Cape Peninsula University of Technology

FRAMEWORK FOR ENHANCEMENT OF GOVERNMENT HOUSING POLICY ON CONSTRUCTION RESOURCES TOWARDS SUSTAINABLE HOUSING DELIVERY IN THE WESTERN CAPE, SOUTH AFRICA

by

ROBIN ALLAN FISHER

Thesis submitted in fulfilment of the requirement for the degree

Master of Construction

In the Faculty of Engineering and the Built Environment

Supervisor: Dr J.A Fapohunda

Bellville Campus

DECLARATION

I, Robin Allan Fisher, declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

---------- ----------

Signed **Date**

ABSTRACT

The ineffective implementation of the government housing policy on sustainable housing delivery in the Western Cape, one of the nine provinces in South Africa, is recognised as the main challenge in the provision of affordable housing for low-income earners. This aforesaid problem persists due to the inability of government housing policy to create an environment in which construction professionals can successfully provide sustainable housing delivery to the less privileged in South Africa. Meanwhile this is a mixed method research which is guided by the Survey approach. I also employed a qualitative (semi-structure interview) and quantitative method (close ended questionnaire) of data collection to respond to the critical questions used to underpin this study. The application of this method was analysed with the Cronbach's alpha coefficient reliability test to quantify the degree of reliability of the questionnaire developed for data collection together with the application of descriptive statistics to statistically demonstrate the mean and standard deviation of the dataset. The values obtained were tabulated and graphically demonstrates the distribution of the values across each variable.

However, the findings attained revealed the factors with major or slight effects on the government housing policy on labour, materials, plants and equipment. All these resources are significant in the sustainable housing production process and the integration of sustainability into housing production. In addition, the framework for enhancing Government policies on the implementation of sustainable housing delivery for low-income earners developed in this study created a comprehensive approach towards mitigating the different factors that impact on construction resource utilisation. Therefore this study through its findings recommends the South African Government to redevelop their housing policies in order to mitigate its impact on construction professionals and role players by providing them with good policies which will enable sustainable housing delivery to the lower-class groups within the Western Cape Province – and consequently to the entire country.

Keywords: Government housing policy, housing legislation, housing policy implementation, housing delivery, housing delivery agencies, construction resources

management, sustainability, sustainable development, sustainable housing**,** framework.

ACKNOWLEDGEMENTS

I want to thank the Almighty God for his infinite mercy over me during this study.

Also, I acknowledge the guidance of my supervisor, Dr Fapohunda Ayodeji Julius, for his patience, concern and valuable support towards successful completion of this study.

My appreciation extends to the Heads of Department of Construction Management and Quantity Surveying, Mrs Toni Stringer, Mr Lance Wentzel and Mr Eric Simpeh for their incomparable assistance towards the success of this research work.

Similarly, I duly appreciate everyone who contributed to the success of this study, specifically these staff members of the Department of Construction Management and Quantity Surveying: Mr Akinyede Imisioluseyi Julius, Mr Ayodele Fatoba, Mr Alvin Opperman, and especially Mr Ndukuba Nnadoziem Samuel for their valuable assistance.

Special gratitude goes to my family and friends who have been supportive, particularly my mother, Mrs. Olga Marion Andrews, and my children, Stuart and Nicole, Randall and Farzana, Sean and Tiana, Nicole and Juan-Luc, and my first grandson Roare-Sebastian, as well as my life-long friend, Willem Hollander, for all the motivation, encouragement and patience bestowed upon me during this study.

I will never forget to mention the support given by the pastors, leaders and all the members of the Word of Faith Community Church of Athlone who covered me with their prayers.

Lastly, I thank the Cape Peninsula University of Technology (CPUT) and the Dean of the Faculty of Engineering and staff members for the bursary awarded to me throughout the duration of my studies.

DEDICATION

This thesis is dedicated to my late father, James Everett Granville Fisher, who taught me a love of reading and always expected me to do my best.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

GLOSSARY

The following terms are defined according to the context of the research topic.

Terms	Definitions
Policy	A plan or course of action, adopted and pursued by a government, ruler or a political party, intended to influence and determine decisions and regulate actions.
Implementation	Phase of the policy cycle in which adopted policies are put into effect through organised activities by government directed towards the achievement of its goals and objectives.
Housing	Generally refers to the social problem of ensuring that members of society have a home or dwelling in which to live that meets the requirements of government building regulations.
Sustainability	Ability to continue a defined behaviour indefinitely; incorporates environmental sustainability, economic sustainability, and social sustainability.
Sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Sustainable housing	Homes that are designed to reduce overall environmental impact during and after construction.
Construction resources	Those factors of production required to accomplish construction activity which will include land, labour, capital, materials, machinery, energy, expertise, management and time.
Housing delivery	Provision of adequate shelter according to a set of principles, standards, and policies in terms of sustainability, quantity, and quality of housing environment.

ABBREVIATIONS

BNG	Breaking New Ground
CIDB	Construction Industry Development Board
CQC	Contractor Quality Control
MV	Mean Value
NHF	National Housing Forum
PPPs	Private Public Partnerships
PMBOK	MGT Principles and Practices, MGT Knowledge
QAC	Quality Assurance Control
SD	Standard Deviation

CHAPTER ONE

INTRODUCTION OF THE STUDY

1.1 INTRODUCTION

The provision of sustainable housing and consistency in the quantity and quality of its delivery has been a major problem since the time of apartheid policy in South Africa. The post-apartheid government inherited an urban housing backlog of approximately 1.3 million units at its inception in 1994 (Knight, 2001; Goebel, 2007; Landman & Napier, 2010; Gwedla & Shackleton, 2015). Segregation of community and class among the citizens has been a foremost contribution to this problem. Hence, it became difficult for the majority of citizens to access significant and decent accommodation for both old and young in South Africa. Although the new government established a policy especially to provide housing for all South African citizens, the inefficient implementation of the policy is plagued with political, technical, and social problems. The impact of these factors, experienced since the pre-1994 apartheid regime, is exacerbated by population growth, migration and slow housing delivery.

Today, millions of South Africa's poor black households live in shacks, hostels and crowded houses in marginalised townships and informal settlements that are awaiting access to government-availed land and houses. Moreover, since the realisation of democratic governance in 1994, the South African government and other stakeholders have been crafting, incorporating and applying several methodologies to housing provision with the objective of consolidating the rapidly rising demand (Mafukidze & Hoosen, 2009; Van Wyk & Oranje, 2014; Doppelt, 2017).

Based on these circumstances, it is necessary to conduct research on the provision of increasing housing for South African citizens by investigating the required steps for enhancing government housing policy and the adequate utilisation of construction resources towards sustainable housing delivery. However, other important sections of this chapter comprise the background of this study, problem statement, research question, aim and objectives, significance of the study and scope of the study. Also presented is a brief introduction of the research methodology, delineation of the study, thesis outline, and ethical consideration for the study and key assumptions.

1.2 BACKGROUND OF THE STUDY

In the South Africa construction industry, initial planning is a major problem in effective production process for the delivery of sustainable housing. In essence, adequate planning is a necessity for attaining sustainability. According to Burgoyne (2008), a lack of planning capacity has rendered government policy impotent with regard to the delivery of affordable *and* sustainable housing. In addition, adequate planning towards achieving a sustainable production process should include:

1. maximised potential for renewable energy;
2. minimised waste and maximised, re-used and recycled materials during the production process;
3. conserved water resources;
4. minimised pollution emissions into water and soil; and
5. Sourced-out local materials and maximised use during production process (Burgoyne, 2008; Ates & Bititci, 2011; Kumar *et al.*, 2017).

The South Africa housing policy in the new era is highly commendable in its aspiration to achieving adequate housing by supporting citizens and fulfilling their need for accommodation, as noted in the South African Report for the Review of the Implementation of the Habitat Agenda 2000 (South Africa, 2000). Similarly, the report on South Africa's housing experience and progress between 1996 and 2001, in accordance with the commitments of the Habitat Agenda, stated that, "the separation of residential areas of the upper class from the poor and lack of access to basic facilities for the poor is a major challenge to realising the objectives of the South Africa housing policy" (Tomlinson, 2011). Particularly, there is an urgent need for the provision of housing and also the necessary facilities for citizens to resolve the present challenges of inadequate housing and underdeveloped urban periphery settlements (Huchzermeyer, 2011; Charoenkit & Kumar, 2014).

Despite the government having devoted significant resources to enabling sufficient housing delivery, the wholly inadequate contribution of construction operators coupled with ineffective policy implementation caused a setback to the delivery of affordable housing for the lowest income earners (Burgoyne, 2008; Hoornweg & Freire, 2013; Ibem, Aduwo & Onyemaechi, 2017). Similarly, in a study conducted by Ngxubasa (2010), construction operators' inadequate attention to housing design and

construction procedures on the site resulted in a decline in sustainable housing delivery. Inadequate design in sustainable housing delivery then, in turn, contributed to the problem of inaccessibility of housing design choice by the citizens. This is because the price of housing delivery exceeded the income of the individuals on the waiting list (Ngxubasa 2010; Bakhtyar *et al.,* 2013; Opoko & Oluwatayo, 2014; Iwuagwu, Onyegiri & Iwuagwu, 2016).

Rust (2006) further clarified that inadequate design by construction operators has constrained the poor in squatter settlements. In essence, this makes it difficult for people to access comfortable housing, have good health conditions and find conducive environments suitable for living and working. Despite a lack of the aforementioned basic amenities, demand for quality housing has persistently increased. A report on the institutional arrangement of the three tiers of government clarified that adequate design prior to policy implementation will enhance development and reduce the running costs of the housing production process; even though the government has delivered over three million houses that are fully subsidised, there remains a backlog of over two million housing units still unaddressed (Du Toit, 2002). To this effect, some challenges that frustrated the delivery of housing units were identified as infrastructure constraints, delay in township establishment processes, limited availability of affordable and well-located land.

The 1996 Constitution of South Africa is the supreme law of the country. It is not only applied to the principle of meeting people's basic needs but also recognises the right to basic needs such as housing, healthcare and a healthy environment. This has a significant influence on the new National Housing Policy. Hopkins (1999) further emphasised that section 26 of the 1996 Constitution states that all South Africans have the right to have "access to adequate housing". Further understanding discloses that the government is held responsible to have a substantial legislature, and other valuable measures, within its available resources regarding the attainment of this right on a progressive basis (Kahn & Thring, 2003). In addition, the constitution acknowledged that the right of every citizen to adequate housing is not attainable immediately, but over time. As a result, the government is expected to convince the public that citizens' housing issues will be resolved in due time. To buttress this, Hopkins (1999) defined *adequate housing* in terms of legal security of tenure based

on: “the availability of services, materials, facilities and infrastructure, affordability, accessibility and housing location.”

The White Paper on housing by the South African government of National Unity declares that “the greatest challenge faced is to house the nation” (South Africa, 1994). However, the magnitude of this challenge has not emerged only from the immense size of the existing backlog and/or the misery and frustrations of the homeless; it also emerged from extremely complex and bureaucratic institutional framework inherited from the previous government (Greene, 2014; Green & Haines, 2015; Hojdestrand, 2016). Essentially, the 1994 White Paper signified the beginning of a new process, wherein it is the first time that a policy framework envisaged housing for all citizens. This framework was established to create certainty in the market and partnerships between all tiers of government and the private sector. The aim was to attract the private investments required to achieve a complete removal of the visible and damaged inheritance of homelessness from the past (Stroh, 2015; Silver, 2016; Donley, Crisafi, Mullins, & Wright, 2017). The Thematic Committee in 2001 explained that the sustained delivery of housing at an unprecedented level will be the foundation of restructuring society and rejuvenating the economy of a new South Africa.

On the part of the government, adequate policy has been legislated but the successful implementation of this policy is yet to be achieved. This has resulted in a gap that must be investigated. Comprehensibly, the possibility of attaining efficiency in implementing policy and delivery of sustainable housing in Western Cape Province in particular, and in South Africa as a whole, seems unlikely due to daily increases in the number of people living in the slums and squatter settlements despite high subsidy rate offers from the government to contractors (SAIRR, 2015). These circumstances prompted the development of a research topic in the area of enhancing the government policy for the galvanisation of an effective utilisation of construction resources towards sustainable housing delivery in Western Cape Province of South Africa. Therefore, the outcome of this research recommends that the determinable factors should improve government policy based on the effective utilisation of the construction resources for sustainable housing delivery in the western region of South Africa. The diagram displayed in the Figure 0.1 represents the conceptual understanding of the framework formulated for this study.

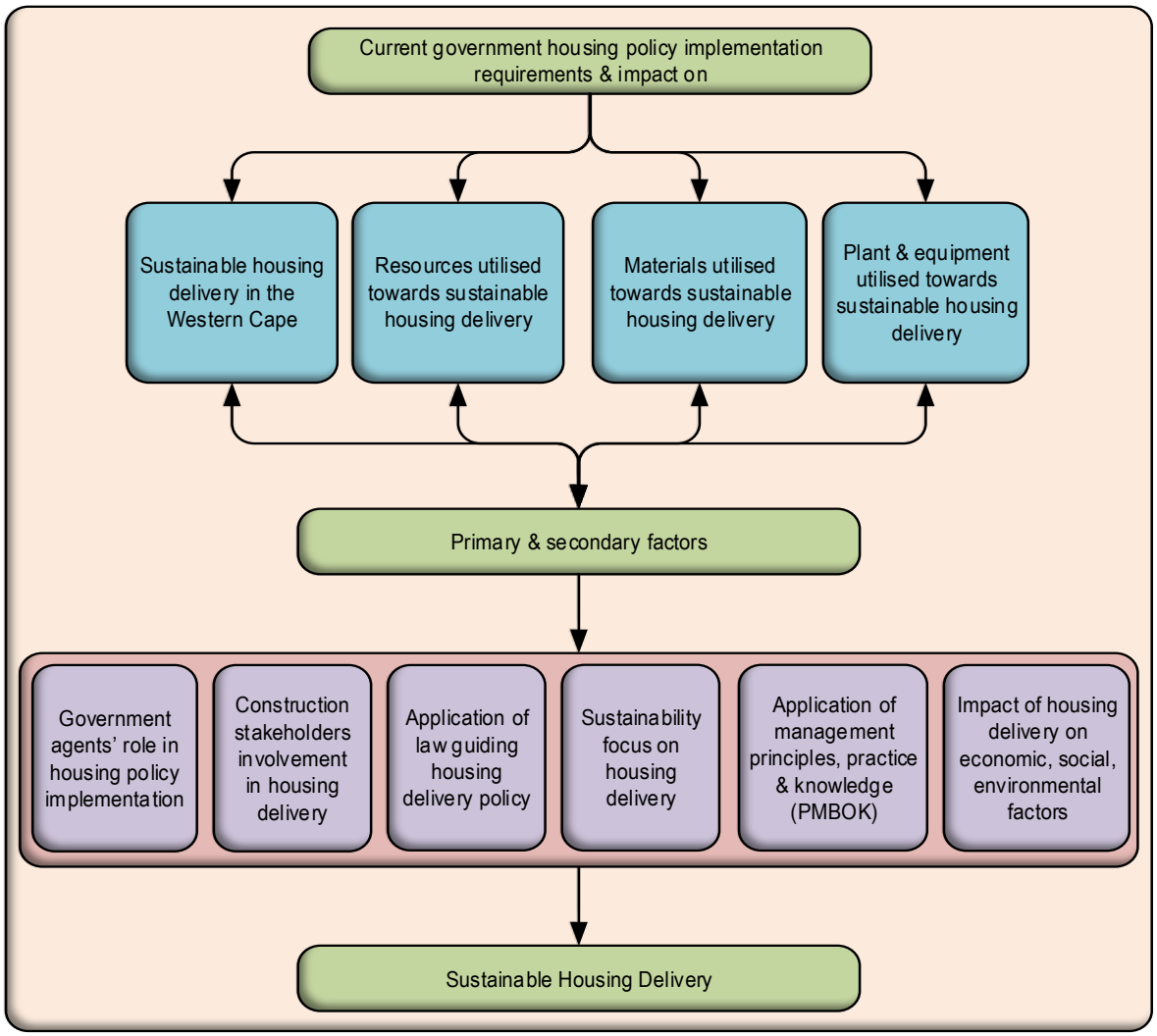

Figure 0.1: Conceptual framework

1.3 PROBLEM STATEMENT

Despite the efforts placed by the South African government in the provision of good, quality and affordable households/houses for its citizens and ensuring the delivery of sustainable housing to its citizens as well as it affordability. There still remains a major problem concerning how Government housing policy on construction resources could contribute towards ensuring sustainable housing delivery. Meanwhile, the ineffective implementation of the government policy pertaining to affordable and available housing delivery to people is considered as an obstinate challenge in the world as well as in South Africa today (World Commission on Environment and Development, WCED thereafter, 1987); due to this, many people inhabiting the shantytowns are vulnerable to diseases. Moreover, because the cost of sustainable housing delivery is

high, there is a reduction in the production of high quantity and quality housings to these vulnerable people. In the course of resolving this predicament some decades back, the government of National Unity aimed to provide adequate housing to the lower-class. This scheme was blocked by existing issues in the construction process, such as inadequate design services, geographical location, social issues, poor construction, funding, long waiting lists, urban planning and services delivery (Le Roux, 2011). The introduction of the Breaking New Ground (BNG) programme by the former Department of Housing was specifically intended for the delivery of human settlements. BNG is an entity specifically created for the delivery of sustainable housing for the poor (Tomlinson, 2015).

One of the functions of BNG is to integrate sustainability into the housing production process to facilitate sustainable development, create wealth, alleviate poverty and provide equity (Jeucken, 2010; Cuthill, 2010; Khansari *et al*., 2014). The aforesaid opportunities are frustrated by inadequate housing delivery, unreliable housing production process (in creating jobs), inaccessible housing, unimproved economy, increased crime rate, poor social cohesion, poor quality of life, increase in segregation and spatial settlements (Leishman & Rowley, 2012; Aalbers & Christophers, 2014; Gilbert, 2014; Alexander, 2018).

The policy established for planning and development by the government that existed before South Africa became a republic is alleged to have promoted segregation and spatial separation of residential areas in relation to income, class, urban extended population groups, urban peripheral settlements and poor residential areas with inadequate access to basic amenities (Goodfellow, 2013; Philip, 2014; Butler, 2017; Thorns, 2017). These factors have led to human settlements being unequal, highly inefficient and wholly unsustainable as illustrated by the Thematic Committee on South Africa housing policy of 2001 (Carley & Smith, 2013; Josie & Chetty, 2015; Todes & Turok, 2018). That said, the government's policy aimed to improve the people's standard of living by providing decent accommodations and enabling environments (Makinde, 2014; Del Pero *et al*., 2016; Ball, 2017), but little to no fewer of the low-income earners to have access to decent housings of their choice at low costs (Adebayo & Adebayo, 2001; Rosenberger, 2003; Chanter & Swallow, 2008; Wapwera, Parsa & Egbu, 2011).

1.4 AIM AND OBJECTIVES OF THE STUDY

The study aims to establish a framework for the enhancement of government policy on construction resources utilisation towards the delivery of sustainable housing in the Western Cape by ensuring that the following specific objectives are met:

1. To identify and ascertain the effects of government policy on the utilisation of materials towards the delivery of sustainable housing;
2. To discover and assess the effects of government policy on construction labour utilisation towards the delivery of sustainable housing;
3. To ascertain the effects of government policy on plant and equipment usage towards the delivery of sustainable housing;
4. To identify the effects of government policy requirements on resource utilisation towards the delivery of sustainable housing; and
5. To establish and develop a framework for the enhancement of government policy on construction resources utilisation towards the delivery of sustainable housing.

1.5 KEY RESEARCH QUESTIONS

The research questions for this study were developed to probe the need for the study towards what is achievable within the research framework. The main research question for this study is;

> *What are the effects of government policy on construction resource utilisation for the delivery of sustainable housing in the Western Cape?*

However, to address the issues surrounding the main research questions, answers will be sought from the sub-questions set as follow: appropriately:

I. What effect does government policy have on material utilisation towards the delivery of sustainable housing?
II. What are the effects of government policy on construction labour utilisation towards the delivery of sustainable housing?

III.	What are the effects of government policy on plant and equipment usage towards the delivery of sustainable housing?
IV.	What are the effects of government policy requirements on resource utilisation towards the delivery of sustainable housing?
V.	How can the government achieve an operational framework to enhance policy on construction resources utilisation towards the delivery of sustainable housing?

1.6 SIGNIFICANCE OF THE STUDY

The significance of this study is to further the utilisation of the construction resources toward productivity during a sustainable housing production process. In addition, the study will boost the capability to integrate sustainability into the housing production process. This effect is expected to facilitate the implementation of necessary policy.

1.7 OVERVIEW OF THE LITERATURE REVIEW

This is an investigation of the effects of government policy on construction resources utilised towards the delivery of sustainable housing.

1.7.1 Government policy and the effects on housing delivery

Since 1994, housing policy in South Africa has been centred on the housing crisis (Knight, 2001). During this period, the challenges facing the Department of Housing were numerous. The study by Rust (2006) revealed that approximately 86% of households earn less than R3,500 per month; thus, housing affordability is critically restricted and in dire need of subsidisation (Rust, 2006). In the same period, it was estimated that the country had a backlog of three million housing units (Du Toit, 2002). The government then introduced housing policy based on ‘market centred approach’ to facilitate mass housing delivery programme with the intention of attaining a mass production of one million houses in the first five years of government. This intent was only achieved in the seventh year of office and the public was dissatisfied with this foot-dragging achievement (Rust, 2006).

The implementation of the housing policy was accompanied with a promising one-off capital subsidy. This came with the creation of a series of government initiatives to

stabilise the housing sector and the creation of conducive environments to entice the private sector with an incremental housing ‘consolidation' initiative, that is, self-help housing (White, 2013; Cheng & Fung, 2015). Important additional initiatives for the housing sector included a discount scheme for the sale of state rental housing stock, a hostels-focused redevelopment programme, the creation of financial assistance mechanisms for the local authorities for bulk infrastructure provision and eradication of informal housing (Jenkins, 1999). In addition, by 1997, the government passed a new Housing Bill, which demonstrated the worst features of the existing approach. The implementation of this bill peculiarly contradicted the provision of housing. Nevertheless, there seemed to be no consideration of limited consumer affordability, which remains the main challenge thwarting large-scale provision of township housing (Bond & Tait, 1997; Kahn & Thring, 2003).

1.7.2 Negative effects of government policy on housing delivery

Explicably, as far back as 1997, failure of the ‘market centred approach’ of government housing policy was attributed to increasing political alienation. This effect could mean the government will find it difficult to convince the people in future elections and certainly thwarted the task of unifying and reconciling the nation back then (Bond & Tait, 1997). Upon examination, researchers began to assert that the new South African housing policy seemed to embed and fortify rather than lessen surviving inequalities existing since the apartheid regime (Lalloo, 1998). Over the two and a half years of the policymaking process to establish oneness among the shareholders in the National Housing Forum (NHF), it is now understood that the opinions of the displaced people were never heard; this was attributed to the lack of properly structured organisations and nonexistence of organisations through which they could express their views (Rust & Rubenstein, 1996). In that case, the resulting defective policy from the NHF process merely echoed the views of technical experts and not the concerns of those affected with housing delivery (Tomlinson, 1999).

It is evident that the provision of housing to impoverished communities by the South African government is considered to be inconsistent, poorly handled and inadequately delivered to relieve the dire conditions of the homeless in need of shelter. For example, relatives located in two peripherally located areas of the Cape Metropolitan Area had to struggle before securing access to housing despite the difficulties undergone with regard to the state officials’, politicians’ and other stakeholders’ hostilities (Oldfield,

2000). In some cases, where the central government has neither the will nor the ability to provide housing, Private Public Partnerships (PPPs) are often perceived as a implementation solution. Here, the private firms contact municipalities in a desperate manner and deprived communal groups of the idea of equality and power sharing (Agyeman, 2013; Plummer, 2013; Simmons *et al.,* 2018) because the community is often at the receiving end when private firms handle any developmental projects. This effect leads to the conflict between the private sector's profit-driven interests and communities' welfare-driven interests – and ultimately results in inadequate project delivery (Miraftab, 2004).

Furthermore, Gordon and Nell (2005) emphasised that difficulties and high initial costs daunt venture capitalists from investing in urban residential development. The researchers suggested the implementation of a 'development facilitation' team to support and guide property developers on the complex maze that is the development process and further suggested that the creation of this team could facilitate potential reductions in development and connections costs; in return, this team would beneficially affect the capital costs essential to the development project (Gordon & Nell, 2005). Understandably, the municipalities' ineptitudes and failures in the right discharge of obligations have caused excessive development fees and, in effect, imposed increased sponsorship requirements on the government during affordable housing projects (Rust, 2006).

1.7.3 Positive effects of government policy on housing delivery

Considering the positive effects of government policy on the housing delivery in South Africa since the 1994 democratic elections, the South African government – in conjunction with the republic's financial sector – is committed to offering mortgage financing to low-income households through its housing subsidy scheme. South Africa's housing policy declared that economical housing finance is fundamental to the delivery of an acceptable standard of housing to low-income households of less than R3,500 per month (Department of Housing, 1994). In the past ten years, the willingness and cooperation of South Africa's banks to provide finance has been frequently doubted and, in reaction, the state has launched an array of programmes to release housing finance to the needy (Tomlinson, 2007).

One approach vigorously encouraged in the South African housing policy documents has been community participation (Mafukidze & Hoosen, 2009). It is argued that end user involvement is vital for the successful execution of low-cost housing projects. In that case, this claim is presumed to help the end users make personal choices about housing design, which could latterly lessen the problem of the high-cost housing projects. However, it is now understood that the general implementation of the low-cost housing projects is not, in any substantial way, hinged on community participation given that the communities often choose short-term solutions over long-term benefits (Lizarralde & Massyn, 2008).

The study also discovered that a lack of competence, mismanagement and a lack of transparency and accountability are commonly associated with municipality government involvement in the housing delivery. Many times, municipalities have been blamed by the communities for housing delivery failure which they have no jurisdiction to administer. In light of that, the provincial government has been assigned to administer the delivery of housing to the people. Ironically, if the provincial government fails to deliver housing to the people as assured, the municipalities are often left to deal with the consequences (Tomlinson, 2011).

1.7.4 Effect of government policy on housing quality

The full aesthetic of housing is measured through efficiency and quality implemented throughout the production process to ensure that the delivery of quality housing is given attention to detail (Arditi & Gunaydin, 1998). The government is expected to design a policy that guides the development of said model in stimulating the quality required for the construction industry, with which the construction stakeholders must comply (Tomlinson 2015).

The Construction Industry Development Board (CIDB), the apex body tasked with the obligation of administering of ‘quality’ implementation in the South African construction industry, explained that value, to a client, is a complex and subjective issue and, in addition, the body further established that quality in construction is a key component of perceived value to the client. However, the lack of quality in construction is an indication of poor and non-sustainable practices by the workforce (Gusta, 2016; Karakhan & Gambatese, 2017; Samih, 2018). Similarly, Adebayo and Adebayo (2001) claimed that ineffective management and inexperience in construction technology by

construction operators were additional factors responsible for low-quality in housing delivery. Rajkumar *et al*. (1998) support the above statement by clarifying that construction policy on quality is not properly implemented due to inadequate and ineffective management of housing production processes. With a clear explanation, sustainable housing delivery should be integrated into quality assurance control (QAC) and contractor quality control (CQC) to achieve implementation of policy goals during production. Arditi and Gunaydin (1998) then consolidated the above discussion by mentioning that efficient resource management is required to achieve a high level of quality housing delivery during production processes.

1.7.5 Material resources management

Resource management of materials is a significant component in the housing production process (Ameh & Osegbo, 2011). The effective use of materials during the production process is considered imperative in the delivery of sustainable housing. Material selection, as a determinant, has a significant impact in the quality level of the housing delivery; more importantly, improper material selection has caused significant variance during production (Madhavi *et al*., 2013). Gulghane and Khandve (2015) emphasised that increases in the price of building materials affects the housing production process, which has a resultant effect on construction costs and, understandably, the artificial scarcity of building materials at the construction site contributes to delay in housing delivery.

However, Donyavi and Flanagan (2009) suggested that the establishment of effective procurement management systems on site be required to avoid and mitigate the constant increase in price of materials. Similarly, Patil and Pataskar (2013) also supported the importance of having efficient material management plans on site to facilitate constant supply of building materials. In other words, easy accessibility to construction materials enhances efficiency in production process. Ramah *et al*. (2012) and Madhavi *et al*. (2013) asserted that accessibility to materials encourages adequate selection of quality materials for production and enhances sustainable housing delivery.

Actually, sustainable housing construction necessitates an efficient use of resources, with the intention of reducing material wastages during production (AL-Najjar & Enshassi, 2008). Moreover, sustainable housing delivery encourages proper planning

regarding resource usage, since the policy of sustainability is aimed at conserving natural resources. Donyavi and Flanagan (2009) contradicted the above statement by declaring that availability of materials in the construction industry influences high productivity, including avoidance of time wastage by construction operators. Sustainable housing delivery within approved budgets is only possible with a constant supply of materials, effective time management and standards for quality control. In South Africa, the government is yet to enact a policy on material resources management. This laxity is seen as a significant problem in the delivery of sustainable housing to the poor.

1.7.6 Manpower resources management

Manpower is a significant resource required for a sustainable housing production process. Efficiency in human resources management enhances sustainable housing delivery. Lack of proper management of the workforce hinders effective management of the production process in the delivery of sustainable housing. Equally, ineffective management of human resources affects construction budgets specified for building production processes (Rahman Memon & Karim, 2013). Human resources management in the construction industry is critical and, if not properly managed, can influence other constraints during building production process such as time, budget and quality (Alwi, 2003).

Efficiency in labour productivity enhances timely delivery and paves the way for the control of expected quality and construction costs by the project managers (Rahman *et al*., 2013). As part of the importance of manpower resources management, teamwork is considered as a necessity among the workforce to boost the efficient delivery of housing projects. With the aim of attaining efficient housing delivery within the budget stipulated, conflict among workers must be thoroughly resolved. Sustainable housing delivery is attained by effective planning and by focusing the workers on their assigned tasks in achieving organisational target goals (Delaney & Huselid, 1996). No human resources management policy is enacted by the government in South Africa like those pertaining to material resources management.

1.7.7 Machinery resources management

The construction industry role-players are categorised as organisations and people, which include companies, firms and individuals working as consultants, main

contractors and sub-contractors, material and component producers, plant and equipment suppliers, builders and merchants. The effective handling of these resources, and the risks related to them, are considerably critical towards attaining complete project implementation (Ling & Hoi, 2006).

Machinery resources management, in accordance with the construction projects, location and circumstances are prone to delays and excess costs due to factors such as equipment availability, machinery availability and materials availability (Frimpong Oluwoye & Crawford, 2003). This effect is triggered by unproductive procurement and resource management procedures (Frimpong *et al*., 2003). Moreover, the construction industry has the highest occurrence of fatal accidents and devastating injuries (Cheng, Li, Fang & Xie, 2004). Frequent occurrence of accidents and injuries in this sector is primarily attributed to lack of attention to safety management by main contractors and 'poor quality of construction materials and machinery' (Cheng *et al*., 2004).

The implementation of heavy machinery in the construction industry is controlled by government policy in terms of health and safety aspects. The Occupational Health and Safety Act No. 181 of 1993 defines *machinery* as "any article or combination of articles assembled, arranged or connected, and used in converting any form of energy to performing work, or stored" (South African Department of Labour, 1993). The purpose of this is to delay the implementation of the safety preparations until the start of a construction phase and the ability to effectively design for the elimination, avoidance and reduction of hazards is not fully realised (Behm, 2005). Clearly, it is understood that whenever a project is undertaken, firms are subjected to risks associated with design, construction and technical aspects such as design failure, equipment and systems failure, estimation error, collision and accidents (Ling & Hoi, 2006). Fiscal challenges are also categorised as a primary factor that causes delay in construction projects, while other factors like co-ordination and material problems are categorised as secondary factors (Frimpong et al., 2003).

More so, construction plants and equipment are deemed to be a significant source of delay in construction projects (Alaghbari *et al*., 2007). Edwards and Holt (2009) contended that proper construction equipment and plant management can foster safer working conditions and improve productivity rates – provided that more robust associations are cultivated within the industry. These days, there is a divergent line

between the research and development (R&D) performed by manufacturers and academic researches executed at the academic institutions by the research scholars (Edwards & Holt, 2009).

1.7.8 Effects of government policy on housing production process

Conventional housing delivery has increased by 50% since 1994. An additional 5.6 million formal homes have been constructed since the first democratic elections. Government and human settlement stakeholders committed to deliver 1.5 million housing opportunities by 2019. The banks, developers, mining companies, and big employers officially declared South Africa one of the biggest construction sites in Africa and the developing world (South African Government, 2014). To some degree, many indigenous people believe there is nepotism in the allocation of housing, wherein necessary home-ownership requirements are not followed or the monetary resources of the poor are not considered as determinants in the allocation of housing (Nsengiyumva, 2013; Yung & Lee, 2014; Paris, 2017). However, only a few studies have been carried out assessing the willingness or ability of home-ownership to meet housing needs and relieve the pressure of the current housing production crisis (Watson & McCarthy, 1998).

The increase in urbanisation and poverty levels are continuously raising the demand for housing delivery; now, even delivery programmes established by government strive to satisfy the demand (Rondinelli, 2013; Berry, 2015). In the production of housing, there are emerging delivery programmes, such as in the private sector, market related housing (typical townhouse clusters and security/lifestyle estates), delivery of public housing (RDP and social housing models) and an emergence of various aided and unaided self-help models (People's Housing Process of state-aided house building and unaided growth of informal settlements) (Bulkeley, Luque-Ayala & Silver, 2014; Lund, 2017; Czischke, 2018). Traditional self-help housing, along with a number of formal programmes to promote aided self-help housing have not scaled due to an insufficient consideration of the local market, land supply patterns, land values and housing mixes (Landman & Napier, 2010).

Housing design is a powerful communicative medium because it reflects people’s social values and political motives, although new methods used for both can enhance the production of real transformation (Dweck, 2013; Woolthuis *et al.,* 2013; Fields &

Uffer, 2016). Actually, legislation flexibility could encourage alternative methods, including creative exploration of layouts, materials and methods. In that case, legislation promotes the smaller scale of building but neglects the larger scale urban planning. This is prescriptive in nature and restricts innovation (Osman 2010). South Africa, as a developing nation, is finding it difficult to address the United Nations (UN) Millennium Development Goals target of slum-free cities as a result of the current housing policy (Le Roux, 2011; Van Der Byl, 2014).

The inefficiency of housing delivery in South Africa does not lie in the allocation subsystem or co-ordination subsystem because the innovations related to these areas abound (Ajayi, 2012). Literally, delivery technology is *not* a problem, but rather the delivery process is. For instance, the process involved in the delivery of urban social housing project with the involvement of the housing cooperatives should ensure that an effective housing development and implementation process for low-income group is achieved. In the developing countries, however, the development of housing cooperatives is considered 'slow' because they are newly established. The cooperative housing approach is a parallel line between two extremes: one end of the spectrum is the individual ownership and the other end is rental housing (Allen *et al*., 2008; Ajayi, 2012; Alves, 2017).

Since April 2002, the government of South Africa has granted municipalities the jurisdiction of managing the development of the low-income housing. This is due to the necessary amendments to the procurement process that were implemented after the bill on the Housing Amendment Act 4 of 2001 was passed. Since 1998, however, a shift towards a more local government-centred and state-driven approach was attained. Thus, approved municipalities are allowed to carry out housing related functions through an appropriate accreditation, including functions like subsidy budget planning, which is currently undertaken by both national and provincial governments (Jimoh, 2012).

1.8 OVERVIEW OF THE RESEARCH METHODOLOGY

Descriptively, methodology is an embodiment of practices and techniques applied in investigating a particular phenomenon. Also, it is used in facilitating a direct approach to gaining knowledge on the best way to solve persistent or intermittent problems. In

essence, the knowledge enhances the ability (or possibility) of the researcher determining the necessary steps to be taken in accomplishing reliable research results.

The methodology employed in this study involves the collection of required information, data gathering, interview recording, questionnaire design, selected respondents, results validation and data analysis. These steps, procedures and techniques were applied thoroughly to comprehend the literature reviewed and galvanise the knowledge required to attain the aim and objectives developed for this study. This process is achieved through the implementation of the quantitative and qualitative methods that facilitate a simple methodical approach to attaining the aim and objectives that proffer satisfactory solutions to the problem statement and research questions highlighted earlier in section 0, 0 and subsection **Error! Reference source not found.**.

To support the above description, Rajaseker Philominaathan and Chinnathambi (2013) gave a simple description of quantitative and qualitative methods as an application of additional reasoning towards research. Furthermore, research methods may be described as techniques applied in the execution of research. Alternatively, research methods can be referred to as techniques required for performing research operations. In other words, Kothari (2009) explained that any applicable methods used by a researcher to perform a study on the research problem are termed as research methods. In addition, research methodology consist not only the techniques but also includes the consideration of the technical know-how that guides the methods applied in the study (Kothari, 2009). This is further explicated as an understanding into the reason for adopting a specific method or technique to resolve obstinate problems (Kothari, 2009).

In this study, mixed methods were employed to simplify the significance of an analytical approach to data analysis when investigating compound and multi-faceted research questions. The above description paves the way for the application of qualitative and quantitative approaches in a data analysis that involves survey responses and pure numerical analysis. These facilitate a comprehensive assessment of the response structures (Driscoll *et al*., 2007). Consequently, the combination of these two approaches adds perceptive depth and definition to the study.

The novelty of this study covers the establishment of a framework to enhance the government policy implementation on construction resources utilised for a sustainable housing delivery. Ruane (2011) mentioned that an error free scientific research is attained through a careful execution of the methodical approach formulated, which tends towards integrity and knowledge realisations. This implies that evaluation of information is directed towards knowledge and integrity of the outcome.

1.8.1 Research flow chart

The flow diagram displayed in the Figure 0.2 illustrates the steps for formulating, assessing and executing the study. The process started with the *topic identification,* which defines the development of research proposal and extends to both *exploratory* and *pilot studies.* As part of the process, the *research aim* and *objectives* were developed from the *problem statement,* including the *research methodology* formation and *qualitative interviews,* which were formulated from the *literature review* and *qualitative survey,* respectively.

In addition, the research methodology extends to the *quantitative survey* and *data collection,* which facilitates the design of *quantitative questionnaires.* Afterwards, the *data analysis* approach was implemented to explore the categorisation of the data collected and confirm the degree of suitability of the data towards achieving the research aim. Appropriate execution of this process generated simplified *findings* in accordance with the objectives layout to develop *recommendable solutions* and *concluding understandings.*

The *recommendations* and *conclusion* that was derived at the end of the *discussion of findings* simplified and highlighted the right procedures required for developing a suitable framework to enhance the government housing policy in regard to construction resources and sustainable housing delivery in the Western Cape of South Africa.

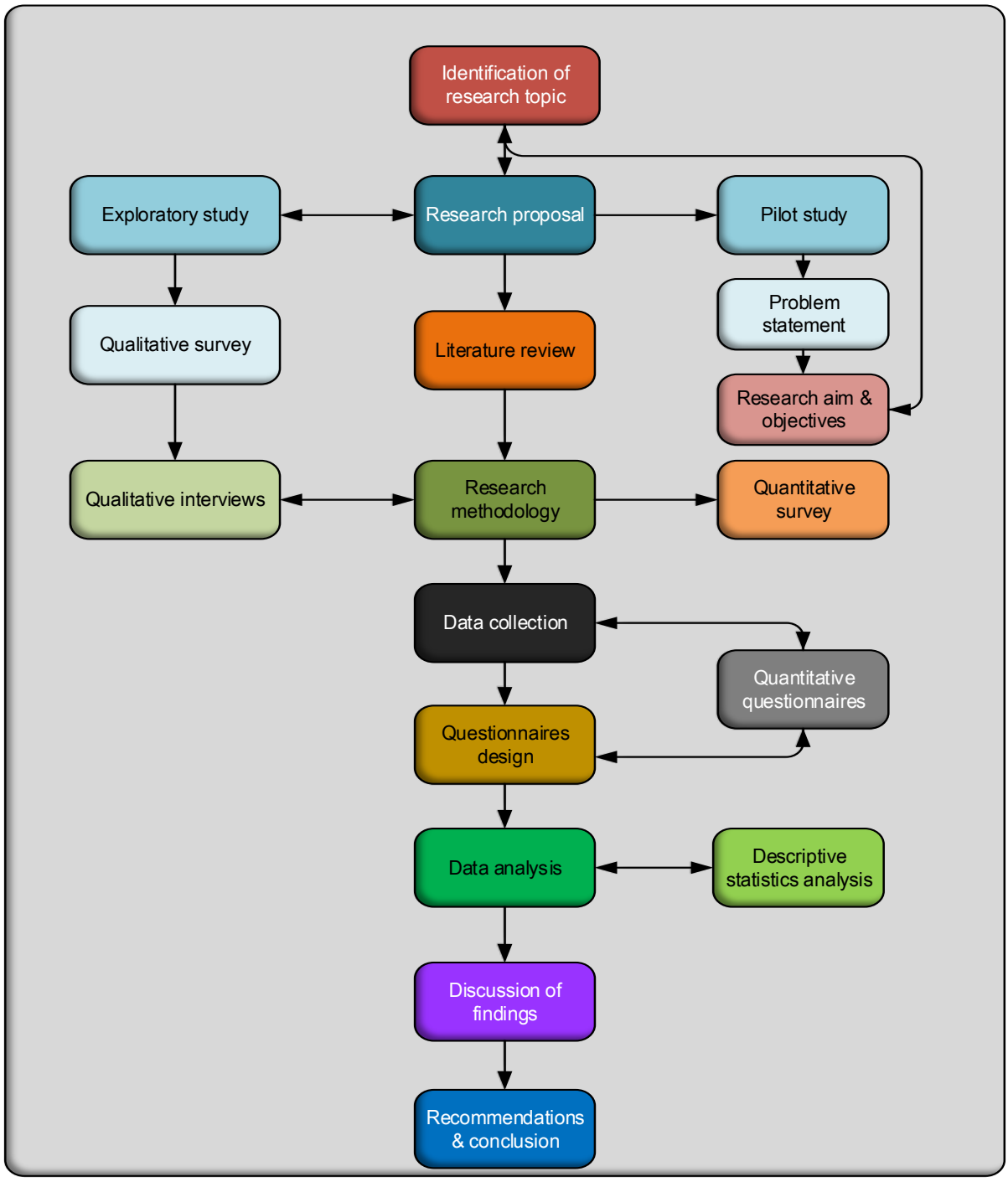

Figure 0.2: Research flow diagram

1.8.2 Application of qualitative research method

The qualitative research method devised for this study entailed the interview of the selected respondents. These respondents are selected based on their significant contribution toward attaining the aim and objectives of this study. Furtherance, the method guides the practical understanding of the study for obtainable objectives, questions, the research problem and the topic. Here, qualitative research is distinctly

advantageous in obtaining socially specific knowledge about the morals, standards, views, thoughts, ideas, sentiments, activities, conducts and social contexts of particular populations (Mack, Woodsong, MacQueen, Guest & Namey, 2005).

Primarily, qualitative research supports the determination of people's experience about a particular research problem. The integration of qualitative research with the quantitative research encourages sharper insight into the complex aspect of a specific situation and the implications of quantitative data.

1.8.3 Application of quantitative research method

The quantitative research method used in this study guides the design of the questionnaires. This method was used to collect data through a closed-ended questionnaire system. The questionnaires were distributed to the selected sample size of participants considered relevant to this study. Quantitative research supports the statistical and graphical analyses of the data collected with the objective of determining applicable findings. Key features include formal and systematic measurements, and the use of statistics (Marczyk *et al*., 2005). Quantitative research is based on the measurement of quantity or amount, that is, it is applicable to phenomena that can be expressed in terms of quantity (Kothari, 2004).

1.8.4 Survey population selection

This set of selected participants include stakeholders (construction industry), and government officials in charge of physical infrastructure policy implementation in the department of human settlements and municipality in the Western Cape). These representatives were allotted forms with a set of questions to complete in order to obtain statistical information on the status quo and they returned the completed forms to the distributor. The distributed copies are categorised as samples of research populations, which are used to generalise the findings as an integral part of the populations. According to Ruane (2011), only a genuine representative of the samples is considered accepted in making general decisions concerning the populations on the expected findings.

1.8.5 Data collection

Collection of data is carried out by implementing the necessary steps that aid an easy gathering and assembling of the data for this study. These steps include the understanding or reviewing literature such as related textbooks, journals, science magazine and theses. Yet the reviewing of the aforesaid related literature only yields secondary data. On the other hand, primary data were generated through the survey exercise distributed to the selected participants. Then, the data collected was analysed with the use of SPSS version 25 and the attainable results were validated through qualitative interviews.

From a clear viewpoint, secondary data is considered advantageous over primary data because there are no survey exercises, measurement instruments – used for construction and validation for subjects and special equipment – and the data type offers sufficient time towards in-depth understanding to the researchers (Tayie, 2005).

1.8.5.1 Collection of information

The distributed questionnaires with the crucial information from the selected respondents were collected. This exercise was conducted among the principal staff (government departments); senior staff (human settlements department); and stakeholders (construction industry) with not less than 10 years of experience in the service.

To initiate the research, an exploratory pilot study is expected to be conducted to pave way for an in-depth understanding of the process: collecting the right information or data about a particular research, experiment, group or phenomenon. Consequently, exploratory research tends to utilise relatively small samples of subjects that permit the researcher to gather ‘up-close’ or first-hand information. In addition, Ruane (2011) suggested that unstructured interviewing is a good technique to use when one is pursuing an exploratory piece of research. That idea is adopted here.

The advantage of applying exploratory research to the collection of information and data lies in the essentiality of adopting a qualitative method for executing open-ended questions, wherein the participants are allowed to respond to any given question with their own understanding (Mack *et al*., 2005). This is unlike quantitative methods, where

the participants are directed or instructed to respond in a fixed way (Mack *et al*., 2005). Rugg and Petrie (2006) advised that a pilot study be conducted to pave the way for a better result. A well formulated research question is a significant element in good research that necessitates a pilot study before the execution of the main study.

1.8.5.2 Questionnaire design

A closed-ended questionnaire was designed for this study in order to outline the aim and objectives of the research and devise a better way of tackling the study through the responses supplied by the respondents. The design of the questionnaire contains the arrangement of the response options in Likert scale format, where the respondents are asked to mark or tick the options that suit their interpretation of the question. To collect data, a large number of statements related to the objectives of the research were compiled. Subsequently, inappropriate, extraneous, vague and unclear statements are removed. Thus, the remaining statements are given to a few respondents to indicate their reaction based on a five-point rating system as indicated below:

(5)	Strongly approve;
(4)	Approve;
(3)	Undecided;
(2)	Disapprove; and
(1)	Strongly disapprove.

The relationship between statement scores and the total score is then determined. Statements with a high total score are then selected for the final scale (Singh, 2007).

1.8.6 Data analysis

Analysis of data collected and categorised is executed by applying descriptive statistical data analysis in SPSS version 24. The process involves the exploration of quantitative and qualitative data, wherein data are gathered, assembled and analysed to attain reliable results. Essentially, quantitative data is categorised and coded before commencing analysis, while qualitative data is categorised and prepared for analysis without coding. Thereafter, data cleaning is initiated to eliminate probable errors that could occur during data collection, coding, and inputting stages. Most importantly, this

process identifies areas where there is missing or omitted data, anomalies and range checks (Singh, 2007).

1.8.7 Delimitations of the study

The study was restricted to only data collected from the construction industry and the department of human settlement and public works in South Africa. The collection of required data involved the participation of the stakeholders in construction and consultancy firms, project managers, site managers, architects, quantity surveyors, engineers and heads of departments in government offices.

1.8.8 Key assumptions

It is presumed that the proposed government departments, construction companies and consulting firms selected for the surveys would cooperate and provide access to their records.

1.8.9 Ethical considerations

Based on the internationally acceptable ethical standards, the identity of the selected participants – employees of government departments, construction firms, stakeholders and professionals – is not included in the research instruments. During the course of the exercise, no participant was compensated in monetary or other forms. In the process, quality assumptions were made on the data captured, competence and professional conduct of interviewers, correctness and completeness of questionnaires and the accuracy of calculation

1.9 THESIS OUTLINE

To determine an appropriate approach for this study, the following structure was employed, this study comprises of five chapters which was as follow:

Chapter One: This is an introductory chapter that includes the background information, the aim and objectives, the problem statement, preliminary literature review, methodology, limitations, key concepts and chapter outline.

Chapter Two: In this chapter, related literature was discussed to specify the factors, causes and effects of government policy on the delivery of sustainable housing projects.

Chapter Three: This chapter explains the research design and methodology that was used to establish the aims and objectives of the research. The research methods, research techniques and data collection instruments were discussed too.

Chapter Four: This chapter discusses the data analysis, interprets the findings and present the findings in the tabular formats and diagrams.

Chapter Five: This chapter presents a summary of the findings, practical conclusions and recommendations derived from the research questions, aim, objectives and the development of a suitable framework for the enhancement of government housing policy on construction resources.

1.10 CHAPTER SUMMARY

This introductory chapter provided the introduction and background of the study as well as identified the purpose and rationale of embarking in the study, the significance and contribution of the study and lastly the aims, objectives and key research questions that guide this study. This first chapter has also presented the synopsis of the literature review and the research design and methodology used to underlie the study. Therefore, the next chapter presents the relevant literatures and the theoretical framework employed to underpin this study.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 INTRODUCTION

This chapter presents the relevant literature review and theoretical framework adopted to conduct this study. On the one hand, it discusses the relevant literatures on housing delivery in the Western Cape Province, together with the impact of the government policy on the implementation of the housing policies in the province. In addition, other relevant studies carried out on this basis were thoroughly assessed to identify and simplify relevant information that relates to the development of a suitable framework for the enhancement of government housing policy on construction resources for a sustainable housing delivery in the Western Cape. Furthermore, this chapter offers a concise exploration of the government housing policy, namely its requirements and implementation and further present discussions of the role of government agencies, housing construction stakeholders, including the interpretation and application of various policies guiding housing delivery, with the understanding and determination of the various challenges experienced while attempting to attain sustainable housing delivery in the Western Cape. In addition, impact of sustainable housing delivery on factors such as environmental and construction resources will be discussed subsequently in this chapter, along with specific challenges.

On the other hand, the second part of this chapter discusses the theoretical framework adopted to guide this study which is the …. And it ends with a concise summary of the chapter.

2.2 LITERATURE REVIEW ON GOVERNMENT POLICIES ON THE DELIVERY OF SUSTAINABLE HOUSING

This section discusses the various relevant literatures explored on Government policies on the delivery of sustainable housing below:

2.2.1 Government housing policy

The challenges of affordable housing delivery in developing nations are complicated due to political influence within the country. Considering the variations existing in some

global housing policies, limited support is given to the social housing programmes which tend to prevent owner occupation and private landlordism. Actually, the inability to sustain housing provisions indicates a need for sturdy policy development to reinforce effective application of housing policy. Consequently, demographic and macroeconomic trends must be taken into consideration by the government in order to ensure maximum participation of all sectors (Balchin, 2013; Daly, 2013; Charter & Tischner, 2017). Thus, the next section explores the policy implementation for affordable housing delivery.

2.2.2 Policy implementation for affordable housing delivery

Government policy on the affordable housing delivery in the developing nations is frustrating for the underprivileged. In most developing nations, low income earners are residents in the cities but have difficulty with affordable housing produced under the policy. As part of the challenges, it is noted that mortgage institutions are not made available in the cities and major townships to assist in the implementation of the housing policy. Consequently, there is a need to incorporate social housing into this policy to enhance the ability of the underprivileged to take care of their housing consumption needs (Aribigbola, 2008; Balchin, 2013; Ball, 2017). Similarly, Huchzermeyer (2014) argued that since housing policy in South Africa was basically concluded in 1994, poor communities have been given less privilege in terms of the housing production and delivery polices. Meanwhile the next section discusses the community based labour involvement in housing project delivery.

2.2.3 Community-based labour involvement in housing project delivery

In the South African construction industry, labour employment has recorded significant successes due to constant recruitment of personnel from the communities where housing projects are situated (Emuze, Smallwood & Han, 2014; Epstein, 2018). Similarly, Halim and Othman (2014) stated that the community-based approach for housing delivery contributes significantly in creating job opportunities and economic improvement within the communities where projects are executed.

Nevertheless, Lizarralde and Massyn (2008) and Shortt and Hammett (2013) all explained that this community-based approach to housing project delivery

demonstrates unexpected consequences which furthers shortcomings created by the profit-driven housing developers in South Africa. The outcomes of the three case studies conducted showed that overall performance of low-cost housing project does not depend on community participation and emphasised that some advantages and disadvantages of community participation need to be reconsidered (Lizarralde & Massyn 2008; Shortt & Hammett, 2013). In actuality, the communities' desires were overshadowed by the inability of the community groups to make one decision about the development of their area.

Municipalities in developing nations often find it challenging to collaborate with their community on housing delivery (Andrew *et al*., 2013; Opoko & Oluwatayo, 2014; Lizarralde, 2014; Lizarralde *et al.,* 2016). This is due to the impacts of political, economic and social difficulties on the probability of procuring low-cost housings for displaced people in disaster-prone areas (Andrew *et al.,* 2013; Opoko & Oluwatayo, 2014; Lizarralde, 2014; Lizarralde *et al.,* 2016). In addition, other factors such as safe land acquisition; matching public and private resources; beneficiary selection; evaluation and approval criteria; and choosing affordable minimum standards are all part of challenges to the process of housing delivery (Makinde, 2014; Chikomwe, 2014; Ojebode, 2016; Ezebilo, 2017). It is noted that only the informal construction sector, as a main player in the industry, that considered the local labours in the housing production activities (Lizarralde & Root, 2007; Zulu, 2016; Govender, 2017). In essence, the relationship benefits both parties in *design choice*, *cheap labour, employment opportunities* and *choice of affordable housing* (Lizarralde & Root, 2007; Zulu, 2016; Govender, 2017).

The issue of low-cost housing delivery in developing nations is largely considered inefficient, along with the subsidised programmes that are regarded as unproductive (Hammam, 2014; Sdralevich *et al.,* 2014). In South Africa, one of the major problems frustrating the housing market is the exclusion of the local construction sector from the housing production policies and construction practices. However, this sector is the only sector with consistent delivery of affordable housing to the poor (Lizarralde & Root, 2008; Zulu, 2016; Govender, 2017). It is emphasised by policymakers, commentators, funding bodies and NGOs that the key to performance in low-cost, developing country projects lies in community involvement (Davidson *et al.,* 2007; Seyfang & Longhurst, 2013; Pugh, 2014). Beneficiaries are often only involved in housing projects in

developing nations with cheap labour, whereas they should be more involved in decision and operational policymaking for the housing production process. Based on the above, the next section discusses the application of management principles, practices and knowledge in diverse management areas.

2.2.4 Application of management principles, practices and knowledge management areas

Community participation in affordable housing delivery projects has been prevalent for many decades. As a result, the construction industry is advised to be more intentional and systematic in knowledge management areas with the intention of redefining the old structures and practices in the construction industry by providing new dimensions to encourage a more effective production process (Wenger *et al*., 2002; Skerratt, 2013; Dixon & Eames, 2014; Lombard & Rakodi, 2016). The rapid shift towards infrastructural development, in both developed and developing nations, requires advancement in knowledge management (Pandey & Dutta, 2013; Angelidou, 2015; Klimova *et al.,* 2016). With regard to this, every aspect of economic development segment in a nation, especially with social and environmental economies, requires the implementation of a new dimension of management (Davenport & Prusak, 1998; Albino, Berardi & Dangelico, 2015; Epstein, 2018).

With the need to devise a new dimension of management, technical know-how and adequate knowledge management procedures are vital to make organisations competitive in the new global market (Park, 2011; Ageron, Gunasekaran & Spalanzani, 2012; Schermerhorn *et al.,* 2019). It is imperative for the construction industry to develop a mechanism that fosters an adept utilisation of employees' collective skills required to create a greater organisational knowledge base that will stimulate effective production and resource utilisation (Lee, Hancock & Hu, 2014; Kibert, 2016). This can be attained provided that knowledge management is adeptly implemented (Birasnav, Rangnekar & Dalpati, 2011).

Additionally, the application of knowledge and techniques cannot be discouraged in the execution of housing production activities in order to meet stakeholder and user needs through the initiation of housing project management skills (Zhang, Shen & Wu, 2011; Mallory-Hill, Preiser & Watson, 2012; Berardi, 2013). Housing delivery process

management is accomplished through appropriate application and integration of five process groups. The five process groups are given as initiating, planning, executing, monitoring, controlling and close-out (Badiru, 2011; Morris, 2013; Fewings & Henjewele, 2019). The steps involved in managing and attaining affordable housing delivery usually include identifying necessary requirements and addressing various needs, concerns and expectations of both the stakeholders and users as the housing project is planned and implemented (Othman & Abdellatif, 2011; Lizarralde, 2011; Adenuga, 2013). Also, housing constraints must be adequately considered and integrated into production processes to include quality, scope, budget, resources, risk, communication, stakeholders, procurement and integration of the process (Atkinson, 1999; Malhotra & Temponi, 2010; Schwalbe, 2015; Kerzner, 2017; Fewings & Henjewele, 2019).

2.2.4.1 Management of costs in sustainable housing

Effective management of costs for the housing production process requires adequate planning and control of said costs during production. Moreover, cost is the fundamental factor in housing production process on which all other factors depend. Failure to handle cost management effectively during production causes high construction costs (Mao *et al*., 2013; Ball, 2014; Mitra, 2016). In essence, the financial aspect of the housing production process is a critical factor that requires special attention from construction operators. The initial planning for cost effectiveness at the early stages of the housing production process will improve the design stage process and extend that effectiveness to the implementation and close-out of production phases. In addition, at the planning stage of production, cost of construction is determined; inversely, at the planning stage of housing production, high cost of construction is determined. In light to this, planning and implementation of housing production hinges on the skills of construction operators handling housing production (Kerzner, 2017).

2.2.4.2 Communication management during housing production

According to Bosman (2015), decision-making in the housing production process by assigned disciplines such as architects, engineers and contractors has an impact on the progress of one another's functional disciplines and hinders immediate attainment of affordable housing delivery. Each functional discipline has self-developed objectives, goals and values in the process. Basically, this effect persists because

each functional discipline strictly constrains itself to its own functionality. In relation to this, the boundary that exists between functional disciplines has become a potential barrier to effective and efficient communication and co-ordination in the housing production process. This requires special treatment from the government and agents with the possibility of devising a sustainable policy that could improve poor communication among government officials and construction operators on housing production sites (Love & Irani, 2003).

2.2.4.3 Quality management in housing production

Quality management is a type of operations management involving cyclic processes. Still, the integration of project management with quality management is considered vital in attaining an immediate completion of a particular project with the total quality management standard required to enhance the quality of project outcomes and deliverables (Orwig & Brennan, 2000; Ihuah, Kakulu & Eaton, 2014; Walker, 2015; Willar, Trigunarsyah & Coffey, 2016). This type of operational management is perceived to dominate operational aspects of housing production activities in sustainable delivery (Orwig & Brennan, 2000; Ihuah, Kakulu & Eaton, 2014; Walker, 2015; Willar, Trigunarsyah & Coffey, 2016). Even so, the project management sector seems reluctant to adopt an effective application of the Iron Triangle that includes time and quality for affordable housing delivery. From this description, *quality* can be described as a phenomenon because quality is an element of people's attitude and beliefs (Atkinson, 1999; Rogers *et al*., 2015; Yada & Yadeta, 2016; Sahle, 2018).

2.2.4.4 Risk management in the housing production process

According to Akintoye and MacLeod (1997), risk management is an essential process in the construction activities; it is by this means that a construction company minimises losses and enhances profitability. Meanwhile, construction risk is generally understood as a phenomenon that influences project objectives in cost, time and quality. This statement clarifies the effect of inadequate handling of risk during any project production processes. Thus, an inadequate handling of that risk during the process delays many activities performed at the construction site (Porwal & Hewage, 2013; Sarhan & Fox, 2013; Langford *et al*., 2014; Tay *et al*., 2017). It is reported that a consistent monitoring of construction projects will prevent any uncertainty or risk in the production processes (Ward & Chapman, 2003; Nieto-Morote & Ruz-Vila, 2011; Loosemore *et al.,* 2012). Additionally, adequate risk management in the project

production process is founded on the intuition and experience of the management team (Loch, DeMeyer & Pich, 2011; Fidan *et al.,* 2011; Carvalho & Rabechini Junior, 2015).

2.2.4.5 Scope management in production

Scope management has been a general problem in project delivery, particularly in the delivery of housing projects in developing nations. However, management of uncertainty in housing delivery is seen as a necessary condition for effective project management because sources of uncertainty are wide ranging and have a fundamental effect on delivery (Atkinson, Crawford & Word, 2006). To achieve effective housing project delivery, management teams are advised to focus more on the sources of uncertainty in the production (Atkinson, Crawford & Ward, 2006).

2.2.4.6 Stakeholders influence in the management of the housing production process

Stakeholders are personnel or participants – including clients, contractors, sponsors/investors, end-users, construction firms and communities at large – who are involved in managing housing production processes (Isaksson, Johansson & Fischer, 2010; Tang, Mason & Sun, 2012). Moreover, stakeholder interests are paramount in the housing production process. Adequate management of the stakeholders' interests will promote appropriate utilisation of production factors like cost, time and quality to discourage any dissatisfactory outputs during the housing production process (Voinov & Bousquet, 2010; Hauck *et al.,* 2013; Heravi, Coffey & Trigunarsyah, 2015).

The exclusion of the stakeholders can also cause high construction costs and unavailability of affordable housing delivery among low-income earners. To avoid this, the construction operators on the site are directed to habitually consider the interests of the stakeholders, irrespective of their categories, at the inception of the planning stage of housing production (Cleland, 1986; Tunas & Peresthu, 2010; Werther & Chandler, 2010; Beckers *et al.*, 2013; Windapo & Cattell, 2013; Lawrence & Weber, 2014).

2.2.4.7 Delivery time management in housing production process

Timeliness has become a significant problem in the effective delivery of project in the construction industry. As earlier stated in subsection 0 and 0, time, cost and quality

are major factors in the swift delivery of sustainable housing within the western provincial area of South Africa (Atkinson, 1999). Noticeably, time management, which is an important factor in the project delivery, together with a lack of adequate financing for projects, produced unsuccessful delivery of housing projects (Mezher & Tawil, 1998). In fact, in developing countries, many housing projects are abandoned or uncompleted due to extensive delays and upsurge of cost estimations in labour usage and materials along the planning stages of production processes. The consequences of having delays in the delivery are impacts on the economic feasibility of capital projects and claims and disputes within the construction environment among the stakeholders (Odeh & Battaineh, 2002). Nonetheless, the ineffectiveness of these three factors are induced by the unprofessional attitude of the owners, contractors, architectural and engineers.

2.2.4.8 Monitoring and controlling management in the housing production process

Monitoring and controlling management are procedural operations in reviewing, tracing and regulating progress and ensuring effective performance of the housing production processes (Ahuja Hira, Dozzi & Abourizk, 1994). These procedural operations enhance the identification of vulnerable areas along the production processes that require immediate improvement in the existing procedural plans. Besides, this particular type of operational management ensures regular evaluation of performances in delivery to align the housing production processes with the objectives established at the planning stage. While performing this task, however, it is particularised that some designated objectives established to attain affordable housing delivery are not adequately planned at the inception stage of production (Calvert, Bailey & Cole, 2002). The problem is categorically triggered by the inconsideration of user and stakeholder requirements which extensively constrains the objectives for the people and encourages high construction cost (Cleland & Ireland, 2006).

2.2.4.9 Close-out stage in housing production

This stage executes processes to conclude or complete housing production activities. As part of the stages involved, contractual obligations and objectives that are established at the planning stage are ascertained by the quality assurance group. These parameters are adequately implemented and processes defined are then

completed. More so, certain conditions are expected to be fulfilled before the closure of housing project:

1. quality entrenched;
2. stakeholder interests; and
3. documented lessons learned.

Based on the aforesaid conditions, the housing delivery process will be completed and closed out appropriately. Most of the affordable housing projects initiated in African countries do not pass through the normal process that enhances delivery of affordable housing within budget, thereby exacerbating the shortage of affordable housing within poor communities (Turner, 2008). Meanwhile the next section discusses the sustainable materials involvement in housing production processes.

2.2.5 Sustainable materials involvement in housing production process

Several previous studies reported that material management programs have the capacity to yield significant construction cost savings but, despite this positive advantage, small and medium-sized contractors in developed countries are yet to deduce any need to integrate sustainable materials management programs with cost effectiveness production processes (Thomas,& Yiakoumis, 1987). To confirm this statement, when the impact of cost is compared to the cost of effective material management, the results indicate a clear cost benefit, informing the contractors that paying greater attention to material management is critical (Thomas *&* Yiakoumis, 1987). Related studies have specified that material management requires adequate attention to prevent any delays or interruptions that may affect the supply of materials to the construction site during daily production (Al-Dubaisi, 2000).

Ineffective material management leads to the inefficient use of craft labour. The inefficient use of craft labour causes high construction costs; however, construction labour productivity is the measure of the effect that influences affordable sustainable housing delivery. Methodically, habitual productivity increases in the construction industry can be attained through an adequate management of materials supplied to the site (Alwi, 2003). Similarly, Thomas and Yiakoumis (1987) explained that governments of developing nations should take decisive steps to enact material delivery policy on affordable housing through the following:

1. planning material delivery;
2. material availability; and
3. material handling and distribution.

The effective implementation of policy will aid local contractors in creating more job opportunity for local-based communities. Therefore, in this next section, the economic influence on sustainability of affordable housing delivery is discussed.

2.2.6 Economic influence on sustainability of affordable housing delivery

Maliene and Malys (2009) emphasised that both developed and developing nations have been subjected to severe social and economic burdens over the past few decades. This causes an unequal spatial impact on the urban environment and simultaneously triggers a rise in the number of deprived households in the worst urban peripheries. The objectives laid down by the governments of both developed and developing countries are seen as attempts to create sustainable communities that will improve quality of life. Affordable housing delivery for the poor is a key issue to consider in the delivery of health and attractive communities. In that case, affordable and sustainable housing planned for the community should be made available, comfortable, economical, ecological, with high-quality, aesthetical design and cost effective. Additionally, dwelling houses, apartments and housing premises should be planned and designed in accordance with the condition of that locality and adequately meet the established technical and hygienic requirements entrenched in housing policy (Maliene & Malys, 2009).

Over the last decade, the swift rise of political essentiality in the developed and developing countries regarding sustainably, has placed governments in a position where planning and construction practices are seen as the main mechanisms to aid in the provision of employment and affordable housing for the poor – and consequently deliver a sustainable environment (Williams & Dair, 2007). Conversely, governments have instigated a number of initiatives to ensure that sustainable development schemes are produced. To reinforce this, governmental departments and agents are leading the programmes to create sustainable community, reduce energy use in building, ensure sustainable usage of building materials and equally promote private sector interests for sustainable housing delivery and economic development (Williams & Dair, 2007). Similarly, McDonald *et al.* (2009) stressed that cities in both developed

and developing countries have been subjected to severe social and economic pressure for the past twenty years. Governments have established devices to address social, physical and economic consequences of these changes through variety of mechanisms and policy initiatives with varying degrees of success. Drawing from the above views, the next section explores the social influence on sustainability of affordable housing delivery.

2.2.7 Social influence on sustainability of affordable housing delivery

The orientation of people can be impacted if enabled to possess their own shelters or approve their required houses. This quality is found within a community of people with similar cultures and behavioural characteristics who exercise communal responsibility to build homes for themselves (Seyfang, 2010). In view of this, the government liaises with the local community to devise an appropriate policy for enhancing the social economic situation in connection with local understanding and cultural heritage (Seyfang, 2008). Middlemiss and Parrish (2010) mentioned that change is inevitable; consequently, it is vital for people with limited power, resources and capability to influence others.

Clearly, the difficulties facing the local communities (within urban settlements) in attaining their desired socio-environment are a huge concern to practitioner, policy and academic circles. Comprehensibly, changing communities (peoples) social orientation is one of the most reliable paths towards attaining sustainable affordable housing delivery in local communities' residences (Knight, 2001; Goebel, 2007; Landman & Napier, 2010; Gwedla & Shackleton, 2015.). The problems that require improvement as attributed to individual behaviours within the communal settlements are named as social dilemmas, social conventions, socio-technical infrastructures and the helplessness of individuals (Heiskanen, Johnson, Robinson, Vadovics & Saastamoinen, 2010).

2.2.8 Environmental influence on sustainability of affordable housing delivery

Environmental impact on the assessment of the sustainability of affordable housing delivery within a communal settlement is vital to the improvement of the quality of life and community, economic and social sustainability of housing (Mulliner *et al*., 2013). Mulliner *et al.* (2013) added that most issues attributed to environmental influence such as housing sustainability, location and quality are often disregarded. Location of affordable housing promotes sustainability of the delivery within communities. This can be sustained provided that affordability and sustainability are simultaneously tackled.

Mulliner and Maliene (2011) explained that affordability of housing is a pressing problem not only affecting individual households but also has implications on the wider economy and environment, including employment, health and sustainability. In addition, affordable housing provisions should not depend only on cost reduction and beautiful homes; it involves a broad range of factors.

2.2.9 Factors that influence sustainable housing delivery

2.2.9.1 Environmental influence on sustainable housing delivery

Since the post-apartheid urban era, the government of South Africa majorly considered sustainable housing delivery as a significant project to cater for displaced citizens (Mafukidze & Hoosen, 2009; Van Wyk & Oranje, 2014; Doppelt, 2017). Based on the significance, changes were seen and felt by the citizens; still, there is a huge concern about the social and environmental sustainability of housing programs, including its influence on the surrounding environment and human health. The major impediments to sustainable affordable housing delivery include current macro-economic conditions, enduring historical legacies of race and class, the scale and rapidity of urban population and institutional challenges (Goebel, 2007). All the aforesaid impediments demonstrate little indication of decreasing (Goebel, 2007).

As previously stated in section 0 and subsection 1.7.1, housing policy was officially announced in 1994 when the governing affairs of South Africa was changed or transferred into a republic. Thereafter, financial and administrative mechanisms were set in motion and a capital subsidy was introduced. Being an important part of the policy, the republic government set a target at providing one million low cost houses in five years. These mechanisms, named project-linked subsidies, are based on

housing projects with community partners and they are still under implementation till date. However, environmental influence on sustainable housing delivery has not been adequately catered for in the housing policy despite it having a noteworthy influence on the poor community (Jenkins, 1999).

2.2.9.2 Planning for housing production implementation

Adequate planning for housing construction is essential for effective production processes (Smeddle-Thompson, 2012) However, the implementation of this plan is critical to the successful delivery of projects with cost, time and quality entrenched at the initial stage of production (see subsection 0, 0 and 0). Positive planning and its implementation revolve around the skills and experiences of the construction operators. Consequently, this fulfils the aim and objectives established for project delivery. The procedure and capability of successful planning can be engaged to initiate an understudy on further implementation of development. However, the degree of success is a typical reflection of adequate practice of planning. Success of a plan is determined based on conformance between the plan and its product (Altes, 2006).

2.2.9.3 Sustainability focus in housing delivery

Sustainability focus in housing delivery is a process where sustainable growth and development are considered as paradigms established at the core of the economic growth and development (Irurah & Boshoff, 2003). Nevertheless, economic growth is based on the economic output of a nation (Irurah & Boshoff, 2003). Applicability of sustainable principles and practices in developing nations' industrialised housing is established by production culture in sustainability integration. Thus, a strong project culture remains unchanged even if construction operators leave or join the production team. In addition, if anything does change during production, the behaviour of the construction operators is expected to change simultaneous to the project culture (Hook & Stehn, 2008).

2.3 THEORETICAL FRAMEWORK FOR GOVERNMENT POLICIES ON SUSTAINABLE HOUSING DELIVERY

This section provides a theoretical perspective on the theory of enhancement of sustainable housing delivery.

Theoretical perspective on the sustainability of housing delivery

The theory of enhancement for sustainable housing delivery is used as a lens to establish a framework for the enhancement of the implementation of government policy on construction resources utilisation towards the delivery of sustainable housing in the Western Cape. The theory enabled was employed to ascertain the effect of government policy on housing within the South African context with the intention of gaining a comprehensive understanding of the past and present housing policies practised in South Africa. The framework also helped to identify the policy requirements on housing in South Africa and the world at large. This focuses on the requirements and possible adjustments needed to establish a suitable housing policy for accommodating less privileged people into the current housing policy in South Africa. Therefore, the flow diagram displayed in the Figure 0.1: Research theoretical framework

below demonstrates the theoretical approach to the investigation around the enhancement of government housing policy on construction resources towards sustainable housing delivery.

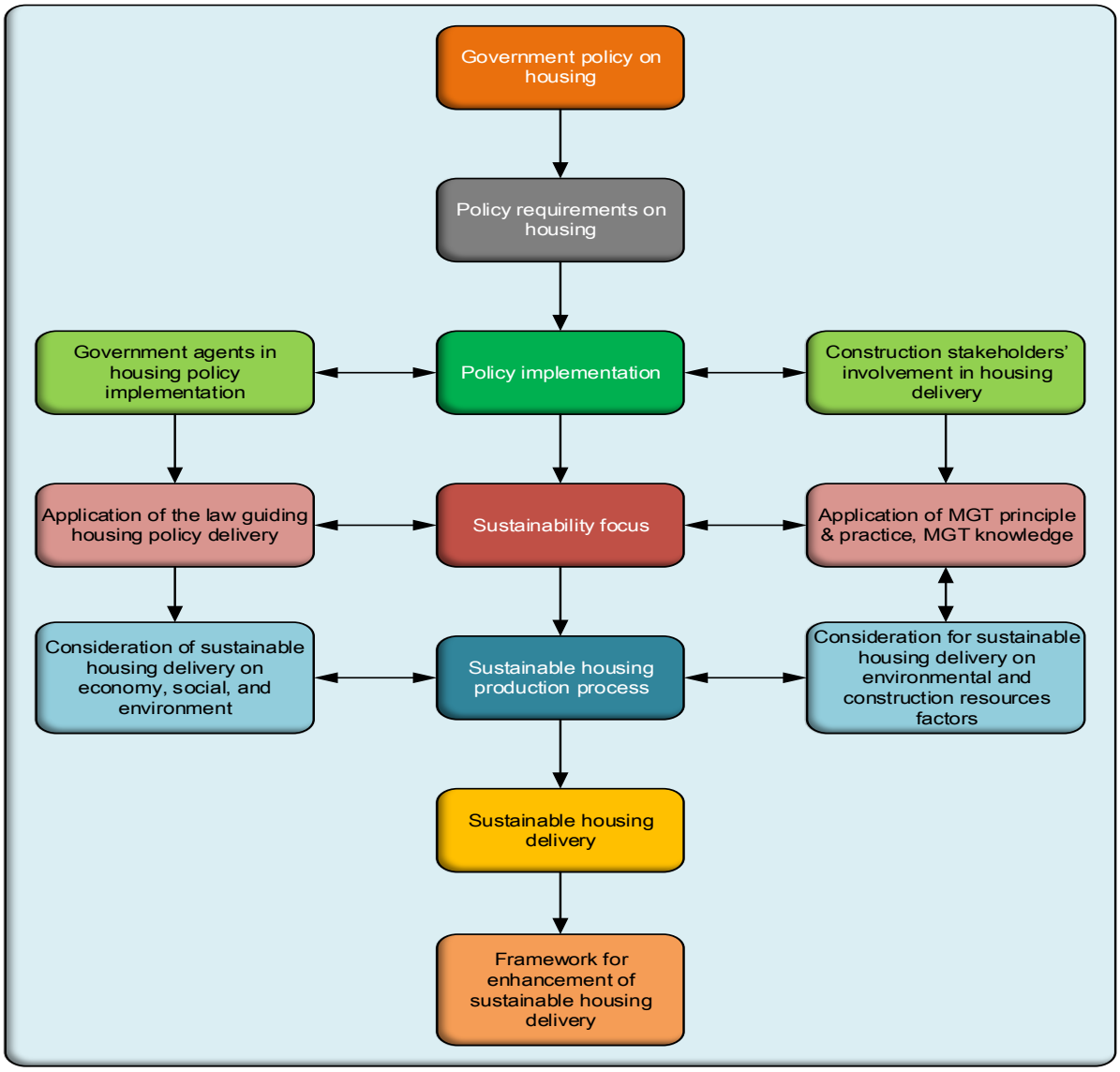

Figure 0.1: Research theoretical framework

The above diagram on policy requirements produced policy implementation, sustainability focus and sustainable housing production process, which are all subordinated by other significant theoretical studies on the agents in housing policy implementation, stakeholder involvement in housing delivery, laws guiding housing policy delivery, management principles and practices, management knowledge, sustainable housing delivery on the economy, society and the environment and sustainable housing delivery on environmental and construction resource factors.

In the theory, some aspects of the framework established relative knowledge such as the knowledge association between management principles and practices, management knowledge and sustainable housing delivery on environmental and

construction resource factors. However, the last two aspects of the theoretical framework represent the sustainable housing delivery and development of the framework for the enhancement of the sustainable housing delivery.

2.4 CHAPTER SUMMARY

The first section of the chapter reviewed scholarly literatures which demonstrated that affordable housing delivery is frustrated by both internal and external factors. Further abstractions show that little support is provided for the social housing sector, whereas governments prefer to look towards partnerships with a profit-focused private sector to implement housing policy. Other previous studies mentioned that mortgage institutions are not interested in the poor. This action, coupled with the discord between housing policy and sustainable housing delivery have contributed greatly to the lack of delivery.

Having the involvement of community-based labour in the housing projects contributes to the decline in unemployment; to the contrary, smaller municipalities often struggle due to a lack of expertise and ability to work with beneficiary communities. In addition, attempts to integrate management principles with practical housing delivery are admirable but management of costs, communication, quality, risk, scope, stakeholders within housing production coupled with delivery time management as well as monitoring and control of the housing production process up till close-out stage is essential for meaningful progress.

A body of considerable literature further demonstrated that the integration of sustainability at all stages of the housing production process, from the conception to delivery, is a key finding wherein social, economic and environmental impacts and an influence on the housing delivery are considered. It was discovered that a sustainability focus, combined with proper interpretation of housing implementation policies, together with in-depth planning for sustainability, would lead to sustainable delivery of affordable low-cost housing for the poor. However, in the second section, the theoretical framework which is the framework for the enhancement of sustainable housing delivery was explored and discussed. Thus, the next section discusses the research design and methodology employed to guide this study.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter presents the research philosophy that leads to the proposed research methodology, its methods and validation of their use in this study. In essence, in this chapter, the justification for adopting and employing this particular methodology – and related methods appropriate for this study was discussed. Furthermore, I also discussed and presented the population and sample sizes, data collection, analysis and validation methods, including how the ethical considerations were ensured. Hence the chapter ends with a succinct summary.

3.2 DEFINITION OF RESEARCH

What is research?

Research is a procedural method that begins with the determination of the research problem and devises an appropriate method for solving it with available information by designing research to collect and analyse information and deduce a ‘best’ decision to a particular problem (Singh, 2007). Thus, discovery, construction and establishment of new knowledge is the *purpose of research*, which could be defined as 'a systematic quest for undiscovered knowledge.' Although, it is only classified as 'systematic' if it is planned, organised and has specific goals and objectives (Goddard & Melville, 2004). Systematic or scientific research, in any field of study, has defined characteristics that include testing hypotheses, careful observation and measurement, systematic evaluation of data and drawing valid conclusions (Marczyk, DeMatteo & Festinger, 2005).

With this precise and technical approach, researchers are able to acquire novel and fresh understandings by meticulous examination and logical, efficient, structured, systematic and methodical methods compared to unplanned, casual observations and an informal approach leading to the construction of more cogent and reliable

conclusions about the subject of their investigations (Shaughnessy & Zechmeister, 1997; Marczyk *et al.,* 2005).

Knowledge of the initial guiding research philosophies and resultant methods used enables a judicious and analytical appraisal of the quality of information gathered with the aid of pre-determined and rigid standards based on methodical procedures specifically intended to minimise or restrict the extent of inaccuracy that could compromise any critical research endeavour (Ruane, 2011).

In general terms, scientific research consists of an investigation that seeks answers to a question by methodically exercising a predetermined set of processes to gather information and make discoveries that were not established previously but may be more relevant than the direct borders of the investigation (Mack *et al.,* 2005). Empiricism is the practice of relying on systematic observation to draw valid conclusions about the nature of the world. Therefore, data obtained through systematic empiricism allows researchers to draw more confident conclusions than they can draw from casual observation alone (Leary, 2011).

Due to the fact that systematic, structured, scientific and empirical approaches enable one to draw reliable conclusions from the data, it will be the primary philosophy that underlines the design of the research methodology and choice of adopting research practices, techniques and tools for this study.

3.3 RESEARCH PHILOSOPHIES, THEORIES, APPROACHES, AND METHODS

Dawson (2002) states that research philosophy is the general principle that determines a specific approach or research strategy, which usually leads to consideration of issues such as the constraints, dilemmas and ethical choices within the research. In the same vein, Babbie (2007) avers that it is a researcher's philosophical stance and world view which underlies and informs a style of research; and, consequently, determines the research strategy, design and methodology. Alternatively, Scotland (2012) asserts that research philosophy is established upon ontology (the nature of reality) and epistemology (the view on what constitutes acceptable knowledge) together with the methodology and methods which are generally accepted as the model behind the research process.

However, it is important to briefly note the difference between research methodology and research methods. Henn, Weinstein and Ford (2006) explained that methodology is about the research approach and its strategy as a whole, while the research method is concerned with the range of techniques and tools that are employed to collect evidence for the proposed study.

3.3.1 Philosophy of ontology: objectivism vs. subjectivism/constructionism

The word 'Ontology', as a philosophy, basically comprises the belief of the researchers with regard to the way the world works and their perceptions on *how* the world works. The two primary positions of ontology are *objectivism,* which holds that objects exist in actuality outside of social concerns, and *subjectivism,* which implies that social events are occurrences created from perceptions and consequent actions that can be subject to observation in generating knowledge (Nieuwenhuis, 2008). The primary difference is whether social entities could or should be treated as objective entities that have an existence external to, or independent of social actors; or alternatively, whether they could or should be considered as social constructions built up from the perceptions and consequent actions of social actors (Bryman, 2004). These two opposing views, respectively labelled *objectivism* and *constructionism* (Gilham, 2004), are further discussed in the subsequent subsections.

3.3.1.1 Objectivism

Objectivism is the ontological view that hypothesises that social occurrences and their interpretations have an existence outside of social factors (Lee, 2000). Basically, this denotes that social phenomena and their classifications have an existence that is independent or separate from social actors (Silverman, 2000). Further interpretation specifies social phenomena under investigation will not be intrinsic to individual social actors, but general in all social interaction, and safely be determined, categorised, and analysed objectively.

3.3.1.2 Constructionism

Constructionism is the second ontological view that emphasises that social phenomena and their connotations are continually being comprehended, modified and utilised by social actors (Treiman, 2008). This suggests that social phenomena are not only formed through social interaction and then remain static, but that they are in a constant state of change and adjustment (Hall & Hall, 1996).

Pertaining to this study, constructionism was selected as the ontological view because it is essential to realise that data collected from the respondents on personal perceptions regarding their situations and knowledge on the subject matter remains a constant influx and revision as they make sense of the world around them. In other words, respondents have constructed their perceptions based on the past experiences and continue to construct their reality as they interact with tools designed to obtain opinions and knowledge from them for the purposes of this study.

3.3.2 Philosophy of epistemology–interpretivism vs positivism

Epistemology is a field of philosophy focused on the possibility, nature, sources and limits of human knowledge (Singh, 2006). In addition, it is concerned with how, if at all, we can have knowledge of reality and what constitutes acceptable knowledge in a field of study (Singh, 2006). The main epistemological dispute has been between empiricism and rationalism. Empiricism claims that valid knowledge is derived from the external world, through sensory perceptions based on systematic observations, while rationalism elucidates that human rationality and cognitive processes make ontological knowledge possible through logical deduction based on previously established principles (O'Leary, 2004).

Equally important, the main epistemological debate revolves around the difference between the social world and the natural world. Thus, social scientists place less importance on the data collected and focus more on the feelings and attitudes (known as *interpretivism*); although, a researcher studying the natural world would view the objects studied empirically or quantitatively, as in *positivism,* with regard to the development of knowledge (Maree & van der Westhuizen, 2009).

3.3.2.1 Interpretivism

Eriksson and Kovalainen (2008) described the interpretivism paradigm of research as a philosophical position aimed at interpreting and understanding the theoretical content of data by adopting the principles of social sciences. Interpretivism explains that, in order to comprehend human behaviour, social researchers need to grasp the meanings and interpretations that connect people to social phenomena (Henn *et al.,* 2006). Therefore, according to Neuman (2000), social research cannot progress by simply applying the same methodological approaches employed in the natural sciences.

Moreover, interpretivism employs methods that are commonly more explorative and, hence, its approach to data is not with hypotheses but with questions and propositions (Lee, 2000). An interpretivist is concerned with the adoption of an unstructured qualitative approach in data collection, which may include in-depth interviews with the participants (Henn *et* al., 2006).

Further clarification demonstrates that interpretivism is based on the belief that the social world must be comprehended from the position and perspective of individuals who are part of it, as agreed upon by Cohen *et al.* (2011) and Creswell (2009). The above statement essentially points out that the primary focus of the researcher is to understand, analyse and give meaning to social realities from their perspective (Flowers, 2009). Interpretivism aims to create an awareness of hidden social forces and structures influencing humanity's complex perception of reality. Therefore, precise, systematic and theoretical answers to complicated human problems are not possible with the ontological position of interpretivism.

A major emphasis is laid on each participant's frame of reference and how each utilises things (Nieuwenhuis, 2008). Interpretivism is based on the assumption that reality is not one but many, wherein interpretivist researchers preferably conduct their investigations in the natural context to reach the highest possible understanding by using inductive analysis (Jansen, Smith & Booth, 2007).

3.3.2.2 Positivism

The ontological application of positivism represents objects being observed as independent of the researcher because positivists believe that social reality is external and objective (Scotland, 2012). Henn *et al.* (2006) stated that the positivist's method is founded on the scientific approach used in the natural sciences, such as physics and chemistry. Positivism is expressed through quantitative approaches, such as surveys and experiments that emphasise the importance of reliability and replication (Denscombe, 2010).

Biggam (2011) highlighted that positivist research is based on the concept of obtaining quantifiable data for research, which involves the use of quantitative methods such as questionnaires, experiments and interviews with statistical analysis dependent on the human responses and experience. Positivists use a scientific approach for developing numeric measures to acquire acceptable knowledge and claim that only objective and

observable facts constitute the basis for science (Jansen *et al.,* 2007). Thus, positivists believe that a universal overview exists for use across environments and they prefer a cognitive systematic deductive data analysis strategy.

Categorically, both interpretivism and positivism have positive benefits when applied to the analysis of research data. Hence, this study is designed to adopt both epistemological approaches to catalyse the importance of attaining reliable data in an analytical approach.

3.3.3 Philosophical research approaches

Reasoning is an intellectual practise that results in the production of facts or information when constructed from an agreed supposition and transpires whenever human beings make implied knowledge unambiguous (Knauff, Hertwig, Schurz, Spohn, & Waldmann 2002). Investigations carried out on the relationship between 'theory' and 'research process' revealed that there are two possible approaches – *deductive* and *inductive* reasoning – and the difference between the two and how they are related is an important debate (Heit & Rotello, 2010).

3.3.2.1 Deductive reasoning

Deductive reasoning in research comprises logical arguments that begin with the general statements and the intention of attaining a specific conclusion (Walliman, 2006). Dahlberg and McCaig (2010) agreed that a deductive research approach involves the process of generating hypotheses from a general truth or statement to reach a definite conclusion. Additional descriptions asserted that deductive reasoning is a research strategy in which theory is consulted to guide the formulation of specific research questions that are presented as hypotheses and then tested with empirical data (Blaikie, 2003).

Lawson (2005) concurred that the first step in deductive reasoning is speculation, followed by the formulation of a hypothesis to be tested by gathering observations or conducting experiments and then the results attained are confirmed by testing these hypotheses empirically. Therefore, the principles of this research approach can be adapted for use in qualitative research (Bryman, 2012).

3.3.2.2 Inductive reasoning

Inductive reasoning is used in scientific research to aid or perform a specific observation or survey exercise and, thereafter, reliable results are generated to acquire a general conclusion (Walliman, 2012). According to Babbie (2007), unlike deductive reasoning, inductive reasoning begins with observation and progresses to theory. This process is the basis of the development of social scientific theory. In addition, inductive concedes that theory can be derived from observing or discovering patterns in the research data (Blaikie, 2003). However, Lawson (2005) argued that inductive reasoning happens when scientists measure aspects of the phenomenon being studied; the measurements are analysed and certain generalisations are made, which are referred to as theories.

This type of reasoning presumes that a scientist can do a study by measuring, recording and describing what they encounter without preconceived expectations or hypotheses. Basically, inductive reasoning is seen as generalisation that involves applying inferences from specific observations of a theoretical population (Mouton, 2008).

This study followed the inductive strategy, including interpretivist and positivist approaches. Literature was examined and the observations made will allow certain initial conclusions or objectives to be formulated. These approaches will be tested by using quantitative and qualitative methods for measuring and analysing the data obtained from respondents.

3.3.3 Inductive/deductive approach

The inductive/deductive research approach is an amalgamation of both observatory analysis and logical argument. It involves the process of developing and testing hypotheses to form a foundation for potential additional knowledge – mostly scientifically based (Walliman, 2012). The application of this combined approach to research implies the process of seeking valid statements (truth) from opposite schools of thought (Walliman, 2006). Henn *et al.* (2006) noticed that in scientific research, researchers can be required to begin the research process with an inductive exploratory approach to generate hypotheses that will be tested using the deductive explanatory approach to reach a valid conclusion. Thus, this study adopts the principles of quantitative and qualitative methodology for research.

3.4 RESEARCH METHODOLOGY

Methodology is referred to as the practices and techniques used to gather information. It is a study of the methods through which knowledge is gained and used to explain in simple terms exactly what must be done in a research study (Silverman, 2000). According to Fapohunda (2014), research methodology is the process of weighing the merits of various research methods so as to identify the best appropriate methods. Research methodology is an inclusive, holistic process of obtaining, examining and understanding data to reach a conclusion that broadens the knowledge of a phenomenon or an area of study (Leedy & Ormrod 2010). It is concerned with the philosophies, worldviews, and principles that guide our research practice and informs investigators how to investigate and uncover things, to gain more knowledge.

Further understanding indicates that methodology specifically provides guidelines on a particular task to be executed, as well as focusing on certain methods or tools in the research process (Leary, 2011; Wayne *et al.*, 2004) This process involves research methods such as sample design and sampling methods, data collection methods and fieldwork practice, measurement, data capturing and data editing, data analysis, as well as deficiencies and limitations in the study (Babbie, 2013; Lancaster, 2007; O'Leary, 2004; Although research is about creating new knowledge incrementally or radically to solve problems, the difference between solving problems in daily life and conclusions reached through scientific methods is that the scientific method of approach consists of organised systematic investigation, categorisation and analysis of data before conclusions can be drawn (Neumann, 2000; Rugg & Petrie, 2006; Wayne *et al*., 2004).

Research methods are various procedures and techniques employed in a study. They are essentially planned and scientific in nature, including theoretical procedures, observational studies, numerical and statistical approaches. As described by Rajasekar *et al.* (2013), these methods are used in samples collection, generating data and finding a solution to the problem identified. Currently, the three primary methods for conducting research are quantitative, qualitative and mixed method (Ivankova *et al.,* 2008). At each step in research the best approach, methods, procedures and models that suit objectives to be attained must be utilised.

3.4.1 The research approach

Based on the nature of this study, the quantitative method is deemed best for use by considering the adoption of the closed-ended questionnaires approach to collect information about factors that have impact on the government housing policy implementation and government policy requirements on resources – including materials, plant and equipment utilisation – for the delivery of sustainable housing in the Western Cape as derived from the preliminary literature survey.

On the other hand, the qualitative approach is still considered relevant in this study through the use of open-ended questions, especially by using live interviews to collect information from experienced stakeholders who are involved in housing delivery in the Western Cape, primarily working with the government and construction industry in South Africa. Semi-structured interviews were conducted on the impact of government policy on housing policy implementation and government policy requirements on resources, including materials, plant and equipment utilisation.

3.4.1.1 Quantitative methods approach

Quantitative research is a systematic process of using numerical data to generalise findings obtained from the analysis performed on the selected sample group of a population to represent the total population of the study (Maree & Pieterson, 2008). Quantitative research is the measurement of quantities, numbers and amounts (Kothari, 2004). This approach uses the statistical method of analysis and presents the results numerically (O'Leary, 2010). Thomas (2003) explained that the quantitative research method allows researchers to obtain generalisable and predictable results from a large population within a short time at low cost.

In quantitative studies, data is represented as metadata before being converted into numeric data – after being subjected to different statistical exploitations, which are later expressed in words and numbers (Blaikie, 2003). In addition, extreme emphasis is placed on tight control of all the factors and variables in order to statistically determine how they are related (Hall & Hall, 1996). Generally, there are some common methods used in conducting a quantitative research, such as theoretical studies, descriptive research, developmental studies (case studies and surveys), correlational studies, surveys, documentary methods, observations and experiments (Leedy & Ormrod, 2005).

In quantitative studies, it is common that sample data extracted from a population reflect the attributes of the targeted population. Findings generated from the exploration of the sample data can be related to the targeted population in drawing general conclusions relevant to the entire population. Consequently, the general consensus is that the higher the representativeness, the more accurate the generalisability of findings. In essence, this will yield higher study quality. As earlier stated in subsection 0, this method is applied through statements presented in closed-ended questionnaires formulated to aid the data collection from the stakeholders tasked with the implementation of housing policy as well as in the construction industry.

3.4.1.2 Qualitative methods approach

Qualitative research seeks to understand a given research problem or topic from the perspectives of the local population involved. More so, the approach is effective in obtaining collective information about the values, opinions, behaviours and social contexts of particular populations (Mack *et al.,* 2005). It explores attitudes, behaviours and experiences through such methods as interviews or focus groups as it attempts to obtain in-depth opinions from participants. That said, only few participants are selected for this approach and the communication with these participants is expected to last longer (Dawson, 2002).

Leedy and Ormrod (2005) mentioned that qualitative research is a comprehensive method that incorporates many methods, tactics and techniques – including the use and collection of empirical data. Creswell, Klassen, Clark, & Smith (2011) added that observation, interviews, life stories and historical studies are also methods commonly utilised. O'Leary (2010) observed that qualitative research methods are needed to collect in-depth and descriptive data concerning a particular phenomenon with the aim of improving a knowledge base. The intention of qualitative research methods is not to test existing theories about human interactions, but rather to understand the basic motivations that people have for doing what they do (Henn *et al.,* 2006). The process is described as being intensive because a proper detailed study involves the collection of large quantities of data from a small number of respondents and settings (Gilham, 2004). Similarly, Rajasekar *et al.* (2013) described qualitative research as a phenomenon involving quality and applied reasoning as it is a non-numerical and descriptive research method.

In qualitative research, a researcher is able to measure and analyse data that already has a constructed theory (Silverman, 2000; Creswell, 2009). Furthermore, under these methods, research findings can be generalised if sample data is adequate to draw relevant conclusions from the entire population as done with quantitative research data (Babbie, 2007). In addition, these methods encourage the study of dependent and independent variables and compare concluding statements attained with the research findings from quantitative methods. Nevertheless, some disadvantages are noted in qualitative research, such as the fact that the context of the research is ignored and the method does not offer the meaning of objects or study objects in their natural scenery because it focuses on the respondent's subjective experience (Rugg & Petrie, 2006; Singh, 2006).

3.4.2 RESEARCH DESIGN

3.4.2.1 Historical research

Historical research can be described as a study performed on the cause and effect patterns of related events to examine a current situation and predict future situations (Kothari, 2004; Singh, 2006; O'Leary, 2004). The research does not directly include causes or effects, instead data is gathered from the primary sources, such as past research records directly obtained from immediate occurrence of past events; in the case of the secondary sources, relevant data is collected from the past research records produced after events have already occurred and been analysed (Goddard & Melville, 2004). Nonetheless, the purpose of doing historical research is to gain a clear perspective of the present, since most current events have a past 'history'. Therefore, it is essential for researchers to acquaint themselves with this history if they wish to appreciate the potential significance and impact on the current state of affairs (Singh, 2006).

3.4.2.2 Survey research

Survey research is gathering data from respondents representing some population, wherein an instrument composed of a closed structure or open-ended items is used (Singh, 2007). Surveys are the most widely used data gathering technique in social research, having been developed within a positivist approach to social science

(Neuman, 2000). They are incredibly versatile research instruments since there are relatively few areas of social life that cannot be studied by having subjects respond to questions and/or statements about selected topics (Ruane, 2011).

In survey research, a sample of a predetermined population is studied (questioned or observed) to determine its characteristic and it is then inferred that the whole population has the same characteristics (Kothari, 2004). Surveys might require respondents to provide information about their beliefs, opinions, characteristics and past or present behaviour – and are most effective when people's responses to questions quantify variables (Neuman, 2000). Furthermore, surveys enable variables to be operationalised when researchers ask people questions as a way of getting data for analysis and interpretation (Babbie, 2013). Descriptive surveys or studies also serve as direct sources of valuable knowledge concerning human behaviour (Singh, 2006).

Pre-testing is critical in the identification of questionnaire problems by aiding the removal of ambiguities, sources of bias and highlighting any challenges that the interviewers and respondents may have with regard to the language of the questions (Singh, 2007). Questions should be relevant to the respondents in order to provide meaningful answers when viewpoints are sought on the issues that few respondents have thought about or really care about; therefore, the results are not likely to be useful (Babbie, 2013). The statistical measures used to summarise the survey or research data are measures of central tendency or statistical averages, measures of dispersion, measures of asymmetry (skewness) and measures of relationship (Kothari, 2004).

Dahlberg and McCaig (2010) added that the proportion of information derived from the survey participants is vital in determining the validity and reliability of the study. This infers that the generalisation of research results in any study is dependent on the response rate of the research population. According to Maree and Pieterson (2008), survey research is characterised by a large sample size and numerous variables measured to generate related hypothesis for testing and results that can be generalised.

The survey method that uses close-ended questions, as derived from the literature survey with regard to the four objectives in this study, is considered most appropriate method for this study. The simplicity of this method allows for a follow up with the

intended respondents in a sample population by exchanging emails to confirm the completion of the questionnaires. As part of the intended sample population, site-based construction personnel located on the current construction sites were handed questionnaires to complete. This was the easiest, most convenient and most secure way to gather the required data.

3.4.2.3 Exploratory research (Pilot study)

Exploratory research is usually undertaken to gain familiarity, initial knowledge or understanding of a new or 'unresearched' situation, group, or phenomenon. Basically, it is used to gain better insight into a research topic. Therefore, exploratory research was done with a small sample of subjects, allowing the researcher access more intimate first-hand information. Exploratory research often produces qualitative data (Ruane, 2011). With regard to this study, a pilot study is executed with a close-ended questionnaire, wherein a small sample of the target population is considered to ascertain the feasibility of the study. In essence, the questionnaires were distributed and tested to determine if there are any crucial adjustments needed to avoid impracticality of the study.

In addition, this process enables a researcher to have a clear interpretation of the areas to be investigated, and test the quality, validity, and reliability of the questionnaires developed for such investigation. Data obtained through this process was analysed using descriptive statistical analysis to ascertain the degree of applicability of the questionnaire and the relevance of the data in resolving the research problem developed for this study. For instance, if the same questionnaire is included in the primary study and yields similar results from a different set of similarly chosen sample of respondents, then internal consistency was established. Also, a possible sampling margin of error can be determined to allow the data to be integrated and deduce general conclusion about the target population with more confidence.

3.4.3 The population and sample size

Researchers are often interested in learning or discovering something about a large group of people or research population (Ruane, 2011) because a population is an abstract concept outside of small specialised populations. Therefore, the researcher needs to estimate the population. As an abstract concept, the population needs an

operational definition. The researcher operationalises a population by developing a specific list that closely approximates all the elements in the population (Neuman, 2007). This approach is called a *sampling frame* and is used to determine a sample (Neuman, 2000).

The primary goal is to obtain a definite sample size, with which the researcher can make a general conclusion about the target population or large group based on probability sampling. The determination of sampling size, then, depends on the data variables such as the nature of the research, method and type of data, ease of collecting data and means of collecting data (O'Leary, 2004).

3.4.3.1 Population sampling

Sampling is the selection of a particular quantity from an entire population or totality, from which a collective decision, judgement or inference is made (Singh, 2006; Kothari, 2004; Neumann, 2000). In other words, sampling is the process of gaining information about an entire population by observing only a portion of it. In most cases, the approach is to generalise or draw inferences about the entire population from the samples observed (Kothari, 2004). Considering the validity of the results and generalisations in qualitative research, it is understood that the larger the sample size, the better the possibility of achieving the aim of the research in an unbiased manner (O'Leary, 2010). Larger populations permit smaller sampling ratios for equally good samples because, as the population size grows, accuracy of the sample size shrinks (Neuman, 2000).

The population study considered here is government officials who work in the construction department at the provincial and local levels. These personnel are tasked with the implementation of housing delivery policy, including professional consultants who are tasked with initial and implementation phases of the housing delivery cycle (principal agents, architects, quantity surveyors and project managers) and site based construction personnel (contract managers, construction managers and construction surveyors) who execute tasks associated with housing development and housing delivery contracts in the Western Cape.

3.4.3.2 Probability sampling

In this sampling technique, there are two main types of sample: probability and purposive samples. However, in the probability samples, data in the research population have tendency of being selected to aid detailed explanations, predictions, or generalisations about the entire research population. On the other hand, purposive samples discourage the tendency of one person to sample. Within the probability and purposive categories there are also several different sampling methods (Dawson, 2002).

The sampling method adopted in this study was determined through factors such as research area, selected research methodology and philosophical inclination of the researcher. Then, due to the nature of the study, probability sampling was chosen as the sampling technique considered suitable to enable a reliable generalisation of findings attained from the sample analysed. However, without probability sampling, the capacity to generalise findings attained will be hindered, thus rendering the practical use of the data ineffective (Ruane, 2011). In this case, the use of probability sampling will aid a possible determination of the extent to which results are affected by sampling errors (error margin) (Leary, 2011). The effect of this demonstrates the degree to which data extracted from the sample is expected to deviate from the entire population (Leary, 2011). Simply, it is understood that the smaller, the margin of error, the greater the assurance that the data extracted from the sample will reflect the characteristics or opinions of the entire population.

3.4.3.3 Non-probability sampling

With non-probability sampling there is no indication that a particular case will be selected for the sample (Ruane, 2011; Tayie, 2005; Mack *et al.,* 2005). This deters the researcher from determining the estimation error and establishing the degree at which the sample result reflects the true characteristics of the population. Although this may not truncate an interpretation of the result, it reduces the capacity to generalise sample result as the complete reflection of the population (Leary, 2011). This illustration implies that the validity of the sampling analysis is compromised. In addition, in a case where the probability sampling is inapplicable, the researcher is expected to adopt alternative sampling techniques like non-probability sampling technique. This method mandates this technique be based on availability and proximity of the participants (or respondents), such as university students, fans attending a sport meeting, shoppers

in a mall or restaurant patrons, etc. The literal clarification of this method is that participants who are not nearby have no chance of being selected for sampling. Due to this, as earlier mentioned, representativeness and validity of the sample are reduced tremendously (Ruane, 2011).

For this study, access to the alumni database of the Department of Construction Management and Quantity Surveying with current employment statistics and contact details made it convenient to quantify the population size and seek a fairly accurate probability sample from the population. This is based on the predetermined criteria considered critical to the success of this study, such as involvement in the construction industry with a high probability of having been involved in housing delivery.

- **Purposive sampling**

In purposive sampling, a researcher or expert uses their judgement to decide the participants that are representative of the population (Singh, 2006; Kothari, 2004; Neumann, 2000). In most cases, this method is used when forecasting election results, e.g. the United States of America presidential election. However, a researcher's judgment cannot be relied on as a scientifically accurate or unbiased basis for selecting samples (Leary, 2011). Due to the shortcomings of purposive sampling, it is mostly used in the preliminary or exploratory research or in field research, where the intention is not to generalise to a larger population but to gain a better understanding of a problem in order to achieve a more thorough research project (Neumann, 2000).

With regard to the experience level in the construction industry, it was decided to involve trained and experienced housing personnel who were working as government workers or as professionals involved in the design and delivery processes. Ideally they would be someone who facilitated the implementation of housing delivery policy and the physical delivery of housing projects.

- **Use of snowball sampling to attain specific sample of respondents**

This is another sampling technique used by researchers to determine who, in the sample, was persuaded to offer additional names of the people willing to be part of the research project to attain a satisfactory sample size (Ruane, 2011). This method is also called *chain referral sampling*, where researchers identify cases of interest from the people who know what cases are information-rich (Creswell, 2009).

In addition, snowball sampling is generally used in explorative research, where researchers have limited information. The process starts by identifying respondents who meet the criteria for selection and inclusion in the study (Singh, 2007). These respondents are expected to offer extra respondents or reliable information to stimulate the study (Singh, 2007). As such, it is often used to find and recruit 'hidden populations' or groups not easily accessible to researchers through other sampling strategies (Mack *et al.,* 2005). However, with the potency of applying snowball sampling there is no guarantee of representativeness (O'Leary, 2004). Because of this disadvantage, this technique was not deemed appropriate for this type of research.

3.4.4 Data collection methods

The purpose of a data collection process is to validate the research hypotheses. This process enables the research team to determine the quantity, type of data to be collected, usability of the data collected, procedural steps involved in the data collection process and tools suitable for the data analysis (Singh, 2007). As implied, data collection is a vital process in the research approach; although many papers were published on the methods developed for data collection process, there is lack of a systematic framework to guide researchers in their choice and use of appropriate data collection techniques to suit their needs (Rugg & Petrie, 2006).

Understandably, some techniques are considered especially effective when addressing specific kinds of questions or topics (Neuman, 2000). This involves particular skills, practices and creativity suited to each research question with an appropriate data collection technique (Neuman, 2000). In addition, this step is executed only when a researcher is able to fathom a viable resolution to the research problem where the skills, practices and creativity required are utilised appropriately in understanding the type of research design, data collection techniques and analytical methods suitable for questions asked and answered (Rugg & Petrie, 2006). More so, data collection techniques task a researcher with exploring a range of data sources suitable for acquiring relevant research objectives (Burch, 2006). However, selection of data collection techniques for a particular research depends on sample size, sample type and characteristic, research topic, available resources and facilities available for data collection (Fowler & Cosenza, 2009). Leary (2011) noted that data obtained

through systematic empiricism allows researchers to draw reliable conclusions from casual observation alone.

Explicitly, quantitative and qualitative data collection techniques are two techniques used in the data collection procedure (Neuman, 2000). Techniques for quantitative data collection include experiments, surveys, content analyses and existing statistics, while techniques for qualitative data collection include field research such as interviews and participant observations as well as historical research (Neuman, 2000). In this particular technique, person-to-person interviews, written interviews, telephonic interviews, written interviews, telephonic interviews and online questionnaires (Braun, 2015). In the process of data collection, data are categorised into two sources: primary and secondary (Singh, 2006). These two sources of data offer a clear understanding of the integrity of the data required to solve a research problem. Actually, methods of collecting primary and secondary data differ by the definition of the data source. Simply put, primary data is originally sourced or collected, while secondary data is a combination of existing data that are already statistically analysed (Kothari, 2004).

Pertaining to this study, a triangulation data collection technique is adopted. This implies that data is not only collected with the aid of questionnaires but also by interview and literature reviews. Burch (2006) noted that this particular technique entails the collection of more than one data type suitable for comparison and cross-examination to determine the association or correlation between two findings of different sources. This essentially consolidates the authenticity and reliability of the concluding facts attained to support the degree of actuality of the data utilised. Additionally, literature reviews, questionnaires and interviews were used to obtain data for this study as subsets of secondary and primary data collection.

3.4.4.1 Primary data collection

As described in the above section, primary data is original data that has never used before in any study. This type of data is used in consultancy, dissertations (theses), and projects; also, it can be collected through techniques such as experimentation, interviewing, observations and surveys (Lancaster, 2007). Primarily, when a researcher executes an experiment, some quantitative measurements and primary data points are observed and recorded to aid reliable assessment of the hypothetical statements made in accordance with the study (Kothari, 2004). Furthermore, primary

data are generally obtained either through observation or by personal interviews with respondents or stakeholders (Creswell, 2009). This denotes that there are several methods of collecting primary data, particularly in surveys and descriptive researches.

Kothari (2004) indicated that the primary collection methods are as follows:

1. observation methods;
2. interview methods;
3. questionnaire methods;
4. scheduling methods; and
5. other methods including:
    - ✦ warranty cards;
    - ✦ distributor audits;
    - ✦ consumer panels;
    - ✦ mechanical devices;
    - ✦ projective techniques;
    - ✦ depth interviews; and
    - ✦ content analysis.

In this study, data are collected in form of a survey where questionnaires were administered to selected respondents to generate quantitative data (or, primary data). Likewise, some questionnaires were administered to the site management on housing delivery projects and officials in government departments who are tasked with housing policy implementation. These questionnaires were dispatched by email to the selected population for this study. The idea behind this study was to obtain mainly quantitative data from respondents involved in housing policy implementation as well as housing design and delivery.

3.4.4.2 Secondary data collection

Secondary data, as briefly described in the section **Error! Reference source not found.**, is a type of data that is sourced from previous studies or literature. Generally, secondary data is not considered particularly useful in decision-making, not providing a conclusive answer to the research problems. In other words, this type of data does not offer an in-depth understanding on a specific situation because the results generated do not represent the entire population of the study (Singh, 2007). It is

advisable that the researcher be cautious in considering secondary data and/or existing statistical study for his/her research questions (Kothari, 2004; Neuman, 2000). In some cases, the data may not be adequate for use in the process of the research by a researcher (Kothari, 2004). According to Singh (2006), secondary sources of data may be limited value for research purpose due to errors derived from one person to another.

Goddard and Melville (2004) stated that the secondary data (literature review) has two different forms, which are the preliminary review and the comprehensive review. Moreover, the preliminary review method was utilised in Chapter One of this study with the purpose of developing a suitable framework for the proposal of the study. On the other hand, the comprehensive review of literature was conducted in Chapter Two of this study with the purpose of evaluating and highlighting the views of other researchers on relevant aspects.

From past research conducted, the data revealed the primary factors affecting the effective implementation of government housing policy in the Western Cape. Sources of information for the review of literature included books, journals, articles, conference proceedings, dissertations and theses.

- **Collection of qualitative data using interview method**

Interviewing is the concept of one-to-one interactions, or one-to-many interactions, where the researcher presents a list of formulated questions to facilitate data collection from respondents (Rugg & Petrie, 2006). An interview is typically defined as a face-to-face discussion or communication via some technological means like the telephone or computer between an interviewer and a respondent. A qualitative interview is essentially a conversation in which the interviewer establishes a general direction for the conversation and pursues specific topics raised by the respondent (Babbie 2013).

In this technique there are three basic types of interviews, namely: *unstructured interview*, which allows a free flow of communication during the interview or questionnaire administration; *structured interview,* where information required from the respondents is already prepared to aid information relevance; and *semi-structured*, which restricts some particular communication types but permit communication freedom in certain discussions (Singh, 2007). At one end of the spectrum, is the *fully structured* interview that uses pre-established questions, asked in a predetermined

order, using a standard mode of delivery. At the other end of the spectrum, is the *unstructured* interview that attempts to draw out information, attitudes, opinions and beliefs about particular themes, ideas and issues without the aid of predetermined questions. It uses a more conversational style and attempts to prompt, probe and develop questions on the spot related to the on-going conversation (O'Leary, 2004).

Kothari (2004) indicated that despite the variations in interview techniques, the major advantages of personal interviews are as follows:

i.	Adequate information in greater depth can be obtainable.
ii.	Interviewer can overcome the resistance by personal skill.
iii.	There is greater flexibility under this method, which permits question restructuring, especially in unstructured interviews.

Also, there are also certain weaknesses in the interview method. Some of the weaknesses are highlighted as follows:

i.	Expensive method when a large and widely spread geographical sample is taken.
ii.	Possible bias from the interviewer and respondent; issue of training, supervision and control of the interviewers.
iii.	Personnel or stakeholders of high ranks may be difficult to approach under this method. Due to this, data collected may prove inadequate (Kothari, 2004).

Provisionally, one condition that could mandate the use of interview method rather than questionnaires is the inability of respondents or participants to read fluently. Other advantages of using the interview method over questionnaires is that researcher can categorically instruct the respondent to clarify unclear answers and follow up with interesting responses (Goddard & Melville, 2004). In this study, pertaining to the use of interviews, respondents were notified on the scheduling and programmes designed for the interview. By doing this, the interviewer was able to have adequate time to prepare ahead. The interview was recorded with permission from the respondents.

- **Questionnaires**

Questionnaires (or structured interviews) are used as a wide-range survey method in a quantitative research to produce relevant data (Dawson, 2002). Although, it is more

effective to use a questionnaire rather than interviews for a large group of people and there may not be enough time for general interviews (Burch, 2006). A questionnaire is usually a self-administered exercise that permits respondents to personally complete the survey and have researcher follow-up on the delivery and collection (Singh, 2007). Based on this illustration, questionnaires appear a practical approach to attaining information from respondents (Goddard & Melville, 2004).

According to Ruane (2011), the questionnaire technique enables researchers to collect data without having any contact with the respondents. Other advantage of this technique is that respondents can provide answers to the questions provided in the questionnaire at a convenient time and with guaranteed anonymity (Neuman, 2000). In addition, similar 'closed-ended' or fixed questions are asked and responses are compared to ascertain feasibility and relevance of the data represented (Mack *et al.,* 2005). Furthermore, the design of questionnaire's answers is attributed to options presented, such as Yes/No (or, True/False), rating scales, numerical scales, multiple choice and ranking scales (Burch, 2006). Many researchers tend to use a combination of both closed-ended questions with boxes to tick or scales to find out how many people use a particular service and open-ended questions for a more detailed response to determine what they think about that particular service (Dawson, 2002). Practically, the options indicated or marked by the respondents will aid in a clear determination and interpretation of the actual problems influencing the housing delivery policy in Western Cape Province, South Africa (Neuman, 2000).

3.4.4.3 Data generation procedure

- **Questionnaire development**

The necessary steps before distributing the questionnaires are as follows: means of surveying sample, complete formulation of specific questions, determining the content and structure of the questions (open-ended, closed-ended, Likert scales) (Figure 0.1 below) and general format of the survey instruments, such as scripted introductions and order of questions. In addition, and most importantly, the final survey stage will be ascertaining the degree of robustness, simplicity, ease of understanding and structure (Marczyk 2005). The questionnaire developed for this study is completely closed-ended questions, with a four-point Likert scale to limit the answers provided by survey

respondents. However, the questionnaire design was based on the information derived from reviewed literature in correlation with objectives of the study.

Moreover, the questionnaire was structured into seven related sections, with three sections requiring respondent details and the four remaining sections addressing the four objectives of the study. Table 3.1 illustrates the correlation between the sections and objectives of the study. As structured, the objectives to be addressed are correlated with the section title. The first section of the questionnaire required information about the employer's institutions with the length of service of the survey participants to determine if they were employed as government officials, consultants, contractors, or in other industries associated with the construction industry including the extent of the exposure had by the industry. However, in this study, it is imperative to include the representative sample of each sector.

The second section of the questionnaire required the respondents to indicate their professional positions – including the length of service time in the position – with the intention of determining their association with the housing construction projects. In this case, they could be associated with the government housing policy implementing agencies, design consultants or at the physical housing project construction phase of the delivery process. In addition, the third section of the questionnaire required respondents to indicate the type of housing projects they had been involved in.

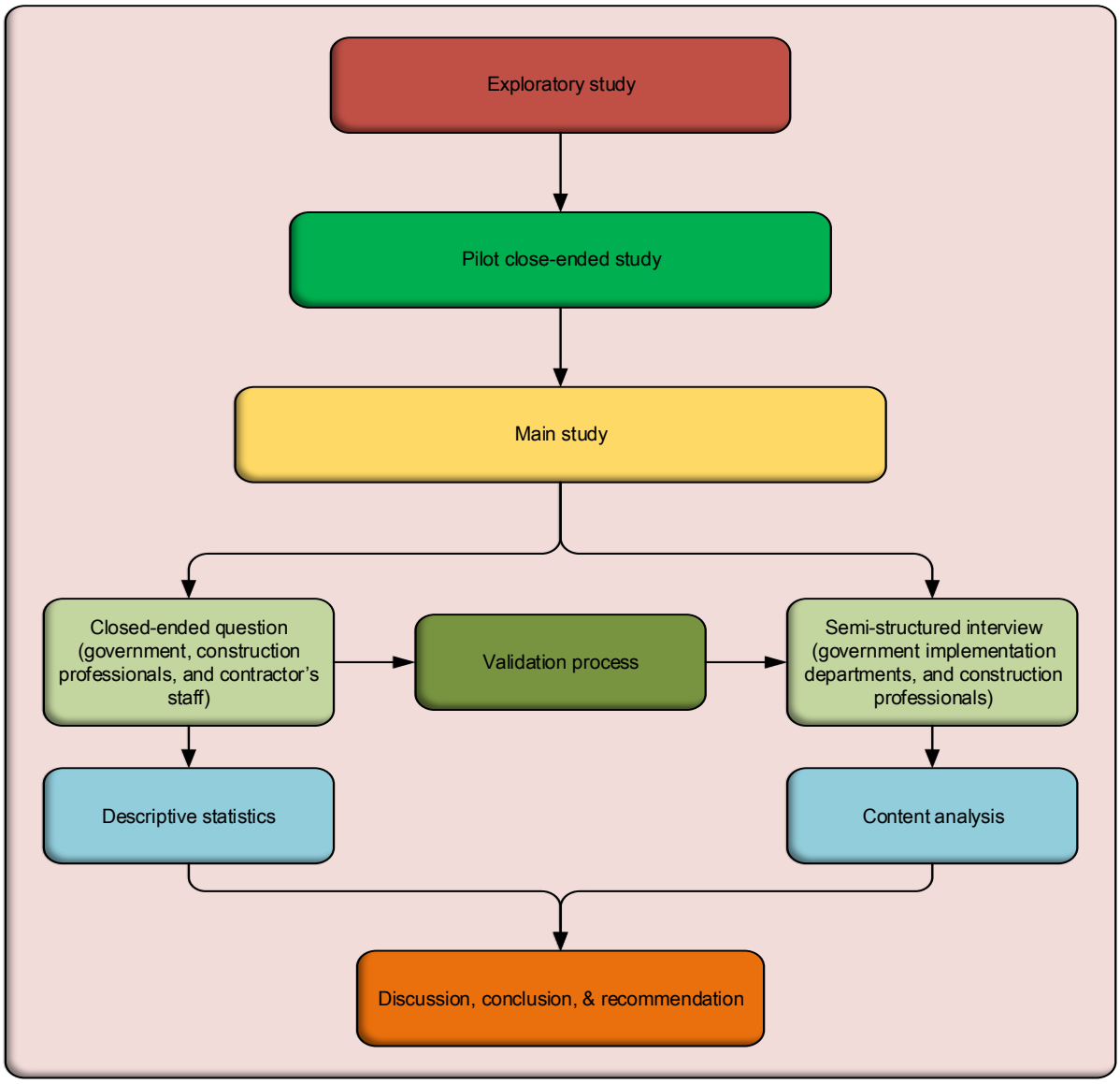

Figure 0.1: Research methodology

The last four sections of the questionnaire entailed questions on the four primary objectives of this study. These four sections demonstrated views on the interpretation of the impact of government housing policy implementation on delivery, resources and materials including plant and equipment resources used to attain reliable housing delivery in the Western Cape. To make the interpretation easy, each of the objectives has fifteen different factors formulated from the literature studied, but are presented as statements in the questionnaire. A Likert scale of 1 to 4 was provided for each question presented in the last four sections: Strongly Agree (4), Agree (3), Disagree (2) and Strongly Disagree (1). According to Goddard and Melville (2004), a four-point scale forces a decision, while a five-point scale provides the possibility of a neutral answer. Then, each factor was coded as a variable (metadata) and data related to

each of the sixty-five variables was inputted into the SPSS software for quantitative analysis.

Table 0.1: Questionnaire design

Questionnaire design		
Section	**Section title**	**Purpose**
A	Respondent employment details	Determine provincial location
B	Professional details	Determine if government employee or consultant
C	Type of housing project involvement	Determine involvement in housing projects
D	Factors that impact government policy implementation on delivery of sustainable housing in Western Cape	Objective 1
E	Effect of government policy requirements on resources utilisation toward the delivery of sustainable housing	Objective 2
F	Factors that affect government housing policies on the utilisation of materials towards the delivery of sustainable housing	Objective 3
G	Effects of government housing policy on plant and equipment usage towards the delivery of sustainable housing	Objective 4

3.4.5. Methods of data analysis

According to Gilham (2004), the selection and application of statistical analysis depends on a suitable research design with practical methods for data retrieving and pertinent variables. All these procedural techniques help the researcher make effective and comprehensive conclusions in determining if data obtained supports the objectives of the study (Babbie, 2007). Regardless of the method, the goal is always a rigorous and systematic approach to data analysis that ultimately leads to credible findings (O'Leary, 2004). Lancaster (2007) mentioned that researchers are ultimately interested in data analysed through a rigorous procedure and are consequentially daunted by impractical data. Inappropriate data analysis procedures can discourage effective interpretation of the research problem (or problem statement), which could lead to misinterpretation of the objectives of the study (Lancaster, 2007). Therefore,

data analysis should be adequately planned and executed to guide the design approach with respect to external validity and probable accuracy (Tayie, 2005).

Laws *et al*. (2003) emphasised that the first phase of analysis entails paperwork control, which involves inputting or recording of data collected. The complete data analysis process also includes data preparation, data coding, data testing and tabulating, categorising and examining the results to address the purpose of a study (Yin, 2003). The questionnaires collected were scrutinised for completion and to determine if they contained any obvious errors that would considerably influence the validity of the data. For instance, if for some reason, respondents do not fall into required population category that is specifically defined for this study then their information is considered irrelevant.

3.4.5.1. Qualitative data analysis

Data analysis is vital in a research project because it is it the point where all the data generated through various research methods are examined in order to obtain conclusions on the issue being researched (Newton, 2010). The qualitative data analysis involves the analyses of textual or non-numerical data (e.g., text, video, or audio) to understand concepts, opinions, or experiences. This supported by Cohen et al (2011) who posed that that data analysis is a complex process that involves organising, accounting and summarising the data in order to make meaning out of it according to the patterns, themes, categories and regularities of the participants. This implies that there are diverse types of techniques used for analysing qualitative data which are namely: organising, coding or categorisation, interpretation and summarising. Therefore the data collected during the interviews were analysed using content analysis by firstly identifying the codes from the transcripts and immersing in it and categorising the codes with similar responses for themes and interpreting the data. The last step I took in analysing the qualitative data was by doing an indepth discussion of main findings by responding to the research questions (Clarke & Braun 2014).

3.4.5.2 Quantitative data analysis

Quantitative data analysis is a process used in determining the validity of a particular research objective through a stable, consistent and error free analysis (Dawson, 2002). Data collected with the use of quantitative techniques are represented in

metadata format as raw data to enhance easy data grouping approaches, where variables are named to measure the characteristics of subjects, respondents or other cases. Another description is that quantitative analysis is the use of techniques in which data are converted or transformed into numerical format to pave the way for easy inputting of data into the selected statistical software (Babbie, 2013).

Afterwards, the following step is data coding, where data is reorganised or regrouped into a particular data structure (dataset) that enables easy data computation, data charting and graphing to summarise their features and an interpretation or theoretical understanding of the results (Neuman, 2000; Babbie, 2013). More so, in the process of achieving the frequency distribution of the dataset, descriptive statistics are used to analyse and showcase the distribution of data across the defined variables. In some cases, the descriptive statistics assist in summarising the measures of central tendency – mean, median, mode and standard deviation – and other important statistical methods (Leary, 2011). Each measure of central tendency is based on data having a specific level of measurement (Neuman, 2000). From the data distribution structure, correlation or association patterns in various variables are used to make meaning of the data. This evaluation process will enhance the possibility of quantifying probable cause (Greener, 2008).

In this study, each objective linked with their fifteen related factors was assigned a code, such as OBJ1-1, where the first three letters and numerical value 1 signified a specific objective and the final numerical value 1 signified the fifteen related factors. Therefore, the assignment of the codes makes the collection and grouping of the quantitative data easier, while preparing the dataset for statistical analysis by means of content analysis techniques on the Statistical Package for Social Sciences (SPSS) software.

- **Descriptive statistical analysis**

Statistical analysis is used to test hypotheses and satisfy the objectives generated from the research questions (Neumann, 2000). A short introduction of the descriptive statistics was presented in the preceding section. However, Maree and Pietersen (2008) describe descriptive statistics as the scientific discipline used in the study of phenomena *and* used as a statistical approach to data evaluation. It is used to precisely characterise the variables under observations within a specific sample and

to determine basic patterns in the data distribution shape (Neumann, 2000). In essence, this statistical tool is used to organise and summarise data to provide an in-depth knowledge of the data characteristics. In addition, it provides comprehensible and concise information on the overall characteristics of the sample. The main goal of descriptive statistics is to illustrate the distributions of some variables from a set of data (Marczyk, 2005).

Henn *et al*. (2006) described measures of central tendency, measures of dispersion and frequency distributions as the three primary tests used in descriptive statistical data analysis. Descriptive statistics presents a basic overview of each data variable through the use of descriptive statistical tools (O'Leary, 2010). Descriptive statistical analysis, though, does not produce a complete understanding or representation of a dataset. Due to this, it is imperative to consider the application of an advanced statistical tool known as 'inferential statistics' to have a clear and complete representation of a dataset (Rugg & Petre, 2006). In this study, frequency distribution and measures of central tendency (mean and standard deviation) were applied to analyse the quantitative data representing the opinions of respondents as indicated in the survey questionnaires. The dataset was regrouped in the form of factor ranking, where the factors categorised under each objective were ranked accordingly to determine the degree of consistency, reliability and validity of the data analysed.

3.4.5 Data validity and reliability

Data validity and reliability are two crucial processes used in quantitative data analysis to ensure that results are consistently satisfactory – without any cause of errors or bias in the ultimate results (Dawson, 2002). However, evaluation of research problem must follow sequential steps to support the producing of relevant and accurate data. Therefore, the inability of a researcher to follow these steps will encourage a backlog of errors in any study executed (Tayie, 2005).

Validity and reliability testing of the survey tool increases the chances of acquiring relevant data needed to make significant conclusions in a study (Leedy & Ormrod, 2010). Validity measures the ability of a dataset analysed or studied to demonstrate the true concepts of the whole study (Goddard & Melville, 2004). On the other hand,

reliability measures the degree of consistency in a study compared to similar results in another study performed with similar methods (Goddard & Melville, 2004).

- **Validity**

In the preceded section above, a short description of validity was presented to demonstrate its importance in attaining a true outcome of a study. Others have described validity as a degree to which a research tool measures what it is intended to measure rather than measuring another thing or nothing at all (Leary, 2011). Other descriptions mention that validity is a degree to which dataset acquired demonstrates variability in the phenomenon or event being measured (Leary, 2011).

Explicably, when various research methods yield similar results, then there is a greater assurance of their validity. This research method is known as *converging operations* or *triangulation* (Leary, 2011). Concerning this study, the triangulation method was considerably applied for data validation. In relation to this, a pilot study was conducted to test the validity of the questionnaires for content validity and the results attained from the quantitative data analysed were validated with the taped interviews compiled by the researcher to establish correlation.

- **Reliability**

Similarly, a short description of reliability was presented in section 0 to demonstrate the importance of consistency in attaining similar results in two different studies with the application of similar methods. In other words, reliability measures do not fluctuate; they yield consistent results (Ruane, 2011). In addition, according to Bryman (2004), reliability of a research tool implies that the application of similar tools at different times or to different subjects from the same population yields the same results or findings (Ruane, 2011). Determination of reliability measures are obtained through the execution of a test-retest strategy. This approach involves a simple way of testing for consistency in two different results; however, if the results of a study are replicated, greater confidence in the reliability of the original findings is attained (Marczyk *et al*., 2005).

Maree and Pietersen (2008) also explained that reliability of a research tool can be tested quantitatively for correlation with use of Cronbach's alpha coefficient. An outcome of zero indicates low reliability, while an outcome of one indicates high reliability. The correlation coefficient is determined when a research tool, such as a

questionnaire, demonstrates consistency in its outcome. Goddard and Melville (2004) supported the above statement by stating that a study is considered to be reliable only if the outcomes of the study are consistent when conducted under similar conditions by another researcher. Nonetheless, considering this study, the degree of the reliability of the questionnaire used was examined by applying Cronbach's coefficient alpha approach. As earlier stated, the closer the coefficient is to 1, the more reliable the survey tool is for the study. Thus, according to Leary (2011), an acceptable Cronbach's coefficient of alpha value is above 0.7. This indicates that at least 50% of the total variance in the scores is a systematic, true-score variance (Leary, 2011).

3.4.6 Ethical considerations

This study was conducted in accordance to the Cape Peninsula University of Technology (CPUT) post graduate guidelines related to research. Based on the internationally acceptable ethical standards, the identity of the selected participants – employees of government departments, construction firms, stakeholders and professionals – is not included in the research instruments. . Key ethical permissions were considered and applied for before conducting this study. For instance, permission was granted as I sought for it, from the university. During the course of the exercise, no participant was compensated in monetary or other forms. Permission was obtained from the participants in this study, and I clearly explained the research in order to get their consent. The research purpose was clearly explained to the participants as they were issued consent letters were signed before the study was conducted. In the process, quality assumptions were made on the data captured, competence and professional conduct of interviewers, correctness and completeness of questionnaires and the accuracy of calculations. Anonymity and confidentiality of the participants were maintained by me (Leedy and Ormrod, 2005) as well as ensuring that the study was non-maleficent and beneficial to the participants (Cohen et al., 2011).

3.5 SCOPE AND LIMITATION OF THE STUDY

The scope of this study is limited to the impact of government policy on the delivery of sustainable housing, resources, materials and on plants and equipment utilised for the delivery of sustainable housing in the Western Cape. The focus of the study was

directed towards government officials working in the departments and tasked with implementing housing policy; and professionals involved with the design and implementation of sustainable housing, including the staff of construction companies dedicated to delivering sustainable housing projects all over the Western Cape. In the process, questionnaires were distributed through email to construction professionals like quantity surveyors, construction managers and project managers both in the government and construction industries. They were followed up weekly with a reminder. Also, questionnaires handed out on construction sites were collected directly.

The purpose of the research was to develop a framework to enhance the delivery of sustainable housing in the province. The literature surveyed indicated that the primary challenge was the implementation of government housing policy. The limiting or constricting impacts of these policies on the delivery, resources, materials and plants used in the delivery of housing in the Western Cape are to be studied. Once these limiting impacts are effectively mitigated, sustainable delivery will recover and proceed unhampered. One of the major limitations encountered is the inability of the researcher to schedule the actual timeframe with the participants to aid data collection timeliness.

3.6 CHAPTER SUMMARY

In this chapter, a comprehensive overview of the philosophies, research methodologies and methods used in the study was provided. Furthermore, mixed methods (quantitative and qualitative methods) were applied to attain the aim and objectives of this study. A quantitative research questionnaire was compiled and devised to capture the perceptions of construction professionals, government officials and stakeholders regarding the impact of government policy on the delivery of sustainable housing in the Western Cape. Literature reviews, interviews and questionnaires were used in a triangulated approach to collect both the secondary and primary data for the study. Approaches used for questionnaire administration were ‘online’ and ‘hand-in’. Thereafter, data was coded and subjected to various statistical analyses to determine consistency, validity and reliability. The resultant findings were further validated qualitatively. However, the next chapter presents the quantitative and qualitative data, data analysis and discussion of findings.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSION OF FINDINGS

4.1 INTRODUCTION

This chapter contains the analysis and discussion of data gathered from the survey questionnaire and interviews performed with professionals employed in government agencies who are tasked with the implementation of housing legislation and management of the construction companies assigned with the physical delivery of housing projects. To achieve this, the quantitative data was analysed using both descriptive and inferential statistical analysis techniques while the qualitative data was analysed using content analysis techniques to produce logical outcomes. Meanwhile, these outcomes are presented in tabular and bar graphs such as clustered bar and stacked column graphs.

As part of the process, the degree of correctness and simplicity of the questionnaire distributed is determined by performing a piloting exercise. In total, forty (40) questionnaires were administered. The instructions were given in a way that directed the participants to mark or indicate their choice of responses (answers) to the related questions on the questionnaires. After the piloting exercise, necessary adjustments were made to improve the relevance of the questionnaire relevant in the research then executed.

4.2 ANALYSIS OF RESPONDENTS DEMOGRAPHIC INFORMATION

For the survey exercise, a total of two hundred and fifteen (215) copies of questionnaires were administered to construction professionals such as architects, project managers, quantity surveyors and government employees partaking in housing delivery activities in the Western Cape. These selected respondents are considerably relevant to the design, planning and programming implemented for a backlog of housing requirements in the province affected by the current housing regulations. In this case, the answers indicated on the questionnaires were evaluated to comprehend the effect of the current housing legislation on the physical aspects of the housing project implementation process. Moreover, this result demonstrates the

effects of legislation on labour, plant and material resource utilisation in housing delivery in the province.

After the survey exercise, fifty-one (51) responses were received by email. Only forty-nine (49) of them were completed and considered usable; in total a percentage estimate of 23% response rate was realised. In contrast, forty-five (45) questionnaires were distributed by hand to the site management staff on the housing project construction sites, but only twenty-two (22) of them were appropriately completed and considered usable. Therefore, a percentage estimate of 49% response rate was realised from the questionnaires distributed on site. It was difficult to achieve this percentage because some of the site management staff are unwilling to complete the questionnaire on time. Some requested that the forms be left on site and collected on another day. Overall, only seventy-one (71) copies of questionnaires were recovered and collated from a total of 260 questionnaires, which yielded a total percentage response rate of 27%. The seventy-one (71) questionnaires collated were quantitatively analysed to obtain relevant results.

4.2.1 Respondents professional profile

Table 0.2 below. The table presents respondents' demographics relating to Professional practice, Employment duration (in the organisation), Work position (in the organisation), Current position duration (in the organisation) and Housing project type (involved in). This information was collected from public and private sectors of the construction industry, from different work divisions to professions and was extended to organisations.

Considering data collection under professional practice, five options were available for the respondents to choose from. These five options were categorised as 1 = Construction company, 2 = Construction consultancy, 3 = Architectural consultancy, 4 = Government (provincial or local government) and 5 = Other (specify).

Table 0.2 summary of Respondents' demographics as employees

Factors	Respondents	Percentage estimates (%)

Professional practice	Construction company	33.8
	Government	43.7
	Construction consultancy	5.6
	Architectural consultancy	7.0
	Others (specify)	9.9
Employment duration	1-10 years	80.3
	11-20 years	14.1
	21-25 years	2.8
	>25 years	2.8
Work position	Contract manager	4.2
	Project manager	23.9
	Quantity surveyor	26.8
	Others (specify)	45.1
Current position duration	1-10 years	78.9
	11-20 years	15.5
	21-25 years	4.2
	>25 years	1.4
Housing project type	New housing project	15.5
	Housing renovation/maintenance	9.9
	New housing project and housing renovation	70.4
	Unspecified	4.2

From Figure 0.2 below, observations indicated that a high number of respondents were from both *Government establishment* and *Construction company,* with percentage estimates of 43.7% and 33.8%, respectively. A sum estimate of 12.6% respondents contributed to both *Construction consultancy* and *Architectural consultancy*, while 9.9% respondents represented *Other* as specified in the questionnaire. It is statistically noted that more respondents worked in the *Government establishment* on the implementation of housing policy, followed by the respondents working with *Construction companies* on the same housing policy implementation. On the contrary, the fewest number of respondents worked with *Construction consultancy* on the implementation of housing policy.

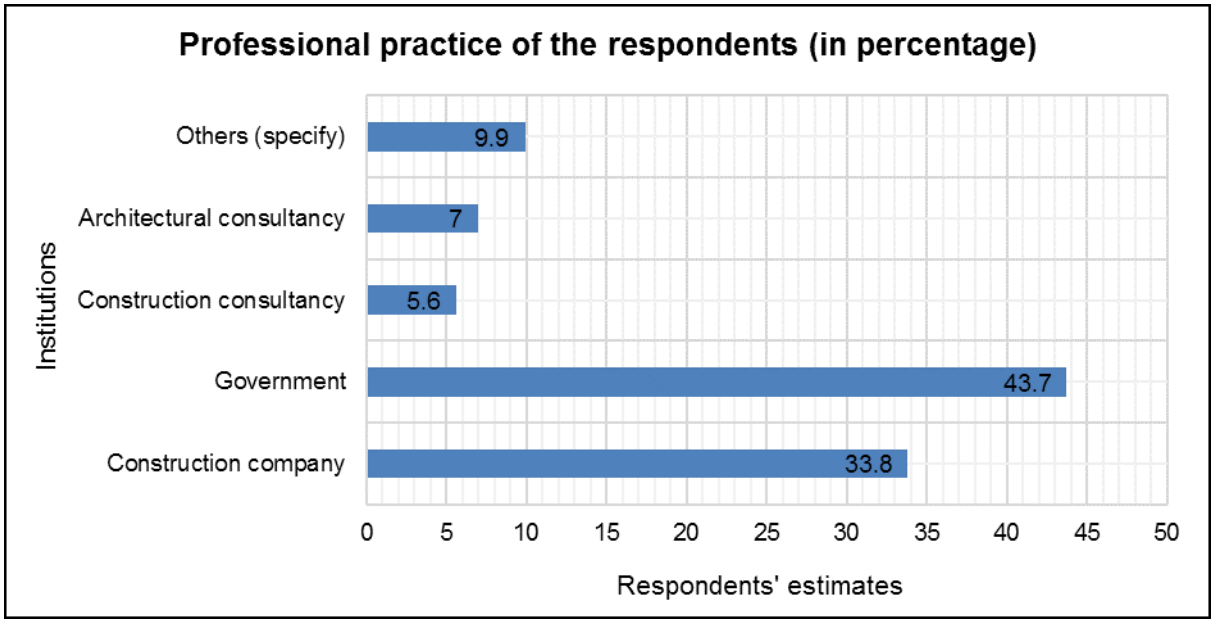

Figure 0.2: Graphical illustration of professional practice of the respondents

4.2.1.1 Employment duration

From the same table, it is observed that 80.3% respondents were within range of 1-10 years of *Employment duration*. This signifies that the majority of the respondents who participated in the survey exercise had not worked more than 10 years in their various organisations. In addition, this year of employment duration may affect the experience level of these respondents in housing policy implementation compared to respondents with more than 10 years employment duration in the same domain.

More so, another observation demonstrated that 14.1% respondents had been working in their various organisations for 11-20 years. An equal of estimate of 2.8% respondents claimed to be working in their various organisations within the range of 21-25 years and >25 years respectively (Figure 0.3 below). Based on the distribution of data, it is observed that majority of the respondents that participated in the survey exercise had not worked more than 20 years in their various organisations.

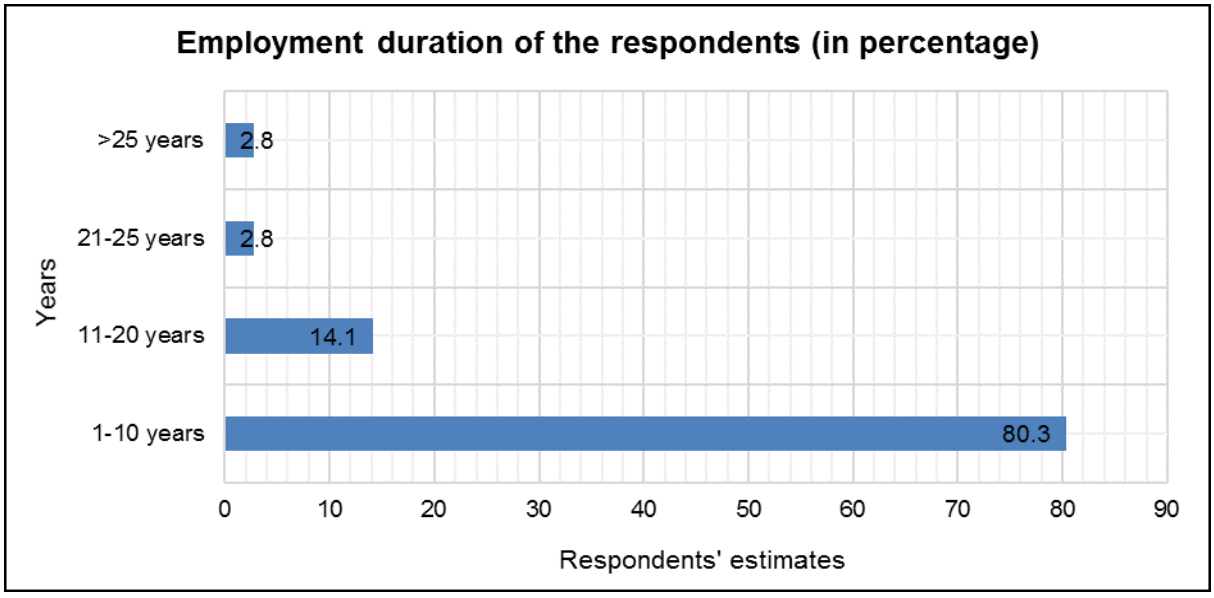

Figure 0.3: Graphical illustration of employment duration of the respondents

4.2.1.2 Work position

In the third row of Table 0.2, the estimated percentages of the positions handling by the respondents in their various organisations are presented to determine their relevance in the housing policy implementation. According to the statistical estimates given in the table, many of the respondents are working as *Quantity surveyor*, with a percentage estimate of 26.8%, followed by *Project manager,* with a percentage estimate 23.9%. *Contract manager* represents 4.2%, which is considered as the smallest number of respondents (Figure 0.4 below).

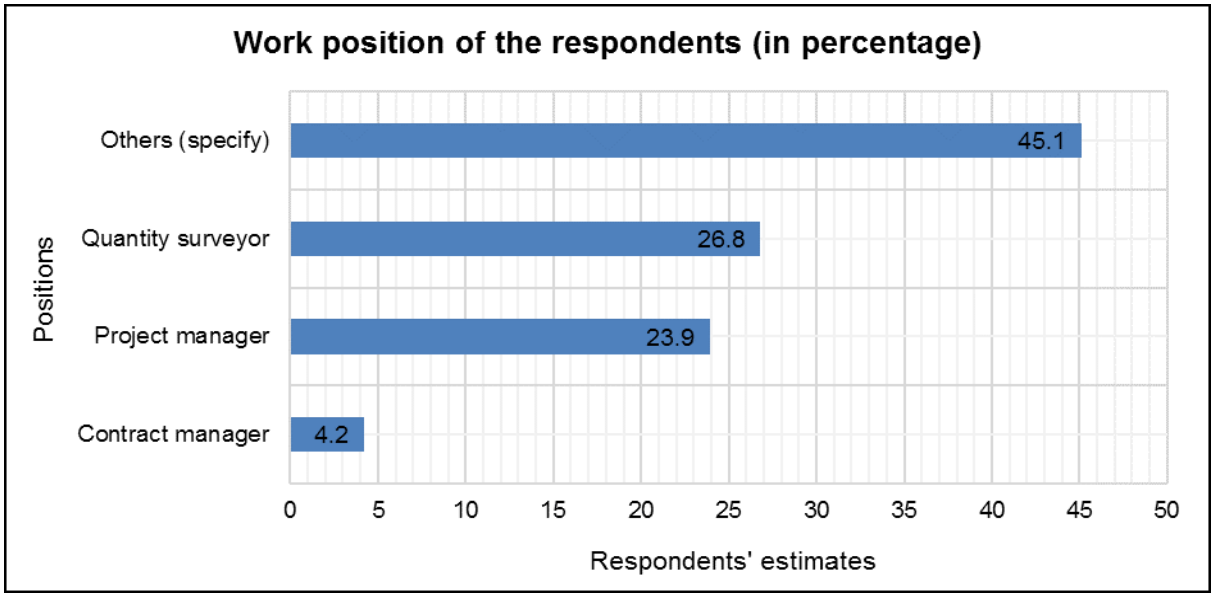

Figure 0.4: Graphical illustration of work position of the respondents

The aforesaid three working positions are appointed within the capacity of the construction industry, while the *Other* specified positions are within the government management. Understandably, it is noted that *Contract manager, Project manager* and *Quantity surveyor* are all working within the construction industry. This illustration demonstrates that construction workers who hold top positions are very relevant in determining the best approach towards improving the housing policy implementation.

4.2.1.3 Current position duration

Considering the analysis of the duration spent by a respondent in his/her current working position, it is deduced statistically that many of the respondents were not in their current position for more than 10 years, with an estimate of 78.9%, followed by respondents who spent 11-20 years in their current positions, with an estimate of 15.5%. Evidently, a fewer number of respondents spent 21-25 years and >25 years in their current position, representing 4.2% and 1.4% respectively (Figure 0.5 below).

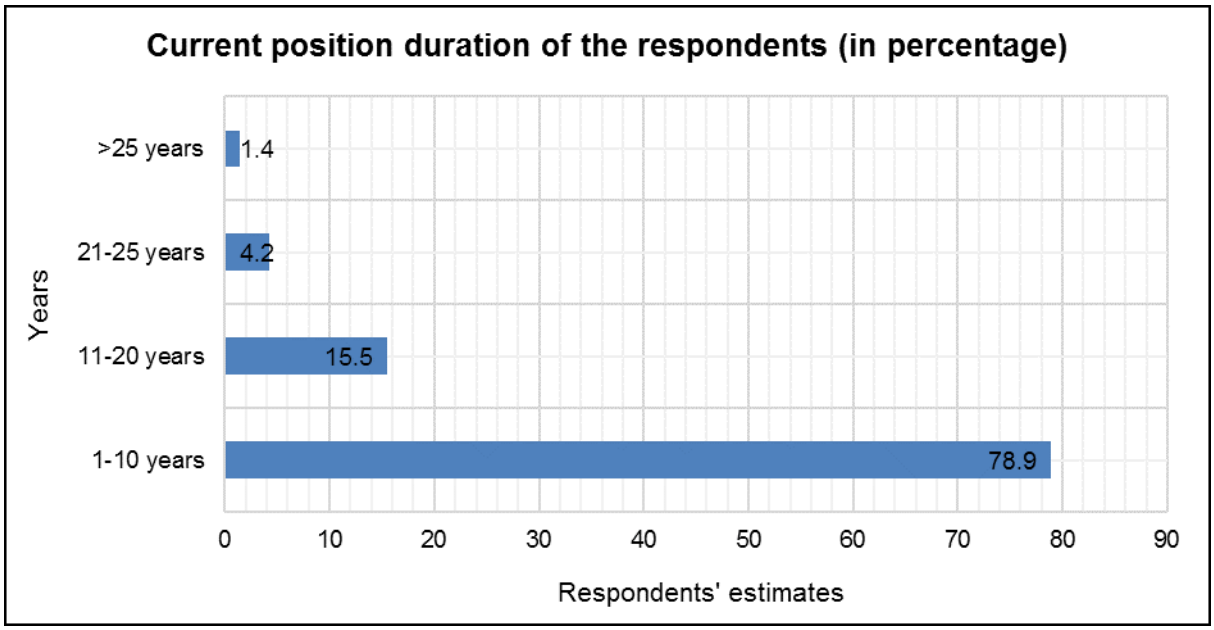

Figure 0.5: Graphical illustration current position duration of the respondents

In addition, observation shows variation in the data distribution between the *Current position duration* and *Employment duration*. Respondents who claimed to be employed with their various organisations over a certain duration are observed to not

be working in their *Current position* over the same duration of time. In essence, this illustration demonstrates that number of respondents who were employed within the range of 1-10 years do not spend all 10 years in their current positions. Many of them were rewarded promotions to superior positions before the 10 years was up. A similar interpretation is applicable to other values of *Employment duration* and *Current position duration* as presented in the Table 0.2 above.

4.2.1.4 Housing project type

The last row in the Table 0.2 presents the results derived from the analysis of the *Housing project type*. From the table, the highest number of respondents, with an estimate of 70.4%, indicated that they were involved in *New housing project and Housing renovation*, followed by 15.5% respondents who claimed that they were involved in *New housing project*. A low percentage estimate of 9.9% respondents indicated that they were involved only in *Housing renovation/maintenance.* In addition, a total estimate of 4.2% respondents did not specify or respond to this particular question (Figure 0.6 below).

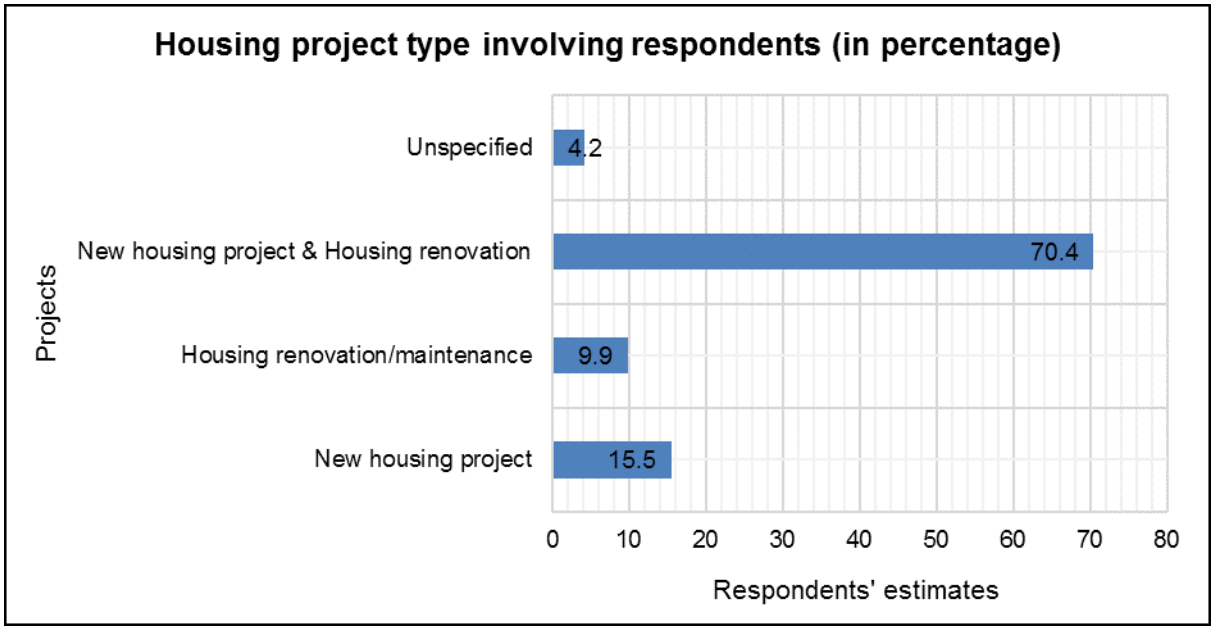

Figure 0.6: Graphical illustration of housing project type involving respondents

An overall estimate of 95.8% respondents who participated in the *Housing project type*, in one way or another, indicated that sizeable number of respondents had substantial experience in housing delivery projects.

4.3 RELIABILITY TESTING OF RESEARCH THE TOOL

In this section, reliability testing of the research tool was executed through the use of Cronbach's alpha coefficient in SPSS software. This process was initiated to quantify the degree of reliability of the questionnaire as earlier elucidated in the subsection □. Cronbach's alpha coefficient reliability test is an estimate of the internal consistency associated with the scores derived from the scale or composite (Cronbach, 1951; Tavakol & Dennick, 2011; Peterson & Kim, 2013).

Table 0.3: Realiability test scores for Likert scale questions

Section	Statement	Cronbach's alpha coefficient
D	Factors that impact government policy on delivery of sustainable housing in Western Cape	0.70
E	Factors indicating the effect of government policy requirement on resources utilisation towards sustainable housing delivery	0.70
F	Factors that affect government housing policies on the utilisation of materials towards the delivery of sustainable housing	0.80
G	Factors indicating the effect of government housing policy on plant and equipment usage towards the delivery of sustainable housing	0.80

Table 0.3 summarises the reliability tests conducted on the scaled questions. The Cronbach's alpha coefficient values are greater than 0.70. The score values between 0.75 – 0.95 are standardised values for the reliability of a test to be proven (Tavakol & Dennick, 2011). The results of the Cronbach's alpha coefficient tests were satisfactory in terms of reliability requirements.

4.4 PRESENTATION OF FINDINGS

This section presents findings from the evaluation of the questions tabulated in section 0. This study is primarily centred on the establishment of a framework for the enhancement of government housing policy in the areas of construction resources in the Western Cape Province, South Africa. In this case, areas such as the effects of government policy on the utilisation of materials towards the delivery of sustainable housing, the effects of government policy on construction labour utilisation for the delivery of sustainable housing, the effects of government policy on plant and equipment usage for the delivery of sustainable housing and the effects of government policy requirements for resource utilisation are presented.

4.4.1 Factors impacting government policy on sustainable housing delivery in Western Cape

One of the purposes of this survey is to identify factors mitigating government policies on sustainable housing delivery. To achieve this purpose, there is a need to assess the level of government policies on sustainable housing delivery. However, the data

from the survey on the factors impacting government policy on the sustainable housing delivery in Western Cape were analysed using descriptive statistics and presented in Table 4.3. The assessment of these factors was subjected to a four-point Likert scale to quantify respondents' opinions. The four-point Likert scale used was categorised into 1-Strongly disagree, 2-Disagree, 3-Agree and 4-Strongly agree.

From the table, it is deduced that some factors have a more intense impact on the government policy regarding sustainable housing delivery in the Western Cape than other factors. Considering the values presented, Mean Value (MV) and Standard Deviation (SD) values demonstrated the spread of data (responses) across the factors in accordance with the options marked by the respondents. Observably, the results displayed show a variation in the distribution of data across the factors. In support of the above illustration, the values (scores) arrayed directly under the SD for each factor demonstrate disparities in options marked between the set of factors, regardless of the MV. In this case, the MV and SD determine the ranking of each factor from the highest value to the lowest value.

Table 0.4 Summary of the impact of government policy on sustainable housing delivery in Western Cape

Significant factors	N	Min	Max	Mean value (MV)	Standard deviation (SD)	Rank
Shortage of suitable housing for poor communities	71	3.00	4.00	3.6667	0.48154	1
Inadequate planning for policy implementation	71	3.00	4.00	3.5833	0.50361	2
Low quality housing delivery	71	2.00	4.00	3.5833	0.65386	3
Competent professionals to handle government policy in housing delivery	71	1.00	4.00	3.4583	0.77903	4
Poor accessibility to housing	71	2.00	4.00	3.4167	0.65386	5
High construction costs	71	2.00	4.00	3.4167	0.65386	5
Land policy implementation	71	2.00	4.00	3.2917	0.69025	6
Economic stability	71	1.00	4.00	3.2917	0.85867	7
Inadequate capacity for housing delivery	71	1.00	4.00	3.2917	0.85867	7
Poor prior training for artisans at construction site	71	1.00	4.00	3.2083	0.77903	8
Poor implementation of housing policy by construction stakeholders	71	2.00	4.00	3.1667	0.70196	9
Community involvement in housing production	71	2.00	4.00	3.1667	0.76139	10
Availability of skilled workers at the construction site	71	1.00	4.00	3.1667	0.91683	11
Land availability for housing	71	1.00	4.00	3.1667	0.91683	11
Inadequate management of housing loans	71	1.00	4.00	2.7917	0.93153	12

Also, it is observed that factors such as shortage of suitable housing for poor communities, inadequate planning for policy implementation, low quality housing delivery, competent professionals to handle government policy in housing delivery, poor accessibility to housing and high construction costs with MVs of 3.67, 3.58, 3.58,

3.46, 3.42 and 3.42 (approximated values) respectively, have high impact on the government policy on the sustainable housing delivery in the Western Cape. In contrast, other factors such as availability of skilled workers at the construction site, land availability for housing, and inadequate management of housing loans with MVs of 3.17, 3.17 and 2.79 (approximated values) respectively, demonstrate low impact on the government policy when correlated with their high SD values of 0.92, 0.92 and 0.93 (approximated values) respectively.

From the SD viewpoint, according to the values displayed, it is deduced that some options marked were lopsided or concentrated more on '*4-Strongly agree'* and *'3-Agree'*, while fewer numbers concentrated on *'2-Disagree'* and *'1-Strongly disagree'*. Still, there is a mix of options selected by the respondents, which caused more variation according to the graphical illustrations of the SD value in Table 4.3.

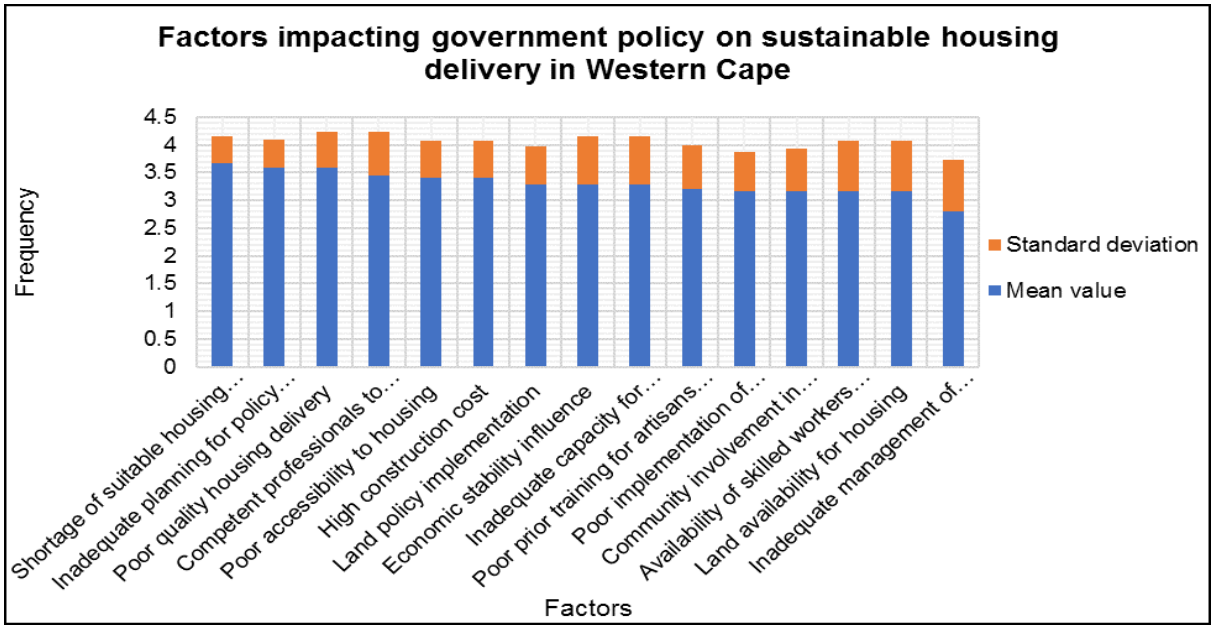

Figure 0.7: Graphical illustration of the impacts of factors on the government policy on the sustainable housing delivery in the Western Cape

This is because there is not an even distribution of data (responses) from the lowest SD values to the highest SD values; for instance, data variation is determined within the factors ranked from 5th to 10th due to the disparities in the SD values presented. More findings demonstrated that more importance is placed on the intense impact of factors ranked 1st to 5th on the government policy regarding delivery.

4.4.2 Factors affecting government housing policy in the utilisation of labour towards the delivery of sustainable housing

Results obtained from the descriptive analysis of the factors that affect government housing policy regarding the utilisation of labour towards the delivery of sustainable housing is arrayed by MV and SD in Table 0.5 below. As usual, the responses of the respondents were quantified through the use of four-point Likert scale in a similar format to the preceding subsection.

According to the evaluation of the respondents' opinions, it is confirmed that factors ranked from 1st to 3rd hugely affect the government housing policy in the utilisation of labour for effective delivery of sustainable housing. Factors ranked in these positions are conflict between profit-driven interests of the private sector and welfare-driven interests of the communities, sustainability integration into production will enhance sustainable housing delivery and decisive policy on human management is significant to effective production with MVs of 3.46, 3.39 and 3.29 (approximated values) respectively. Similarly, factors with the lowest effect on the government housing policy on the utilisation of labour are identified as settlement of the people at the urban periphery, excessive development fees caused by local government's inability to fulfil functions, procurement policy for onsite resource utilisation, excess cost based on availability of equipment, machinery and materials on site and construction plants and equipment are deemed to be sources of delay in sustainable housing delivery, with MVs of 2.98, 2.94, 2.92, 2.92 and 2.46 (approximated values) respectively.

Table 0.5: Factors affecting government housing policy on the utilisation of labour towards the delivery of sustainable housing

Significant factors	N	Min	Max	Mean value (MV)	Standard deviation (SD)	Rank
Conflict between profit-driven interests of the private sector and welfare-driven interests of the communities	71	2.00	4.00	3.4648	0.60547	1
Sustainability integration into production will enhance sustainable housing delivery	71	2.00	4.00	3.3944	0.62057	2
Decisive policy on human management is significant to effective production	71	2.00	4.00	3.2958	0.64130	3
Matching construction constraints with sustainability of policy	71	1.00	4.00	3.2254	0.53977	4
Human resources management is critical for influencing construction constraints	71	2.00	4.00	3.2113	0.73515	5
Risk subjected to by construction industry through technical and design failure, equipment and system failure	71	2.00	4.00	3.1972	0.74871	6

Lack of proper management of initial budget involved by construction operators	71	1.00	4.00	3.1831	0.68264	7
Affordable housing delivery is prone to holdups	71	1.00	4.00	3.1831	0.85038	8
Inadequate planning to relieve the dire conditions in which the dispossessed people find themselves.	71	2.00	4.00	3.1690	0.71686	9
Safety management on site	71	1.00	4.00	3.1408	0.78003	10
Settlement of the people at the urban periphery	71	2.00	4.00	2.9859	0.66532	11
Excessive development fees caused by local government's inability to fulfil functions	71	1.00	4.00	2.9437	0.73460	12
Procurement policy for onsite resource utilisation	71	1.00	4.00	2.9296	0.74304	13
Excess cost based on availability of equipment, machinery and materials on site	71	1.00	4.00	2.9296	0.78055	14
Construction plants and equipment are deemed to be source of delay in sustainable housing delivery	71	1.00	4.00	2.4648	0.87556	15

Observably, there is variation in the distribution shape of the Mean or respondents' choice of options (responses) due to the SD values. The smaller the SD values, the better the distribution of data across the (selected) variables (Figure 0.8). From this simple illustration, it is observed that from the factors ranked 1st to 3rd the distribution of data (responses) is centred or concentrated on *4-Strongly agree* and *3-Agree* than any other related options, but variation occurred within the factors ranked 4th to 11th. In addition, the ranking of these factors specified the degree at which each factor affects government housing policy in the utilisation of labour for the delivery of sustainable housing. For instance, a high number of respondents claimed that conflict between profit-driven interests of the private sector and welfare-driven interests of the communities contributed greatly to the ineffective of the government housing policy on the utilisation of labour towards the delivery of sustainable housing.

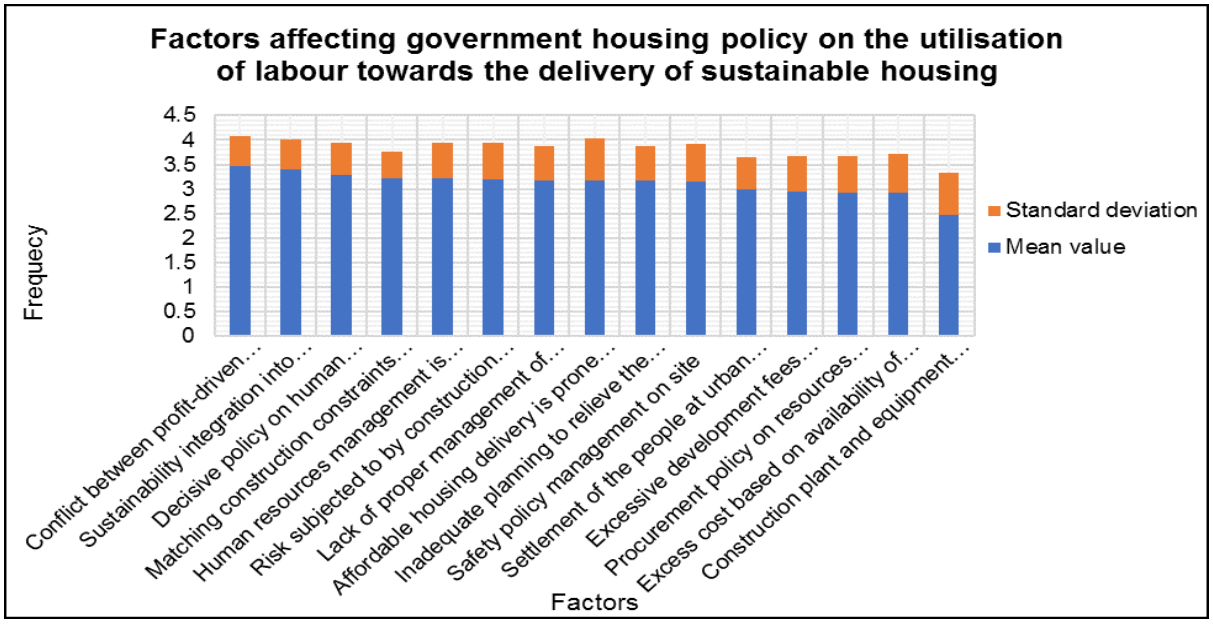

Figure 0.8: Graphical illustration of the factors that affect government housing policy for the utilisation of labour in the delivery of sustainable housing

4.4.3 Factors affecting government housing policy on the utilisation of materials in the delivery of sustainable housing

Similarly, results from the analysis presented in the subsection 0 and 0 reveals factors affecting the government housing policy in the utilisation of materials towards the successful delivery of sustainable housing were determined and tabularised appropriately in the Table 0.6 below. The opinions of the respondents were measured with the use of the four-point Likert scale, as executed in the previous subsections. Also, options developed for the four-point Likert scale are *1-Strongly disagree, 2-Disagree, 3-Agree* and *4-Strongly agree.*

Considering the factors with the most intense effect – MVs of 3.42, 3.01, and 3.00 (approximated values) – signify that factors ranked 1st to 3rd deeply affect the government housing policy in utilising materials for the delivery of sustainable housing, such factors as *constant increase in price of materials, availability of raw materials for building production* and *guideline on the price of materials.* Additionally, similar observation was considered in determining the factors with the least effect. Noticeably, only three factors are identified as factors with the least effect, as ranked in the table below with MVs of 2.70, 2.65 and 2.59 (approximated values). These included *processing time for clearing of import materials from the sea port, constant importing of materials from overseas countries* and *availability of materials for production.*

Table 0.6: Factors affecting government housing policy in the utilisation of materials for the delivery of sustainable housing

Significant factors	N	Min	Max	Mean value (MV)	Standard deviation (SD)	Rank
Constant increase in price of materials	71	2.00	4.00	3.4225	0.64724	1
Availability of raw materials for building production	71	1.00	4.00	3.0141	0.81928	2
Guideline on price of materials	71	2.00	4.00	3.0000	0.67612	3
Fixing taxes on vendors of building materials	71	1.00	4.00	2.9718	0.79232	4
Bylaws on materials quality	71	1.00	4.00	2.9296	0.68293	5
Subsidies for materials	71	1.00	4.00	2.9296	0.78055	6
Sustainability policies on materials usage	71	1.00	4.00	2.9296	0.85061	7
Placement of high tariffs on materials importation	71	1.00	4.00	2.8873	0.85439	8
Conservation of material resources	71	1.00	4.00	2.8732	0.65312	9
Reduction in material wastage	71	1.00	4.00	2.8310	0.87808	10
Artificial scarcity of materials from market	71	1.00	4.00	2.8028	0.62381	11
Regulation on materials importation	71	1.00	4.00	2.7746	0.88151	12
Processing time for clearing of import materials from sea port	71	1.00	4.00	2.7042	0.86840	13

Constant importing of materials from overseas countries	71	1.00	4.00	2.6479	0.84682	14
Availability of materials for production	71	1.00	4.00	2.5915	0.72855	15

Statistically, the SD values obtained, as illustrated in the Figure 0.9 below, demonstrated variation in the distribution of data (responses) around the options given in the questionnaire. Unlike the previous subsections, the structure of the SD values indicates that high amount of data (responses) is centred more on *4-Strongly agree* and *1-Strongly disagree* than the other two options. This demonstrates the strength of respondents' opinions with regard to the factors affecting government housing policy over the use of materials in attaining a consistent and successful delivery of sustainable housing.

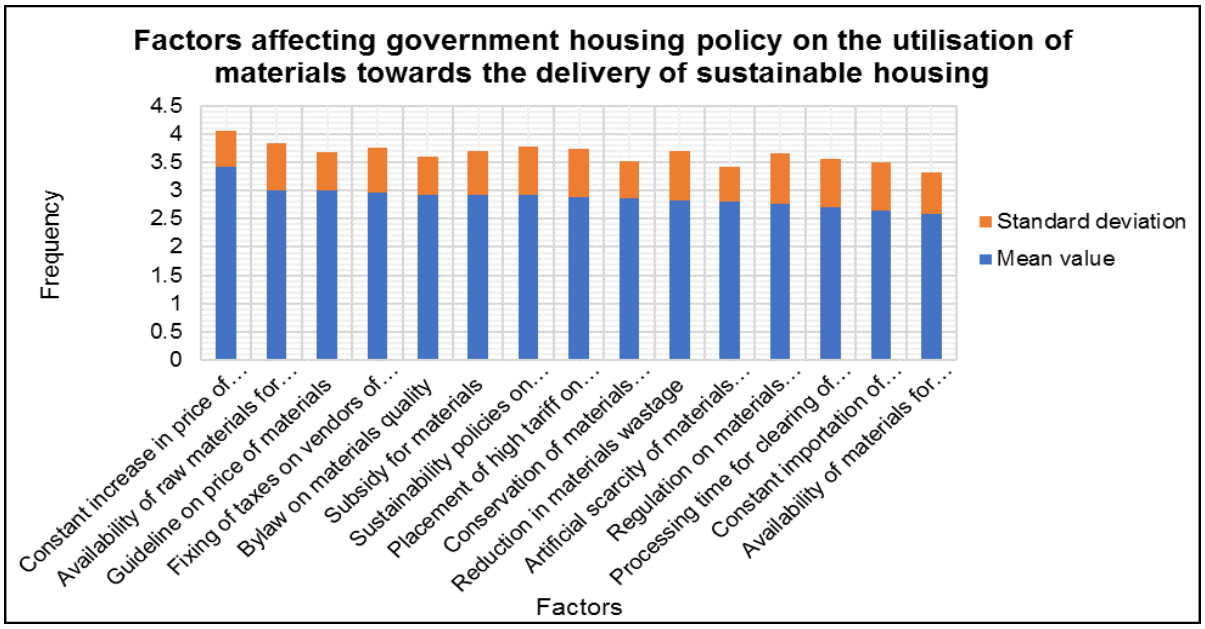

Figure 0.9: Graphical illustration of the factors that affect govenment housing policy on the utilisation of materials in the delivery of sustainable housing

In this instance, variation in the distribution of data occurred throughout the entire dataset. In essence, this validated the respondents' understanding levels towards the questions presented in the questionnaire.

4.4.4. The effect of government housing policy on plant and equipment usage in the delivery of sustainable housing

The effect of government housing policy on plant and equipment use is analysed in the delivery of sustainable housing. A four-point Likert scale was used to quantified

the responses or options choice of the respondents, in such format as 1-Strongly disagree, 2-Disagree, 3-Agree and 4-Strongly agree.

From Table 0.7 below, according to the findings attained, it is understood that some factors exhibited a high impact on government housing policy in the areas of plant and equipment use with the objective of attaining the delivery of sustainable housing. Therefore, such factors as fluctuation in exchange rate of currency and constant increase in price of equipment, with MVs of 3.28 and 3.21 (approximated values), are affirmed by the respondents as major government housing policy impacts for sustainable.

Table 0.7 Effects of government housing policy on plant and equipment usage in the delivery of sustainable housing

Significant factors	N	Min	Max	Mean value (MV)	Standard deviation (SD)	Rank
Fluctuations in exchange rate of currency	71	2.00	4.00	3.2817	0.67998	1
Constant increases in price of equipment	71	2.00	4.00	3.2113	0.67434	2
Establishment of training institutes for driving of equipment	71	2.00	4.00	2.9155	0.73186	3
Accessibility to equipment usage	71	1.00	4.00	2.9155	0.73186	4
Equipment sustainability strategy	71	1.00	4.00	2.9155	0.75112	5
Regulation of health and safety in equipment usage	71	1.00	4.00	2.9155	0.84086	6
Rules and regulations on equipment importation	71	1.00	4.00	2.8873	0.85439	7
Traffic regulations on movement of heavy equipment	71	1.00	4.00	2.8592	0.83317	8
Availability of spare parts for equipment usage	71	1.00	4.00	2.8310	0.65435	9
Taxes on companies that import equipment	71	1.00	4.00	2.7606	0.70640	10
Regulations for hiring rate of equipment	71	1.00	4.00	2.7183	0.61373	11
Subsidies for equipment	71	1.00	4.00	2.6338	0.79713	12
Regulations on accident rates of equipment on site	71	1.00	4.00	2.6197	0.74385	13
Availability of materials for production	71	1.00	4.00	2.5915	0.72855	14
Tariffs on import equipment	71	2.00	4.00	2.5634	0.62638	15
Time for clearing of equipment at sea port	71	1.00	4.00	2.5493	0.71292	15

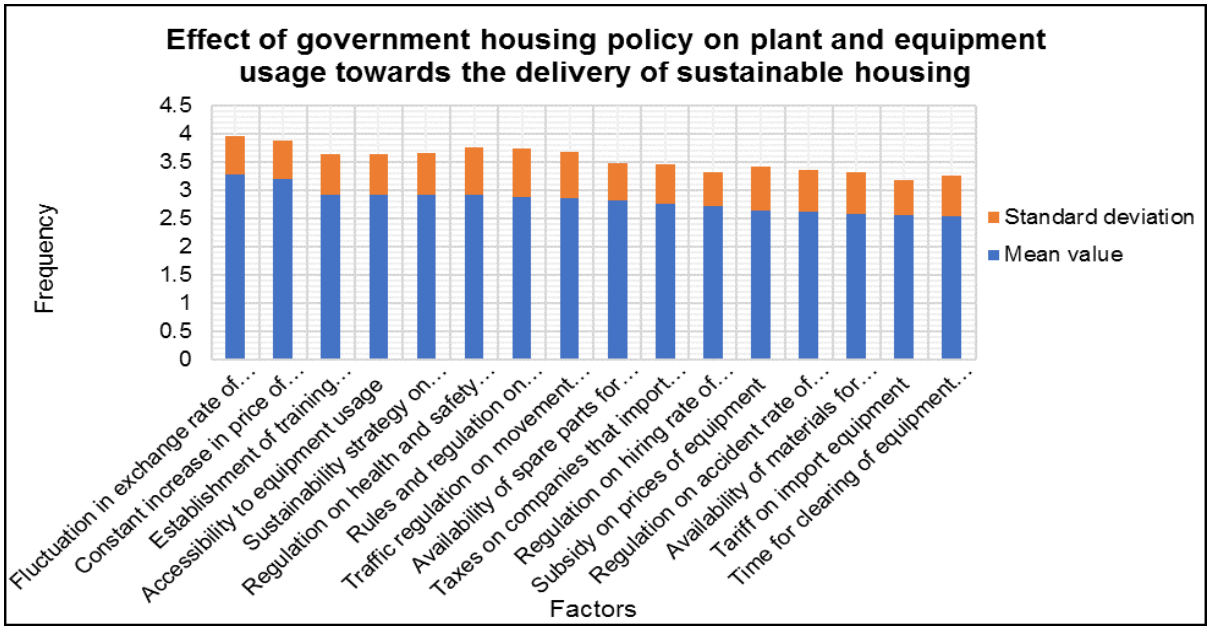

Figure 0.10: Graphical illustration of the effect of government housing policy on the plant and equipment usage towards the delivery of sustainable housing

In contrast, the three factors with the least effect on the use of plant and equipment in the delivery of sustainable housing were determined as *tariffs on import equipment, time for clearing of equipment at sea port,* and *availability of materials for production* with MVs of 2.59, 2.56 and 2.54 (approximated values) respectively. As part of the assessments, SD values generated exhibited variation in the distribution or spread of data (responses) across the options selected by the respondents (Figure 0.10 above). Data (responses) variation occurred from the 9th ranked factor to 1. However, the 5th ranked factor displayed in Figure 0.10 was because the respondents selected more of *3-Agree, 2-Disagree,* and *1-Strongly disagree*. This indicates that respondents understood that many of the factors contributed less to the effect of the government housing policy on the plant and equipment use in the delivery of sustainable housing.

4.5 QUALITATIVE INTERVIEW ANALYSIS

With the purpose of validating the findings attained from the quantitative analysis of the factors affecting, or in some other ways contributing to the effect of the government housing policy, a qualitative interview was executed. The interview was scheduled, and locations were selected to facilitate easy qualitative interview amongst the interviewer and respondents. Consequently, four construction sites were chosen locations for the interview exercise, and stakeholders such as quantity surveyors, project managers and architects were interviewed.

To initiate the exercise, a semi-structured interview was used, since interview questions were developed from the results acquired in the analysis of the quantitative data. The documentation of the qualitative interview was done with the use of a recording device, which was concurrently transcribed to satisfy the degree of integrity and adequacy of the interview exercise. In the process, two Quantity Surveyors, a Project Manager and an Architect were sequentially interviewed. The selected respondents were permitted to personally identify any government policy that has an impact on the sustainable housing delivery. Meanwhile, the exercise started with the introduction of the research topic to the respondents with the purpose of enhancing the content comprehension of the respondents. The copy of interview content can be found in Appendix B.

4.5.1 The semi-structured Interview

The semi-structured interview was conducted on different dates and times with four selected respondents, as previously mentioned in the preceding section. The four selected respondents were categorised into Respondent A, Respondent B, Respondent C, and Respondent D. The two *Quantity Surveyors* are represented as Respondent A and Respondent C, the *Project Manager* as Respondent B and the *Architect* as Respondent D. Each interview section was scheduled for 30 minutes.

4.5.1.1. Biographical information of selected respondents

The first respondent to be interviewed was Respondent A on 15 October, 2019, at 9:30 am in their construction site office. It lasted for 30 minutes. Demographically, Respondent A had 14 years of work experience in his current work position as a Quantity Surveyor. Similarly, Respondent B, a Project Manager, was interviewed in the construction site office three days (18 October, 2019) after Respondent A was interviewed. The interview section commenced at 11:00 am and ended 30 minutes later. In addition, the respondent had 10 years of work experience in the construction industry.

Another Quantity Surveyor, Respondent C, with 12 years of work experience, was interviewed on the 23rd of October, 2019, at 11:28 am, a few days after the interview with Respondent B was conducted. The last of the four respondents is Respondent D, an Architect, who was interviewed on 24th of October, 2019, at 12:28 pm in the

construction site office. However, amongst the four respondents, Respondent D had the least work experience with 11 years in the construction industry.

4.5.1.2 Presentation of the findings from the Interview

The questions presented to the respondents were formulated from the characterised factors in the qualitative interview schedule. These questions were simplified to smooth the interpretation of their headings by the respondents. In essence, this assisted them to cope with the questions and be able to relate them to the research domain. In the interviews, similar questions were asked based on the content of the exercise. With regard to the first question, Respondent A affirmed that the implementation of the government policy has an impact on the sustainable housing delivery through such factors as inadequate planning. The respondent further declared that “any situation where there is inadequate planning of the project, the project is considered unready”. In other words, the “project is seen as non-compliant, or rather perceived as unready for implementation”. In some cases, it is noted that the “project [did] not qualify for funding”. The respondent mentioned some general forms of planning, which are environmental, town, social, financial and settlement. At a point, the respondent clarified that ‘planning’ is not the main issue, but rather that ‘project funding’ was the key driver in the impact of government policy on the sustainable housing delivery in the Western Cape. Virtually, planning was expected to be the initiator for a project funded by the government because different projects have different stages of planning, which are attributed to the planning cycle engaged within the organisation.

The second question covered the significant impact of the shortage of suitable quality housing for poor communities in the Western Cape Province. Respondent B gave a valid instance of land use in the province by emphatically stating that, “land is an internal process in the municipality”. This is considered one of the main drivers in the shortage of suitable quality housing for poor communities, with other growing backlogs like immigration policy, residency policy, etc. It is understood that these backlogs influence the government’s ability to provide sufficient quality houses for poor communities within the province.

The third question, on high overall construction costs, was affirmed by Respondent C to have a major impact on the affordable housing delivery in the Western Cape

Province. This particular question was linked with the effective utilisation of labour and materials (see factors 2 and 3) in attaining affordable (social) housing for poor communities. Regarding this factor, the respondent pointed out that the probable approach to resolving the conflict between profit-driven interests of the private sector and the welfare-driven interests of the communities is to practically evaluate such factors as tax, materials, land use and cost of housing maintenance. The respondent further pointed out that the "cost of maintaining a house should be in accordance with the salaries of the civil servants (low income earner)". Also, the respondent added that issue of land use should be resolved with the intention of enabling the people to possess their own land.

As part of the interview, Respondent D gave concise points noting that innovative and decisive policy around human resource management can significantly encourage effective and sustainable housing production by promoting skilled human resources and improving career acquisitions. The respondent, in a similar way, gave their understanding of the integration of sustainability into the housing production process to enhance sustainable housing delivery through factors such as socio-environmental and socio-economic sustainability. The respondent clarified that procurement policy must be followed by the supplier to ascertain whether or not the supplier is client compliant. This approach is expected to promote the purchasing of recyclable materials and use of recycled water in enhancing sustainable housing delivery.

Considering the significant increases in material prices, Respondent C added that, "the government has no choice in keeping the material prices fixed because they will not tender". This indicated the importance of government involvement in addressing the problem of availability of raw materials for building production. The respondent further stated that, "low cost housing keeps the building industry afloat" and advised that materials procured be sourced in close or neighbouring localities. This implied that it was not viable or prudent for the government to source materials from far distances. On the other hand, affordable housing, in terms of social housing, should not be materially expensive in providing a sustainable housing delivery for the use of the low-income earners.

In this section, Respondent C further claimed that, "no brand new plants on the construction site". Further understanding indicated that the cost of a plant is affected by work done or work needing to be done. The respondent pessimistically stated that

establishment of a training institute for driving and handling plant had “no” impact on the sustainable housing delivery. On the other hand, government policy was affirmatively declared to enhance access to construction plant and machinery for sustainable housing delivery.

Table 0.8 Summary of qualitative interviews

Factors	Respondent A	Respondent B	Respondent C	Respondent D
Inadequate planning for housing policy implementation	Inadequate planning will affect housing implementation	Observed as unready for implementation	Unprepared for implementation	Impromptu implementation
Innovative and decisive policy on human resource management	Promoting skilled human resources	Improving career acquisitions	Encouraging skilled human resources	Improving career acquisitions
Constant increase in material prices	Increase in material prices will affect housing production	Housing production will be affected	Increase in material prices will affect construction output	Increase in material prices will affect housing production
Fluctuations in the exchange rate and increases in plant	Fluctuation in exchange rates for imported plant will affect the housing delivery	Rand becomes weak, imported plants becomes too expensive	Fluctuation in exchange rate for imported plant will affect the housing delivery	The profit of local contractor will be reduced

4.6 DISCUSSION OF FINDINGS

This section presents a discussion on the findings from the study which revealed;1) the impact of government policy for the sustainable housing delivery in the Western cape; 2) the diverse factors affecting government housing policy on the utilisation of labour towards sustainable housing delivery; 3) the various factors affecting government housing policy on the utilisation of materials for sustainable housing delivery; 4) The effects of government housing policy on plant and equipment usage for the delivery of sustainable housing.

4.6.1 The impact of government policy for sustainable housing delivery in the Western Cape

According to the respondents' opinions, findings validated that factors such as shortage of suitable housing for poor communities, inadequate planning for policy implementation, low quality housing delivery, competent professionals to handle government policy in housing delivery, poor accessibility to housing, and high construction costs contributed significantly to the impact of government policy on sustainable housing delivery. In addition, interview reports implied that current shortage of suitable housing aided the influx of economic migrants from other provinces and countries to the Western Cape. This effect makes the supply and demand of housing widen. In essence, the challenge of housing in general is persistent and this could refer to squatter or informal low-quality housing (Eppel, 2007; Huang & Tao, 2015). In addition, an inability to close the gap between demand and supply of housing by the government affects the planning process. In most cases, this leads to a public protest that could destroy the existing services (Miraftab & Wills, 2005; Kettl, 2011).

4.6.2 Diverse factors affecting government housing policy on the utilisation of labour towards sustainable housing delivery

With regard to respondents' opinions, findings deduced that factors such as conflict between profit-driven interests of the private sector and welfare-driven interests of the communities, sustainability integration into production will enhance sustainable housing deliver and decisive policy on human resource management is significant to effective production all had a vast influence on the government housing policy in the utilisation of labour towards the delivery of sustainable housing. To support this, the reports documented from the interviews implied that the government should consider additional funds to subsidise things like paying for project steering committee, including housing construction that can be turned into a community facility (Huchzermeyer, 2001; Robbins & Aiello, 2006). More so, innovation and decision-making in construction companies has declined due to poor technical quality and inexperience, which result in wastage and extra remedial work. Such remedial work has a negative effect on cash flow and causes failure in housing projects delivery (Douglas & Ransom, 2013; Wilkinson, Remøy & Langston, 2014).

4.6.3 Various factors affecting government housing policy on the utilisation of materials for sustainable housing delivery

In this subsection, diverse factors were determined as high contributors to the effect of government housing policy on the utilisation of materials in the delivery of sustainable housing in the Western Cape. According to the findings deduced, factors such as constant increases in price of materials, availability of raw materials for building materials production and guideline on the price of materials were all affected the designated housing policy used by the government of Western Cape. To bolster this, reports gathered from the interview denoted that increases in material prices of housing were quite significant and affected the profitability of the contractors and as the subsidy tended to increase at a steady rate (Rodrik, 2008; Greenhalgh & Rogers, 2010). Policy should then be directed to ensure that the subsidy quantum is reviewed accordingly in the delivery process (Huchzermeyer, 2001; Batra, 2009; Sobuza, 2011). As raw materials are vital, the government should ensure market forces avoid disruptions in the market by enforcing guidelines for suppliers and utilising their institutions in the building environment, NHBRC and SHRA (Trusler, 2012).

4.6.4 The effects of government housing policy on plant and equipment usage for the delivery of sustainable housing

In this area, the factors fluctuations in exchange rate of currency and constant increases in price of equipment are determined, among all other factors, as the most influential on the government housing policy in using plants and equipment to deliver sustainable housing in the Western Cape. In support of this, reports compiled from the interview exercise suggested that fluctuations in exchange rate for imported plant affected housing delivery. Literally, when the Rand (ZAR) becomes weak in the exchange market, the imported plant becomes too expensive for the local contractor, thereby reducing profitability (Eberhard, 2011; Jacque, 2013). As part of the problem, training institutions are expected to provide the application skills that make the production of sustainable housing delivery effective and efficient (Ademiluyi & Raji, 2008; Blismas, Wakefield & Hauser, 2010; Ihuah, Kakulu & Eaton, 2014).

Hence, the table below in Figure 4.8 depicts the summary of the findings that emerged from the quantitative data analysis for this study.

Table 0.9 Summary of the quantitative analysis

Concepts	Issues addressed	Findings	
To identify and ascertain the effects of government policy on the utilisation of materials in the delivery of sustainable housing	Impact of government policy in sustainable housing delivery in the Western Cape	Shortage of suitable housing for poor communities	Inadequate planning for policy implementation
		Lack of quality housing delivery	Competent professionals to handle government policy towards housing delivery
		Lack of accessibility to housing and high construction costs	Land availability for housing
		Low availability of skilled workers within the construction site	Inadequate management of housing loans as factors that can impact government
To assess the effects of government policy on construction labour utilisation for the delivery of sustainable housing	Factors that affect government housing policies on the utilisation of labour for the delivery of sustainable housing	Conflict between profit-driven interests of the private sector and welfare-driven interests of the communities	Sustainability integration into production will enhance sustainable housing delivery
		Decisive policy on human management is significant to effective production	Matching construction constraints with sustainability of policy
		Human resource management is critical in influencing construction constraints	Procurement policy for onsite resource utilisation
		Excess costs based on availability of equipment	Machinery, materials onsite, and construction plants and equipment
To ascertain the effects of government policy on plant and equipment usage towards the delivery of sustainable housing	Factors that affect government housing policies on the utilisation of materials toward the delivery of sustainable housing	Constant increases in price of materials	Availability of raw materials for building materials production
		Guidelines on price of materials	Fixing of taxes on vendors of building materials
		Bylaws on materials quality	Processing time for clearing of import materials from sea port
		Constant importing of materials from overseas countries	Availability of materials for production

To identify the effects of government policy requirements for resource utilisation in the delivery of sustainable housing	Effect of government housing policy on plant and equipment usage for the delivery of sustainable housing	Fluctuations in exchange rate of currency	Constant increases in price of equipment
		Establishment of training institutes for driving of equipment	Accessibility to equipment usage
		Sustainability strategy for equipment	Time for clearing of equipment at sea port
		Tariffs on import equipment	Availability of materials for production

4.7 ASSURING VALIDITY OF THE RESEARCH OUTCOME

Validity assurance is the process of checking whether or not research measures what it claims to measure and is essential to quantify the degree of validity of a study to understand if the results attained will be accurately applied and appropriately interpreted (Teddlie & Tashakkori, 2009). Leary (2011) confirms that validity is the level to which the research tool accurately measures what was intended to be measured; it is also defined as the authenticity of data collected to produce a desired result.

The following were considered:

- **Research population –**

  In this aspect, construction professionals were selected or identified as the population sample. They were all working in the construction industry or government establishment in the Western Cape Province. In essence, this population sample was used to attain reliable results (refer to section 0).

- **Expected participants –**

  Construction professionals with adequate work experience relating to this study were appropriately considered to galvanise more reliable and quality knowledge in this aspect of the study (refer to section 0 and 0).

- **Sampling technique –**

  This research adopted convenient and purposive sampling techniques. Considering the busy schedule of the project participants, questionnaires were administered to construction professionals based on the accessibility to construction sites and availability of construction professionals onsite (convenient sampling). Gubrium and Hostein (2002) describe purposive sampling as a sampling technique that enables a researcher to select study participants with respect to their characteristics; that is, participants with the right information. In support of the above statement, Mertens (2014) elucidated that a purposive sampling strategy is a system where the researcher deliberately chooses a sample for a study with a purpose in mind. O'Leary (2010) indicated that an adequate sample frame and large sample size prevent unbiased research, represent a population, and present a generalisable finding with respect to the population (subsection □).

- **Time –**

  The data were collected within a considerable time limit.
- **Data collection tool –**

  An appropriate data collection tool was adopted for each phase of the data collection processes (section **Error! Reference source not found.** and section 0).
- **Pilot study –**

  The pilot study was conducted to determine the reliability and accuracy of the data collection tool (section 0).
- **Cronbach's alpha coefficient analysis**

  The Cronbach's alpha coefficient analysis was conducted to test the reliability of quantitative research question in this study (section 0).

4.8 ATTAINING THE OBJECTIVES OF THE STUDY

4.8.1 The first objective of the study determined the impact of government policy on sustainable housing delivery in the Western Cape

This objective was attained immediately after the complete analysis of all data collected. Major findings obtained centred around the shortage of suitable housing for poor communities, inadequate planning for policy implementation, low quality housing delivery, competent professionals to handle government policy in housing delivery, poor accessibility to housing and high construction costs. In addition, these factors were deemed to affect government policy on sustainable housing delivery in the Western Cape.

4.8.2 The second objective of the study assessed the effects of government policy requirement on labour utilisation in sustainable housing delivery

The objective was attained. In the process, some factors to this particular objective were determined and discussed to clarify their relevance towards sustainable housing delivery in the aspect of labour utilisation, such factors as conflict between profit-driven interests of the private sector and welfare-driven interests of the communities, sustainability integration into production will enhance sustainable housing delivery and decisive policy on human resource management is significant to effective production. All the above mentioned factors were considered to frustrate the efficiency of

government housing policy on the utilisation of labour in the delivery of sustainable housing.

4.8.3 The third objective of the study determined impact of government housing policy on the materials utilisation for sustainable housing delivery

This objective was attained and appropriately discussed to quantify the impact of government policy on materials utilisation in sustainable housing delivery. Major findings were centred on the constant increases in price of materials, availability of raw materials for building materials production and guidelines on the price of materials.

4.8.4 The fourth objective of the study identified the impact of government housing policy on plant and equipment utilisation in sustainable housing delivery

The objective was attained and relevant findings were deduced to clarify the list of factors thwarting government housing policy. These factors were identified as fluctuations in exchange rate of currency and constant increases in price of equipment; they are both considered more significant based on the magnitude of their MVs compared to others. Below is the operational framework of the study (Figure 0.1).

4.9 CHAPTER SUMMARY

This chapter presents, analysed and discusses the results of the analysis of the quantitative data and qualitative interviews using the descriptive and inferential statistics as well as the content analysis. The results affirm and answered the key research question and the subsequent questions employed to conduct this study. However, the next chapter presents the summary and conclusion of the study.

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSION OF THE STUDY

5.1 INTRODUCTION

The previous chapter presented the data analysis, presentation and discussion of the findings of this thesis. This, last chapter provides the summary of the findings that answered the research questions used in guiding this study. The research recommendations from the findings as well as limitations are provided by me. In addition, the recommendations for future research are also emphasised.

Meanwhile, the findings attained in this study were fostered by the appropriate analysis of both quantitative and qualitative data in the development of the framework for enhancing government housing policy on construction resources for sustainable housing delivery in Western Cape, South Africa. The aim of the study was to develop an appropriate framework required to improve government housing policy by answering the following research question that guided the study:

What are the effects of government policy on construction resource utilisation for the delivery of sustainable housing in the Western Cape?

However, to address the issues surrounding the main research questions, the following sub-questions was also answered too:

I. What effect does government policy have on material utilisation towards the delivery of sustainable housing?

II. What are the effects of government policy on construction labour utilisation towards the delivery of sustainable housing?

III. What are the effects of government policy on plant and equipment usage towards the delivery of sustainable housing?

IV. What are the effects of government policy requirements on resource utilisation towards the delivery of sustainable housing?

VI. How can the government achieve an operational framework to enhance policy on construction resources utilisation towards the delivery of sustainable housing?

By investigating and examining the above questions, I employed a mixed method research approach to enable me assess the effects of government policy on construction resource utilisation for the delivery of sustainable housing in the Western Cape. The researcher used a questionnaire survey and qualitative interview methods to investigate the effect of government policy have on material utilisation towards the delivery of sustainable housing; the effect of government policy on construction labour utilisation towards the delivery of sustainable housing; the effects of government policy on plant and equipment usage towards the delivery of sustainable housing and lastly the diverse ways in which the government can achieve an operational framework to enhance their policy on construction resources utilisation towards the delivery of sustainable housing. However, the next section discusses the summary of the findings that responded to the research questions employed to frame this study.

5.2. SUMMARY OF FINDINGS

Appropriate interpretation and implementation of the sequence of findings attained in this study by the government construction institutes tasked with the production of the housing delivery policy, together with the housing construction professionals whose task it is to advise housing developers in the South African construction industry, are considered paramount along the process. With regard to this, findings determined in each study objective were attained and discussed individually.

5.2.1 The impact of government policy on sustainable housing delivery

This objective facilitated the evaluation of the factors that impact government policy implementation in sustainable housing delivery. The findings relating to this particular objective were attained through related literature studied, pilot study execution and appropriate distribution of survey questionnaires. All these approaches were applied to acquire the right information (data) from the construction professionals in both private and public sector for the evaluation of this objective and to foster the validation of findings deduced. According to the analysis executed, a majority of the respondents

categorically affirmed that all the factors studied, in one way or another, contributed to the inability of the government policy to enhance sustainable housing delivery.

5.2.2 The effects of government policy on labour utilisation towards sustainable housing delivery

The second objective was where government policy effects on the labour utilisation towards sustainable housing delivery were evaluated and appropriately determined to foster a simplified interpretation of the findings in line with the research problem. In the process, relevant literature was studied and a pilot study was executed to promote the integrity of the study, including the distribution of questionnaires and interviews to experienced construction professionals. Based on the opinions of the respondents after thorough evaluation, a majority of them declared that all the factors attributed to this particular objective contributed either vastly, or slightly, to the effects of the government policy on the labour utilisation for sustainable housing delivery.

5.2.3 The effects of government housing policy on material utilisation towards sustainable housing delivery

This is the third evaluated objective, in which the government policy effects of material utilisation towards sustainable housing delivery were determined. A similar approach was applied and related literature was studied – together with the pilot study executed to validate the practicality of the survey tool – including the interviews scheduled with the construction professionals. Respondents' opinions revealed that all factors explored contributed to this effect, either vastly or slightly, due to the variation in the distribution of the respondents' responses (data).

5.2.4 The effects of government housing policy on plant and equipment utilisation towards sustainable housing delivery

This is the fourth objective evaluated to determine the government housing policy effects in the use of plant and equipment towards sustainable housing delivery. Again, relevant literature was considerably studied and the survey tool was subjected to a pilot study to quantify its usability level. Interviews were scheduled based on agreed dates between the parties involved. Similar deductions were attained and respondents' opinions indicated that all factors surveyed considerably contributed, either vastly or slightly, to the effects of government housing policy on the plant and equipment utilisation towards sustainable housing delivery.

5.2.5 General considerations

Problems of ineffective implementation of the government policy still persist in the delivery of affordable housing to the people across the Western Cape Province and the entire country (South Africa). Some decades back, the government of South Africa intended to provide adequate and quality housing units to lower-class in the country by trying to tackle the aforesaid problem; this idea became a mirage due to the influence of other subordinate problems, such as inadequate design services, geographical locations, social issues, poor construction, funding, long waiting lists, urban planning and services delivery (Le Roux, 2011). To understand, identify, evaluate and quantify the influential factors thwarting the appropriate implementation of the government policy in attaining efficient application of materials, labour, plants, equipment and resources in the delivery of sustainable housing within the Western Cape Province, a mixed method of research was utilised to determine the influence of the factors through both a survey exercise and interview sections.

Findings were attained categorically using a similar approach across all factors to satisfy the related objectives formulated in this study. In addition, findings indicated that respondents in related professional practices who had been employed in their work positions between 10 years to 25 years and participated in different housing project types were involved in the survey exercise and interview sections.

General understanding shows that Cronbach's alpha coefficient reliability test was successfully performed to quantify the degree of reliability of the questionnaire developed for collection of data. The results were confirmed to be satisfactory before approving the distribution of the questionnaires to the selected respondents. The findings deduced from the analysis of the respondents' opinions showed that many respondents declared all factors analysed – with regard to the effect of the government housing policy on the use of labour, materials, plants, equipment and resources – to have considerable influence on the sustainable housing delivery in the Western Cape.

Ultimately, the government of the Western Cape is advised to investigate these factors to understand the gravity of government housing policy impact on the inability of the construction professionals and role players to provide sustainable housing delivery to

the lower-class groups within the Western Cape Province – and consequently to the entire country.

5.3 OUTCOME OF THE STUDY

One of the primary goals of the study was to establish a framework for the enhancement of government policy on construction resources utilisation towards delivery of sustainable housing. Also, the study was used to enhance the efficiency of the utilisation of construction resources, such as manpower, money, machinery and materials. In essence, the study aims to improve the availability of housing for the low-income earners in the Western Cape Province.

5.4 CONTRIBUTION OF THE STUDY

This study contributes to the field of construction engineering by establishing a framework to enhance the government policy on construction resource utilisation for construction operators in the Western Cape and South Africa at large. As part of the inputs, the cost-effectiveness of resource usage during the production process was established, together with the enhancement of policy implementation toward providing upliftment and economic improvement for the poor people through the provision of this housing. The diagram below depicts the framework to enhance the implementation of Government policy providing sustainable housing in the Western Cape of South Africa.

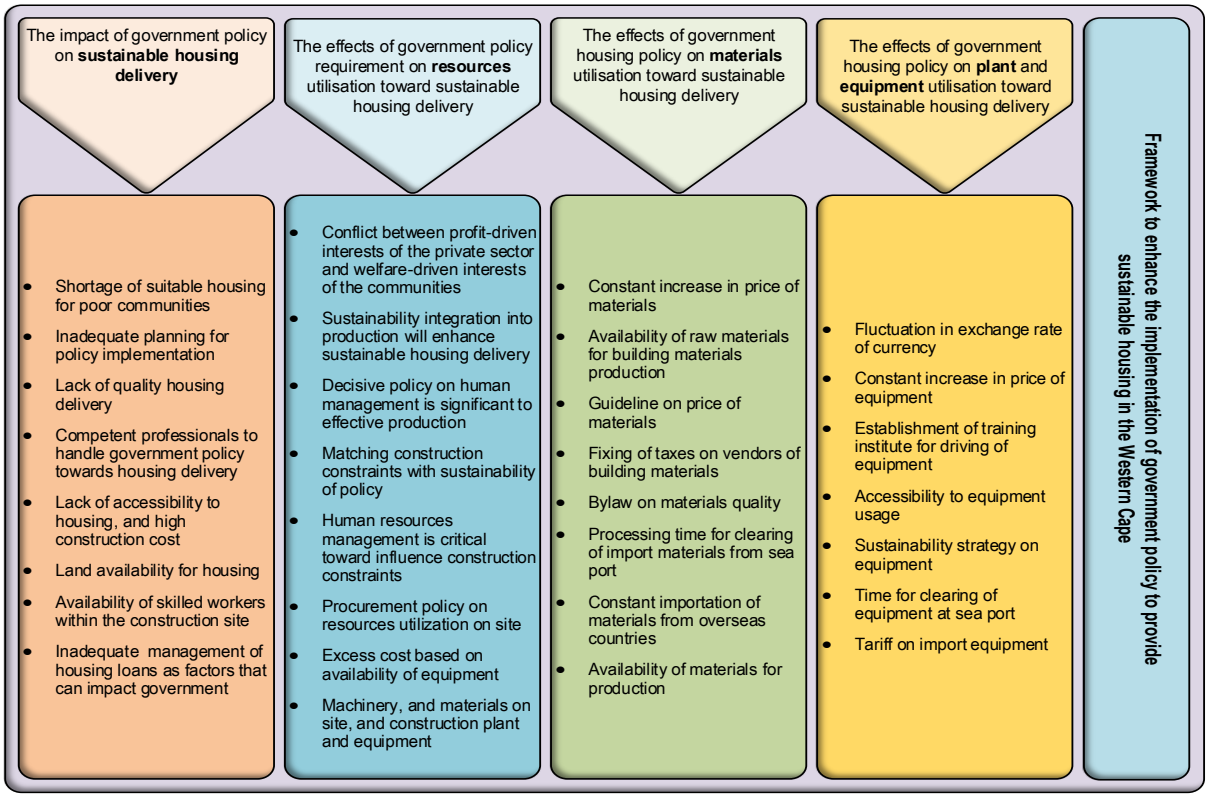

Figure 0.1: Framework to enhance the implementation of Government policy to provide sustainable housing in the Western Cape.

5.5 RECOMMENDATIONS FOR FUTURE RESEARCH

In this study, the researcher identified some areas that require or beckon for further or future study in such areas as *investigating the need for competent and qualified housing professionals,* including *roles played* in analysing, planning and operationalising the implementation of the government housing policy to solve the current and massive shortage of sustainable housing, not only in the Western Cape but in the entire South African context. A case is hereby made for further study on the empowerment, effective involvement and impact of beneficiary communities early on in the housing project cycle, even at the design stage, which could yield major benefits when properly facilitated by housing implementation agencies. Furthermore, there is need to conduct similar studies on the current impact of government policy in the delivery of sustainable housing in all provinces, which could eventually result in the compilation of a South African National Housing Delivery Framework for the delivery of sustainable housing across the country. This framework will cover all provinces and

monitor the impact of any determinable factors uniquely relative to each individual province.

5.6 LIMITATIONS OF THE STUDY

From the inception of this study, the most challenging part was data collection from all the parties involved, such as construction professionals and contractors to the government employees at both provincial and municipal levels. This could be as a result of the busy schedules of the respondents. Evidently, most construction site-based respondents have signified that they had limited time to complete or allow for an interview during operational hours. This effect is attributed to their busy schedule, including attending site meetings and pressure to meet project completion times. Unfortunately, also due to their busy time schedule, a significant number of the questionnaires were returned uncompleted and were discarded by the researcher. However, this effect discourages the generalisation of the findings across the sustainable housing delivery in the other provinces in South Africa.

5.7 CONCLUSION OF THE STUDY

The prime aim of this research was to develop an appropriate framework required to improve government housing policy. The framework for enhancing the implementation of Government policy to provide sustainable housing in the Western Cape was developed, presented and discussed. The findings indicated diverse factors that impacted on the implementation of government policies on material utilisation towards the delivery of sustainable housing; the effect of government policies on the construction labour utilisation towards the delivery of sustainable housing; the effects of government policy on plant and equipment usage towards the delivery of sustainable housing and lastly the diverse ways in which the government can achieve an operational framework to enhance their policy on construction resources utilisation towards the delivery of sustainable housing. The major conclusion of this research is that sustainable housing delivery to low income earners is tenable and possible; if the different government policies are implemented and social and environmental factors mitigated.

Furthermore, the government of the Western Cape is advised to investigate the factors utilised in the study in order to fully understand the gravity of government housing policy impact on the inability of the construction professionals and role players to provide sustainable housing delivery to the lower-class groups within the Western Cape Province.

Ultimately, this study has made a significant contribution to literature on housing, as well as sustainability in construction by developing a framework for enhancing the implementation of Government policy in providing sustainable housing in the Western Cape and providing a model that can be replicated for each province which eventually can be developed into a national framework applicable to the entire country.

REFERENCES

Aalbers, M.B. & Christophers, B. 2014. Centring housing in political economy. *Housing, Theory and Society*, *31*(4): 373-394.

Adebayo, A. & Adebayo, P. 2001. Sustainable Housing Policy and Practice: Reducing Constraints and Expanding Horizons Within Housing Delivery. *Safundi: The Journal of South African and American Comparative Studies*, *2*(3): 1-14.

Ademiluyi, I.A. & Raji, B.A. 2008. Public and private developers as agents in urban housing delivery in Sub-Saharan Africa: The situation in Lagos State. *Humanity and Social Sciences Journal*, 3(2): 143-150.

Adenuga, O.A. 2013. Factors affecting quality in the delivery of public housing projects in Lagos State, Nigeria. *International Journal of Engineering and Technology*, *3*(3): 332-344.

Adler, S. & Clark, R. 2008. *How it's done – An invitation to social research.* 3rd ed. Thompson Wadsworth. pp. 216-244.

Ageron, B., Gunasekaran, A. & Spalanzani, A. 2012. Sustainable supply management: An empirical study. *International journal of production economics*, 140(1): 168-182.

Agyeman, J. 2013. *Introducing just sustainabilities: Policy, planning, and practice*. Zed Books Ltd.

Ahuja, S.P., Hira, N., Dozzi & Abourizk, S.M. 1994. *Project Management Techniques in Planning and Controlling Construction Projects.* 2nd ed. New York: John Willey and Sons, Inc.

Ajayi, J.R. 2012. *Strategies for Sustainable Housing Co-operatives in South Africa* (Doctoral dissertation, Nelson Mandela Metropolitan University, Port Elizabeth).

Akintoye, A.S. & MacLeod, M.J. 1997. Risk analysis and management in construction. *International journal of project management*, 15(1):31-38.

Alaghbari, W.E., Razali A. Kadir, M., Salim, A. & Ernawati, 2007. The significant factors causing delay of building construction projects in Malaysia. *Engineering*, *Construction and Architectural Management*, *14*(2):192-206.

Albino, V., Berardi, U. & Dangelico, R.M. 2015. Smart cities: Definitions, dimensions, performance, and initiatives. *Journal of urban technology*, *22*(1):3-21.

Al-Dubaisi, A.H., 2000. *Change Order in Construction Projects in Saudi Arabia, King Fahd University of Petroleum and Minerals,* Dhahran (kfupm.edu.sa).

Alexander, J.G. 2018. *Battle Front: An Estate Based Analysis of the Impact of Professionalism on the Ability to Provide Localised Neighbourhood Based Social Controls* (Doctoral dissertation, Goldsmiths, University of London).

Allen, J., Barlow, J., Leal, J., Maloutas, T. & Padovani, L. 2008. *Housing and welfare in Southern Europe* (Vol. 16). John Wiley and Sons, Inc.

Allison, B. 1993. *Research methods*. De Monfort University.

AL-Najjar, J.M. & Enshassi, A. 2008. Factors Influencing Time and Cost Overrun on Construction Project in The Gaza Strip. Unpublished Master's Dissertation, Islamic University of Gaza.

Altes, W.K.K. 2006. Stagnation in housing production: another success in the Dutch 'planner's paradise'. *Environment and Planning B: Planning and Design*, 33(1):97-114.

Ates, A. & Bititci, U., 2011. Change process: a key enabler for building resilient SMEs. *International Journal of Production Research*, *49*(18): 5601-5618.

Alves, S. 2017. Poles apart? A comparative study of housing policies and outcomes in Portugal and Denmark. *Housing, Theory and Society*, 34(2):221-248.

Alwi, S. 2003. Factors Influencing Construction Productivity in Indonesian. *Proceeding of the Eastern Asia Society for Transportation Studies,* 4:1557-1571.

Ameh, O.J. & Osegbo, E.E., 2011. Study of Relationship between Time Overrun and Productivity on Construction Sites. *International Journal of Construction Supply Chain Management,* 1:56-67.

Andrew, S.A., Arlikatti, S., Long, L.C. & Kendra, J.M. 2013. The effect of housing assistance arrangements on household recovery: an empirical test of donor-assisted and owner-driven approaches. *Journal of Housing and the Built Environment*, 28(1):17-34.

Angelidou, M. 2015. Smart cities: A conjuncture of four forces. *Cities*, 47*:*95-106.

Arditi, D. & Gunaydin, H.M. 1998. Factors that affect process quality in the life cycle of building projects. *Journal of Construction Engineering and Management*, 124(3):194-203.

Aribigbola, A. 2008. Housing policy formulation in developing countries: Evidences of programme implementation from Akure, Ondo State Nigeria. *Journal of Human Ecology*, *23*(2):125-134.

Atkinson, R. 1999. Project management: cost, time and quality, two best guesses and a phenomenon, it's time to accept other success criteria. *International Journal of Project Management*, 17(6): 337-342.

Atkinson, R., Crawford, L. & Ward, S. 2006. Fundamental uncertainties in projects and the scope of project management. *International Journal of Project Management,* 24(8):687-698.

Babbie, E.R. 2007. *The practice of social research*. 11th ed. California: Thomson Wadsworth.

Babbie, E.R. 2013. *The basics of social research*. Cengage Learning.

Badiru, A.B. 2011. *Project management: Systems, principles, and applications*. CRC Press.

Bakhtyar, B., Zaharim, A., Sopian, K. & Moghimi, S., 2013. Housing for poor people: a review on low-cost housing process in Malaysia. *WSEAS transactions on environment and development, 9*(2):126-136.

Balchin, P. 2013. *Housing policy in Europe.* Routledge.

Ball, M. 2014. *Rebuilding Construction (Routledge Revivals): Economic Change in the British Construction Industry*. Routledge.

Ball, M., 2017. *Housing policy and economic power: the political economy of owner occupation (*Vol. 828). Routledge.

Batra, L. 2009. *A review of urbanisation and urban policy in post-independent India*. New Delhi: Centre for the Study of Law and Governance.

Beckers, F., Chiara, N., Flesch, A., Maly, J., Silva, E. & Stegemann, U. 2013. *A risk-management approach to a successful infrastructure project*. Mckinsey Work. Pap. Risk, 52:18.

Behm, M. 2005. Linking construction fatalities to the design for construction safety concept. *Safety Science, 43*(8):589-611.

Berardi, U. 2013. Stakeholders' influence on the adoption of energy-saving technologies in Italian homes. *Energy policy, 60*:520-530.

Berry, B.J. 2015. *The human consequences of urbanisation*. Macmillan International Higher Education.

Biggam, J. 2011. *Succeeding With Your Masters Dissertation: A Step-By-Step Handbook*. McGraw-Hill International.

Birasnav, M., Rangnekar, S. & Dalpati, A. 2011. Transformational leadership and human capital benefits: *The role of knowledge management. Leadership and Organization Development Journal, 32*(2):106-126.

Blaikie, N., 2003. *Analyzing quantitative data: From description to explanation*. London: Sage.

Blismas, N., Wakefield, R. & Hauser, B. 2010. Concrete prefabricated housing via advances in systems technologies: Development of a technology roadmap. *Engineering, Construction and Architectural Management, 17*(1):99-110.

Bollinger, A.S. & Smith, R.D. 2001. Managing organizational knowledge as a strategic asset. *Journal of knowledge management, 5*(1):8-18.

Bond, P. & Tait, A. 1997, March. The failure of housing policy in post-apartheid South Africa. *In Urban Forum 8, Springer Netherlands, 8*(1):19-41.

Bosman, G. 2015. *The acceptability of earth constructed houses in central areas of South Africa* (Doctoral dissertation, University of the Free State).

Bradlow, B., Bolnick, J. & Shearing, C. 2011. Housing, institutions, money: the failures and promise of human settlements policy and practice in South Africa. *Environment and Urbanization, 23*(1):267-275.

Braun, L. 2015. *Capacity Development Workshop - Postgraduate Students and Supervisors*. CPUT 9–13 March.

Brundtland, G.H. 1987. *Our common future (Report for the World commission on Environment and Development,* United Nations.

Bryman, A. 2004. *Social research methods.* 2nd ed. New York: Oxford University Press

Bryman, A. 2012. *Social research methods*. 4th ed. Oxford University press.

Brynard, P. & Hanekom S.X. 2006. *Introduction to Research in Management-Related Fields*. Van Schaik: Pretoria.

Bulkeley, H., Luque-Ayala, A. & Silver, J. 2014. Housing and the (re) configuration of energy provision in Cape Town and São Paulo: Making space for a progressive urban climate politics. *Political Geography, 40*:25-34.

Burch, P.E., 2006. The new educational privatization: Educational contracting and high stakes accountability. *Teachers College Record, 108*(12): p.2582.

Burgoyne, M.L. 2008. *Factors affecting housing delivery in South Africa: a case study of the Fisantekraal housing development project, Western Cape* (Doctoral dissertation, Stellenbosch: University of Stellenbosch).

Butler, A. 2017. *Contemporary South Africa.* Macmillan International Higher Education.

Calvert, R.E., Bailey, G. & Coles, D. 2002. *Introduction to Building Management*, 6th ed. Auckland Butterworth Heinemann.

Carley, M. & Smith, H. 2013. *Urban development and civil society: The role of communities in sustainable cities*. Routledge.

Carvalho, M.M.D. & Rabechini Junior, R. 2015. Impact of risk management on project performance: the importance of soft skills. *International Journal of Production Research, 53*(2):321-340.

Chanter, B. & Swallow, P. 2008. *Building maintenance management.* John Wiley and Sons, Inc.

Charoenkit, S. & Kumar, S. 2014. Environmental sustainability assessment tools for low carbon and climate resilient low income housing settlements. *Renewable and Sustainable Energy Reviews, 38*:509-525.

Charter, M. & Tischner, U. eds., 2017. *Sustainable solutions: developing products and services for the future.* Routledge.

Cheng, E.W., Li, H., Fang, D.P. & Xie, F., 2004. Construction safety management: an exploratory study from China. *Construction Innovation, 4*(4):.229-241.

Cheng, A. & Fung, M.K., 2015. Determinants of Hong Kong's housing prices. *Journal of economics, business and management, 3*(3):352-355.

Chikomwe, S. 2014. *An analysis of public-private partnerships in housing in the Zimbabwe National Housing Delivery Programme: a case of Masvingo City* (Doctoral dissertation).

Cleland, D.L. 1986. *Project stakeholder management*. John Wiley and Sons, Inc., pp. 275-301.

Cleland, D.L. & Ireland, L.R. 2006. *Project management.* McGraw-Hill Professional.

Cohen, L., Manion, L. & Morrison, K. 2011. *Research methods in education*. 7th ed. London: Routledge Falmer.

Creswell, J.W., 2009. *Research design: Qualitative, Quantitative and Mixed Methods Approaches.* 2nd ed. SAGE Publications, London.

Creswell, J.W., Klassen, A.C., Plano Clark, V.L. & Smith, K.C. 2011. *Best practices for mixed methods research in the health sciences*. Bethesda (Maryland): National Institutes of Health.

Creswell, J.W. 2013. *Qualitative inquiry and research design: Choosing among five approaches*. Sage.

Cronbach, L.J., 1951. Coefficient alpha and the internal structure of tests. *psychometrika, 16*(3): 297-334.

Cuthill, M., 2010. Strengthening the 'social' in sustainable development: Developing a conceptual framework for social sustainability in a rapid urban growth region in Australia. *Sustainable Development, 18*(6):362-373.

Czischke, D., 2018. Collaborative housing and housing providers: towards an analytical framework of multi-stakeholder collaboration in housing co-production*. International Journal of Housing Policy, 18*(1):55-81.

Dahlberg, L. & McCaig. 2010. *Practical research and evaluation – A start to finish guide for practitioners*. Sage, pp. 20-181.

Daly, G. 2013. *Homeless: Policies, strategies and lives on the streets*. Routledge.

Davenport, T.H. & Prusak, L. 1998. *Working knowledge: How organizations manage what they know.* Harvard Business Press.

Davidson, C.H., Johnson, C., Lizarralde, G., Dikmen, N. & Sliwinski, A. 2007. Truths and myths about community participation in post-disaster housing projects. *Habitat International, 31*(1):100-115.

Del Pero, A.S., Adema, W., Ferraro, V. & Frey, V. 2016. *Policies to promote access to good-quality affordable housing in OECD countries.*

Delaney, J.T. & Huselid, M. A. 1996. The impact of human resource management practices on perceptions of organizational performance. *Academy of Management Journal, 39*(4):949-969.

Denscombe, M. 2010. *The Good Research Guide For Small-Scale Social Research Projects: For small-scale social research projects*. McGraw-Hill International.

Department of Labour .1993. *Occupational Health and Safety Act (OHS) 1985 of 1993. Republic of South Africa.* Pretoria: Government Printer.

Dixon, T. & Eames, M. 2014. *Sustainable urban development to 2050: complex transitions in the built environment of cities. Urban Retrofitting for Sustainability*. Routledge, pp. 37-66.

Donley, A.M., Crisafi, D., Mullins, A. & Wright, J.D., 2017. How Stable is the Condition of Family Homelessness?. *Society, 54*(1):.46-55.

Donyavi, S. & Flanagan, R. 2009. *The impact of effective material management on construction site performance for small and medium sized construction enterprises*. In Proceedings of the 25th Annual ARCOM Conference, Nottingham, UK, 11-20.

Doppelt, B. 2017*. Leading change toward sustainability: A change-management guide for business, government and civil society*. Routledge.

Douglas, J. & Ransom, B. 2013. *Understanding building failures*. Routledge.

Driscoll, D.L., Appiah-Yeboah, A., Salib, P. & Rupert, D.J. 2007. Merging qualitative and quantitative data in mixed methods research: How to and why not. *Ecological and Environmental Anthropology (University of Georgia), 18*.

Du Toit, J. 2002. *The Structure of the South African Economy*. Financial Sector Charter Forum, Johannesburg.

Dunne, M., Pryor, J. & Yates, P. 2005. *Becoming a researcher: a research companion for the social sciences*. New York: McGraw-Hill.

Dawson, C., 2002. *Practical research methods: A user-friendly guide to mastering research techniques and projects. How to books*.

Dweck, C.S. 2013. *Self-theories: Their role in motivation, personality, and development*. Psychology press.

Eberhard, A. 2011. The future of South African coal: Market, investment and policy challenges. *Program on energy and sustainable development*, 1-44.

Edwards, D.J. & Holt, G.D. 2009. Construction plant and equipment management research: thematic review. *Journal of Engineering, Design and Technology, 7*(2):186-206.

Emuze, F., Smallwood, J. & Han, S, 2014. Factors contributing to non-value adding activities in South African construction. *Journal of Engineering, Design and Technology, 12*(2):223-243.

Eppel, S. 2007. *They come here and take our houses!: Community conflicts in Langa in the context of the housing crisis in Cape Town: borners against migrants* (Doctoral dissertation, University of Cape Town).

Epstein, M.J. 2018. *Making sustainability work: Best practices in managing and measuring corporate social, environmental and economic impacts*. Routledge.

Eriksson, P. & Kovalainen, A. 2008. *Qualitative Methods in Business Research*. 1st ed. Sage: London.

Ezebilo, E. 2017. Evaluation of affordable housing program in Papua New Guinea: A case of Port Moresby. *Buildings, 7*(3):73-88.

Fapohunda J.A. 2014. *Research methods and Methodology. Seminar presented to the research students of Construction Management and Quantity Surveying*. Cape Peninsula University of Technology. Cape Town South Africa. July 31st [Unpublished].

Fewings, P. & Henjewele, C. 2019. *Construction project management: an integrated approach*. Routledge.

Fidan, G., Dikmen, I., Tanyer, A.M. & Birgonul, M.T. 2011. Ontology for relating risk and vulnerability to cost overrun in international projects. *Journal of Computing in Civil Engineering, 25*(4):302-315.

Fielding, N. 2010. Mixed methods research in the real world*. International Journal of Social Research Methodology, 13*(2):127-138.

Fields, D. & Uffer, S. 2016. The financialisation of rental housing: A comparative analysis of New York City and Berlin. *Urban Studies, 53*(7):1486-1502.

Flick, U. 2011. *Introducing research methodology – A beginner's guide to doing a research project.* Sage.

Flowers, P. 2009. *Research philosophies – Importance and relevance*. Cranfield University.

Fowler Jr, F.J. & Cosenza, C., 2009. Design and evaluation of survey questions. *The SAGE handbook of applied social research methods*, pp.375-412.

Frimpong, Y., Oluwoye J. & Crawford, L. 2003. Causes of delay and cost overruns in construction of groundwater projects in a developing country; Ghana as a case study. *International Journal of Project Management*, 321-326.

Gilbert, A.G. 2014. Free housing for the poor: An effective way to address poverty? *Habitat International, 41*:253-261.

Gillham, B. 2004. *Developing a questionnaire*. Suffolk: Paston Prepress Ltd.

Goddard, W. & Melville, S. 2004. *Research methodology: An introduction*. Cape own: Juta and Company Ltd.

Goebel, A. 2007. Sustainable urban development? Low-cost housing challenges in South Africa. *Habitat International, 31*(3):291-302.

Goodfellow, T. 2013. Planning and development regulation amid rapid urban growth: Explaining divergent trajectories in Africa. *Geoforum, 48*:83-93.

Gordon, R. & Nell, M. 2005. *Research into housing supply and functioning markets – Final Report. Matthew Nell and Associates, Sunnyside Ridge* (Parktown), December 31.

Govender, R. 2017. *Evaluation of the approach of eThekwini Municipality in delivering low income housing in the context of urbanisation* (Doctoral dissertation).

Green, G.P. & Haines, A., 2015. *Asset building & community development*. London: Sage publications.

Greene, J., 2014. Urban restructuring, homelessness, and collective action in Toronto, 1980–2003. *Urban History Review/Revue d'histoire urbaine, 43*(1):21-37.

Greenhalgh, C. & Rogers, M. 2010. *Innovation, intellectual property, and economic growth*. Princeton University Press.

Greener, S., 2008. *Business research methods*. BookBoon.

Gubrium, J.F. & Holstein, J.A., 2002. *From the individual interview to the interview society. Handbook of interview research: Context and method*, pp.3-32.

Gulghane, A.A. & Khandve, P.P. 2015. Management for Construction Materials and Control of Construction Waste in Construction Industry: *A Review. IJERA ISSN*, 2248-9622.

Gusta, S., 2016. *Sustainable construction in Latvia–opportunities and challenges. In 15th International scientific conference" Engineering for rural development*": proceedings, Jelgava, Latvia, May (pp. 25-27).

Gwedla, N. & Shackleton, C.M. 2015. The development visions and attitudes towards urban forestry of officials responsible for greening in South African towns. *Land Use Policy, 42*:17-26.

Halim, A.S.A. & Othman, A.A.E. 2014. *Managing Stakeholders' Needs And Expectations In The Architectural Design Process: A Knowledge Management Approach*. Postgraduate Conference, 10:405.

Hall, D & Hall, I. 1996. *Practical social research.* London: Macmillan Press Ltd.

Hammam, S. 2014. *Housing matters*. World Bank Policy Research Working Paper, pp. 6876.

Hauck, J., Görg, C., Varjopuro, R., Ratamäki, O. & Jax, K. 2013. Benefits and limitations of the ecosystem services concept in environmental policy and decision making: some stakeholder perspectives. *Environmental Science and Policy, 25*:13-21.

Heiskanen, E., Johnson, M., Robinson, S., Vadovics, E. & Saastamoinen, M. 2010. Low-carbon communities as a context for individual behavioural change. *Energy Policy, 38*(12):7586-7595.

Heit, E. and Rotello, C.M., 2010. Relations between inductive reasoning and deductive reasoning. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 36*(3), p.805.

Henn, M., Weinstein, M. & Foard, N., 2006. *A short introduction to social research*. Sage, pp. 3-206.

Heravi, A., Coffey, V. & Trigunarsyah, B. 2015. Evaluating the level of stakeholder involvement during the project planning processes of building projects. *International Journal of Project Management, 33*(5):985-997.

Hill, J.E & Kerber, A., 1967. *Models, Methods and Analytical Procedures in Educational Research.* Detroit: Wane State University Press.

Höjdestrand, T., 2016. Social Welfare or Moral Warfare?: Popular Resistance against Children's Rights and Juvenile Justice in Contemporary Russia. *The International Journal of Children's Rights, 24*(4), pp.826-850.

Höök, M. & Stehn, L. 2008. Applicability of lean principles and practices in industrialized housing production. *Construction management and Economics, 26*(10):1091-1100.

Hoornweg, D. & Freire, M., 2013. Building sustainability in an urbanizing world: A partnership report.

Hopkins, J. 1999. *Social housing in South Africa: A review of South Africa's housing policy.* The Southern African Housing Foundation (SAHF), pp. 12-15..

Huang, Y. & Tao, R. 2015. Housing migrants in Chinese cities: Current status and policy design. Environment and Planning C: *Government and Policy, 33*(3):640-660.

Huchzermeyer, M. 2001. Housing for the poor? Negotiated housing policy in South Africa. *Habitat International, 25*(3):303-331.

Huchzermeyer, M. 2011. *Cities with 'Slums': From informal settlement eradication to a right to the city in Africa*. Juta and Company Ltd.

Huchzermeyer, M. 2014. *Changing housing policy in South Africa. Affordable housing in the urban Global South: Seeking sustainable solutions*, pp. 336-348.

Ibem, E.O., Aduwo, B.E. & Onyemaechi, P., 2017. Challenges and Opportunities in Public-Private Partnerships (PPPs) for Housing Low-Income Earners in Nigeria.

Ihuah, P.W., Kakulu, I.I. & Eaton, D. 2014. A review of Critical Project Management Success Factors (CPMSF) for sustainable social housing in Nigeria. *International Journal of Sustainable Built Environment, 3*(1):62-71.

Höök, M. & Stehn, L. 2008. Applicability of lean principles and practices in industrialized housing production. *Construction management and Economics, 26*(10):1091-1100.

Irurah, D.K. & Boshoff, B. 2003. *An interpretation of sustainable development and urban sustainability in low-cost housing and settlements in South* Africa. Cape Town: University of Cape Town Press.

Isaksson, R., Johansson, P. & Fischer, K. 2010. Detecting supply chain innovation potential for sustainable development. Journal of business ethics, 97(3):425-442.

Ivankova, N.V., Creswell, W. & Maree, K. 2008. Foundations and approaches to mixed methods research. In Maree, K. (eds), *First Steps in Research*. Hatfield, Pretoria: Van Schaik Publishers.

Iwuagwu, B.U., Onyegiri, I. and Iwuagwu, B.C., 2016. Unaffordable low cost housing as an agent of urban slum formation in Nigeria: how the architect can help. *International Journal of Sustainable Development, 11*(2): pp.05-16.

Jacque, L.L. 2013. *Management and control of foreign exchange risk*. Springer Science and Business Media.

Jansen, B.J., Smith, B. & Booth, D.L., 2007.. *Understanding Web search via a learning paradigm. In Proceedings of the 16th international conference on World Wide Web* (pp. 1207-1208).

Jenkins, P. 1999. Difficulties encountered in community involvement in delivery under the new South African housing policy. *Habitat International, 23*(4):431-446.

Jeucken, M. 2010. *Sustainable finance and banking: The financial sector and the future of the planet*. Routledge.

Jimoh, R.A., 2012. *Strategies for sustainable housing co-operatives in South Africa.*

Josie, J. & Chetty, C. 2015. A BRICS sustainable development perspective for inclusive housing policy. In *BRICS Academic Forum VII, Moscow*, pp. 21-23.

Jupp, V. 2006. *The Sage dictionary of social research methods*. Sage.

Kerzner, H. 2017. *Project management: a systems approach to planning, scheduling, and controlling.* John Wiley and Sons, Inc.

Kettl, D.F. 2011. *Sharing power: Public governance and private markets*. Brookings Institution Press.

Khansari, N., Mostashari, A. & Mansouri, M. 2014. Impacting sustainable behavior and planning in smart city. *International journal of sustainable land Use and Urban planning, 1*(2).

Kahn, F & Thring, P. 2003. *Housing policy and practise in post-apartheid South Africa. Heineman, Sandown*, pp. 161-165.

Karakhan, A. A. & Gambatese, J. A., 2017. Integrating worker health and safety into sustainable design and construction: designer and constructor perspectives. *Journal of Construction Engineering and Management, 143*(9), p.04017069.

Kibert, C.J. 2016. *Sustainable construction: green building design and delivery*. John Wiley and Sons, Inc.

Klimova, A., Rondeau, E., Andersson, K., Porras, J., Rybin, A. & Zaslavsky, A. 2016. An international Master's program in green ICT as a contribution to sustainable development. *Journal of Cleaner Production, 135*:223-239.

Knauff, M., Hertwig, R., Schurz, G., Spohn, W. & Waldmann, M., 2002. *New Frameworks of Rationality.*

Knight, R. 2001. *Housing in South Africa*. Accessed May 6 2017 from www.sharedinterest.org.

Kothari, C.R., 2004. *Research methodology: Methods and techniques*. New Age International.

Kothari, C.R., 2009. *Research Methodology Methods and Techniques* 2nd Revised edition New Age International publishers. Retrieved February, 20, p.2018.

Kumar, A., Sah, B., Singh, A.R., Deng, Y., He, X., Kumar, P. & Bansal, R.C. 2017. A review of multi criteria decision making (MCDM) towards sustainable renewable energy development. *Renewable and Sustainable Energy Reviews, 69*:596-609.

Kumar, R. 2011. *Research methodology – A step by step guide for beginners*. 3rd ed. Sage, pp. 11-199.

Lalloo, K. 1998. Arenas of contested citizenship: housing policy in South Africa. *Habitat International, 23*(1):35-47.

Lancaster, G. 2007. *Research methods in management*. Routledge.

Landman, K. & Napier, M. 2010. Waiting for a house or building your own? Reconsidering state provision, aided and unaided self-help in South Africa. *Habitat international, 34*(3):299-305.

Langford, D., Fellows, R.F., Hancock, M.R. & Gale, A.W., 2014. *Human resources management in construction*. Routledge.

Lawrence, A.T. & Weber, J. 2014. *Business and society: Stakeholders, ethics, public policy*. Tata McGraw-Hill Education.

Lawrence, N.W. 2000. *Social research methods: Qualitative and quantitative approaches*. 4th Ed. Allyn and Bacon Publishing, pp. 65-98.

Laws, S., Harper, C. & Marcus, R. 2003. *Research for Development: A practical guide*. Sage. ISBN 076-19-73265.

Lawson, A.E. 2005. What Is the Role of Induction and Deduction in Reasoning and Scientific Inquiry? *Journal Of Research In Science Teaching, 42*(6):716-740.

Le Roux, F.E. 2011. *The provision of low-cost housing in South Africa: a wicked problem with a systems theory solution* (Doctoral dissertation, Stellenbosch: Stellenbosch University).

Leary, M.R. 2011. *Introduction to behavioural research methods*. Pearson Higher Ed.

Lee, J.H., Hancock, M.G. & Hu, M.C. 2014. Towards an effective framework for building smart cities: Lessons from Seoul and San Francisco. *Technological Forecasting and Social Change, 89*:80-99.

Lee, R.M. 2000. *Unobtrusive methods in social research*. London: Biddles Ltd.

Leedy, P.D. & Ormrod, J.E. 2005. *Practical research*. Columbus, OH: Pearson Merrill Prentice Hall.

Leedy, P.D. & Ormrod, J.E. 2010. *Practical research: Planning and design*. 9th ed.

Leedy, P.D. 1993*. Practical research: Planning and design*. Macmillan.

Leishman, C. & Rowley, S. 2012. *Affordable housing. The Sage handbook of housing studies*, pp. 379-96.

Ling, F.Y.Y. & Hoi, L. 2006. Risks faced by Singapore firms when undertaking construction projects in India. *International Journal of Project Management, 24*(3):261-270.

Lizarralde, G. 2008. *The challenge of low-cost housing for disaster prevention in small municipalities.*

Lizarralde, G. & Massyn, M. 2008. Unexpected negative outcomes of community participation in low-cost housing projects in South Africa*. Habitat International, 32*(1):1-14.

Lizarralde, G. & Root, D. 2007. *Ready-made shacks: Learning from the informal sector to meet housing needs in South Africa*. CIB Congress, Cape Town, South Africa.

Lizarralde, G. & Root, D. 2008. The informal construction sector and the inefficiency of low cost housing markets. *Construction Management and Economics, 26*(2):103-113.

Lizarralde, G. 2011. Stakeholder participation and incremental housing in subsidized housing projects in Colombia and South Africa. *Habitat International, 35*(2):175-187.

Lizarralde, G. 2014. *The Invisible Houses: Rethinking and designing low-cost housing in developing countries*. Routledge.

Lizarralde, G., Fayazi, M., Kikano, F. & Thomas, I. 2016. *15 Meta-Patterns in Post-Disaster Housing Reconstruction and Recovery.*

Loch, C.H., DeMeyer, A. & Pich, M. 2011. *Managing the unknown: A new approach to managing high uncertainty and risk in projects.* John Wiley and Sons, Inc.

Lombard, M. & Rakodi, C. 2016. Urban land conflict in the Global South: Towards an analytical framework. *Urban Studies, 53*(13):2683-2699.

Loosemore, M., Raftery, J., Reilly, C. & Higgon, D. 2012. *Risk management in projects*. Routledge.

Love, P.E. & Irani, Z., 2003. A project management quality cost information system for the construction industry. *Information and Management, 40*(7):649-661.

Lund, B. 2017. Understanding housing policy. Policy Press.

MacDonald, S. & Headlam, N. 1986. *Research Methods Handbook Introductory Guide to Research Methods for Social Research*. The Centre for Local Economic Strategies (CLES). George Leigh Street, Manchester: M4 SDL.

Mack, N., Woodsong, C., MacQueen, K.M., Guest, G. & Namey, E. 2005. *Qualitative research methods: a data collector's field guide.*

Mackay, C.J. 1999. Policy review housing policy in South Africa: The challenge of delivery. *Housing Studies, 14*(3):387-399.

Madhavi, T.P., Mathew, S.V. and Sasidharan, R., 2013. Material management in construction–a case study. *International journal of research in engineering and technology, 2*(13): .400-403.

Mafukidze, J.K. & Hoosen, F. 2009. in Diepkloof Housing shortages in South Africa: A discussion of the after-effects of community participation in housing provision. *Urban forum. 20*(4):379-396. Springer Netherlands.

Makinde, O.O. 2014. Housing delivery system, need and demand. *Environment, Development and Sustainability, 16*(1):49-69.

Malhotra, R. & Temponi, C. 2010. Critical decisions for ERP integration: Small business issues. *International Journal of Information Management, 30*(1):28-37.

Maliene, V. & Malys, N. 2009. High-quality housing: A key issue in delivering sustainable communities. *Building and Environment, 44*(2):426-430.

Mallory-Hill, S., Preiser, W.F. & Watson, C.G. 2012*. Enhancing building performance*. John Wiley and Sons, Inc.

Mao, C., Shen, Q., Pan, W. & Ye, K. 2013. Major barriers to off-site construction: the developer's perspective in China. *Journal of Management in Engineering, 31*(3):0401-4043.

Marczyk, G., DeMatteo, D. & Festinger, D. 2005. *Essentials of research design and methodology*. John Wiley and Sons, Inc.

Maree, K. & Pietersen, J. 2008. Surveys and the use of questionnaires. In Maree, K. (eds). *First Steps In Research*. Hatfield, Pretoria: Van Schaik Publishers.

Maree, K. & Van der Westhuizen, C.N., 2009. Head start in designing research proposals in the social sciences. Capr Town: Juta and Company Ltd.

McDonald, S., Malys, N. & Maliene, V. 2009. Urban regeneration for sustainable communities: A case study. *Technological and Economic Development of Economy, 15*(1):49-59.

Mcniff J. & Whitehead, J. 2011. *All you need to know about action research*. 2nd ed. Sage, pp. 8-55.

Mertens, D.M., 2015. *Mixed methods and wicked problems*. London: Sage

Mezher, T.M. & Tawil, W. 1998. Causes of delays in the construction industry in Lebanon. *Engineering, Construction and Architectural Management, 5*(3):252-260.

Middlemiss, L. & Parrish, B.D., 2010. Building capacity for low-carbon communities: The role of grassroots initiatives. *Energy Policy, 38*(12):7559-7566.

Miraftab, F. & Wills, S. 2005. Insurgency and spaces of active citizenship: The story of Western Cape anti-eviction campaign in South Africa. *Journal of planning education and research, 25*(2):200-217.

Miraftab, F. 2004. Public-Private Partnerships the Trojan Horse of Neoliberal Development. *Journal of Planning Education and Research, 24*(1):89-101.

Mitra, A. 2016. *Fundamentals of quality control and improvement*. John Wiley and Sons, Inc.

Morris, P.W. 2013. *Reconstructing project management*. John Wiley and Sons, Inc.

Mouton, J. 2008. *How to Succeed in Your Master's and Doctoral Studies: A South African Guide and Resource Book.* Hatfield, Pretoria: Van Schaik Publishers

Mulliner, E. & Maliene, V. 2011. *Criteria for sustainable housing affordability*. International Conference Environmental Engineering, 8th ed.

Mulliner, E., Smallbone, K. & Maliene, V. 2013. An assessment of sustainable housing affordability using a multiple criteria decision making method. *Omega, 41*(2):270-279.

Neuman, W.L. 2000. *Social research methods*. 4th ed. New York: Pearson Education Company.

Ngxubaza, V.J. 2010. *An investigation of the low cost housing process with specific reference to the Mbashe Local Municipality* (Doctoral dissertation, Cape Peninsula University of Technology).

Nieto-Morote, A. & Ruz-Vila, F. 2011. A fuzzy approach to construction project risk assessment. *International Journal of Project Management, 29*(2):220-231.

Nieuwenhuis, J. 2007. Introducing qualitative research*. In* Maree .K*. (ed) First steps in research*, pp. 47-68.Sage

Nieuwenhuis, J. 2008. Introducing qualitative research. In Maree, K. (eds). *First steps in research.Sage*

Nsengiyumva, P. 2013. *Female migration and housing in South Africa: evidence from the 2007 community survey* (Doctoral dissertation, University of the Western Cape).

O'leary, Z. 2004. *The essential guide to doing research*. Sage.

O'Leary, Z. 2010. The essential guide to doing your research project. Sage, pp. 88-240.

Odeh, A.M. & Battaineh, H.T. 2002. Causes of construction delay: traditional contracts. *International journal of project management, 20*(1):67-73.

Ojebode, A.J. 2016. *Public-Private Partnership (PPP) as a Mechanism for the Provision of Affordable Housing Delivery in Nigeria* (Doctoral dissertation, University of Brighton).

Oldfield, S. 2000. The Centrality of Community Capacity in State Low-income Housing Provision in Cape Town, South Africa. *International Journal of Urban and Regional Research, 24*(4);858-872.

Opoko, P.A. & Oluwatayo, A. A. 2014. Trends in urbanisation: implication for planning and low-income housing delivery in Lagos, Nigeria. *Architecture Research, 4*(1A):15-26.

Orwig, R.A. & Brennan, L.L. 2000. An integrated view of project and quality management for project-based organizations. *International Journal of Quality and Reliability Management, 17*(4/5):351-363.

Osman, A. 2010. Architects and the housing challenge: A process, not a product. *Journal of the South African Institute of Architects, 2.*

Othman, A. & Abdellatif, M. 2011. Partnership for integrating the corporate social responsibility of project stakeholders towards affordable housing development: A South African perspective. *Journal of Engineering, Design and Technology, 9*(3):273-295.

Pandey, S.C. & Dutta, A. 2013. Role of knowledge infrastructure capabilities in knowledge management. *Journal of knowledge management, 17*(3):435-453.

Paris, C. 2017. *Housing Australia.* Macmillan International Higher Education.

Park, B.I. 2011. Knowledge transfer capacity of multinational enterprises and technology acquisition in international joint ventures. *International Business Review, 20*(1):75-87.

Patil, A.R. & Pataskar, S.V. 2013. Analysing Material Management Techniques on Construction Project*. International Journal of Engineering and Innovative Technology (IJEIT), ,* 2277-3754.

Peterson, R.A. & Kim, Y., 2013. On the relationship between coefficient alpha and composite reliability. *Journal of applied psychology, 98*(1): p.194.

Philip, K. 2014. *A history of townships in South Africa. Economics of South African Townships,* 31.

Plummer, J. 2013. *Focusing partnerships: a sourcebook for municipal capacity building in public-private partnerships.* Routledge.

Porwal, A. & Hewage, K.N. 2013. Building Information Modelling (BIM) partnering framework for public construction projects. *Automation in construction, 31*:204-214.

Pugh, C. 2014. *Sustainability the Environment and Urbanisation*. Routledge.

Rahman, I.A., Memon, A. & Karim, A.T.A. 2013. Relationship Between Factors of Construction Resources Affecting Project Cost. *Modern Applied Science, 17*(1):67-75.

Rajasekar, S., Philominaathan, P., & Chinnathambi, V. 2013. *Research Methodology*. Accessed April 8, 2015, from http://arxiv.org/pdf/physics/0601009.pdf

Rajkumar, K., Kavin, S. & Jagadeesh, S, 2014. *An empirical study on factors affecting the quality in construction project. Housing to human settlement a city perspective*.

Robbins, G. & Aiello, A. 2006. *Study on employment aspects of slum upgrading: practices and opportunities identified in two South African case studies.* School of Development Studies, University of Kwazulu-Natal.

Rodrik, D. 2008. *One economics, many recipes: globalization, institutions, and economic growth*. Princeton University Press.

Rogers, J., Chong, H.Y., Preece, C., Lim, C.C. & Jayasena, H.S. 2015. *BIM Development and Trends in Developing Countries: Case Studies*. Bentham Science Publishers.

Rondinelli, D.A. 2013. *Development projects as policy experiments: An adaptive approach to development administration*. Routledge.

Rosenberger, I.K. 2003. *Sustainable low-cost housing–a review of three low-cost housing developments in Gauteng province* (Doctoral dissertation, Rand Afrikaans University).

Ruane, J.M. 2011. *Essentials of research methods*. Blackwell Publishing

Rugg, G. & Petre, M. 2006. *A gentle guide to research methods*. McGraw-Hill Education (UK).

Rust, K. 2006. *Analysis of South Africa's housing sector performance*. FinMark Trust.

Rust, K. & Rubenstein, S. eds., 1996. *A mandate to build: Developing consensus around a national housing policy in South Africa*. Ravan Press.

Sahle, A. 2018. *Determinants of Project Performance: The Case of 40/60 Housing Projects in Ayat Site, Addis Ababa* (Doctoral dissertation, St. Mary's University).

Samih, H., 2018. An Investigation of Sustainability Issue for Building Construction in North Cyprus. *Journal of Environmental Sustainability, 6*(1), p.5-15.

Sarhan, S. & Fox, A. 2013. Barriers to implementing lean construction in the UK construction industry. *The Built and Human Environment Review.*

Schermerhorn Jr, J.R., Davidson, P., Woods, P., Factor, A., Junaid, F. & McBarron, E. 2019. *Management*. John Wiley and Sons, Inc.

Schwalbe, K. 2015. *Information technology project management*. Cengage Learning.

Scotland, J. 2012. Exploring the Philosophical Underpinnings of Research: Relating Ontology and Epistemology to the Methodology and Methods of the Scientific, Interpretive, and Critical Research Paradigms. *English Language Teaching, 5*(9):1-15.

Sdralevich, M.C.A., Sab, M.R., Zouhar, M.Y. & Albertin, G. 2014. *Subsidy reform in the Middle East and North Africa: Recent progress and challenges ahead.* International Monetary Fund.

Seyfang, G. 2008. *Grassroots innovations in low-carbon housing. Centre for Social and Economic Research into the Global Environment*, WP ECM, 08-05.

Seyfang, G. 2010. Community action for sustainable housing: Building a low-carbon future. *Energy Policy, 38*(12):7624-7633.

Seyfang, G. & Longhurst, N. 2013. Growing green money? Mapping community currencies for sustainable development. *Ecological Economics, 86*:65-77.

Shaughnessy, J.J. & Zechmeister, E.B. 1997. *Research methods in psychology*. New York: McGraw-Hill.

Shortt, N.K. & Hammett, D. 2013. Housing and health in an informal settlement upgrade in Cape Town, South Africa. *Journal of housing and the built environment, 28*(4):615-627.

Silver, H., 2016. *National Urban Policy in the Age of Obama. Urban Policy in the Time of Obama*, pp.11-44.

Silverman, D. 2000. *Doing Qualitative Research: A Practical Handbook*. United Kingdom: Sage.

Simmons, G., Giraldo, J.E.D., Truong, Y. & Palmer, M. 2018. Uncovering the link between governance as an innovation process and socio-economic regime transition in cities. *Research Policy, 47*(1):241-251.

Singh, K. 2007. *Quantitative social research methods.* Sage.

Singh, Y.K. 2006. *Fundamental of research methodology and statistics*. New Age International.

Skerratt, S. 2013. Enhancing the analysis of rural community resilience: evidence from community land ownership. *Journal of Rural Studies, 31*:36-46.

Smeddle-Thompson, L. 2012. *Implementing Sustainable Human Settlements* (Masters dissertation, Stellenbosch University).

Sobuza, Y. 2011. *Social housing in South Africa: are public private partnerships (PPP) a solution?* (Doctoral dissertation, University of Pretoria).

South Africa Department of Housing. 1994. *White paper on Housing: A new policy and strategy for South Africa.* Pretoria: Government printers.

South Africa Department of Human Settlements. 2014. *Pocket Guide to South Africa 2014/2015.* Pretoria: Government printers.

South African Government. 2001. *The South African Housing Policy Report - Operationalizing the right to adequate housing. 5-6 June*. *Thematic Committee*. Pretoria*:* Government printers

South African Government. 2000. *Report for the Review of the Implementation of the Habitat Agenda.*

South African Institute of Race Relations (SAIRR). 2015. *South Africa's housing conundrum*. http://irr.org.za/reports-andpublications/atLiberty/files/liberty-2013-south-africas-housing-conundrum Accessed 2018/06/02.

Stroh, D.P., 2015. *Systems thinking for social change: A practical guide to solving complex problems, avoiding unintended consequences, and achieving lasting results*. Chelsea Green Publishing

Struwig, F.W. & Stead, G.B. 2001. *Planning, designing and reporting research*. Cape Town: Pearson Education Ltd.

Tang, Y., Mason, R.J. & Sun, P. 2012. Interest distribution in the process of coordination of urban and rural construction land in China*. Habitat International, 36*(3):388-395.

Tashakkori, A. & Teddlie, C. 1998. *Mixed methodology:Combining qualitative and quantitative approaches*. Sage, 46.

Tavakol, M. & Dennick, R., 2011. *Making sense of Cronbach's alpha. International journal of medical education, 2:*.53-67.

Tay, Y.W.D., Panda, B., Paul, S.C., Noor Mohamed, N.A., Tan, M.J. & Leong, K.F. 2017. 3D printing trends in building and construction industry: a review. *Virtual and Physical Prototyping, 12*(3):261-276.

Tayie, S. 2005. *Research methods and writing research proposals. Pathways to Higher Education.*

Teddlie, C. & Tashakkori, A. 2009. *Foundation of Mixed Methods Research: Interesting Quantitative and Qualitative Approaches in the Social and Behavioural Sciences*. London: Sage.

Thomas, H.R. & Yiakoumis, I. 1987. Factor model of construction productivity. *Journal of construction engineering and management, 113(*4):623-639.

Thomas, H.R., Sanvido, V.E. & Sanders, S.R. 1989. Impact of material management on productivity—A case study. *Journal of Construction Engineering and Management, 115*(3): 370-384.

Thorns, D.C. 2017. *The transformation of cities: urban theory and urban life*. Macmillan International Higher Education.

Tissington, K. 2011. *A Resource Guide to Housing in South Africa 1949-2010: legislation, policy, programmes and practice.* SERI

Todes, A. & Turok, I. 2018. Spatial inequalities and policies in South Africa: Place-based or people-centred? *Progress in Planning, 123*:1-31.

Tomlinson, M.R. 1999. From rejection to resignation: beneficiaries' views on the South African government's new housing subsidy system. *Urban Studies, 36*(8):1349-1359.

Tomlinson, M.R. 2007. The development of a low-income housing finance sector in South Africa: Have we finally found a way forward? *Habitat International, 31*(1):77-86.

Tomlinson, M.R. 2011. Managing the risk in housing delivery: Local government in South Africa. *Habitat International, 35*(3):419-425.

Tomlinson, M.R. 2015. South Africa's housing conundrum. SA Institute of Race Relations. *Liberty, 4*:1-14.

Treiman, D.J. 2008. *Quantitative Data Analysis*. San Francisco: John Wiley and Sons, Inc.

Trusler, R.K. 2012. *Is 'breaking new ground' as a comprehensive plan for housing delivery, a realistic solution to the housing problem faced in South Africa*?

Tunas, D. & Peresthu, A. 2010. The self-help housing in Indonesia: The only option for the poor? *Habitat International, 34*(3):315-322.

Turner, J.R. 2008. *Handbook of project-based management.* McGraw-Hill Professional Publishing.

Van Der Byl, C. 2014. *Twenty-year review: South Africa 1994-2014. Background paper: Economy and Employment.*

Van Wyk, J. & Oranje, M. 2014. The post-1994 South African spatial planning system and Bill of Rights: A meaningful and mutually beneficial fit? *Planning Theory, 13*(4):349-369.

Voinov, A. & Bousquet, F. 2010. Modelling with stakeholders. *Environmental Modelling and Software, 25*(11):1268-1281.

Walker, A. 2015. *Project management in construction*. John Wiley and Sons, Inc.

Walliman, N. 2006. *Your Research Project: A Step-by-Step Guide for the First-time Researcher.* 2nd ed. London: Sage.

Walliman, N. 2012. *Your research project: Designing and planning your work*. London: Sage.

Wapwera, S.D., Parsa, A. & Egbu, C. 2011. Financing low income housing in Nigeria. *Journal of Financial Management of Property and Construction, 16*(3):283-301.

Ward, S. & Chapman, C. 2003. Transforming project risk management into project uncertainty management. *International journal of project management, 21*(2):97-105.

Watson, W. & McCarthy M. 1998. Rental Housing Policy and the Role of Household rental sector: Evidence from South Africa. *Habitat International, 22*(1):49-56.

Wayne, J., Musisca, N., & Fleeson, W. 2004. Considering the role of personality in the work-family experience: Relationship of the big five to work-family conflict and facilitation. *Journal of Vocational Behavior, 64,* 108-130.

Wenger, E., McDermott, R. A. & Snyder, W. 2002. *Cultivating communities of practice: A guide to managing knowledge.* Harvard Business Press.

Werther Jr, W.B. & Chandler, D. 2010. Strategic corporate social responsibility: Stakeholders in a global environment. London: Sage.

White, P., 2013. Ideologies, social exclusion and spatial segregation in Paris. In *Urban segregation and the welfare state* (pp. 162-181). Routledge.

Wilkinson, S.J., Remøy, H. & Langston, C. 2014. *Sustainable building adaptation: innovations in decision-making*. John Wiley and Sons, Inc.

Willar, D., Trigunarsyah, B. & Coffey, V. 2016. Organisational culture and quality management system implementation in Indonesian construction companies. *Engineering, Construction and Architectural Management, 23*(2):114-133.

Williams, K. & Dair, C. 2007. What is stopping sustainable building in England? Barriers experienced by stakeholders in delivering sustainable developments. *Sustainable Development, Bradford, 15*(3):135-147.

Willis, W.J. 2007. *Foundation of Qualitative Research Interpretive and Critical Approaches*. California: Sage.

Windapo, A.O. & Cattell, K. 2013. The South African construction industry: Perceptions of key challenges facing its performance, development and growth. Journal of Construction in Developing Countries, 18(2):65.

Woolthuis, R.K., Hooimeijer, F., Bossink, B., Mulder, G. & Brouwer, J. 2013. Institutional entrepreneurship in sustainable urban development: Dutch successes as inspiration for transformation. *Journal of Cleaner Production, 50*:91-100.

Yada, A.L. & Yadeta, F.T. 2016. Factors affecting the performance of construction project under Oromia Industry and Urban Development Bureau, Ethiopia. *ABC Research Alert, 4*(2):27-35.

Yanow, D. 2013. *Interpretive analysis and comparative research. Comparative policy studies: conceptual and methodological challenges*, pp. 131-154.

Yin, R.K. 2003. *Case study research design and methods* (3rd ed.). Thousand Oaks, CA: Sage.

Yung, B. & Lee, F.P. 2014. 'Equal right to housing' in Hong Kong housing policy: perspectives from disadvantaged groups. *Journal of Housing and the Built Environment, 29*(4):563-582.

Zhang, X., Shen, L. & Wu, Y. 2011. Green strategy for gaining competitive advantage in housing development: a China study. *Journal of Cleaner Production, 19*(2/3):157-167.

Zulu, L.P. 2016. *Using low-cost housing projects as a mechanism for skills transfer and job creation. a case study of national youth build programme in Ivory Park*, Johannesburg South Africa (Doctoral dissertation).

APPENDIX A

CONSENT LETTER

Framework for Enhancement of Government Policy Implementation On Construction Resources Utilisation Towards Delivery of Sustainable Housing in Western Cape Province of South Africa

Dear Sir/ Madam

RE: PARTICIPATION IN A RESEARCH STUDY SURVEY

You are cordially invited to participate in a survey entitled “Framework for enhancement of government policy implementation on construction resources utilisation towards delivery of sustainable housing in Western Cape Province of South Africa”

This aim of this study is to establish a framework for the enhancement of government policy implementation on construction resources utilisation towards the delivery of sustainable housing.

The researcher is a student of Cape Peninsula University of Technology Department of Construction Management and Quantity Surveying.

Please read through the questionnaire and rate each question appropriately. Ethical procedure will be observed; names and opinions of respondents will not be disclosed.

Answering this questionnaire will only take fifteen minutes. The completed questionnaires can either be returned through email or to the address below.

I appreciate your brotherly and friendly assistance.

Yours sincerely,

Robin Allan Fisher

Email: fisherr@cput.ac.za

Telephone: 021-953 8736

Mobile: 071 389 0993

APPPENDIX B

QUESTIONAIRE

SECTION A: RESPONDENT's DETAILS

1. Please indicate the professional construction practice of your organisation

Construction Company

Construction consulting

Government

Other (specify) ……..

2. Indicate length of years you are with this organisation

1-10

11-20

21-25

More than 25

SECTION B: WHAT IS YOUR PROFESSIONAL RELATIONSHIP WITH THE ORGANISATION?

Please indicate your professional relationship with your company:

3. What position do you occupy in your company?

Contract manager

Project manager

Quantity Surveyor

Site Engineer

Contractor

Client

Other (specify)……

4. Please indicate how long have you been in your current position?

1-10

11 - 20

21 - 25

More than 25 years

SECTION C: TYPE OF HOUSING PROJECTS WITH WHICH YOU HAVE BEEN INVOLVED

5. Please kindly indicate type of housing projects in which you have been involved. Tick

whichever is applicable:

New housing projects

Renovation/maintenance of housing projects

Both renovations of housing AND new housing projects

SECTION D: FACTORS THAT IMPACT GOVERNMENT POLICY IMPLEMENTATION ON DELIVERY OF SUSTAINABLE HOUSING IN WESTERN CAPE

The literature reviewed indicates that the factors listed below are the ones which mainly impact government policy in delivery of sustainable housing in Western Cape. Indicate the level to which you agree or disagree with these factors.

Significant factors 4 3 2 1

Shortage of housing among the community

High construction cost

Lack of accessibility to housing

Lack of proper implementation of housing policy by construction stakeholders

Inadequate capacity for housing delivery

Inadequate management of housing loans

Land availability for housing

Lack of quality housing delivery

Community involvement in housing production

Availability of skill workers within construction site

Lack of prior training for artesian within construction site

Economic stability influence

Competent professionals to handle government policy toward housing delivery

Land policy implementation

Inadequate planning for policy implementation

SECTION E: THE EFFECTS OF GOVERNMENT POLICY REQUIREMENTS ON RESOURCES UTILIZATION TOWARD THE DELIVERY OF SUSTAINABLE HOUSING IN WESTERN CAPE, SOUTH AFRICA.

Below are factors that indicate the effect of government policy requirements on resources utilisation towards the delivery of sustainable housing in Western Cape South Africa. Indicate the level to which you agree or disagree with the factors.

4-Strongly agree, 3- Agree, 2-Disagree, 1- Strongly disagree

Significant factors

4 3 2 1

Sustainability integration into production will enhance sustainable housing delivery

Matching construction constraints with sustainability of policy

Human resources management is critical toward influence construction constraints

Decisive policy on human management is significant to effective production

Affordable housing delivery is prone to holdups

Excess cost based on availability of equipment, machinery, and materials on site

Procurement policy on resources utilisation on site

Safety policy management on site

Risk subjected to by construction industry through technical and design failure, equipment and system failure

Construction plant and equipment are deemed to be source of delay in sustainable housing delivery

Inadequate planning to relieve the dire conditions in which the dispossessed people find themselves.

Settlement of the people at urban periphery

Conflict between profit-driven interests of the private sector and welfare-driven interests of the communities

Lack of proper management of initial cost involve by construction operators

Excessive development fees continue to be fuelled by local government inadequate to fulfil functions

SECTION F: FACTORS THAT AFFECT GOVERNMENT HOUSING POLICIES ON THE UTILISATION OF MATERIALS TOWARDS THE DELIVERY OF SUSTAINABLE HOUSING IN THE WESTERN CAPE

Listed below are the factors that affect government housing policy relating to the materials used towards the delivery of sustainable housing in Western Cape South Africa. Indicate the level to which you agree or disagree with the factors.

4-Strongly agree, 3- Agree, 2-Disagree, 1- Strongly disagree

Significant factors	4	3	2	1
Constant increase in price of materials				
Reduction on materials wastage				
Conservation of materials resources				
Availability of material for production				
Regulation on materials importation				
Placement of high tariff on materials importation				
Fixing of taxes on vendor of building materials				
Constant importation of materials from overseas country				
Processing time for clearing of import materials from sea port				
Sustainability policies on materials usage				
Guideline on price of materials				
Bylaw on materials quality				
Availability of raw materials for building materials production				
Subsidy for materials				
Artificial scarcity of materials from market				

SECTION G: EFFECTS OF GOVERNMENT HOUSING POLICY ON PLANT AND EQUIPMENT USAGE TOWARDS THE DELIVERY OF SUSTAINABLE HOUSING IN THE WESTERN CAPE

The factors below affect government housing policy on plant and equipment usage towards the delivery of sustainable housing in Western Cape South Africa. Indicate the level to which you agree or disagree with the factors.

4-Strongly agree, 3- Agree, 2-Disagree, 1- Strongly disagree

Significant factors	4	3	2	1
Rules and regulations on equipment importation				
Constant increase in price of equipment				
Fluctuation in exchange rate of currency				
Regulations on accident rate of equipment on site				
Regulation on health and safety on equipment usage				
Taxes on companies that import equipment				
Subsidy on prices of equipment				
Time for clearing of equipment at the sea port				
Tariff on import equipment				
Accessibility to equipment usage				
Regulation on hiring rate of equipment				
Sustainability strategy on equipment				
Availability of spare parts for equipment usage				
Establishment of training institute for driving of equipment				
Traffic regulation on movement of heavy equipment				

THANK YOU FOR YOUR PARTICIPATION AND COOPERATION

APPENDIX C

Interview guide

1. How does inadequate planning for housing policy implementation have a substantial effect on the sustainable housing delivery in Western Cape Province?

2. How considerable as a factor is the current shortage of suitable quality housing for poor communities at present?

3. How will innovative and decisive policy on human resource management significantly encourage effective and sustainable housing production?

4. How significant is the constant increase in material prices as a factor when considering government policy that could enhance delivery of housing?

5. How would the fluctuations in the exchange rate and increases in plant costs be major cause for concern when considering plant and equipment utilised in housing delivery?

THANK YOU FOR YOUR PARTICIPATION AND COOPERATION