premises, be tax registered and meet other formal registration requirements (Berry et al., 2002; Jewel et al., 2005; Rebello, 2005). They also employ skilled personnel to carry out the work required (Shakantu et al., 2006). Medium-sized contractors are a wide range of companies employing from 51 to about 200 employees and generate between R6.1 million and R26 million turnover per annum and/or have gross assets valued between R1.1 and R5 million. Moreover, like small enterprises, medium-sized enterprises are also usually owner or manager-controlled (Department of Trade and Industry, [DTI], 1995; Jewell et al., 2005; Rebello, 2005) and employ skilled people (Shakantu et al., 2006).

SMEs are not peculiar to the construction industry or developing countries, rather they are regarded as engines of economic growth in all sectors of many countries. For instance, in the

OECD, SMEs employing less than 20 persons account for over 95% of enterprises and 69 to 95% of total employment (OECD, 2013), and generate a large share of new jobs (OECD, 2004). SMEs also make up 91 to 93% of industrial enterprises in the South-East and East Asian countries, contribute 35 to 61% of employment, and account for 22 to 40% of total value-added (Shakantu, 2012). Moreover, SMEs produce about 50% of the GDP of most countries, and up to 55% of all technical innovations (Burke, 2006).

Although these figures highlight the relevance of SMEs to the national economy of all countries regardless of stage of development, Palma (2005) noted that SMEs are especially important to developing economies with major employment and income distribution challenges (as cited in Shakantu, 2012). Putting this in proper context, South Africa with an unemployment rate of 27.7% also has one of the most unequal distributions of income in the world with approximately 10% of the population earning 55 to 60% of the country's income and holding 90 to 95% wealth (StatsSA, 2017). Palma (2005) further observed that rapid growth of small-scale enterprises usually precedes the process of industrialisation; however, such companies continue to remain relevant during and beyond the industrialisation phase because at any level of a country's development, some activities that are needed involve few or no economies of scale.

Shakantu and Kajimo-Shakantu (2007) noted that for small businesses to contribute effectively to the economy, they should be able to evolve into efficient, well-organised, technically competent and well-managed operations that are able to respond to opportunities and challenges in their environment. They should be able to offer reliable products with dependable delivery and conformance to quality. They should be price-competitive and continuously improve upon their performance. They should focus on cost effectiveness, integrated quality actions, customer responsiveness, information technology management and human resource management. In the context of the construction industry, the complexity of construction activities and factors that influence construction processes constitute certain constraints and challenges on construction businesses (Shakantu, 2012). Therefore, contractors must have the capacity to deliver the necessary volume of works required for socio-economic progress within the specified time, at reasonable and predictable cost, and to the specified quality, while paying attention to the health and safety of the public and the workers on site, as well as using materials, equipment and methods that are least harmful to the environment (Ashworth, 2006; Barrie and Paulson, 2001; Harris et al., 2006; UNCHS, 1996).

There are limited contractors with such capacity in developing countries and in scenarios where contractors with adequate capacity are available, they are faced with several challenges including but not limited to managerial, technical skills, resources, regulations and client procedures (Ibrahim et al., 2010). For instance, due to lack of adequate capacity among SMEs, the cidb estimates that 88% of government infrastructure spend in South Africa is concentrated at cidb Grades 7 to 9 contractors who represent only 11% of registered Grades 2 to 9 contractors (cidb, 2017a). The increasing complexity of projects and concentration of capacity in the higher grades provides a compelling need for targeted contractor development which aims to increase the delivery capacity and capability, as well as sustainability of emerging SME contractors who constitute an estimated 89% of registered Grades 2 to 9 contractors.

The sustained significance of construction small businesses has led to the focus of government policies on promoting the advent of capable small contractors and supporting their continuous development and sustainability (Adediran and Windapo, 2016). Consequently, some governments have implemented prescriptive measures to promote small contractor development (Gounden, 2000; Hawkins, 2012; Ofori, 1996; Watermeyer, 2003). Others have initiated and set-up supportive procurement programmes (demand side interventions) and well-structured contractor development models (supply side interventions) (Dlungwana and Rwelamila, 2004) to improve technical and managerial skills, knowledge and, hence, competitiveness of these contractors (Shakantu, 2012).

These interventions in the construction industry are usually implemented through public procurement where the government serves an active participant in the market economy as a major client. For example, at the end of 2016, public-sector infrastructure investment in South Africa was amounted to about 6% of total GDP (South African Reserve Bank, 2017), with a long-term plan of 10% GDP by the year 2030 (The Presidency, 2012). Moreover, the demand from public-sector clients is estimated at 63% of total domestic construction expenditure in South Africa (StatsSA, 2017). Osabutey (2010) also observed that, central and state governments and government agencies in most developing countries are responsible for up to 80% of construction output. Therefore, governments progressively use their purchasing power to intervene in the construction industry towards achieving a broad range of national socio-economic goals including the development and sustainability of the de facto drivers of economic growth, that is, local SMEs (Adediran and Windapo, 2016a; 2017a).

Public procurement has been shown to be an effective vehicle for achieving a broad range of socio-economic objectives, such as supporting local and domestic small firms, assisting historically disadvantaged or minority and woman-owned businesses (Erridge, 2004). Researchers and policymakers agree that increased emphasis on public procurement contract awards to small businesses increase innovativeness, entrepreneurship and contributes to job creation and economic development (Reed, 2004). Moreover, government policies structure the environment within which SMEs function (OECD, 2014). Therefore, SME-friendly public procurement represents a major component of government policy in many countries.

2.5 OVERVIEW OF PREFERENTIAL PROCUREMENT POLICIES: INTERNATIONAL PERSPECTIVES

International experience on the use of public procurement to achieve socio-economic objectives suggests that different models exists in different countries based on contextual procurement regimes and socio-economic imperatives. Procurement is increasingly used by OECD countries as a mechanism for delivering strategic policy objectives including supporting SME participation in public procurement, achieving sustainability and promoting innovation. However, from an international perspective, the affirmative action programme, and by extension set-aside programs in the US represents one of the most similar public-sector procurement intervention strategies to the South African model.

The concept of preferential procurement adopted by South Africa has its roots in the American model of affirmative action (Letchmiah, 2012). Both originating from government policies that attempted to strengthen the viability of SMEs, their aim is to develop historically disadvantaged enterprises and counter the effects of past discrimination (Bolton, 2006; Chatterji et al., 2014). However, in the US, it was intended to cater for disadvantaged minorities, especially Blacks and Latinos (Khatleli, 2009) rather than a majority population as in the case of South Africa. Moreover, Adam (2000) opined that affirmative action in the US context tend to be perceived as a moral issue, with a somewhat paternalistic character bordering on charity.

The US government oversees several programmes focussed on awarding contracts to targeted small firms and giving preferential treatment to minority businesses. Affirmative action procurement strategies for government projects were implemented in the US construction industry through set-asides to ensure that a portion of Public Works funded contracts would be secured by minority black-owned businesses in an attempt to stimulate the growth of the entrepreneurial black middle class (Bates, 1997; Chatterji et al., 2014). Set-aside is described

by Bates (1997) as the most powerful tool used by city governments in the US to promote historically disadvantaged enterprise (HDE) development. It is a piece of legislation or an executive order requiring that a specified percentage of procurement expenditures go to HDE. Bid preferences are also a common public policy tool in the US, where preference points are given to small businesses and HDEs. Bates (1997) reported emerging firms in industries such as construction and manufacturing are most capable of exploiting extended market opportunities created by preferential procurement programmes. Sales to government was considered important in the US particularly to small businesses (Bates, 1997), as the scope of preferential procurement programmes was substantial with over 10% of the minority-owned firms reporting that they had done business with government clients (Bates and Williams, 1995). However, Bates and Williams (1995) further reported that minority business sales to government declined in the 1990s due to restrictive Supreme Court ruling regarding preferential procurement practices. Indeed, the continued widespread use of public procurement as an instrument of social policy has not without controversy and various questions have been raised with regard to its effectiveness, transparency and cost effectiveness.

Despite its perceived benefits towards attaining socio-economic goals, preferential procurement policies have faced many criticisms, with opposing views based on moral and socio-political grounds from various interest groups (Kajimo-Shakantu, 2007; Rice, 1992; Watermeyer, 2000). The targeting of small firms, particularly HDEs on government procurement is often justified on the grounds of job creation, and to remedy the present effects of past discrimination and disadvantage by giving HDEs greater opportunity to participate in government contracts (Bates, 1995a, 1997; Evenett and Hoekman, 2005). However, giving preference to some individuals over others has been opposed for both being morally unjust and for introducing an element of inefficiency in the procurement system (Charlton and van Nierk, 1994). Moreover, preferential policies reinforce group identities and exacerbate tensions (The FW de Klerk Foundation, 2005). Nonetheless, the use of public procurement as an instrument of social policy suffers from a lack of shared understandings, and because of the limited research and data on most programmes, it is difficult to support or disapprove of them (Gounden, 2000). Despite the varying viewpoints, many governments continue to use preferential policies in public procurement to pursue redistributive and development goals (McCrudden and Gross, 2006).

Notwithstanding the lack of empirical studies in the literature, some research has contributed to identifying the impact of minority business enterprise programmes in the US. Marion (2007) studied the effectiveness of set-asides in road construction in the US, and found that set-asides significantly increases contract awards to SMEs. However, an earlier study indicate that while total number of SMEs receiving contracts increased, as did the volume of contracts, contract-winning rates actually fell from pre-set-aside era to set-aside era (Myers and Chan, 1996); suggesting that the programmes did not substantially improve the competitiveness of minority businesses. Blanchflower and Wainwright (2005) also found that removal of set-asides led to 80 to 99% decline in minority business participation in public procurement in the construction industry. They also argue that affirmative action programs have not achieved their objectives of improving the position of minority businesses in the construction industry. The issue of fronting and switching has also been reported, where "certified minority businesses have traded the opportunity to gain a foothold in the construction industry for the quick profit available from selling the use of their name to non-minority firms" (Bates, 1995b).

In the state of California, where affirmative action does not apply to state funded contracts since 1996, a 2006 study by Morris et al. (2006) found that SMEs experienced more than 50% reduction in contract winning rate, and only one-third of transportation construction SMEs that was operating in 1996 were still in business. In a separate study on the impact of minority set-aside programs on black-owned SME growth in Cleveland, House-Soremekun (2006) conclude that affirmative action programs, and by extension minority set-aside programs, appear to have a positive and significant empirical impact on the growth of black-owned SMEs regardless of how growth is measured. Marion (2007) also suggest that set-asides may play a role in the net survival rates of these businesses. Holzer and Neumark (2000) however reports that firms moving from set-aside projects to an environment without set-asides did not fail at higher rates than comparable firms. On the other hand, evidence suggests that SMEs deriving a large percentage of their revenue from set-aside projects are relatively more likely to go out of business (Bates and Williams, 1996; Holzer and Neumark, 2000); although this phenomenon may be attributable to fronting activities in the construction industry.

Malaysia and Northern Ireland also adopted the concept of affirmative action as originated by the American model (McCrudden, 2004). Malaysia introduced a comprehensive system of preferential policies in the New Economic Policy (NEP) designed to benefit the politically dominant, but economically weak, indigenous Malay (Bumiputra) majority (Emsley, 1996);

which bears striking similarity to the South African context because the policy benefits the majority, and also because racial and ethnic differences coincide. Moreover, it is constitutionally sanctioned under Article 153, which exclusively warrants preferential treatment to Malays and other native groups, safeguarding their "special position" in modern Malaysian society (Guan, 2005). The promulgation of the NEP resulted in what Adam (2000) described as a rare case of complete success in preferential policy implementation, which saw a significant socio-economic restructuring of Malaysian society leading to ethnic integration (Guan, 2005). The Malaysian government also structured procurement works contracts in the construction industry, where at least 30% of the annual value of contracts was set aside for Bumiputra contractors (McCrudden, 2004). The Malaysian experience provides an important lesson for South Africa, and serves as a set of lenses which can help to clarify the possibility and limits of transformation in South Africa.

From the foregoing, several schemes for using public procurement as a tool to achieve socioeconomic objectives have evolved in different countries and socio-political contexts (McCrudden, 2004; Watermeyer, 2003; Manchidi and Harmond, 2002; Gounden, 2000). These include reservations, preferencing, and indirect and supply-side interventions. The manner in which a country implements its procurement policy will influence the achievement of its socio-economic objectives (Evenett and Hoekman, 2005). A summary of these schemes and their associated methods and actions is presented in Table 2.1.

SME development initiatives through public procurement have mostly been applied by governments in two broad ways: bid price preferences that load the lowest non-SME bid or provide a discount to the lowest SME bid, and set-asides which provide quotas for targeted SMEs to bid competitively against each other (ADB, 2012). For example, in Singapore, bidding preferences were offered to local construction firms and joint ventures (Ofori, 1996). Botswana also implemented bid preferencing schemes to promote engagement of citizen contractors (Govender and Watermeyer, 2001; Watermeyer 2003). While Namibia adopted South African-style preferential procurement strategies to realize socio-economic objectives in its labour-based programmes and in promoting the participation of small enterprises in construction projects (Govender and Watermeyer, 2001). Whereas, set-asides or reserved procurement

Table 2.1: Methods used to implement preferential procurement policies

Scheme type	Methods	Associated actions
Reservation	Set-asides	Only enterprises with specific characteristics required by the procuring entity can compete for contracts reserved for their exclusive execution. These are typically enterprises that meet the procurement policy objectives. For example, a tender can be issued restricting bidding to HDI-owned companies. Set asides are however, not acceptable within the legislative framework of South Africa. Bolton (2010) affirm that "the use of set-aside practices or the exclusion of certain contractors from procurement procedures is unlikely to pass the constitutional muster."
	Qualification criteria	Exclude enterprises that cannot meet a specified requirement relating to procurement Policy objectives from participating in contracts other than those provided for in law.
	Contractual conditions	Make policy objectives a contractual obligation. The contractor that is awarded the contract through a competitive bidding process is required to subcontract a percentage of the contract to SMEs or form a joint venture with a HDI-owned company.
	Offering back	The procuring entity offers bidders that satisfy criteria relating to policy objectives the opportunity to execute the contract or part thereof if the tenderer is prepared to match the price and quality of the best tender received. This arrangement is usually sought if the bidder that submitted the best offer in terms of price and quality is not HDI-owned and does not satisfy the policy requirements in relation to the achievement of RDP goals.
Preferencing	Preferencing at the shortlisting stage	Limits the number of suppliers or service providers who are invited to tender on the basis of pre-qualification and give a weighting to policy objectives along with usual commercial criteria, such as price and quality, at the short-listing stage.
	Award criteria (tender evaluation)	The procuring entity gives a weighting to procurement policy objectives along with usual commercial criteria, such as price and quality, at the evaluation stage. This is common practice in South Africa where procuring entities are required to allocate preference points in advance which will be used to evaluate tender offers.
Indirect interventions	Product or service specification	The procuring entity states requirements in product or service specifications for example, by specifying labour-based construction methods where procurement is used as a policy tool for employment creation. In South Africa all contracts under the EPWPs have mandatory conditions for the maximum use of labour (unskilled labour in particular) to create job opportunities.
	Targeted Procurement	Design procurement processes, specifications and/or set contract conditions to facilitate the participation of targeted groups of contractors, suppliers and service providers.
Supply-side interventions	General assistance	Provide support for targeted groups to compete for business, without giving these parties any favourable treatment in the actual procurement.

HDI: historically disadvantaged individual(s); RDP: Reconstruction and Development Programme, EPWP: Expanded Public Works Programme

Source: Watermeyer (2003:5)

strategies have been used to encourage participation of small businesses and minority business enterprises in government contracts in the US, South Africa, Indonesia and Malaysia (Arrowsmith, 1995; Hawkins, 2012) and to develop minority enterprise and counter the effects of past discrimination (Bolton, 2006; Chatterji et al., 2014). Hence, government interventions have been an integral part of public procurement arrangements; they are initiated, facilitated and financed by contracting authorities to provide mechanisms for accelerating the development of targeted enterprises through learning from their experiences and that of other contractors.

2.6 PREFERENTIAL PROCUREMENT AND CONTRACTOR DEVELOPMENT IN SOUTH AFRICA

Preferential procurement policy as defined by Watermeyer (2003:2) is a "procurement policy that promotes objectives additional to those associated with the immediate objective of procurement itself." In the South African context, a preferential procurement policy is defined by Kajimo-Shakantu (2007) as a policy which favours preference in the award of contracts either directly or indirectly to certain categories of people or groups, based on prescribed characteristics, in order to achieve specific secondary objectives of procurement.

Over the years, particularly from 1994, the South African public-sector procurement environment has been influenced by key policies and legislative acts. Given the linkage between government procurement and socio-economic development, it is not surprising that procurement has emerged as an important regulatory mechanism to address the effects of institutional discrimination and inequality (McCrudden, 2004). The vision of an economy that caters for all people in South Africa dates as far back as the Freedom Charter of 1955 and was refined in the RDP in 1994 (DTI, 2003). Several attempts were made during the 1970s and 1980s to incorporate blacks in the mainstream economy by the private sector, mainly driven by multinational companies under pressure to address black economic advancement in the face of sanctions and disinvestments in South Africa (McCrudden, 2004). The process of incorporating blacks in the socio-economic activities of the country accelerated in the 1990s particularly as political change gathered momentum, with affirmative action emerging as a key policy objective (RDP, 1994). The aim of affirmative action was therefore to "ensure that people who were discriminated against in the work situation are empowered to enable them to gain access to and compete for all posts, including those at high level" (Innes et al., 1993:42).

Since the emergence of the new democratic government in 1994, they have taken various steps to restructure the economy and achieve greater diffusion of economic power among the historically disadvantaged groups. The restructuring process entails the equitable integration of the majority historically marginalised groups into the formal economy through Black Economic Empowerment (BEE) policies. The government also realised the importance of small, medium and micro enterprises (SMMEs) in the macro economic development of South Africa and acknowledged that they were had been largely ignored in the past (National Treasury, 2017). They also recognized that historically, the tendering system favoured larger and more established businesses, which made it difficult for new and emerging enterprises to compete successfully in the existing public-sector procurement system (Gounden, 2000; Watermeyer et al., 1998).

As a result, policymakers introduced preferential procurement in the public-sector to address past imbalances by making the procurement process more easily accessible to new and emerging businesses (Letchmiah, 2012). Procurement reforms commenced in 1995 with the appointment of a Task Team by the Ministries of Finance and Public Works and concluded with the release of the Green Paper on Public Sector Procurement Reform in 1997. Procurement reforms focused on the two constitutional requirements: good governance in procurement; and the attainment of socio-economic objectives through procurement which resulted in subsequent legislation as summarized in Table 2.2.

2.6.1 Preferential procurement as a constitutional and legislative framework

South Africa's preferential procurement system is unique in that the principles governing preferential procurement are contained in Section 217 of the Constitution (Bolton, 2008). Given the economic disparities due to past discrimination, public procurement became one of the regulatory mechanisms used to redress the effects of institutional discrimination and inequality in South Africa after the dismantling of apartheid (McCrudden, 2004). Section 217 of the Constitution therefore establishes the primary and secondary procurement objectives to be derived from public procurement as contained in the three Sections (The Presidency, 1996): the policy for the "good governance" aspects of procurement is captured in Section (1) and establishes a framework for procurement that is consistent with international norms and standards: South Africa's preferential procurement policy is derived from Section (2) of which proposes a preferencing scheme to protect or advance persons disadvantaged by unfair discrimination: and the requirement that national legislation must prescribe a framework within

which the preferential procurement policy must be implemented is identified in Section (3). According to Watermeyer (2003), the constitutional requirements for procurement in South Africa is consistent with the objectives of UNCITRAL model laws and as such adheres to international best practice.

Table 2.2: Chronological development of key preferential procurement policies and legislation

Date	Policy or legislation	Impact on preferential procurement
November 1995	Public Sector Procurement Reform in South Africa, Interim Strategies (a 10-Point Plan)	Interim strategies aimed at increasing the participation of previously disadvantaged enterprises. It was only applicable for use within the state procurement legislation, that is., applicable within the ambits of the State Tender Board Act (Act No. 86 of 1968, as amended), and as a guiding framework for the provinces (that is, not enforceable).
February 1996	Constitution of the Republic of South Africa (Act No. 108 of 1996)	The Constitution requires the procurement process to be fair, equitable, transparent, competitive and cost effective and that, in addition, national legislation must prescribe a preferential policy framework. The Interim Constitution of RSA (Act No. 200 of 1993) did not cater for preferencing. The final Constitution was therefore influenced by the 10-Point Plan.
February 1999	Public Finance Management Act (Act NO.1 of 1999, as amended by Act No. 29 of 1999)	The Act promotes good financial management at national and provincial levels. It requires accounting officers to have a procurement system that is fair, equitable, transparent, competitive and cost-effective, as required by the Constitution. It also authorizes the National Treasury to issue procurement regulations as and when necessary. The Municipal Finance Management Act (MFMA) applies to local government.
February 2000	Preferential Procurement Framework Act (Act No.5 of 2000)	The Act is intended to give effect to Section 217 (2) of the Constitution to provide a framework for preferencing. Regulations to this effect were issued in August 2001 and subsequently changed in December 2011.
January 2004	Broad-based Black Economic Empowerment Act (Act No. 53 of 2003)	The Act provides a legislative framework for the promotion of black economic empowerment. It also enables the Minister of Trade and Industry to issue codes of good practice and to publish transformation charters and, in addition, to establish the Black Economic Empowerment Advisory Council

RSA: Republic of South Africa
Source: Letchmiah (2012); The Presidency (2004); Manchidi and Harmond (2002)

2.6.2 Preferential Procurement Policy Framework Act

The Preferential Procurement Policy Framework (PPPFA) Act, No. 5 of 2000 was legislated to effect Section 217 (2) of the Constitution and to provide a framework within which procurement policies referred to therein must be implemented (The Presidency, 2000; Letchmiah, 2012). The PPPFA requires Organs of State to determine their preferential procurement policy and to implement it within the framework which required a preference

points-scoring system to be developed weighted between the price mechanism and social development objectives. Specific socio-economic goals for which preference points could be awarded included, inter-alia: the promotion of South African owned enterprises; the creation of new jobs; the promotion of enterprises in a specific region, municipality, or rural area; and the improvement of communities (Bolton, 2008; Department of Finance, 2001). Table 2.3 provides a summary of socio-economic objectives regarded as a contribution towards achieving the goals of the RDP as envisaged in the PPPFA.

Table 2.3: Socio-economic goals permitted by the PPPFA

S/No.	Policy or legislation
1.	The promotion of South African owned enterprises.
2.	The promotion of export orientated production to create jobs.
3.	The promotion of small, micro and medium-sized enterprises.
4.	The creation of new jobs or the intensification of labour absorption.
5.	The promotion of enterprises located in a specific province for work to be done or services to be rendered in that province.
6.	The promotion of enterprises located in a specific region for work to be done or services to be rendered in that region.
7.	The promotion of enterprises located in a specific municipal area for work to be done or services to be rendered in that municipal area.
8.	The promotion of enterprises located in rural areas.
9.	The empowerment of the work force by standardising the level of skill and knowledge of workers.
10.	The development of human resources, including by assisting in tertiary and other advanced training programmes, in line with key indicators such as percentage of wage bill spent on education and training and improvement of management skills.
11.	The upliftment of communities through, but not limited to, housing, transport, schools, infrastructure donations, and charity organisations.

Source: Department of Finance (2001)

Within the points-scoring system, public-sector clients award 80 or 90 points for financial price and 20 or 10 for socio-economic development goals during the tender adjudication process, depending on the estimated value of the contract (The Presidency, 2000). For large contracts the 90/10 applies, while the 80/20 system is used for small contracts where SMEs are encouraged to participate as the main contractor (The Presidency, 2000; Kajimo-Shakantu, 2007). To get the final score, the points scored for socio-economic development goals are added to that scored for financial price (see National Treasury, 2017 for calculation). The use of the points-scoring system ensures that the socio-economic aspect is a relevant criterion in the award of contracts in public procurement. However, Watermeyer (2000) cautioned that socio-economic objectives must be balanced against other pertinent criteria such as quality and price to ensure the delivery of social benefits within the minimum possible cost to government.

No preferencing outside of the points system provided for in the PPPFA was permitted, implying that tenderers who obtained the highest number of points could only have their tenders rejected should they not have sufficient capacity or capability to deliver, or are under suspension from participating in public procurement for prior actions (The Presidency, 2000; Letchmiah, 2012). Moreover, tenderers awarded contracts on the basis of preference points may not, in general, sub-contract more than 25% of the value of the contract to any other enterprise that does not have an equal or higher Broad-based Black Economic Empowerment (B-BBEE) status level (National Treasury, 2011).

The Broad-Based Black Economic Empowerment Act, No. 53 of 2003 was introduced to address the lack of a comprehensive BEE strategy and drew together the various elements of the government's transformation programme in a more coherent and focused way (Letchmiah, 2012). Critically, it was a shift from a narrow-based BEE policy that focused primarily on ownership by historically disadvantaged individuals to a broad-based BEE policy which measures the status of an enterprise using a 'balanced scorecard' that take into account seven related empowerment elements in evaluating a business enterprise (Letchmiah, 2011). An enterprise's scorecard formed the basis of awarding preference points during tender adjudication. The B-BBEE act expanded the framework provided in the PPPFA and enables the Minister of Trade and Industry to issue codes of good practice on BEE that may include: adjudication criteria for preferential procurement purposes; indicators to measure broad-based black economic empowerment; and the weighting attached to such indicators (The Presidency, 2003). The PPPFA regulations are continuously amended in line with the B-BBEE Act to establish a legislative framework for the promotion of black economic empowerment (Bolton, 2008).

2.6.3   Preferential targeted procurement in the South African construction industry

Preferential procurement policies in the South African construction industry are currently being implemented through the policy provisions enshrined in the PPPFA and B-BBEE Act, both of which provides the primary statutory framework for preferential procurement and the promotion of black economic empowerment in South Africa. The objectives of the B-BBEE Act, in relation to the construction industry are implemented through the Construction Sector Transformation Charter. The charter provides a framework for the South African construction industry to address B-BBEE, enhance capacity and increase productivity; and applies to all enterprises that are involved in the creation, expansion and/or maintenance of fixed assets

related to residential or non-residential buildings, infrastructure or any other form of construction works in South Africa (DTI, 2006).

The objectives of the charter include: the transformation and growth of the sector; improvement in the competitiveness and efficiency of the sector; the achievement of a substantial change in the racial and gender composition of the ownership, control and management within the sector; addressing the critical skills shortage and skills development with a specific focus on women; and enhancing entrepreneurial development and sustainable development of black economic empowered SMME construction companies through strategic partnerships.

Preferential procurement interventions are comprised of mechanisms aimed at the engagement of SMMEs owned by previously disadvantaged persons in government contracts thus maximizing job creation. Preferential procurement ensures that participation in procurement activities is achieved through: making the tendering process accessible to the target group (without, however, guaranteeing work); and linking opportunities to target business enterprises. The long-term goal is to facilitate growth in the numbers and sizes of business enterprises owned and controlled by the target groups, as well as in terms of the efficiency and effectiveness of delivery.

According to Hawkins (2012), the combined achievement of infrastructure project delivery objectives and incorporation of social development opportunities (for example, contractor development) during the process of design, procurement, implementation and operation has the potential to increase the contribution of investment in infrastructure towards economic growth, poverty reduction and attaining sustainable development goals (Hawkins, 2012). Depending on how procurement strategies are structured to incorporate social development opportunities, the process of procuring infrastructure assets can be as significant as the constructed assets itself (Gounden, 2000; Hawkins, 2012).

The adoption of preferential procurement policies in South Africa as a vehicle for contractor development, in a practice called Targeted Procurement is well-documented in literature (Adediran and Windapo, 2017a; London 2008; Shakantu 2012; Watermeyer 2003). Similar to the Malaysian NEP model, Targeted Procurement was introduced to promote the participation of targeted enterprises and targeted labour in government infrastructure contracts (cidb, 2008a; Ofori, 2009; Jacquet and Noyana, 2001; Watermeyer, McCrudden, 2004). However, unlike the Malaysian model which provided set-asides exclusively for the Bumiputras, Targeted

Procurement was not designed to exclude any enterprise from tendering (Letchmiah, 2012). The South African model was intended to usher in an evolution from past inefficient prescriptive instruments used by governments as procurement interventions for SMEs, to more effective options where incentives or benefits are awarded for achieving or improving on predetermined performance goals (Watermeyer, 2000). Furthermore, Targeted Procurement was developed to enable implementation of the Ten Point Plan and satisfies the framework set out in the PPPFA (Letchmiah, 2000).

The cidb (2017b) defined a targeting strategy as an approach which is pursued to make a contract participation goal (CPG) an obligation of contract. A CPG, in the case of targeted enterprises, is the amount equal to the value of goods, services and works for which the contractor contracts the targeted enterprises in the performance of the contract, expressed as a percentage of the tender value (cidb, 2017b). The Malmesbury prison complex project of 1996 with a CPG of 30% was the first Targeted Procurement project in South Africa (Watermeyer, 2000). Target Procurement has since become an innovative government procurement intervention strategy designed and used by public-sector clients in the construction industry to achieve the state entities' 'contractor development goals' which are included as relevant criteria for contract award. Prior to inviting the submission of bids, the client entity establishes the objective to be derived from the procurement process, and a limited range of targeting strategies are selected, which are to be defined and activated in the tender documents. These objectives are defined as contract-specific goals and tender evaluation points are awarded in a competitive and flexible process to motivate the potential contractor to optimise the use of, for example, local SMEs (Hawkins, 2012). Hence, Targeted Procurement allows preferential procurement policies to be implemented and enables social objectives to be linked to procurement in a fair, transparent, equitable, competitive and cost-effective manner; it also permits these objectives to be quantified, measured, verified and audited.

The Department of Public Works (DPW) introduced innovative Targeted Procurement strategies in 1996 as part of national procurement reforms to address past imbalances and stimulate SMC growth and development (Shakantu 2012; Watermeyer et al., 1998). The various government Targeted Procurement strategies used in public procurement in the South African construction industry include (Watermeyer, 2000, 2005, SANS, 2003, 2004; cidb, 2008b; Letchmiah, 2012): unbundling of contracts, mandatory subcontracting, preferencing,

third-party management, tendering equity, and accelerated rotations. They are further described in Table 2.4.

Table 2.4: Targeted Procurement strategies used in the construction industry

Targeted Procurement strategy	Description
Unbundling of Contracts	The client break contracts down into smaller packages to facilitate the participation of SMCs as prime contractors.
Mandatory Subcontracting	In Mandatory Subcontracting, the client requires larger prime contractors to subcontract a portion of the works (for example, 20% contract sum) to SMCs using prescribed procurement procedures.
Preferencing	Preferencing involves the client granting tender evaluation points to contractors who satisfy prescribed preferencing criteria (for example, joint ventures between large and small contractors).
Third-party Management	In Third-party Management strategy, the client appoints a larger established contractor(s) and/or consultant(s) to provide construction, materials and management support as appropriate, and mentor SMCs in the execution of contracts as prime contractors and monitor satisfactory progress of their work.
Tendering Equity	Tendering Equity is when the client requires tenderers to have minimum levels of equity when tendering for certain type of contracts (for example, >50% black women ownership).
Accelerated Rotations	Accelerated Rotations refers to when the client uses electronic databases to accelerate the rotation of targeted enterprise through the quotation roster to ensure that target groups have more opportunities for the preparation of quotations and hence a greater chance of success.

Source: cidb (2008b); Letchmiah (2012); SANS (2003; 2004); Watermeyer (2000; 2005)

Targeted Procurement, through a variety of techniques, can provide opportunities for participation by targeted enterprises, even to those who may not have all the necessary resources, capacity or expertise in their own right to perform contracts. However, this is done in a manner which does not guarantee contracts to these enterprises. On small contracts having a value below a predetermined financial threshold, direct preferences are accorded to targeted enterprises to tip the scales in their favour. On contracts above a financial threshold, tenderers are required to compete on the basis of both the product and the process. The use of Targeted Procurement enables contracts to be awarded in a number of ways, viz. (SANS, 2003; 2004; Watermeyer, 2000): by procuring works in the smallest practicable quantities; by obligating prime contractors to engage SMEs in the performance of their contracts in terms of resource specifications; by requiring joint venture formation between large businesses and SMEs (known as Structured Joint Venture); and by providing third-party management support to enterprises which are not capable of operating as prime contractors (known as Development Contracts).

Technical specifications are used to define the product and establish compliance criteria. Standardized resource specifications are used to define social objectives and establish compliance criteria. These specifications accordingly define the social deliverables which must be realized through the delivery process and set out the manner in which they can be achieved, measured and monitored. Contracts are awarded to the most advantageous offer, based on a balance between the tendered price and the tendered deliverables in respect of targeted groups. Targeted enterprises, depending upon the contracting strategy which is adopted, may participate in contracts as prime contractors, joint venture partners, subcontractors, service providers, manufacturers or suppliers. The preference system for Targeted Procurement is implemented via tender adjudication criteria that complies with the legislative framework of awarding tenders, whereby tenderers are required to meet both price and development goals. The Targeted Procurement specifications for construction are contained in the South African National Standards document – SANS 10396:2003 (Implementing preferential construction procurement policies using targeted procurement procedures).

Despite its widespread popularity, Targeted Procurement has come under some criticisms. Khatleli (2009) described the relationship between government clients and established large construction companies (whereby the established companies are compelled to unbundle work packages to accommodate emerging small businesses as subcontractors or joint venture partners) as a principal agent relationship characterised by moral hazard and adverse selection problems militated by asymmetric information favouring the established companies. Khatleli (2009) further opined that Targeted Procurement is structured such that successful empowerment of SMEs is effectively ceded to the private sector, that is, main contractors who serves to implement the government client's contractor development objectives through the Targeted Procurement project. He argues that this is problematic given that previously advantaged owners of large established companies have the capital, skills and experience skewed in their favour, and represent a significant majority of construction companies operating as main contractors in South Africa. However, Rogerson (2000) noted that best empowerment results occur where partnerships are formed between large established construction businesses and emerging enterprises.

2.6.4 Contractor development initiatives in South Africa

Construction industry development can be linked to the development of new entrant small businesses and existing small and medium enterprises. In most countries there are basic

constraints to growth, or barriers to entry, in the emerging business sector related to access to markets, credit, skills and supportive institutional arrangements (Gounden, 2000). Procurement interventions can provide direct access to markets and, as such, can address one of the main constraints to contractor development. Appropriate procurement policies are effective demand-side mechanisms for targeted businesses when applied correctly (Watermeyer, Jacquet and Letchmiah, 2000). However, for the full enablement of emerging construction businesses, specific supply-side measures are also required.

Supply-side interventions are essential to ensure that the demand created by government is balanced by the supply of businesses capable of meeting it. Government can improve this supply by minimizing barriers to small enterprise start up and operation. This is a particularly important consideration if the goal is to encourage emerging SMEs to develop into sustainable enterprises. Supply-side measures and the associated institutional arrangements for supply-side interventions are, as a result, dependent upon factors such as socio-economic policy choices, and targeting and contracting strategies (Gounden, 2000). The aim of empowering targeted small, medium and micro enterprises is to enable them to access the procurement process without guaranteeing work to them by competitive tendering, notwithstanding the preferencing advantages provided to the target groups.

In the South African construction industry, supply-side interventions have recently been implemented through contractor development programmes. The National Department of Public Works launched an Emerging Contractor Development Programme (ECDP) in 1997 to address supply side constraints facing black contractors in the construction industry and develop sustainable black owned and controlled businesses (Gounden, 2000; Letchmiah, 2012). The ECDP was focused on contractors who had the required technical skills, but were unable to source work opportunities from the public sector due to a lack of expertise in submitting quotations and tenders.

After the introduction of the ECDP, the National Contractor Development Programme (NCDP) framework was also launched by the cidb in partnership with national and provincial departments of public works and related stakeholders to: address certain growth constraints among previously disadvantaged contractors; develop sustainable contracting capacity in the construction industry; and promote equity ownership across the different cidb grades and categories (Adediran and Windapo, 2016a; DPW and cidb, 2011). The impetus for introducing the NCDP was due to the lack of a co-ordinated and consistent approach to contractor

development (Adediran and Windapo, 2016a). Lessons and progress learnt from some of pre-existent CDPs were also incorporated into the NCDP framework. The NCDP framework also established the parameters for implementation of CDPs, known as 'guidelines' for implementing contractor development (Adediran and Windapo, 2016a).

One of the key principles which underpins the NCDP stipulates that government entities may use procurement of infrastructure as a means to achieve contractor development. According to the NCDP framework, various instruments may be used to support the contractor development process, the two main instruments include (Adediran and Windapo, 2016a; cidb, 2011a; DPW and cidb, 2011): CDPs and procurement-driven models. CDPs operate based on a direct targeting model that provides structured developmental support and direct contracting opportunities to contractors which is targeted to achieve predetermined developmental objectives. While procurement models provide developmental support by indirect targeting through a main contractor to a developing joint venture partner or sub-contractor. The main component of the NCDP focuses directly on the development of contractors and comprises several sub-components starting at the emerging contractor stage and progressing to the stage which seeks to develop the contracting enterprises (cidb, 2011a).

The DPW also established a Contractor Incubator Programme and the Expanded Public Works Programme (EPWP) in 2004 to promote sustainable development by providing mentorship, training and support to targeted SME contractors that demonstrates the potential to perform contracts up to R30 million (cidb, DPW and Construction Education and Training Authority, 2005). The EPWP is targeted mainly at the creation of work opportunities particularly using unskilled labour by directing government grants toward labour-intensive activities in the construction industry. The EPWP has a contractor learnership programme (*Vuk'uphile*) aimed at developing trained and experienced contractors and supervisors who can respond to the increased demand from provinces and municipalities for labour-intensive services (EPWP, 2006).

2.7   SUPPLY CHAIN RELATIONSHIP QUALITY IN THE CONSTRUCTION INDUSTRY

Characterised as a labour-intensive, project-based and location-specific industry within which individual projects are custom-built to the specifications of clients (Loosemore, Dainty and Lingard, 2003; Wild, 2002), the construction industry requires not only the setting up of temporary organisational structures at sites but also the employment of professionals,

technicians and skilled and unskilled workers to form project teams to execute projects (Debrah and Ofori, 2001a; Fellows et al., 2002). Atkins and Gilbert (2003) note that a construction project environment is characterised by groups of individuals working together for short periods of time before being disbanded and redeployed elsewhere within the organisation. In addition, the industry is considered to be often filled with crises, uncertainty and suspense, and the short-term interaction of project teams requires the combined and effective use of superior technical knowledge, skills and expertise with appropriate behaviour and co-ordination.

In the construction industry, most working relationships usually start at the beginning of projects, and they are governed by standard forms of contracts formulated to assign responsibilities and liabilities to the contracting parties. Such working relationships are usually transactional contracts, and they do not always facilitate good working relationships because the goal is to place blame where there is liability (Jelodar et al., 2016). As a result, construction projects are often characterized by a highly fragmented supply chain (and a less fragmented demand side) that is organized and linked via supply chain relationships (Oyegoke et al., 2009). Consequently, this has led to the introduction of pro-collaboration contracts known as relational contracts to stimulate better quality of relationships (Cox and Thompson, 1997; Hong et al., 2012). Relational-based contracting has relationship quality attributes (based on principles of good faith, commitment and mutual trust) that represent measures of assessment of the relationships in a project organisation (Jelodar et al., 2016), and it has been found to be particularly important in project partnering and project alliances (Suprapto et al., 2014).

Projects are dynamic systems requiring agile and reciprocal relationships between stakeholders (Davis, 2014; Svejvig and Andersen, 2015). Pryke (2006) held that the construction project is a network of relationships between firms that make up the project supply chain. The project-based nature of construction procurement (Meng, 2012) suggest that firms are often required to manage complex and usually unfamiliar, temporary networks and relationships (Sedita and Apa, 2015). A number of industry reports (for example, cidb, 2004a; DPW, 1999; Egan, 1998; Latham, 1994; Wolstenholme, 2009), particularly in the UK, have documented the fragmented organisational structure of the construction industry, which has inhibited the development of efficient supply chain relationships and an impediment to industry development. Emuze and Smallwood (2014) opined that fragmentation usually starts upstream of the supply chain and extends downstream with prime contractors mainly engaged in supervision of their subcontractors and suppliers.

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The construction industry has been described as one which is driven by short-term profit maximisation where opportunism is prevalent, communication is minimal, relationships are adversarial and characterised by a lack of trust, and this has been largely attributed to the use of traditional procurement systems (Ren et al., 2012; Zuppa et al., 2016). Akintoye and Main (2007) attributed the primary causes of the current poor relationships to a lack of communication, lack of trust, misaligned business cultures, poor attitudes and lack of management support. Similarly, Zuo et al. (2013) reported that poor communication, lack of trust and low co-operation levels are common problems in the industry that have led to adversarial relationships among project stakeholders.

Insufficient literature on supply chain relationships exists in South Africa. Emuze and Smallwood's (2014) study assessed the level of collaborative working among project partners in South African construction and explored relationship quality elements such as trust and risk allocation among contractors and subcontractors. They reported that collaborative working is still at best a 'work in progress' in South Africa, with collaboration-related issues similar to those in the UK; characterised by short-term objectives, price-oriented approach, and the existence of poor problem-solving mechanisms between project partners. They further attributed the prevalent adversarial relationships on project teams to a lack of trust, cumbersome contract conditions, unfair risk allocation and tender selection processes. The cidb (2013) also reported poor working relationships between subcontractors and prime contractors in South Africa driven by tight profit margins, unfavourable payment practices, and lack of continuous work.

The use of project procurement and contracting methods that promote collaborative working relationships for construction industry development is well-documented in literature (Cox and Thompson, 1997; Jelodar et al., 2016). Although the use of traditional procurement methods is still being adhered to (Akintoye and Main, 2007; Eriksson and Laan, 2007; Kashwagi and Byfield, 2002; Windapo et al., 2016), there is an increasing shift towards strategies that focus on building and managing relationships which positively impacts project performance. Eriksson and Laan (2007) reported that effective relationship management through building trust, respect, commitment and communication enhances project quality, improves conflict resolution and minimizes time and cost overruns. Bennet and Jayes (1998) suggested that a wide range of performance criteria (for example, costs, time, quality, buildability, and fitness-for-purpose) can be improved if project organisations adopt more collaborative working

procedures. Collaborative project networks increase the capabilities of small contractors, and benefit large contractors by minimizing direct workforce employment, promoting specialized technologies, facilitating competitiveness and improving overall capability (Alvarez and Barney, 2001; Arslan et al., 2008). Project networks have also been found to facilitate organisational learning (Barringer and Harrison 2000), enable efficient knowledge transfer (Uzzi, 1997), and increase firm performance (Matinheikki et al. 2016).

A large body of literature has recognised the importance of project networks and quality of relationships in business-to-business conditions (Fruchter and Simon, 2005; Grönroos, 2011; Grönroos and Helle, 2012; Harker and Egan, 2006), as well as in project management context (Zou et al., 2014). Toor and Ogunlana (2010) contend that project success should include the project's impact on relationship quality as additional metrics, and should be evaluated after project completion (as cited in Williams et al., 2015). Williams et al. (2015) highlighted that effective agile project management is based on high levels of interaction, collaboration, responsiveness, and joint problem solving. Mir and Pinnington (2014) also found that inter-organisational teamwork was an important project success factor, and Zou et al. (2014) reported that active client relationship management leads to better project performance as the relationship changed across project phases. Jelodar et al. (2015) and Meng (2012) found that systems, procedures, and methods thrive in suitable levels of relationship quality. Moreover, the quality of relationship between project organisations play a key role in enabling the formation of strong ties and willingness to develop cooperation (Holmlund, 2008) which has been found to have a direct impact on value-creation such as knowledge and resource sharing, and skills transfer (cidb, 2013; Lechner et al., 2010). Relationship quality has also been identified as a long-term orientation that leads to more collaboration and coordination (Ahola et al., 2008; Holmlund, 2008), where are central aspects of project execution.

2.8 OVERVIEW OF SUPPLY CHAIN RELATIONSHIP MODELS

The relationship quality phenomenon is based on supply chain management (SCM) concept which aims to integrate the interests of all stakeholders (suppliers and customers) towards a common goal (Brown et al., 2001a; Cox and Townsend, 1998; Oyegoke et al., 2009). Emerging in the purchasing and supply sector in the mid-1990s, supply chain relationship models has subsequently been introduced in the construction industry to describe, measure and improve the relationships between the key partners of a construction supply chain (Adediran and Windapo, 2017b). Seven supply chain relationship models identified in this study through a

review of extant literature are: the Client-Contractor Working Relationship Model (Larson, 1995), the Model of Partnering (Ellison and Miller, 1995), the Construction Industry Institute's (CII) Partnering Continuum (Thompson and Sanders, 1998), the Best Practice in Partnering Group's (BPiPG) Partnering Positioning Matrix (Jones and O'Brien, 2003), the Strategic Forum for Construction's (SFfC) Supply Chain Maturity Assessment Grid (SFfC, 2003), the Supply Chain Position Matrix (Hines, 1994), and the Supply Chain Relationship Maturity Model by Meng et al. (2011) (as cited in Adediran and Windapo, 2017b). Table 2.5 provides a summary of the comparison of these seven models.

Six of the models are all related to the construction industry, while Hine's Supply chain position matrix is a comprehensive model developed in the purchasing and supply sector that provides a good comparison with construction-specific models (Adediran and Windapo, 2017b). Three of the construction-oriented models focus on the relationships between clients and main contractors, and have not paid attention to downstream relationships where majority of SMEs in the construction industry are clustered (Adediran and Windapo, 2017b). Except for Meng et al.'s supply chain relationship maturity model, the other three models that try to examine the supply chain as a whole have limited use in practice as they are only applicable to integrated supply chains, which makes them difficult to use when different types of relationship quality exist in different parts/tiers of the supply chain (Adediran and Windapo, 2017b). Three of the models (Ellison and Miller's, CII's, and BPiPG's model) are further characterised by either inappropriate definition of relationship quality levels, and/or biased towards the collaborative end of the relationship quality spectrum by establishing one level for a traditional relationship and three levels for different partnering (Adediran and Windapo, 2017b; Meng, 2010; Meng et al., 2011). However, evidence shows that most contracting relationships in the construction industry are still very traditional, as partnering is yet to be fully entrenched in construction practice (Briscoe and Dainty, 2005; Meng et al., 2011). Hine's, Larson's and Meng et al.'s model establishes two levels each for traditional relationship and collaborative relationship.

Table 2.5: Comparison of supply chain relationship models

	Larson (1995)	Ellison and Muller (1995)	CII (1998)	BPiPG (2003)	SFfC (2003)	Meng, Sun and Jones (2011)	Hines (1994)
Focus	Working relationship in construction	Problem-solving in construction	Partnering practice in construction	Partnering practice in social housing	Construction Supply chain management	Construction Supply chain management	Generic customer-supplier relationship
Scope	Client-contractor	Client-contractor	Client-contractor	Whole supply chain	Whole supply chain	Any customer supplier relationship	Any customer supplier relationship
Type of relationship	One-to-one	One-to-one	One-to-one	Multiparty	Multiparty	One-to-one	One-to-one
Number of relationship quality levels	4	4	4	4	3	4	4
Criteria descriptions	General descriptions at each level	General descriptions at each level	General descriptions at each level	General descriptions at each level	Detailed descriptions of 20 criteria at each level	Detailed descriptions of 24 criteria at each level	Detailed descriptions of 29 criteria at each level

CII: Construction Industry Institute; BPiPG: Best Practice in Partnering Group; SFfC: Strategic Forum for Construction
Source: Adapted from Meng et al. (2011)

In comparison to the other six models, Meng et al.'s supply chain relationship maturity model builds on the inherent weaknesses of the other models such as the incomplete coverage of key criteria. For example, Larson's model does not include communication as a key criterion, while SFfC's model does not cover trust and problem-solving. Meng et al.'s model is a robust systematic model that explores the specific characteristics of the construction industry project network for example, the existence of different types of relationships at different tiers of the project supply chain. Developed in the UK construction industry based on literature review and expert group discussion, the model adopts the capability maturity approach (Paulk et al., 1993), and establishes four relationship quality maturity levels in matrix format with 24 assessment criteria in eight categories at each of the four maturity levels (see Meng et al., 2011). Based on this comparison, Meng et al.'s (2011) model is best suited for assessing construction supply chain relationships, and it will be adapted in this study to measure. For this study, thirteen assessment criteria in seven categories at each of the four maturity levels are proposed (see Table 2.6).

According to London (2008) and Meng et al. (2011), relationship quality varies from project to project, and different types of relationships may exist at different tiers of the construction project supply chain. Table 2.6 shows that the relationship in a supply chain at one tier might be collaborative (RQ 4) while the relationship at another tier may be traditional (RQ 1), hence it is necessary to examine different detailed relationships (Adediran and Windapo, 2017b). The adopted relationship quality maturity model therefore focuses on specific one-to-one relationships between SMCs and other key parties of the construction supply chain rather than the whole supply chain. For example, between client and contractor if the SMC has a direct contracting relationship with the client, otherwise between main contractor and subcontractor, or one subcontractor and another supplier in the downstream supply chain. This will allow for a robust understanding of the nature and quality of these relationships.

Table 2.6 shows that the key component of the model that sums up the levels of relationship quality are the four maturity levels which describe the progression of relationship maturity or improvement from adversarial, through limited cooperation and short-term collaboration, to close and long-term collaboration. They are (Meng et al., 2011): Price competition (RQ 1), Quality competition (RQ 2), Project partnering (RQ 3), and Strategic alliance (RQ 4). Figure 2.1 illustrates the conceptual relationship quality model. The relationship quality at RQ 1 is

Table 2.6: Relationship quality matrix for the study

Main criteria	Sub-criteria	RQ 1 (*Price competition*)	RQ 2 (*Quality competition*)	RQ 3 (*Project partnering*)	RQ 4 (*Strategic alliance*)
Procurement	Selection criteria	Lowest price	Cost and quality	Multi-criteria (capability, experience, performance, cost) from short-term perspective	Multi-criteria (capability, experience, performance, cost) from long-term perspective
	Procurement method	Traditional single-stage tendering	Traditional two-stage or direct negotiated tendering	Integrated design and build	Integrated joint venture partnering or strategic alliance
	Form of contract	JBCC® Principal Building Agreement (PBA)	General Conditions of Contract (GCC)	FIDIC Conditions of Contracts for Construction - The Red Book	NEC3 Engineering and Construction Contract (ECC)
Objectives alignment	Objectives alignment & benefits	Only self-objectives leading to win-lose outcome	Mainly self-objectives leading to win-partial win outcome	Mutual objectives in the short-term leading to win-win short-term outcome	Mutual objectives in the long-term leading to win-win long-term outcome
	Continuity of work	No prospect of future work	Prospect of future work exists through competitive tendering	Prospect of future work exists as preferred supplier	Future work is guaranteed
Communication	Information exchange	Little information exchanged openly and timely	Some information exchanged openly and timely	Much information exchanged openly and timely	Most information
	Learning and innovation sharing	No learning and innovation sharing	Limited learning and innovation sharing	Much learning and innovation sharing	Continuous learning and innovation sharing
	Cost data transparency	No cost data transparency	Limited cost data transparency	Open book cost data transparency	Continuous open book cost data transparency
Collaboration	Working relationship	Confrontational or arm's-length relationship	Limited cooperation	Collaboration	Close collaboration and integration
Risk allocation	Risk sharing & allocation	No risk sharing and risk 'always' allocated to weaker party	Limited risk sharing and risk 'often' allocated to weaker party	Increased risk sharing and risk allocated to the party best able to manage it short-term	Risk sharing is common practice and risk allocated to the party best able to manage it long-term
	Balance of risk and reward	No rewards for taking risk	Some rewards for taking risk	Often appropriate rewards for taking risk	Always appropriate rewards for taking risk
Joint problem-solving	Problem-solving effectiveness	Problems often lead to disputes	Problems sometimes lead to disputes	Some problems are timely resolved at the lowest level	Most problems are timely resolved at the lowest level
Trust	Type of trust	Contractual trust leading to little confidence in others	Competence trust leading to some confidence	Short-term goodwill trust leading to much confidence	Long-term goodwill trust leading to full confidence in others

RQ: relationship quality
Source: Adapted from Meng et al. (2011)

characterized by self-interest, mistrust, lack of mutual objectives, and win-lose business philosophy that results in adversarial or arms-length relationships. RQ 2 is characterized by partial win-win benefits, and trust is mainly built on the capability of each party to execute quality work; this can be seen as a transition from traditional/separated to a hybrid of separated-collaborative contracting relationship to achieve project objectives. At RQ 3, mutual objectives are achieved on a single project, partners work together collaboratively as an integrated project team, goodwill trust and win-win attitude foster the project partnering relationship. At RQ 4, objectives are aligned over a series of projects, close collaboration is achieved across the whole supply chain, high degree of trust exist between parties, and an attitude of joint problem-solving and continuous improvement is adopted. The model presented in Figure 2.1 and the matrix in Table 2.6 will be adopted in obtaining information on SMCs' experience on public-sector Targeted Procurement projects, using a questionnaire survey.
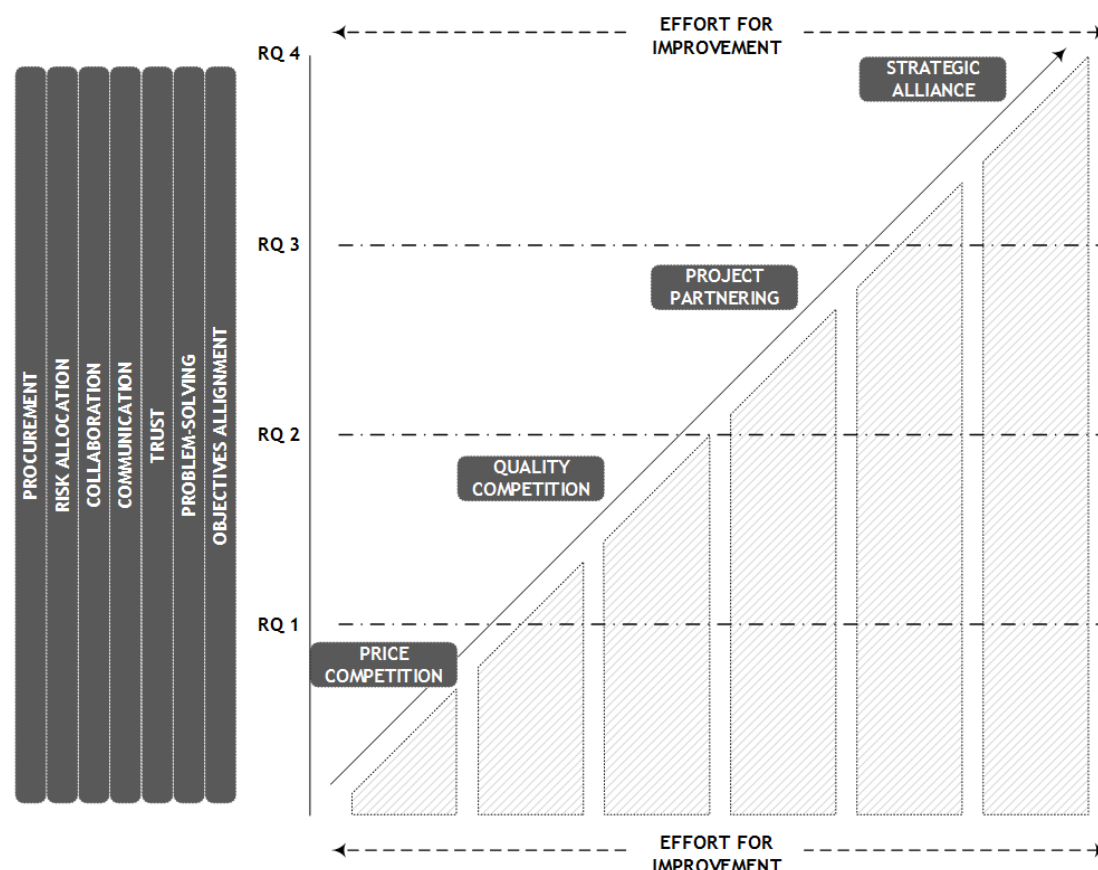
Figure 2.1: Relationship quality model for the study

2.9 RELATIONSHIP QUALITY ASSESSMENT CRITERIA

The previous section presented the supply chain relationship quality model developed for the study. The 13 assessment criteria classified into seven main criteria used in this study comprise

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of: Procurement (selection criteria, procurement method, form of contract), Objectives alignment (objectives alignment & benefits, continuity of work), Communication (information exchange, learning and innovation sharing, cost data transparency), Collaboration (working relationship), Risk allocation (risk sharing & allocation, balance of risk and reward), joint problem-solving (problem-solving effectiveness), and Trust (confidence in others' behaviour). They are discussed in subsequent sections.

2.9.1 Procurement

Procurement and by extension contracts are the foundation in building supply chain relationships (London and Henley, 2001). Procurement criterion encompasses the selection criteria, procurement method, and form of contract. Selection criteria identifies the basis for selecting the contractor for example, lowest price or multi-criteria of capability, experience, performance, cost (Fong and Choi, 2000; Meng et al., 2011). Building contractor selection process is critical for clients on construction projects (Sarkis et al., 2012). Procurement method identifies whether traditional single-stage tendering or two-stage tendering, or an integrated method is used to select the contractor. Form of contract identifies which form of contract is used. The commonly used forms of contract in the South African construction industry that satisfy the cidb requirements and are in accordance with the provisions of SANS 10403 are (cidb, 2005): FIDIC Conditions of Contracts for Construction - The Red Book, 1999 published by the International Federation of Consulting Engineers; General Conditions of Contract for Construction Works (GCC 2004) published by the South African Institution of Civil Engineering; JBCC® Principal Building Agreement (PBA) 2000 published by the Joint Building Contracts Committee; and NEC3 Engineering and Construction Contract (ECC) published by the Institution of Civil Engineers, UK.

2.9.2 Objectives alignment

Successful supply chain collaboration is ensured by common objectives and mutual benefits (Meng et al., 2011). The supply chain management concept aims to integrate the interests of all project stakeholders towards a common goal (Brown et al., 2001a; Oyegoke et al., 2009). The objectives alignment criterion includes: objectives alignment and benefits, and continuity of work. Objectives alignment and benefits assess whether project supply chain parties are self-interested or interested in mutual objectives and win-win benefits. Short-term objectives and price-oriented approach which persists in the industry is detrimental to core capability development, and the achievement of sustainable competitive advantage in the construction

industry (Ingirige and Sexton, 2006). Continuity of work assesses the prospect for future work for the contractor with the client or prime contractor, and under what conditions.

2.9.3   Communication

Communication is an important factor in building supply chain relationships (Jiang et al., 2011), it facilitates information exchange and learning between project supply chain parties (Meng et al., 2011). Open and honest communication improves procurement relationships as it facilitates problem-solving and enhances transparency (Ling and Tran, 2012; Wood et al., 2002). Communication criterion encompasses information exchange, learning and innovation sharing, and cost data transparency. Information exchange assesses how much information is exchanged openly and freely between the project supply chain parties. Learning and innovation sharing assesses whether learning and innovation is shared between the parties. Cost data transparency assesses how much cost data are transparent and whether open book costing is adopted. Transparency is an essential element in building trust as a means of improving relationship quality (Nijhof et al., 2009).

2.9.4   Collaboration

Collaboration reflects whether the project supply chain parties work collaboratively together and how close the parties work together (Meng et al., 2011). Embracing collaborative working concepts within the supply chain creates value in the construction process (Davis, 2008). Collaboration criterion includes working relationship which assesses the type of working relationship that exist between the project supply chain parties, for example, confrontational, cooperation or collaborative working relationship. Collaborative working is the ability of parties to agree on mutual objectives, decision-making processes and problem resolution systems while focusing on improving their performance (Bennett and Peace, 2006). It eliminates fragmentation, duplication and distrust in the construction process (Shelbourn et al., 2007).

Despite the perceived benefits of collaborative working, Arend and Wisner (2005) highlighted two potential problems for SMEs when considering to enter into cooperative relationships with supply chain partner, they risk: becoming potential acquisition targets of larger firms when the supply chain is successful; and being bullied into a closer relationship to be easily exploited by the larger firm for example, learning its innovative methods. Indeed, large contractors typically acting as prime contractors in a collaborative network were found to gain stronger advantage where they have more bargaining power in negotiating subcontracts with many pools of smaller

contractors (Park et al., 2011). Empirical evidence also suggest that large contractors achieve more profit gains when they associate with many smaller contractors as it allows them to select contractors with the lowest price rather than engaging a known contractor in their network (Park et al, 2011). Park et al. (2011) also reported that collaborative relationships characterised by self-interest and profit-seeking inclinations causes a mismatch between firms in such alliances due to the fundamentally dissimilar motivations of forming the collaborative venture.

2.9.5 Risk allocation

Risk allocation describes how project risk is allocated and the reward for taking on risk is given (Meng et al., 2011). Risk allocation criterion encompasses risk sharing and allocation, and balance of risk and reward. Risk sharing and allocation assesses whether the project supply chain parties are willing to share the risks or not, and whether risk is allocated to the weak party or allocated to the party who is best able to manage it. Balance of risk and reward assesses whether there is appropriate reward for the party who takes on risk.

2.9.6 Joint problem-solving

Joint problem-solving ensures collaborative working and project success (Meng et al., 2011). Inefficient and ineffective problem-solving mechanisms contribute to poor performance in the construction industry (Emuze and Smallwood, 2014). Zenger and Folkman (2002) found that problem-solving is associated with organisational effectiveness. Cox and Blake (1991) also argued that organisations arrive at better decisions through in-depth evaluation inherent in the attributes of joint problem-solving. Joint problem-solving criterion includes problem-solving effectiveness which assesses whether problems are solved jointly at the lowest possible level as quickly as possible, and whether a learning mechanism is in place to avoid the repeat of similar problems.

2.9.7 Trust

Trust in procurement and relational exchange processes has been defined as the belief by one party that the other party whose behaviour is beyond their control will fulfil its obligation in a relationship and will not take advantage of them (Hefferman, 2004; Kwon and Suh, 2005; Sahay, 2003). Trust has a significant influence on the relationship quality between project supply chain parties, which can be inhibited by the short-term nature of construction projects (Wong and Chen, 2004; Zuppa et al., 2016). Trust criterion includes confidence in others' behaviour which assesses whether a party has confidence in others' behaviour and the reliability of the received information. Small contractors were generally found to prefer

associating with a partner they have cooperated with before (Gils and Zwart 2009; Rezgui and Miles 2010), as they experience difficulties in forging and managing trusting multi-partner collaborations (Hoffmann and Schlosser 2001). However, Alvarez and Barney (2001) argued that small contractors can build trustworthy relationships through long-term connections.

2.10 MEASURES OF SMC GROWTH AND DEVELOPMENT

"Growth for the sake of growth is the ideology of the cancer cell."

- Abbey (1977:183)

"... as long as we are unable to put our arguments into figures, the voice of our science, although occasionally it may help to dispel gross errors, will never be heard by practical men."

- Schumpeter (1933:12, as cited in Avanzini, 2011)

"Firm growth is a complex phenomenon. It is not uni-dimensional. It is hard to predict and assess. Further, it can manifest itself in various ways, and consequently it can have differential effects on several different levels."

- Davidsson, Delmar and Wiklund (2006:5)

2.10.1 Defining and conceptualizing (small) firm growth and development

Small firm growth theorists (Davidsson et al. 2005; Delmar et al., 2003; Penrose 1959, 1995; Starbuck 1971) refer to growth as the change in an organisation's size – a multidimensional phenomenon that necessarily happens over time. Whereas, development is an aggregation of the firm's post-entry performance measured by qualitative or quantifiable growth indicators over a period (Teruel-Carrizosa 2006). Firm growth is also closely and frequently associated with business success (Baum et al., 2001; Kiviluoto et al., 2011). Reynolds and Ablett (1998) also referred to organisational development as an ongoing system-wide development approach that seeks to improve both productivity and efficiency. Stewart (2005) further noted that organisational development programmes have characteristics that are in line with the principles of learning organisations.

Previous growth studies can be classified into three broad 'conceptual' streams (McKelvie and Wiklund, 2010): growth as an outcome (studies that empirically or conceptually viewed growth as a dependent variable and used a set of independent variables to explain variance in the growth outcome); the outcome of growth (studies that treats growth as a variable that influences

other variables); and the growth process (studies that treated growth neither as an independent variable, nor as a dependent variable, but instead was interested in the actual growth process) (McKelvie and Wiklund, 2010). This study falls into the 'growth as an outcome' research stream, using Targeted Procurement strategies to predict the growth performance and development of small and medium-sized companies in the construction industry.

Unlike large firms that tend to grow through acquisitions, small firms usually grow organically (McKelvie et al., 2006; Penrose, 1959). Coad and Hölzl (2010) note two basic approaches to measuring firm growth – the absolute or relative. There is a general preference in the literature for the use of relative over absolute measures (Kiviluoto et al., 2011). However, the measure of absolute growth has been preferred in the literature on the growth of small firms, and it examines the actual change in firm size (Coad and Hölzl, 2010). In the analysis of firm growth from the change-in-size perspective, growth has been measured with a range of different indicators in the literature; the most frequently suggested being sales, revenue, employee size, assets, physical output, market share and profits (Ardishvili et al., 1998; Delmar, 1997; Weinzimmer et al., 1998; Wiklund, 1998; as cited in Adediran and Windapo, 2016b). In specific industry studies, more specialized measures are conceivable (Adediran and Windapo, 2016b; Davidsson et al., 2005). For example, in construction, increase in turnover and employment are the most frequently used by scholars in construction management research (Abu Bakar et al., 2011; 2012; Hillebrandt and Cannon, 1990; Ofori and Chan, 2000; Tucker et al. 2015). Hillebrandt and Cannon (1990) however posited that the growth of a construction firm may be measured by the value of assets, corporate turnover, profits, number of employees and share prices. Coad and Hölzl (2010) and Davidsson and Wiklund (2000) contended that there is not one single best approach to measuring organisational growth, and the choice of the appropriate way depends on the industry under consideration and the research question.

2.10.2 Approach to growth and development measures

Measuring an organisations growth performance and development provides viable and useful information to decisionmakers on the outcomes of adopted strategies, ensuring they remain effective to sustain competitive advantage (Oyewobi, 2014; Robson, 2005; Seang, 2003). Achtenhagen et al. (2010) argued that there is disparity in organisational growth literature over which measures to use in empirical studies, causing a fragmented theory base. Kiviluoto et al. (2011) found that there is a clear preference among researchers for objective measures over subjective measures. Achtenhagen et al. (2010) contended that the simplified (objective) conceptualization of growth used in empirical studies by researchers differs from the

practitioner's view where growth is a more complex (subjective) phenomenon with a strong emphasis on internal development. Firm growth has been measured in terms of inputs (investment funds, employees), outputs (sales, revenues, profit), or value of the firm (assets, market capitalization, economic value added elements); each being subject to limitations as a growth indicator (Abu Bakar et al., 2011). Earlier seminal studies (for example, Penrose, 1959) have differentiated between growth as an 'increase in amount' and as an 'internal process of development.' Achtenhagen et al. (2010) further argued that to successfully link theory and practice, organisational development should be defined, measured and studied in a way that is meaningful and relevant to entrepreneurial practice.

Organisational growth has been conceptualized and measured in a number of different ways (Davidsson and Wiklund, 2000; Wiklund, 1998). Richard et al. (2009) cited three common approaches to measuring growth performance and development in organisations. The first approach involves a single measure being adopted on the basis that there is link between that measure and organisational performance (for example, Hawawini et al., 2003; Spanos et al., 2004). In the second approach, the researcher applies diverse measures to produce analysis with dissimilar outcomes but identical predictive variables (for example, Baum and Wally, 2003). The third approach combines outcome variables, based on correlation between them through convergent validity (for example, Cho and Pucik, 2005).

This study considers growth performance and development measures from the third perspective where different objective and subjective measures are combined. The study adopted multiple quantifiable economic and qualitative social indicators to measure small and medium-sized contractor (SMC) growth and development in relation to Targeted Procurement objectives (Coad and Hölzl, 2010). This follows Delmar's (1997) suggestion that the use of multiple indicators may best represent the theoretical concept of growth. Achtenhagen et al. (2010) supported this view and suggested that reporting results along a range of different growth indicators should become a widely accepted approach in future publications. Moreover, the use of multiple indicators is a common feature in organisational growth studies (Achtenhagen et al., 2010; Delmar, 1997). Furthermore, the multiple indicators adopted captures the complexity and multidimensionality of growth processes (Achtenhagen et al., 2010), which has not found much scholarly or policy attention so far (Achtenhagen et al., 2010; Davidsson et al., 2006). The adopted indicators of SMC growth performance and development are discussed further in the subsequent sections.

2.10.3 Economic indicators of SMC development

Economic indicators of SMC development in the context of this study are the objective or quantifiable measures of an organisation's growth performance, which includes both financial and non-financial indicators (Coad and Hölzl, 2010). The financial indicators are turnover and profits, while the non-financial indicators are assets (plant and equipment) and number of employees.

2.10.3.1 Turnover

Turnover is the volume of construction contracts or work opportunities obtained by a construction firm over a certain period of time, usually a year (Armstrong, 2006). However, SMEs face challenges of lack of market exposure or access to sustainable work opportunities, which has a negative impact on the ability of the small businesses to create sustainable employment and foster economic empowerment (Rebello, 2005; Cheetham and Mabuntana, 2006; cidb, 2006). Consequently, governments of many countries have attempted to provide work opportunities through preferential procurement. Given that the primary objective of Targeted Procurement is to promote the participation of targeted businesses in public-sector contracts by providing greater access to work opportunities, one could argue that the increase in these businesses' turnover is the main goal. Coad and Hölzl (2010) suggested that turnover may best reflect the short and long-term growth changes in an organisation.

Achtenhagen et al. (2010) reported that increase in sales/turnover, along with profitability were cited as the most crucial growth dimensions to entrepreneurs. However, the entrepreneurs viewed a combination of different measures as relevant. In a review of 35 articles published in nine leading strategy, organisation, and entrepreneurship journals between 1981 and 1992, Weinzimmer et al. (1998) found that 83% of the studies used sales (turnover) as a measure of growth, with about 75% using sales as the only measure of growth. Kiviluoto et al. (2011) found a similar trend in their review of 118 empirical articles on firm growth performance. In an earlier review of 55 empirical studies (1989 – 1996), Delmar (1997) found that 31% of studies used turnover or sales as a measure of organisational growth. A later study by Achtenhagen et al. (2010) reported that the findings of the earlier reviews still largely hold with 42% and 27% studies using turnover and employees respectively as growth measures. The results from these reviews indicates that turnover is an essential measure of an organisation's growth and development. Moreover, annual turnover has been used as a dependent variable of growth performance in previous construction management research (Abu Bakar et al., 2011, 2012).

2.10.3.2 Assets

Assets are generally defined as any property including resources in the form of buildings or engineering works or components created by capital expenditure (Calvert et al., 2003). Assets comprise of fixed assets (assets that are relatively permanent, in that they are not held for sale or for conversion into cash but are retained as an instrument of production, or in order to earn revenue for example, land, buildings and machinery) and current assets (assets made or acquired for sale and conversion into cash, or assets in the form of cash in hand or money at the bank) (Calvert et al., 2003). Assets in the context of this study refers to fixed assets, particularly plant and equipment used in the execution of construction projects.

Asset growth is a commonly used indicator of firm growth (Coad and Hölzl 2010; Weinzimmer et al., 1998). Although some scholars are of the view that plant and equipment does not improve a contracting business' competitiveness since they can be easily bought, this is not always the case, especially for small businesses with limited resources. Moreover, Lubit (2001) and Tam and Harris (1996) argued that plant and equipment is a contributor to technical ability and thus a performance indicator for contracting businesses. Rasiah et al. (2014) asserted that companies must invest in more assets in the long-term in order to grow (and increase in size). Windapo and Cattell (2011) also suggested that lower graded contractors in South Africa should invest in fixed assets and maintain adequate cash reserves to enhance sustainable growth.

The capital-intensive nature of the construction industry requires contractors to acquire and retain their own plants and equipment while maximizing its utilisation. Tan et al. (2007) lists possession of plant and equipment along with its efficient utilisation and maintenance as an important indicator for measuring the technical ability of construction organisations. Fagbenle and Oluwunmi (2010) found that indigenous construction firms in Nigeria invest little or nothing in plants and equipment. The inability of SMCs to enhance their operational capacity through the acquisition of plants and equipment results in their employment as subcontractors on simpler less capital-intensive and more labour-intensive works, thus hindering their growth and development (cidb, 2013).

2.10.3.3 Size (Number of employees)

Total number of employees is one of the most commonly used indicators to measure an organisation's size (Bonaccorsi and Giannangeli, 2008; 2010). It is also the most used measure of organisational growth, along with sales/turnover (see Achtenhagen, 2010; Delmar, 1997;

and Kiviluoto et al., 2011). Coad and Hölzl (2010) argued that employment has certain advantages as an indicator of firm growth over turnover. For instance, measuring size in terms of employment reduces measurement problems compared to financial measures such as turnover as it does not require deflation. Coad and Hölzl (2010) further suggested that employment is more robust for measuring the growth of small firms, who are notorious for concealing true profits (Cressy, 2006). Kirchhoff and Greene (1998) also suggested that analysing new employment created over time by firms is the appropriate methodology for understanding the process of economic growth.

Becchetti and Trovato (2002) and Stam et al. (2006) reported a positive relationship between the size of an organisation and its growth. Rasiah et al. (2014) also suggested that a firm's ability to expand in size represent evidence of its success. Moreover, Windapo and Cattell (2011) reported that companies with relatively stable growth in number of technical employees exhibited growth in turnover, improved profit, increased cash position and fixed asset value; while companies with stronger growth in number of technical employees did not exhibit the same pattern. Achtenhagen (2010) argued that many studies take an increase in employment as an indicator of whether a company is growing successfully or not, even though many entrepreneurs have a much more sceptical view on employment. The OECD (2010) supported this view, stating that most firms do not wish to grow, especially in employment, even under favourable macroeconomic conditions. Nonetheless, the number of employees in an organisation constitute the organisation's human resources, which goes beyond mere numbers to further reflect the organisation's capacity.

Resources are an element of an organisation's strengths or weakness, and just as physical resources (financial, equipment, raw materials) can enhance or constrain productivity, so too can human resources (for example, experience, skills and training) (Armstrong, 2006). Employees represent a significant factor of an organisation's success (Cascio et al., 1999), and higher levels of strategic and human resource planning has been shown to have a significant impact on organisational competitiveness and performance, as well as higher productivity, greater cost effectiveness and greater overall efficiency (Ferris et al., 1990; Gratton et al., 1999). Inadequate human resource capacity in terms of skilled technical workers and professionals is often cited as the reason for poor performance of construction organisations (Morrison et al., 2003; Ogunlana et al., 1996; Wang, 2000). Abu Bakar et al. (2012) found that human factor was a significant factor contributing to the growth of construction companies in

Malaysia. This was aligned to an earlier study by Morrisson et al. (2003) who noted that human factor was considered as the key element determining small business prosperity.

In line with Armstrong's (2006) description of human resources, and Achtenhagen's (2010) claim on the sceptical position of practitioners on employment, this study conceptualises organisational size as the number of permanent and skilled employees in an organisation. Moreover, in the specific context of this study, there seems to be a cyclical link between contractor development initiatives and job creation. Von Broembsen (2005) alluded that there is a mismatch between policy objectives of promoting SMEs as both vehicles of poverty alleviation and agents of employment generation thus ignoring their training and education which compromises the profitability and sustainability of small businesses. Von Broembsen (2005) further proposed that, governments should shift their focus from SME development programmes that support wealth redistribution or poverty alleviation to those that develop entrepreneurial skills and create jobs.

2.10.3.4 Profit

Profit is a financial indicator of an organisation's profitability and growth, usually expressed as a percentage of turnover (Oyewobi et al., 2013). The main aim of any business is to yield profit (Naoum, 2003; Norris, 1990; Tam, 2002). Prats et al. (2012) affirm that profitable growth remains a top-priority for most executives around the world. In economic theory, the maximization of profit is regarded as the sole objective of a rational firm. However, in reality, it is found that the entrepreneurs generally do not care to maximize profits but simply to earn a satisfactory return. Baumol (1959) argued that managers are more concerned with the maximization of sales or sales revenue rather than profits. Notwithstanding, profitability is vital to corporate survival of every company project as inability to maintain appropriate profit levels is a precursor to business failure (as cited in Mazzoli, 2014).

Higher growth rates for a firm are indicative of good financial performance and vice-versa (Kahya and Theodossiou,1999). Small firms depend on retained profits for growth to avoid external lenders retaining a stake in the company which reduces the profitability-growth relationship. Coad and Hölzl (2010) also reported that more profitable firms will grow increase their market share and access to external finance as well as their motivation to grow, while less profitable firms will decline. Growth rate has also been reported to be a significant determinant of profitability (Coad, 2007; Cowling, 2004). Coad and Hölzl (2010) however argued that growth rates do not seem to increase with profits.

Phua (2006) contended that measuring organisational performance in terms of economic profitability has the advantage of reducing measurement ambiguity. This is also in line with established research standards that use profitability as a proxy for organisational performance (for example, McGahan and Porter, 1997). Moreover, profit has been used as a measure of firm performance in previous international construction management studies in the UK (Kagioglou et al., 2001), Australia (Furneaux et al., 2010), and Korea (Han et al., 2007; Han, Kim and Kim, 2007; Park et al., 2011), as well as general firm growth literature (Kiviluoto et al., 2011). Profitability measures are considered most suitable for assessing small firm performance (Begley, 1995, as cited in Kiviluoto et al., 2011). However, Cressy (2006) warned that small businesses are notorious for concealing true profits from the tax authorities for income or corporation tax purposes. According to Coad and Hölzl (2010), profit rates are heterogeneous and persistence across firms.

2.10.4 Social indicators of SMC development

Financial measures of organisational performance have been criticized for lacking neutrality, not related with the progress of the company in achievement of long-term objectives, and focusing more on physical assets while neglecting perspectives of customers, and internal processes of the business (Kaplan and Norton, 1996). Hoque (2004) and Kaplan and Norton (2001) found that that non-financial measures are better response variables for organisational performance. Moreover, true growth extends beyond adding something to the company – people, office space, sales force (Recklies, 2001); it is a multidimensional construct that includes a variety of measures (Abu Bakar et al., 2011). Given these criticisms of encouraging short-termism, the study further adopted social measures of SMC development. Social indicators of SMC development in the context of this study are the subjective or qualitative measures of an organisation's growth performance, which includes skills development and skills transfer, application of innovation and technology, advancement on the cidb register of contractors (RoC), as well as formation of joint venture (JV) partnerships.

2.10.4.1 Skills development and skills transfer

Skills development is a terminology, somewhat peculiar to South Africa, but likeable to the international terms – training, vocational training, learning or human resource development (HRD) (Hammond, 2011; Osabutey et al., 2012). According to Felstead et al. (2005), although these terms are being used interchangeably, they examine learning particularly. Learning was described by De Cenzo and Robbins (1996) as seeking a permanent change in knowledge, skill, attitude, and behaviour. HRD is predominantly defined as an integrated use of organisational

learning interventions such as training and development, career development, and organisation development with the specific aim of improving skills, knowledge and understanding, as well as improving individual and organisational performance and effectiveness (McLean and McLean, 2001; Swanson, 2001; Sydhagen and Cunningham, 2007). Wickham (1998) defined skills as the active demonstration of knowledge. Smith and Perks' (2006) classified skills into personal, technical, business operations and management – financial management and managerial skills, which has some resonance with construction SMEs (Hammond, 2011).

Therefore, skills development encompasses the demand for all type of skills training (formal and informal) such as technical trade skills, building/construction process management, business management, as well as entrepreneurial skills (Cattell, 1994; Shakantu and Kajimo-Shakantu, 2007a,b; Hammond, 2011). Given that quantifiable outcome variables that measure formal qualifications are unlikely to capture informally acquired and uncertified skills (Hammond, 2011), the study adopted a subjective measure for skills development. Similarly, qualification and skills training has been used as business key performance indicators (KPIs) in studies in the UK (Constructing Excellence, 2006).

Goedhuys and Veugelers (2012) stressed the importance of skilled workforce and management over tertiary education levels, which are found to be low for construction employees when compared to other industries (The Centre for Construction Research and Training, [CPWR] Data Centre, 2010). According to Anumba et al. (2005), the construction industry is a knowledge-based sector that demands increased level of knowledge, skills and learning which rely on the formation of hierarchies of networks. Ofori (1994a) noted that HRD is an integral part of construction industry development, and is recognised as an important element in improving the performance of organisations as well as industries and economies (Debrah and Ofori, 2001a; Stewart, 2007; Sydhagen and Cunningham, 2007). Human capital represents the main assets for any firm, including SMEs (OECD, 2014). Training and management development enhance SME performance (Storey, 2004) and facilitates a firm's expansion (Cosh et al., 1998), existence (Marshall et al., 1995), profitability and productivity (Betcherman et al., 1997), and competitive advantage (Huang, 2001).

Bower (2003) and Shakantu (2012) opined that construction is technically challenging and involves a high degree of specialist skills across a wide range of trades and activities to ensure success. Therefore, construction small businesses are expected to have above-average decision-making, technical, and cost and time management skills. However, developing countries

generally suffer from a skills shortage as a result of decades of overdependence on foreign expertise (Osabutey et al., 2012) and underinvestment in human capital development (Kapur and McHale, 2005). Osabutey (2010) also noted the absence of requisite technology and knowledge within local construction firms in developing countries. This highlights the relevance of education and training policies tailored towards improving labour employability, productivity and flexibility (Shakantu, 2012).

South Africa's skills shortage challenges is well-documented in the literature (for example, DTI, 2008; Erasmus and Breier, 2009; Hammond, 2011; Kraak et al., 2000; The Presidency, 2006; Shakantu and Kajimo-Shakantu, 2007a,b). There is also considerable debate on who bears the responsibility for HRD (is it the organisations themselves, the state, or both?), with overwhelming support in the literature for state intervention in skills development, particularly in developing countries (Finlay and Niven, 1996; Debrah and Ofori, 2001b). Skills development is an essential instrument of the South African government's national transformation agenda to facilitate employment and address historical imbalances (DTI, 1995; The Presidency, 2011). There has been a clear commitment towards skills and small enterprise development since the first democratic decade (McGrath et al., 2005). For instance, a key responsibility of the Construction Education and Training Authority (CETA) is to ensure the provision of requisite skills for the construction sector as per the Sector Education and Training Authorities' (SETA) Sector Skills Plan which prioritizes the training of previously disadvantaged persons. However, CETA only identifies requisite skills and facilitates the appropriate training by quality-assured training providers, which does not adequately replicate the previous industrial training board's services of providing (free) training directly. Given the relevance of the cost of training after the closure of the training board, the importance of informal on the job training cannot be overemphasised.

McGrath et al. (2005) reported the existence of relatively high levels of informal training among small businesses, which suggests that not all learning and skills formation is obtained from formal training programmes (Wachira et al., 2008). Moreover, there has been an increasing demand for innovative measures of providing requisite skills to the industry. One of such measures is through the proliferation of Targeted Procurement strategies and contractor development programmes. Targeted Procurement allows for the incorporation of social objectives such as skills development as a prerequisite to award of contracts. Whereas CDPs provides a structured approach to the development of contractors. For example, the Expanded Public Works Programme was developed to enhance workers' skills and labour market

exposure towards curbing unemployment (McCord, 2005). These approaches are considered effective means of facilitating skills development as well as efficient skills transfer in the construction sector.

The call for government intervention is further intensified by the absence of learning and development activities as an important element of most local firm's operational activities (Osabutey et al, 2012). Osabutey (2010) observed that for effective technology and knowledge transfer to occur in developing countries, even with the right government policies, foreign and local firms as well as other institutions have significant roles to play. Drawing on the experience of Singapore's construction industry, Debrah and Ofori (2001b) also suggested that governments of developing economies should assume a key role by adopting an 'activist' HRD policy in order to develop the skills of workers in the construction industry. This could be done by the state continually working with organisations and offering grants and training programmes to upgrade the skills and competencies of professionals and skilled and unskilled workers. Brown, Green and Lauder (2001) identified different models of state intervention for skills development which includes the High Skills Society model used in Germany, the High Skills Manufacturing model used by the Japanese government, the Low Skills/High Skills model of the UK and the Developmental State model of Singapore. Although the applicability of all these models to other countries has been questioned (Kraak, 2002), the Singaporean Developmental State model is cited by many authors as the most suitable for the construction industries in developing countries (Aryee, 1994; Debrah and Ofori, 2001b; Goodwin, 1997; Ofori, 1994b; as cited in Osabutey et al., 2012). Kraak (2002) also argued for the need for a comprehensive understanding of HRD embracing a multiple skill level approach for successful socio-economic reform, proposing a strategy for developing high, intermediate level, and low skills.

This study aims to investigate the effect of Targeted Procurement strategies on skills development and skills transfer in small and medium-sized contractors. Skills in the context of this study focuses on technical and management skills. Management skills involve the effective management of quality and striving to improve all facets of the organisation in order to meet the demands and expectations of the client (Delgado-Hernandez and Aspinwall, 2005; McIntyre and Kirschenman, 2000). Dlungwana (2000) also described it as the ability of an organisation to realise the full potential of its employees through the transfer of knowledge across projects embedded in the capability to enhance continuous growth of the organisation.

According to Thomas et al. (2002) and Ling et al. (2009), technical and management skills involve improving the quality of product or services offered in order to minimize resources and cost (including reworking), thereby increasing the profitability of construction organisations. Abu Bakar (1993) suggested that the technical expertise of construction organisations can enhance business performance. The cidb (2009) cited technical skills and experience as an important indicator of contractor development. Hillebrandt (2000) also indicated that management expertise is one of the rarest resources in the construction industry; implying that lack of managerial skills poses a significant constraint on small construction company development (Kayanula and Quartey, 2000; Ramokolo and Smallwood, 2008). An earlier study by Hillebrant and Cannon (1990) identified management expertise as the most important determinant of the capacity as well as capability of construction firms (as cited in Tucker, Windapo and Cattell, 2015).

2.10.4.2 Application of Innovation & Technology

According to Rush et al. (2007) innovation is the technological, organisational, financial and marketing capacity of a firm. Slaughter (2000) described innovation as the actual use of a non-trivial change and improvement in a process, product or system that is new and strange to the organisation effecting the change. It is the ability of a firm to use proper management approaches to implement assimilated knowledge in order to increase its efficiency and skills (Seaden et al., 2003). The creation and execution of successful ideas within an organisation is also often viewed as innovation (Amabile et al., 2006). Innovation can be categorized into two, namely: administrative (the effect of social systems of an organisation) and technical (improvement of the technical capability of an organisation) (Damanpour et al., 1989). Authors further find it useful to distinguish between product innovation (introduction of a new or significantly improved good or service) and process innovation (implementation of a new or significantly improved production or delivery method) (Coad and Hölzl, 2010; Harrison, et al., 2005; Hall et al., 2008; OECD, 2010). The OECD differentiates four types of innovation: product, process, organisational and marketing; the former two involving innovation activities where the technological dimension plays a central role.

Researchers and practitioners perceive innovation as a significant contributor to enhancing an organisation's competitive advantage and performance (Rosenbusch et al., 2011; Porter, 1985; Sexton and Barrett, 2003; Swann, 1993) and growth (Abu Bakar, 1993; CIDB Malaysia, 2006; Marmet, 2004; Ofori and Chan, 2000). According to Coad and Hölzl (2010), a number of theoretical models have posited a positive relationship between innovation and organisational

growth. Dickson and Hadjimanolis (1998) and Guinet and Pilat (1999) reported that innovation contributes positively and significantly to corporate financial performance, indicating that the more innovative an organisation is, the greater is its capacity, its employment growth and its profitability. They further asserted that organisations with poor performance records tend to have poor innovation records. Hitt et al. (1997) also reported that organisations that invest more resources in innovative capabilities are likely to perform better in the long run. Coad and Rao (2008) and Hölzl (2009) however argued that evidence suggested that innovation success is the driver of growth rather than investment in innovation.

Eaton et al. (2006) and Egbu (2004) reported that the technological innovations of organisations lead to cost and time savings, thereby enhancing performance. Innovation has also been cited as the key factor in the high growth of several well-known new ventures in technological fields (OECD, 2010). According to Rush et al. (2007), the acquisition and development of technological knowledge enhances the growth performance of organisations. Damanpour et al. (1989) affirm that the application of technical innovation is essential for organisational growth effectiveness (as cited in Bas and Zhao, 2012). Thus, the value and significance of innovation to construction organisations cannot be overemphasized.

Four innovation requirements that construction organisations should possess as proposed by Harty et al. (2007) include: awareness, intense motivation, a surfeit of skills and competence, and infrastructure that supports innovative construction organisations. They further cited awareness to be the biggest contributor to innovation in construction organisations. However, the construction sector is often seen as lacking or too slow in adopting innovative systems and approaches. Van Wyk (2007) stated that when compared to firms in other economic sectors, construction organisations in South Africa seem to lack innovation. This is aligned to an earlier report by Winch (2003) that the construction industry still maintains its craft method of operation while other sectors continue to innovate; an approach met with criticism for delivering lower productivity, quality and value for money than what is obtainable in other industries for example, automobile manufacturing. Moreover, the construction industry is largely dominated by small firms who do not have enough resources or will to be innovative (Blayse and Manley, 2004; McFallan, 2002). Hence, SMEs and young businesses introduce less new products and technologies than large established firms (OECD, 2014). However, they tend to produce and commercialise higher quality innovations (van Praag and Versloots, 2007).

The project-based manner in which construction projects are managed is mainly to blame for low levels of innovation by construction organisations. According to Keegan and Turner (2002), most construction companies do not imbibe a record keeping culture where experiences and lessons learnt on projects are documented reflected upon; hence losing such knowledge that may be beneficial for future projects (Blayse and Manley, 2004). Sydow et al. (2004) also pointed out that construction project teams tend to focus solely on the project at hand, risking becoming a knowledge silo where developed knowledge is unavailable for external team members. Drejer and Vinding (2006) suggested that prioritizing the assimilation and use of new knowledge, often through strategic partnering with other organisations, enhances firm's innovative capacity. The authors further suggested using post-project reviews and systematic evaluation and diffusion of experiences to help combine short-term task performance with long-term learning and knowledge accumulation.

2.10.4.3 Advancement on cidb Register of Contractors
The Construction Industry Development Board in South Africa is a national body established by an Act of Parliament (Act No. 38 of 2000) to oversee the sustainability and growth of construction enterprises across the country (cidb, 2011a). The cidb promulgated and maintains a national Construction Registers Service which comprises of the Register of Contractors and the Register of Projects, established in terms of the cidb Act (cidb, 2011c). The Register of Contractors (RoC) facilitates public-sector procurement and serves as a framework for contractor development; it helps policy makers to objectively assess the extent of empowerment and transformation in the industry, and directs focus to appropriate development interventions (cidb, 2011c,d). Moreover, the Construction Industry Development Regulations of 2004 (as amended), bind public-sector clients to only award construction contracts to cidb registered contractors (cidb, 2011d).

The cidb RoC grades and categorises contractors according to financial and works capability, and class of works, with grading ranging from Grades 1 to 9, where 9 is the highest attainable Grade (cidb, 2011d). Grade 3 contractors may tender for contracts with a maximum tender value of R2 million; whereas Grade 6 contractors may tender for contracts with an upper tender value of R13 million; while Grade 9 contractors have no upper tender value limit. Contractors may be registered in any of the twenty class of works – General Building (GB), Civil Engineering (CE), Electrical Engineering Works (Building or Infrastructure), Mechanical Engineering, and sixteen Specialist Works (cidb, 2016a). Although joint venture entities are not required to be cidb registered where all partners in the JV are individually registered, a

higher combined grade may be achieved when registered as a JV (cidb, 2011d). For example, a JV comprising of three Grade 2 contractors can achieve a Grade 3; two Grade 4 contractors or one Grade 4 and two Grade 3 contractors can also achieve a Grade 5; whereas three Grade 8 contractors can achieve a Grade 9. This extends the benefits of collaboration and forging strategic alliances via JV partnerships in the construction industry.

Factors considered and verified by the cidb in determining the appropriate grading of contractors include annual turnover, employable capital, qualified personnel, size of contracts successfully completed and track record (cidb, 2016a). Windapo and Cattell (2011) posited that advancement on the cidb RoC implies that the firm had been able to procure sufficient and profitable contracts reflecting the firm's capability, because best annual turnover in preceding two years and largest contract value completed in preceding five years is a criterion used by the cidb in its contractor grading system. Windapo and Cattell (2011) further noted that this is an indication that the firm must have capitalized on its strengths, overcome its weaknesses, coped with threats to its survival and taken advantage of opportunities in its path to growth. Contractor upgrades is also the measure of the growth of contractors used in the cidb's quarterly Construction Monitor for contractor development, which indicated that an average of 52% (50% GB and 53% CE) black-owned contractors have upgraded 1 or more grade in 3 years; a figure slightly higher than the industry average of 49% (48% GB and 50% CE) (cidb, 2015). Furthermore, growth in contractor's cidb grading over time is a frequent objective of CDPs, hence it is an important indicator of development (cidb, 2009). Moreover, grading helps contractors to benchmark themselves against peers, and it is a means for them to market their capabilities better and position themselves appropriately in the market.

Although a company's path through the cidb contractor grading system can be regarded as a holistic measure of company 'growth' performance in the South African construction industry, the grading system has been criticised for not assessing the competence levels of contractors in its database, nor the quality of the work they deliver, or the business and construction process maturity; it is limited to enterprise development through the mechanism of upgrading to higher grades, which is an incomplete indicator of contractor 'development' (cidb, 2009). Windapo and Cattell (2011) also argued that success is not determined solely by grade of registration, but also by capabilities and capacities embodied in the profitability of operations and return on investment (ROI). They also noted that not all companies necessarily go through, or want, further expansion and upgrade, particularly companies older than ten years that must have gone

through at least three stages of growth – conception and survival; growth and development; and maturity.

Windapo and Cattell (2011) further recommended that an escalation factor that corresponds to the yearly construction inflation rate should be introduced by the cidb into its contractor grading system. The cidb (2014) also reported that there is no relationship between the financial grade of a contractor and profit, and suggested more emphasis be placed on developing good small contractors, rather than pressure to achieve a higher financial grade as some small contractors make just as good a profit as their larger and higher graded counterparts. Despite this, the cidb RoC offers further benefits such as facilitating sustainable growth and transformation of contractors, promoting minimum standards and contractor best practice, and provides information on the size, distribution, nature and development of contractors. Other countries where similar contractor registration and/or grading systems are in place include Malaysia's register of contractors maintained by the Construction Industry Development Board, as well as Botswana and Singapore's contractor registration system administered by the Building and Construction Authority and Public Procurement and Asset Disposal Board respectively.

2.10.4.4 Joint venture partnerships

The cidb (2004b) defined a joint venture as a speculation for profit in which risks and rewards are shared by two or more parties. Usually project-based, joint ventures are temporary inter-firm alliances or partnerships formulated for the specific purpose of executing a specific project where the JV partners enter into an agreement to contribute resources in the form of skills, knowledge, expertise, capital and property (cidb, 2004b; Sillars, 2003). Each party contribute resources as required and share the rewards as financial returns. The increasing magnitude, complexities and risks associated with major construction projects have brought together organisations with diverse strengths and weaknesses to form joint ventures to meet procurement requirements and execute projects (Kumaraswamy, Palaneeswaran and Humphreys, 2000). Joint venture provides the means for a firm to quickly add resource, political, technical, or other required strengths that will increase project acquisitions (Sillars, 2003).

Researchers indicate that collaborative ventures and alliances feature among the mechanisms needed by firms to successfully meet future market demands (Badger and Mulligan, 1995). There has been an increasing number research effort focusing on joint venture strategies, its

effects and performance (Fisher and Ranasinghe 2001; Low and Leong 2000; Ofori 1996; Ofori and Toor 2009; Ozorhon et al. 2008). In their review of the literature relating to firm growth, Abu Bakar et al. (2011) cited joint ventures as an important growth factor. Although, most of the construction-related studies have primarily focused on large, international joint ventures and firms, many joint ventures are formed on small-and medium-sized projects between large and small contractors or between a number of small contractors (Sillars, 2003; Park et al., 2011).

Many firms are motivated to work with other firms under diverse forms of collaboration, such as equity JVs or project-based JVs for various reasons. This is often motivated by the competitive and risky nature of international construction markets which is mitigated by a collaborative joint venture (Badger and Mulligan, 1995; Shen et al., 2001; Sillars and Kangari, 2004). Park et al. (2011) reported that collaboration, particularly between large companies and small and medium-sized companies, tends to increase when overseas construction projects are concerned, which represent an indication of growth or expansion of an organisation. Such joint ventures bring many benefits such as sharing burden of risk exposure, allowing access to better technologies, securing financing requirements, improving competitive position, and understanding local markets (Badger and Mulligan, 1995; Park et al., 2011).

Park et al. (2011) and Sillars and Kangari (2004) reported that firms that form joint ventures with larger well experienced partners to gain increased market position, complement their management abilities by developing their bid capability, enhancing their bond issue competency, or increasing their access to information, risk management skills leading to success. Sillars and Kangari (2004) suggested that smaller firms recognize the opportunity available for growth and income through partnering with larger, more resourced firms. Windapo and Catell (2011) also recommended that lower ranked contracting firms hoping to develop should enter into JV alliances with large contractors to overcome their limited resources and gain access to specialized technology, knowledge and experience. This gave support to earlier views by BarNir and Smith (2002) and Park et al. (2011). Windapo and Catell (2011) further suggested that they go into such alliances as equal partners rather than minorities, insisting on an appropriate share of the turnover depending their role in the partnership.

The cidb (2004b) provided three main reasons why joint ventures are formed, namely: (i) due to the complexity and large scope of project for one company to undertake with its available

resources; (ii) request for specialist skills, or abilities, which a company is unable to provide by itself; and (iii) development of the skills and expertise of small emerging firms by association with large well-established companies. In the context of this study, joint venture partnerships as a measure of SMC development is aligned to the third reason where public-sector clients offer bidding preferences to large contractors that have entered into JV partnerships with small contractors in the award of Targeted Procurement contracts. However, reports of joint venture success vary widely; although the tendency is towards better than expected experience, both in terms of profitability and market gain (Sillars, 2003). Prats et al. (2012) also warned that partnerships with top-tier companies can be a double-edged sword. From an operational perspective, team collaboration and mutual trust, based on the clear understanding of the parties' roles as well as open and constant communication are critical success factors as vertical alignment of the joint venture goals is a necessity in each partner (Han et al., 2005; Sillars, 2003).

2.11 SUMMARY OF LITERATURE REVIEW

The literature presented in this chapter examined holistically, the development of preferential procurement policies, and by extension innovative Targeted Procurement strategies in South Africa; showing that government intervention is an integral part of public procurement arrangements. The concept of preferential procurement in relation to contractor development initiatives in the South African construction industry was also discussed. The chapter also reviewed existing literature on supply chain relationships in the construction industry, emphasizing the need for contractors to shift towards long-term collaborative relationship approach to managing project supply chains. The supply chain relationship quality assessment criteria used in this study was also presented. Moreover, the approaches and measures of firm growth performance and development was explored and conceptualized in the context of the present study, suggesting that SMC development can be measured by a combination of objective economic measures and subjective social measures.

CHAPTER THREE:
THEORETICAL AND CONCEPTUAL FRAMEWORK
OF THE STUDY

3.1 INTRODUCTION

This chapter provides a brief overview of the research context and presents the theoretical perspectives adopted for the study, which formed the basis, along with reviewed literature, for developing the research conceptual framework presented in the latter part of the chapter. The chapter also outlines the research hypotheses which were tested to answer the research objectives.

3.2 OVERVIEW OF THE RESEARCH CONTEXT

Governments are involved in four main economic activities, namely: providing a legal and institutional framework for all economic activities; redistributing income through taxation and spending; providing public goods and services; and purchasing goods, services and public works from the private sector (Thai, 2001; 2009). Although these activities are conducted passively, it sometimes becomes essential for governments to intervene in economic affairs. State intervention is increasingly justified for two main reasons – efficiency and equity (cidb, 2009, 2010; Cook, 1999; Muradzikwa et al., 2004; Przeworski, 1998). The former is to correct instances of market failure, and the latter to achieve a more equitable distribution of income and wealth. Governments serve as the biggest client to most sectors of the economy procuring public works, goods and services which are crucial to the functioning of the economy (cidb, 2009, 2010; Morand, 2003; Shakantu, 2012). Public procurement represents a sizeable contribution to GDP in many countries (McCrudden and Gross, 2006; Morand, 2003; Rogerson, 2004). Therefore, governments can leverage its large purchasing capability to influence the behaviour of economic participants and outcomes (Bayat et al., 2004; McCrudden, 2004; Ohlin, 1992; Thompson, 2004). Previous studies have noted that several developed and developing countries use procurement as a vehicle to achieve a variety of socio-economic objectives (Arrowsmith, 1995; Govender and Watermeyer, 2001; Rogerson, 2004) including supporting contractor development in South Africa (cidb, 2009, 2010).

3.3 THEORETICAL PERSPECTIVES OF THE STUDY

A theory is the scientific approach to explaining empirical observations about a natural setting or scientific occurrence, to provide better understanding in predicting future behaviour of the

phenomenon under consideration (Anvuur, 2008; Oyewobi, 2014). The subject of firm growth is a key research area in entrepreneurial studies that has garnered substantial interest from researchers. However, theoretical development in this area has been limited and slow (Davidsson and Wiklund, 2000; Delmar et al.., 2003; Shepherd and Wiklund, 2009). According to Achtenhagen et al. (2010), half of the studies (28 of 56) reviewed on organisational growth have no clear theoretical underpinning, most of them only making reference to prior studies in the same field or to the current phenomenon being investigated. Achtenhagen et al. (2010) concluded that one reason for the lack of a more integrated body of theory on firm growth might be not only the fragmented research findings, but also a lack of theorizing in the first place. Ahlemann et al. (2013) also noted that the project management literature is generally lacking in theoretical development, and suggested that theoretical foundations be drawn from other related disciplines and applied to project management.

McKelvie et al. (2010) argued that certain theories have a better fit with certain modes of growth because they are closely associated with the causal mechanisms underlying that particular mode of growth. A causal mechanism here refers to the aspect of a theory that explains why a specific outcome occurs (Anderson et al., 2006; Davis and Marquis, 2005; Hedström and Swedberg, 1998). Hence, there should be a logical association between the mode of growth studies and theory used. McKelvie and Wiklund (2010) also suggested a clearer connection between theory employed and the type of growth measure used, because certain theories have a natural fit with specific indicators of growth (that is, sales, employee size, profit).

Davidsson and Wiklund (2000), viewed business growth as a collective term for several rather different empirical phenomena, with different underlying causal mechanisms, requiring separate theoretical explanations. Government intervention through Targeted Procurement strategies and supply chain relationship quality represents the causal mechanisms in this study, which form the explanatory variables predicting firm growth performance and development as outcome variables. Therefore, the study adopts multidisciplinary theoretical perspectives that are largely rooted in industrial organisation economics, which adequately captures the phenomenon being investigated.

3.3.1 Theory of the growth of the firm

Penrose's (1959) work – *The Theory of the Growth of the Firm*, developed over 50 years ago, still represents the most comprehensive, adequate, and popular theory on firm growth; and

many recently published studies in leading journals specifically examining growth have used Penrose's theory (for example, Garnsey et al., 2006; Macpherson and Holt, 2007; Mishina et al., 2004). In addition to Penrose, Downie (1958) and Marris (1963, 1964) also made major contributions to the theory of the growth of the firm.

Penrose viewed the firm as a pool of productive resources (human and physical) organized within an administrative framework, and sought to identify the causes of growth of the firm, and the factors that lead to limiting its rate of growth. Although she did identify external inducements (for example, changes in demand, technological innovations and other changes in market conditions) and obstacles (competition from rivals, patent or other barriers to entry) for expansion of the firm, the ideas that are quite dominant in her growth theory are internal resources and inducements, such as unused capacities, including managerial services. Over the years, Penrose's theory has received criticism for neglecting financial and other external constraints on the growth of the firm, which is a departure from the current study; because in practice, firms encounter growth challenges due to lack of finance and other market restraints. Moreover, corporate realities have shifted since the 1950s. Hence, important extensions and modifications of Penrose's theory have been suggested (Lockett et al., 2010). Firm growth theorists have also recognised increased formal alliances between firms, and inter-firm networking; an indication of the blurring of firm boundaries, which has prompted the call for a revision of firm growth theories also to incorporate joint ventures and other hybrid modes of growth (McKelvie et al., 2010).

3.3.2 Industrial organisation economics

Industrial organisation (IO) economics builds on the Theory of the Firm, which is a group of economic theories that explain and predict the nature of the firm, including its existence, behaviour, structure, and relationship to the market (Kantarelis, 2007). IO examines the behaviour of firms in industries and recognizes that relationships exist between the market structure, the conduct of firms and their performance. Market structure here refers to the characteristics of the industry which influence the relationship between firms in the industry (Terry and Forde, 1992). The key measures of performance in IO literature refer to profitability, efficiency and progressiveness (London, 2012; Martin, 1993). IO methodology deals with the performance of business enterprises and the effects of market structures on market conduct, and how firms are organized, owned and managed (Bancock et al., 1998). The most important elements of market structure in these models refer to: the nature of the demand; existing

distribution of power among rival firms; government intervention; and physical structuring of relationships (horizontal and vertical integration) (Litman, 1998).

Since the beginning of the IO field in the seminal work of Adam Smith's (1776) *Wealth of Nations* (as cited in Hay and Morris, 1979), two distinct paths have evolved – the "deductive theoretical" (focusing on firm behaviour) and the "inductive empirical" observation (focusing on market competition) (see London, 2012 for discussion). The distinct development in the two paths, to some extent, forms the basis for the two schools of thought (see Figure 3.1) that have since characterized the IO field. These are discussed in subsequent sections of this chapter. Recently, IO has been linked to wider perspectives and concepts such as supply chains, industrial networks and clusters, inter-organisational relationships and strategic alliances; often towards improving industry competitiveness and innovation. Firm growth also represents one of the main foci of industrial organisation, which has become a focus of attention for empirical and theoretical researcher (Gassie, 2012; Teruel-Carrizosa, 2006).
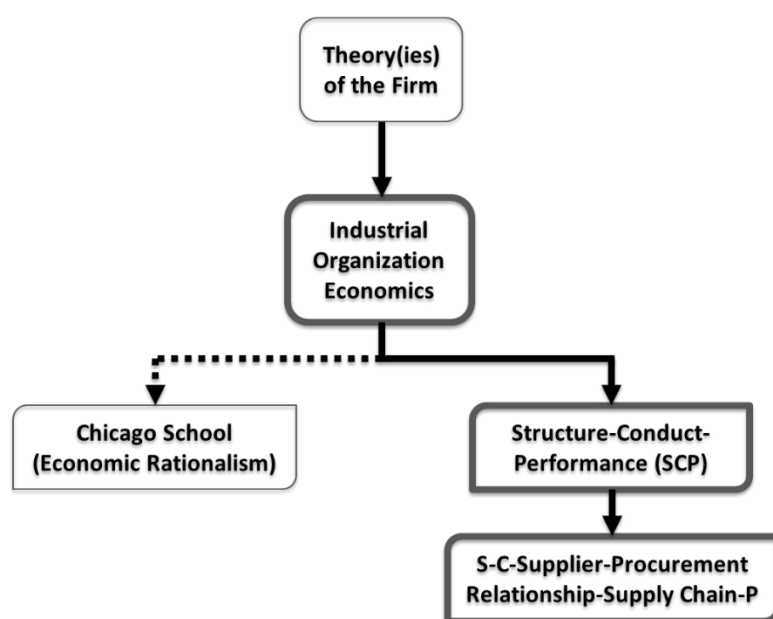
Figure 3.1: Industrial organisation economics schools of thought

Industrial organisation Organization economics differs from micro-economics in that it is concerned with government policy about business performance (London, 2008), which makes it the most useful theoretical framework for this study. Martin (1993) affirmed that industrial economics is profoundly and fundamentally concerned with policy questions. Indeed, since the new democratic government in South Africa came to power in 1994 and inherited a legacy of inequality, unemployment and poverty, its biggest challenge has been to provide the

institutional support to business, and to implement appropriate policies to alleviate the effects of these legacies (The Presidency, 1994).

Researchers have examined the influence of a series of factors, such as strategy factors, top management and industry characteristics, on firm growth (Weinzimmer, 2000). Previous studies have also explored the concept of supply chain management from an IO perspective. For instance, Ellram (1991) used IO to examine an organisation's ability to manage the supply chain, suggesting types of competitive relationships that firms undertake, from transaction, short term contract, long term contract, joint venture and equity interest, to acquisition. The ability to describe and analyse the structure and interdependence of relationships in the system of supply chains are significant contributions derived from IO literature (London and Kenley, 2001).

Construction-related studies have been criticised for failing to address the firm or project level of supply chains, rather focusing on the market view and the major players in key markets. London and Kenley (2001) emphasised the need to explore the explicit inter-firm supply chain relationships on projects within the context of the firm and market which fall within the field of industrial organisation economic theory. They further suggested that government policy relating to industry competition should be informed by observing the current state of the supply chain as it is vital to understand the interdependences between firms at firm level in relation to the market level as well as the long-term impact of changes to relational position between firms.

As stated earlier, the primary phenomenon being investigated by this study (that is, the relationship between government intervention in the construction industry through Targeted Procurement and SMC development), has its theoretical underpinnings in the field of industrial organisation economics. IO focuses on two main areas, that is, the structural and behavioural characteristics of the industry, and how these influences the performance of firms in the industry (Bain, 1959; Martin, 1993). Industrial economists hold the view that the relationship between industry structure and the firm's performance greatly impacts on the firm's profitability (Bain, 1959; Hay and Morris, 1979). IO is split into two distinct schools of thought, namely: the Chicago School and the Structure-Conduct-Performance (SCP) school.

3.3.3   The Chicago School of Thought
The Chicago School, which takes its philosophical roots from the deductive school of logic, argues for economic rationalism, that is, market forces rather than government intervention

should dictate the allocation of economic resources and determine the performance of firms within the industry (Stilwell, 1993). This is an approach usually applied to markets in perfect competition, which is not always the case, as some experience market failure or are characterised by severe socio-economic challenges, for example, income inequality in South Africa (Palma, 2005; Rwelamila, 2012; UNDP, 2013). In the context of the construction industry, the practice of awarding construction project contracts through open tendering, and the ensuing competitive bid process for cost leadership (Runeson and Raftery, 1997) assumes a perfect competition market, thus providing the framework upon which other contractual relationships along the construction supply chain are based. London (2008) argued that in such environments, contractual relationships are based upon the "arm's length" philosophy. In addition to the seminal analyses by Baldwin (1970) and Baldwin and Richardson (1972), relevant previous studies that have assumed perfectly competitive markets include those of Lowinger (1976), Joson (1985), and Kim (1994); while Miyagiwa (1991), Branco (1994), Laffont and Tirole (1993), and Trionfetti (2000) extend their contributions to consider imperfectively competitive markets (as cited in Evenett and Hoekman, 2005).

3.3.4   Structure-conduct-performance (SCP) framework

In contrast to the Chicago School, the SCP framework argues for government intervention, suggesting that the strategic behaviour of some firms in a market (industry) prevents other firms from competing based on merit, therefore governments must implement policies to moderate this (London, 2008). It contends that the structure of the industry is a primary facet and central to the firm's economic conduct or behaviour and ultimately, performance of the firm (and industry) (Tirole, 1988). In other words, the structure of the industry is a primary aspect of the firm's environment and a key determinant of firm conduct and performance. Moreover, the structure of industry has a direct influence on the performance of the firm. Therefore, firm performance is significantly influenced by the structure of the industry. Hence, it is necessary for governments in their role as the regulators of the economy, to intervene and alter the industry structure, towards influencing the performance of firms and the industry as a whole.
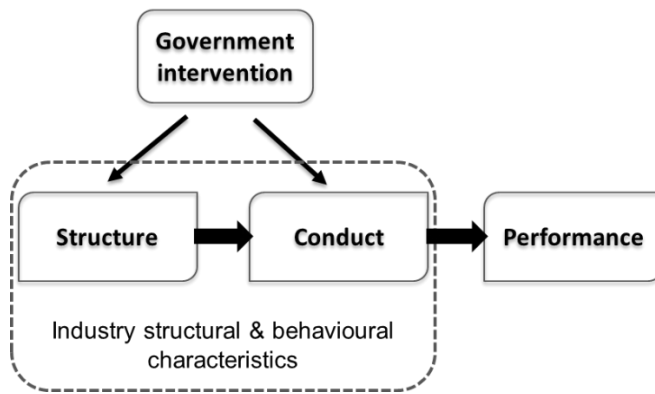
Figure 3.2: The structure-conduct-performance framework

Targeted Procurement – a form of government intervention, is aligned to the SCP framework, and evidence suggest that Targeted Procurement has changed the structural characteristics of the construction industry with the contract-winning rate of SMCs and their market share increasing significantly (Letchmiah 2012; London 2008; Manchidi and Harmond 2002). However, little is known about the actual effects of Targeted Procurement on the growth performance and development of SMCs at the individual firm level.

3.3.5   New industrial economics

Industrial organisation has evolved over the last few decades. Recent attention in industry analysis has explored chains, clusters and complexes; this is a shift from mechanistic conceptions of the nature of industrial organisation as a market consisting of a collection of establishments producing homogeneous outputs (Scott and Storper, 1986), to a more complex interconnected and interdependent set of markets and firms (as cited in London and Kenley, 2001). Perhaps one of the major changes is the paradigm shift from a linear structure-conduct-performance model that assumed simple causal relationships, to the new industrial organisation model that assumes greater interactions between the elements of the model. The new industrial organisation model proposes a complex interactive structure-conduct-performance framework (London, 2008; Martin, 1993) where structure and conduct are both determined, in part, by underlying demand conditions and technology (see Figure 3.3). Structure affects conduct. Structure and conduct interact to determine performance. Sales efforts – an element of conduct – also feed back and affect demand. Performance, in turn, feeds back on technology and structure. Progressiveness moulds the available technology. Profitability, which determines how attractive it is to enter the market, has a dynamic (intertemporal) effect on market structure.
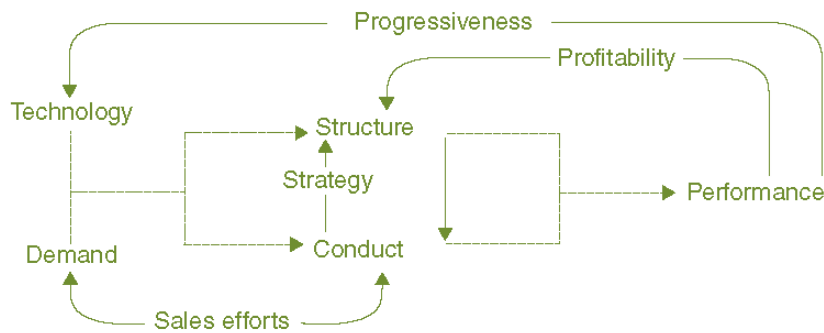
**Figure 3.3: Interpretive structure-conduct-performance framework
(Source: London, 2008:141)**

Industrial organisation economics is multidisciplinary because it draws from economics, law, management and sociology and various combinations of these. It has been identified as a field of research that has contributed to the practical organisation, integration, management, and theoretical understanding of the structural and behavioural characteristics of supply chains in a variety of industries, including retail, auto manufacturing, information technology and electronics engineering (London, 2008). However, given that these industries are not project-based industries, implications for a project-oriented industrial organisation economics supply chain procurement model must be considered. Moreover, there is disagreement within the IO field, and there are quite distinct approaches to industrial organisation economics in different countries. Therefore, attempting to borrow the concept as a framework to apply in another field remains problematic (London, 2008). London and Kenley (2001) however, contended that construction supply chain theory can be strengthened by considerations of industrial organisation economics.

London (2008) emphasized the significance of firm–firm procurement relationships in relation to the project-based IO model. She posited that procurement relationships are constantly changing for each project, give an indication of the structural characteristics of the industry, as a whole, as these are the physical links between firms in the supply chains; they indicate the conduct of firms in markets, that is, the behavioural characteristics of firms in supply chains as they interact with the market to determine governance strategies. The procurement relationship is an entity that can provide information that describes structural and behavioural characteristics of the construction industry's industrial organisation through the supply chain concept. Therefore, firm – firm project procurement relationships are a fundamental component of the project-based industrial organisation economic model of the construction industry. Given the significant role of firm – firm supply chain relationships in the construction industry,

London (2008) further suggested that performance elements of profitability, efficiency/productivity and innovation are more appropriate criteria of supply chain performance, and also of industry performance.

London (2008) adopted a project-based industrial organisation object-oriented methodology for construction supply chain procurement modelling, to provide a conceptual framework of structure-conduct-supplier-procurement relationships-supply chain-performance (SC-SPRSC-P) rather than a simple structure-conduct-performance framework. This was prompted by the relative lack of theoretical and empirical research within the construction community that considers the fundamental structural, economic and organisational nature of the industry's supply chains. The SC-SPRSC-P framework focuses on the nature of the construction supply chains and their industrial organisational economic environment (London, 2008; London and Kenley, 2001), merging the supply chain concept with the industrial organisation model as a methodology for understanding the industry's structural and behavioural characteristics. It is considered an important contribution to both construction supply chain and construction economic theory, and therefore relevant to the current study.

Built on the principles of the SCP framework, London's SC-SPRSC-P framework is an industrial organisation model specifically for construction supply chains that can be used to answer a wide range of pertinent questions such as: what is the overall nature of the organisational relationships along the supply chain? What are the power relationships between firms and their suppliers along the chain? How do we analyse such fundamental structural and behavioural properties in the supply chain?

3.3.6 Relational governance theory

In addition to government policies playing an essential role in stimulating the growth of historically disadvantaged small contractors in South Africa, other factors also influence the growth of these companies including working closely with the supply chain (cidb, 2012). Relationship quality is studied in a variety of disciplines, however, there is a lack of conceptual clarity around relationship quality (Fincham and Rogge, 2010). This study also draws on theories in the areas of relational governance (Boulay, 2013; Ferguson et al., 2005; McNeil, 1974; 1980) to examine relational issues on Targeted Procurement projects, since projects are a type of exchange between supply chain members.

Relational governance theory holds that inter-firm exchanges (or projects) are governed by two key mechanisms – contracts and relational norms (McNeil, 1974), and suggests that relational norms surpass contracts in their ability to minimize opportunistic behaviour (Boulay, 2013), promote value-creation between firms, and enhance performance (Lusch and Brown; 1996; Noordewier et al., 1990; Williams et al., 2015). Unlike contracts, relational governance is an endogenous mechanism that binds firms together by prescribing acceptable behaviours (Heide and John, 1992) and enhances inter-firm working relationships, by embedding information flows in a matrix of social ties rather than resorting to contracts or their enforcement by legal action (Ferguson et al., 2005).

In addition to the ten relational norms proposed in McNeil's (1980) analysis, ensuing research has identified role integrity, solidarity, and reciprocity to be the most important norms, which are related to the behaviours of trust, communication, aligned objectives and shared benefits (Blois and Ivens, 2007; Williams et al., 2015). Williams et al. (2015) contend that relationship quality is important for the development of such relational norms and behaviours throughout a project. Moreover, based on network and social exchange theory in marketing channels, relationship quality has emerged as a critical aspect of business to business exchange (Palmatier et al., 2007).

3.4 HYPOTHESIS DEVELOPMENT

The previous section presented the theories that underpin the proposed relationship between government intervention in the construction industry (through Targeted Procurement strategies), relationship quality and the development of small contractors. This section further presents the theoretical background from literature that lends support to the research hypotheses to be tested.

3.4.1 Relationship between government intervention through preferential procurement and firm growth performance and development

McCrudden (2004) emphasized distinct models of procurement – social development linkage, which includes the use of preferential procurement as a method to help stimulate increased entrepreneurial activity by disadvantaged groups for example, set-asides for minority or historically disadvantaged businesses. In these context, procurement serves a mechanism to address important quasi-constitutional problems; for example, historical imbalances and racial inequality in the United States and South Africa, ethnic inequality in Malaysia, and unfair treatment of aboriginals in Canada (McCrudden, 2004).

Preferential procurement practices in public procurement are an important government intervention strategy for stimulating the growth and development of SMCs in the construction industry of many countries including South Africa (Hawkins, 2012; Watermeyer et al., 2001). Although the firm growth and survival studies in developing countries have expanded significantly in recent years, the impact of government interventionist policies on the business performance at an individual firm level remains to be fully explored (Hansen et al., 2009). The OECD (2010) however argued that policy initiatives are critical towards growth of small enterprises. The OECD (2014) suggested that well-designed policy interventions may be used to support technology absorption, transform lagging industries and develop new sources of innovation-led growth.

Little is known about the actual effectiveness of preferential procurement in promoting the growth and development of SMCs, and only a handful of studies have attempted to analyse whether these programmes have met their goals in the construction industry (Chatterji et al., 2014; Letchmiah, 2012). Findings from previous studies on the impact of affirmative action programmes such as set-asides in the US construction industry indicate that these programmes: significantly increased contract awards to SMCs (Blanchflower and Wainwright, 2005; Marion, 2007; Morris et al., 2006); have a positive and significant empirical impact on SMC growth regardless of how growth is measured (House-Soremekun, 2006); and plays a significant role in the net survival rates of these SMCs (Marion, 2007; Morris et al., 2006). Particularly, House-Soremekun (2006) reported a significantly positive relationship between participation in minority set-aside programs in the US and growth in annual company profit. However, Blanchflower and Wainwright (2005) argue that these programmes have not achieved their objective of improving the position of SMCs in the construction industry. Holzer and Neumark (2000) also reported that firms moving from set-aside projects to an environment without set-asides did not fail at higher rates than comparable firms.

Related studies in other sectors, such as manufacturing, indicate that companies receiving government support perform better and survive longer (Wjewardena and De Zoysa, 2005). Fajnzylber et al. (2009) reported that while access to government support did not appear to significantly influence the profits of microenterprises in Mexico, it improved the likelihood of their survival. However, Ferraz et al. (2016) found empirical evidence that government procurement contracts in Brazil led to an increase in firm growth and survival. Similarly, Reis and Cabral (2015) reported that after the introduction of preference programmes in Brazil in 2007, small and microbusinesses' participation and their odds of winning public contracts

increased. Brown et al. (2005) also found that technical assistance from the Romanian government had weak effects on firm growth. In contrast, Hansen et al. (2009) investigated whether interaction with state-owned enterprises (SOEs), government agencies and institutions affected firm performance among Vietnamese SMEs and found that receiving initial government assistance is insignificant for survival, but has a positive impact on revenue growth and firm performance.

Iqbal and Urata (2002) suggested that various government policy interventions have played a significant role in the explanation of SME successes in the Asian region. Ofori and Chan (2001) examined key factors that influence the development of the construction industry and technology transfer and found the role of the government to be most significant. Walker et al. (2003) stated that more innovative procurement strategies drive higher levels of innovation in the construction industry. Drawing on the experience of Singapore's construction industry, where the government actively promoted joint ventures between local and foreign contractors, Debrah and Ofori (2001b) and Ofori (1994b) stressed how governments as a major client of the construction industry can influence technology and knowledge transfer, as well as local capacity building through skills development.

In South Africa, the government presumes that the growth of an enterprise is related, to a large extent, to the opportunity and experience gained over time in the execution of works (SANS, 2003). Consequently, targeting SMCs and increasing their contract participation rate and by extension their rate of gain of experience, is one of the primary means of stimulating the growth of SMCs in the construction industry. Given that the primary objective of Targeted Procurement in South Africa is to promote the participation of targeted businesses in public-sector contracts by providing greater access to work opportunities, it can therefore be argued that the increase in these businesses' turnover is the primary objective, with room for specifying other secondary economic and social contractor development objectives, such as employment, knowledge transfer and skills devolvement. However, the relationship between Targeted Procurement strategies remains to be empirically proven. Therefore, the following research hypotheses were formulated, towards answering Research Objectives Two and Three.

Main Hypothesis 1: *Targeted Procurement strategies have a direct and significant relationship with social indicators of construction SMC development.*

Hypothesis 1a: *Targeted Procurement strategies have a direct and significant relationship with skills development.*

Hypothesis 1b: *Targeted Procurement strategies have a direct and significant relationship with application of innovation and technology.*

Hypothesis 1c: *Targeted Procurement strategies have a direct and significant relationship with skills transfer.*

Hypothesis 1d: *Targeted Procurement strategies have a direct and significant relationship with advancement on the cidb Register of Contractors.*

Hypothesis 1e: *Targeted Procurement strategies have a direct and significant relationship with JV partnerships.*

Main Hypothesis 2: *Targeted Procurement strategies have a direct and significant relationships with economic indicators of construction SMC development.*

Hypothesis 2a: *Targeted Procurement strategies have a direct and significant relationship with turnover.*

Hypothesis 2b: *Targeted Procurement strategies have a direct and significant relationship with company assets.*

Hypothesis 2c: *Targeted Procurement strategies have a direct and significant relationship with number of employees.*

Hypothesis 2d: *Targeted Procurement strategies have a direct and significant relationship with company profits.*

3.4.2 Relationship quality and firm growth performance and development

Public procurement is characterised by inter-firm project networks involved in formal and informal resource and knowledge exchange, as well as learning activities (Park et al., 2011; Scarbrough et al., 2004; Taylor et al., 2009). Consequently, the network effect on firm performance has been investigated by researchers in various industries (for example, Gulati and Gargiulo, 1999; Park and Han, 2001; Schilling and Phelps, 2007). These studies all agree that the characteristics and quality of relationships in an inter-firm network significantly affect a firm's innovation and potential for performance improvement (Park et al., 2011).

Previous research by Isatto and Formoso (2006), Rowley (1997) and Ibarra (1993) into the structural dimensions of project networks have explained the influence of one contracting organisation on others depending on their position and hierarchy in the network. For example, prime contractors have a major influence on a subcontractor's access to work opportunities which is a key factor to their sustainability (cidb, 2013). Sedita and Apa (2015) also supported the view that the performance of project-based organisations on public-sector projects is

dependent on their structural position within project networks. For instance, a contractor that includes an intermediary (broker) in its project network is likely to derive more benefits from the relationship than the broker itself (Sedita and Apa, 2015). Moreover, Park et al. (2011) verified that firm performance is strongly related to diverse network attributes. Anumba et al. (2005) contended that the construction industry is a knowledge-based sector requiring increased knowledge levels and high skills which are dependent on the formation of network hierarchies. Hence, the relationship quality and efficient functioning of the entire project network is an important factor influencing organisational performance (Gann and Salter, 2000).

Emuze and Smallwood (2014) noted that the significance of relationship quality and merits of collaborative working to organisational development is encapsulated in the successful completion of the of the five-year construction phase of London Heathrow airport's Terminal 5, which was built on three success themes, operationalised through integrated project teams, and through shared liabilities, good industrial relations, fair employment policies, commitment to people and a culture that actively promoted opportunities (see Wolstenholme et al., 2008 for discussion).

3.4.2.1   *Relationship quality and firm growth performance and development (social)*

Previous research has explored the relationship between inter-firm networks and subjective indicators of firm performance used in this study. According to Park et al. (2011), sustaining long-term cooperative alliances with partner firms based on trust and reliability enables accessibility to advanced technology and tacit knowledge. Moreover, firm performance enhancement and innovative output through technology exchange, and knowledge, experience and skills sharing were found to be positively influenced by direct and indirect ties (Ahuja 2000; Gulati 1995; Powell et al. 1996). Using social network analysis (SNA), Park and colleagues (2011) also described how a dense inter-firm network contributed to innovation, knowledge diffusion, and performance enhancement of firms in the network. Sedita and Apa (2015) later reported contrasting findings in the context of public construction projects, suggesting that quality is better than quantity.

Beyond Penrose's seminal contribution to firm growth theory, it has since been conceived as an outcome of inter-firm knowledge creation. Relationship quality elements such as trust were found to be statistically significantly related to knowledge-sharing behaviour among parties (Nesheim and Hunskaar, 2015). Continuous inter-firm collaboration with reliable well-known large contractors enables SMCs to mitigate their limited resources and market presence, thus

leading to the sustainable success and advancement of such small firms (Park et al., 2011). Supply chain integration and quality of relationships between the parties strongly influences innovation and knowledge diffusion acquisition dynamics in the construction industry (Emuze and Smallwood, 2014; Dubois and Gadde, 2002; Miozzo and Dewick, 2004; Park et al., 2011). However, the fragmented and project-based nature of the construction industry, coupled with the complexity of the supply chain relationships, makes the diffusion of information and innovation slow and inefficient (Geneste, 2010; Heintz and Wamelink, 2015; Kulatunga et al., 2006).

Therefore, based on the discussion presented, the following research hypothesis was formulated towards answering Research Objective Four:

Hypothesis 3a: *Supply chain relationship quality has a direct and significant relationship with social indicators of construction SMC development.*

3.4.2.2   *Relationship quality and firm growth performance and development (economic)*
Sedita and Apa (2015) suggested that attention should be given to relational aspects and social dimensions of project organisations such as interpersonal and inter-organisational relationships of contractors, which are important to understanding the economic behaviours of firms in a project network. Several authors (for example, Allens, 1994; Emuze and Smallwood, 2014; Henry, 1994; Lobelo, 1996; Smallwood, 2000) have cited poor working relationships as one of the causes of poor contractor performance in South Africa. According to Park et al. (2011), direct and indirect ties in a collaboration network enhance firm capabilities and benefits, implying that a firm's involvement in a collaborative network characterised by good quality of relationships significantly affects the performance of that firm. London and Kenley (2001) suggested that close-knit inter-organisational networks produce superior economic performance and quality.

Researchers have examined the connection between relationship quality assessment criteria and economic performance of firms. Zuppa et al. (2016) reported that trust augments team integration and leads to higher profits. Park et al. (2011) explored the connectivity between inter-firm relationship attributes based on long-term collaboration and company profit; they found that focused long-term relations with targeted firms led to higher profits for small contractors. Park et al. (2011) further reported that small contractors have a better chance of acquiring good quality projects from larger partnering firms based on strong ties and long-term

relationships thus substantially increasing company turnover. Moreover, firms embedded in a network of stable and repeated relationships garner experience from previous projects, which contributes to their selection for involvement in future projects (Eccles, 1981; Sedita and Apa, 2015) thereby boosting company turnover. Therefore, considering the evidence from the literature, the following research hypothesis was formulated towards answering Research Objective Four:

Hypothesis 3b: *Supply chain relationship quality has a direct and significant relationship with economic indicators of construction SMC development.*

3.4.3   Nexus between procurement, supply chain relationships and firm growth performance and development

Construction projects bring together a wide range of interdependent organisations that form an inter-firm project network (Pryke, 2006). The use of project procurement and contracting methods that promote collaborative working relationships for construction industry development is well-documented in the literature (Cox and Thompson, 1997; Jelodar et al., 2016). Public procurement is characterised by complex temporary project organisations (Sedita and Apa 2015) comprising of firms involved in formal and informal resource exchange and learning activities (Pryke 2004; Scarbrough et al. 2004); therefore, each party is influenced by the others (Pryke and Pearson, 2006). Sedita and Apa (2015) examined partnerships on public projects, regarding them as project organisations which are usually promoted by a public-sector institution; and the collective capabilities, knowledge and resources of the firms in the project organisation are developed through the execution of public contracts. They also found that a contractor's success was positively affected by the number or breadth of relationships of the contractor, and by the closeness of the contractor to other firms in a project organisation – a combination of relationship quantity and quality.

Researchers have suggested the client as the more likely beneficiary and proponent for managing and integrating the supply chain (London et al., 1998; London and Kenley, 1999), and should avoid selecting procurement strategies that promote fragmentation. For example, Targeted Procurement strategies that encourage subcontracting (for example, mandatory subcontracting) lead to reduction in main contractor numbers, while substantially increasing the numbers of subcontractors, which promotes more fragmentation in the industry and in turn significantly impacts on contractors' operational capacities (Shakantu et al., 2007). Emuze and Smallwood (2014) asserted that clients must select procurement methods that can facilitate

supply chain integration, common objectives and mutual benefits among parties, and ensure contractors get regular profitable work, while managing a supply chain of subcontractors and suppliers to curb adversarial relationships and opportunism in the construction industry. Clausen (1995) evaluated a government programme in Denmark, where the government client aimed to improve the performance of construction firms, and advocated for the need for vertical integration of the project stakeholders, including downstream supply chain members, in the construction process. Cox and Townsend (1998) also advocated that clients should understand the underlying structural market characteristics of their own construction supply chains, and develop procurement strategies based upon this understanding.

Jelodar et al. (2016) posited that relationship quality and its attributes can be developed and enhanced through the procurement strategy in the construction industry. According to Walker et al. (2003), project team integration is a crucial causal factor for innovation in a procurement process. Han et al. (2007) and Han, Kim and Kim (2007) also reported association between procurement process, inter-firm network characteristics and profit performance. Despite the perceived importance of social relations in assessing a firm's performance, there hasn't been any attempt to make an empirical link between relationship quality attributes and the growth performance and development of firms within a preference programs framework. However, there have been a few theoretical studies that have introduced relationship quality as an intervening variable in predicting performance. For instance, Park et al. (2011) who argued that project network attributes can significantly affect the profit performance of a firm, found that certain collaborative network elements mediate the collaboration-profit relationship in a project network. Moreover, Williams et al. (2015) responded to Serrador and Turner's (2015) call, by introducing relationship quality as a mediator in the relationship between project performance drivers and success.

Comprehensively, based on evidence from the literature presented, this study therefore formulates the following hypotheses:

Hypothesis 4: Targeted Procurement strategies have a direct and significant relationship with supply chain relationship quality.

Hypothesis 5a: Supply chain relationship quality mediates the relationship between Targeted Procurement strategies and social indicators of construction SMC development.

Hypothesis 5b: Supply chain relationship quality mediates the relationship between Targeted Procurement strategies and economic indicators of construction SMC development.

3.5   CONCEPTUAL FRAMEWORK

Previous sections of the chapter outlined the theoretical underpinnings for the relationships among the research constructs. The conceptual framework of the study which illustrates the association among the research constructs and provides direction to the study is presented in this section. The study primarily sought to model the relationships between Targeted Procurement strategies used by public-sector clients, supply chain relationship quality attributes and SMC growth performance and development. The conceptual model presented in Figure 3.4 hypothesises unidirectional, direct and indirect relationships between three unobserved latent variables (constructs), each of which is operationalized by indicators supported by literature and theoretical concepts presented earlier.
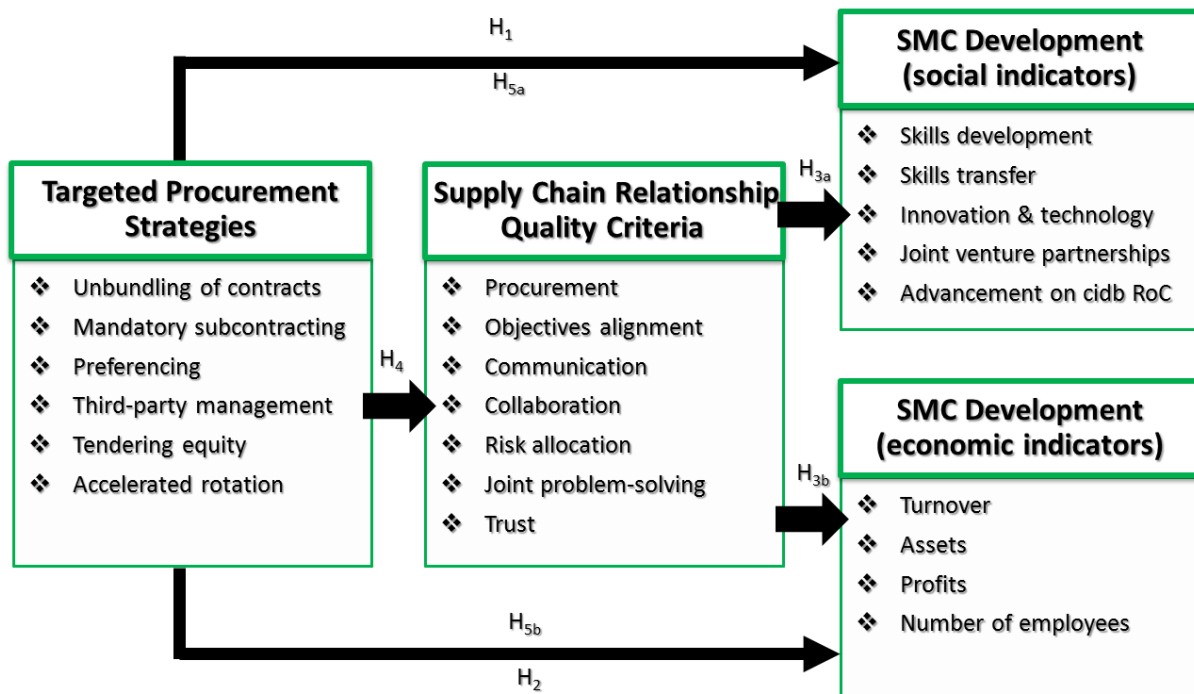
Figure 3.4: Conceptual framework for the study

The conceptual model for the study proposes a direct relationship between Targeted Procurement strategies and relationship quality as well as SMC development. It further proposes a direct path between relationship quality and SMC development. Moreover, the model proposes an indirect relationship between Targeted Procurement strategies and SMC development, mediated by relationship quality. The conceptual model represents the summary of the hypothesised relationships and causal paths between the research constructs, which would be tested in Chapter Five and validated in Chapter Six respectively.

3.6   SUMMARY OF THEORETICAL PERSPECTIVES

This chapter presented the theoretical underpinnings and conceptual framework for the research that position the phenomenon being studied within broader theoretical perspectives and give direction to the research. The industrial organisation economics theory, and by extension, the structure-conduct-performance paradigm, were both presented as the overarching theory for the study. Other relevant theoretical perspectives presented included the theory of the firm, and relational governance theory. The chapter also formulated and presented the research hypothesis to be tested in Chapter Five.

CHAPTER FOUR:
RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

The evaluation of impacts of strategies on organisational performance is a complex process requiring appropriate methodological approaches to data collection and analysis, to obtain reliable results that explain the nature of the impacts. Akadiri (2011) affirms that when undertaking research, it is important to adopt a suitable methodology, to ensure that the research objectives can be met and that the findings can be validated. This chapter provides justification for the research methodology and techniques employed by this research to achieve the aim of the study. The chapter first outlines the philosophical underpinning of the research approach considered, and examines the research paradigms that are dominant within the construction management research purview. Subsequently, a discussion is offered about the rationale for the research design, and the criteria for evaluating the research design. The details of the instruments of data collection, the unit of analysis, sample selection, and data analysis techniques are also discussed. Finally, the ethical considerations are examined.

4.2 RESEARCH PHILOSOPHY

The philosophy underpinning a research project involves thinking about the questions, making interpretations, drawing inferences, formulating ideas and thinking of possible arguments for and against them, and wondering how the concepts work in reality (Ganiyu, 2017). It is a systematic approach designed by the researcher based on their own understanding of the problem being investigated (Odediran, 2016). According to Easterby-Smith, et al., (2012), it is important for the researcher to understand the philosophical aspects of a research endeavour, for these main reasons: it helps to clarify research design; knowledge of research philosophy helps the researcher to recognise which design will work and which will not; and it helps the researcher identify and create designs that may be outside their previous experience. Easterby-Smith, et al., (2012) further state that research philosophy may also suggest how to adapt research design according to the constraints of different subjects or knowledge structures. The two main philosophical schools of thought in social science research and by extension the management research community are ontology, epistemology and pragmatism (Easterby-Smith, et al., 2012). The research philosophy involves creating some assumptions or fundamental beliefs for the study which will typically influence how the researcher approaches a research problem and hence, their methodological design (Creswell and Plano Clark, 2011;

Guba and Lincoln, 2005). The common terms used to describe the set of assumptions in social science research include "paradigm" and "worldview" (see Creswell and Plano Clark, 2011 for discussion). This study employs "research paradigm" to describe research assumptions made, which is based on the knowledge of the research problem (Lincoln et al., 2011).

4.3   THE RESEARCH PARADIGM

Research paradigm is viewed as a "set of interrelated assumptions about the social world which provides a philosophical and conceptual framework for the organised study of that world" (Field, 1979). The choice of paradigm made by the researcher will provide the philosophical guidance and assumptions upon which the research is based, including the selection of tools, instruments, unit of analysis, and methods adopted in the research. Research paradigm provides the philosophical, conceptual, and methodological direction in a study in order to answer the research questions and solve the research problem (Creswell and Plano Clark, 2011; Denzin and Lincoln, 2000; Greener, 2011; Ponterotto, 2005). Worldviews that provide philosophical and theoretical direction within and outside the construction management field of study can be classified into four broad research paradigms – the interpretivist approach, the positivist approach, the realist approach, and the pragmatic approach (Creswell, 2014; Creswell and Plano Clark, 2011). Holt and Goulding (2014) and Love et al. (2002) identify the interpretivist or phenomenological approach and the positivist approach as the dominant ones in construction management research; while Dainty (2008) concluded that the positivist approach appears to be dominant.

However, Dainty (2008) further argued that no paradigm could independently provide an understanding of the entire range of complexities that characterises the construction industry. Thus, a multi-approach combining both qualitative and quantitative methodologies is encouraged to address problems in construction management research (Love et al., 2002). Taking into account the advantages of using a multi-approach, the views of previous construction management researchers who used a mixed-methods approach, were deemed relevant to the study (Amaratunga et al., 2002; Denscombe, 2007; Johnson and Onwuegbuzie, 2004). Moreover, Amaratunga et al. (2002) suggested that a mixed methods approach is appropriate and desirable in built-environment research because it focuses on the strengths of both methodologies, allowing the researcher to collect data from multiple sources – quantitative and qualitative, in a single study design (Creswell, 2014; Creswell and Plano Clark, 2011). Nonetheless, to eliminate disparity in research approaches, philosophical positions under each

research paragdim will be considered, to understand the philosophical underpinning of the research paradigm adopted for this study. Table 4.1 presents a comparison of four research paradigms in management research.

Table 4.1: Comparison of research paradigms in management research

	Interpretivism	Positivism	Realism	Pragmatism
Epistemology: the researcher's view regarding what constitutes acceptable knowledge	Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meanings motivating actions	Only observable phenomena can provide credible data, facts. Focus on causality and law like generalisations, reducing phenomena to simplest elements	Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating different perspective to help interpret the data
Ontology: the researcher's view of the nature of reality or being	Socially constructed, subjective, may change, multiple	External, objective and independent of social actors	Objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist)	External, multiple, view chosen to best enable answering of research question
Data collection techniques	Small samples, in-depth investigations, qualitative	Highly structured, large samples, measurement, quantitative, but can use qualitative	Method chosen must fit the subject matter, quantitative or qualitative	Mixed or multiple method designs, quantitative and qualitative

Source: Adapted from Saunders et al. (2009:119)

4.3.1 The epistemological approach

Epistemology is the branch of philosophy that studies the nature of knowledge, particularly its foundation, scope and validity. The epistemological approach deals with questions of knowledge acceptability in a discipline, and is concerned with 'how we know' and the methods through which knowledge is acquired (Bryman, 2012; Easterby-Smith, et al., 2012). The epistemological position has notably been grouped by scholars as either an interpretivist or positivist paradigm (Love, et al., 2002; Bryman, 2012).

Interpretivism (constructivism) adheres to a relativist position that focuses upon the development of substantive theory as it emerges from the research investigation (Stiles, 2003; Ponterotto, 2005). Interpretivists believe that reality is constructed in the minds of the

individual, rather than it being an externally singular entity (Hasen, 2004), and avoid pre-set guidelines; they are poised to integrate new insights introduced during the investigation. However, the constructivist position advocates a hermeneutical approach, which maintains that meaning is hidden and must be brought to the surface through deep reflection. The interactive researcher–participant dialogue can stimulate this reflection. Thus, a distinguishing characteristic of constructivism is the centrality of the interaction between the investigator and the object of investigation (Ganiyu, 2017). In an attempt to generate the depth and idiographic perspective upon which the phenomenological paradigm relies, the constructivist approach tends to favour techniques such as observation, in-depth interviews and case studies, which allows the researcher to discover the basis for new ideas and theories (Stiles, 2003).

Positivism is a form of philosophical realism adhering closely to the hypothetic-deductive method (Fellows and Liu, 2008; Ponterotto, 2005). Stiles (2003) held that positivism stems from epistemological assumptions of belief in an external reality constituted of facts that are structured in a law-like manner. Easterby-Smith, et al., (2012) view positivism as a school of thought that is grounded upon the idea that the social settings exist externally, and that behaviour is measured objectively, rather than drawing upon the subjective interface of feeling, thinking or instinct. Positivists focus on efforts to verify prior hypotheses that are most often stated in quantitative propositions. They prefer exact measures and objective research, whereby hypotheses are tested to discern the facts and relationships that can be generalised to the population. Positivism includes behaviourism and empiricism. It favours the quantitative approach, which mostly uses questionnaires for data collection, experiments, surveys and analytical, statistical analysis (Neuman, 1997; Stiles, 2003).

4.3.2   The ontological approach

Ontology involves investigation to elucidate the reality and existence of facts about the research subject (Easterby-Smith, et al., 2012), which revolves around the question of 'what is' and why things happen the way they do. Greener (2011) posited that ontology is considered when a researcher thinks the guiding theory about an investigation exists independently of the researcher's perception. Two broad ontological paradigms, realism and relativism, have been identified in the literature (Easterby-Smith, et al., 2012; Fitzgerald and Howcroft, 1998).

Realism aims to understand the reality of the social world in its natural state. The realist position views the external world as constituted of hard and tangible structures that exist independent of an individual's ability to acquire knowledge about them. The realist position is

practical and not concerned with abstract or idealistic views of life. Realists believe that a researcher may not be able to change or understand the world socially until the underlying structures that create the natural event or conversation are identified (Carlsson, 2005; Stiles, 2003). Although realists argue that the knowledge may be incomplete or biased, it is vital to offer an explanation on reflections from the social world using hypothetical structures to ascertain the fundamental mechanism that affects people's actions or behaviour (Stiles, 2003). Stiles (2003) further noted that the realist perspective inclines towards a mixed-method approach, since it relies on semi-structured interviews or group observation to collect rich subjective data, which is further strengthened by the inclusion of deductive methods and a theoretical framework emanating from literature. Thus, realists address an investigation from both subjective and objective perspectives, reflecting inductive and deductive qualities of a particular phenomenon.

Relativism stems from dissatisfaction with some aspects of the realist view. Relativists perceive reality as being influenced by socially transmitted terms, and varies according to language and culture, so that concepts like right or wrong, truth and falsehood may differ from culture to culture, and situation to situation (Fitzgerald and Howcroft, 1998). However, the relativist position is of the view that human intellectual mechanisms are flawed, and that life's phenomena are basically intractable and therefore 'true' reality can never be captured. The key distinction between the realist and relativist views is that the realist stresses "theory verification" while the relativist stresses "theory falsification" (Lincoln and Guba, 2000). Despite the distinction between the two ontological positions, they share much in common, as both provide an explanation that leads to prediction and control of a phenomenon. However, both the realist and relativist operate from both a nomothetic and an etic perspective. Realism and relativism serve as the primary foundation and anchor for qualitative research.

4.3.3 Pragmatism

Pragmatism is a philosophical school of thought that has its origins in the works of twentieth-century American philosophers, William James, and John Dewey. However, it has continued to find support among contemporary scholars including Cherryholmes (1992), Murphy (1990), Patton (1990), Rorty (1990). The philosophical view underpinning pragmatism arises out of actions, situations and consequences rather than antecedent conditions, which is often seen as a compromise position between internal realism and relativism. Pragmatist theorists do not accept that there are pre-determined theories or frameworks that shape knowledge and truth, nor can people construct truth out of nothing (Easterby-Smith, et al., 2012). Fendt, et al. (2008)

argued that the pragmatic approach focuses on tackling pressing and current problems to create constructive knowledge, and subsequent translation of the developed knowledge into action. This was aligned to earlier reports by Tashakkori and Teddlie (1998) who held that pragmatists engage in what is appealing and has value, study these subjects in a way they understand, and use the results to generate positive effects within the value system being studied.

Pragmatism is viewed as a valuable dimension in management research since it focuses on processes that are particularly relevant to studies of knowledge and learning; its impact on methods can be seen in the tradition and methods of grounded theory (Easterby-Smith, et al., 2012). Hence, it is a widely accepted philosophical foundation for the mixed methods approach, which argues for the successful combination of positivist and constructivist philosophical stances (Teddlie, and Tashakkori, 2011). Pragmatist assumptions are based on knowledge or experience and examination, which is widely accepted as the basis of the mixed methods approach to research (Onwuegbuzie and Johnson, 2006). These however, distinguish pragmatism from quantitative or qualitative approaches that are founded on positivist and interpretivist paradigms respectively. Pragmatists adopt diverse methodologies and values, both qualitative and quantitative in nature, flexibly employing "what works" (Creswell and Plano Clark, 2011).

This philosophical approach relying on the use of solutions that "work" is also open to criticism. Creswell (2009) argued that the research problem should be more important than the methodological preferences. Tashakkori and Teddlie (1998) suggested that the researcher should use all approaches that would shed light on the problem at hand, and for which mixed methods are seen as beneficial. Creswell (2009) summarizes the characteristics of research that has its philosophical foundation in pragmatism: it affords mixed methods researchers a plurality of approaches, multiple worldviews or paradigms, as well as different forms of data collection in a single study. Therefore, this study employed a pragmatic quasi-mixed methods approach in its research design, primarily relying on quantitative (survey) means of data collection, and supported by qualitative data (focus group interview and document analysis) which were collected concurrently.

4.4   RESEARCH APPROACH

Construction management research draws on knowledge from a wide range of disciplines, for example, social sciences, management, and engineering, to provide context, depending on the

requirement of a particular research project (Dainty, 2008; Fellows and Liu, 2008). Given the availability of different research paradigms to choose from, critical consideration of which is the most appropriate research approach is essential. Amaratunga et al. (2002) affirm that each research approach has its inherent advantages, hence the choice is dependent on how they relate to the nature of the question to be addressed, the type of data required, the analysis of the results, as well as the conclusions to be drawn from the study. Teddlie and Tashakkori (2009) classified research approaches into three categories: quantitative research, qualitative research, and mixed method research. Fellows and Liu (2008) suggest the research approaches of action research, ethnographic research, surveys, case studies and experiments. Similarly, Yin (2012) classified research in social sciences into five approaches: surveys, experiments, archival analysis, histories and case studies. However, the basis for the categorization relates to the different perspectives provided in different research fields. Moreover, definitions vary and the boundaries between the research approaches are not well defined. In order to provide a guide to identifying the most suitable approach to the collection, analysis and interpretation of data for this study, different research approaches were explored before making a choice. Table 4.2 provides a comparison between quantitative and qualitative approaches.

4.4.1 Quantitative research

Creswell (2009) defined quantitative research as "an inquiry into a social or human problem, based on testing a hypothesis or theory composed of variables, measured with numbers, and analysed with statistical procedures to determine whether the hypothesis or theory hold true". Brannen (1992) asserted that quantitative research is concerned with attitudes and large-scale surveys, rather than simply with behaviour and small-scale surveys. Fellows and Liu, (2008) posited that quantitative research approaches seek to gather factual data, to study the relationships between facts and how such facts and relationships concur with theories and the findings of other researches in the extant literature.

According to Cooper et al. (2007) and Creswell (2009), types of quantitative research include experimental quantitative research (quasi-experimental, or applied behavioural, or single subject experimental), or non-experimental quantitative research (typically surveys). The effectiveness of the selected type depends mainly on the nature of the research. However, the survey technique is the most widely used method in social science, which is also the most relevant to this study. A survey typically involves cross-sectional and longitudinal studies using questionnaires or interviews to collect large amounts of data. The most common data collection techniques are mail (including electronic), personal and telephone survey (Bryman, 2012;

Creswell, 2009; Rubin and Babbie, 2010), each with its merits and demerits. However, data collected quantitatively are usually precise and reliable, and the findings obtained can be generalized to the entire population (Amaratunga et al., 2002; Awodele, 2012; Creswell, 2003; Neuman, 1997; Stiles, 2003).

Table 4.2: Comparison between quantitative and qualitative approaches

	Quantitative research	**Qualitative research**
Alternative labels	Positivist, rationalistic or functionalist	Constructivist, naturalistic-ethnographic or interpretative.
Scientific explanation	Deductive	Inductive in nature
Data classification	Objective	Subjective
Objective/purpose	To quantify data and generalise results from a sample to the population of interest. To measure the incidence of various views and options in a chosen sample.	To gain understanding of underlying reasons and motivations. To provide insight into the settings of a problem, generating ideas and /or hypothesis for later quantitative research. To uncover prevalent trends in thought and opinion.
Sample	Usually a large number of cases representing the population of interest. Randomly selected respondents.	Usually a small number of non-representative cases. Respondents selected to fulfil a given quota or requirement.
Data collection	Structured interview, self-administered questionnaires, experiments, structured observation, content analysis / statistical analysis	Participant observation, semi and unstructured interview, focus groups, conversation and discourse analysis.
Data analysis	Statistical usually in the form of tabulations. Findings are conclusive and usually descriptive in nature	Non-statistical
Outcome	Used to recommend a final course of action.	Exploratory and/or investigative. Findings are not conclusive and cannot be used to make generalisations.

Source: Adapted from Amaratunga, et al. (2002:20)

4.4.2   The qualitative research approach

Having its origins in the social sciences, qualitative research involves approaching the research from an observer's perspective, with data collection and interpretation done through contact with the field (Miles and Huberman, 1994, cited in Warfield, 2005). The qualitative approach seeks to gain insight into people's perceptions of the world, whether as individuals or groups (Fellows and Liu, 2008). It is based on the belief by interpretivists that the external world cannot be accessed directly, but only indirectly through social constructions made by people living in it (Ardley, 2008; Greener, 2011; Stiles, 2003). Amaratunga, et al., (2002) explain that qualitative researchers investigate the beliefs, understandings, opinions and views of the

respondents. Moreover, Bryman (2012) describes qualitative research as a research strategy that places emphasis on words rather than quantification, in the collection and analysis of data. Inductive in nature, qualitative research does not rely on a hypothesis to start the research, rather it employs inductive data analysis to provide a better understanding of researcher and participants' interacting realities and experiences (Lincoln and Guba, 1985).

Information gathered in qualitative research can be classified as either exploratory or attitudinal. Exploratory qualitative research is used when the researcher has a limited amount of knowledge about the research topic (Bryman, 2012), with the aim of getting a clear and precise statement of the problem; attitudinal research is used to subjectively evaluate the opinion of a person or group about an attribute, variable, factor or question. Common methods used in conducting qualitative research include the phenomenological approach (practically expressed by obtaining the experience of an individual in interviews) (Giorgi, 2009); narrative analysis (a study of an individual or their life) (Clandinin and Connelly, 2000; Riessman, 2008); ethnography (studying shared patterns of behaviours, or actions over a prolonged period of time) (Fetterman, 2010); grounded theory (obtaining general knowledge using multiple stages of data collection, until the refined data are obtained) (Charmaz, 2006; Corbin and Strauss, 2007); and case studies (evaluation of a system, or case, by collecting detailed information using different data collection procedures over a continuous period of time) (Yin, 2012). Although this study is not philosophically rooted in interpretivism, it sought to adopt a phenomenological approach where focus group interviews were conducted to obtain more detailed knowledge and practical experience about the relationship quality attribute of the research problem under investigation, which could not be addressed by the quantitative method (Amaratunga et al., 2002; Knox and Burkard, 2009). Moreover, the positivist research approach does not take into consideration the multifaceted nature of organisational performance and characteristics (Dainty, 1998). However, the use of the qualitative approach in this study was limited, as it may be subject to bias and subjectivity, and the data and results may be influenced by a variety of external environmental variables (Bryman, 2012; Fellows and Liu, 2008; Flick, 2014).

4.4.3   The mixed methods research approach

The mixed methods research approach draws upon the principles and strengths of both qualitative and quantitative methods, recognising the existence and importance of the physical, natural world as well as the importance of reality and the influence of human experience (Creswell et al. 2003; Grafton et al., 2011; Onwuegbuzie and Johnson, 2006). Mixed methods

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research combines quantitative (interpretivist views) and qualitative research (positivist views) in the same study or a series of studies, in the collection of data, analysis and drawing inferences (Johnson et al., 2007; Swanson and Holton, 2005; Teddlie and Tashakkori, 2009), for the broad purposes of breadth and depth of understanding and corroboration (Johnson et al., 2007). The concept of mixing methods was first introduced by Jick (1979) as a means for seeking convergence across quantitative and qualitative methods within social science research, thereby addressing the issue of bias and weakness inherent in individual methods. The propagation of the use of mixed methods designs has most recently been stimulated by pragmatic issues, like the increasing demand for cost effective research and the quest to move away from theoretical research, to research which meets policymakers' and practitioners' needs (Ostlund, et al., 2011).

Swanson and Holton (2005) classified mixed methods research into different types: complementary (which combines the results of one method with the results of the other method); development (which uses the results from one method to develop or inform the other method); initiation (in which the result from one method is recast to questions or results from the other method); and expansion (in which a different method is used to extend the breadth or range of inquiry). Plano Clark and Creswell (2015) further classified mixed methods research into convergent parallel, sequential, embedded, concurrent, multiphase, and transformative (see Plano Clark and Creswell, 2015:391–403 for discussion). Table 4.3 provides an overview of the characteristics of the different mixed methods research designs.

Holt and Goulding (2014) also introduced another variant of the mixed methods research approach – ambiguous mixed methods research (AMMR) arising from observations that most building and construction researchers failed to categorically and clearly state which research methods they intended to adopt, despite the actual approach employed being either of the quantitative or the qualitative research methods. According to Plano Clark and Creswell (2015), mixed methods research designs differ in terms of their priority, which refers to the relative importance of the quantitative and qualitative components for addressing the purpose of the study. Mixed methods can either be equal priority (quantitative and qualitative components of a mixed methods study are both equally important) or unequal priority (one of the components of the, for example the quantitative or the qualitative component, has a greater importance, while the other component has a lesser priority).

Table 4.3: Overview of the characteristics of the different mixed methods research designs

	Design intent	Typical characteristics
Convergent parallel	To develop a complete and valid understanding	Concurrent timing Equal priority Merging the quantitative results and qualitative findings during analysis and/or interpretation
Sequential explanatory	To explain the mechanisms or reasons behind quantitative results	Sequential timing Unequal priority Connecting from the quantitative results to shape the qualitative data collection
Sequential exploratory	To test or generalize qualitative findings	Sequential timing Unequal priority Connecting from the qualitative findings to shape the quantitative data collection
Embedded experiment	To enhance a quantitative experimental study by including a secondary qualitative component to explore the procedures or process of the experiment	Concurrent or sequential timing Quantitative priority Embedding a qualitative component into a quantitative experimental design
Embedded case study	To enhance a qualitative case study by including a secondary quantitative component to enrich the interpretation of the case	Concurrent or sequential timing Qualitative priority Embedding a quantitative component into a qualitative case study design
Concurrent conversion	To identify quantitative relationships among variables that include at least one variable that is a quantification of qualitative findings	Concurrent timing Quantitative priority Converting qualitative findings into a new quantitative variable and analysing that new variable statistically with other quantitative data
Concurrent multilevel	To examine multiple levels (for example, students, teachers, principals, and districts)	Concurrent timing Equal or unequal priority Merging the quantitative results and qualitative findings from each level during analysis and/or interpretation
Multiphase	To conduct a program of studies aimed at achieving an overall objective such as developing and evaluating a program	Concurrent and sequential timing Varies for each study in the program Connecting from each study to inform the later steps of the program development
Transformative	To conduct research that empowers individuals and advocates for social justice	Concurrent or sequential timing Equal or unequal priority Embedding a mixed-methods design in a social justice framework, which shapes all the design decisions

Source: Plano Clark and Creswell (2015:391)

Dainty (2008) affirm that most of the research within construction management can be considered social research, which focuses on understanding the structure and complex nature of interactions that shape the industry. He further argued that using a single methodology cannot adequately reveal the complex nature of these relationships. This is aligned to an earlier stance by Love et al. (2002) who also argued that if construction management researchers are

to offer solutions to problems confronting the construction industry, there is the need to adopt a vigorous philosophical approach that takes into cognisance both ontological and epistemological perspectives.

4.5 RESEARCH APPROACH FOR THIS STUDY

Philosophical approaches to research were described in previous sections of this chapter to provide background knowledge on the use of each of the philosophical viewpoints. Selecting a suitable research approach to examine the relationship among the research constructs is a significant step in the research process as it provides a methodological direction to solving the research problem. This was done after careful consideration of certain key factors relating to the study, such as the main research question, type of data required to answer the research question, analysis of the data collected, as well as the expected conclusions to be drawn from the study.

Several research approaches and designs have been used in previous studies on organisational growth, with varying theories developed, as well as varying use of empirical data and analyses applied (McKelvie and Wiklund, 2010). However, these studies can be classified into three broad streams: growth as an outcome (studies that empirically or conceptually viewed growth as a dependent variable and used a set of independent variables to explain variance in the growth outcome); the outcome of growth (studies that treats growth as a variable that influences other variables); and the growth process (studies that treated growth as neither an independent variable, nor a dependent variable, but instead were interested in the actual growth process) (McKelvie and Wiklund, 2010). This study falls into the "growth as an outcome" research stream. Consequently, pragmatic philosophy was deemed most relevant to the study, since pragmatism provides justification for the combination of both quantitative and qualitative approach in research (Bryman, 2012).

To achieve the aim of the study, which was to examine the influence of Targeted Procurement strategies on SMC growth performance, and establish the nature of the relationships between the study constructs, the study primarily adopted a positivist paradigm, which is known to be efficient in explaining behavioural aspects as well as measuring the descriptive aspects of built-environment research (Amaratunga et al., 2002). Moreover, an interpretivist paradigm has been proven to be suitable in addressing the complex issue of organisational performance (Amaratunga et al., 2002). Although the use of both quantitative and qualitative approaches is

prevalent in construction management research (Amaratunga et al., 2002; Dainty, 2008; Love et al., 2002), some studies on strategic management in construction utilised a single quantitative approach (for example, Kale and Arditi, 2003; Pamulu, 2010; Tan et al., 2012). Moreover, Amaratunga et al. (2002) and Ankrah (2007) argued that the essence of undertaking research at this level is to advance a new perspective to an existing body of knowledge for which a quantitative approach is appropriate.

It is acknowledged that this study is primarily deductive and theory-testing, hence the adoption of a pragmatist positivist approach. However, Dainty (2008) and Love et al. (2002) argued that to unravel the inherent complexities of the construction industry, construction management researchers need to adopt multi-methodology approach which draws from the strengths of both an interpretivist qualitative approach and a positivist quantitative approach. This study therefore adopted an embedded mixed-methods approach that primarily relied on quantitative (survey) means of data collection, and was supported by secondary qualitative data (focus group interview and document analysis) which was conducted concurrently. Hence, this study employs a quantitative component priority which has greater importance for addressing the study's main purpose (Plano Clark and Creswell, 2015). The chosen approach was considered appropriate for this study as it would enhance the confidence in and credibility of findings reported, and its validity (Easterby-Smith et al., 2012), thus providing a better understanding of the phenomenon being investigated.

4.5.1 Embedded mixed methods research design

The embedded (quasi-experiment) mixed methods design is described as the procedure used by researchers to collect a secondary dataset (qualitative) in a study which is guided by a traditional quantitative design, where the secondary set of data addresses a different question and is used to augment the interpretation of the primary method (Plano Clark and Creswell, 2015). For example, the quantitative dataset may be of primary importance to test the effectiveness of an intervention, while the qualitative dataset provides secondary information about the intervention's process. The collection of data for embedded design maybe concurrent or sequential, with the researcher's emphasis and focus on the primary method (Plano Clark and Creswell, 2015).

The study set out to empirically validate a pre-existing assumption (that targeting SMCs and increasing their participation in government contracts stimulates their growth performance and development), which relies upon quantitative data from a large sample of respondents. The

rationale for selecting an embedded research approach stemmed from the inherent nature of the research problem which called for a secondary dataset to the support the primary quantitative design, thus augmenting its interpretation and discussion of results. The embedding or inclusion of qualitative data paved the way for the exploration of the relationship quality attribute of the study. This explains the nature and the quality of relationships experienced by the SMCs with other stakeholders in the Targeted Procurement project organisation or supply chain. Hence, the qualitative data within a larger primarily quantitative research design enriched the description of the supply chain relationship quality attribute within the specific context of the Targeted Procurement process in South Africa.

A positivist quantitative approach was more appropriate for addressing the main purpose of the study, which set out to empirically validate the pre-existing assumption or theory that targeting SMCs and increasing their participation in government contracts stimulates their growth performance and development. However, Achtenhagen et al. (2010) called for more qualitative research to better understand certain neglected aspects of organisational growth, and to gain new insights into practitioner's perspectives of growth. In a more specific context to this study, Hammond (2011) also suggested that a greater use of qualitative methodology would be beneficial to understanding the social world of emerging contractors within the construction sector in South Africa.

The study also followed the concluding remarks from Coad's (2007) study on firm growth that the use of empirical analysis is the way forward to understanding the growth of firms, as theoretical predictions have been of limited use, if not downright misleading. Coad (2007) further recommended a Simonian methodology (Simon, 1968) whereby facts are first pursued through empirical investigations, and theories later formulated as attempts to explain the "stylised facts" that emerge. However, Achtenhagen et al. (2010) recommended a combination of primary data and secondary data to ensure validity in the results. Hence, the results from the secondary qualitative component although having the lesser priority to the overall purpose of the study, served to provide an additional source of information for the primary quantitative component. The adoption of this approach represents a significant departure from the approaches employed in previous research on preferential procurement and SME development
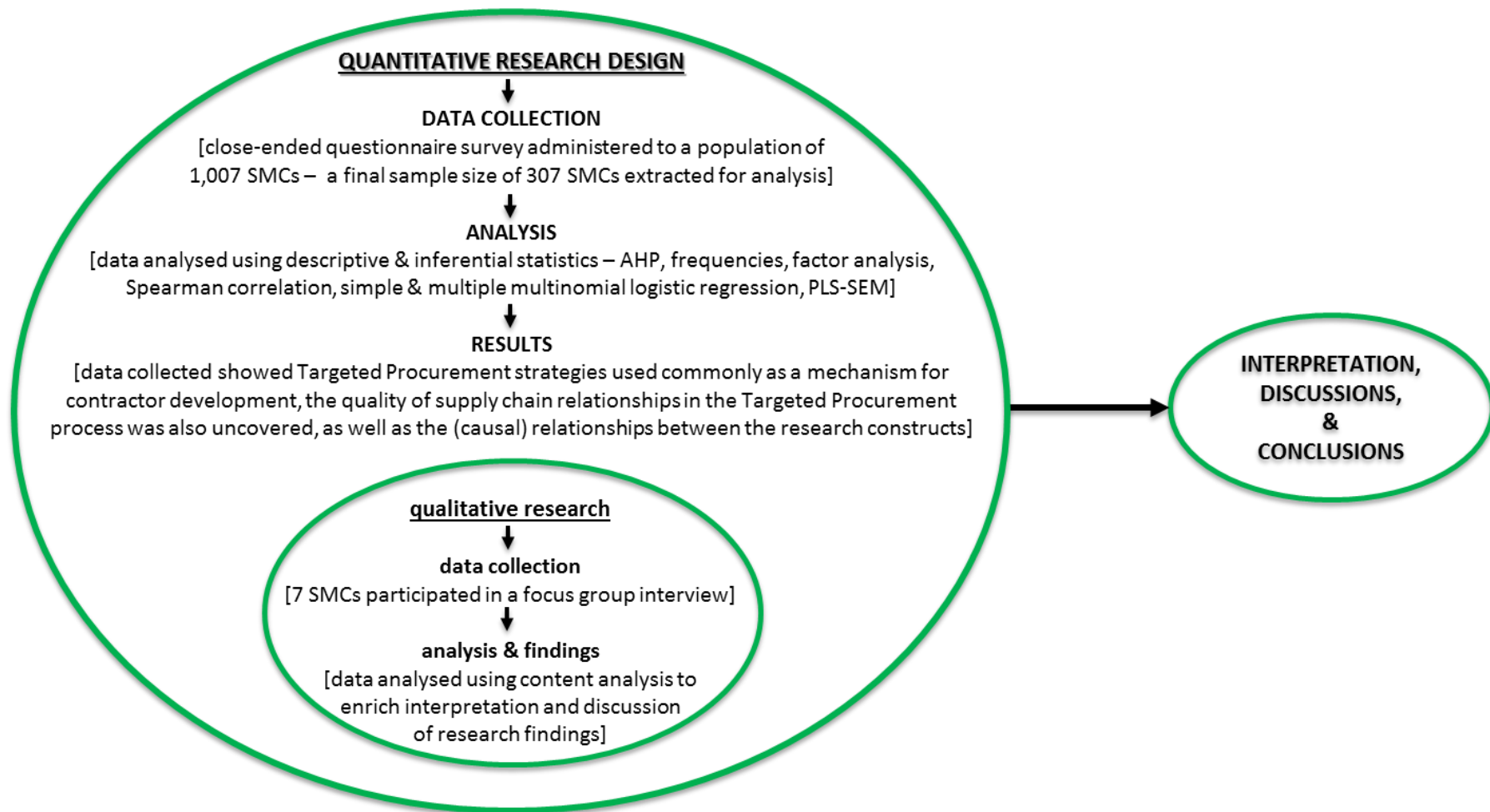
Figure 4.1: Embedded mixed methods design for the study
(Adapted from Plano Clark and Creswell, 2015:400)

in South Africa, which makes this research a significant contribution to the body of knowledge on procurement in the construction industry. Figure 4.1 illustrates the embedded mixed methods design employed in this study.

4.6   STUDY POPULATION, SAMPLING TECHNIQUE AND SAMPLE SIZE

4.6.1   Study population

The study was focused on SMCs registered on Grades 3 to 6 on the cidb RoC who have executed Targeted Procurement projects and been part of a cidb-registered CDP within the last five years, and this constituted the population of the study. To determine the population for the study, a list of 1,007 general building (GB) and civil engineering (CE) contractors that had been part of a cidb-registered CDP within the period of observation was obtained from the cidb in May 2016. Table 4.4 provides a breakdown of the sampling frame (that is, contractors to be invited for the survey) according to their resident CDPs.

Table 4.4: Distribution of contractors in registered contractor development programmes

Name of CDP	Province	No. of contractors
Coega Development Corporation, Port Elizabeth	Eastern Cape	96
Department of Roads and Public Works, Bisho	Eastern Cape	241
Department of Police, Roads and Transport	Free State	74
Department of Roads and Transport, Johannesburg	Gauteng	28
Independent Development Trust, Pretoria	Gauteng	49
Johannesburg Water	Gauteng	18
Department of Transport	KwaZulu-Natal	354
Department of Public Works	Limpopo	45
Lepelle-Nkumpi Local Municipality	Limpopo	4
Department of Public Works and Roads, Mmabatho	North West	63
Tlokwe Local Municipality	North West	9
Department of Public Works	Western Cape	26
Total		**1,007**

Source: cidb (May, 2016); Available at: https://registers.cidb.org.za/PublicContractors/Reports

4.6.2   Sampling technique

Given that it is practically impossible to obtain data from the entire population within the scope of a study, sampling is commonly used to obtain data from a part of the population that will be representative of the population being studied (Fellows and Liu, 2008). A combination of stratified sampling and targeted sampling techniques was used in the selection of SMCs for the survey (Odediran, 2016; Teddlie and Yu, 2007). Targeted sampling was used because the study was only interested in SMCs that had executed Targeted Procurement projects and been part of a cidb-registered CDP within the five-year period of observation. Stratified random sampling technique was used because contractors in South Africa are stratified by the cidb according to

their grades, and only Grades 3 to 6 SMCs constituted the focus of the study. Grades 1 to 2 contractors were excluded because they are unlikely to reflect the growth performance being sought, while Grades 7 to 9 contractors were also excluded because these were considered large established contractors (Windapo and Cattell, 2011).

However, there was no way to ascertain the profile of the SMCs beforehand to determine those that met the criteria for the study (Grades 3 to 6 contractors classified as an SME, have executed Targeted Procurement projects, and been part of a cidb-registered CDP between 2011 and 2015); hence the entire study population of 1,007 SMCs was surveyed. Based on the information obtained from the SMCs surveyed, those that met the criteria for the study were identified and extracted for the empirical study. Nonetheless, it was still necessary to determine the appropriate sample size that would be representative of the study population.

4.6.3 Sample size

Sample size was calculated to determine the appropriate sample size that was representative of the population being studied (Fellows and Liu, 2008). The iterative formula cited in Ankrah (2007) was employed to calculate the sample size for the study as shown in Equation 4.1.

$$SS = \frac{z^2 \times p(1-p)}{c^2} \quad\quad [4.1]$$

Where: ss = sample size

z = standardised variable

p = percentage picking a choice, expressed as a decimal

c = confidence interval, expressed as a decimal

The sample size was determined based on the required degree of accuracy and confidence level – worst case percentage picking choice, $p = 50\%$ was recommended by Ankrah (2007); with a 95% confidence level (0.05 significance level; $z = 1.96$); and a confidence interval, $c = \pm10\%$ (Czaja and Blair, 1996). These values were put into Equation 4.1 to estimate the minimum sample size for the study as shown in Equation 4.2.

$$ss = \frac{1.96^2 \times 0.5(1-0.5)}{0.1^2} = 96.04 \quad\quad [4.2]$$

The preliminary sample size based on Ankrah's (2007) formula is 96 construction company units. However, this figure will be used to calculate the new sample size from the study population using the formula as shown in Equation 4.3.

$$New\ ss = \frac{ss}{1+\left[(ss-1)/pop\right]} \hspace{3cm} [4.3]$$

Where: *pop* = population

Therefore:

$$New\ ss = \frac{96.04}{1+\left[(96.04-1)/1007\right]} = 87.76 \hspace{2cm} [4.4]$$

The revised sample size for the study was estimated to be 88 participants from the study population (Equation 4.4). However, construction management scholars have highlighted difficulties in obtaining responses from the construction industry particularly for questionnaire surveys (Akadiri, 2011; Ankrah, 2007; Ganiyu, 2017; Oyewobi, 2014). Consequently, Idrus and Newman (2002) and Takim et al. (2004) considered a response rate of 20% to 30% to be adequate for built-environment research. Thus, an upper boundary conservative response rate of 30% was assumed to account for non-responses, and the survey sample was recalculated as shown in Equation 4.5.

$$Survey\ sample\ size = \frac{New\ ss}{0.3} = 292.53 \hspace{2cm} [4.5]$$

The appropriate sample size for the study was further validated using Raosoft.com's (2004) sample size calculator. Based on 5% margin of error, 95% confidence level, 50% response distribution and a population size of 1,007 SMCs; a recommended sample size of 279 participants was obtained (Raosoft.com, 2004). Therefore, a sample size of between 279 to 293 SMCs was deemed sufficient and representative of the study population. The total number of valid responses (307) for the current study was over and above the recommended sample size upper limit of 293. Hence, it can be concluded that the number of participants in the study is representative of the entire study population of SMCs that have been part of a cidb-registered CDP in the five-year period of observation. Moreover, in their review of 118 empirical articles on firm growth performance from five top business and entrepreneurship journals, Kiviluoto et al. (2011) reported that the median size of the samples used is 186 respondents. Hence, the

current study's final sample size of 307 SMCs measures well above the trend from previous studies.

4.7   UNIT OF ANALYSIS

Unit of analysis refers to the phenomenon being investigated, about which data is collected and analysed (Collis and Hussey, 2003). Depending on the design, the unit of analysis may be an individual, groups of individuals, an organisation or a unit within an organisation. Organisational growth studies involve examining individual firms (McKelvie and Wiklund, 2010). The unit of analysis for this study was small and medium-sized construction companies (civil engineering and general building contractors) in South Africa which had executed Targeted Procurement projects within a five-year period (2011 – 2015). Thus, the participants of the study were selected from this study population, with a particular focus on contractors registered on Grades 3 to 6 of the cidb RoC.

4.8   INSTRUMENTS OF DATA COLLECTION

Data collection for the study was primarily collected using questionnaire surveys and supported with a semi-structured focus group interview protocol. The data collection procedure is discussed in the subsequent Sections.

4.8.1   Questionnaire development

The development of the questionnaire survey instrument is an integral part of the data collection phase of a quantitative study design, as it must be designed to minimize certain difficulties (in completion time and clarity) that may affect response rate and the accuracy of the information obtained (Odediran, 2016). Questionnaires are used to obtain objective data from respondents and must be logically designed, unambiguous, coherent, free of language errors and well-presented (Creswell, 2009; Odediran, 2016; Oyewobi, 2014). Questions asked in a questionnaire could either be open-ended (allow respondents to give opinion-based answers) or closed (provides a choice of answers from which respondents must select) (Fellows and Liu, 2008), however, questions with negative implications should be avoided (Fellows and Liu, 2008). The questionnaire for the study was designed while taking into account these elements of a good questionnaire. (see Appendix A1).

A draft of the questionnaire was assessed by an editor at the Writing Centre, University of Cape Town while the final draft received the research supervisor's approval before being

administered to the study participants. The questionnaire was divided into five sections, which were preceded by a preliminary section that sought the consent of the respondents to participate in the study. General background information of the companies and responding officers were collected in Section A. This included companies' experience/years in business, Grade and class of works on cidb RoC, number of employees and their highest level of qualification, and responding officers' designations. Section B and Section C sought to enquire about the SMCs participation in public-sector Targeted Procurement projects and contractor development programmes respectively. In Section D, the respondents were first asked to rate the development benefits derived from participating in Targeted Procurement contracts, followed by the quality of supply chain relationships experienced in the Targeted Procurement process. This section was project-specific where the SMCs were asked to identify one Targeted Procurement project executed in the last five years, which they used to answer all questions in the section. Finally, information on the companies' growth performance was collected in Section E. Responses were mostly subjective and measured on four or five-point Likert-like scales. Further details about the research constructs and the variables used in the questionnaire survey are provided in Section 4.8.1.2.

4.8.1.1 *Pre-test of the questionnaire*

Fellow and Liu (2008) and Saunders et al. (2009) suggested that the research instrument (questionnaire in this study) should be piloted to improve the quality and suitability of the collected data for analysis. Piloting of the questionnaire was done by sending copies of the final draft to seventeen contractors within the study population, and three academics with research interests in procurement and enterprise development as recommended by Xiaopeng and Pheng (2013) and Zhang (2011). This was done to confirm the simplicity of the questions, ease of reading and to ascertain the time required to complete the questionnaire. Out of the twenty copies of questionnaire sent out for piloting, five responses with useful suggestions were received, which were incorporated into the questionnaire before it was administered to the participants. Two questionnaires were also self-administered which allowed for interaction and immediate feedback. Approval from the university Ethics in Research Committee was also received on 13 April 2016, ahead of the start of data collection (see Appendix A4).

4.8.1.2 *Measures and variables of research constructs used in the questionnaire design*

The research variables used in designing the questionnaire survey for this study were obtained though the extensive review of extant literature presented in Chapter Two. The three constructs

of the study with their variables were also presented in Chapter Three where the conceptual framework was developed. This section provides further details on the research constructs and the variables used in the questionnaire survey.

Targeted Procurement Strategies

The variables for Targeted Procurement strategies as identified in the literature are (cidb, 2008b; Letchmiah, 2012; SANS, 2003, 2004; Watermeyer, 2000, 2005): unbundling of contracts, mandatory subcontracting, preferencing, third-party management, tendering equity and accelerated rotations. The respondents were asked to indicate the Targeted Procurement strategies that is frequently used on public-sector projects they have executed, using a five-point Likert scale ranging from 1 (never) to 5 (always).

Supply chain relationship quality

This study adopted thirteen assessment criteria for relationship quality adapted from Meng et al.'s (2011) supply chain relationship maturity model. The thirteen assessment sub-criteria classified into seven main criteria used in this study comprise of: Procurement (selection criteria, procurement method, form of contract), Objectives alignment (objectives alignment & benefits, continuity of work), Communication (information exchange, learning and innovation sharing, cost data transparency), Collaboration (working relationship), Risk allocation (risk sharing & allocation, balance of risk and reward), Problem-solving (problem-solving effectiveness), and Trust (confidence in others' behaviour). Using the relationship quality assessment criteria, the participants were asked to rate the quality of relationship experienced in the Targeted Procurement process (between SMCs and other supply chain parties) which was measured on a four-point Likert scale ranging. Scores ranging between 1 and 4 (the progression of the relationship through the maturity levels) was assigned based on the criteria and component that best fits the respondent's project scenario. A score tending towards 4 will indicate a higher quality of relationship (close long-term collaboration) than a score that tends towards 1 (arms-length adversarial).

SMC Development

This study adopted multiple economic and social indicators to measure SMC growth performance and development in line with majority of empirical studies on firm growth that used multiple dependent variables (Kiviluoto et al., 2011). The economic indicators of SMC development used in this study are (Abu Bakar et al., 2011, 2012; Ofori and Chan, 2000; Teruel-Carrizosa, 2006; Tucker et al., 2015): Turnover, Profits, Assets – plant and equipment,

and Number of permanent skilled employees. Raw data for a five-year period (2011 – 2015) were obtained from the respondents which was then aggregated and converted into five-point Likert scale items based on the classification for construction SMEs by the National Small Business Act, No. 26 of 2003. This was in line with previous growth studies that designed questionnaires with lagged dependent variables or respondents being asked to account for their growth over a certain number of years (Shepherd and Wiklund, 2009), mostly one to three or five-year periods (Delmar et al., 2003; Kiviluoto et al., 2011). McKelvie and Wiklund (2010) asserted that the effect of time is important for understanding how new and small firms in particular, change and grow over time. Moreover, using aggregate values in calculating growth is preferred, since growth does not follow any linear pattern (Achtenhagen et al., 2010; Garnsey et al., 2006) which could be especially problematic, for example where differences between first and last year sizes are used (Weinzimmer et al., 1998). Davis et al. (1996) also proposed using firms' aggregate size for classification.

Social indicators of SMC development comprise of: skills development, joint venture partnerships, skills transfer, application of innovation and technology, and advancement on the cidb RoC. These were measured using five-point Likert scales ranging from 1 (very low) to 5 (very high). These indicators were employed because they are aligned to the cidb's main requirements for progressing through the cidb contractor grading system, as well as the core objectives of the National Contractor Development Programme framework in South Africa (DPW and cidb, 2011). Moreover, the researcher engaged in critical reflection on the choice and operationalization of growth variables, based on the theoretical reasoning driving the study, to select relevant growth measures that represented an outcome that could be meaningful to practitioners (Achtenhagen et al., 2010).

4.8.1.3 *Questionnaire administration and collection*

The questionnaire survey is the most common method of collecting quantitative data in the social sciences, because it is a structured means of data collection from a large population (Blaxter et al., 2006; Creswell, 2014; Saunders et al., 2009). The questionnaire survey has been described as a simple technique that allows respondents to compare and establish relationships among the research variables (Saunders et al., 2009) by ranking questions using numerical scales (Creswell and Plano Clark, 2011). A questionnaire survey may be provided to respondents in different ways (for example, it may be sent in the post, provided as an online/internet survey, or self-administered), and the choice of the most appropriate depends on the accessibility of the targeted participants (Saunders et al., 2009). Given the geographical

spread of the SMCs that constituted the focus of the study, an online/internet-based survey (SurveyMonkey Inc.) was primarily employed to reach as many participants as possible across the seven provinces of South Africa. Moreover, the online system afforded the researcher easier access to majority of the participants, who also had quick and easy access to complete the survey whenever it suited them. Although web-based surveys often encounter low response rates (Archer, 2008; Wiseman, 2003), other benefits include ease of sending reminders, lower cost, and built-in characteristics that make data cleaning easier (Boyer et al., 2010; Dillman et al., 2009; Israel, 2011). The online survey was conducted between August 2016 and February 2017, with follow-up reminder emails sent during this period.

A smaller group of 43 SMCs, also within the sample frame, that agreed to participate in a self-administered survey, were also surveyed face-to-face. These were SME contractors in the supply chain of a state-owned entity in South Africa with major infrastructure projects across the country. The questionnaires were administered in three phases to three different teams of SMCs. The first two teams were surveyed at Mthatha and Libode in Eastern Cape on 25th August; while a third team of women SME contractors were surveyed on 26th August at Port St. Johns, also in the Eastern Cape. The questionnaire administration period did not go without some challenges, for example, a few participants opted out of the study, some emails bounced, while others responded bitterly to the invitation with sometimes harsh, abusive and vulgar words. However, this did not deter the researcher's resolve, and reminders and telephone calls to participate in the survey helped to build up a suitable response rate (Easterby-Smith et al., 2012).

Response rate
Out of the estimated 1,007 potential participants that were invited to participate in the study, a total of 360 (35.4%) completed responses were received at the end of the survey period. However, after careful examination of the respondent profiles, only 307 responses from contractors that met the criteria for the study (for example, those classified as an SME and registered on cidb Grades 3 to 6) were identified and extracted for the empirical study. The response rate of 35.4% was considered high within the sphere of construction management research (Akintoye and Fitzgerald, 2000; Alreck and Settle, 2004; Black et al., 2000; Takim et al., 2004), especially for a largely web-based questionnaire survey where response rates as low as 2% have been reported (Petchenik and Watermolen, 2011). Moreover, previous research on construction company growth performance by Abu Bakar et al. (2011), Ofori and Chan (2000), and Tucker et al. (2015) recorded response rates of 17%, 26%, and 33.5% respectively. The

total number of valid responses (307) for the current study was also over and above the recommended sample size of 293 for the study. Hence, it can be concluded that the number of participants in the study is representative of the entire study population of SMCs that have been part of a cidb-registered CDP in the five-year period of observation (2011 to 2015).

4.8.2 Semi-structured interview

This study adopted an embedded mixed methods research where the qualitative component was embedded into a larger quantitative research design. Plano Clark and Creswell (2015) argued that although quantitative data are most effective for testing outcomes, qualitative data can augment a quantitative research design. Plano Clark and Creswell (2015) further noted interviews as the most common approach to qualitative data collection used by researchers. Qualitative interviews involve asking one or more participants open-ended questions (that allow participants to give opinion-based answers) and recording their responses. It is important to ask good open-ended questions that allow participants to give free voice to their experiences (Plano Clark and Creswell, 2015).

A semi-structured interview (focus group) was employed as the appropriate means of data collection for the qualitative component of the study. This method made it possible to elicit useful information about the contractors' experiences while executing Targeted Procurement projects, particularly the quality of supply chain relationships experienced in the Targeted Procurement process. Moreover, an interview allowed the researcher to ask specific questions relating to the relationship quality attribute of the study. However, Plano Clark and Creswell (2015) suggested that interviews are not the best choice in a study where the participants have trouble (verbally) expressing themselves. This was taken into consideration when selecting the participants, who were chosen from those who willing divulged additional information during the questionnaire survey and further expressed interest in participating in the interview. Since the qualitative component of the study was embedded within the quantitative component, selection of interview participants followed from the sample frame of the questionnaire phase.

4.8.2.1 Focus group interview and procedure

Focus groups, also described as group in-depth interviews, consist of a small number of individuals or interviewees that are drawn together for the purpose of expressing their opinions on a specific set of open questions (Welman et al., 2005). The use of interviews may be frustrated by the difficulty in securing willing participants for the interview process (Easterby-Smith et al., 2012). Ganiyu (2017) also noted the lack of readiness of construction industry

professionals to participate in research procedures due to the busy nature of their activities. Hence, this study adopted a double-barrelled approach that involved seeking the respondents' willingness to participate in the interview, by means of a question in the questionnaire survey. Those that expressed interest in participating in the interview were immediately contacted via email, thanking them for their prompt response to the quantitative survey and their readiness to be interviewed. Interview dates were subsequently proposed based on the collective availability of at least eight potential participants. Easterby-Smith et al. (2012) emphasised that establishing contact with respondents immediately (when they show interest in the opportunity to be interviewed) is very essential. Moreover, prompt acknowledgment to survey respondents showed the level of seriousness attached to the research by the researcher, thereby promoting the respondents' interest in offering future opportunities to other researchers.

As highlighted in the previous section, the research adopted a focus group interview approach as the preferred means of qualitative data collection. Focus group interviews are a data collection process used by qualitative researchers to collect both the views of specific people and a shared understanding from several individuals (Plano Clark and Creswell, 2015). The process involves collecting data through conversations with a small group of people (typically four to eight individuals) where the researcher asks a small number of general questions and elicits responses from all individuals in the group as well as their reactions to what others have said in that group.

The focus group interview was conducted on 28th November 2015 at the offices of a state-owned entity in Port Elizabeth, Eastern Cape, South Africa. Out of twelve contractors invited, seven arrived at the venue and participated in the interview session, which was about an hour, as recommended by Plano Clark and Creswell (2015). Background information on the focus group participants is presented in Table 4.5.

Information obtained from the seven focus group participants showed that they had between 2 to 11 years of service in their various companies, holding top management positions including chief executive officer, chief operating officer and director. The SMCs they represent employ between 3 and 30 persons at any given time, and generated revenues/profit between R22,000 and R2.3 million in the year ended, with assets worth between R10,000 and R800,000. Thus, it can be deduced that the SMCs interviewed meet the SME classification requirement for this study. Furthermore, the SMCs indicated involvement in various services in the construction industry ranging from general building, and civil engineering for example, roads construction.

Moreover, all participants that responded to the Targeted Procurement contract and contractor development programme participation question responded affirmatively that they had participated in a Targeted Procurement project and been part of a cidb-registered CDP.

Table 4.5: Background information of focus group participants

	A	B	C	D	E	F	G
			SMC Coding				
Years of service in company	3	11	2	6	2	11	10
Designation	COO	Director	Director	CEO	Director	Director	Director
Company grade & class of work	4 GB/CE	3 CE	CE	6 CE	3 CE	3 CE	4 CE
Number of employees	30 (3)	10	8	30 (4)	7	14	4
Revenue in the year ended (Rm)	.600	.050	.236	2.300	.150	–	.022
Assets (Rm)	.300	–	0	.500	.010	–	.800
Participation in TP projects	✓	✓	✓	✓	✓	–	✓
Participation in CDP	✓	✓	✓	✓	✓	–	–

– : No response; Rm: million Rands; TP: Targeted Procurement; CDP: contractor development programme; GB: general building; CE: civil engineering; ( ): full time; COO: chief operating officer; CEO: chief executive officer

The interview session was divided into two parts, the first part involved the participants completing an interview guide that included a consent form, followed by a group discussion during the second part (see Appendix A2). The interview guide comprised of contextual questions that set the tone for the group discussion. This also provided the researcher with ample time to build trust and openness in communication with the interviewees before the group discussion (Knox and Burkard 2009; Turner, 2010).

The interview was recorded using a digital voice recorder, with the permissions of the interviewees sought beforehand. All information collected were kept anonymous to ensure confidentiality and compliance with ethical requirements (Yin, 2009). The study benefitted from the use of the focus group interview, because the interaction among interviewees yielded useful information. This was facilitated by the interviewees finding shared similarities with others in the group, and giving their cooperation during the discussions. Plano Clark and Creswell (2015) noted that the group format makes focus group interviews an efficient means of collecting data.

4.9   CRITERIA FOR JUDGING THE QUALITY OF THE RESEARCH DESIGN

A fundamental part of a research process is the ability of the researcher to judge the quality of a research design, which determines the reliability of the data collected, the results obtained, interpretations, and conclusions drawn (Creswell and Plano Clark, 2011). Although different

in quantitative and qualitative research, the concept of validity in research design is used to ensure good quality and reliability in research output. According to Creswell and Plano Clark (2011) quantitative researchers design their studies against threats to internal and external validity of the data, by their choice of research instruments.

4.9.1 Internal validity

Internal validity is the extent to which a measured and observed effect among research variables can be said to be due to a causal relationship, rather than a spurious one (Fellows and Liu, 2008; Yin, 2009). Creswell and Plano Clark (2011) also described internal validity as the degree to which the relational and causal effects which the researcher observes between the research variables, may be the correct evidence for the conclusions. It becomes imperative for researchers to consider content, criterion-related and construct validity because the main concern of survey designs with regards to internal validity has to do with the quality of the scores obtained from the questionnaire. Content validity refers to the extent to which questionnaire items are representative of all facets of the constructs being measured. This study ensured content validly through an in-depth review of extant literature from which the questionnaire items were derived.

Criterion-related validity and construct validity examine whether the obtained scores relate to some external standard, like scores on a similar instrument, and measure what they are intended to measure (Creswell and Plano Clark, 2011). This was addressed by employing universal scales of measurement for the questionnaire items, to obtain valid scores from the respondents. Convergent and divergent validity were also examined, as well as correlations of the variable items to their constructs, which were found to be positive and significant. The study also controlled for other variables that might have influenced organisational performance and development, such as firm age, and level of education, which were incorporated into the questionnaire design. Furthermore, at the end of the survey period, careful examination of the responses was done by the researcher to check for responses that did not meet the criteria for the study. As a result, some responses that represented a threat to internal validity were excluded from the empirical analysis.

4.9.2 External validity

External validity is fundamental to quantitative research designs as it refers to the degree to which the findings can be generalised to the study population (population validity) and possibly other contexts or research settings (ecological validity). Population validity was achieved in

this study by employing standard procedures for selecting an appropriate sample that is non-biased, and representative of the study population as recommended by Plano Clark and Creswell (2015) and Yin (2009). While ecological validity (although not a major concern in quantitative research) was ensured by designing the questionnaire in such a way that there was no wrong or right answer.

4.9.3 Reliability

A prerequisite for research quality and validity, reliability in quantitative research measures the internal consistency of the data collected. This is based on the degree to which the scores obtained from respondents are consistent and stable over time (Creswell and Plano Clark, 2011). Reliability is often assessed by reliability coefficients, calculated with statistical tools. Cronbach's alpha (α) is one of the most commonly reported measures of internal consistency (Field, 2013; Gliem and Gliem, 2003) used to determine how much the items on a scale measure the same underlying construct. Gliem and Gliem (2003) asserted that when using Likert-type scale questionnaire items, it is imperative to calculate and report Cronbach's alpha coefficient for internal reliability of such scales. However, Cronbach's alpha does not provide reliability estimates for single items, hence a reliability coefficient must be reported for summated scales or subscales. Cronbach's alpha reliability coefficient normally ranges between 0 and 1; the closer to 1.0, the greater the internal consistency of the items in the scale (Gliem and Gliem, 2003). Although there is no lower limit to the coefficient, George and Mallery (2003:231) provide the following rules of thumb: > 0.9 = Excellent, > 0.8 = Good, > 0.7 = Acceptable, > 0.6 = Questionable, > 0.5 = Poor, and < 0.5 = Unacceptable. The result of the reliability test is presented in Table 5.12 and indicates acceptable to excellent unidimensional scales with reliability coefficients (α) ranging from 0.7 to 0.9. However, principal components analysis was further used to determine the dimensionality of the scales, and presented in Chapter Five.

4.10 METHODS OF DATA ANALYSIS

Adopting appropriate techniques in analysing collected data is important to ensure correct handling, collation and treatment of data to bring the research outcomes into focus (Ganiyu, 2017). Given that the study primarily adopted a quantitative design where most responses were rated on Likert scales, objective data collected for this study were generally nominal or ordinal data. Therefore, the collected data was subjected to descriptive and non-parametric inferential statistical techniques using the Statistical Package for Social Sciences (SPSS) software to

enhance the presentation and interpretation of research results, allowing valid conclusions to be drawn. The descriptive statistics employed (mainly used to analyse the background information of the respondents) included frequencies, percentiles and mean scores. The inferential statistics used include Spearman rank-order correlation, and multinomial regression. Principal components analysis (PCA) was also used to reduce and further classify variables of the research constructs for model development. Furthermore, the partial least squares structural equation modelling technique was used to validate the conceptual model developed in Chapter Three. Analytical hierarchy process was also performed, to determine the distribution (weights) of each relationship quality assessment criterion on the relationship quality construct.

4.10.1 Mean scores

The mean score is an average value of scores from a question, or two or more variables related to a specific scale (Odediran, 2016). These variables can be measured on either a continuous or an ordinal scale. Mean scores were used to examine variables of the research constructs as well as to analyse the background information of the SMCs surveyed. The use of mean scores is a common technique employed by construction management researchers (Abdul-Rahman et al., 2012; Eybpoosh et al., 2011; Zhang, 2011; Xiaopeng and Pheng, 2013), and was determined for each variable using the formula in Equation 4.6.

$$\text{Mean score} = \frac{5n_5 + 5n_4 + 5n_3 + 5n_2 + 5n_1}{n_5 + n_4 + n_3 + n_2 + n_1} \qquad [4.6]$$

Where $n_{1\text{-}5}$ = number of respondents who picked 1, 2….5

4.10.2 Analytical hierarchy process

Analytical hierarchy process (AHP) is a multi-criteria decision making (MCDM) method originally developed by Saaty (1980). AHP simplifies preference ratings among decision criteria using pairwise comparison matrices and provides measures of judgement consistency. In a pairwise comparison matrix for *n* items the decision maker indicates how much more important (or how much more suitable, or how much better qualified, or how much more likely, or whatever the basic comparison mode is) item *i* is than item *j* (Dijkstra, 2011). The relative importance as expressed in words is translated into numbers, using practical scales: 1 for equal importance, 3 for moderate importance, 5 for strong, 7 for very strong and 9 for extreme importance; integers in between can be used for refinements, and reciprocals for the inverse judgements (Dijkstra, 2011). Some scenarios for the application of AHP include procurement model selection (Alhazmi and McCaffer, 2000), and contactor selection (Bochenek, 2014).

The basic procedure to conduct AHP involves (Saaty, 1980; 2005; 2006): (i) develop the ratings for each decision alternative for each criterion, (ii) develop the weights for the criteria, and (iii) calculate the weighted average rating for each decision alternative. Although many methods will yield the weight vector, Dijkstra (2011) concluded that using (weighted) geometric means is the 'only reasonable' way to consistently synthesize judgements from decision makers. This assertion gives support to earlier studies by Barzilai (1997), Dong et al. (2010), and Saaty (1980, 2005, 2006). The geometric row mean is a robust and dependable workhorse for use in decision problems with multiplicative input (Dijkstra, 2011).

Analytical hierarchy process was employed in this study as a ranking tool to determine the distribution (weight) of each relationship quality assessment criterion on the relationship quality construct. The ranking of the relationship quality criteria is determined by experts or decision makers using a questionnaire primarily designed to collect their perceptions on the seven relationship quality criteria. This involves a pairwise comparison of the criteria in a prioritisation process forming a matrix. A range of computation is performed from the matrix to determine, in numerical terms, the importance of each of the criteria over the other alternative being compared. Goepel's (2013) AHP calculator is used to calculate the weights of the comparison matrices and consistency index. Acceptable consistency ratio values is given as 0.05 for a 3 x 3 matrix, 0.08 for a 4 x 4 matrix and 0.1 for larger matrices (Saaty, 1994; Zavadskas et al., 2014).

4.10.3 Principal components analysis (PCA)

Principal components analysis is a multivariate variable-reduction technique that shares many similarities with exploratory factor analysis (Laerd Statistics, 2015). Although conceptually different to factor analysis, researchers often use PCA interchangeably with factor analysis in practice. PCA is used to reduce a larger set of variables into a smaller set of artificial variables (principal components) that account for most of the variance in the original variables. Hair et al. (2010) described factor analysis as a multivariate statistical technique for examining the underlying structure, or the structure of interrelationships (or correlations) among a large number of variables. The decision to use PCA can be defended, since there is limited research regarding the dimensionality of the variables of the research constructs. Moreover, PCA was used in this study for exploratory purposes and not for hypothesis testing, as recommended by Costello and Osborne (2005). Tabachnick and Fidell (2012) further asserted that PCA should be used if the researcher's interest is in simply producing an empirical summary of the dataset.

Prior to conducting PCA, it is important to examine the adequacy of the data collected and its appropriateness for PCA (Laerd Statistics, 2015). This was established using the Kaizer-Meyer-Olkin measure of sampling adequacy (KMO MSA) and Bartlett's test of sphericity which provide the basis for the minimum standard that the data must meet to be considered adequate for further analysis (Laerd Statistics, 2015). The KMO MSA value ranges between 0 and 1, with 0.6 suggested as the minimum value for a good factor analysis (Pallant, 2012; Tabachnick and Fidell, 2012). Hence, KMO MSA values greater than 0.6 were considered in this study. The Bartlett test indicates the strength of the relationship among variables and should be significant at $p < 0.05$ for the data to be considered suitable for analysis (Field, 2013; Pallant, 2012; Tabachnick and Fidell, 2012; William et al., 2012).

PCA was used in this study to determine the variables of research constructs that would be retained for hypothesis testing and validating the conceptual model (see Section 5.6.2). This was achieved through factor extraction (principal component extraction method), using factor rotation to discriminate between factors or indicate the specific number of basic dimensions among the components (Costello and Osborne, 2005). Although most of the research constructs in this study required a single or two-factor solution to achieve simple structure, factor (varimax) rotation gives a more apparent separation of factors, thus making interpretation of the factors easier. Four major criteria have been identified to guide in deciding how many factors to retain, namely: Kaiser's eigenvalue-greater-than-one criterion, the proportion of total variance accounted for, Cattel's scree plot test and the interpretability criterion (Laerd Statistics, 2015; Pallant, 2012). Kaiser's criterion is one of the most popular methods for establishing how many components to retain in a PCA. Moreover, except for Kaiser's criterion, all other criteria require some degree of subjective analysis (Laerd Statistics, 2015). The scree plot approach is also commonly used and is preferred by many researchers (Park et al., 2002; Costello and Osborne, 2005); however, it requires a dataset of over 200 observations (Stevens, 2002).

In this study, factor extraction was done based on a combination of Kaiser's eigenvalue-one criterion, scree plot, as well as observing the communality values to determine the dimensionality of the variables (see Section 5.6.2). The Kaiser criterion with a threshold level of 1.00 for Eigenvalues was first used to determine the number of factors. Hair et al. (2010) and Laerd Statistics (2015) considered a factor solution that accounts for 60% or more of total variance to be satisfactory in the social sciences, while Diekhoff (1992) and Heck (1998) considered 50% of total variance explained, as adequate. The desired factor loading threshold

for a variable was set at 0.60, which is high for a sample size of 307 (see Field, 2013; and Hair et al., 2010). Finally, communality measures were assessed with a threshold of 0.40 (Costello and Osbourne, 2005).

4.10.4 Spearman rank-order correlation

The Spearman's rank-order correlation calculates an index of correlation – coefficient 'rho' (ρ), which is a measure of the strength and direction of the association or relationship between two continuous or ordinal variables (Laerd Statistics, 2017a). The correlation coefficient ranges from 0 to ±1, where +1 indicates a perfect positive correlation, -1 a perfect negative correlation and 0 indicates no association between the ranks (Hair et al., 2010). The higher the correlation coefficient, the stronger the relationship between the variables. According to the categorisation by Dancey and Reidy (2011), correlation coefficients of 0.7 – 0.9, 0.4 – 0.6, and 0.1 – 0.3 represent a strong, moderate and weak correlation respectively. However, according to the categorisation by Field (2013), a correlation coefficient of ±0.1 denotes small effect, ±0.3 represents medium effect and ±0.5 is a large effect.

Spearman's correlation is a nonparametric test (distribution-free test), it does not assume anything about the underlying distribution of the data, or that the data is normally distributed, as is the case for parametric tests (Lehman, 2006; Sheskin, 2011). Hair et al. (2010) posited that correlational analysis is a relevant confirmatory statistical tool towards the development of regression-based models. Given that the objective data collected for this study were generally nominal or ordinal data, with non-linear relationships (see Appendix B1), Spearman's correlation was used as an index of association to identify whether significant associations existed among the variables of the research constructs. This served as a preliminary step towards establishing causal relationships.

4.10.5 Multinomial regression

Multinomial regression (also called 'multinomial logistic regression') is a multivariate statistical tool used to predict a nominal (usually unordered) dependent variable given one or more independent variables (Laerd Statistics, 2017b). It is sometimes considered an extension of binomial logistic regression that allows for predicting a dependent variable with more than two categories. As with other types of regression, multinomial regression can have nominal and/or continuous independent variables and can have interactions between independent variables, to predict the dependent variable.

Multinomial regression (MR), like other data analysis procedures, requires some initial data analysis and assessment of assumptions to determine the appropriateness of the data for MR. Given that the dependent variables in the study have ordered categories (or are measured on an ordinal scale) signifying progression from low to high, a cumulative odds ordinal logistic regression (OLR) model with proportional odds (PO) was estimated as the natural choice to investigate whether Targeted Procurement strategies predict SMC development (Laerd Statistics, 2015). As a rule of thumb, a full likelihood ratio test (FLR) was done to check if the assumption of PO was met, which is fundamental in a cumulative OLR model. The assumption of PO was not met by almost half of the models, as assessed by the FLR test comparing the fit of the PO model to a model with varying location parameters (see Appendix B2 to B5). Although the FLR test can flag violations that do not exist, and the PO assumption is frequently rejected (for example, large sample sizes can lead to a statistically significant result even when the coefficients are not very different) (Allison, 1999; Clogg and Shihadeh, 1994), multinomial regression has been recommended in such scenarios (Agresti, 2002; Liao, 1994). Hence, multinomial regression analysis was selected as the appropriate method for this study to achieve uniformity in the analysed results (see Section 5.6).

MR also requires careful consideration of the sample size. Sample size guidelines for MR indicate a minimum of 10 cases per independent variable (Tabachnick and Fidell, 2012). This study had not more than six independent variables at any given time during hypothesis testing, hence a sample size of 370 cases was over and above the recommended 60 cases (6×10) for the study. The issue of multicollinearity was also examined to ensure there were no high correlations among the independent variables (see Table 5.12). Researchers often consider multinomial regression as an attractive analysis because it does not assume normality, linearity, or homoscedasticity; which is a view shared by the researcher in this study, since objective data collected for this study were generally nominal or ordinal data with non-linear relationships (see Appendix B1). MR models were developed and used to examine direct causal and mediated or indirect causal relationships, based on Equations 5.1 and 5.17 respectively. The predictive strength or effect size of the models was measured using a Nagelkerke's pseudo-R^2 (1991) which is a corrected version of the Cox-Snell R^2 (1989) that adjusts the scale of the statistic to cover the full range from 0 to 1. Goodness-of-fit of the models was assessed using the Likelihood Ratio chi-square (χ^2) test, with a 95% significance level ($p < .05$) which indicates that the model predicts significantly better, or more accurately, over and above the null or intercept-only model (Tabachnick and Fidell, 2012).

4.10.6 Partial least squares structural equation modelling (PLS-SEM)

Empirically validating a proposed model has become the *sine qua non* of the model development process. Although statistical methods are essential in testing the applicability of causal models and theories, they can also aid theory development. Structural equation modelling (SEM) is a widely used second-generation (2G) multivariate statistical technique used for testing and validating (networks of effects simultaneously in) causal models (Lowry and Gaskin, 2014). An SEM model is made up of two basic components: a measurement model relating the manifest variables to their own latent variable; and a structural model relating some endogenous latent variables to other latent variables. The measurement model is also called the outer model and the structural model the inner model (Tenenhaus et al., 2005). PLS-SEM was executed using SmartPLS (version 2.0 M3). The PLS-SEM algorithm attempts to obtain the best weight estimates for each block (component) of indicators corresponding to each theoretical construct.

The popularity of SEM in the literature can be attributed to several reasons. For instance, SEM allows for simultaneous modelling of relationships among multiple independent and dependent research constructs (Schumacker and Lomax, 2004, Tabachnick and Fidell, 2012). For confirmatory purposes and model validation, SEM offers extensive capabilities beyond the first-generation (1G) methods such as principal components analysis, factor analysis, discriminant analysis, or multiple regressions because of the greater flexibility that a researcher has for the interplay between theory and data (Chin, 1998a). Unlike other statistical techniques, SEM explicitly take measurement error into account when analysing the data (Schumaker and Lomax, 2004). As a result, SEM is free of measurement error (such as sampling and analytical biases, instrument reading and recording errors, and temporal and spatial sampling sample collection discrepancies), leaving only the common variance (Tabachnick and Fidell, 2012).

SEM also allows researchers to perform some advanced modelling such as multi-level (or hierarchical) modelling which makes the analysis of complex phenomena manageable for the researcher. When there are complex relationships (i.e. many indicators, constructs and relationships), Lowry and Gaskin (2014) recommended using the PLS approach. Given that study's conceptual framework consists of multiple latent constructs and manifest variables with hypothesised relationships, PLS-SEM is considered more appropriate. PLS-SEM also allowed for the use of a global fit measure (GoF) for model goodness of fit suggested by Tenenhaus et al. (2005). The GoF index takes into account both the measurement and structural model

performance, thus providing a single measure for the overall evaluation of PLS model performance. These considerations informed the choice of SEM for model validation.

SEM analysis can be either covariance-based SEM (CB-SEM) or variance-based partial least squares SEM (PLS-SEM) (Garson, 2016; Hair et al., 2014; Hair et al., 2012; Lowry and Gaskin, 2014). CB-SEM seeks to model the covariation of all the indicators to demonstrate that the proposed model (the null hypothesis) is insignificant (Lowry and Gaskin, 2014). In contrast, PLS-SEM aims demonstrate that the alternative hypothesis is significant, allowing the researcher to reject a null hypothesis by showing significant values (Gefen et al., 2000:24). PLS-SEM offers certain advantages over CB-SEM (and 1G techniques) particularly with regards to theory development or exploratory causal modelling (see Lowry and Gaskin, 2014).

Researchers suggest that PLS-SEM is suitable in situations where there is limited theoretical background to support hypotheses, as in exploratory studies (Chin, 1998b, 2010; Lowry and Gaskin, 2014), making it more applicable for this study, which aims to test a theory that has yet to be empirically validated. Lowry and Gaskin (2014) affirm that CB-SEM is very unreliable in the exploratory analysis required for theory-building. For these reasons, PLS-SEM was deemed an appropriate statistical technique to address one of the motivations of this study, that is, the paucity of empirical research on preferential procurement in relation to contractor development in the South African context. The validated PLS-SEM model results are expected to contribute to theory building on the use of Targeted Procurement strategies to stimulate the development of SMCs in South Africa.

Latent constructs can be estimated formatively or reflectively in PLS-SEM; whereas all constructs are measured reflectively in CB-SEM. This study uses a combination of formative and reflective latent constructs; hence PLS-SEM is considered appropriate (Lowry and Gaskin, 2014). PLS-SEM also incorporates several (1G) statistical techniques that are not part of CB-SEM (for example, PCA, multiple regression, multivariate analysis of variance). In addition, unlike CB-SEM, PLS-SEM does not assume data linearity which is pertinent to all statistical techniques employed in this study (see Appendix B1). PLS-SEM is also insensitive to sample size considerations (Hair et al., 2014), and sample size requirements when using PLS for complex models are smaller than those required for CB-SEM (Hair et al., 2014). However, Marcoulides and Saunders (2006) caution researchers still to consider the use of an appropriate sample size as required, to study the phenomena of interest. The sample size for this study is 307 which satisfies the recommended sample size requirements for PLS-SEM (Chin, 2010).

The use of PLS-SEM was further prompted by the dated but still relevant exhortation "the subject of organisational growth has progressed beyond abysmal darkness. It is ready for and badly needs – solid, systematic empirical research directed toward explicit hypotheses and utilizing sophisticated statistical methods" (Starbuck, 1971:126, as cited in Coad, 2007). Although the hypotheses tested were initially tested quantitively in Chapter Five, the use of PLS-SEM proved to be a useful and more robust technique for this empirical and theoretical research, as its applications in construction research has continued to increase (Xiong et al. 2015), especially for predictive purposes (Oyewobi, 2014). The predictive power of the PLS-SEM model will be assessed by the R^2 values, with a recommended lower bound cut-off of 10% (Elbanna et al., 2013; Henseler, et al., 2014), which is a good enough R^2 to influence organisational performance over time (see Jacobson, 1987 for discussion).

4.11 ETHICAL CONSIDERATIONS

The credibility of a study and reported findings is preserved by the adherence to ethical principles (Oyewobi, 2014). Therefore, the planning and conduct of the study hinged on ethical considerations such as honesty, integrity, informed consent, confidentiality, carefulness and right to privacy (Leedy and Ormrod, 2005). Ethical considerations taken into account in the design and execution of the study included: ensuring that participants understood the nature of the information required from them; seeking the consent of participants before they took part in the study (Appendix A3), ensuring that participants remained anonymous and safeguarding any proprietary information; and ensuring voluntary participation, which allowed the participants the freedom to discontinue and withdraw their participation at any time without offering reasons. Furthermore, approval from the university Ethics in Research Committee was received on 13 April, 2016 ahead of the start of data collection (see Appendix A4).

4.12 SUMMARY OF DISCUSSIONS ON RESEARCH METHODOLOGY

This chapter critically explained and justified the philosophical and methodological approach adopted by this research. The chapter acknowledged that the study is primarily deductive and theory-testing, but also requiring an interpretivist paradigm which has been proven to be suitable in addressing the complex issue of company growth and development. Hence, the adoption of a multi-methodology approach which draws from the strength of an interpretivist qualitative approach and a positivist quantitative approach. This study therefore adopted an embedded mixed methods approach that primarily relied on quantitative means of data collection, and was supported by secondary qualitative data, which was gathered concurrently.

The main data collection instrument employed was a questionnaire survey, complemented by a semi-structured interview (focus group interview) and supported by documentary evidence. The collected data was subjected to descriptive and non-parametric inferential statistical techniques, using the SPSS software. Furthermore, the PLS-SEM technique was used to validate the conceptual model developed in Chapter Three.

CHAPTER FIVE:
DATA PRESENTATION, ANALYSIS AND RESULTS

5.1 INTRODUCTION

This chapter presents and describes the results and findings from the data analysis. The quantitative data were analysed using both descriptive and inferential statistical techniques, and inferences drawn from the analysis was used to validate the research hypotheses. Findings presented include: a summary of the general profile and information on the small and medium-sized contractors (SMCs) and responding officers; results from underlying attributes of the variables of the research constructs; and a series of tests of hypotheses. These analyses serve as a preliminary step towards developing the empirically validated model presented in Chapter Six.

5.2 GENERAL PROFILE OF STUDY PARTICIPANTS

The respondents in this study were drawn mainly from responding officers representing 307 SMCs listed on Grades 3 to 6 on the Construction Industry Development Board (cidb) Register of Contractors (RoC) in the South African construction industry. In addition to this, seven top management employees of these companies volunteered to participate in a focus group interview. Moreover, three experts in the South African construction industry participated in the AHP survey for supply chain relationship quality assessment.

5.2.1 General profile of the SMCs and responding officers surveyed

The survey respondents in this study were drawn from SMCs listed on Grades 3 to 6 on the cidb RoC that have executed Targeted Procurement projects and been part of a cidb-registered CDP within the five-year period of observation (2011 – 2015). This section presents the general profile of SMCs and designation of the responding officers.

The profile of the SMCs and information on officers who responded to the questionnaire survey is presented in Table 5.1. Results from the frequency analysis captured the SMCs': experience/years in business, grade of works on cidb RoC, class of works on cidb RoC, number of employees, highest level of qualification - technical staff, highest level of qualification - professional staff, and responding officers' designations. The results show that 166 (54%) SMCs have been in the construction business for more than 10 years while 141 (46%) have less than 10 years' experience in the construction industry. Furthermore, 199 and 108 (65% and 35%) of the companies are registered with cidb on Grades 3 to 4 and 5 to 6 respectively.

Table 5.1 also show that 281 (91.5%) contractors are involved in either general building works or civil engineering works or both, while 26 (8.5%) are involved in other class of works for example, electrical engineering and mechanical engineering works. The result further shows that 215 (70%) respondents engage less than 20 permanent full-time employees. The majority of the technical (90%) and professional (95%) staff have at least Grade 12 certificates; while 48 (16%) and 116 (38%) technical and professional staff respectively have a university degree.

Table 5.1: General profile of SMEs and responding officers surveyed

	Frequency (N)	Valid percentage (%)	Cumulative percentage (%)
Companies' experience/years in business			
1 – 5 years	52	17.0	17.0
6 – 10 years	89	29.1	46.1
11 – 20 years	145	47.1	93.1
21 – 30 years	17	5.6	98.7
> 30 years	4	1.3	100.0
Grade of works on cidb RoC			
3	117	38.2	38.2
4	82	26.8	65.0
5	60	19.5	84.5
6	48	15.5	100.0
Class of works on cidb RoC			
GB/CE/both	281	91.5	91.5
Other	26	8.5	100.0
Number of employees			
Less than 20	215	69.9	69.9
20 – 49	55	18.0	87.9
50 – 99	27	8.7	96.5
100 – 199	7	2.4	99.0
More than 199	3	1.0	100.0
Highest level of qualification - Technical staff			
Less than Grade 12	29	9.6	9.6
Grade 12/Diploma/Advanced certificates	230	74.9	84.5
University degree (Bachelors/Hons/Postgrad)	48	15.5	100.0
Highest level of qualification - Professional staff			
Less than Grade 12	16	5.1	5.1
Grade 12/Diploma/Advanced certificates	175	57.1	62.2
University degree (Bachelors/Hons/Postgrad)	116	37.7	100.0
Responding officers' designations			
Top management	255	83.1	83.1
Middle management	40	13.1	96.2
Senior employees	12	3.8	100.0

RoC: register of contractors; GB: general building; CE: civil engineering

5.3 SMCS' PARTICIPATION IN TARGETED PROCUREMENT CONTRACTS AND CONTRACTOR DEVELOPMENT PROGRAMMES

Information on the participation of the SMCs in Targeted Procurement contracts and CDPs over the five-year period of observation is presented in Table 5.2. Results captured include:

number of Targeted Procurement contracts won in the last five years, number of non-Targeted Procurement government contracts won in the last five years, number of private sector contracts won between 2011 and 2015, participation in a CDP, and number of years in a CDP.

Table 5.2 show that 208 (68%) have won up to 5 public-sector contracts where Targeted Procurement strategies was implemented. Whereas, 173 (57%) and 156 (51%) did not execute any non-Targeted Procurement government contracts and private sector contracts respectively during the period of observation. A further assessment of the respondents' participation in CDPs indicate that 104 (34%), 123 (40%), 53 (17%), and 27 (9%) have been in a CDP for one, two to three, four to five, and more than five years respectively. Moreover, 7 (7%) and 34 (36%) SMCs have experienced a negative and positive advancement respectively on the cidb RoC, whereas 53 (57%) have maintained their cidb grading since participating in a CDP.

Table 5.2: SMCs' participation in Targeted Procurement contracts and CDPs

	Frequency (N)	Valid %	Cumulative %
Number of Targeted Procurement contracts won in the last five years			
1 – 5	208	67.9	67.9
6 – 10	51	16.7	84.6
> 10	47	15.4	100.0
Number of non-Targeted Procurement government contracts executed (2011 – 2015)			
0	173	56.3	30.5
1 – 5	89	29.1	100.0
> 5	45	14.6	
Number of private sector contracts executed (2011 – 2015)			
0	156	50.7	50.7
1 – 5	95	30.8	81.5
> 5	57	18.5	100.0
Number of years in a CDP			
0	0	0	0
1 year	82	33.9	33.9
2 – 3 years	101	40.1	73.9
4 – 5 years	53	17.3	91.2
> 5 years	71	8.8	100.0
Advancement on the cidb RoC since participation in a CDP			
Negative advancement	7	7.3	69.4
No advancement	53	56.9	78.2
Positive advancement	34	35.8	100.0

CDP: contractor development programme; cidb: Construction Industry Development Board; RoC: register of contractors

5.4 ASSESSMENT OF RESEARCH CONSTRUCTS

This section presents results from the survey data measuring the constructs of the study – Targeted Procurement strategies, supply chain relationship quality, and SMC development. Analytical descriptive statistics was used to present the data in terms of central tendencies

(means), and dispersion (standard deviation) to provide an understanding of underlying attributes of the survey data collected. The research constructs were assessed separately, and the results are presented below.

5.4.1 Targeted Procurement strategies

Research Objective One sought to identify and establish the Targeted Procurement strategies commonly used as a mechanism for contractor development. The respondents were asked to indicate the Targeted Procurement strategies that is frequently used on public-sector projects they have executed, using a five-point Likert scale ranging from 1 (never) to 5 (always). The prevalence of the Targeted Procurement strategies was assessed by computing their mean scores (MS) and standard deviation (SD), and ranked according to the mean scores.

Table 5.3: Descriptive statistics and frequencies of response for Targeted Procurement strategies

Coding	Variables for TP Strategies	Frequency % (1 = never; 5 = always)					MS	SD	Rank
		1	2	3	4	5			
TSPRE	Preferencing	29.1	23.6	23.6	9.1	14.5	2.56	1.37	2
TSTEQ	Tendering equity	24.9	18.9	24.2	10.9	21.1	2.84	1.46	1
TSARO	Accelerated rotation	53.4	22.7	11.2	5.8	6.9	1.90	1.22	5
TSMSU	Mandatory subcontracting	34.4	25.7	14.9	12.8	12.2	2.43	1.39	3
TSUNB	Unbundling of contracts	46.7	22.1	13.0	8.8	9.5	2.12	1.34	4
TSTPM	Third-party management	61.3	18.2	9.9	6.2	4.4	1.74	1.14	6

TP: Targeted Procurement; MS: mean score, SD: standard deviation

Table 5.3 shows the descriptive statistics and frequencies of responses for Targeted Procurement strategies. From the rankings, Table 5.3 revealed that the most frequently used Targeted Procurement strategy as a mechanism for contractor development was tendering equity with a MS of 2.84, signifying rare to often implementation of the strategy. This is followed by preferencing, mandatory subcontracting, and unbundling of contracts also with rare to often usage. Third-party management and accelerated rotations ranked lowest, indicating that these strategies are the least used by state entities.

5.4.2 Supply chain relationship quality

5.4.2.1 Descriptive statistics

Research Objective One of the study also sought to establish the quality of supply chain relationships between SMCs and other project parties in the Targeted Procurement process. Therefore, the respondents were asked to indicate the quality of supply chain relationship experienced in the Targeted Procurement process using four-point Likert scale questions ranging from 1 (arms-length adversarial) to 4 (close long-term collaboration). Relationship

quality was measured using thirteen assessment sub-criteria classified into seven main criteria, namely: Procurement (selection criteria, procurement method, form of contract), Objectives alignment (objectives alignment & benefits, continuity of work), Communication (information exchange, learning and innovation sharing, cost data transparency), Collaboration (working relationship), Risk allocation (risk sharing & allocation, balance of risk and reward), Joint problem-solving (problem-solving effectiveness), and Trust (confidence in others' behaviour). The thirteen relationship quality assessment criteria were subjected to factor reduction using principal components analysis, from which seven unidimensional criteria that fitted well onto the relationship quality construct was extracted. This made it possible to compute a composite continuous variable for relationship quality (RQ) from mean scores of the seven criteria, which was then transformed into a categorical variable based on Meng et al.'s (2011) four supply chain relationship quality maturity levels. The result from the descriptive statistics and frequencies of responses for supply chain relationship quality is presented in Table 5.4.

Table 5.4: Descriptive statistics and frequencies of response for supply chain relationship quality

Coding	Variables for relationship quality	Frequency % (1 = PC, 2 = QC, 3 = PP, 4 = SA)				MS	SD
		1	2	3	4		
	Trust						
RQTRU	Confidence in other's behaviour	17.5	37.3	20.3	25.0	2.53	1.05
	Joint problem-solving						
RQJPS	Problem-solving effectiveness	24.5	37.0	20.8	17.6	2.31	1.03
	Collaboration						
RQWRE	Working relationship	12.4	32.3	33.2	22.1	2.65	.96
	Communication						
RQIEX	Information exchange	28.0	28.9	20.6	22.5	2.38	1.12
RQLIS	Learning and innovation sharing	15.3	45.8	24.1	14.8	2.38	.92
RQCDT	Cost data transparency	22.8	43.7	20.9	12.6	2.23	.94
	Risk allocation						
RQRSA	Risk sharing and allocation	22.8	34.0	20.0	23.3	2.44	1.08
RQBRR	Balance of risk and reward	44.8	25.5	15.6	14.2	1.99	1.08
	Procurement						
RQSCR	Procurement selection criteria	35.0	20.5	30.9	13.6	2.23	1.08
RQPME	Procurement method	60.2	24.1	13.4	2.3	1.58	.81
RQFOC	Form of contract	23.5	60.2	1.8	14.5	2.07	.91
	Objectives alignment						
RQOAB	Objectives alignment and benefits	28.9	26.1	23.7	21.3	2.37	1.12
RQCOW	Prospect for future work	22.7	57.9	12.0	7.4	2.04	.80
	Computed RQ variable[a]						
RQ	Relationship quality	24.1	35.4	19.3	21.2	2.38	1.07

[a]. See Section 5.5.2.2 for discussion
PC: price competition; QC: quality competition; PP: project partnering; SA: strategic alliance; MS: mean score; SD: standard deviation

The result show that 60% of the respondents' procurement method and form of contract was based on price competition and quality competition respectively. Confidence in other party's behaviour was relatively low with a majority 37% reporting trust based on competence rather than goodwill. Moreover, learning/innovation sharing, and cost data transparency was limited as indicated by 46% and 44% of the respondents respectively. Balance of risk and reward was also inadequate with 45% reporting little or no rewards for taking risks on Targeted Procurement projects. Table 5.4 also show that continuity of work was limited as 58% reported that prospect for future work existed through competitive tendering only. Furthermore, joint problem-solving was ineffective with 37% reporting that problems sometimes lead to disputes.

5.4.2.2 Analytical hierarchy process for supply chain relationship quality criteria

Analytical hierarchy process was performed to determine the distribution (weights) of each supply chain relationship quality assessment criteria (retained after principal component analysis in Section 5.5.2.2) on the relationship quality construct. Information obtained from the three expert respondents showed that they held Quantity Surveying, Senior Project Manager, and Project Manager designations with 13, 37, and 17 years of construction industry experience respectively. The expert participants also held professional qualifications with their respective statutory and voluntary professional bodies, which improves the validity and reliability of the data obtained and subsequent findings. The final aggregate distribution of these weights from pairwise comparisons obtained from three experts was calculated and extracted using weighted row geometric mean method (Dijkstra, 2011; Dong et al., 2010) and is presented in Table 5.5.

Table 5.5: Aggregate matrix for pairwise comparisons of supply chain relationship quality assessment criteria

	Relationship quality assessment criteria	1	2	3	4	5	6	7	Weights (w)	Rank
1	Trust	1	1.200	1.714	.833	1.250	.600	1.444	.1461	3
2	Joint problem-solving	0.833	1	1.000	1.250	2.750	0.555	1.333	.1416	4
3	Information exchange	0.600	1.000	1	2.500	3.666	0.600	2.500	.1814	2
4	Working relationship	1.200	.800	0.400	1	1.000	0.375	3.111	.1184	5
5	Learning and innovation sharing	0.800	.333	0.286	1.000	1	0.286	1.800	.0834	6
6	Risk sharing and allocation	1.714	1.800	1.666	2.625	3.555	1	3.555	.2604	1
7	Cost data transparency	0.666	0.750	0.400	0.333	0.555	.286	1	.0687	7

Number of participants: 3, Consistency Ratio: .049

The AHP result showed that risk sharing and allocation had the highest weighting from the experts ($w = 26\%$), followed by information exchange ($w = 18\%$), trust – confidence in other's behaviour ($w = 15\%$), and joint problem-solving ($w = 14\%$); while cost data transparency had

the lowest weighting from the experts (w = 7%), followed by learning and innovation sharing (w = 8%), and working relationship (w = 12%). This ranking of supply chain relationship quality assessment criteria is further presented in Figure 5.1, depicting the order perceived by the experts to be of relative importance for quality of relationships in a project supply chain. The result further revealed a consolidated Consistency Ratio of 4.9% which is below the 10% cut-off value for a good consistency (Zavadskas et al., 2014).
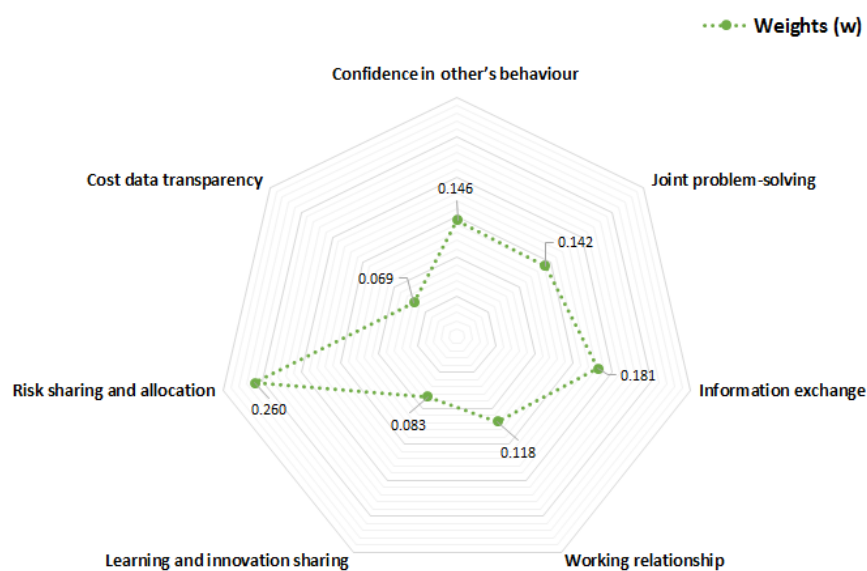
Figure 5.1: AHP weights (w) for supply chain relationship quality assessment criteria

5.4.3   SMC growth performance and development

In this study, SMC growth performance and development was conceptualised and measured using nine indicators categorized into objective economic and subjective social indicators.

5.4.3.1   Economic indicators of SMC development

Economic indicators of SMC growth performance were assessed using objective measures of development. The constructs employed were adapted from previous construction management research (Abu Bakar et al. 2011, 2012; Ofori and Chan 2000; Teruel-Carrizosa 2006; Tucker et al. 2015); and they are turnover, profits, assets, and number of skilled employees. Table 5.6 show the result from the descriptive statistics and frequencies of responses for economic indicators of SME development. Figure 5.2 illustrates the year-on-year average percentage change in growth performance (annual turnover, profits, assets, and number of employees) of construction SMCs participating in Targeted Procurement projects over a five-year period between 2011 and 2015.

Result from Table 5.6 reveal that most of the SMCs' recorded average growth in company profit ranging between 30% to 100% between 2011 and 2015. This was followed by assets with 40% of the companies surveyed owning assets valued between R110,000 and R500,000. The result also showed that 40% respondents reported total value of works (turnover) between R4 million and R6.49 million, and 55% employing not more than five persons. The result further revealed that in terms of turnover, most of the SMCs surveyed had received total value of works averaging between R2 million and R6.5 million, falling within the tender value range for Grades 3 to 6 contractors. Whereas company assets averaged between R110,000 and R1 million. While number of employees averaged between 1 and 20 persons.

Table 5.6: Descriptive statistics and frequencies for economic indicators of SMC development

Coding	Variables for SMC development (economic)	Frequency %					MS	SD
		1	2	3	4	5		
EDTUR	Turnover	39.9	23.9	13.0	10.9	12.3	2.32	1.41
EDPRO	Profit	21.4	17.5	10.7	20.4	30.1	3.20	1.56
EDAST	Assets	15.4	40.2	10.3	25.6	8.5	2.72	1.24
EDEMP	Number of employees	54.7	35.9	8.6	0.8	0.0	1.55	0.69

MS: mean score, SD: standard deviation
Turnover scale: 1 = less than 2m; 2 = 2m-3.9m; 3 = 4m-6.49m; 4 = 6.5m-12.9m; 5 = 13m and above
Profit scale: 1 = less than 1%; 2 = 1%-29%; 3 = 30%-49%; 4 = 50%-99%; 5 = 100% and above
Asset scale: 1 = 0-0.10m; 2 = 0.11m-.50m; 3 = 0.51m-1m; 4 = 1.1m-5m; 5 = 5m and above
Employees scale: 1 = 1-5; 2 = 6-20; 3 = 21-50; 4 = 51-200; 5 = 201 and above
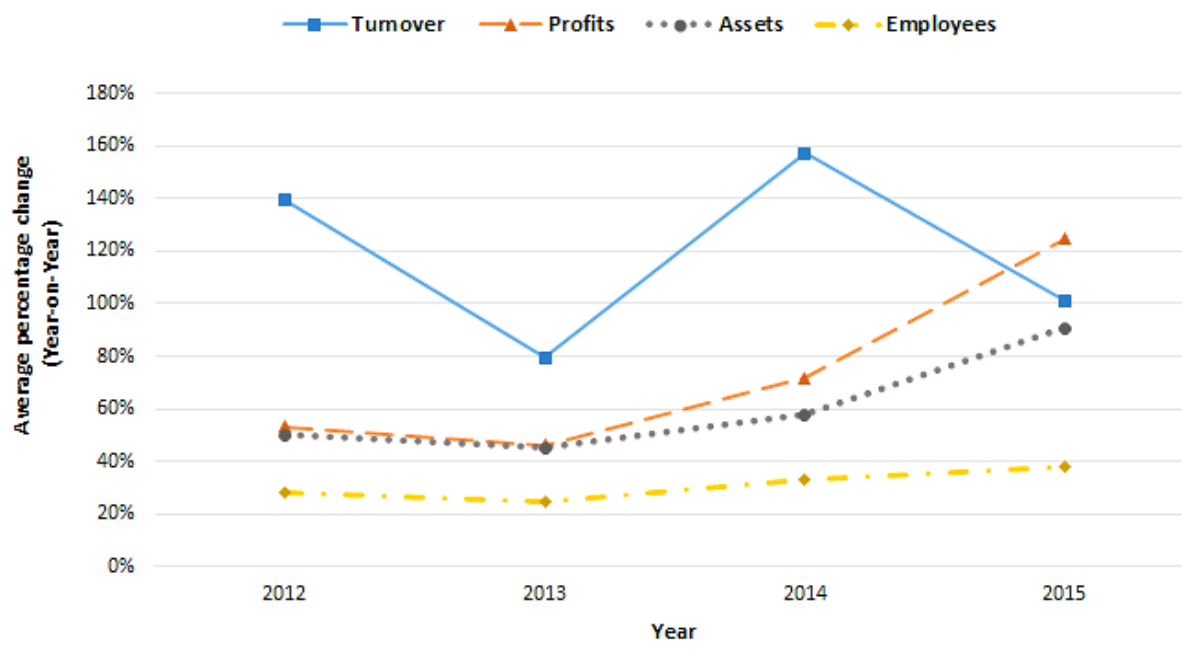
Figure 5.2: Percentage average year-on-year change in company growth performance

Result from Figure 5.2 show that, except for year 2014 where the average increase in turnover more than doubled from the previous year, the companies generally experienced a decrease in turnover between 2012 and 2015. There was also a corresponding decrease in company profits, assets and number of employees between 2012 and 2013 when compared to turnover. Company profits, assets and number of employees also increased along with turnover between 2013 and 2014 but increased in 2015 against a decline in turnover.

5.4.3.2 *Social indicators of SMC development*

Social indicators of SMC development was assessed using subjective measures, namely: Skills development, Joint venture (JV) partnerships, Skills transfer, Application of innovation and technology, and advancement on the cidb RoC. Table 5.7 show the result from the descriptive statistics and frequencies of responses for social indicators of SME development.

Result from table 5.7 reveal that skills transfer was the most derived social development target on Targeted Procurement projects (MS = 3.0) with a medium level achievement. This is closely followed by application of innovation & technology, skills development and advancement on the cidb RoC. Formation of JV partnerships was the least ranked with almost half (48%) of the companies surveyed reporting very low involvement in JV partnerships through Targeted Procurement projects.

Table 5.7: Descriptive statistics and frequencies for social indicators of SMC development

Coding	Variables for SMC development (social)	Frequency % (1 = very low; 5 = very high)					MS	SD	Rank
		1	2	3	4	5			
SDSDE	Skills development	15.8	23.7	28.8	13.0	18.6	2.95	1.32	3
SDJVP	JV partnerships	48.1	31.4	13.3	5.20	1.90	1.81	0.98	5
SDSTR	Skills transfer	15.9	20.1	30.4	13.1	20.6	3.02	1.34	1
SDITE	Application of innovation & technology	17.3	22.0	26.2	14.0	20.6	2.99	1.37	2
SDACR	Advancement on cidb RoC	13.2	28.3	29.7	12.3	16.4	2.90	1.26	4

MS: mean score, SD: standard deviation

5.5 IDENTIFYING THE UNDERLYING DIMENSIONS OF THE RESEARCH VARIABLES

Identifying the underlying structure of the variables in the research constructs – Targeted Procurement strategies, relationship quality and SMC development is an important component of the research to be carried out before establishing the specific Targeted Procurement strategies that are empirically associated with relationship quality in achieving different economic and social indicators of SMC development as postulated in the research objectives.

These objectives will be achieved by testing the research hypotheses set up in Section 3.4. Hence, it is imperative at this stage to further explore and establish the underlying attributes of the study variables and to reduce or classify the variables used for the research constructs in hypotheses testing and model validation. To achieve this, principal component analysis (PCA) was employed and variables were extracted by means of the principal component method using varimax rotation.

5.5.1 Test of sample adequacy and appropriateness

As a rule of thumb, a test of the appropriateness of the study data was first undertaken using the KMO MSA and Bartlett's test of sphericity which measures the adequacy of the data collected. These tests provide the basis for the minimum standard that the data must meet to be considered adequate for further analysis. The KMO MSA value ranges between 0 and 1, with 0.6 suggested as the minimum value for a good factor analysis (Pallant, 2012; Tabachnick and Fidell, 2012). Hence, KMO MSA values greater than 0.6 were considered in this study. The Bartlett test indicates the strength of the relationship among variables and should be significant at $p < 0.05$ for the data to be considered suitable for analysis (Field, 2013; Mat Isa et al., 2014; Pallant, 2012; Tabachnick and Fidell, 2012; William et al., 2012). KMO MSA and Bartlett's test of sphericity was conducted for the three study constructs and the results presented in Table 5.8. The results obtained show that there is adequacy of sampling and the study data is suitable for PCA as indicated by the KMO MSA greater than 0.6, and Bartlett's test of sphericity which was statistically significant for all research constructs. Inspection of the correlation matrices also revealed the presence of many coefficients above 0.3 as suggested by Pallant (2012).

Table 5.8: KMO MSA and Bartlett's Test

Variables	KMO MSA	Bartlett's test of sphericity Sig.
Targeted Procurement Strategies	.750	.000
Relationship Quality	.872	.000
SMC Development (economic)	.667	.000
SMC Development (social)	.811	.000
SMC Development (All)	.765	.000

KMO MSA: Kaiser-Meyer-Olkin measure of sampling adequacy

5.5.2 Principal component analysis

After establishing the appropriateness of the data collected through KMO MSA and Bartlett's test of sphericity, the next step in identifying the underlying attributes of research constructs is component (factor) extraction which is the process of determining the variables that strongly load on the components indicating that such variables measure the construct (Field, 2013;

Pallant, 2012). For this study, the intention is to conduct PCA on the Targeted Procurement strategy variables to confirm if each variable is a sub-construct on its own. On the other hand, PCA is conducted on relationship quality and SMC development variables to identify potential factors or components within the constructs and ascertain that the variables in the component retained for model validation measures the same construct (Pallant, 2012; Field, 2013).

Factor extraction was done via the principal component extraction method based on the criteria described in Section 4.10.2. Given that this study has a sample of 307, Kaiser's eigenvalue-one criterion was used. A visual inspection of the scree plot was also conducted, as well as assessment of communality values. The interpretability criterion of achieving 'simple structure' (Thurstone, 1947) was also taken into consideration; this is a structure where you have a readily explainable division of variables onto components, with a component loading onto at least three variables (Laerd Statistics, 2015).

5.5.2.1 *PCA: Targeted Procurement strategies*

A PCA was run on the six Targeted Procurement strategy variables and the result presented in Table 5.9. PCA revealed that only one component had eigenvalues greater than one, explaining 39% of the total variance. A further visual inspection of the scree plot (Figure 5.3) confirmed that all six Targeted Procurement strategies loaded on one component (factor); hence, factor rotation was not done on the Targeted Procurement strategy variables. Furthermore, the one component solution meets the interpretability criterion of achieving simple structure (Laerd Statistics, 2015; Thurstone, 1947). The PCA results also show that all Targeted Procurement strategies loaded above 0.5 on component matrix; thus, they can be retained for hypothesis testing and model validation. However, communality values indicate that the Targeted Procurement strategies do not fit well into one component or construct with three strategies having communality values below the recommended minimum of 0.4 (Costello and Osborne, 2005). Moreover, the one component solution explaining only 39% of the total variance further confirm that each of the six Targeted Procurement strategies is more likely to be a sub-construct on its own rather than variables measuring a latent construct. Therefore, each Targeted Procurement strategy will be used as a formative indicator rather than reflective indicator for model validation.

Table 5.9: PCA results for Targeted Procurement strategies

Targeted Procurement strategies	Component 1	Communalities
Preferencing	.724	.377
Tendering Equity	.644	.379
Accelerated Rotations	.632	.524
Mandatory Subcontracting	.616	.256
Unbundling of Contracts	.614	.415
Third-party Management	.506	.400
Total eigenvalues of variance	2.351	
% of variance	39.183	
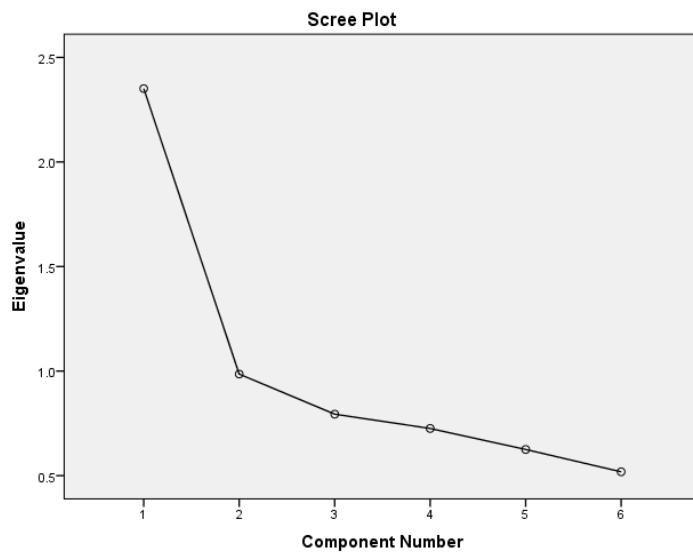
Figure 5.3: Cattel's scree plot test for Targeted Procurement strategies

5.5.2.2 *PCA: Supply chain relationship quality criteria*

PCA was run on the thirteen supply chain relationship quality assessment criteria (variables) and the result presented in Table 5.10. The initial PCA result with varimax rotation show that three components had eigenvalues greater than one, cumulatively explaining 60% of the total variance. However, a further visual inspection of the scree plot (Figure 5.4) revealed that only one component should be retained for further investigation as indicated by the inflection point after the first component. Given that the thirteen relationship quality variables were developed to measure a latent relationship quality construct, a one-component solution also meets the interpretability criterion of achieving simple structure (Laerd Statistics, 2015; Thurstone, 1947). Hence, the PCA was re-run with forced factor extraction to retain only one component. The PCA results with forced factor extraction also showed three components having eigenvalues greater than one as the initial PCA. However, communality values indicated that not all relationship quality criteria fit well into one component or construct with six variables having communality values below the recommended minimum of 0.4 (Costello and Osborne,

2005). Therefore, PCA with eigenvalue-one criterion was re-run for the third time excluding the three variables with the lowest communality values – form of contract (0.001), procurement method (0.001), procurement selection criteria (0.178); and the fourth time excluding the next two variables with the lowest communality values – prospect for future work (0.252), and objectives alignment & benefits (0.327); and finally excluding the variable with the highest communality value below 0.4 – balance of risk and reward (0.362).

The third, fourth and final PCA results produced a one-component solution to satisfy the interpretability criterion of achieving simple structure. However, only the final PCA result explained at least 60% (63%) of the total variance as recommended by several researchers (Laerd Statistics, 2015; Pallant, 2012). The final PCA results also show that all the retained relationship quality variables loaded above 0.6 on component matrix; thus, they can be retained for hypothesis testing and model validation.

Table 5.10: Principal components analysis results for supply chain relationship quality variables

Supply Chain Relationship quality variables	Initial PCA				PCA 2		PCA 3		PCA 4		Final PCA	
	Rotated Components				Comp.		Comp.		Comp.		Comp.	
	1	2	3	Commu.	1	Commu.	1	Commu.	1	Commu.	1	Communalities
Trust	.813			.683	.810	.656	.818	.670	.827	.684	.835	.697
Joint problem-solving	.800			.647	.775	.601	.787	.620	.798	.636	.796	.634
Information exchange	.765			.611	.772	.595	.781	.610	.786	.618	.809	.654
Working relationship	.756			.616	.766	.597	.772	.596	.773	.597	.776	.602
Learning and Innovation Sharing	.752			.685	.819	.670	.817	.668	.816	.666	.829	.686
Risk sharing and allocation	.734			.541	.701	.492	.706	.498	.720	.518	.699	.489
Cost data transparency	.715			.640	.793	.629	.786	.617	.797	.636	.805	.648
Balance of risk and reward	.617			.461	.602	.362	.605	.366	.612	.374		
Procurement selection criteria		.780		.709	.422	.178						
Objectives alignment and benefits		.580		.512	.572	.327	.556	.309				
Procurement method			.735	.646	-	.001						
Prospect for future work			.606	.548	.502	.252	.497	.247				
Form of contract			.569	.545	-	.001						
Total eigenvalues of variance	5.351	1.354	1.139		5.351		5.201		4.730		4.410	
% of variance	41.164	10.419	8.763		41.164		52.014		59.120		63.003	
Cumulative %	41.164	51.183	60.346		41.164		52.014		59.120		63.003	

Extraction method: principal component; Rotation method: varimax with Kaiser normalization

Commu.: communalities; Comp.: components
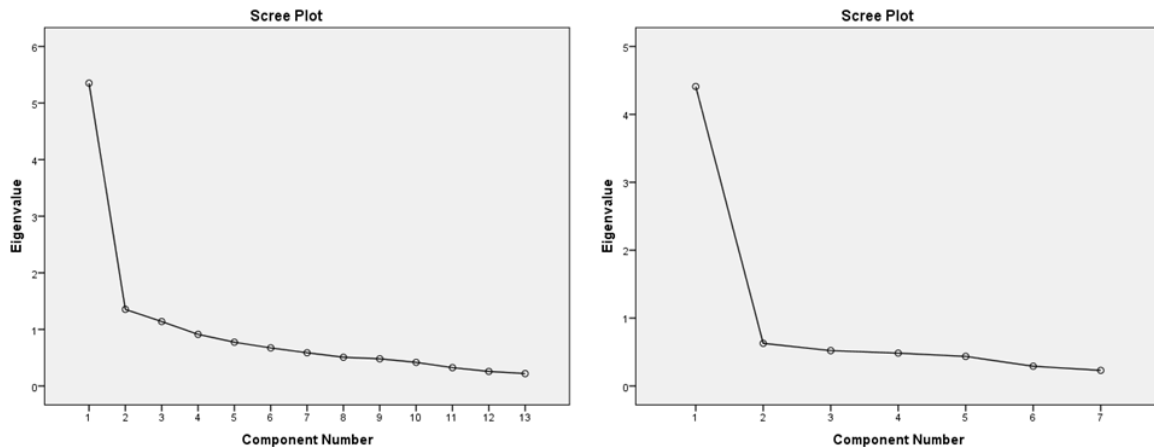
Figure 5.4: Scree plot from initial PCA (13 variables) and final PCA (7 variables) for relationship quality

5.5.2.3 PCA: SMC Development

PCA was used to determine the dimensionality of the indicators of SMC development, in order to establish specific measures or indicators of growth performance and development that can be used to objectively evaluate the effect of Targeted Procurement strategies on SMC development. PCA was run on nine SMC development variables comprising of five variables for economic indicators and four social indicators. Initial PCA results show that three components had eigenvalues greater than one, cumulatively explaining 70% of the total variance (see Table 5.11). However, a further visual inspection of the scree plot (Figure 5.4) revealed that only two components should be retained for further investigation as indicated by the inflection point after the second component. Hence, the PCA was re-run with forced factor extraction to retain only two components. The second PCA result also produced three components having eigenvalues greater than one. However, company profits (.008), JV partnerships (0.187) and advancement on cidb RoC (0.389) did not meet the communality criteria (> 0.4). Therefore, the PCA with eigenvalue-one criterion and varimax rotation was re-run for a third time excluding company profits and JV partnerships. The third PCA result produced a two-component rotated solution (eigenvalues greater than one), explaining 73% of the total variance. The two-component solution satisfies the interpretability criterion of achieving simple structure which is consistent with the SMC development indicators the questionnaire was designed to measure with strong loadings (> 0.6) of social indicators on Component 1 and economic indicators on Component 2; hence, they can be retained for model validation.

Table 5.11: Principal components analysis results for SMC development indicators

SMC development indicators	Initial PCA				PCA 2			Final PCA		
	Rotated Components				Rotated Components			Rotated Components		
	1	2	3	Commu.	1	2	Commu.	1	2	Communalities
Social										
Skills development	.915			.914	.945		.899	.956		.919
Application of innovation & technology	.932			.871	.928		.862	.934		.874
Skills transfer	.931			.873	.926		.859	.936		.877
Advancement on cidb RoC	.613			.442	.623		.389	.624		.390
JV partnerships	.413			.228	.420		.187			
Economic										
Turnover		.858		.747		.859	.743		.861	.748
Assets		.818		.682		.819	.672		.818	.669
Employees		.789		.627		.788	.622		.789	.623
Profits			.948	.900	-		.008			
Total eigenvalues of variance	3.250	1.991	1.043		3.250	1.991		3.110	1.990	
% of variance	36.110	22.126	11.584		36.110	22.126		44.425	28.429	
Cumulative %	36.110	58.236	69.820		36.110	58.236		44.425	72.854	

Extraction method: principal component; Rotation method: varimax with Kaiser normalization
Comp.: components
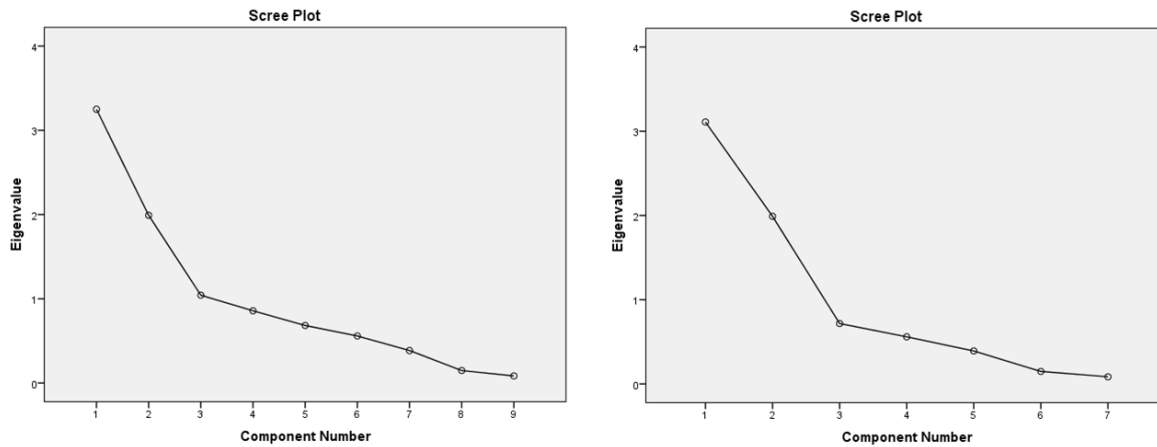
Figure 5.5: Scree plot from initial PCA (9 variables) and final PCA (7 variables) for SMC development

5.5.3   Summary of statistics of the research variables

Section 5.5 examined the relationships between variables within the study constructs – Targeted Procurement strategies, relationship quality and SMC development. However, the objective is to employ PLS-SEM technique to develop and validate an empirical model depicting the strength of relationships between study constructs. To achieve this objective, careful selection of variables of research constructs is sine qua non. A summary of statistics of the research variables is presented in Table 5.12 from which the variables for PLS-SEM model validation will be extracted.

5.6   TESTING OF RESEARCH HYPOTHESES

The results of the hypotheses outlined to test the relationships among the variables of the research constructs (see Section 3.4) is presented in this section. Inferential statistical tools employed include: Spearman's rank-order correlation and multinomial regression (MR).

Prior to performing the MR analysis, the data was examined for multicollinearity to check if the independent variables (Targeted Procurement strategies and relationship quality) are highly correlated to each other which affects the accuracy of the regression calculations. The simplest and most obvious means of identifying collinearity is an examination of the correlation matrix for the independent variables. The presence of high correlations (generally 0.90 and higher) is the first indication of substantial collinearity Hair et al. (2010). Given that the correlation coefficient among the independent variables were generally less than 0.5, this is an indication that the data does not exhibit multicollinearity. Nevertheless, a collinearity diagnostic was performed to confirm further. The collinearity diagnostic showed that the variance inflation factor (VIF) values, which indicates the degree to which each independent variable is explained

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by the other independent variables, were less than 5 (between 1.142 and 1.405) and their tolerance values were higher than 0.2 (between 0.712 and 0.876). Hence, the issue of multicollinearity among the independent variables can be excluded (Hair et al., 2010). Collinearity results for relationship quality criteria is discussed subsequently.

Table 5.12: Summary of statistics of the research variables

Coding	Targeted Procurement strategies	α	FL1	FL2	Commu.	Tol.	VIF	MS	SD
TSPRE	Preferencing		.724		.377	.712	1.405	2.56	1.37
TSTEQ	Tendering Equity		.644		.379	.759	1.318	2.84	1.46
TSARO	Accelerated Rotations		.632		.524	.780	1.282	1.90	1.22
TSMSU	Mandatory Subcontracting		.616		.256	.799	1.251	2.43	1.39
TSUNB	Unbundling of Contracts		.614		.415	.828	1.208	2.12	1.34
TSTPM	Third-party Management		.506		.400	.876	1.142	1.74	1.14
		.688							
	Relationship quality variables								
RQTRU	Trust		.835		.697	.363	2.758	2.53	1.05
RQJPS	Joint problem-solving		.796		.634	.429	2.333	2.31	1.03
RQIEX	Information exchange		.809		.654	.431	2.319	2.38	1.12
RQWRE	Working relationship		.776		.602	.501	1.998	2.65	0.96
RQLIS	Learning and innovation sharing		.829		.686	.393	2.545	2.38	0.92
RQRSA	Risk sharing and allocation		.699		.489	.623	1.604	2.44	1.08
RQCDT	Cost data transparency		.805		.648	.429	2.333	2.23	0.94
		.899							
RQ	Relationship quality							2.38	1.07
	SMC development indicators								
	Social								
SDSDE	Skills development		.956		.919			2.95	1.32
SDITE	Application of innov. & tech.		.934		.874			2.99	1.37
SDSTR	Skills transfer		.936		.877			3.02	1.34
SDACR	Advancement on cidb RoC		.624		.390			2.90	1.26
SDJVP	JV partnerships[a]							1.81	0.98
		.891							
	Economic								
EDTUR	Turnover			.861	.748			2.32	1.41
EDAST	Assets			.818	.669			2.72	1.24
EDEMP	Number of Employees			.789	.623			1.55	0.69
EDPRO	Profits[a]							3.20	1.56
		.714							

[a]. Excluded from PLS-SEM model
α: Cronbach's alpha; FL: factor loading; Commu: communalities; Tol: tolerance; VIF: variance inflation factor

Initially there were twenty-two ordinal variables (six for Targeted Procurement strategies, seven for relationship quality, and nine for SMC development) measured on Likert scales, and representing study construct data collected from 307 SMCs. Mean scores from the seven relationship quality variables were first computed into a continuous variable before being transformed into a categorical variable based on Meng et al.'s (2011) four supply chain

relationship quality maturity levels (see Table 5.4). This was possible given that PCA results showed that all seven variables loaded strongly (< 0.7) on a single component, and their communality values were above 0.4 meaning that they fit well into one construct. Moreover, a reliability test and collinearity diagnostic were performed before computing the relationship quality variable. Cronbach's alpha was used as a measure of internal consistency to determine how much the items on a scale (that is, seven Likert questions) measure the same underlying construct (that is, supply chain relationship quality). The reliability test showed that the scale had a high level of internal consistency, as determined by a Cronbach's alpha of 0.899 (see Table 5.12). The collinearity diagnostic further showed that the tolerance values were higher than 0.2 (between 0.363 and 0.623), and their variance inflation factor (VIF) values were less than 5 (between 1.604 and 2.758) (see Table 5.12). Hence, the issue of multicollinearity among the relationship quality variables can be excluded (Hair et al., 2010).

5.6.1 Correlation analysis of the research variables

Research Objective Two sought to examine the association between Targeted Procurement strategies, SMC development indicators and relationship quality. To address this objective, Spearman's correlation was conducted to assess whether there is an association between the variables of the study constructs. The strength and direction of association was measured by a correlation coefficient – rho (ρ) which ranges from 0 to ±1, where $+1$ indicates a perfect positive correlation, -1 a perfect negative correlation and 0 indicates no association between the ranks. Moreover, the index of association between variables serves as the preliminary step towards addressing Research Objectives Three, Four, Five and Six. Correlations significant at 95% confidence level ($p < .05$) were retained and MR analysis was done to check for causal direct relationships and mediated indirect relationships. In line with previous studies, a 95% significance level was adopted for the verification of research hypotheses (Park et al., 2011).

The result from Spearman's correlation analysis is presented in Table 5.13. For the social indicators of SMC development, the result show that skills development was significantly and positively ($p < .05$) associated with preferencing ($\rho = .214$), tendering equity ($\rho = .200$), mandatory subcontracting ($\rho = .200$) and third-party management Targeted Procurement strategies ($\rho = .199$). Application of innovation and technology (I&T) was found to be significantly and positively associated with preferencing ($\rho = .277$), tendering equity ($\rho = .260$), accelerated rotation ($\rho = .149$) and third-party management ($\rho = .196$). Skills transfer was significantly and positively associated with preferencing ($\rho = .220$), tendering equity ($\rho = .207$),

mandatory subcontracting (ρ = .171) and third-party management (ρ = .160). Advancement on the cidb RoC was significantly and positively associated with tendering equity (ρ = .176). While JV partnerships was significantly and positively associated with preferencing (ρ = .222), tendering equity (ρ = .158), accelerated rotation (ρ = .160), mandatory subcontracting (ρ = .201) and third-party management (ρ = .185).

For the economic indicators of SMC development, the result show that turnover was significantly and positively associated with preferencing (ρ = .293), tendering equity (ρ = .172) and accelerated rotation (ρ = .224). Company assets was also found to be significantly and positively associated with third-party management (ρ = .203). Number of employees was significantly and positively associated with tendering equity (ρ = .201) and accelerated rotation (ρ = .229). While company profit did not exhibit any significant associations with Targeted Procurement strategies. However, company profit was found to be positively associated with third-party management and accelerated rotation but not significant.

It emerged that all significant associations were positive. This implies that an increase in one variable was strongly associated to an increase in another significantly correlated variable. In other words, an increase in the use of a Targeted Procurement strategy (for example, third-party management) is strongly associated to an increase in the corresponding SMC development indicator (for example, company assets). The results show that there were 18 (out of a possible 30) significant associations between the identified Targeted Procurement strategies and social indicators of SMC development thus partially supporting Hypothesis 1; while Targeted Procurement strategies had only 6 (out of a possible 20) significant associations with economic indicators of SMC development, giving a weak support to Hypothesis 2. However, these hypotheses will be further validated using MR analysis.

The result also revealed that were no significant associations between unbundling of contracts and SMC development or relationship quality. Moreover, although not significant, it emerged that the relationship between social indicators of SMC development and unbundling of contracts is positive, while negative for economic indicators. Similarly, unbundling of contracts also exhibited a negative association with relationship quality. It also emerged that mandatory subcontracting did not have significant association with economic indicators of SMC development. Furthermore, company assets exhibited significant association with only third-party management Targeted Procurement strategy. Similarly, advancement on the cidb RoC exhibited significant association with only tendering equity.

Results from Table 5.13 further showed that relationship quality was positively and significantly associated with preferencing ($\rho = .142$), tendering equity ($\rho = .202$) and mandatory subcontracting ($\rho = .170$), thus partially supporting Hypothesis 4. Relationship quality was positively and significantly associated with social indicators of SMC development ($p < .05$), thus fully supporting Hypothesis 3a. This means that an increase in the quality of relationship is strongly associated to an increase in a social indicator of SMC development (for example, skills transfer) and vice versa. However, there were no significant associations between economic indicators of SMC development and relationship quality, hence not supporting Hypothesis 3b. Moreover, although not significant, relationship quality exhibited negative association with company profits.

5.6.2 Targeted Procurement strategies and SMC growth performance and development

Research Objective Three sought to determine the influence of Targeted Procurement strategies on SMC development as required to test Hypotheses 1 and 2.

Main Hypothesis 1: Targeted Procurement strategies have a direct and significant relationship with social indicators of construction SMC development.

Main Hypothesis 2: Targeted Procurement strategies have a direct and significant relationships with economic indicators of construction SMC development.

Multiple MR and simple MR models were used to measure the direct effect – c of Targeted Procurement strategies (predictor variable – X) on SMC development (ordinal response variable – Y). Multinomial regression models the specific category probabilities $Pr(Y_i = j)$ of the dependent variable and can be represented as follows (Agresti, 2002; McCullagh, 1980):

$$\log [\, Pr \, (Y = j \, / \, \mathrm{x}) \,] = \alpha_j + \beta'_j \, \mathrm{x}, \qquad \text{for } j = 1,2,\ldots, J - 1. \tag{5.1}$$

Where Y is the response variable; $\mathrm{x} = (x_1, \ldots, x_n)$ denote the values of the predictors. β is the parameter coefficient vectors; j is the response category up to $J - 1$, where J is the number of response categories; and α_j is the intercept of category j.

Given that the hypothesis was aimed at developing a causal model, the variables of Targeted Procurement strategies were the predictor variables while variables of the two categories of SMC development were the response variables. Nine main hypotheses grouped into the two categories of SMC development will be tested in this section using multiple MR; with each

Table 5.13: Correlation matrix for the study variables

	Coding	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	TSPRE	1															
2	TSTEQ	.348**	1														
3	TSARO	.254**	.411**	1													
4	TSMSU	.386**	.190**	.204**	1												
5	TSUNB	.308**	.258**	.299*	.276**	1											
6	TSTPM	.253**	.095	.170*	.217**	.148*	1										
7	SDSDE	.214**	.200**	.139	.173*	.044	.199**	1									
8	SDITE	.227**	.260**	.149*	.120	.074	.196**	.881**	1								
9	SDSTR	.220**	.207**	.118	.171*	.050	.160*	.902**	.853**	1							
10	SDACR	.098	.176*	.062	.074	.076	.027	.476**	.451**	.406**	1						
11	SDJVP	.222**	.158*	.160*	.201**	.080	.185**	.240**	.252**	.233**	.193**	1					
12	EDTUR	.293**	.172*	.224*	.101	-.044	.175	.155	.116	.151	.107	.069	1				
13	EDAST	.092	.129	.142	-.152	-.068	.203*	.093	.056	.046	-.009	.062	.552**	1			
14	EDEMP	.053	.201*	.229*	.093	-.007	.170	.069	.042	.021	.055	.033	.484**	.431**	1		
15	EDPRO	-.131	-.151	.058	-.143	-.012	.041	.010	-.025	-.017	-.124	-.081	.015	.100	-.027	1	
16	RQ	.142*	.202**	.102	.170*	-.005	.095	.452**	.468**	.400**	.404**	.218**	.136	.157	.064	-.028	1

**. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed).

The coding for the variables are described in Table 5.4

hypothesis having either 1, 4 or 5 sub-hypotheses that would be tested using simple MR. Multiple MR models were used to test the combined effect of the six Targeted Procurement strategies on individual SMC development indicators, while simple MR models were used to further examine the individual effect of each Targeted Procurement strategy on correlated SMC development indicators (see Tables 5.14 and 5.15). The predictive effect of the models was measured using Nagelkerke's pseudo-R^2 (1991) which is an corrected version of the Cox-Snell R^2 (1989) that adjusts the scale of the statistic to cover the full range from 0 to 1.

5.6.2.1 Targeted Procurement strategies and social indicators of SMC development

Main Hypotheses 1 states that: *Targeted Procurement strategies have a direct and significant relationships with social indicators of construction SMC development.* For the variables of social indicators of SMC development that were examined, the following five multiple MR models (and 18 further simple MR models for correlated relationships previously established in Section 5.6.1) were fitted to statistically test the sub-hypotheses to examine whether the regression coefficients were significantly different from zero (see Equations 5.2 to 5.6). See Appendix C1 for a typical result of the regression analysis conducted.

$$\log\left[Pr\left(SDSDE = j \,/\, \mathrm{x}\right)\right] = \alpha_j + \beta\ TSPRE^* + \beta\ TSTEQ^* + \beta\ TSARO + \beta\ TSMSU^* + \beta\ TSUNB + \beta\ TSTPM^* \qquad [5.2]$$

$$\log\left[Pr\left(SDITE = j \,/\, \mathrm{x}\right)\right] = \alpha_j + \beta\ TSPRE^* + \beta\ TSTEQ^* + \beta\ TSARO^* + \beta\ TSMSU + \beta\ TSUNB + \beta\ TSTPM^* \qquad [5.3]$$

$$\log\left[Pr\left(SDSTR = j \,/\, \mathrm{x}\right)\right] = \alpha_j + \beta\ TSPRE^* + \beta\ TSTEQ^* + \beta\ TSARO + \beta\ TSMSU^* + \beta\ TSUNB + \beta\ TSTPM^* \qquad [5.4]$$

$$\log\left[Pr\left(SDACR = j \,/\, \mathrm{x}\right)\right] = \alpha_j + \beta\ TSPRE + \beta\ TSTEQ^* + \beta\ TSARO + \beta\ TSMSU + \beta\ TSUNB + \beta\ TSTPM \qquad [5.5]$$

$$\log\left[Pr\left(SDJVP = j \,/\, \mathrm{x}\right)\right] = \alpha_j + \beta\ TSPRE^* + \beta\ TSTEQ^* + \beta\ TSARO^* + \beta\ TSMSU^* + \beta\ TSUNB + \beta\ TSTPM^* \qquad [5.6]$$

*. Correlations significant at $p < .01$; $p < .05$

The results of the Targeted Procurement strategy – SMC development models tested are presented in Table 5.14. The log likelihood ratio test from multiple MR models was first assessed for overall model fit among the Targeted Procurement strategies and social indicators of SMC development (White, 1982). When skills development was entered as the dependent variable in Model 5.2, the results show that the final model significantly and positively predicted skills development over and above the intercept-only model, [likelihood ratio $\chi^2(96) = 151.198$, $p < .001$]. In other words, together, the Targeted Procurement strategies accounted for a statistically significant amount of variance in skills development acquired by the SMCs, meaning that the model fits the data. Moreover, the model accounted for 59% of the variance in the outcome ($R^2 = .594$). Model 5.3

tested the degree to which application of innovation and technology (I&T) was predicted by Targeted Procurement strategies which was statistically significant and positive [$\chi^2(96) = 137.012$; $p < .01$] with a predictive effect of 56% ($R^2 = .556$). Model 5.4 showed that Targeted Procurement strategies significantly and positively predicted skills transfer [$\chi^2(96) = 132.967$; $p < .01$] with a predictive effect of 55% ($R^2 = .553$). Exhibiting a predictive effect of 55% ($R^2 = .546$), Model 5.5 also indicated that Targeted Procurement strategies significantly and positively predicted advancement on the cidb RoC [$\chi^2(96) = 133.151$; $p < .01$]. The predictive effect of Model 5.6 ($R^2 = .605$) implies that Targeted Procurement strategies accounted for 61% of the variance in predicting JV partnerships which was also statistically significant and positive [$\chi^2(96) = 142.685$; $p < .01$]. It emerged that all the relationships were statistically significant and positive, thus supporting Hypothesis 1.

To explore these relationships further, simple MLR was performed to examine the individual effect of each Targeted Procurement strategy on correlated social indicators of SMC development. When the Targeted Procurement strategies were examined individually, the result show that skills development was significantly and positively predicted by preferencing [Wald $\chi^2(16) = 39.728$, $p < .01$] and third-party management [$\chi^2(16) = 33.997$, $p < .01$]; but was not significantly predicted by tendering equity [$\chi^2(16) = 26.153$, $p > .05$] and mandatory subcontracting [$\chi^2(16) = 19.796$, $p > .05$]. Application of I&T was significantly and positively predicted by preferencing [$\chi^2(16) = 36.503$, $p < .01$], tendering equity [$\chi^2(16) = 35.263$, $p > .05$] and accelerated rotation [$\chi^2(16) = 27.501$, $p < .05$]; but was not significantly predicted by third-party management [$\chi^2(16) = 24.027$, $p > .05$].

Skills transfer was significantly and positively predicted by tendering equity [$\chi^2(16) = 31.332$, $p < .05$]; but was not significantly predicted by preferencing [$\chi^2(16) = 22.487$, $p > .05$], mandatory subcontracting [$\chi^2(16) = 18.510$, $p > .05$], mandatory subcontracting [$\chi^2(16) = 18.510$, $p > .05$] and third-party management [$\chi^2(16) = 20.739$, $p > .05$]. Advancement on the cidb RoC was significantly and positively predicted by tendering equity [$\chi^2(16) = 37.065$, $p < .01$]. Finally, JV partnerships was significantly and positively predicted by preferencing [$\chi^2(16) = 29.731$, $p < .05$], tendering equity [$\chi^2(16) = 33.109$, $p > .01$] and accelerated rotation [$\chi^2(16) = 28.059$, $p < .05$]; but was not significantly predicted by mandatory subcontracting [$\chi^2(16) = 20.908$, $p > .05$] and third-party management [$\chi^2(16) = 26.113$, $p > .05$].

Results from Table 5.14 also revealed that preferencing had the strongest predictive effect on skills development and application of I&T explaining 19% ($R^2 = .194$) and 18% ($R^2 = .179$) of the total variance in the models respectively. Similarly, tendering equity outperformed other Targeted Procurement strategies in explaining 15% ($R^2 = .150$), 17% ($R^2 = .173$) and 17% ($R^2 = .169$) of the total variance in skills transfer, advancement on the cidb RoC and JV partnerships respectively.

Table 5.14: Regression analysis of Targeted Procurement strategies and social indicators of SMC development

Model	Dependent Variable	Predictor Variable	χ^2	df	Sig.	R^2_{Nag}	Model fit
5.2	Skills development	All TPS	151.198	96	.000**	.594	Yes
		TSPRE	39.728	16	.001**	.194	
		TSTEQ	26.153	16	.052	.126	
		TSMSU	19.796	16	.230	.097	
		TSTPM	33.997	16	.005**	.167	
5.3	Application of innovation & technology	All TPS	137.012	96	.004**	.556	Yes
		TSPRE	36.503	16	.002**	.179	
		TSTEQ	35.263	16	.004**	.167	
		TSARO	27.501	16	.036*	.136	
		TSTPM	24.027	16	.089	.121	
5.4	Skills transfer	All TPS	132.967	96	.007**	.553	Yes
		TSPRE	22.487	16	.128	.115	
		TSTEQ	31.332	16	.012*	.150	
		TSMSU	18.510	16	.295	.092	
		TSTPM	20.739	16	.189	.107	
5.5	Advancement on the cidb RoC	All TPS	133.151	96	.007**	.546	Yes
		TSTEQ	37.065	16	.002**	.173	
5.6	JV partnerships	All TPS	142.685	96	.001**	.605	Yes
		TSPRE	29.731	16	.019*	.157	
		TSTEQ	33.109	16	.007**	.169	
		TSARO	28.059	16	.031*	.147	
		TSMSU	20.908	16	.182	.108	
		TSTPM	26.113	16	.052	.139	

**. $p < .01$; *. $p < .05$

5.6.2.2 *Targeted Procurement strategies and economic indicators of SMC development*

Main Hypotheses 2 states that: *Targeted Procurement strategies have a direct and significant relationships with economic indicators of construction SMC development.* For the variables of economic indicators of SMC development that were examined, the following four multiple MR models (and 6 further simple MR models for correlated relationships previously established in Section 5.6.1) were fitted to statistically test the sub-hypotheses to examine whether the regression coefficients were significantly different from zero (see equations 5.7 to 5.10). See Appendix C2 for a typical result of the regression analysis conducted.

$$\log [Pr (EDTUR = j \, / \, \text{x})] = \alpha_j + \beta \, TSPRE^* + \beta \, TSTEQ^* + \beta \, TSARO^* + \beta \, TSMSU + \beta \, TSUNB + \beta \, TSTPM \qquad [5.7]$$

$$\log [Pr (EDAST = j \, / \, \text{x})] = \alpha_j + \beta \, TSPRE + \beta \, TSTEQ + \beta \, TSARO + \beta \, TSMSU + \beta \, TSUNB + \beta \, TSTPM^* \qquad [5.8]$$

$$\log [Pr (EDEMP = j \, / \, \text{x})] = \alpha_j + \beta \, TSPRE + \beta \, TSTEQ^* + \beta \, TSARO^* + \beta \, TSMSU + \beta \, TSUNB + \beta \, TSTPM \qquad [5.9]$$

$$\log [Pr (EDPRO = j \, / \, \text{x})] = \alpha_j + \beta \, TSPRE + \beta \, TSTEQ + \beta \, TSARO + \beta \, TSMSU + \beta \, TSUNB + \beta \, TSTPM \qquad [5.10]$$

*. Correlations significant at $p < .01$; $p < .05$

The results of the Targeted Procurement strategy – SMC development models tested are presented in Table 5.15. When turnover was entered as the dependent variable in Model 5.7, the results show that the final model significantly and positively predicted company turnover over and above the intercept-only model, [likelihood ratio $\chi^2(24) = 40.690$, $p < .05$]. In other words, together, the Targeted Procurement strategies accounted for a statistically significant amount of variance in company turnover, meaning that the model fits the data. Moreover, the model accounted for 32% of the variance in the outcome ($R^2 = .315$). Model 5.8 tested the degree to which company assets (plant and equipment) was predicted by Targeted Procurement strategies, which was found not to be statistically significant [$\chi^2(24) = 35.770$; $p > .05$] with a predictive effect of 33% ($R^2 = .325$). Exhibiting a predictive effect of 39% ($R^2 = .389$), Model 5.9 showed that Targeted Procurement strategies significantly and positively predicted number of employees [$\chi^2(24) = 43.597$; $p < .01$]. While Model 5.10 showed that Targeted Procurement strategies did not significantly predict company profits [$\chi^2(24) = 35.543$; $p > .05$] with a predictive effect of 36% ($R^2 = .358$). It emerged that two models were statistically significant and positive, thus partially supporting Hypothesis 2.

To explore these relationships further, simple MR was performed to examine the individual effect of each Targeted Procurement strategy on correlated economic indicators of SMC development. The result show that company turnover was significantly and positively predicted by accelerated rotation [Wald $\chi^2(4) = 11.084$, $p < .05$]; but was not significantly predicted by preferencing [$\chi^2(4) = 5.069$, $p > .05$] and tendering equity [$\chi^2(4) = 3.162$, $p > .05$]. Company assets was significantly and positively predicted by third-party management [$\chi^2(4) = 10.586$, $p < .05$]. While Number of employees was not significantly predicted by tendering equity [$\chi^2(4) = 4.088$, $p > .05$] and accelerated rotation [$\chi^2(4) = 8.918$, $p > .05$]. Simple MLR was not performed for company profits as it did not exhibit any statistically significant correlation with SMC development indicators.

Table 5.15: Regression analysis of Targeted Procurement strategies and economic indicators of SMC development

Model	Dependent Variable	Predictor Variable	χ2	df	Sig.	R^2_{Nag}	Model fit
5.7	Turnover	All TPS	40.690	24	.018*	.315	Yes
		TSPRE	5.069	4	.280	.110	
		TSTEQ	3.162	4	.531	.043	
		TSARO	11.084	4	.026*	.090	
5.8	Assets	All TPS	35.770	24	.058	.325	No
		TSTPM	10.586	4	.032*	.054	
5.9	Number of employees	All TPS	43.597	24	.008**	.389	Yes
		TSTEQ	4.088	4	.394	.062	
		TSARO	8.918	4	.063	.085	
5.10	**Profits**	All TPS	35.543	24	.061	.358	No

**. $p < .01$; *. $p < .05$

5.6.3 Targeted Procurement strategies and relationship quality

Research Objective Three also sought to determine the influence of Targeted Procurement strategies on relationship quality as required to test Hypothesis 4. Hypothesis 4 states that: *Targeted Procurement strategies have a direct and significant relationship with supply chain relationship quality.* The following multiple MR model (and 3 simple further MR models for correlated relationships previously established in Section 5.6.1) were fitted to statistically test the hypothesis to examine whether the regression coefficients were significantly different from zero (see equations 5.11). See Appendix C3 for a typical result of the regression analysis conducted.

$$\log [Pr (RQ = j \,/\, x)] = \alpha_j + \beta \; TSPRE^* + \beta \; TSTEQ^* + \beta \; TSARO + \beta \; TSMSU^* + \beta \; TSUNB + \beta \; TSTPM \qquad [5.11]$$

*. Correlations significant at $p < .01$; $p < .05$

The results of the Targeted Procurement strategy–relationship quality models tested are presented in Table 5.16. When relationship quality was entered as the dependent variable in Model 5.11, the results show that the final model significantly and positively predicted company turnover over and above the intercept-only model, [likelihood ratio $\chi^2(72) = 112.520$, $p < .01$]. In other words, together, the Targeted Procurement strategies accounted for a statistically significant amount of variance in relationship quality, meaning that the model fits the data. Moreover, the model accounted for 50% of the variance in the outcome ($R^2 = .504$). The result from Model 5.11 therefore supports Hypothesis 4.

To explore these relationships further, simple MR was performed to examine the individual effect of each correlated Targeted Procurement strategy on relationship quality. The result show that relationship quality was significantly and positively predicted by preferencing [$\chi^2(12) = 33.016$, p

$< .01]$ and mandatory subcontracting $[\chi^2(12) = 23.600, p < .05]$; but was not significantly predicted by tendering equity $[\chi^2(12) = 18.505, p > .05]$. Table 5.15 also revealed that preferencing had the strongest predictive effect on relationship quality explaining 17% ($R^2 = .169$) of the total variance in the model.

Table 5.16: Regression analysis of Targeted Procurement strategies and relationship quality

Model	Dependent Variable	Predictor Variable	$\chi2$	df	Sig.	R^2_{Nag}	Model fit
5.11	Relationship quality	All TPS	112.520	72	.002**	.504	Yes
		TSPRE	33.016	12	.001**	.169	
		TSTEQ	18.505	12	.101	.095	
		TSMSU	23.600	12	.023*	.121	

**. $p < .01$; *. $p < .05$

5.6.4 Supply chain relationship quality and SMC development

Research Objective Four sought to determine the influence of relationship quality on SMC development as required to test Hypotheses 3a and 3b. Hypothesis 3b which states that *Supply chain relationship quality has a direct and significant relationship with economic indicators of construction SMC development* has been previously disproven with no significant associations in Section 5.6.1 (see Table 5.13). Hence hypothesis testing in this section will proceed excluding Hypothesis 3b.

5.6.4.1 Supply chain relationship quality and social indicators of SMC development

Hypothesis 3a states that: *Supply chain relationship quality has a direct and significant relationship with social indicators of construction SMC development*. The following MR models (for correlated relationships previously established in Section 5.6.1) were fitted to statistically test the hypothesis to examine whether the regression coefficients were significantly different from zero (see equations 5.12 to 5.16). See Appendix C4 for a typical result of the regression analysis conducted.

$$\log [Pr (SDSDE = j / \text{x})] = \alpha_j + \beta \, RQ^* \qquad [5.12]$$

$$\log [Pr (SDITE = j / \text{x})] = \alpha_j + \beta \, RQ^* \qquad [5.13]$$

$$\log [Pr (SDSTR = j / \text{x})] = \alpha_j + \beta \, RQ^* \qquad [5.14]$$

$$\log [Pr (SDACR = j / \text{x})] = \alpha_j + \beta \, RQ^* \qquad [5.15]$$

$$\log [Pr (SDJVP = j / \text{x})] = \alpha_j + \beta \, RQ^* \qquad [5.16]$$

*. Correlations significant at $p < .01$; $p < .05$

The results of the relationship quality–SMC development models tested are presented in Table 5.17. When skills development was entered as the dependent variable in Model 5.12, the results show that the final model significantly and positively predicted skills development over and above the intercept-only model, [likelihood ratio $\chi^2(12) = 67.695$, $p < .001$]. In other words, relationship quality accounted for a statistically significant amount of variance in skills development, meaning that the model fits the data. Moreover, the model accounted for 31% of the variance in the outcome ($R^2 = .311$).

Model 5.13 tested the degree to which application of innovation and technology was predicted by relationship quality, which was found not to be statistically significant [$\chi^2(12) = 69.880$; $p > .001$] with a predictive effect of 32% ($R^2 = .320$). Exhibiting a predictive effect of 26% ($R^2 = .257$), Model 5.14 showed that relationship quality significantly and positively predicted skills transfer [$\chi^2(12) = 53.678$; $p < .001$]. Model 5.15 also indicated that relationship quality significantly and positively predicted advancement on the cidb RoC [$\chi^2(12) = 43.871$; $p < .001$] with a predictive effect of 21% ($R^2 = .211$). While Model 5.16 exhibited a predictive effect of 14% ($R^2 = .141$) to significantly and positively predict JV partnerships [$\chi^2(12) = 25.463$; $p < .05$]. It emerged that all the relationships were statistically significant and positive, thus supporting Hypothesis 3a.

Table 5.17: Regression analysis of relationship quality and SMC development (social)

Model	Dependent Variable	Predictor Variable	χ^2	df	Sig.	R^2_{Nag}	Model fit
5.12	Skills development	RQ	67.695	12	.000[**]	.311	Yes
5.13	Application of innovation & technology	RQ	69.880	12	.000[**]	.320	Yes
5.14	Skills transfer	RQ	53.678	12	.000[**]	.257	Yes
5.15	Advancement on the cidb RoC	RQ	43.871	12	.000[**]	.211	Yes
5.16	JV partnerships	RQ	25.463	12	.013[*]	.141	Yes

RQ: relationship quality
[**]. $p < .01$; [*]. $p < .05$

5.6.5 Mediated indirect effects of Targeted Procurement strategies on SMC development through relationship quality

Research Objective Five sought to determine the indirect influence of Targeted Procurement strategies on SMC development as required to test Hypotheses 5a and 5b.

Hypothesis 5a: Supply chain relationship quality mediates the relationship between Targeted Procurement strategies and social indicators of construction SMC development.

Hypothesis 5b: Supply chain relationship quality mediates the relationship between Targeted Procurement strategies and economic indicators of construction SMC development.

Mediated MR was performed by introducing relationship quality (continuous mediator variable – *M*) into the MR models in equations 5.2 to 5.10 to assess the indirect effect – *c′* of *X* on *Y*; and *c* - *c′* is the measure of the indirect effect (Imai et al. 2010). To establish that *M* completely mediates the *X-Y* relationship, *c′* should be (a) < *c*, and (b) equal to zero or not significant (Baron and Kenny, 1986; Frazier et al., 2004; James and Brett, 1984). The main effects mediation model of Equation 5.1 accounting for *X* and *M* is:

$$\log [Pr (Y = j / \text{x})] = \alpha_j + \beta_j X + \beta_j M \qquad [5.17]$$

It is assumed that the relationships in Equation 5.17 are causal and that *M* is causally located between *X* and *Y*; and that *X* causes *M* which in turn causes *Y* (Hayes, 2013) as depicted in the conceptual model in Figure 3.4.

The hypotheses tested in the section were aimed at developing a mediated causal model, hence, the variables of Targeted Procurement strategies were the predictor variables while variables of the two categories of SMC development were the response variables, and supply chain relationship quality was the mediator variable. Multiple MR models were first used to examine the combined effect of the six Targeted Procurement strategies and relationship quality on individual SMC development indicators, while mediated MR models were used to examine the mediated indirect effect of individual Targeted Procurement strategy on SMC development indicators, with relationship quality as the mediator. The mediation analysis procedure attempted to isolate the main effects of Targeted Procurement strategies on SMC development, and to assess whether the predictive effect of each Targeted Procurement strategy on SMC development indicators was mediated by relationship quality. Given that most contemporary scholars of mediation analysis (for example, Hayes, 2009; MacKinnon, 2008; Rucker et al., 2011; Shrout and Bolger, 2002; Zhao et al., 2010) agree that lack of correlation does not disprove causation, and correlation is neither a necessary nor a sufficient condition of causality, mediation tests is expected to be performed for all Targeted Procurement strategy – SMC development relationships irrespective of prior evidence of correlation (Hayes, 2013).

5.6.5.1 *Mediated indirect effect of Targeted Procurement strategies on social indicators of SMC development through relationship quality*

Hypotheses 5a states that: *Relationship quality mediates the relationship between Targeted Procurement strategies and social indicators of construction SMC development.* The following mediated MR models (and further mediated multiple MR models with individual Targeted Procurement strategies and relationship quality as independent variables) were fitted to

statistically test the hypothesis and examine whether *relationship quality* completely mediates the *Targeted Procurement strategy – SMC development* relationship (see equations 5.18 to 5.22). See Appendix C5 for a typical result of mediated regression analysis conducted.

$\log [Pr (SDSDE = j / \mathrm{x})] =$

$$\alpha_j + \beta\ TSPRE^* + \beta\ TSTEQ^* + \beta\ TSARO + \beta\ TSMSU^* + \beta\ TSUNB + \beta\ TSTPM^* + \beta\ RQ^* \quad [5.18]$$

$\log [Pr (SDITE = j / \mathrm{x})] =$

$$\alpha_j + \beta\ TSPRE^* + \beta\ TSTEQ^* + \beta\ TSARO^* + \beta\ TSMSU + \beta\ TSUNB + \beta\ TSTPM^* + \beta\ RQ^* \quad [5.19]$$

$\log [Pr (SDSTR = j / \mathrm{x})] =$

$$\alpha_j + \beta\ TSPRE^* + \beta\ TSTEQ^* + \beta\ TSARO + \beta\ TSMSU^* + \beta\ TSUNB + \beta\ TSTPM^* + \beta\ RQ^* \quad [5.20]$$

$\log [Pr (SDACR = j / \mathrm{x})] =$

$$\alpha_j + \beta\ TSPRE + \beta\ TSTEQ^* + \beta\ TSARO + \beta\ TSMSU + \beta\ TSUNB + \beta\ TSTPM + \beta\ RQ^* \quad [5.21]$$

$\log [Pr (SDJVP = j / \mathrm{x})] =$

$$\alpha_j + \beta\ TSPRE^* + \beta\ TSTEQ^* + \beta\ TSARO^* + \beta\ TSMSU^* + \beta\ TSUNB + \beta\ TSTPM^* + \beta\ RQ^* \quad [5.22]$$

*. Correlations significant at $p < .01$; $p < .05$

Table 5.18 presents results from multiple MR models that include the relationship quality variable (c') which is compared to the model without the relationship quality variable (c). The log likelihood ratio test from the MLR models was first assessed for overall model fit among the Targeted Procurement strategies, relationship quality and social indicators of SMC development. When skills development was entered as the dependent variable in Model 5.18 (c'), the results show that the final model significantly and positively predicted skills development [likelihood ratio $\chi^2(108) = 191.430$, $p < .01$]. In other words, together, the Targeted Procurement strategies and relationship quality accounted for a statistically significant amount of variance in skills development acquired by the SMCs, meaning that the model fits the data. Moreover, the model accounted for approximately 73% of the variance in the outcome ($R^2 = .727$), which is an improvement of the model over and above Model 5.2 (c). This means that the introduction of relationship quality increased the predictive effect and improved overall model fit.

Model 5.19 (c') tested the degree to which application of innovation and technology (I&T) was predicted by Targeted Procurement strategies and relationship quality, which was statistically significant and positive [$\chi^2(108) = 176.204$; $p < .001$] with a predictive effect of approximately 69% ($R^2 = .694$), which is also an improvement of the model over and above Model 5.3 (c). Model 5.20 (c') showed that Targeted Procurement strategies and relationship quality significantly and

positively predicted skills transfer [$\chi^2(108) = 166.623$; $p < .001$] with a predictive effect of approximately 68% ($R^2 = .682$), which is an improvement of the model over and above Model 5.4 (c). Exhibiting a predictive effect of approximately 64% ($R^2 = .641$), Model 5.21 (c') also indicated that Targeted Procurement strategies and relationship quality significantly and positively predicted advancement on the cidb RoC [$\chi^2(108) = 153.407$; $p < .01$], which was an improvement of the model over and above Model 5.5 (c). The predictive effect of Model 5.22 (c') ($R^2 = .675$) implies that Targeted Procurement strategies and relationship quality accounted for approximately 68% of the variance in predicting JV partnerships which was also statistically significant and positive [$\chi^2(96) = 142.685$; $p < .01$], and an improvement of the model over and above Model 5.6 (c). It emerged that all the relationships were statistically significant and positive, thus supporting Hypothesis 5a.

Table 5.18 further presented results from individual mediated MLR models that include the relationship quality variable (c') which is compared to the model without the relationship quality variable (c). Mediation analysis was performed only on models that were significant ($p < .05$) in Model c. When skills development was entered as the dependent variable, results from Model c show that accelerated rotation was a statistically significant predictor of skills development [Wald $\chi^2(16) = 31.564$, $p < .05$]. The mediation analysis results (c') show that accelerated rotation was no longer a statistically significant predictor of skills development after controlling for the mediator – relationship quality [$\chi^2(16) = 23.713$, $p > .05$], which is consistent with complete mediation. Moreover, approximately 40% of the variance in skills development was accounted for by accelerated rotation and relationship quality ($R^2 = .401$). On the other hand, the mediation analysis for preferencing [$\chi^2(16) = 31.107$, $p < .05$, $R^2 = .437$] and third-party management [$\chi^2(16) = 29.636$, $p < .05$, $R^2 = .421$] Targeted Procurement strategies on skills development show that the Targeted Procurement strategies retained a statistically significant predictive effect on skills development, which is consistent with partial mediation.

When application of I&T was entered as the dependent variable, results from Model c show that accelerated rotation was a statistically significant predictor of application of I&T [$\chi^2(16) = 27.501$, $p < .05$]. However, the mediation analysis results (c') show that accelerated rotation was no longer a statistically significant predictor of application of I&T after controlling for the mediator – relationship quality [$\chi^2(16) = 19.582$, $p > .05$], which is consistent with complete mediation. Moreover, approximately 40% of the variance in application of I&T was accounted for by

accelerated rotation and relationship quality (R^2 = .396). Similar complete mediation results in Model c' were obtained for preferencing [$\chi^2(16)$ = 22.698, p > .05, R^2 = .417], tendering equity [$\chi^2(16)$ = 24.991, p > .05, R^2 = .408], and unbundling of contracts [$\chi^2(16)$ = 25.809, p > .05, R^2 = .419].

For skills transfer, results from Model c show that tendering equity was a statistically significant predictor of skills transfer [$\chi^2(16)$ = 31.332, p < .05]. However, the mediation analysis results (c') show that tendering equity was no longer a statistically significant predictor of skills transfer after controlling for the mediator – relationship quality [$\chi^2(16)$ = 19.430, p > .05], which is consistent with complete mediation. Moreover, approximately 33% of the variance in skills transfer was accounted for by tendering equity and relationship quality (R^2 = .396). On the other hand, the mediation analysis for accelerated rotation [$\chi^2(16)$ = 38.244, p < .05, R^2 = .404] and unbundling of contracts [$\chi^2(16)$ = 27.155, p < .05, R^2 = .360] Targeted Procurement strategies on skills transfer show that the Targeted Procurement strategies retained a statistically significant predictive effect on skills transfer, which is consistent with partial mediation.

When advancement on cidb RoC was entered as the dependent variable, results from Model c show that tendering equity was a statistically significant predictor of advancement on cidb RoC [$\chi^2(16)$ = 27.501, p < .05]. The mediation analysis results (c') show that tendering equity retained a statistically significant predictive effect on advancement on cidb RoC [$\chi^2(16)$ = 19.582, p > .05], which is consistent with partial mediation. Moreover, 34% of the variance in advancement on cidb RoC was accounted for by tendering equity and relationship quality (R^2 = .340).

For JV partnerships, results from Model c show that preferencing was a statistically significant predictor of JV partnerships [$\chi^2(16)$ = 31.332, p < .05]. However, the mediation analysis results (c') show that preferencing was no longer a statistically significant predictor of JV partnerships after controlling for the mediator – relationship quality [$\chi^2(16)$ = 19.430, p > .05], which is consistent with complete mediation. Moreover, approximately 33% of the variance in JV partnerships was accounted for by preferencing and relationship quality (R^2 = .396). On the other hand, the mediation analysis for tendering equity [$\chi^2(16)$ = 38.244, p < .05, R^2 = .404] and accelerated rotation [$\chi^2(16)$ = 27.155, p < .05, R^2 = .360] Targeted Procurement strategies on JV partnerships show that the Targeted Procurement strategies retained a statistically significant predictive effect on JV partnerships, which is consistent with partial mediation. It emerged that

seven the relationships were completely mediated while the other seven were partially mediated, thus further supporting Hypothesis 5a.

5.6.5.2 *Mediated indirect effect of Targeted Procurement strategies on economic indicators of SMC development through relationship quality*

Hypotheses 5b states that: *Relationship quality mediates the relationship between Targeted Procurement strategies and economic indicators of construction SMC development.* The following mediated MR models (and further mediated MR models with individual Targeted Procurement strategies and relationship quality as independent variables) were fitted to statistically test the hypothesis and examine whether *relationship quality* completely mediates the *Targeted Procurement strategy – SMC development* relationship (see equations 5.23 to 5.26). See Appendix C5 for a typical result of mediated regression analysis conducted.

$\log [Pr (EDTUR = j / \text{x})] =$
$$\alpha_j + \beta \; TSPRE^* + \beta \; TSTEQ^* + \beta \; TSARO^* + \beta \; TSMSU + \beta \; TSUNB + \beta \; TSTPM + \beta \; RQ \qquad [5.23]$$

$\log [Pr (EDAST = j / \text{x})] =$
$$\alpha_j + \beta \; TSPRE + \beta \; TSTEQ + \beta \; TSARO + \beta \; TSMSU + \beta \; TSUNB + \beta \; TSTPM^* + \beta \; RQ \qquad [5.24]$$

$\log [Pr (EDEMP = j / \text{x})] =$
$$\alpha_j + \beta \; TSPRE + \beta \; TSTEQ^* + \beta \; TSARO^* + \beta \; TSMSU + \beta \; TSUNB + \beta \; TSTPM + \beta \; RQ \qquad [5.25]$$

$\log [Pr (EDPRO = j / \text{x})] =$
$$\alpha_j + \beta \; TSPRE + \beta \; TSTEQ^* + \beta \; TSARO + \beta \; TSMSU + \beta \; TSUNB + \beta \; TSTPM + \beta \; RQ \qquad [5.26]$$

[*]. Correlations significant at $p < .01$; $p < .05$

Table 5.19 presents results from multiple MLR models that include the relationship quality variable (c') which is compared to the model without the relationship quality variable (c). The log likelihood ratio test from the MLR models was first assessed for overall model fit among the Targeted Procurement strategies, relationship quality and economic indicators of SMC development. When company turnover was entered as the dependent variable in Model 5.23 (c'), the results show that the final model significantly and positively predicted turnover [likelihood ratio $\chi^2(27) = 46.465$, $p < .05$]. In other words, together, the Targeted Procurement strategies and relationship quality accounted for a statistically significant amount of variance in company turnover, meaning that the model fits the data. Moreover, the model accounted for approximately 39% of the variance in the outcome ($R^2 = .389$), which is an improvement of the model over and above Model 5.7 (c). This means that the introduction of relationship quality increased the predictive effect and improved overall model fit.

Table 5.18: Mediated regression analysis of Targeted Procurement strategies, relationship quality and social indicators of SMC development

Model	Dependent Variable	Predictor Variable	Model c				Model c'				Model fit	Mediation
			$\chi2$	df	Sig.	R^2_{Nag}	$\chi2$	df	Sig.	R^2_{Nag}		
5.18	Skills development	All TPS + RQ	151.198	96	.000**	.594	191.430	108	.000**	.727	Yes	
		TSPRE[a]	39.728	16	.001**	.194	31.107	16	.013*	.437		Partial
		RQ	–	–	–	–	58.236	12	.000**			
		TSARO	31.564	16	.011*	.155	23.713	16	.096	.401		Complete
		RQ	–	–	–	–	56.031	12	.000**			
		TSTPM[a]	33.997	16	.005**	.167	29.636	16	.020*	.421		Partial
		RQ	–	–	–	–	58.386	12	.000**			
5.19	Application of innovation & technology	All TPS + RQ	137.012	96	.004**	.556	176.204	108	.000**	.694	Yes	
		TSPRE[a]	36.503	16	.002**	.179	22.698	16	.122	.417		Complete
		RQ	–	–	–	–	60.354	12	.000**			
		TSTEQ[a]	35.263	16	.004**	.167	24.991	16	.070	.408		Complete
		RQ	–	–	–	–	61.620	12	.000**			
		TSARO[a]	27.501	16	.036*	.136	19.582	16	.240	.396		Complete
		RQ	–	–	–	–	59.191	12	.000**			
		TSUNB	30.664	16	.015*	.148	25.809	16	.057	.419		Complete
		RQ	–	–	–	–	64.181	12	.000**			
5.20	Skills transfer	All TPS + RQ	132.967	96	.007**	.553	166.623	108	.000**	.682	Yes	
		TSTEQ[a]	31.332	16	.012*	.150	19.430	16	.247	.332		Complete
		RQ	–	–	–	–	43.468	12	.000**			
		TSARO	42.894	16	.000**	.206	38.244	16	.001**	.404		Partial
		RQ	–	–	–	–	40.414	12	.000**			
		TSUNB	31.685	16	.011*	.153	27.155	16	.040*	.360		Partial
		RQ	–	–	–	–	47.169	12	.000**			
	Advancement on cidb RoC	All TPS + RQ	133.151	96	.007**	.546	153.407	108	.003**	.641	Yes	
		TSTEQ[a]	37.065	16	.002**	.173	31.265	16	.012*	.340		Partial
		RQ	–	–	–	–	37.335	12	.000**			
5.22	JV partnerships	All TPS + RQ	142.685	96	.001**	.605	151.023	108	.004**	.675	Yes	
		TSPRE[a]	29.731	16	.019*	.157	25.097	16	.068	.269		Complete
		RQ	–	–	–	–	23.225	12	.026*			
		TSTEQ[a]	33.109	16	.007**	.169	26.928	16	.042*	.268		Partial
		RQ	–	–	–	–	21.611	12	.042*			
		TSARO[a]	28.059	16	.031*	.147	29.623	16	.020*	.289		Partial
		RQ	–	–	–	–	23.442	12	.024*			

**. $p < .01$; *. $p < .05$; [a]. Correlations significant at $p < .01$; $p < .0$

Model 5.24 (c') tested the degree to which application of company assets (plant and equipment) was predicted by Targeted Procurement strategies and relationship quality, which was statistically significant and positive [$\chi^2(27) = 43.497$; $p < .05$] with a predictive effect of 42% ($R^2 = .420$), which is also an improvement of the model over and above Model 5.8 (c). Model 5.25 (c') showed that Targeted Procurement strategies and relationship quality significantly and positively predicted number of employees [$\chi^2(27) = 52.279$; $p < .01$] with a predictive effect of approximately 50% ($R^2 = .501$), which is an improvement of the model over and above Model 5.9 (c). The predictive effect of Model 5.26 (c') ($R^2 = .400$) implies that Targeted Procurement strategies and relationship quality accounted for 40% of the variance in predicting company profit, however it was not statistically significant [$\chi^2(27) = 36.002$; $p > .05$. It emerged that three out of four relationships were statistically significant and positive, thus partially supporting Hypothesis 5a.

Table 5.19 further presented results from individual mediated MR models that include the relationship quality variable (c') which is compared to the model without the relationship quality variable (c). Mediation analysis was performed only on models that were significant ($p < .05$) in Model c. When company turnover was entered as the dependent variable, results from Model c show that accelerated rotation was a statistically significant predictor of company turnover [Wald $\chi^2(4) = 11.084$, $p < .05$]. However, the mediation analysis results (c') show that accelerated rotation retained a statistically significant predictive effect on company turnover after controlling for the mediator – relationship quality [$\chi^2(4) = 10.279$, $p > .05$], which is consistent with partial mediation. Moreover, approximately 13% of the variance in company turnover was accounted for by accelerated rotation and relationship quality ($R^2 = .132$).

For company assets, results from Model c show that third-party management was a statistically significant predictor of company assets [$\chi^2(4) = 10.586$, $p < .05$]. However, the mediation analysis results (c') show that third-party management was no longer a statistically significant predictor of company assets after controlling for the mediator – relationship quality [$\chi^2(4) = 7.377$, $p > .05$], which is consistent with complete mediation. Moreover, approximately 16% of the variance in company assets was accounted for by third-party management and relationship quality ($R^2 = .162$).

When company profit was entered as the dependent variable, results from Model c show that mandatory subcontracting was a statistically significant predictor of company profit [$\chi^2(4) = 11.773$, $p < .05$]. However, the mediation analysis results (c') show that mandatory subcontracting was no longer a statistically significant predictor of company profit after controlling for the

mediator – relationship quality [$\chi^2(4) = 5.279$, $p > .05$], which is consistent with complete mediation. Moreover, approximately 12% of the variance in company profit was accounted for by mandatory subcontracting and relationship quality ($R^2 = .118$). It emerged that two relationships were completely mediated while one was partially mediated, thus lending some support to Hypothesis 5a.

5.7 SUMMARY OF DATA PRESTATION AND ANALYSIS

This chapter presented the results from the analysis of quantitative data of the study which was obtained by testing research hypotheses using descriptive and inferential statistical techniques. Background information on the SMCs surveyed indicate that the majority of respondents have considerable experience and track record in the construction industry and are mostly involved in general building works or civil engineering works or both. A significant majority of the companies surveyed can also be classified as SMEs engaging less than 50 employees. Information on the participation of the SMEs in Targeted Procurement contracts showed that means that a significant number of SMEs are actively participating in public-sector targeted contracts and depend on them for their survival. A further assessment of the respondents' participation in CDPs indicate that most SMCs have not been part of a cidb-registered CDP over the five-year period of observation; however, majority of those that have been part of a cidb-registered CDP have maintained their cidb grading since participating in a CDP.

The suitability of the variables of the research constructs was determined by testing sample adequacy and appropriateness; data collected were shown to be adequate and significant. In addition, principal component analysis was conducted to understand the underlying attributes of the variables employed in hypotheses testing which provided guidelines in the selection of the study variables. The results from hypotheses testing provided evidence to fully support Hypotheses: H$_1$ (*Targeted Procurement strategies have a direct and significant relationship with social indicators of construction SMC development*); H$_{3a}$ (*Supply chain relationship quality has a direct and significant relationship with social indicators of construction SMC development*); and H$_4$ (*Targeted Procurement strategies have a direct and significant relationship with supply chain relationship quality*) and are thereby accepted.

Table 5.19: Mediated regression analysis of Targeted Procurement strategies, relationship quality and economic indicators of SMC development

Model	Dependent Variable	Predictor Variable	Model c				Model c'				Model fit	Mediation
			$\chi2$	df	Sig.	R^2_{Nag}	$\chi2$	df	Sig.	R^2_{Nag}		
5.23	**Turnover**	All TPS + RQ	40.690	24	.018[*]	.315	46.465	27	.011[*]	.389	Yes	
		TSARO[(a)]	11.084	4	.026[*]	.090	10.279	4	.036	.132		Partial
		RQ	–	–	–	–	1.928	3	.587			
5.24	**Assets**	All TPS + RQ	35.770	24	.058	.325	43.497	27	.023[*]	.420	Yes	
		TSTPM[(a)]	10.586	4	.032[*]	.054	7.377	4	.117	.162		Complete
		RQ	–	–	–	–	7.875	3	.049			
5.25	**Number of employees**	All TPS + RQ	43.597	24	.008[**]	.389	52.279	27	.002[**]	.501	Yes	
5.26	**Profits**	All TPS + RQ	35.543	24	.061	.358	36.002	27	.115	.400	No	
		TSMSU	11.773	4	.019[*]		5.279	4	.260	.118		Complete
		RQ	–	–	–	–	4.348	3	.226			

[**]. $p < .01$; [*]. $p < .05$; [(a)]. Correlations significant at $p < .01$; $p < .05$

The results partially supported Hypotheses: H_2 (*Targeted Procurement strategies have a direct and significant relationships with economic indicators of construction SMC development*); H_{5a} (*Supply chain relationship quality mediates the relationship between Targeted Procurement strategies and social indicators of construction SMC development*); and H_{5b} (*Supply chain relationship quality mediates the relationship between Targeted Procurement strategies and economic indicators of construction SMC development*). While Hypothesis H_{3b} (*Supply chain relationship quality has a direct and significant relationship with economic indicators of construction SMC development*) was not supported and is thereby rejected.

A further examination of the predictive power of the regression models and the amount of variance explained by the Targeted Procurement strategies in the performance of small and medium-sized contractors revealed that some of the models exhibited low predictive power; however, this does not in any way invalidate the findings, as this could be due to complexity and evolving nature of organisational growth. Moreover, Coad (2009) reported that the combined explanatory power of independent variables in firm growth studies is remarkably low with R^2 values usually around 5%, although in rare cases rising to about 30%. It must also be taken into account that other statistics (for example, *p*-value) showed the validity of the models. Furthermore, empirical evidence suggests that (Nagelkerke) R^2 values from logistic regression are intuitive and should not confused with R^2 of common regressions which show relatively higher values (Hosmer and Lemeshow, 1989). In addition, Jacobson (1987) stated that a low R^2 value is significant enough to influence organisational performance over time.

CHAPTER SIX:
VALIDATION OF CONCEPTUAL MODEL

6.1 INTRODUCTION

The results of analysis in Chapter Five established latent constructs contributing to individual constructs in the study conceptual framework presented in Chapter Three. This chapter presents the results of the validation of the conceptual model using Partial Least Square Structural Equation Model (PLS-SEM) technique as stated in Research Objective Six. A quantitative approach using questionnaire survey is the primary instrument for achieving the aim of the study – to validate the pre-existing assumption that targeting SMCs and increasing their participation in government contracts stimulates their growth performance and development. This led to the development of a mathematical model; therefore, an empirical validation of the model prompted the use of advanced multivariate statistical techniques.

The SEM model was analysed and presented in four stages. The measurement or outer model was analysed in the first stage which examined the relationships between the latent variables and manifest variables also called observed indicators or measured variables. The second stage involved the assessment of the structural or inner model which established the significance of the links between latent constructs. Structural equation of the paths was developed in the third stage, which was followed by estimating the path coefficients of the model in the fourth stage which determined the predictive strength of the structural model.

6.2 MODEL DEVELOPMENT

In order to develop a predictive causal model, the study employed an embedded mixed methods approach in data collection – combining quantitative data from questionnaire survey and qualitative data from focus group interview. However, the conceptual model was validated using primarily quantitative data. The research variables were established through a review of relevant extant literature, and a conceptual model was developed (Chapter Three). Data was collected and analyzed using appropriate research methods (Chapter Four) and the results were presented in Chapters Five of this thesis. The results from hypotheses testing revealed that Targeted Procurement strategies and relationship quality had an influence on the prediction of SMC development. Drawing from these results, as well as the analysis of the underpinning theories, a predictive causal model for Targeted Procurement strategies-SMC development was developed using the PLS-SEM technique.

6.2.1 Selection of variables for the PLS model

The research variables used in this study were established through a review of relevant extant literature (Chapter Two), and a conceptual model was developed (Chapter Three). The variables selected for model development were chosen after critical analysis of the underlying dimensions of the data (Chapters Six). These were the variables that contributed most significantly to their individual constructs. Since the objective is to employ PLS-SEM technique to develop and validate an empirical model depicting the strength of relationships between study constructs, careful selection of variables of research constructs is sine qua non.

Previous studies in construction management domain that have used PLS-SEM selected variable numbers ranging from 2-3 (Oyewobi, 2014; 2017), 2-4 (Odediran, 2016), 3-5 (Ganiyu, 2017), and 4-8 variables (Memon and Rahman, 2014). Other previous works by Sahinidis et al. (2012) and Al-Gahtani et al. (2007) used 3-6 and 3 variables respectively. The number of variables for model validation in this study was selected in line with the views of these authors. There are six variables for Targeted Procurement strategies, seven for relationship quality; while SMC development variables are grouped into two categories (economic and social), 3-4 variables in each category with a total of seven variables (see Table 5.12).

6.3 MODEL ANALYSIS AND FITTING USING PLS-SEM

The fitness of the conceptual model was tested and validated using the PLS-SEM technique which estimated the relationship between the explanatory independent variables and the dependent variables. PLS-SEM also established the relationships that exist among the manifest variables and how these relationships influence latent variables. PLS-SEM was adopted because it is considered to be a superior technique for refining and developing theoretical models, which is the focus of this research (Robins, 2012). Therefore, PLS-SEM was used in this research to investigate the strength and total effects of Targeted Procurement strategies and relationship quality on organisational performance using SMC growth performance and development indicators as outcomes (dependent variables). PLS-SEM path model validation was done using three quality criteria (Odediran, 2016; Oyewobi, 2017; Tenehaus et al., 2005): the measurement model, the structural model and structural equations.

In order to achieve reliable PLS-SEM results, basic assumptions that "the sample size must be a minimum of ten times the number of path relationships leading to endogenous construct" must be satisfied to establish adequate sample size (Elbanna, et al., 2013). Based on this assumption, there

are three main paths leading to SMC development (social and economic), therefore, a minimum sample size of 30 observations would be appropriate. The sample size for this study was 307 thereby satisfying the adequate sample size requirement. The main goal of developing this model was to establish the links, nature of relationship and the relative predictive power of the variables among the latent constructs (constructs).

6.3.1 Model validation: assessment of measurement (outer) model

PLS-SEM analysis was conducted using SmartPLS (version 2.0 M3) software because of a special feature that deals with unobserved heterogeneity through the finite mixture routine (FIMIX) technique (Ringle et al., 2010; Sarstedt et al., 2011; Sarstedt and Ringle 2010). In order to obtain the measurement model results, all possible structural relationships among the constructs were drawn with reflective indicators for endogenous latent variables (SMC development and relationship quality) and formative indicators for the exogenous latent variable (Targeted Procurement strategies). Reflective models indicate that the indicators shown are effects of the latent construct or variable (Garson, 2016).

The measurement model was then assessed using PLS algorithm in SmartPLS which sets the inner weighting (Chin, 2010) and number of iterations which was set to SmartPLS default 300 iterations. The psychometric traits of the indicators of the latent constructs were then examined for item (factor) loadings, discriminant validity and reliability on the latent constructs (Elbanna et al., 2013; Nandakumar, 2008). Standardised regression coefficient and total variance (R^2 value) explained by the explanatory latent variables were also estimated.

Although convergence is not often a problem in PLS-SEM, Garson (2016) posited that if the measurement model result fails to converge, then coefficients in the output are unreliable. Therefore, the model was examined for convergence prior to reporting the PLS algorithm results. The convergence check showed that the solution converged in six iterations which is below the maximum (default = 300) and is acceptable.

As mentioned in the previous section, the endogenous latent variables of relationship quality and SMC development are reflective. In a reflective model, arrows go from the latent construct to the indicator variables, signifying that a unidimensional underlying construct determines the values of the measured and representative indicator variables (Garson, 2016). Appropriate measures employed in testing for internal consistency, convergent validity and divergent validity in reflective models include composite reliability, average variance extracted (AVE) and Cronbach's

alpha (Garson, 2016). Convergent validity represents the extent of agreement between two or more indicators of the same latent construct, and was assessed by examining the AVE which reflects the average communality for each latent construct in a reflective model. In an adequate model, convergent validity is established if the AVE is: higher than 0.5 (Chin, 1998b; Henseler et al., 2009; Höck and Ringle, 2006), as well as greater than the cross-loadings which means factors should explain at least half the variance of their respective indicators (Garson, 2016). Composite reliability varies from 0 to 1, with 1 being perfect estimated reliability (Garson, 2016). Garson (2016) posited that the acceptable cut-off for composite reliability is the same as for any measure of reliability, including Cronbach's alpha. Composite reliability should be equal to or greater than 0.6 for exploratory purposes (Chin, 1998b; Höck and Ringle, 2006), and equal to or greater than 0.7 for confirmatory purposes (Henseler et al., 2009).

The result obtained indicate that the latent constructs were robust in terms of their convergent validity and internal consistency as shown by the AVE and composite reliability values which were above the 0.5 and 0.7 thresholds respectively (see Table 6.1). Moreover, AVE vales of latent constructs was greater than the cross-loadings (see Appendix D1). AVE and composite reliability values were not computed for Targeted Procurement strategies (TPS) since it is a formative composite latent construct in the model. Furthermore, discriminant validity was established by the Fornell-Larcker criterion that examines the square root of AVE (diagonal cells in the Table 6.1), which should be higher than the correlations that appear below it (Fornell and Lacker, 1981). Results from Table 6.1 indicates that the square root of AVE in all cases are greater than the off-diagonal elements in their corresponding column, thus satisfying the Fornell-Larcker criterion for discriminant validity.

Table 6.1: Latent variables inter-construct correlation and reliability measures

Latent Constructs	AVE	Composite Reliability	R^2	Cronbach's Alpha	RQ	SD_ECO	SD_SOC	TPS[*]
RQ	.7094	.9445	.0854	.9321	**.8423**			
SD_ECO	.6997	.8745	.1407	.7836	.0679	**.8365**		
SD_SOC	.7844	.9332	.3131	.8953	.5253	.1190	**.8857**	
TPS[*]	-	-	-	-	.2922	.3729	.3379	**-**

AVE: average variance extraction; [*]. formative model

Indicator reliability or outer (measurement) model path loadings was also assessed to provide another set of criteria for evaluating the reliability of indicators in the (reflective) model. Indicator reliability may be interpreted as the square of the measurement loading: thus, if 0.7 is the acceptable measurement loading, $0.7^2 = 0.5$ which is the reliability threshold (Hair et al.,

2014:103). Chu et al. (2004) and Hulland (1999) posited that latent variable items with small and insignificant item loadings (< 0.5) are to be removed since their contribution to the model is insignificant. However, this does not apply to formative models because indicators represent different dimensions of the latent composite factor (Garson, 2016). Item loadings of all reflective indicators to their latent constructs is presented in Table 6.2 and show that they are above 0.5, ranging from 0.56 to 0.98 which is acceptable, hence all the variables in the model were retained.

A further examination of the item cross-loadings showed that simple structure was achieved with cross-cross-loadings below the recommended 0.4 threshold (Garson, 2016), except for relationship quality variables which had substantial cross-loadings with social indicators of SMC development (see Appendix D2). However, no reflective indicator variable had a higher correlation with another latent variable other than its own latent variable. These results mean that the PLS-SEM measurement (outer) model had acceptable reliability and validity in explaining and predicting the links among the model constructs which is highly significant to the achievement of the study objective of developing a causal model for the Targeted Procurement strategies – SMC development relationship.

Table 6.2: Item loadings for measurement (outer) model

	TPS[*]	RQ	SD_SOC	SD_ECO
TS_ARO	.3871			
TS_MSU	.2135			
TS_PRE	.6797			
TS_TEQ	.6416			
TS_TPM	.5240			
TS_UNB	.0153			
RQ_CDT		.8670		
RQ_IEX		.8647		
RQ_JPS		.8119		
RQ_LIS		.8756		
RQ_RSA		.7415		
RQ_TRU		.8903		
RQ_WRE		.8355		
SD_ACR			.5601	
SD_ITE			.9812	
SD_SDE			.9834	
SD_STR			.9456	
ED_AST				.7937
ED_EMP				.8069
ED_TUR				.9045

[*]. formative latent construct

6.3.2 Model validation: assessment of structural (inner) model

Structural fit is the next step after measurement fit have been shown to be acceptable. The structural (inner) model consists of the latent constructs and the arrows that connect one factor to another. The essence of the structural model is to demonstrate the relationships among latent constructs, determine the significance level of all PLS path estimates, and establish the total variance (R^2) in each latent construct explained by the model. The path coefficient reflects the contribution of each latent explanatory factor to the predictive ability of the proceeding endogenous construct. The loadings (structural path coefficients) of the direct paths connecting factors are standardized regression coefficients as shown in the PLS path diagram in Figure 6.1 and Table 6.3. As data are standardized, path loadings vary from 0 to 1; the larger the path loading, the stronger that path in the structural model. Chin (1998b) posited that the path coefficients of the structural model should be at least 0.2, and preferably greater than 0.3, while a value of 0.1 has been advocated by other authors (Elbanna et al., 2013; Falk and Miller, 1992). The PLS path diagram in Figure 6.1 show that structural path coefficients of the endogenous latent constructs have positive direct effects on each other ranging from β = 0.20 to 0.47 which is above the minimum threshold of 0.1; except for the supply chain relationship quality → SMC development (economic) path which showed a weak negative effect (β = -.04). The PLS model further showed that Targeted Procurement strategies is the primary driver of SMC development (economic), while supply chain relationship quality emerged as a more important predictor of SMC development (social) than Targeted Procurement strategies.

The coefficient of determination of the structural model was evaluated by the R^2 value of the endogenous constructs in the model (Chin, 2010), which is the overall effect size measure for the structural model (Garson, 2016). Chin (1998b) and Höck and Ringle (2006) described R^2 values above the cut-offs of 67%, 33% and 19% to be substantial, moderate and weak respectively; while Fornell and Lacker (1981) and Henseler, et al. (2014) recommended R^2 values above 10% as acceptable. Garson argued that what is considered "high" R^2 is relative to the field of study. The R^2 values (shown inside the blue circles for endogenous latent constructs) in the PLS path diagram in Figure 6.1 show that an estimated 9%, 31% and 14% of the variance in supply chain relationship quality, SMC development (social) and SMC development (economic) respectively is explained by the model. However, the endogenous latent constructs of SMC development are of major interest in this study, of which they are above the recommended lower bound cut-off of 10% (Fornell and Lacker, 1981; Henseler, et al., 2014). No R^2 is shown for Targeted Procurement strategies as it is an exogenous latent construct (Garson, 2016).
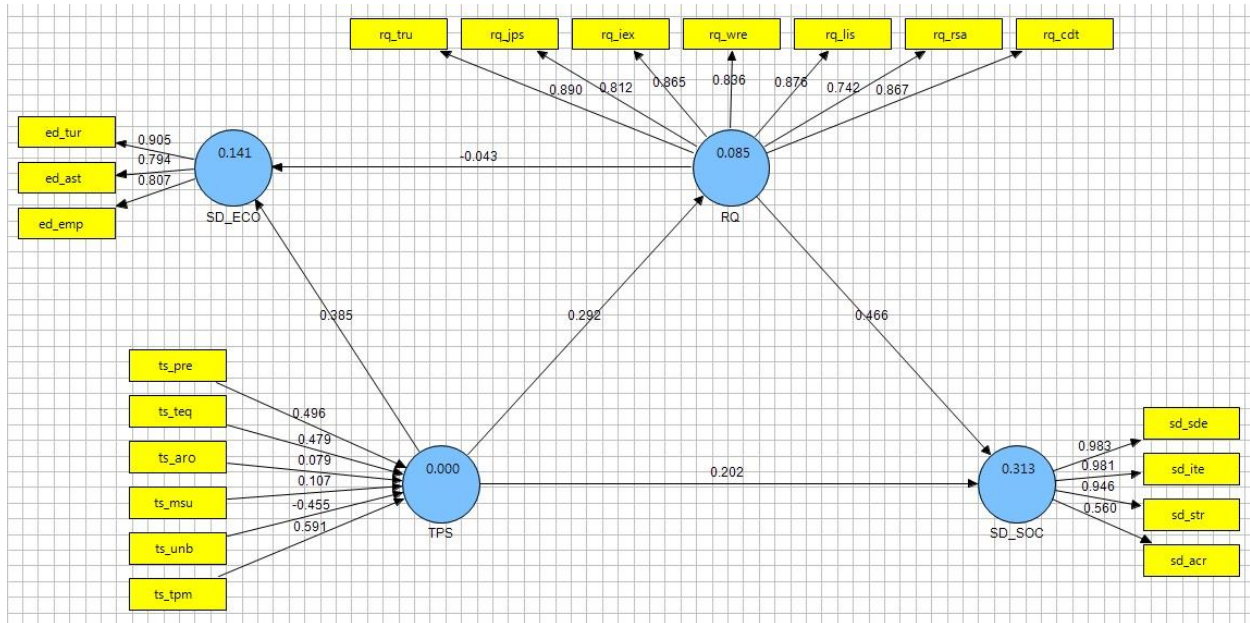
Figure 6.1: Structural model with path coefficients (β) and *R*² values

6.3.2.1 *Bootsrapped path significance coefficient*

The next step in validating the structural model is to test the statistical significance of the PLS-SEM paths. Bootstrapped significance is often used when data cannot be assumed to be normal. PLS bootstrapping technique uses resampling methods to compute the t-statistics which indicates the significance of PLS path coefficients. This was done by running the Bootsrapping command in SmartPLS using 1,000 resamples for 307 cases (sample size). Ringle et al. (2014) also used 1,000 resamples for 241 cases in their analysis. The results obtained are shown in the PLS path diagram in Figure 6.2 which shows the t-statistics associated with each path (see also Table 6.3). The underlying assumption is that all t-values above 1.96 and 0.98 are significant at 0.05 level for a two-tailed test and one tailed-test respectively (Hair et al., 2014). While t-values above 1.65 and 2.57 are significant at 0.10 and 0.01 levels respectively for a two-tailed test (Hair et al., 2014). The *t*-statistics results presented in Table 6.3 and Figure 6.2 indicate that all path coefficients are significant at 0.01 and 0.05 levels for a two-tailed test, except for the supply chain relationship quality → SMC development (economic) path (*t* > .05). Targeted Procurement strategies positively and significantly predicted supply chain relationship quality (*t* < .01), SMC development (social) (*t* < .05), and SMC development (economic) (*t* < .01); while supply chain relationship quality positively and significantly predicted SMC development (social) (*t* < .01), but did not significantly predict SMC development (economic) (*t* > .05), which emerged earlier as a negative effect (β = -.04).
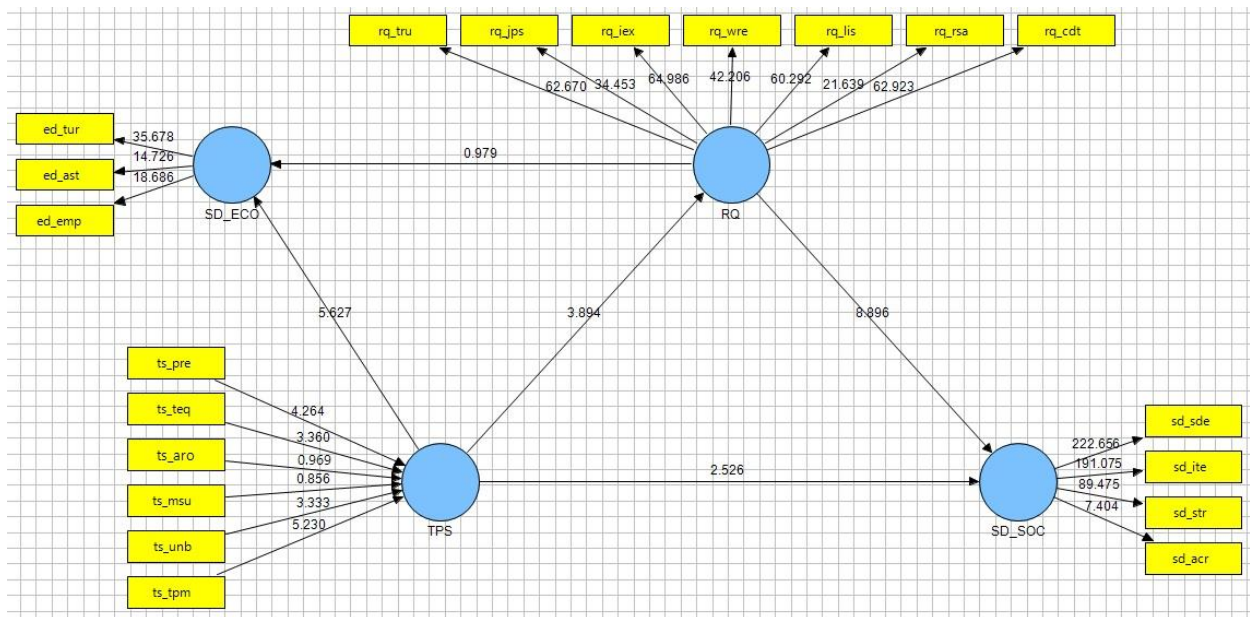
Figure 6.2: Structural model with '*t*' statistic values

Table 6.3: PLS path modelling results with the path coefficients and *t*-statistics

	Original Sample	Sample Mean	Standard Deviation	Standard Error	T Statistics
TP strategies → Relationship quality	.2922	.3102	.0750	.0750	3.8935**
TP strategies → SMC development (social)	.2016	.2087	.0798	.0798	2.5264*
TP strategies → SMC development (economic)	.3854	.3951	.0685	.0685	5.6270**
Relationship quality → SMC development (social)	.4664	.4650	.0524	.0524	8.8962**
Relationship quality → SMC development (economic)	-0.0429	-0.0612	0.0438	0.0438	0.9786

TP: Targeted Procurement; **. *t* < .01; *. *t* < .05 (two-tailed)

6.3.3 Model validation: development of structural equations

The structural (inner) model presented in Figures 6.1 and 6.2 showed how the latent constructs link with each other. Latent variables can be classified into two – endogenous and exogenous. According to Garson (2016) and Wong (2013), a latent variable is endogenous if it is an effect of at least one other latent variable (there is at least one incoming arrow from another latent variable). A latent variable is exogenous if it is not an effect of any other latent variable in the model (there are no incoming arrows from other latent variables). In Figures 6.1 and 6.2, Targeted Procurement strategies is exogenous, while relationship quality, SMC development (social), and SMC development (economic) are endogenous latent constructs.

The PLS-SEM structural model illustrated in Figure 6.3 is a causal model for SMC development. The model in this study has three endogenous latent variables, with three sets of standardised path coefficients which were estimated from the PLS-SEM analysis. PLS-SEM structural path

equations were further modelled to explain the direct causal links between the study constructs hypothesised in this study.

Targeted Procurement Strategy = TP strategies + 0 (exogenous)   [6.1]

Relationship quality = PXM (TP strategies) + ε_1 [6.2]

SMC development (social) = PXY (TP strategies) + PMY (Relationship quality) + ε_2 [6.3]

SMC development (economic) = PXZ (TP strategies) + PMZ (Relationship quality) + ε_3 [6.4]

Note: Symbol 'ε' represents the error terms, denoting the variation that remained unexplained by the predicting variables within the path model. TP denotes Targeted Procurement.

The following path coefficients are depicted by the abbreviations as shown in Figure 6.3:

TP strategies → relationship quality   - PXM

TP strategies → SMC development (social)   - PXY

TP strategies → SMC development (economic)   - PXZ

Relationship quality → SMC development (social)   - PMY

Relationship quality → SMC development (social)   - PMZ
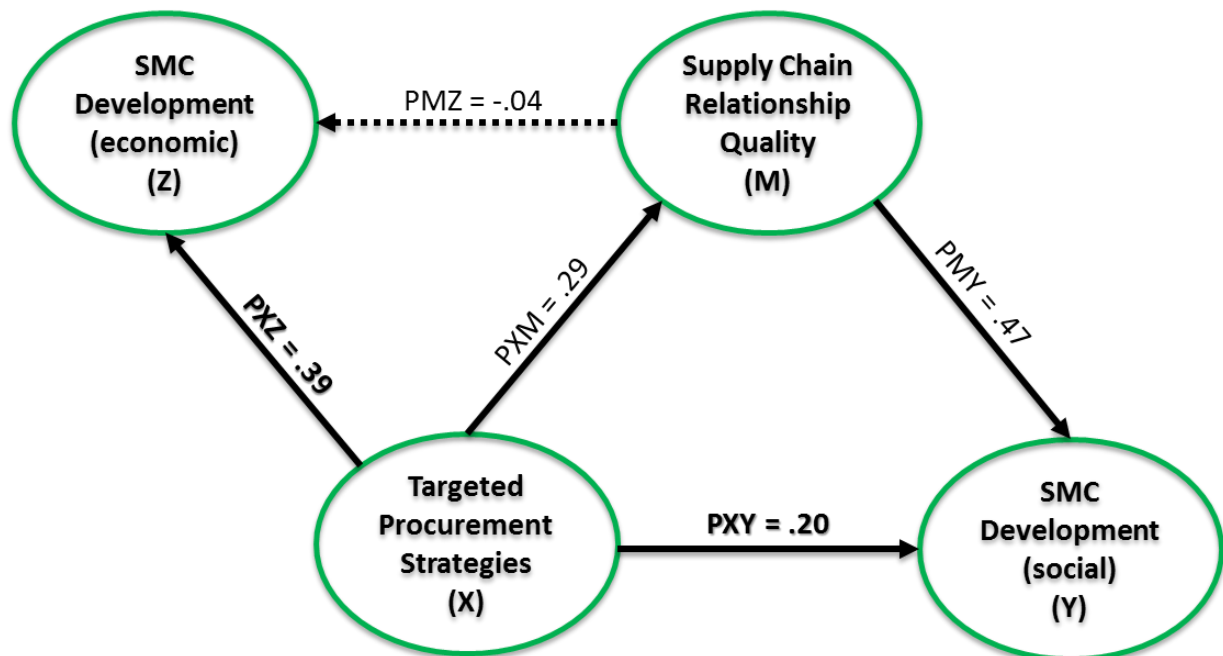
Figure 6.3: Direct causal model showing predictors of SMC development

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6.3.4 Model evaluation: analysis of global fit measures (GoF)

The structural equation model developed in previous sections of this chapter conceptualized and tested causal Targeted Procurement strategies – SMC development relationships using the PLS-SEM technique, and indicates that Targeted Procurement strategies influences relationship quality and predicts SMC development. This is evident from the results of the measurement model which established that the model's internal consistency, convergent validity and discriminant validity are robust. Moreover, the values of item loadings and cross-loadings among variables were acceptable (Table 6.2). The structural model further revealed that R^2 values were above the recommended cut-off (Table 6.1), and all path coefficients were positive and significant (Table 6.3). Although PLS does not report results using indices such as Comparative Fit Indices (CFI), Root Mean Square Error of Approximation (RMSEA) or Tucker-Lewis Fit Indices (TFI), PLS considers R^2 as an essential criterion for predictive significance of any model.

PLS-SEM path modelling technique, unlike the CB-SEM, does not insist on any distributional assumptions, and therefore PLS researchers cannot rely on the classic inferential framework (Hair et al., 2014). Thus, prediction-oriented and non-parametric assessment criteria, in addition to resampling techniques must be used to evaluate the adequacy or fitness of PLS model structures (Chin, 2010). Moreover, due to the increasing requirement to report and evaluate the performance of PLS models, this study conducted the global fit measure (GoF) for PLS path modelling suggested by Tenenhaus et al. (2005). The GoF index takes into account both the measurement and structural model performance, thus providing a single measure for the overall evaluation of PLS model performance. The GoF is estimated as the geometric mean of the average communality and average R^2 values for endogenous constructs, and is denoted as (Tenenhaus et al. 2005):

$$GoF = \sqrt{\overline{AVE} \times \overline{R^2}} = .3625 \qquad [6.6]$$

This study followed the guidelines provided by Wetzels et al. (2009) to estimate the GoF values, which may serve as baseline values for validating PLS models globally. Using the average AVE and average R^2 values in Table 6.1, a GoF value of 0.3625 was obtained for the model, which is approximately equivalent to the cut-off value of 0.36 for large effect sizes of GoF. Hence, it can be concluded that the PLS model developed in this study has a strong explanatory power in comparison to the baseline values ($GoF_{small} = 0.1$, $GoF_{medium} = 0.25$, $GoF_{large} = 0.36$), and lends adequate support to validate the PLS model globally.

6.3.5 Model evaluation: Mediated indirect effects

The previous sections of this chapter have established the direct effects (PXY and PXZ) among the latent constructs, which were depicted in Figure 6.3. Research Objective Five of the study sought to determine the indirect effect of Targeted Procurement strategies on SMC development, through supply chain relationship quality as a mediating construct. Although, the SmartPLS 2.0 output produced the total effects (sum of direct and indirect effects) of the structural model (see Appendix D7), it did not directly estimate the indirect effects as required to test Hypothesis H_{5a} and H_{5b}. The mediating indirect effects of the model is presented in the subsequent Sections.

6.3.5.1 Indirect effects: Targeted Procurement strategies → SMC development (social)

Targeted Procurement strategies (X) and SMC development (social) (Y) are linked by a direct effect (PXY = 0.20) as depicted in Figure 6.3. However, there is also an indirect effect between Targeted Procurement strategies on SMC development, through supply chain relationship quality as a mediating construct (M). The indirect effect is calculated as the product of the two effects, PXM and PMY as shown in Equation 6.7.

$$Indirect\ effect\ (PXY) = 0.29 \times 0.47 = \mathbf{0.14} \tag{6.7}$$

The total effect of Targeted Procurement strategies on SMC development (social) is calculated as the sum of direct and indirect effect as shown in Equation 6.8

$$Total\ effects\ (PXY) = 0.20 + 0.14 = \mathbf{0.34} \tag{6.8}$$

The result show that although the direct effect of Targeted Procurement strategies on SMC development (social) is not very strong (PXY = 0.20), the total effect is a positive improvement (0.34), indicating the relevance of supply chain relationship quality in predicting SMC development (social). Hence, the result suggests that the direct relationship between Targeted Procurement strategies and social indicators of SMC development is mediated by the quality of supply chain relationships in the Targeted Procurement process.

6.3.5.2 Indirect effects: Targeted Procurement strategies → SMC development (economic)

Targeted Procurement strategies (X) and SMC development (economic) (Z) are linked by a direct effect (PXZ = 0.39) as depicted in Figure 6.3. However, there is also an indirect effect between Targeted Procurement strategies and SMC development, through supply chain relationship quality as a mediating construct (M). The indirect effect is calculated as the product of the two effects, PXM and PMZ as shown in Equation 6.9.

$$Indirect\ effect\ (PXZ) = 0.29 \times (-0.04) = -\mathbf{0.01} \qquad [6.9]$$

The total effect of Targeted Procurement strategies on SMC development (social) is calculated as the sum of direct and indirect effect as shown in Equation 6.10.

$$Total\ effects\ (PXZ) = 0.39 + (-0.01) = \mathbf{0.38} \qquad 6.10]$$

The result show that while the total effect of Targeted Procurement strategies on SMC development (economic) (0.38) is less than the direct effect (PXZ = 0.39), indicating the negative role of supply chain relationship quality in predicting SMC development (economic). Hence, the result suggests that the direct relationship between Targeted Procurement strategies and economic indicators of SMC development is negatively mediated by the quality of supply chain relationships in the Targeted Procurement process.

6.4   SUMMARY OF CONCEPTUAL MODEL VALIDATION

The causal conceptual model developed and hypothesized in Chapter Three was validated using the PLS-SEM analytical technique which examined whether there are statistically significant relationships among the latent study constructs in the model. The results of the causal links in the PLS model were all significant and positive, except for the supply chain relationship quality $\rightarrow$ SMC development (economic) path which emerged to be a negative causal link but not significant. The model exhibited a total predictive (explanatory) power of 54%, and a strong GoF value acceptable for global validation of the PLS model. Summarily, the model had adequate explanatory strength to predict the influence of Targeted Procurement strategies on SMC development when accounting for the quality of supply chain relationships in the Targeted Procurement process.

Table 6.4. presents a summary of the research outcomes on the hypotheses. It emerged that results from the PLS-SEM model was aligned to the results obtained from hypothesis testing in Chapter 5. Hypotheses H_1, H_2, H_{3a} H_4 were supported and validated with significant and positive relationships in the PLS model. While Hypothesis H_{3b} was not validated with a negative but not significant relationship emerging from the model. Moreover, results from the mediated indirect effects calculation revealed that the quality of supply chain relationship is an important mediator of the Targeted Procurement strategies – SMC development relationship, thus supporting Hypothesis H_{5a} and H_{5b}.

Table 6.4: Summary of statistics on hypotheses proposed, validated and PLS-SEM causal paths tested

Path label	Path relationships	Sig.	Hypothesis statement	Hypothesis validation
PXY	TP strategies → SMC development (social)	✓	**H₁:** Targeted Procurement strategies have a direct and significant relationship with social indicators of construction SMC development.	Validated in PLS-SEM
–	TP strategies → skills development	✓	**H₁ₐ:** Targeted Procurement strategies have a direct and significant relationship with skills development.	Validated in MR
–	TP strategies → application of innovation & technology	✓	**H₁ᵦ:** Targeted Procurement strategies have a direct and significant relationship with application of innovation and technology.	Validated in MR
–	TP strategies → skills transfer	✓	**H₁꜀:** Targeted Procurement strategies have a direct and significant relationship with skills transfer.	Validated in MR
–	TP strategies → advancement on the cidb RoC	✓	**H₁ₔ:** Targeted Procurement strategies have a direct and significant relationships with advancement on the cidb Register of Contractors.	Validated in MR
–	TP strategies → JV partnerships	✓	**H₁ₑ:** Targeted Procurement strategies have a direct and significant relationships with JV partnerships.	Validated in MR
PXZ	TP strategies → SMC development (economic)	✓	**H₂:** Targeted Procurement strategies have a direct and significant relationships with economic indicators of construction SMC development.	Validated in PLS-SEM
–	TP strategies → turnover	✓	**H₂ₐ:** Targeted Procurement strategies have a direct and significant relationship with turnover.	Validated in MR
–	TP strategies → company assets	✗	**H₂ᵦ:** Targeted Procurement strategies have a direct and significant relationship with company assets.	Not validated in MR
–	TP strategies → number of employees	✓	**H₂꜀:** Targeted Procurement strategies have a direct and significant relationship with number of employees.	Validated in MR
–	TP strategies → company profits	✗	**H₂ₔ:** Targeted Procurement strategies have a direct and significant relationship with company profits.	Not validated in MR
PMY	Relationship quality → SMC development (social)	✓	**H₃ₐ:** Supply chain relationship quality has a direct and significant relationship with social indicators of construction SMC development.	Validated in PLS-SEM and MR
PMZ	Relationship quality → SMC development (economic)	✗	**H₃ᵦ:** Supply chain relationship quality has a direct and significant relationship with economic indicators of construction SMC development.	Not validated in PLS-SEM
PXM	TP strategies → relationship quality	✓	**H₄:** Targeted Procurement strategies have a direct and significant relationship with supply chain relationship quality.	Validated in PLS-SEM and MR
IP	Relationship quality mediation: TP strategies → SMC development (social)	✓	**H₅ₐ:** Supply chain relationship quality mediates the relationship between Targeted Procurement strategies and social indicators of construction SMC development.	Validated in PLS-SEM and MR
IP	Relationship quality mediation: TP strategies → SMC development (economic)	✓	**H₅ᵦ:** Supply chain relationship quality mediates the relationship between Targeted Procurement strategies and economic indicators of construction SMC development.	Validated in PLS-SEM and MR

Sig.: significant; TP: Targeted Procurement; PLS-SEM: partial least squares structural equation modelling; MR: multinomial regression; IP: indirect path

CHAPTER SEVEN:
DISCUSSION OF RESULTS AND FINDINGS

7.1 INTRODUCTION

This chapter presents the interpretation and discussion of empirical results and findings in relation to the existing literature.

7.2 BACKGROUND PROFILE OF THE SMCS AND RESPONDENTS

The results emerging from the SMCs surveyed indicate that more than half have been in the construction business for more than 10 years. Thus, the majority of respondents have considerable experience and a record of their participation in the construction industry, which improves the validity and reliability of the data obtained and subsequent findings. More than two-thirds of the contractors engaged less than 20 permanent full-time employees, which is well within the range for construction SMEs, according to the National Small Business Act, No. 106 of 2003. Moreover, empirical evidence suggests that many small firms start small, with one to three employees, and remain unchanged throughout their existence (Coad, 2007; Garnsey et al., 2006).

The results further showed that a significant majority of the technical and professional staff have at least Grade 12 certificates. Less than one-third of the technical staff have a university degree, while more than one-third of professional staff have a university degree. This finding reflects that most of the SMCs have in their employment, technical personnel with the minimum qualifications and experience required for successful project delivery; but they do not have the same minimum of professional staff. Goedhuys and Veugelers (2012) asserted that the skills of the workforce and management staff are more important than their tertiary education levels. This result compared well with reports from the US construction industry about the educational attainment of construction employees showed that 40% of construction workers had some post-secondary education CPWR Data Center, 2010). The level of education and experience of the staff strongly affect technical capacity, as knowledge and intellectual capital have been linked directly to enterprise growth and performance (Abu Bakar et al., 2011; Lubit, 2001).

7.3 SMCS' PARTICIPATION IN TARGETED PROCUREMENT CONTRACTS AND CDPS

Results from the study show that more than two-thirds of the SMCs surveyed had participated in as many as five public-sector contracts where Targeted Procurement strategies were implemented

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during the five-year period of observation. However, more than half also did not execute any non-Targeted Procurement government contracts or private sector contracts during the period of observation. This implies that a significant number of SMCs are actively participating in public-sector targeted contracts, and more importantly, depend on them for their survival. This find is aligned to reports by Marion (2007) who suggested that set-asides contribute to the survival rates of minority businesses in the US construction industry. The implication of this finding is that SMCs are at the risk of going out of business if they continue to rely on targeted contracts as the sole source of sustainable work (Bates and Williams, 1996; Holzer and Neumark, 2000).

Findings from the SMCs participation in CDPs revealed that 7% and 36% SMCs have experienced a negative and positive advancement respectively on the cidb RoC, while 57% have maintained their cidb grading since participating in a CDP. In contrast, the cidb assessments of contractor upgrades within CDPs report that approximately 51% (355 – 43% GB and 57% CE) of Grades 2 to 6 contractors upgraded by one or more grade in three years between 2013:Q3 and 2016:Q2 (cidb, 2016b). This figure decreases to approximately 45% (391 – 37% GB and 63% CE) in a more recent review between 2014:Q3 and 2017:Q2 (cidb, 2017a). This contrast may be explained by the fact that the cidb report includes contractors who achieved a maximum grade but are no longer registered with the cidb; while this study comprises of only cidb registered contractors. This finding suggests that participation in CDPs may not necessarily translate to holistic growth and advancement on the cidb RoC; however, it enhances the sustainability of SMCs even when they did not move up the cidb register.

7.4 TARGETED PROCUREMENT STRATEGIES COMMONLY USED AS A MECHANISM FOR CONTRACTOR DEVELOPMENT

It emerged from the results obtained that the most frequently used Targeted Procurement strategy as a mechanism for contractor development was tendering equity; this is followed by preferencing, mandatory subcontracting, and unbundling of contracts. Third-party management and accelerated rotations ranked lowest, indicating that these strategies are the least used by state entities. This finding suggests that government clients progressively require bidders to have certain levels of equity ownership when submitting bids for Targeted Procurement contracts; implying that Targeted Procurement is primarily targeted at SMCs owned by historically disadvantaged individuals in South Africa. The result come at little surprise, as this practice is in line with the core objectives of South Africa's preferential procurement policy, as contained in the PPPFA and B-BBEE Act. Preferencing also emerged as the second most commonly used targeting strategy.

This result is similar to the trend reported in other countries, such as Botswana, Malaysia and Singapore (Govender and Watermeyer, 2001; Ofori, 1996; Watermeyer 2003).

7.5   SUPPLY CHAIN RELATIONSHIP QUALITY IN THE TARGETED PROCUREMENT PROCESS

The result from the assessment of relationship quality criteria showed that trust was relatively low between SMCs and other project parties in the Targeted Procurement process, with the majority reporting trust based on competence rather than goodwill. Ineffective joint problem-solving permeated the supply chains studies, with the majority indicating that problems sometimes lead to disputes. Moreover, learning and innovation sharing, and cost data transparency was limited among project parties, indicating borderline arms-length relationships. Balance of risk and reward was also inadequate with little or no reward for taking on risks. While continuity of work was limited, with the prospect for future work existing only through competitive tendering, this indicated that most of the relationships were largely project-based, and not extending beyond a single project. Furthermore, almost two-thirds of the procurement method and the form of contract used on the identified Targeted Procurement projects, was based on price competition and quality competition respectively.

These findings from the questionnaire survey are further substantiated by the following remarks from the focus group interview participants when asked about the quality of relationships; SMC C stated that:

> …*The relationship between the SMEs is better than the relationship between the SMEs and the main contractor. Because with the main contractor, if you go and speak about (rates) to him, then he keeps telling you, "sign for this", while knowing that is not the rates. So there's no way that you can really build a better relationship with such (SMC B murmurs in agreement).* (SMC C)

Regarding information sharing and transparency, SMC B stated that:

> …*the client must see that the main contractor pays us the right money, and we must have the opportunity to look at the contract between the main contractor and the client. Because we are not aware of what is going on there, and then the main contractor just gives us what they like…* (SMC B)

SMC C added:

> *I think the problem there, is the legality of it, because there's a contract between the client and the main contractor. So we don't see that legality. But then in our contract, it says we got access to that main contract. But then that contractor doesn't want to allow us peep into that contract (others murmur in agreement). Because when we see the contract, we*

can say "hey, the rates are different than what we're given". And the legality, how far they're supposed to assist us. So, remember it's money this gentleman (main contractor) is receiving from somewhere, he doesn't divulge it to us, of which we are the ones that do the work… (SMC C)

Regarding joint problem-solving, SMC D stated that:

…and even if we go for advice, they can't give you advice, then we (SMEs) have to work amongst each other. For instance, we get specialist contractors to do our work. I have to go to people who I know who did this job before, years ago. So we must go out ourselves and seek for… (inaudible). Now we are a Grade 3, and expect us to know this work, but they at Grade 9 haven't got somebody who can show us how to do the work (others laugh in agreement). (SMC D)

SMC B also added:

…With the last project we were working on, we worked here on the freeway, they didn't even know how to do the work. We had to find out ourselves how to do this work. (SMC B)

The SMCs also agreed that the construction industry is characterised as a labour-intensive, project-based and location-specific industry (Loosemore et al., 2003; Wild, 2002), with challenges for small contractors exacerbated by socio-political peculiarities in South Africa. SMC B stated:

…when you work in the locations (townships), then you have to employ people from that area, you see, that's why we can't work with the… we can't keep the same guys for future jobs. What happens actually is that we take on this people for a project in their locality, and when it's finished, we do another project, then we must employ people again in that locality... Then you have to train the new guys again… You train them and then you move on again… Train, train, train, train... (SMC B)

SMC C added:

You want to skill your guys, right, to become a bricklayer for example, now you find out you work in an area where they stay but in the next six months, you're been taken away, to work somewhere else. Now that person, that skilled guy cannot go work there with you because he's not from that area. So now you're putting yourself at risk, now you need to train another person which is cost out of your pocket. And you lose because a skilled person that can do a better job than an unskilled one. (SMC C)

Regarding continuity of work, SMC A stated that:

…it's just hard to maintain the work. You find that you might get work for a week, you might get work for a month. Sometimes, either depending on your contract value or for some (main) contractors, how they feel, they might just take you off site. But it is not broad for everyone, but it's something that I've found in my company that's an issue. (SMC A)

This statement also complemented the finding discussed previously that most of the SMCs depend on targeted contracts for their survival. Moreover, the implications of lack of continuous work was particularly distressing for the SMCs, as stated by SMC C:

> *…You don't have work. They develop you to become a business person, now when are they gonna give you work to implement that? … There's nothing on the table. You've been through the development sessions, now you're dead.* (SMC C)

The findings emanating from focus group interview suggest that SMCs prefer to collaborate with other similar small contractors as they believe there is better understanding and trust between themselves. The absence of the principal-agent problem may also be a contributing factor (Khatleli, 2009). This finding supports an earlier report in Park et al.'s (2011) study, which regarded this practice as signifying weak business networks, thus limiting the SMCs' ability to gain new contracts through extended relations. Moreover, collaborating with other small and inexperienced firms inhibits the development of productive relationships and competitiveness (Park et al., 2011). Geneste (2010) also stated that many SME linkages are the non-collaborative, arm's-length type that researchers argue play very little or no role in knowledge transfer and acquisition.

From the foregoing, an overall assessment of the relationship quality criteria revealed that the quality of supply chain relationships between SMCs and other project parties in the Targeted Procurement process is mostly based on a combination of price competition and quality competition, driven largely by poor prime contractor – subcontractor relationships. This finding confirms the cidb's (2013) study that reported poor working relationships between subcontractors and prime contractors driven by tight profit margins, unfavourable payment practices, and lack of continuous work.

The findings also lend support to previous reports suggesting that price remains is a key factor in contractor selection in most contracts (Eriksson and Laan, 2007; Kashwagi and Byfield, 2002). However, researchers argue that price does not provide enough indication of the contractor's capability to execute the work (Ren et al., 2012; Strahorn et al., 2015; Yong and Mustafa, 2012). Moreover, Ren et al. (2012) noted that lowest price selection is characterised by finger-pointing and self-interested contractors, as well as low profit margins, resulting in non-performance, poor quality, disputes and claims, leading to time delays and cost overruns on a project (Kashwagi and Byfield, 2002; Ren et al., 2012). The finding from this study is aligned to numerous industry reports describing supply chain relationships in the construction industry as being arms-length adversarial, driven by a lack of trust (Akintoye and Main 2007; Zuo et al., 2013), poor

communication (Zuppa et al., 2016), unfair risk allocation and tender selection processes, short-term objectives, a price-oriented approach, and poor problem-solving mechanisms between project partners (Emuze and Smallwood, 2014).

Using principal components analysis to determine the dimensionality of the thirteen relationship quality assessment criteria, results from the PCA revealed that only seven unidimensional criteria fitted well onto the relationship quality construct, namely: trust, joint problem-solving, information exchange, working relationship, learning and innovation sharing, risk sharing and allocation, and cost data transparency. This result is well aligned to Meng's (2010) study that established the top ten key relationship indicators cited by researchers, which included, inter alia: trust, problem-solving, communication, teamwork, risk allocation. The indicators of information exchange, learning and innovation sharing, and cost data transparency are grouped under the main criterion of Communication in this study.

7.6   SMC GROWTH PERFORMANCE AND DEVELOPMENT

Key findings emanating from the descriptive statistics for economic indicators of SMC development reveal that in terms of turnover, most of the SMCs surveyed had received a total value of works between R2 million and R6.5 million. Although this figure is within the tender value range for Grades 3 to 6 contractors, it falls significantly below the upper tender value limit of R13 million. However, this may be explained by the fact that the majority of SMCs surveyed were registered at Grade 3 level, with an upper tender value limit of R2 million. This finding suggests that while the participation of SMCs in government contracts may have increased significantly as indicated by previous studies (Gounden, 2000; Kajimo-Shakantu, 2007; Letchmiah, 2012; Manchidi and Harmond, 2002), it raises questions as to whether they are yet to attain optimal operational capacity and capabilities.

The study also provided an overview of the growth performance of SMC contractors under the targeted procurement regime over a period of five years (2011 – 2015), which uncovered certain growth patterns in the companies' turnover, profits, assets and number of employees (Figure 5.1). The study revealed that except for year 2014, SMCs generally experienced a decrease in turnover during the period of observation. Given that the SMCs have been shown to rely on public-sector works, the trend observed can be explained by reports by the cidb Construction Monitor: Supply & Demand, that public entities experienced a substantial decrease in construction works investment between 2011 and 2013 (cidb, 2017a). Moreover, Loosemore et al. (2003) confirm the

discontinuous growth in the construction environment, characterised by increased or reduced construction activity, during economic growth and decline respectively.

In addition, it could be inferred from the relatively low growth in profits against a high growth in turnover in 2014, that this was a period of high construction activity and similarly high competition (cidb, 2013), when contractors have been known to submit low bids which influence the profit margin of contracting firms (Lee, 2009). Furthermore, a corresponding increase and decrease in the number of employees relative to turnover in 2013 and 2014 is an indication that the SMCs tend to hire based on construction activity. In order words, the number of employees depends on the volume of work available. This trend suggests that there is a relationship between SMC's turnover and number of employees, requiring further investigation. The SMCs also generally recorded an increase in asset growth, indicating progressive investment in construction plants and equipment, which contrasts with Fagbenle and Oluwunmi's (2010) finding in a similar investigation on indigenous construction firms in Nigeria. It also emerged that the company profits and assets grew proportionally over the five-year period. A possible explanation for this is a reduction in operation costs which increases profitability and availability of more capital to invest in assets, such as plant and equipment (Ammar et al., 2003, as cited in Rasiah et al., 2014).

Typically, the growth pattern of the SMCs surveyed suggests that growth in this context is organic, steady and gradual (Windapo and Cattel, 2011) as opposed to the random heterogenous process described in firm growth studies (Coad and Hölzl, 2010; McKelvie and Wiklund, 2010). Coad and Hölzl (2010) however, suggested that the majority of the variance in growth rates is within individual firms over time, rather than between different firms. The steady growth, which is particularly visible from the growth in employee numbers at SMCs, may be explained by the reports that the construction industry – a significant contributor to employment and growth in South Africa, has been in a slump since 2009. (Industry Insight, 2012; PwC, 2016). Industry Insight further confirm that although many SME's wish to expand, there is inadequate support for many of them to grow as demand levels remain subdued.

Results from the study also revealed that all economic indicators measuring SMC growth performance were positively and significantly correlated ($p < .01$), except for company profit, which did not have any associations with turnover, company assets or number of employees. This was further substantiated by the PCA results which revealed that company profit did not exhibit communality with other indicators and loaded strongly on a third component, suggesting that company profit may be a dimension on its own. The cidb (2014) also found no relationship

between profit and the financial grade of a contractor. Moreover, Kiviluoto et al. (2011) noted that the relationship between firm growth and profitability remains inconclusive, with results ranging from strong positive effects, to weak negative effects, to no relationship at all. Similar finding was reported by Coad and Hölzl (2010) in their empirical analysis on firm growth, describing the puzzling absence of this relationship as one of the pressing challenges for empirical research on firm growth.

The study revealed that skills transfer was the most derived social development target on Targeted Procurement projects; this is closely followed by application of innovation and technology, advancement on the cidb RoC, and skills development. The finding suggest that innovative Targeted Procurement strategies have the potential to facilitate the transfer of knowledge and skills and drive higher levels of innovation within SMCs (Walker et al., 2003). Formation of JV partnerships was the least ranked. This implies the absence of long-term collaborative alliances between SMCs and other project supply chain parties, a contradiction to previous report that preferential procurement policies have led to the development of business linkages between historically empowered firms and historically disadvantaged SMCs (Manchidi & Harmond, 2002). The result however lends support to Kajimo-Shakantu's (2007) and Hoffmann and Schlosser's (2001) report that SMCs find it difficult to forge genuine quality relationships.

Although the study showed significant positive relationships between the social indicators, it emerged that there was no statistically significant association between economic and social indicators of SMC development, as indicated in the correlation analysis and PCA results. This finding is aligned to results from previous studies which showed that a multitude of dependent variables used to measure growth correlate poorly (McKelvie and Wiklund, 2010). Moreover, Achtenhagen et al.'s (2010) study of 2,455 SMEs in Sweden found a very weak correlation between objective growth measures used by entrepreneurship researchers and the subjective measures perceived by practitioners. Abu Bakar et al. (2011) also asserted that diverse growth measures should not be expected to correlate.

7.7 ASSOCIATIONS BETWEEN TARGETED PROCUREMENT STRATEGIES USED, SUPPLY CHAIN RELATIONSHIP QUALITY AND SMC GROWTH PERFORMANCE AND DEVELOPMENT

Investigation to establish the associations between the study constructs revealed that Targeted Procurement strategies had significant positive associations with specific SMC growth performance and development indicators except company profit, which was found to be positively

associated with third-party management and accelerated rotation but not significant. This finding is aligned to Fajnzylber et al.'s (2009) study which found that access to government forms of support did not appear to significantly influence profits of micro-enterprises in Mexico. This contradicts an earlier study by House-Soremekun (2006), which reported a significantly positive relationship between participation in minority set-aside programs in the US, and growth in annual company profit. This contrast may be because of the size of the businesses studied (Rasiah et al., 2014), an increase in demand, a reduction in operating costs (Ammar et al., 2003, as cited in Rasiah et al., 2014) and/or other internal strategic financial management decisions and critical success factors. Park et al. (2011) showed a series of apparent tendencies in the development of collaboration networks to realize better profit performance which may be a useful consideration for Targeted Procurement project stakeholders.

Although not statistically significant, the result also appears to suggest that the use of unbundling targeting strategy is unfavourable to SMC growth performance, with all economic indicators showing negative correlation to unbundling of contracts. Moreover, unbundling of contracts exhibited a negative association with supply chain relationship quality, suggesting that unbundling targeting strategy promotes fragmentation and boundary relationships (Radosavljevic and Bennet, 2012) in the construction supply chain, due to the many inter-firm networks resulting from the use of the strategy. It also emerged that mandatory subcontracting did not exhibit significant association with economic indicators of SMC growth performance, but negative associations were recorded between mandatory subcontracting and company assets, as well as profits.

The perceived impact of unbundling targeting strategy and mandatory subcontracting is further supported by the following remarks from the focus group interview participants.

Regarding unbundling targeting strategy, SMC C stated:

> *...that is where unbundling comes from, if there's a project of R200 million for example, then you can employ more SMEs. Instead of the contractor getting 70% (of the contract value) and walking away, and that contractor is not even from the region.* (SMC C)

SMC D added:

> *...when they use this strategy of unbundling, ... give the work (directly) to SMEs as (prime contractors). They (SMEs) don't have the capital (to work as prime contractors), the issue is the capital. Whenever the SMEs get a job, the main contractor supplies almost everything (for example, materials, plant and equipment) to the SME. Then that is why I think you may find most of us, in your questionnaire, did not indicate an impact in turnover. Because, the strategy doesn't have an impact in turnover. You get a contract of R3 million*

but the money actually deposited in your bank is about R700,000 because the main contractor is supplying you all the materials, and before they pay you, they deduct the cost and then it doesn't have an impact in your profit, doesn't make an impact in your turnover… and also you don't get to build your own assets… (SMC D)

Regarding mandatory subcontracting, SMC B stated that:

Actually, we're supposed to work as (prime) contractors but the main contractors treat us as subcontractors. They're supposed to give us 30% of the project, and then we find out we're working only for labour alone (surprise laugh in the room). (SMC B)

SMC D added:

You know in this industry, we as SMMEs, we are struggling. We are sitting on the same level (cidb Grade). We don't grow (SMC A - there's no growth), because of subcontracting. If the client can give the job directly to us, then we can see where we're going… (SMC D)

Some of the SMCs attributed the situation to neglect and lack of proper monitoring and evaluation by the client; SMC D stated:

…the client that is implementing this is not directly involved with the SMEs (room murmurs in agreement). The client is directly involved with the main contractor and leaves everything to the main contractor, and not monitor the main contractor... in achieving those targets. So, the problem here is still the client because they're the one who finances the project, they're the one investing... The client doesn't take responsibility (AA – oversight) of making sure the SMEs achieve the development objectives. (SMC D)

Regarding appropriate alternatives to the unbundling strategy and mandatory subcontracting, SMC D stated:

…For instance, a recommendation, maybe for the (targeting) strategy, what they can do is, get a big job of 7CE (Grade 7 Civil Engineering) and subcontract, and put it in small packages, and then the main contractor gonna be the managing party, you understand (room murmurs in agreement). Then the main contractor manages that contract, while the entire contract is executed by the SMEs according to their grade or according to their expertise. (SMC D)

Mandatory subcontracting also did not significantly predict any social indicators of SMC development, despite significant associations with skills development, skills transfer, and JV partnerships. Regarding this, SMC B stated:

But they do get paid to train us. The only training they gave us was for the concrete. (SMC B)

SMC C added:

> *In the contract, it does stipulate that there's money set aside for training. Now, that money we don't see as a subcontractor (SMC B cuts in – We're supposed to get that money)... because that empowers us to empower our guys.* (SMC C)

SMC D added:

> *...they do provide trainings, but those trainings they're not relevant to our situation. They're supposed to consult, what training you require...* (SMC D)

SMC D added:

> *And... for our type of work, training on site is the best one (SMC C - Hands on). There's no use you go sit in a class (room responds affirmatively).* (SMC D)

The findings suggest that SMCs prefer to work directly for the client as the prime contractor, or in a management contracting arrangement where larger established contractors and/or consultants are appointed to provide construction management support, mentor them in the execution of contracts as prime contractors, and monitor satisfactory progress of their work. This strategy could be beneficial to developing capacities of SMCS in the South African construction industry. Moreover, the study revealed that company assets exhibited significant association with only third-party management Targeted Procurement strategy. Ofori and Chan (2000) also found empirical evidence that most construction companies in Singapore grew by working as a main contractor. They also noted that contractors have done well operating as specialist subcontractors, focusing on their traditional areas of expertise. Notwithstanding, given the prevailing practice of using subcontracting as a targeting strategy, large contractors need to function as catalyst of growth to subcontractors as is the case in other countries (Pedersen and McCormick, 1996) rather than the common practice of using subcontracting to small firms as a way to reduce costs.

The study also found that the use of tendering equity is positively and significantly associated with the growth in turnover, and particularly, number of employees of SMCs. This finding supports the trend, discussed earlier, which suggested that targeted contractors increase their employee size to meet a corresponding increase in work (turnover). Another possible explanation for this may be to improve their B-BBEE status and/or to become B-BBEE compliant, which is a common criterion for the award of government contracts in South Africa (National Treasury, 2017).

7.8 TARGETED PROCUREMENT STRATEGIES AND SUPPLY CHAIN RELATIONSHIP QUALITY INFLUENCING SMC GROWTH PERFORMANCE AND DEVELOPMENT

Key findings on the predictive influence of Targeted Procurement strategies on SMC growth performance and development are discussed in this section.

It emerged that Targeted Procurement strategies are a positive and significant determinant of social SMC development indicators. However, Targeted Procurement strategies only significantly predicted the economic indicators of turnover and employee size of SMCs. By juxtaposing this result with the index of correlation which showed a significant association between turnover and number of employees ($p < .01$), it can be inferred that the Targeted Procurement strategies significantly predicting an increase in work opportunities (turnover) will lead to a corresponding increase in number of employees. This finding confirms the earlier trend observed in this study, suggesting that construction companies tend to hire employees based on available work opportunities. This trend was further substantiated from the focus group interview, where SMC A stated:

> *...it is difficult to keep your permanent guys... yeah, it's just hard to maintain the work.* (SMC A)

Regarding the number of permanent staff in their employment, SMC B and C said simultaneously:

> *There is no such thing as permanent people.* (SMC B and C)

These statements have growth performance and development implications as confirmed by reports that lack of access to work and attracting and retaining the right people and maintaining a strong workforce is a severe constraint to contractor development (cidb, 2012, 2017a; Windapo and Cattell, 2011).

The study also found that no (individual) Targeted Procurement strategy significantly predicted growth in employee numbers in SMCs; however, the combined model for all targeting strategies had a statistically significant effect on the prediction of number of employees (see Table 5.15). This could mean that where the objective is to achieve SMC growth in size by number of employees, a combination of two or more targeting strategies could prove effective. For instance, tendering equity and accelerated rotations is likely to fit this purpose, as their index of correlation showed a positive, significant association with the number of employees (see Table 5.13).

The results provide the first empirical evidence for the influence of Targeted Procurement strategies on the growth performance and development of SMCs in South Africa, and suggest that

where the Targeted Procurement strategies collectively have a statistically significant effect on the prediction of an SMC development indicator, there is a likelihood that the development objective will be achieved when two or more strategies are implemented on a project. This finding provides empirical evidence to support previous reports by Watermeyer (2003) that public-sector clients tend to combine targeting strategies in an effort to maximize outcomes.

The study further revealed that the use of accelerated rotations is significantly associated with growth in turnover, and is the only (individual) targeting strategy that significantly predicted it. This finding is aligned to earlier reports (cidb, 2008b; International Standards Organisation, 2010; Watermeyer, 2005) that indicated that accelerated rotations ensure that more work opportunities areis given to target groups. By design, accelerated rotation uses an electronic database to rank firms according to their date of entry and targeted enterprise status, thus facilitating their invitation to submit tenders and offering them a greater chance of success (Watermeyer, 2005). However, it was discussed earlier that accelerated rotation is amongst the least used targeting strategies, and it is underutilized by state entities. This should not be the case, because sustained work opportunities are an important factor in company survival (Lee, 2009).

It also emerged that only the third-party management strategy has a statistically significant effect on the prediction of company assets (plants and equipment). This emphasizes the importance of third-party management in scenarios where the aim is to help SMCs build their assets. Moreover, given that the combined model for all Targeted Procurement strategies did not significantly predict company assets, it implies that the combination of third-party management with other targeting strategies on a project will likely reduce its efficacy in achieving the objective of building the assets of SMCs, and so should be avoided.

The significance of this finding relates to the capital-intensive nature of the construction industry which requires contractors to acquire and retain their own plant and equipment while maximizing its utilisation. Rasiah et al. (2014) stated that companies must invest in more assets in order to grow. The inability of SMCs to enhance their operational capacity through the acquisition of plant and equipment results in their employment as subcontractors on simpler, less capital-intensive and more labour-intensive works, thus hindering their growth and development (cidb, 2013). An estimated 70% and up to 30% contract value of general building works and civil engineering works, respectively, is subcontracted out (cidb, 2013). The implication of this is that SMCs potentially exclude themselves from a significant volume of work as prime contractors in the construction industry due to limited operational capacities. This could be a major factor

forestalling the impact of Targeted Procurement in South Africa as a vehicle for transformation and contractor development. Hence, the implementation of strategies that promote SMC asset growth, such as third-party management, should be encouraged. Bates (1997) also suggested that third-party management could curb fronting in the construction industry as SMCs will not overextend themselves by taking on large contracts they cannot handle due to lack of operational capacity; a circumstance that encourages fronting, which results in business failure.

7.9 MEDIATED INDIRECT EFFECTS OF TARGETED PROCUREMENT STRATEGIES ON SMC DEVELOPMENT THROUGH SUPPLY CHAIN RELATIONSHIP QUALITY

The study revealed that Targeted Procurement strategies are a positive and significant determinant of supply chain quality of relationship between SMCs and other parties in the procurement process. Furthermore, preferencing targeting strategy emerged as a significant predictor of supply chain relationship quality. This may be explained by the JV partnership criteria being specified as a condition for participating on Targeted Procurement contracts – JVs has inherent strong quality of relationship characteristics (Sillars and Kangari, 2004). Moreover, JV partnerships was positively correlated with and significantly predicted by supply chain relationship quality. The result also suggests that mandatory subcontracting was a weak determinant of supply chain quality of relationship, which could be due to main contractors appointing subcontractors they have previous working relationships with for example, those in their permanent supply chain resulting in less boundary relationships (Radosavljevic and Bennet, 2012).

The results also showed a significant positive association between supply chain relationship quality and social indicators of SMC development. These finding suggest that inter-firm networks with strong relationship quality attributes in the supply chain enhance SMCs' social development; thus, lending support to earlier reports that inter-firm network attributes influence knowledge and skills diffusion acquisition (Ahuja, 2000; Nesheim and Hunskaar, 2015) and innovative output through technology exchange (Emuze and Smallwood, 2014; Park et al., 2011). However, there were no significant associations between supply chain relationship quality and economic indicators of SMC growth performance. The PLS model developed also showed a negative causal relationship. Moreover, supply chain relationship quality exhibited a negative association with company profits. These are key findings of the study indicating that being actively sociable with close external relationships and collaboration in the supply chain affect the economic growth performance of SMCs negatively in the Targeted Procurement process. The finding is in line with

Rosenbusch et al.'s (2011) study which found that external collaborations have no significant effect on the performance of small firms. Moreover, Arend and Wisner (2005) cautioned that SMEs risk being pressured into a closer relationship to be easily exploited by a larger supply chain partner. The empirical evidence from this study, however, challenge previous reports (for example Park et al., 2011; Sedita and Apa, 2015; Zuppa et al., 2016) suggesting that relationship quality attributes influence the economic and financial performance of firms.

The mediation results revealed that supply chain relationship quality improved the overall model fit and contributed positively to the predictive effect of Targeted Procurement strategies on SMC growth performance and development indicators, except for company profits. This contribution is significant, in that supply chain relationship quality emerged as an important intervening variable (mediator) in the Targeted Procurement strategies – SMC development relationship. Furthermore, a mix of complete and partial mediation emerged from the results, confirming the existence of an indirect relationship between Targeted Procurement strategies and SMC development, through supply chain relationship quality as a mediator. In practice, this implies that, for example, when third-party management is implemented on a project, the supply chain relationship quality between SMCs and other project parties plays a significant role on the impact of third-party management strategy in helping SMCs develop skills such that a stronger quality of relationship will yield increased skills development and vice versa.

The findings provide the first empirical evidence that supply chain relationship quality has a mediating effect on the Targeted Procurement strategies – SMC development relationship, suggesting that it is necessary for SMCs participating in public-sector targeted projects to increase their relational and relationship management skills to build the organisational and operational capacities required for success. This is aligned to earlier findings by Sedita and Apa (2015) which emphasized this necessity, particularly for SMCs, whose size is a barrier to having the appropriate skills or knowledge to do it alone. Moreover, given that the public-sector contracts represent the largest demand for construction companies, and particularly SMCs' reliance on government contracts in South Africa as reported in the findings of this study, it is worth investing in direct ties with familiar firms which ensures improved performance and reduces the risk of uncertainty (Coleman, 1990; Sedita and Apa, 2015). Following Williams et al.'s (2015) contention that in addition to the 'iron triangle' of project success factors (time, cost and quality), the measure of a project's success should also include the project's impact on relationship quality as additional metrics; Jelodar et al. (2015) and Meng's (2012) reports that systems, procedures, and methods

thrive in suitable levels of relationship quality; and given the evidence presented in this study on the significant role of supply chain relationship quality to the growth performance and development of SMCs in the Targeted Procurement process, it is now necessary for public-sector clients to consider including relationship management as a criterion for participating in public contracts.

7.10 PLS-SEM MODEL RESULTS

The results from the PLS model developed in this study have shown that that 31% and 14% of the variance in SMC development (social) and SMC development (economic) respectively is explained by the Targeted Procurement strategies – SMC development causal model when accounting for quality of supply chain relationships in the Targeted Procurement process. The model further revealed that Targeted Procurement strategies have a significant and positive direct effect on supply chain relationship quality ($\beta = .29$; $t < .01$), SMC development (social) ($\beta = .20$; $t < .05$) and SMC development (economic) ($\beta = .37$; $t < .01$). Similarly, supply chain relationship quality exhibited a significant and positive direct effect on SMC development (social) ($\beta = .47$; $t < .01$); and a non-significant and negative direct effect on SMC development (economic) ($\beta = -.04$; $t > .05$). Moreover, the PL-SEM result exhibited a total predictive (explanatory) power of 54%, and a strong global fit measure (GoF = 0.36) that provides adequate support for global validation of the PLS model. The results imply that the implementation of Targeted Procurement strategies influence the attainment of both social and economic SMC development objectives where the quality of relationships in the project supply chain has appropriate attributes of trust, communication, collaboration, joint problem-solving and risk allocation.

The PLS-SEM model further revealed that the direct relationship between Targeted Procurement strategies and social indicators of SMC development is mediated by the quality of supply chain relationships in the Targeted Procurement process. Whereas, the direct relationship between Targeted Procurement strategies and economic indicators of SMC development is negatively mediated by the quality of supply chain relationships in the Targeted Procurement process. This further validates the regression results emanating from the study, indicating that being actively sociable with close external relationships and collaboration in the supply chain affect the economic growth performance of SMCs negatively in the Targeted Procurement process. Hence, it is important to take cognisance of and invest in relationship management between SMCs and other stakeholders in the supply chain to achieve intended development objectives through the Targeted Procurement process.

CHAPTER EIGHT: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

8.1 INTRODUCTION

This chapter presents the overall summary of research findings from the thesis, demonstrating the extent to which the research objectives are met. Appropriate conclusions are also drawn and the contribution to knowledge is established, while considering the research limitations. Relevant recommendations are made and areas for future research suggested.

The study set out to empirically validate the pre-existing assumption that targeting small and medium-sized contractors (SMCs) in the South African construction industry, and increasing their participation in government contracts, stimulates their growth performance and development. The research further examined whether the quality of relationships in the project supply chain mediates the relationship between Targeted Procurement strategies used and contractor development. The main research question was: *"What Targeted Procurement strategies influence the development of SMCs in the South African construction industry, and what contribution does the quality of supply chain relationships make to this development?"* Therefore, specific research objectives were formulated to answer the research question.

8.2 REVIEW OF THE AIM AND OBJECTIVES OF THE STUDY

The aim of the study was to determine the Targeted Procurement strategies that influence the development of SMCs in the South African construction industry, and establish whether the quality of supply chain relationships between SMCs and other project parties plays a mediating role in those strategies. Given that the aim of this chapter is to summarise the key findings derived from this study in line with the objectives, the Research Objectives are revisited:

RO1. Identify the Targeted Procurement strategies commonly used as a mechanism for contractor development and determine the quality of supply chain relationships between SMCs and other project parties in the Targeted Procurement process.

RO2. Establish the associations between Targeted Procurement strategies, SMC development, and the relationship quality between SMCs and other project supply chain parties.

RO3. Examine whether Targeted Procurement strategies have an influence on SMC development, and on the relationship quality between SMCs and other project supply chain parties.

RO4. Examine whether the relationship quality between SMCs and other project supply chain parties has an influence on SMC development.

RO5. Determine the indirect effect of Targeted Procurement strategies on SMC development, through relationship quality as a mediator.

RO6. Develop and validate a predictive causal model for the relationships between Targeted Procurement strategies, SMC development, and supply chain relationship quality criteria, using the partial least squares structural equation modelling (PLS-SEM) technique.

8.3 SUMMARY OF RESEARCH FINDINGS

This section presents the summary of key findings emanating from this study in line with the research objectives.

8.3.1 Research Objective One

RO1: *To identify the Targeted Procurement strategies commonly used as a mechanism for contractor development and determine the quality of supply chain relationships between SMCs and other project parties in the Targeted Procurement process.*

The study revealed that the most frequently used Targeted Procurement strategy as a mechanism for contractor development was tendering equity, suggesting that government clients progressively require bidders to have certain levels of equity ownership (for example, contractors should be more than 50% black-owned) when submitting bids for Targeted Procurement contracts. This is followed by: preferencing (for example, granting tender evaluation points to contractors who form joint ventures with SMCs); mandatory subcontracting (placing an obligation on prime contractors to subcontract a portion of the works to SMCs); and unbundling of contracts (breaking contracts down into smaller packages to facilitate the participation of SMCs as prime contractors). Third-party management and accelerated rotations ranked lowest as strategies, indicating that they are the least used by state entities in the Targeted Procurement process.

The study also found that the quality of supply chain relationships between SMCs and other project parties in the Targeted Procurement process is largely based on a combination of price competition and quality competition, which was largely driven by poor attributes of trust, joint problem-solving, communication, and objectives alignment. Further assessment of relationship quality criteria showed that trust was relatively low between SMCs and other project parties in the Targeted Procurement process with the majority reporting trust behaviour based on competence rather than goodwill. Ineffective joint problem-solving permeated the supply chains studies, with the majority indicating that problems sometimes lead to disputes. Moreover, learning and

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innovation sharing, and cost data transparency were limited among project parties, indicating borderline arms-length adversarial relationships. Balance of risk and reward was also inadequate, with little or no reward for taking on risks. The continuity of work was limited, with the prospect for future work existing only through competitive tendering, indicating that most of the relationships were largely project-based and did not extend beyond a single project.

8.3.2   Research Objective Two

RO2: *To establish the associations between Targeted Procurement strategies, SMC development, and the relationship quality between SMCs and other project supply chain parties.*

The study found that Targeted Procurement strategies had significant positive associations with specific SMC growth performance and development indicators, except company profit, suggesting that profitability is mostly as a result of other internal strategic financial management decisions and critical success factors. Moreover, Targeted Procurement strategies (for example, preferencing, tendering equity and mandatory subcontracting) were found to be positively and significantly associated with supply chain relationship quality between SMCs and other project parties. The study further revealed positive significant associations between supply chain relationship quality and social indicators of SMC development (skills development, application of innovation & technology, skills transfer, advancement on the cidb RoC, and JV partnerships). However, there were no significant associations between economic indicators of SMC growth performance (turnover, profits, assets and employee size) and supply chain relationship quality. An overall assessment of the intercorrelations indicate thirty-two significant associations between the variables of Targeted Procurement strategies, SMC development, and the relationship quality between SMCs and other project supply chain parties.

8.3.3   Research Objective Three

RO3: *To examine whether Targeted Procurement strategies have an influence on SMC development, and on the relationship quality between SMCs and other project supply chain parties.*

The study established that the use of Targeted Procurement strategies was a positive and significant determinant of social indicators of SMC development (skills development, application of innovation & technology, skills transfer, advancement on the cidb RoC, and JV partnerships). Targeted Procurement strategies only significantly predicted the economic indicators of turnover and employee size of SMCs to suggest a domino effect, where the increase in work opportunities (turnover) would lead to a corresponding increase in the number of employees. Furthermore,

accelerated rotations (using electronic databases to fast-track the rotation of targeted SMCs through the quotation roster, to ensure they had more bidding opportunities) emerged as the only targeting strategy that significantly predicted growth in turnover. This indicates that the use of the strategy would result in a better increase in work opportunities for targeted contractors. Similarly, third-party management (the appointment of an established contractor and/or consultant to manage and mentor SMCs in the satisfactory execution of contracts, as prime contractors) emerged as the only targeting strategy that significantly predicted growth in company assets. The study also found that unbundling of contracts is not associated with SMC development, suggesting that the strategy is unfavourable for stimulating the growth performance and development of SMCs. Mandatory subcontracting also exhibited no predictive influence on SMC growth performance and development, despite some significant associations.

It also emerged from the study that Targeted Procurement strategies (especially preferencing and mandatory subcontracting) had a positive and significant influence on the quality of supply chain relationships between SMCs and other project parties, suggesting the importance of selecting appropriate targeting strategies that promote good elements of trust, communication, collaboration, joint problem-solving and risk allocation.

8.3.4   Research Objective Four

RO4: To examine whether the relationship quality between SMCs and other project supply chain parties has an influence on SMC development.

The study revealed that supply chain relationship quality is a positive and significant determinant of social indicators of SMC development (skills development, application of innovation & technology, skills transfer, advancement on the cidb RoC, and JV partnerships). However, supply chain relationship quality did not exhibit any association with the economic and financial performance of the SMCs.

8.3.5   Research Objective Five

RO5: To determine the indirect effect of Targeted Procurement strategies on SMC development, through relationship quality as a mediating construct.

The study established through regression analysis that supply chain relationship quality contributed positively to the Targeted Procurement strategies – SMC development relationship (except company profit), such that it emerged as an important intervening variable (mediator) in this relationship. Furthermore, a mix of complete and partial mediation emerged from the results, suggesting the existence of an indirect relationship between Targeted Procurement strategies and

SMC development, through supply chain relationship quality as a mediating construct. This was a key finding of the study. validating the relevance of supply chain relationship quality to the growth performance and development of SMCs in the Targeted Procurement process.

8.3.6 Research Objective Six

RO6: To develop and validate a predictive causal model for the relationships between Targeted Procurement strategies, SMC development, and supply chain relationship quality criteria, using the partial least squares structural equation modelling (PLS-SEM) technique.

The study developed a predictive causal PLS-SEM model to validate the conceptualised relationships between Targeted Procurement strategies, SMC growth performance and development, and the supply chain relationship quality between SMCs and other project parties. The model revealed that 31% and 14% of the variance in SMC development (social) and SMC development (economic) respectively is explained by the Targeted Procurement strategies – SMC development causal model when accounting for quality of supply chain relationships ($R^2 = .085$) in the Targeted Procurement process.

The model further revealed that Targeted Procurement strategies have a significant and positive direct effect on supply chain relationship quality, SMC development (social) and SMC development. Similarly, supply chain relationship quality exhibited a significant and positive direct effect on SMC development (social); and a non-significant and negative direct effect on SMC development (economic). Moreover, the PL-SEM result exhibited a total predictive (explanatory) power of 54%, and a strong global fit measure (GoF = 0.36) that provides adequate support for global validation of the PLS model.

It also emerged from the PLS-SEM model that the direct relationship between Targeted Procurement strategies and social indicators of SMC development is mediated by the quality of supply chain relationships in the Targeted Procurement process. Whereas, the direct relationship between Targeted Procurement strategies and economic indicators of SMC development is negatively mediated by the quality of supply chain relationships in the Targeted Procurement process. The study showed that different dynamics operate for the social indicators, compared to the economic indicators of SMC development.

8.3.7 Revisiting the hypotheses of the study

Five main research hypotheses were formulated to answer Research Questions Three, Four, Five and Six; and address Research Objectives Two, Three, Four, Five and Six.

Two main Hypotheses were formulated to address Research Objective Three. Hypothesis 1 stated that: *Targeted Procurement strategies have a direct and significant relationship with social indicators of construction SMC development*; while Hypothesis 2 stated that: *Targeted Procurement strategies have a direct and significant relationship with economic indicators of construction SMC development*. The main Hypothesis was validated in PLS-SEM and all five sub-hypotheses tested to address Hypothesis 1 were also validated; whereas for Hypothesis 2, the main Hypothesis was validated in PLS-SEM, and two out of four sub-hypotheses tested were validated. Hence, based on the result, it is inferred that Targeted Procurement strategies influence the social development of construction SMCs in the Targeted Procurement process; and also influence, to some degree, their economic development.

Two main Hypotheses were also framed to address Research Objective Four. Hypothesis 3a stated that: *Supply chain relationship quality has a direct and significant relationship with social indicators of construction SMC development*; while Hypothesis 3b state that: *Supply chain relationship quality has a direct and significant relationship with economic indicators of construction SMC development*. Hypothesis 3a was validated, while Hypothesis 3b was not validated and negative. Based on the result, it is deduced that the supply chain relationship quality criteria influence the social development of construction SMCs in the Targeted Procurement process; and influence, to some degree, their economic development negatively.

Hypothesis 4, which also addressed Research Objective Three, states that: *Targeted Procurement strategies have a direct and significant relationship with supply chain relationship quality*; which was validated. Hence, based on the result from Hypothesis 4, it is inferred that Targeted Procurement strategies have an influence on the quality of supply chain relationships between SMCs and other project parties in the Targeted Procurement process.

Two main Hypotheses were formulated to address Research Objective Five. Hypothesis 5a stated that: *Supply chain relationship quality mediates the relationship between Targeted Procurement strategies and social indicators of construction SMC development*; while Hypothesis 5b stated that: *Supply chain relationship quality mediates the relationship between Targeted Procurement strategies and economic indicators of construction SMC development*. Hypotheses 5a and 5b were validated. Based on the result, it is inferred that supply chain relationship quality positively mediates the direct effect of Targeted Procurement strategies on the social development of SMCs; while it negatively mediates the direct relationship between Targeted Procurement strategies and the economic development of SMCs.

8.4 CONCLUSION

The following conclusions were drawn, based on the empirical results obtained from the study:

Government clients progressively require bidders to have certain levels of equity ownership when submitting bids for Targeted Procurement contracts; implying that Targeted Procurement is primarily targeted at SMCs owned by historically disadvantaged individuals in South Africa. Therefore, a significant number of SMCs are actively participating in public-sector targeted contracts, and more importantly, depend on them for their survival; suggesting that SMCs are at the risk of going out of business if they continue to rely on targeted contracts as the sole source of sustainable work. Moreover, participation in contractor development programmes may not necessarily translate to holistic growth and advancement on the cidb Register of Contractors; however, it seems to enhance the sustainability of SMCs, although they did not move up the cidb register.

Targeted Procurement strategies influence the quality of supply chain relationships between SMCs and other project parties, and are indeed a significant determinant of the social development of construction SMCs in the Targeted Procurement process; and also influence, to some degree, their economic development. Furthermore, the findings provide empirical evidence suggesting that state entities may combine two or more targeting strategies on a project in an effort to maximize the achievement of SMC development outcomes. The study also dispels the assumption that all targeting strategies produce the same or similar outcomes. For instance, the use of accelerated rotation and third-party management emerged as the only individual targeting strategies to significantly predict growth in turnover and assets respectively.

Unbundling targeting strategy, and to some degree, mandatory subcontracting, are unfavourable to the economic growth performance of SMCs in the Targeted Procurement process. However, unbundling strategy may be used in combination with third-party management (rather than subcontracting) which has inherent attributes associated with the growth in company assets and skills development, knowledge and skills transfer, as well as innovation and technological exchanges. Moreover, SMCs prefer to work directly for the client as the prime contractor, or in a management contracting arrangement where larger established contractors and/or consultants are appointed to provide construction management support, and mentor them in the execution of contracts as prime contractors and monitor satisfactory progress of their work. This strategy could be beneficial to developing capacities of SMCS in the South African construction industry.

The nature and quality of supply chain relationships between SMCs and other project parties in the Targeted Procurement process is mostly based on a combination of price competition and quality competition that is largely driven by poor prime contractor–subcontractor relationships Furthermore, supply chain relationship quality criteria influence the social development of construction SMCs in the Targeted Procurement process; and influence, to some degree, their economic development negatively. Moreover, supply chain relationship quality positively mediates the direct effect of Targeted Procurement strategies on the social development of SMCs; while negatively mediating the direct relationship between Targeted Procurement strategies and the economic development of SMCs. In other words, inter-firm networks with strong relationship quality attributes in the supply chain enhance SMCs' social development; while being actively sociable with close external relationships and collaboration in the supply chain affect the economic growth performance of SMCs negatively in the Targeted Procurement process. Therefore, the empirical evidence from this study challenges the majority of social network and supply chain literature which suggests that more collaboration with external partners is better for small firms; especially in the context of economic growth performance in the Targeted Procurement process.

The study therefore concludes that Targeted Procurement strategies have the potential to achieve their intended results of improving the growth performance and development of historically disadvantaged contractors in South Africa, if selected and implemented appropriately against intended outcomes, and where relationships in the project supply chain have the appropriate attributes of trust, communication, collaboration, joint problem-solving and risk allocation. The findings imply that the government as a key construction sector client should continue to invest in Targeted Procurement or affirmative action policies that benefit historically disadvantaged SME contractors.

8.5   CONTRIBUTION TO KNOWLEDGE

The rationale that launched the study was the paucity of empirical research on preferential procurement in relation to contractor development in the South African context, the lack of knowledge on the nature and quality of supply chain relationships between SMCs and other project parties. The study also aimed to improve understanding of the role of supply chain relationship quality in the relationship between preferential procurement policy and the development of contractors. The study contributed to knowledge by extending our understanding of the impact of public procurement as an instrument of social policy, and more specifically, the role of preferential

procurement regimes in stimulating the growth performance and development of small and medium-sized contractors in the South African construction industry.

This study differs from any previous studies in that it examines the mediating role of supply chain relationship quality on the relationship between Targeted Procurement strategies and social and economic development of contractors. Moreover, these relationships were empirically validated and modelled for the first time using partial least squares structural equation modelling (PLS-SEM) which is particularly useful for theory development. Hence, the validated PLS-SEM model results contribute to theory-building in industrial organisation economics on the use of government intervention, such as Targeted Procurement strategies as a mechanism of contractor development in South Africa. The model further contributes to the development of a theoretically enhanced understanding on the role of supply chain relationship quality criteria in the Targeted Procurement process. This is a major contribution to the existing body of knowledge recognizing the importance of social and relational dimensions of inter-firm relationships within the context of project management and particularly relating to public procurement and small contractor development.

In practice, the PLS-SEM model developed may be applied by public-sector clients as a strategic procurement management tool when targeting SMCs, to identify and select appropriate targeting strategies that will enhance the achievement of intended developmental outcomes. The model also provides both public-sector clients and SMCs with an understanding of the need to pay adequate attention to relationship quality criteria, and to better manage the relationship between SMCs and other stakeholders in the supply chain. If stakeholders understand that intended development objectives can be met through managing their working relationships better, through the targeted procurement process, they may commit to investing more in relational and relationship management skills.

Other salient contributions to knowledge from the empirical findings include: dispelling the preconceived belief that all targeting strategies produce the same outcomes; the possibility that two or more targeting strategies may be combined in a project to maximise developmental outcomes; developing objective and subjective measures and indicators for small contractor development that is specific to the South African context; the finding that company profit represents a dimension on its own, as it did not have any associations with other economic indicators measuring growth performance; growth in this context is organic, steady and gradual as opposed to the random heterogenous process of permeation which is typically described in firm growth studies; and the study also advances the use of embedded mixed methods research and

application of second-generation multivariate statistical techniques in construction management research.

8.6 RECOMMENDATIONS FOR STAKEHOLDERS

Based on the findings presented and the conclusions made, the following recommendations are outlined to inform and aid policymakers, state entities, public-sector client departments, and construction supply chain stakeholders in making strategic decisions towards promoting the development and sustainability of small and medium-sized contractors in South Africa

Recommendations for policymakers, state entities, and public-sector client departments:

- Recognise their role in shaping construction supply chains and encourage the design and implementation of strategies and policies that enable adequate relationship management to be entrenched in the supply chain, and consider including relationship management as a relevant criterion for participating in public contracts.
- Encourage the implementation of strategies that facilitate the employment of SMCs as prime contractors and promote company asset (plant and equipment) growth, such as third-party management, which could also assist in curbing the problem of fronting in the construction industry.
- Match the use of appropriate targeting strategies with intended contractor development outcomes, such as third-party management for enhancing asset growth.
- Consider engaging targeted contractors with growth potential on long-term contracts, such as framework agreements, to enhance the continuity of the work, curb short-termism and minimize risks and uncertainties; and also provide incentives that encourage entrepreneurial orientation and organisation development, to improve the competitiveness of SMCs.
- Implement appropriate monitoring and evaluation procedures that measure intended development objectives against outcomes.

Recommendations for construction supply chain stakeholders:

- Small contractors should develop relational and relationship management skills necessary for building operational capacities.
- Small contractors need to be wary of potential close collaboration partners who may be looking to take advantage of their size and unique characteristics.

- Small contractors should develop entrepreneurial orientation and consider operating as a specialist subcontractor, focusing on their traditional areas of expertise, and not overly rely on public contracts by also participating in private sector contracts.

- Given the prevailing practice of using subcontracting as a targeting strategy, large established contractors should function as a catalyst of growth to smaller contractors rather than the common practice of using subcontracting to small firms as a way of reducing costs.

8.7 LIMITATIONS OF THE RESEARCH

This research was not executed without limitations. While putting the implications of the findings emerging from this research into perspective, some key limitations must be considered. First, the study is spatial-specific, industry-specific and period-specific – limited to South African small and medium-sized contractors in the construction industry's experience and supply chain relationships in the Targeted Procurement process between 2011 and 2015. Therefore, replication of the research in other geographical areas is necessary before generalizing the results from the study. Furthermore, the organisational capacity to be successful could be influenced by other internal factors, internal and external informal ties with public and private institutions, as well as structural factors which are beyond the scope of this study. However, this limitation was minimised by using multiple indicators to measure SMC growth performance and development. Finally, although the economic indicators of SMC development used in this study are widely adopted in the literature about firm growth, further research that makes use of secondary sources of financial information is encouraged.

8.8 RECOMMENDATIONS FOR FUTURE RESEARCH

The findings emanating from this study provide recommendations for future research in a number of promising areas:

- This study focused on contractors registered on Grades 3 to 6 of the cidb register that have executed targeted procurement projects and been part of a cidb-registered contractor development programme within a five-year period. A study with a larger scope and period is therefore recommended.

- This study adopted a primarily quantitative approach to empirically validate a pre-existing theory. Further in-depth qualitative case studies are proposed that build on the findings from this study.

- This study assessed the quality of relationships across the supply chain. A study focusing on the relationship between the subcontractor and the main contractor is therefore proposed.
- A study that examines the efficacy of operational targeting strategies such as unbundling of contracts, mandatory subcontracting, and third-party management is recommended.
- Future studies that examine other strategies used by government to encourage SMCs such as advanced payment is recommended.
- The establishment of a framework on Targeted Procurement for ease of application by the government and accountability is recommended, as well as further research into more measurable criteria for the proposed Targeted Procurement framework.

8.9 CONCLUDING REMARKS

The aim of the study was to determine the Targeted Procurement strategies that influence the development of SMCs in the South African construction industry, and whether the quality of supply chain relationships between SMCs and other project parties play a mediating role in that development. The study established the relationships among the constructs by developing and validating a predictive causal model using partial least squares structural equation modelling technique.

The study showed that Targeted Procurement strategies influences the supply chain relationship quality between SMCs and other project parties, and is a statistically significant determinant of SMC growth performance and development. Findings from the study also showed that supply chain relationship quality is an important mediator of the Targeted Procurement strategies – SMC development relationship.

Being the first study to examine and empirically validate these relationships, the research has made significant contribution to knowledge in the field. As a result, policymakers, state entities, public-sector client departments, and construction supply chain stakeholders should consider responding to the findings and recommendations proffered to drive construction industry development in South Africa. It is also important to build on the findings from this research by responding to some of the potential areas identified for further research.

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APPENDICES

APPENDIX A:
DATA COLLECTION INSTRUMENTS, CONSENT FORM
& RESEARCH ETHICS CLEARANCE

Appendix A1: Research questionnaire

Modelling Targeted Procurement Strategies and Relationship Quality Criteria Influencing the Development of Small Contractors in South Africa

Q. Code: #_____   Date of Survey: _____

PART ONE: SURVEY QUESTIONNAIRE
SECTION A: GENERAL INFORMATION ABOUT THE COMPANY

Kindly provide the following information about your company.

1. Kindly indicate your designation in your company

Designation	Junior employee	Senior employee	Middle management	Top management
Please tick (√)				

2. What is the registered name of your business? (optional)

   _____

3. How long has your company been in business? (e.g. 1 year, 2 years, 3 years, etc.) _____

4. What was your company's **turnover** <u>five years ago</u>? (if applicable)

Turnover (Rands)	Less than 2m	2m – 4.5m	4.5m – 51m	More than 51m	Not Applicable
Please tick (√)					

5. What was the number of **permanent employees** in your company <u>five years ago</u>? (if applicable)

No. of Employees	Less than 20	20 – 49	50 – 99	100 – 199	More than 199	Not Applicable
Please tick (√)						

6. What is the <u>current</u> **classification** and **grade** of your company on the cidb register of contractors?

Classification	Grade					
	1	2	3	4	5	6
Civil Engineering (CE)						
General Building (GB)						
Other (_____)						

7. Please tick (√) from the options below, the <u>highest level</u> of qualification of your technical and professional staff?

NQF Levels	Designation	Technical	Professional
1	Grade 9		
2	Grade 10 and National (vocational) Certificates level 2		
3	Grade 11 and National (vocational) Certificates level 3		
4	Grade 12 (National Senior Certificate) and National (vocational) Cert. level 4		
5	Higher Certificates and Advanced National (vocational) Cert.		
6	Diploma and Advanced certificates		
7	Bachelor's degree and Advanced Diplomas		

1

NQF Levels	Designation	Technical	Professional
8	Honours degree, Post Graduate diploma and Professional Qualifications		
9	Master's degree		
10	Doctoral degree		

SECTION B: PARTICIPATION IN GOVERNMENT TARGETED PROCUREMENT CONTRACTS

Targeted procurement is an innovative government procurement intervention strategy designed to promote the participation of Targeted Enterprises (e.g. historically disadvantaged enterprises) and targeted labour in government contracts. Depending upon the targeting strategy which is adopted, Targeted Enterprises can be engaged in the performance of contracts as prime/main contractors, joint venture partners, subcontractors, suppliers, service providers and manufacturers.

The various public sector targeted procurement strategies include: Unbundling of Contracts, Mandatory Subcontracting, Preferencing, Third-party management, Tendering equity, Accelerated rotations.

Please answer the following questions on your company's experience/perception of Targeted Procurement in the <u>*last five years*</u> *to the best of your knowledge.*

S/N	Company experience on Targeted Procurement projects and non-TP projects in the last five years	Provide a number (e.g. 1, 2, 3, etc.)
1	Total number of government contracts **WON** where TP was implemented	
4	Total number of **non-TP** government contracts <u>executed</u>.	
6	Total number of **private sector** contracts <u>executed</u>.	

8. Please indicate <u>how often</u> your company have participated in TP contracts where the following targeting strategies was implemented.

TP strategies	Description	Never	Rarely	Often	Very often	Always
Unbundling of contracts	Break contracts down into smaller contracts or packages to facilitate the participation of small and/or emerging contractors as *prime/main contractors*.					
Mandatory subcontracting	Require larger main contractors to subcontract a portion of the works to small contractors using prescribed procurement procedures.					
Preferencing	Grant tender evaluation points to contractors who satisfy prescribed preferencing criteria (e.g. *joint ventures* between large and small contractors)					
Third-party management	Require larger established contractors and/or consultants to provide construction management support, and mentor small and/or emerging enterprises in the execution of contracts as prime/*main contractors*, and monitor satisfactory progress of their work.					
Tendering equity	Require tenderers to have minimum levels of equity when tendering for certain type of contracts (e.g. >50% black women ownership)					

2

250

Accelerated rotations	Accelerate the rotation of targeted enterprise on electronic databases to ensure that more opportunity is given to target groups to ensure that they have greater access to work opportunities.					

SECTION C: PARTICIPATION IN CONTRACTOR DEVELOPMENT PROGRAMMES

Contractor development is a deliberate and managed process to achieve targeted developmental outcomes that improves contractor grading status, performance and quality, equity and targeted ownership. **Contractor development programmes (CDPs)** aim to develop skills and promote business sustainability for emerging and historically disadvantaged SME contractors in the construction industry.

Please answer the following questions on your company's experience/perception of CDPs to the best of your knowledge.

1. Has your company participated in a government Contractor Development Programme? | Yes | No |

2. If 'YES' please provide name of CDP _____

3. In what year did your company enter the CDP (if applicable)? _____

4. In what year did your company exit (or expected to exit) the CDP? _____

5. What was the **classification** and **grade** of your company on the cidb Register of Contractors when you entered the CDP?

Classification	Grade						
	0	1	2	3	4	5	6
Civil Engineering (CE)							
General Building (GB)							
Other (_____)							

6. Has your company received any mentorship on government TP projects? | Yes | No |

7. If yes, from prime/main contractor, consultant or government? | Contractor | Consultant | Government |

8. Please rate the impact of the mentoring you received on government TP projects on skills development within your company.

Skills	Very low	Low	Moderate	High	Very high
Technical skills					
Business management skills					
Financial management skills					
Competitive tendering skills					
Entrepreneurship and networking skills					

3

SECTION D: PROJECT-SPECIFIC

IMPORTANT INSTRUCTION: Please identify **ONE** government Targeted Procurement project (executed by your company in the last five years) that impacted on most of the growth performance and development of your company. Use this project to answer ALL questions in this section.

1. Please state the name of the identified TP Project (optional) _____

2. What TP strategy was used on the project? _____

3. What impact did the TP strategy have on the following growth performance and development indicators of your company?

Use the rating scale:

Never	Rarely	Often	Very often	Always
1	2	3	4	5

SME development objectives	Indicators	1	2	3	4	5
Social indicators	Skills development					
	Formation of equity and joint venture partnerships					
	Skills transfer					
	Application of innovation and technology					
	Advancement on the cidb Register of Contractors					
Economic indicators	Turnover					
	Assets					
	Profits					
	Number of employees					

4

PROJECT-SPECIFIC: QUALITY OF SUPPLY CHAIN RELATIONSHIP

The construction project can be viewed as a network of relationships between firms that make up the project supply chain.

To determine the quality of supply chain relationship experienced while executing the identified Targeted Procurement project, please answer the following questions to the best of your knowledge.

1. In your opinion, what was the PROCUREMENT SELECTION CRITERIA for the identified project?

○ Lowest price

○ Cost and quality

○ Multi-criteria (capability, experience, performance, cost etc.) from short-term perspective

○ Multi-criteria (capability, experience, performance, cost etc.) from long-term perspective

2. What was the PROCUREMENT METHOD for the identified project?

○ Traditional single-stage tendering

○ Traditional two-stage or direct negotiated tendering

○ Integrated design and build

○ Integrated joint venture partnering or strategic alliance

3. What FORM OF CONTRACT was adopted for the identified project?

○ JBCC® Principal Building Agreement (PBA)

○ General Conditions of Contract (GCC)

○ FIDIC Conditions of Contracts for Construction - The Red Book

○ NEC3 Engineering and Construction Contract (ECC)

4. In your opinion, what was the level of OBJECTIVES ALIGNMENT and BENEFITS among project parties for the identified project?

○ Only self-objectives leading to win-lose outcome

○ Mainly self-objectives leading to win-partial win outcome

○ Mutual objectives in the short-term leading to win-win short-term outcome

○ Mutual objectives in the long-term leading to win-win long-term outcome

5

5. In your opinion, what was the prospect for FUTURE WORK **while executing the identified project?**

( ) No prospect of future work

( ) Prospect of future work exists through competitive tendering

( ) Prospect of future work exists as preferred supplier

( ) Future work is guarateed

6. In your opinion, what was the level of INFORMATION EXCHANGE between project parties **while executing the identified project?**

( ) Little information exchanged openly and timely

( ) Some information exchanged openly and timely

( ) Much information exchanged openly and timely

( ) Most information exchanged openly and timely

7. In your opinion, what was the level of LEARNING and INNOVATION SHARING between project parties **while executing the identified project?**

( ) No learning and innovation sharing

( ) Limited learning and innovation sharing

( ) Much learning and innovation sharing

( ) Continuous learning and innovation sharing

8. In your opinion, what was the level of COST DATA TRANSPARENCY between project parties **while executing the identified project?**

( ) No cost data transparency

( ) Limited cost data transparency

( ) Open book cost data transparency

( ) Continuous open book cost data transparency

9. In your opinion, how would you describe the WORKING RELATIONSHIP between project parties **on the identified project?**

( ) Confrontational or arm's-length relationship

( ) Limited cooperation

( ) Collaboration

( ) Close collaboration and integration

6

10. In your opinion, how would you describe the RISK SHARING and ALLOCATION between project **parties on the identified project?**

◯ No risk sharing and risk 'always' allocated to weaker party

◯ Limited risk sharing and risk 'often' allocated to weaker party

◯ Increased risk sharing and risk allocated to the party best able to manage it short-term

◯ Risk sharing is common practice and risk allocated to the party best able to manage it long-term

11. In your opinion, how would you describe the BALANCE of RISK and REWARD on the **identified project?**

◯ No rewards for taking risk

◯ Some rewards for taking risk

◯ Often appropriate rewards for taking risk

◯ Always appropriate rewards for taking risk

12. In your opinion, how would you describe the level of JOINT EFFORT FOR IMPROVEMENT **between project parties on the identified project?**

◯ No joint effort for better ways of working

◯ Limited joint effort for better ways of working

◯ Much joint effort for better ways of working

◯ Continuous joint effort for better ways of working

13. In your opinion, how would you describe the level of PERFORMANCE MEASUREMENT and FEEDBACK **on the identified project?**

◯ No performance measurement and no formal feedback

◯ Limited performance measurement and irregular but formal feedback

◯ Increased performance measurement; regular and formal feedback on the short-term

◯ Continuous performance measurement; regular and formal feedback

7

SECTION E: COMPANY GROWTH PERFORMANCE

Company growth performance is the quantitative improvement of the organisation such as increase in the number of employees, higher revenue etc.; while development is an aggregation of the firm's post-entry 'growth performance' measured by quantifiable growth indicators over a period of time.

Kindly provide these documents that will assist in documenting the growth performance of your company:

(A) Abridged audited **financial statements** over the last five years. **(B) Annual reports** over the last five years.

AND / OR

Please provide the following information on your company's growth performance over the last five years.

1. What was your company's annual **turnover** over the last five years (in Rands)?

Year	Annual Turnover (total value of contracts acquired)
2015	
2014	
2013	
2012	
2011	

2. What was your company's annual **profit** over the last five years (in Rands)?

Year	Annual Profit
2015	
2014	
2013	
2012	
2011	

3. What was the value of your company's total **assets** over the last five years (in Rands)?

Year	Company Assets
2015	
2014	
2013	
2012	
2011	

4. What was the size of your company's **skilled employees** (permanent) over the last five years?

Year	Number of permanent skilled employees
2015	
2014	
2013	
2012	
2011	

Thank you for completing our survey!

If you are interested in the results from our research, and wish to be contacted in the future, kindly provide your contact details.

8

Appendix A1: Interview guide

Q. Code: #_____   Date of Interview: _____

PART THREE: FOCUS GROUP INTERVIEWS

GENERAL INFORMATION ABOUT THE COMPANY AND RESPONDING OFFICER

Please introduce yourself?

Name (optional)..

Position/designation in the company...

Years of service in the company..

Kindly provide us the following information about the company?

Name of the company (optional)..

Revenue/profit in the year ended audited financial report....................................

Total asset in the year ended...

Total number of employee in the year ended..

Years of existence of the company...

Specialization/kind of services executed by the company....................................

Key regions/provinces of operation in the South African construction market...........

Has your company participated in targeted procurement projects? YES / NO

Has your company participated in a Contractor Development Programme? YES / NO

SECTION A: EXPERIENCE WITH TARGETED PROCUREMENT ON ONE PROJECT

PLEASE READ CAREFULLY

Targeted procurement is a government procurement intervention strategy designed to promote the participation of targeted enterprises (e.g. historically disadvantaged enterprises) and targeted labour in government contracts. The various public sector targeted procurement strategies as described below.

Targeted Procurement Strategy	Description
Unbundling of Contracts	Client breaks contract down into smaller contracts or work packages to allow small and/or emerging contractors to bid for contracts directly as prime/main contractors. Client manages the small contractors by themselves.
Mandatory Subcontracting	Client requires larger main contractors to subcontract a portion of the works to small contractors using prescribed procurement procedures.
Preferencing	Client prescribes tendering criteria (e.g. joint ventures between large and small contractors) and grants tender evaluation points to contractors who satisfy the prescribed preferencing criteria.
Third Party Management	Client award contracts directly to small and/or emerging contractors, and appoints a larger established contractor and/or consultant to provide construction management support, mentor small contractors in the execution of contracts, and monitor satisfactory progress of their work.
Tendering Equity	Client requires tenderers to have minimum levels of equity/ownership when tendering for certain type of contracts (e.g. more than 50% black women ownership).
Accelerated rotations	Client accelerates the rotation of targeted contractors on an electronic database to facilitate their invitation to submit tenders.

1

PLEASE READ CAREFULLY

Please identify **ONE** government Targeted Procurement project *(executed by your company in the last five years)* that impacted on **most** of the growth performance and development of your company. Use this project to answer ALL questions in this section.

What targeting strategy was used on the project?

Targeted Procurement strategy	Tick (√) one
Unbundling of Contracts	
Mandatory Subcontracting	
Preferencing	
Third Party Management	
Tendering Equity	
Accelerated rotations	

What **impact** did the selected targeted procurement strategy identified above have on the following growth performance and development indicators of your company?

Indicators	Tick (√) all applicable		
	Negative impact	No impact	Positive impact
Turnover			
Profits			
Assets			
Number of employees			
Skills development			
Formation of joint venture partnerships			
Skills transfer			
Application of innovation & technology			
Advancement on the cidb Register of Contractors			

2

How would you describe the nature and type of working relationship between your company and other project parties on the project?

Relationship types	Description	Tick (√) one
Close collaboration and integration	Win-win business philosophy, high degree of trust exists between parties, and an attitude of performance measurement and continuous improvement is adopted.	
Short-term collaboration	Mutual objectives are achieved, partners work together collaboratively as an integrated project team, goodwill trust and win-win attitude fosters the project partnering relationship.	
Limited cooperation	Partial win-win benefits, and trust is mainly built on the capability of each party to execute quality work.	
Confrontational / adversarial	Self-interest, mistrust, lack of mutual objectives, and win-lose business philosophy.	

<div align="center">

******Group Discussion******

</div>

Kindly explain why the identified targeted procurement strategy impacted (negatively or positively) on the growth performance and development of your company.

……
……
……

Please explain why the nature and type of working relationship identified was cultivated on this project.

……
……
……

Do you think the targeting strategy influences the nature and type of working relationship?

……
……
……

<div align="center">

Closure

Greetings

3

</div>

Appendix A3: Consent form

DEPARTMENT OF CONSTRUCTION ECONOMICS AND MANAGEMENT

Abdulrauf ADEDIRAN (PhD Candidate)
University of Cape Town
Level 5, Snape Building
Upper Campus
Rondebosch, 7701
Cape Town, South Africa
Cell: +27 61 220 6195
Email: addabd001@myuct.ac.za

CONSENT FORM

Title of the research project:

Modelling Targeted Procurement Strategies and Relationship Quality Criteria Influencing the Development of Small Contractors in South Africa

Dear participant,

You are invited to take part in a research study on *Modelling Targeted Procurement Strategies and Relationship Quality Criteria Influencing the Development of Small Contractors in South Africa*. This research is conducted by Abdulrauf Adediran, a PhD Candidate at the University of Cape Town. The inquiry is supervised by Associate Professor Abimbola Windapo of the University of Cape Town and the results of the study will be presented to the Department of Construction Economics and Management in fulfilment of the requirements for the degree of Doctor of Philosophy in Construction Economics and Management.

If you have any questions or concerns relating to the research please do not hesitate to contact me, Abdulrauf Adediran or the research supervisor, Associate Professor Abimbola Windapo:

Abdulrauf Adediran	addabd001@myuct.ac.za	+27 (0)61 220 6195
Abimbola Windapo	Abimbola.Windapo@uct.ac.za	+27 (021) 650 2049

Purpose of the Study:

The primary aim of the research is to determine the impact of government intervention through targeted procurement (TP) on the growth and development of SMEs in the construction industry. The study will further establish whether the quality of relationships formed with other entities in the TP process interacts with the TP strategies implemented to influence the growth performance (or development) of SMEs. The study will be conducted in South Africa.

Procedures:

Participation in this study is voluntary. If you volunteer to participate in this study, we would determine a time and date that would be suitable for a semi-structured face-to-face interview or questionnaire administration. Pre-established queries in addition to emergent questions will be asked. The responses will be used to supplement data gathered from other sources of evidence.

Prior to the interview, the researcher will brief the participant on the topic and make sure the respondent is aware of the procedure to follow. Any questions regarding the procedure may be asked at this stage, or any other stage, throughout the interview.

Potential Benefits to the Participant:

Any of the research findings will be shared with the participant at their request.

Confidentiality:

The information obtained in this research will be utilised solely for the purposes for this study. Every effort will be made to ensure that subjects are anonymous and safeguard any proprietary information. The raw data of the questionnaire and interview will only be revealed to personnel directly related to the supervision and marking of this dissertation. The names of the participants and companies will not be included in the research and will be referred to as participant 1, 2, 3 etc. and company A, B, C etc.

Additionally, any information recorded will be only be released to the supervisor upon request and will be destroyed upon submission of the document.

Rights of Participation:

Your consent may be withdrawn, and at any time, and your participation may be discontinued without any repercussions. The study has been reviewed by the University of Cape Town Research Ethics Board and has received ethics clearance.

Signature of Research Participant:

I have read the information provided for this research for the study of:

> "Modelling Targeted Procurement Strategies and Relationship Quality Criteria Influencing the Development of Small Contractors in South Africa"

I have been provided with a copy of this form as a point of reference. My questions have been answered to my satisfaction and I fully consent to participate in this study.

Full name of Participant: _____ Signature: _____ Date: _____

Name of Participating Organisation: _____

Abdulrauf ADEDIRAN (principal researcher)   Signature: _____ Date: _____

Appendix A4: Ethics in Research Clearance
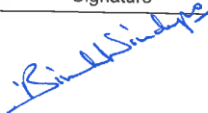
APPLICATION FORM

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

APPLICANT'S DETAILS

Name of principal researcher, student or external applicant		Abdulrauf Adediran
Department		Construction Economics and Management
Preferred email address of applicant:		ADDABD001@myuct.ac.za
If a Student	Your Degree: e.g., MSc, PhD, etc.,	PhD
	Name of Supervisor (if supervised):	Associate Professor Abimbola Windapo
If this is a researchcontract, indicate the source of funding/sponsorship		Click here to enter text.
Project Title		Evaluating the Impact of Public Sector Targeted Procurement Strategies on the Development of SMEs in the Construction Industry

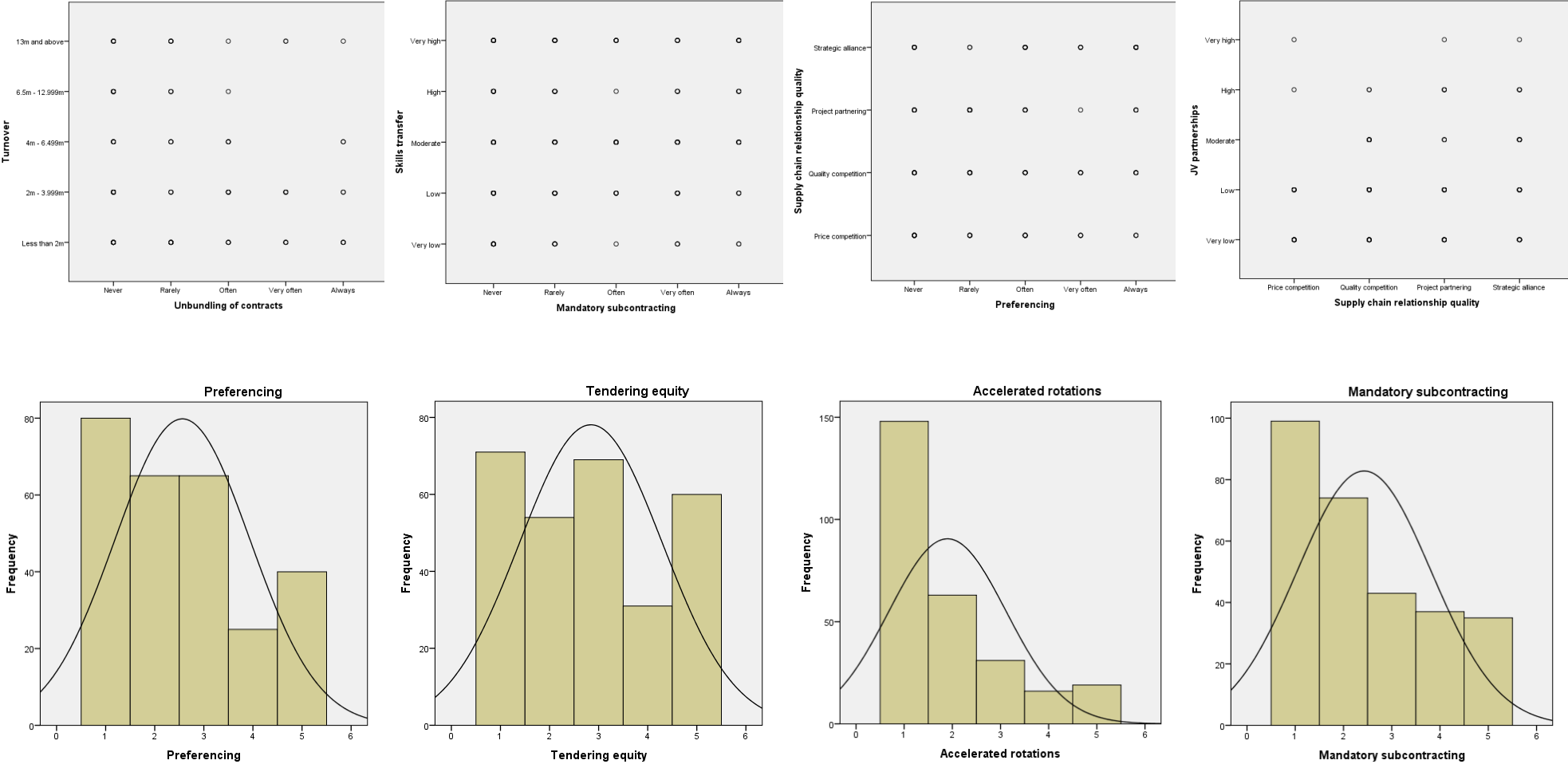I hereby undertake to carry out my research in such a way that:
- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.
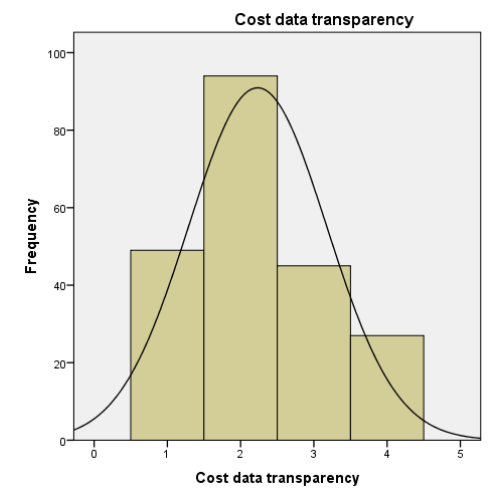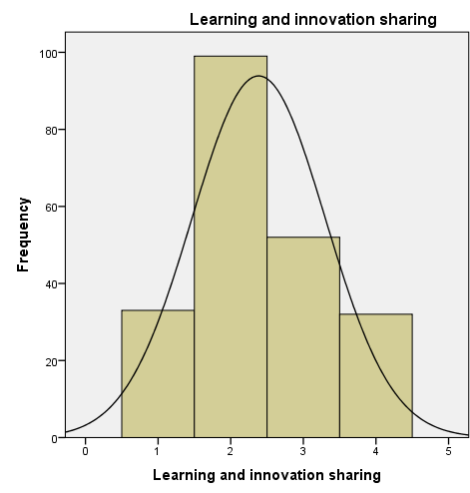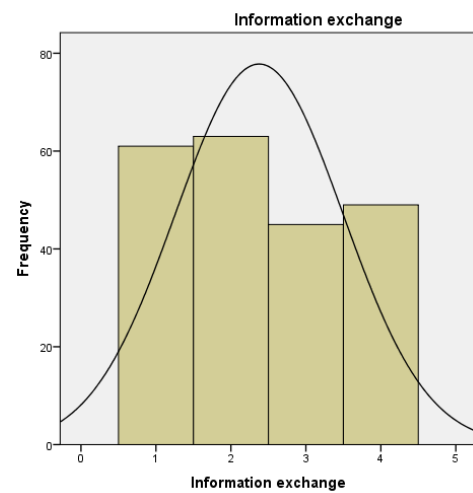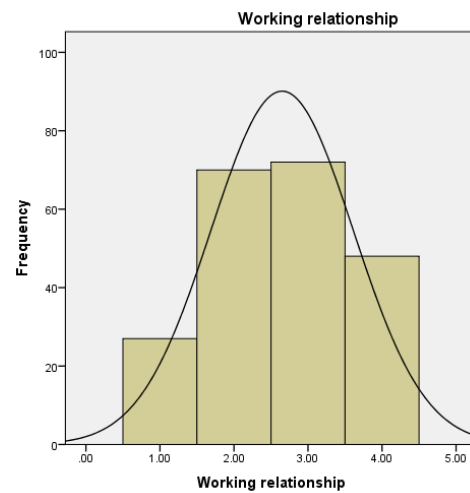
SIGNED BY	Full name	Signature	Date
Principal Researcher/ Student/External applicant	Abdulrauf Adediran	*[signature]*	09 Mar 2016

APPLICATION APPROVED BY	Full name	Signature	Date
Supervisor (where applicable)	Abimbola Windapo	*[signature]*	09 Mar 2016
HOD (or delegated nominee) Final authority for all applicants who have answered NO to all questions in Section1; and for all Undergraduateresearch (Including Honours).	Click here to enter text.		Click here to enter a date.
Chair : Faculty EIR Committee For applicants other than undergraduate students who have answered YES to any of the above	GEORGE SITHOLE Click here to enter text.	*[signature]*	13 APRIL Click here to enter a date. 2016

Page **1** of **2**

APPENDIX B:
PRELIMINARY ANALYSIS AND ASSUMPTION TESTS PERFORMED

Appendix B1: Scatterplot and histograms showing non-linearity and normality of study variables

Risk sharing and allocation

Balance of risk and reward

Procurement selection criteria

Procurement method

Form of contract

Objectives alignment and benefits

Continuity of work

Skills development
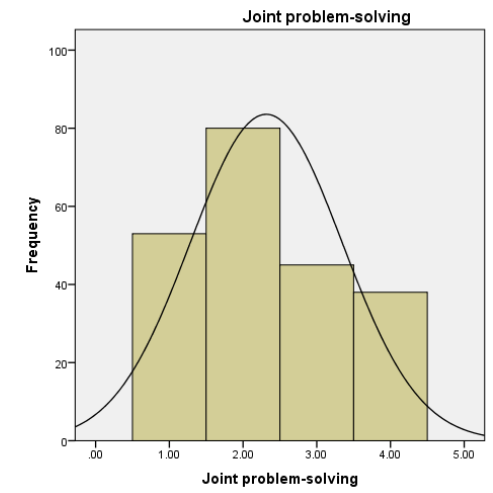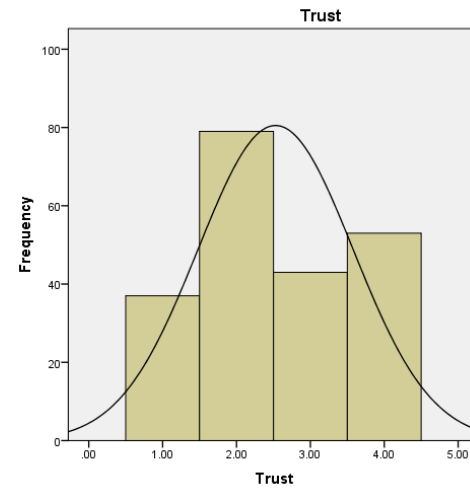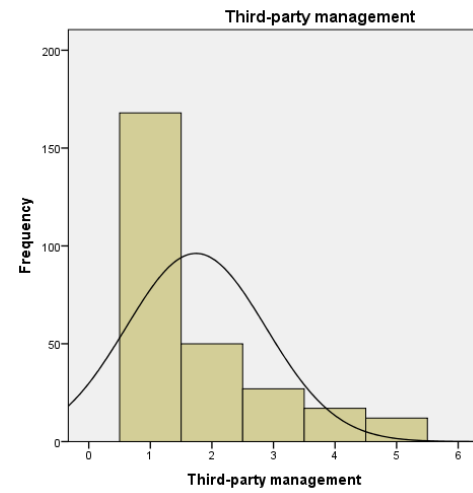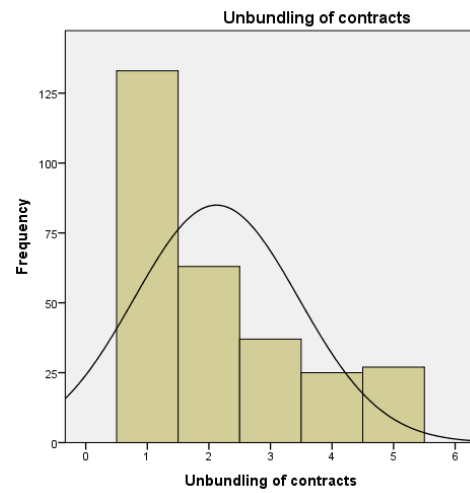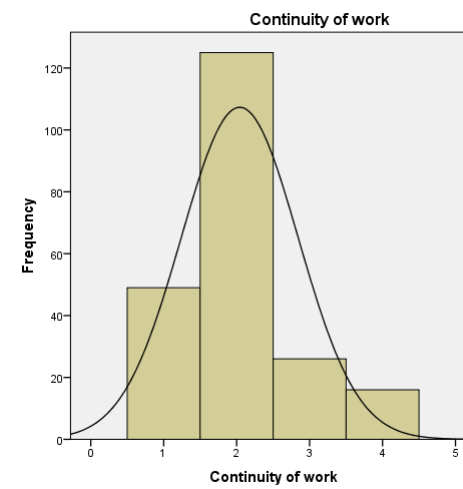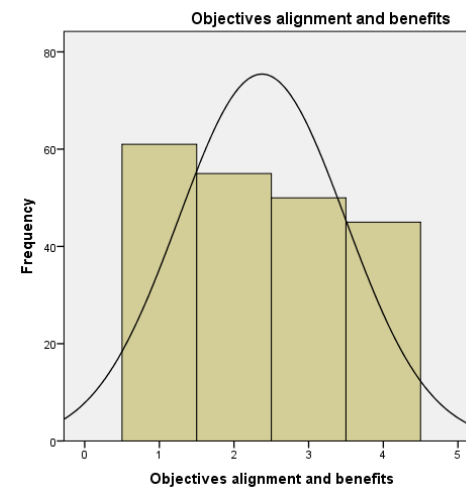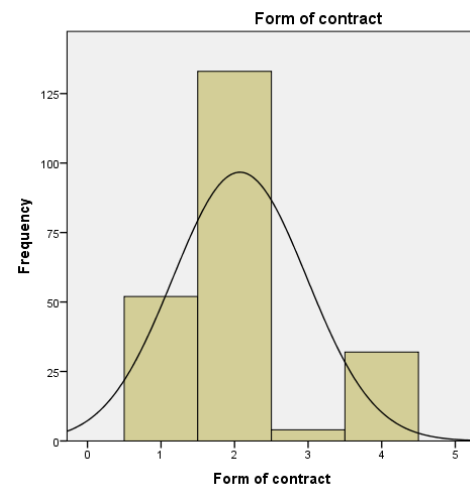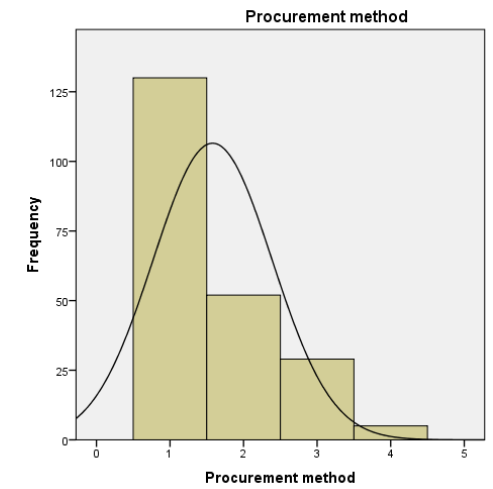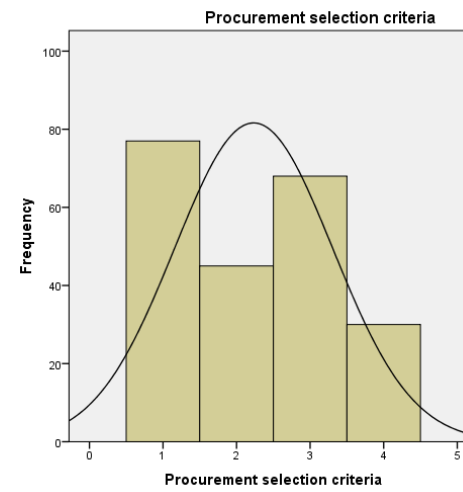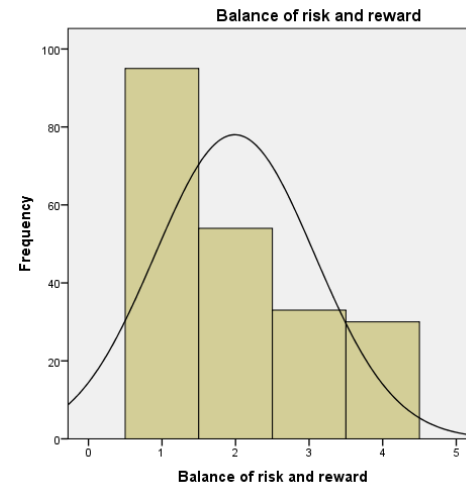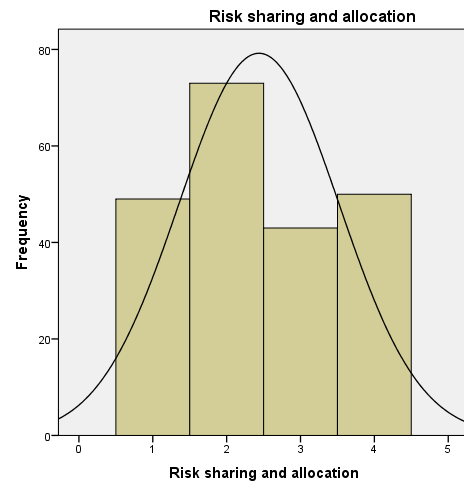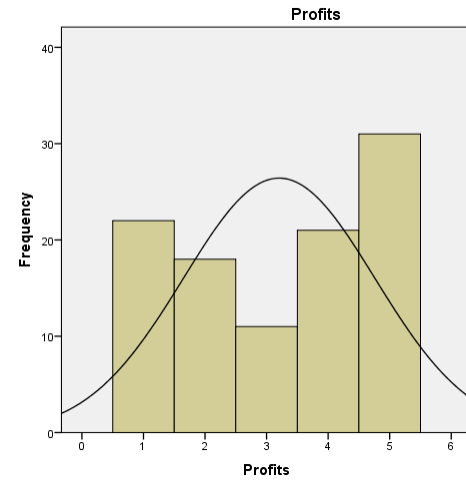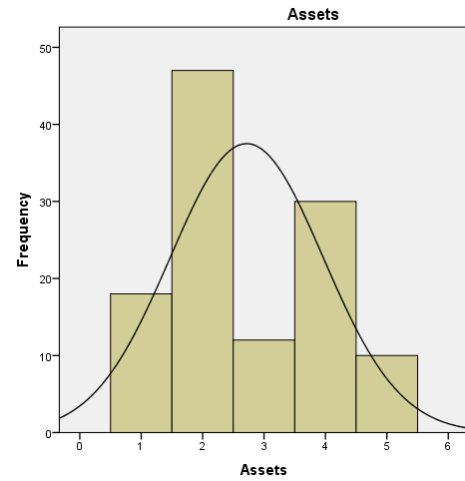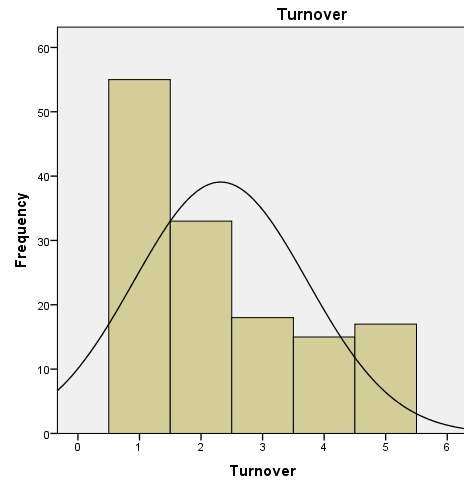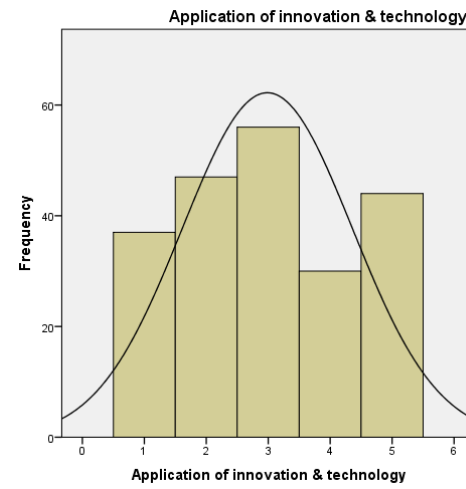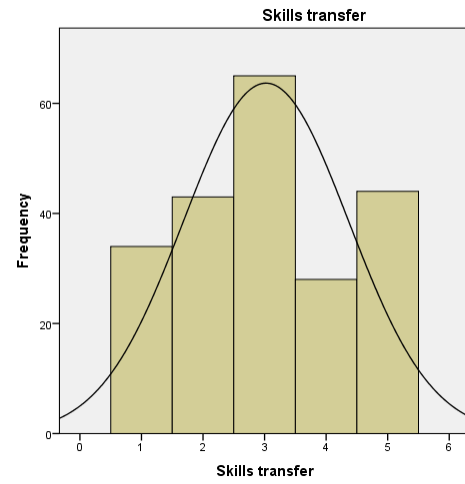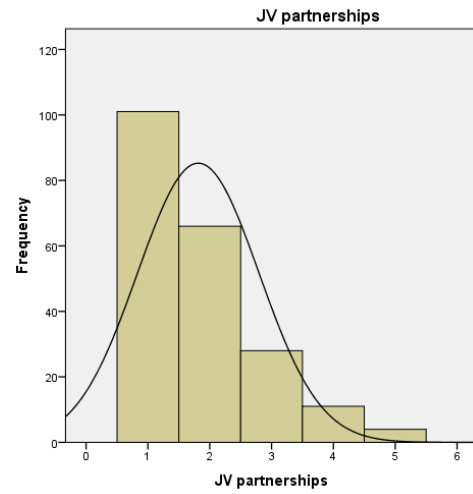
Appendix B2: Full likelihood ratio test results – Targeted Procurement strategies and social indicators of SMC development

Model	Dependent Variable	Predictor Variable	χ2	df	Sig.	Result
Model 5.2	Skills development	All TPS	109.151	72	.003**	✗
		TSPRE	16.700	12	.161	✓
		TSTEQ	13.354	12	.344	✓
		TSMSU	11.428	12	.493	✓
		TSTPM	24.717	12	.016*	✗
Model 5.3	Application of innovation & technology	All TPS	76.105	72	.348	✓
		TSPRE	72.782	12	.000**	✗
		TSTEQ	15.690	12	.206	✓
		TSARO	9.954	12	.620	✓
		TSTPM	14.600	12	.264	✓
Model 5.4	Skills transfer	All TPS	53.280	72	.952	✓
		TSPRE	5.903	12	.921	✓
		TSTEQ	27.483	12	.007**	✗
		TSMSU	11.457	12	.490	✓
		TSTPM	17.037	12	.148	✓
Model 5.5	Advancement on the cidb RoC	All TPS	138.162	72	.000**	✗
		TEQ	23.709	12	.022*	✗
Model 5.6	JV partnerships	All TPS	90.634	72	.068	✓
		TSPRE	62.846	12	.000**	✗
		TSTEQ	72.747	12	.000**	✗
		TSARO	70.493	12	.000**	✗
		TSMSU	-	12	-	✗
		TSTPM	14.584	12	.265	✓

TPS: Targeted Procurement strategies; ✓. assumption of proportionality odds met; ✗. assumption not met
**. $p < .01$; *. $p < .05$

Appendix B3: Full likelihood ratio test results – Targeted Procurement strategies and economic indicators of SMC development

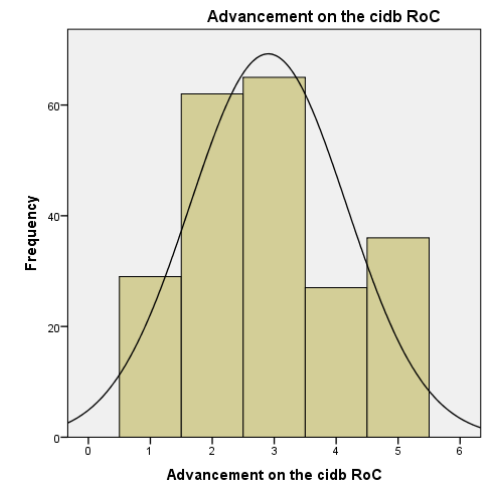| Model	Dependent Variable	Predictor Variable	χ2	df	Sig.	Result
Model 5.7	Turnover	All TPS	81.735	72	.203	✓
		TSPRE	72.575	12	.000**	✗
		TSTEQ	14.225	12	.287	✓
		TSARO	10.246	12	.594	✓
Model 5.8	Assets	All TPS	83.681	72	.164	✓
		TSTPM	12.644	12	.395	✓
Model 5.9	Number of employees	All TPS	156.611	48	.000**	✗
		TSTEQ	36.149	8	.000**	✗
		TSARO	5.578	8	.694	✓
Model 5.10	Profits	All TPS	89.458	72	.080	✗

TPS: Targeted Procurement strategies; ✓. assumption of proportionality odds met; ✗. assumption not met
**. $p < .01$; *. $p < .05$

Appendix B4: Full likelihood ratio test results – Targeted Procurement strategies and relationship quality

Model	Dependent Variable	Predictor Variable	χ2	df	Sig.	Result
Model 5.11	Relationship quality	All TPS	111.181	48	.000**	✗
		TSPRE	22.193	8	.005**	✗
		TSTEQ	9.313	8	.317	✓
		TSMSU	13.432	8	.098	✓

TPS: Targeted Procurement strategies; ✓. assumption of proportionality odds met; ✗. assumption not met
**. $p < .01$; *. $p < .05$

Appendix B5: Full likelihood ratio test results – Relationship quality and social indicators

Model	Dependent Variable	Predictor Variable	χ2	df	Sig.	Result
Model 5.12	Skills development	RQ	20.517	9	.015*	✗
Model 5.13	Application of innovation & technology	RQ	71.205	9	.000**	✗
Model 5.14	Skills transfer	RQ	17.072	9	.048*	✗
Model 5.15	Advancement on the cidb RoC	RQ	7.299	9	.606	✓
Model 5.16	JV partnerships	RQ	58.312	9	.000**	✗

RQ: relationship quality; ✓. assumption of proportionality odds met; ✗. assumption not met
**. $p < .01$; *. $p < .05$

APPENDIX C:
SAMPLE RESULTS FROM MULTINOMIAL REGRESSION

Appendix C1: Targeted Procurement strategies and social indicators of SMC development

Dependent variable: Stills transfer

Model Fitting Information

Model	Model Fitting Criteria -2 Log Likelihood	Likelihood Ratio Tests Chi-Square	df	Sig.
Intercept Only	513.228			
Final	380.261	132.967	96	.007

Link function: Logit.

Pseudo R-Square

Cox and Snell	.528
Nagelkerke	.553
McFadden	.240

Dependent variable: Application of innovation & technology

Model Fitting Information

Model	Model Fitting Criteria -2 Log Likelihood	Likelihood Ratio Tests Chi-Square	df	Sig.
Intercept Only	529.850			
Final	392.838	137.012	96	.004

Link function: Logit.

Appendix C2: Targeted Procurement strategies and economic indicators of SMC development

Dependent variable: Turnover

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	316.812			
Final	276.121	40.690	24	.018

Link function: Logit.

Pseudo R-Square

Cox and Snell	.298
Nagelkerke	.315
McFadden	.121

Dependent variable: Profits

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	258.329			
Final	222.786	35.543	24	.061

Link function: Logit.

Pseudo R-Square

Cox and Snell	.342
Nagelkerke	.358
McFadden	.135

Appendix C3: Targeted Procurement strategies and supply chain relationship quality

Dependent variable: Supply chain relationship quality

Model Fitting Information

Model	Model Fitting Criteria -2 Log Likelihood	Likelihood Ratio Tests Chi-Square	df	Sig.
Intercept Only	452.346			
Final	339.826	112.520	72	.002

Link function: Logit.

Pseudo R-Square

Cox and Snell	.470
Nagelkerke	.504
McFadden	.235

Appendix C4: Supply chain relationship quality and social indicators of SMC development

Dependent variable: JV partnerships

Model Fitting Information

Model	Model Fitting Criteria -2 Log Likelihood	Likelihood Ratio Tests Chi-Square	df	Sig.
Intercept Only	68.894			
Final	43.431	25.463	12	.013

Link function: Logit.

Pseudo R-Square

Cox and Snell	.128
Nagelkerke	.141
McFadden	.057

Appendix C5: Mediated indirect effect of Targeted Procurement strategies on SMC development through relationship quality

Dependent variable: Application of innovation & technology

Likelihood Ratio Tests

Effect	Model Fitting Criteria -2 Log Likelihood of Reduced Model	Likelihood Ratio Tests Chi-Square	df	Sig.
Intercept	153.395ª	.000	0	.
ARO	172.976	19.582	16	.240
RQ	212.586	59.191	12	.000

Pseudo R-Square

Cox and Snell	.379
Nagelkerke	.396
McFadden	.151

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

APPENDIX D:
SAMPLE RESULTS FROM PLS-SEM MODEL OUTPUT

Appendix D1: Item cross-loadings for measurement (outer) model showing AVE values

	TPS	RQ	SD_SOC	SD_ ECO
AVE	-	.7094	.7844	.6997
TS_ARO	**.3871**	.0193	.1117	.2351
TS_MSU	**.2135**	.2409	.0150	-.0085
TS_PRE	**.6797**	.1678	.2627	.2476
TS_TEQ	**.6416**	.1692	.1469	.3169
TS_TPM	**.5240**	.1893	.1948	.1510
TS_UNB	**.0153**	.0242	-.0259	.0184
RQ_CDT	.3298	**.8670**	.4405	.0459
RQ_IEX	.2420	**.8647**	.5969	.1079
RQ_JPS	.2209	**.8119**	.3076	.0170
RQ_LIS	.2654	**.8756**	.5496	.0406
RQ_RSA	.2365	**.7415**	.2879	.0754
RQ_TRU	.2164	**.8903**	.4645	.0201
RQ_WRE	.1874	**.8355**	.2811	.1074
SD_ACR	-.0960	.4037	**.5601**	.0002
SD_ITE	.3777	.5133	**.9812**	.1402
SD_SDE	.3758	.5212	**.9834**	.1505
SD_STR	.3904	.4273	**.9456**	.0881
ED_AST	.2940	.1412	.0482	**.7937**
ED_EMP	.3067	.0563	.1543	**.8069**
ED_TUR	.3337	-.0083	.0939	**.9045**

Appendix D2: Item cross-loadings for measurement (outer) model

Cross Loadings

	RQ	SD_ECO	SD_SOC	TPS
ed_ast	0.141202	0.793728	0.048181	0.293972
ed_emp	0.056251	0.806852	0.154311	0.306660
ed_tur	-0.008337	0.904501	0.093863	0.333723
rq_cdt	0.866972	0.045883	0.440511	0.329842
rq_iex	0.864727	0.107909	0.596852	0.242039
rq_jps	0.811895	0.016985	0.307601	0.220879
rq_lis	0.875610	0.040573	0.549636	0.265361
rq_rsa	0.741503	0.075428	0.287894	0.236461
rq_tru	0.890264	0.020091	0.464541	0.216415
rq_wre	0.835527	0.107431	0.281097	0.187431
sd_acr	0.403746	0.000175	0.560103	-0.095999
sd_ite	0.513264	0.140185	0.981172	0.377730
sd_sde	0.521154	0.150454	0.983352	0.375811
sd_str	0.427330	0.088127	0.945621	0.390375
ts_aro	0.019346	0.235113	0.111701	0.387099
ts_msu	0.240937	-0.008532	0.014979	0.213500
ts_pre	0.167775	0.247585	0.262738	0.679656
ts_teq	0.169165	0.316882	0.146939	0.641624
ts_tpm	0.189263	0.150960	0.194768	0.523959
ts_unb	0.024193	0.018397	-0.025906	0.015291

Appendix D3: Quality criteria showing reliability measures

Quality Criteria

Overview

	AVE	Composite Reliability	R Square	Cronbachs Alpha
RQ	0.709395	0.944549	0.085386	0.932072
SD_ECO	0.699712	0.874467	0.140724	0.783598
SD_SOC	0.784398	0.933173	0.313100	0.895297
TPS				

Appendix D4: Latent variable inter-construct correlation

Latent Variable Correlations

	RQ	SD_ECO	SD_SOC	TPS
RQ	1.000000			
SD_ECO	0.069716	1.000000		
SD_SOC	0.525300	0.119036	1.000000	
TPS	0.292209	0.372881	0.337853	1.000000

Appendix D5: Latent construct path coefficients and t-statistics

Path Coefficients (Mean, STDEV, T-Values)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (|O/STERR|)
RQ -> SD_ECO	-0.042907	-0.061164	0.043845	0.043845	0.978593
RQ -> SD_SOC	0.466401	0.464993	0.052427	0.052427	8.896171
TPS -> RQ	0.292209	0.310248	0.075049	0.075049	3.893547
TPS -> SD_ECO	0.385419	0.395123	0.068495	0.068495	5.626970
TPS -> SD_SOC	0.201567	0.208735	0.079785	0.079785	2.526381

Appendix D6: Structural (outer) model t-statistics

Outer Model T-Statistic

	RQ	SD_ECO	SD_SOC	TPS
ed_ast		14.726245		
ed_emp		18.686158		
ed_tur		35.678355		
rq_cdt	62.922590			
rq_iex	64.986468			
rq_jps	34.452562			
rq_lis	60.291871			
rq_rsa	21.638512			
rq_tru	62.669639			
rq_wre	42.206258			
sd_acr			7.404108	
sd_ite			191.075042	
sd_sde			222.655510	
sd_str			89.474669	
ts_aro				0.968505
ts_msu				0.856107
ts_pre				4.264058
ts_teq				3.359522
ts_tpm				5.230399
ts_unb				3.332696

Appendix D7: Total effects of structural model

Total Effects (Mean, STDEV, T-Values)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (|O/STERR|)
RQ -> SD_ECO	-0.042907	-0.049889	0.056343	0.056343	0.761533
RQ -> SD_SOC	0.466401	0.464993	0.052427	0.052427	8.896171
TPS -> RQ	0.292209	0.310248	0.075049	0.075049	3.893547
TPS -> SD_ECO	0.372881	0.378451	0.067974	0.067974	5.485601
TPS -> SD_SOC	0.337853	0.353053	0.069076	0.069076	4.891049

APPENDIX E: VERBATIM FOCUS GROUP INTERVIEW TRANCRIPT

Note: AA denotes Abdulrauf Adediran (principal researcher). SMC A to E are the interviewees.

AA. …If you can briefly just share your thought on why you think that strategy for example unbuilding of contracts actually impact on your growth performance in any way, positively or negatively or however.

SMC A)

1. Yeah well, the only thing that I have found is that uhmm, you know… whether it is mandatory subcontracting, (you get a certain amount of work from the main contractor), you can't really, it is difficult to keep your permanent guys, whether you're doing all kinds of different works - GBs,

CEs, with this, with that. It is hard to always keep your permanent guys, it's hard to maintain, yeah it's just hard to maintain the work. You find you must get work for a week, you might get work for a month, you might, either depending on your contract value or for some contractors how they feel, they must just you know, take you off site. But it is not broad for everyone, but it's something that I've found in my company that's an issue.

It is difficult to keep the staff

AA1. So you keep changing employees based on availability of work

SMC B)
1. Especially when you work in the locations, then you have to employ the people from that area, you see, that's why we can't work with the, we can't keep the same guys for more jobs. What happens actually is that we take this people for their project and when it's finished we do another project, then we must take people again there.

AA2. Yeah, and that's not sustainable, it's not consistent for you

SMC B) – But we haven't got a choice, we must work.

AA3. And how does that impact on your performance?

SMC B) – Then you have to train the guys again.

AA4. And then, that's it. You train them and then you move on again and... Train, train, train, train...

SMC B) – And the other problem is, you get your people from the councillor and those guys, first time maybe they're going to work. They always give people who never worked before. Not that I've got a problem with it, but the problem is, then we have to train them again how to do the work.

AA5. So basically, you can't maintain the same set of skilled employees. So, for example how many permanent staff do you normally keep?

SMC B) – There is no such thing as permanent people (collectively/B&C)

SMC C) cuts in
1. You want to skill your guys, right, to become a bricklayer for example, now you find out you work in a area where they stay but in the next six months, you been taken away, put somewhere

else. Now that person, that skilled guy cannot go work there because he's not from that area. So now you're putting yourself at risk, now you need to train another person which is cost out of your pocket. And you lost because a skilled person can do more work than an unskilled one.

SMC B) cuts in

2. It's not the, only the skilled people, even the guys who they're labourers, the Councillors always okay, the councillors always give you the guys who have never worked before. Then you have to train those guys how to work.

AA6. So basically, do you work mainly as contractors or as subcontractors?

Subcontractors (unanimously)

SMC B)
3. Actually we're supposed to work as contractors, but the main contractors treat us as subcontractors. They're supposed to give us 30% of the project, and then we find out we're working only for labour alone (surprise laugh in the room).

SMC D)
1. You know in this, in this industry, we as SMMEs, we are struggling. We are sitting on the same level. We don't grow up (A - there's no growth), because of subcontracting. If the client can give the job straight to us, then we'll see where we're going to.

AA7. So, what you're saying is preferably if the client gives you the job directly.

SMC B) cuts in

4. And if they don't wanna do that, then *the client must see that the main contractor pays us the right money, and we must have the opportunity to look at the contract between the main contractor and the client. Because we are not aware of what is going on there, and then the main contractor just gives us what they like*. And in the moment, there's no work in PE, we have to take the work. Although you know you cut your own throat, you take that work.

AA8. So you mean that the client unbundles the contract, breaks it down, and then at the end of the day still... (B cuts in... make profit on your work) subcontracts the work, yeah so...

SMC C) cuts in

2. But… that is where unbundling comes from, if there's a project of R200m for example, then you can employ more SMEs. Instead of now the contractor gets 70% and he walks away, and that contractor is not even from the region.

AA9. So basically, what you're saying is the contract is unbundled but instead of the client administering the contract themselves and giving it to SMEs directly, they still go through a main contractor (room murmurs in agreement).

So it's pretty much like mandatory subcontracting...

[(SMC A) Yes, it is, (SMC B) yeah yeah do sub labour only...]

It's a little bit of both I think, it is unbundled but then it's the contractor who goes ahead to give the contracts.

SMC D)
1. Yeah, I think the other thing that is impacting the SMEs, developing the SMEs is, as your topic is, they really, SMEs they don't, when they using this strategy of unbundling, ...give it to SMEs, they don't have the capital, the issue is the capital. Whenever the SMEs they got the job, they still have to, the main contractor is supplying almost everything to the SME. Then that is, I think you will find most us, in your questionnaire, doesn't have a impact in turnover. Because, the reason doesn't have a impact in turnover, you get a contract of R3m but the money actually deposited in your bank is about R700,000 because the main contractor is giving you this 3m and then he's supplying you all the materials, and before they can pay you, they deduct and then doesn't make impact in your profit, doesn't make impact in your turnover. So, at the end of the day the strategy of...

AA10. And also, you don't get to build your own assets (D replies in agreement).

So that one, in relation to, in terms of the relationship, I think it plays a very important role building the relationship between us (SMEs) subcontractors because as you see now, we have a relationship since we started, that one, the relationship, the the strategy is working well for working relationship. But I think what they need to improve is more injecting the capital to the SMEs, so that the SMEs as well can stand alone, they can do those things. For instance, a recommendation, maybe for the strategy, what they can do is, get a big job of 7CE (Grade 7 Civil Engineering) and subcontract, and put it in a small packages, and then the main contractor gonna be the managing

of that, you understand (room murmurs in agreement). Then the main contractor is the managing of that contract. The whole contract is get done by the SMEs according to their grade or according to their expertise.

SMC B)

5. And the main contractor get paid to train us (AA - that's what I was going to ask), but they don't do it. With the last project we were working on, we working on here on the freeway, they didn't even know how to do the work. We had to find out ourselves how to do this work.

AA11. So basically, you don't get the required training and skills development from the main contractor as expected. (Room responds - No, not really)

SMC B cuts in...
But they do get paid to train us (AA - by the clients). The only training, they gave us was for the concrete.

SMC C)

3. In the contract, it does stipulate that there's money set aside for training. Now, that money we don't see as an subcontractor (B - we supposed to get that money). Because that empower us to empower our guys (AA - of course).

SMC D)

2. I think what the main contractor is supposed to do in this one, they do provide trainings, but those trainings they're not relevant to our situation. They're supposed to consult, what training you require (AA - do you need). They not just get us a training...

SMC B) cuts in...

6. And site uh uh uh, training on site is, for our type of work, training on site is the best one (C - Hands on). There's no use you go sit in a class (Room responds - yeah).

AA12. So I want to go back to what you mentioned about the relationship, is good. Do you mean the relationship between SMEs or the relationship between you and the contractor?

SMC D)

3. The relationship between we SMEs as well as the main contractor. So, in terms of the relationship, it working both ways for the main contractor, for everyone, actually for the client which is ████ and the main contractor, in our case which is ████. And the subcontractors

which different companies now we've got a relationship as small SMEs. So, the relationship-wise I think the strategy is working very well (AA - okay). But the money-wise, Ahh (room laughs), I think they need to improve in that (more laughs).

AA13. So uhmm, I I I I'm still trying to wrap my head around the idea of the the training and the money, and why, why you think the client uhmm, the client is not actually intervening in these matters. Uhmm, is, are they just ignoring what's happening? Or you are actually, you're seeing some improvements or it's just...

SMC C)
4. I think the problem there, is the legality of it, because there's a contract between the client and the main contractor. So we don't see that legality. But then in our contract, it says we got access to that main contract. But then that contractor doesn't want to allow us peep into that contract (others murmur in agreement). Because when we se the contract, we can say "hey the rates are different than what we're given". And the legality, how far they're supposed to assist us. So, remember it's money this gentleman (main contractor) is receiving from somewhere, he doesn't divulge it to us, of which we are the ones that do the work. And there we pick it up.

SMC B) cuts in...
7. And the rates... They ask us for rates, and then they change the rates (AA - oh wow), to suit them (room murmurs in agreement).

SMC D) cuts in...
4. Here that problem is the main contra..., that means the client which is coming up with targe... the client that is ▮▮▮▮ (AA - yeah, yeah) and the main contractor. What is happening, the client which is ▮▮▮▮ that is implementing this is not directly involved with the SMEs (room together - with the SMMEs, murmurs in agreement). ▮▮▮▮ directly involved with the main contractor and leave everything to the main contractor, and not monitor, what is the main contractor... is is achieving those targets. So the problem here is still the client because he's the one who's giving the money, he's the one who's investing... The client doesn't take a responsibility (AA - oversight) of making sure the SMEs that they're do, they do achieve of whatever they want to achieve.

AA14. No proper monitoring and evaluation (D - no, no...; C - nothing, none) of the process.

AA15. ... is that a general opinion that the main relationship for you on a contract is between you and the main contractor, correct? No? Not really? Uhmm what I'm saying is the strongest

relationship or the relationship that has the biggest impact on your performance, is it the relationship between you and the SMEs, other SMEs working on the project, or between you and the main contractor?

SMC C)
5. To me, it's different. The relationship between the SMEs is better than the relationship between the SMEs and the main contractor (AA - Aha). Because with the main contractor, if you go and speak about (rates) to him, then he keeps telling you, "sign for this", while knowing that is not the rates. So there's no way that you can really build a better relationship with such (SMC B murmurs in agreement).

SMC B cuts in...
8. And even if we go for advice, they can't give you advice, then we (SMEs) have to work amongst each other (AA - to figure it out). For instance, we get specialist contractors to do our work. I have to go to people who I know who did this job before, years ago. So we must go out ourselves and seek for… (inaudible). Now we are a Grade 3, and expect us to know this work, but they at Grade 9 haven't got somebody who can show us how to do the work (others laugh in agreement).

AA16. Yeah, I think, yeah definitely, there's still some, some improvements regarding the working relationship between the subcontractors and the main contractor. I was going to ask, uhmm, so what you mentioned about having to go to different locations and retrain new guys, does the main contractor have, do they help in that at all (Room responds collectively - no, no)

SMC B) cuts in
9. ...explain it like this, the main contractor, he comes with his people, right. He comes with his people from other sites, they come work here. But then he take 10, 20 people from the area, and then you can think for yourself, where does that money come from? That money is coming here form the subcontractors. You just don't know it, that's all.

SMC C) cuts in...
6. I just need to, we need to clear this one as well. I think in most contracts, there is a rule that says that if a main contractor receive a contract from any so called client, he needs to plough (put) back into the community. There is that rule, but that does not happen. He must ... he must get labour, but he must also plough back. Because then you have... (inaudible) they normally do now, the cheap one, the HIV counselling thing, which is a very cheap thing. But what about, I've got a child, maybe at a special school, where he has done welding at a special school. Why not develop that

person from that community to become a better welder (inaudible)? But what is happening? So those are the things, on the contractor... doesn't get implemented (AA - interesting).

SMC D) cuts in

5. What is affecting us in that case for employing retraining, because that's a government rule of saying, wherever you working, you must employ the local of that particular...(inaudible), of that particular area that you're working to. So now it makes it difficult for us SMEs when we go to another town we come with our people, because they will say no they're not gonna work here. So, you will find a fight between the communities which is a government rule of saying, if you work here you must employ people from that particular... you're not allowed to come with your own staff. You can come with your tools, skilled (employees), and the rest of the labourers must come to that local. So that makes very difficult to retain your employees, because whenever you, because you working in civil, in construction industry (across provinces), you're not working in one area, you're not based in one area. You keep on moving, so retaining employees is very difficult. That's a challenge because that's the government rule of saying you must employ the local people from that particular area.

SMC B) cuts in...

10. And that is not the problem, but the problem is the rates is so low, you can't afford, you can't afford to bring your own guys (here) who have knowledge of the work and take new ones on here (at the same time).

AA17. So, what you're saying now is mainly errm, the main contractor actually does bring his own guys from elsewhere, but they don't let you take your own guys... (room responds - it's not they, it's the locals)

SMC C) cuts in

7. You see, we must implement this 80/20 rule - 20 must come form, you're bringing 20 the contractor, 80 must come from the community, right. Now if you subcontract, why can't that policy not even fall in our hands where we also bring our people and take the 80 from the community (AA - oh yeah). Because then you got your skilled person performing and assisting the person that doesn't have qualification in the job that we're doing. Then we're building that relation towards back to the community.

SMC B) cuts in

11. ...(inaudible) for the qualified guys, for the labourers too, it's not easy for, to take a guy from the street to ...(inaudible) to work with concrete, you understand? But if you got one (skilled) guy, then you can take three or four guys there who can work with that concrete because then there's one guy who got the knowledge to do the work... Of digging, the same with the digging trenches, you need at least somebody who knows how to do it (AA - and you cannot keep training someone every time to do the same thing). B responds - exactly (AA - yeah, of course). Because now you spend 2, 3 months to train the people, then you start working. That's actually what's happening, you see.

AA18. I'll go back to the strategy just one last time. Uhm regarding uhm, how you get the jobs from these, as in these projects, these targeted projects. What factors do you think actually contributes to you getting the job based on the fact that of course, maybe it's based on uhm because you're a local, you're a local contractor here. And you're the preference to get to work on these contract as a subcontractor. And also at the end of the day, how do you reconcile the fact that, okay yes, they have given you these contracts as preference subcontractors, but at the end of the day, you don't derive the developmental benefits from actually being on these contracts. you don't get to actually grow and learn, and improve from actually executing these contracts. At the end of the day, all what you mentioned now is that uhm, it looks like, yes, the clients, they want to, they go ahead and give you the contracts based on the fact that probably you are a preference subcontractor, but at the end of the day, they don't errm go ahead to follow through and see that you guys are actually better off executing these contracts. I don't know, do you have any opinion regarding that?

SMC E)
1. Yeah, I'll say ... (inaudible) we say that hand to mouth. You can get the the the project with R3 million, as as my colleagues alluded to, saying that the main contractor is giving you that contract, and is supplying you, is supplying you with everything, with the material. But then they deduct that material, you see. We're mot developing really.

SMC B) cuts in...
12. It's not that they deduct the material. They go put now handling fees on top of it (room laughs in agreement) (C- that's true... (inaudible) almost R300 for a... (inaudible)) (E - and you don't get invoices from the contractor, from the main contractor).

AA19. So, I think errm, based on what you just said now, then errm, well from what I understand is that, the idea of actually dealing with, with main contractors is not favourable to you guys (room mumurs in agreement), so far (together - yeah). You understand, errm, you'd rather deal directly with the client. Errrm then maybe, maybe errm, for example, there's one of the, there's a strategy here that's, that's not actually, I don't know, it's not that common. It was one of the strategies that I listed here, which is errrm the third-party management. Uhmm, let me just describe that for you. In this case, yes, the contract is unbundled also, but instead of having a main contractor, all you'll have is just a management contractor.

SMC D) cuts in

6. Yes, if they can do that strategy. The main contract is just appointing the managing contracting, then he's actually managing the SMEs to execute the job. And then after we executed the job, they can do the evaluation (AA - yes) whether we growing or not (AA - exactly). Then that integrated development, it will work well if they can use that strategy (room murmurs in agreement) than the current strategy that they are using.

SMC C) cuts in...

8. Can I just ask a question? What you're doing currently? Is this a study? Or you're gonna give recommendations also to the client (AA - Yeah, the client is actually interested in what comes out of the study). Now let, let, maybe this need to get to, over to the client. We've been through a session like this, where we were, they call it a development, this is a developmental project uhhm project we had on. We were b... I can say we were developed, like doing, having your own company, do your books, do the health and safety and everything. But now, how do you take your skill and implement it out there? (B - when you haven't got work). You don't have work. They develop you to become a business person, now when are they gonna put you, give you work to implement that? (AA - so there's also a problem of work availability). Exactly. So now we still sitting on the same level. There's nothing on the table. You've been through the the development session, now you're dead.

SMC D) cuts in...

7. The sustainability of whatever development, because at the end of the day (AA - is not continuous), in the, in the industry of construction, the cidb, that is managing board, after three years you're not working, you're going down (room murmurs in agreement) ... (inaudible) So they must make sure... (inaudible). So, working, they supposed, if they're saying this, they're doing this implementation of, make sure developing the subcontractors. What they're supposed to do, they

make sure that they working hand in hand with the subcontractor, make sure that there is a sustainability of whatever they are doing. Take for instance, the ████ that is a client, ████ make sure those contractors that it is develop to see, to have evaluation of saying, this is five-year contract, let's seeing this and monitor them (room mumurs in agreement) if they do develop to the next stage.

AA20. Yeah, yeah errm what's it called, framework agreements (room murmurs in agreement) for example where they screen you and they put you on errm, on this uhmm framework and they give you jobs across, yeah like you said, five years, and the job is continuous, and it is sustainable.

SMC B) cuts in...
13. With, with that neh, it's not only us who get uhhh educated about the work, our workers also (AA - definitely). Then we, at least we can give this guy, you're working all the time with concrete, here's a concrete certificate. You're working with bricks, here's a bricks certificate. You're working with plaster, here's a plaster certificate. So that guy tomorrow can work for himself (AA - of course), because he got the knowledge how to work with these material (AA - interesting).

AA21. Okay errm, I don't know if errm, anybody wants to add anything to our discussion. But I think it has been quite insightful to be honest (laughing across the room), to get to hear, hear from you guys directly, you know.

SMC C) cuts in...
9. The best way here, is putting your recommendations. Currently, there is about two projects in the region, to make use of the developmental squad, I can call this a developmental squad. In, so maybe three there, three there on that side. Not to develop them, but to bring the skill that they have learnt from the previous there. because now you gonna go to a disadvantaged area where the people doesn't have the opportunity to sit here. Then we can take that over to that person and let that person (B - train that guy), train that person to become a company, how you handle a company (room murmurs in agreement), assist them (AA - yeah). All that they need to do is, say okay, alright we take this one company to be errr, can I say errr PLO (liaison company) ...(inaudible) but to assist that new company from that floor upwards, and that is...

SMC B) cuts in...
14. There is money for that. It's not that there isn't money for that, there's money for that in that contract (AA - yeah, a lot of money is being put, put aside for contractor development, always).

SMC C) cuts in...

10. It's a, it's now a real pity the PM is not here, the PLO is not a part of this. So, they can either take this and take it to their bosses, because they're are the ones that can make this a reality. They brought us to a course, a three-day course, was it three days? (room murmurs in agreement). Three days course, we went through everything I'm saying now, I've been through a course, a developmental work that I've worked. I cannot upgrade because I have that certificate. cidb says you must work, not develop. So how can I upgrade on a development thing (classroom training) (room murmurs and laughs in agreement) (AA- yeah you must work, you must work, and you must...).

SMC E) cuts in...

2. I I I think, I think whilst, whilst you're here (AA - sure), whilst you're here, I'm talking to these guys now, excluding you (AA - okay), because you're just doing (AA - alright, sure) the evaluation. Let's uhmm, make means and see these guys here, the ████ people, and speak to them about our concern. Errr do you understand what I mean? (room murmurs in agreement) We must have a meeting with these guys.

SMC B) When is that?

SMC C) I think your, your solution to this one is, we get hold of Mr. ████, because he is the PLO, liaising with us. Then we must have ████ here as well (room murmurs in agreement). Our concern then we must give it over to them (room murmurs in agreement) (SMC D – we have to).

…End of recording…