

The Causes and Impacts of Scope Creep in Construction Contracts for Mpumalanga Province



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September 2021

DECLARATION

I declare that this Research proposal is my own, unaided work. It is submitted in partial fulfilment of the Master of Science in the field of Construction Management at the University of the Witwatersrand, Johannesburg.

It has not been submitted before for any degree or examination in any other university.

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ACKNOWLEDGEMENTS

I wish to give acknowledgement to Prof Samuel Laryea for his continuous support despite his busy schedule, the guidance received is very much appreciated. It wouldn't be possible, but with God's grace and endless support I managed to pull through

The support I got from my family. My husband, Msawakhe Mkhize and my son, Ayanda Mkhize. The juggling between school work, the job and balancing the family chores has not been easy, however with the moral and house chores support I have received I made it through, without which the journey would be tougher.

I am thankful to all professionals whom I have the privilege to seek views from, without which this research report would not be able to complete.

ABSTRACT

Purpose: Without a doubt, scope creep significantly affects project budget and objectives. This research evaluates the various causes and impacts resulting from scope creep in construction contracts in Mpumalanga province, South Africa.

Methodology: Data gathering was done by means of a structured online questionnaire survey which targeted 55 professionals working in the construction industry. The research used the non-probability sampling technique due to difficulties in getting the total number of construction professionals working in the province. The research adopted purposive sampling leading to an 80% response rate. Descriptive statistics was employed in analysing the survey response data.

Findings: Poor scope definition had the highest Mean Score (MS) of 4.341 (in the range of agree) and was ranked topmost amongst the 6 causes of scope creep constructs. By and large, the lowest-ranked item was project lifecycle, with a MS of 3.386 (in the range of undecided). The top three ranked impacts of scope creep were, poor scope definition with a MS of 4.341 (in the range of above average), underestimating complexity with a MS of 4.182 (in the range of above average), and poor communication with a MS of 4.023 (in the range of above average).

Research limitations/implications: The general outcome from the research is that from the initiation stage, project scope is not sufficiently presented and thus, clients and advisors should clearly define project needs upfront to avoid scope creep. Furthermore, it is evident that, extra awareness of the causes and impacts of scope creep coupled with the introduction and effective implementation of scope management system(s) improves efficiency within the construction industry. Moreover, project stakeholders should strive to enhance their understanding of project management as this will help to reduce or eliminate scope creep. The resultant effect will be improvements in project delivery within the construction industry.

Originality/ Value: The originality of the research is based on specifically investigating the causes and impacts of scope creep in construction contracts in Mpumalanga Province.

Key words: Causes, Impacts, Scope Creep and Construction Projects

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LIST OF ABBREVIATIONS

Abbreviation	Description
PMI	Project Management Institute
WBS	Work Breakdown Structure
APM	Association for Project Management
MS	Mean Score
SD	Standard Deviation
CV	Coefficient of Variance

GLOSSARY OF KEY CONCEPTS

For the purposes of this research, the following definitions are used to refer to the mentioned concepts.

Construction Projects	These are planned processes of constructing, renovating and refurbishing buildings, structures and or infrastructures that typically commences with a brief, feasibility studies, option studies, design, financing and construction (Designing Buildings Wiki, 2021).
Scope Creep	Involves adding features and functionality without addressing the effects on time, costs, and resources, or without customer approval (PMI, 2017).
Cause	Something that brings about an effect or a result (Merriam-Webster, 2021).
Impact	The force of impression of one thing on another (Merriam-Webster, 2021).

CHAPTER ONE - INTRODUCTION

1.1 Background

Du Randt, Van Waveren, and Chan (2014) emphasize that, construction projects fail largely due to failure by the project team in the implementation of various strategies of scope management when compared to projects where the project team effectively and efficiently implement the strategies of scope management. Worthington and Higgs (2014), affirmed that, enhancing scope management strategy descriptions used by other project teams results in the successful delivery of construction projects. Thus, an increased appreciation of effective strategies of managing scope by project teams has improved project management (Worthington & Higgs, 2014).

Scope creep is identified as one of the top three indicators that have the high probability of occurring during the implementation of projects (Kerzner, 2017). Nevertheless, Moustafaev (2014) postulates that the level of attention given to research on scope creep has been limited. In a literature review conducted by Padalkar and Gopinath (2016) whereby 189 project management articles were reviewed, scope creep was given very little credence. Despite the little attention given to scope creep in literature on project management, Hussain (2012) reports that 97% of construction related projects that fail do experience scope creep in one way or the other. Farok and Garcia (2016) further strengthen that, project failure within the construction industry is chiefly caused by scope creep among other factors.

Many researchers find it shocking as to why project managers do not pay attention to scope creep and how it can be mitigated during project implementation (Hussain, 2012; Farok & Garcia, 2016; Schoonwinkel & Fourie, 2016). Andersen, Olsson, Onsoyen and Spjelkavik (2011) have opined that scope creep needs to be taken seriously by project managers because it has the potential of reducing the efficiency of project implementation and can bring about cost overruns during project implementation. Madhuri, Suma and Mokashi (2018), discovered that, scope creep has become a key problem for project managers due to the lack of effective measuring strategies. According to Kerzner (2017), the neglecting and lack of seriousness attached to scope creep in project implementation is a global problem linked to project failure globally.

From the arguments so far, it could be inferred that, although scope creep has implications for project success, it has not been given the needed attention in project management research. This study finds

it plausible to therefore explore the concept of scope creep within the construction industry of South Africa. The study specifically aims to determine scope creep causes within the construction industry of South Africa. Furthermore, the study seeks to ascertain the impact(s) of scope creep on clients in relation to project quality and cost as well as timelines.

1.2 Problem Statement

According to Mirza, Pourzolfaghar, and Shahnazari, (2013), project managers define a project as an undertaking which brings about a desired service or product. Furthermore, project success rates have been negatively affected by the failure of project managers to recognise scope management strategy benefits, imprecise descriptions, and misinterpretations (Mirza et al., 2013). Thus, enhancing project success rates requires in-depth understanding of scope management strategies (Mirza et al., 2013). Undeniably, the lack of effective strategies for managing scope negatively affects the project quality, schedule, and budget (Colmenar-Santos, Perez, Norge-Diez, & Perez-Molina, 2015).

As has been noted, the continuous usage of ineffective strategies for scope management results in a decrease in use of ground-breaking concepts of managing scope by the project team (Colemenar-Santos et al., 2015). Mirza et al., (2013) certainly agree that, management of scope is chief among various other factors determining project success and the dearth of scope management strategies lead to projects failure. The works of Mirza et al., (2013), Colmenar-Santos et al. (2015), and Du Randt et al., (2014) greatly emphasize on the necessity of more scope management strategy research to enable all stakeholders to completely understand the concept. Furthermore, the findings provided motivation for the researcher to evaluate causes and impacts of scope creep within construction projects in South Africa.

Gurlen (2003) argues that scope creep epitomizes variations and or development of project scope or the burden to produce beyond what was initially agreed. According to Lamont (2013), besides the optimised benefit of projects, scope changes in construction firms creates damages which include but are not limited to low client and stakeholder satisfaction, increased liability, decreased profitability and damaged reputations. Research has confirmed that only 18% of all projects are considered a success while over 59% are considered as failures since they go beyond approved budgets and schedule due to scope changes (Zuber, Nawi, Nifa, and Bahaudin, 2014). The researcher therefore finds it important to examine the nature of the scope change, scope change causes and scope change impacts.

As mentioned before, project leaders who lack scope management strategy understanding contribute to projects failure (Mirza et al., 2013). Evidently, most construction ventures start with the owner and the project team outlining the scope of works to be completed and then it is authorised for construction at an agreed cost, time, quality and other specifications. However, a common problem in construction projects and or contracts is that the original scope tends to experience significant changes that lead to significant alterations or changes to the agreed expectations. Some of these changes are authorised in advance, while some of the changes and resultant impacts are only known after a project is completed. The research evaluates scope creep causes and impacts in construction contracts for Mpumalanga Province in South Africa.

1.3 Research Significance

Kerzner (2017:751) is of the view that, “there are three things that most project managers know will happen with almost certainty: death, taxes, and scope creep”. Undoubtedly, scope creep is very familiar within the construction industry yet there is a dearth in research and theories focusing on the concept. Moustafaev (2014:3) is of the view that “the field of project scope management seems to be one of the most neglected domains in project management”. A study carried out by Padalkar and Gopinath (2016) discovered that, none of the one hundred and eighty-nine examined project management articles focused on project scope. Padalkar and Gopinath (2016:1315) further elaborate that, “research attention on several project management body of knowledge (PMBOK) areas such as quality, scope and integration, is minimal. This is surprising since these areas are often featured in studies on success or failure factors. For instance, scope creep is commonly listed as one of the causes of failure.”

The South African construction sector stands to benefit from the research findings since they provide in-depth knowledge of scope management strategies leading to improved business practices and scope management strategies. Resultantly, improving scope management strategy increases company profits and growth thereby making project managers valuable to the success of businesses (Kolympiris & Kalaitzandonakes, 2013). Consequently, business practice improvements lead to better earned value management systems which has a positive impact on earned value and better implementation of strategies (Trejo, 2014). Sussman, Khemlani, and Oppenheimer, (2014) emphatically support the notion that business practice improvements yield a positive impact on the society. Due to global warming, modern day project managers generate stakeholder value by means

of sustainable designs, decreased natural resources, energy and water usage and savings on operational cost in the long run.

1.4 Primary Research Question

The primary research question emanates from the need to address the problem, causes and impacts of scope creep in the construction industry of South Africa. The primary research question is:

What are the causes and impacts of scope creep in construction projects?

1.5 Secondary Research Questions

From the primary question, the secondary research questions are identified as:

1. How significant is scope creep within the construction environment?
2. What are the causes of scope creep within the construction industry?
3. What are the impacts of scope creep on client?

1.6 Research Aim

This research aims to evaluate causes and impacts of scope creep within the construction contracts for Mpumalanga Province in South Africa

1.7 Research objective

From the research questions, the following research objectives are identified:

1. To ascertain the causes of scope creep.
2. To determine the impact of scope creep.
3. To recommend strategies of dealing with scope creep.

1.8 Assumptions

Yin, (2014) defines research assumptions as viewpoints perceived to be accurate by a researcher although not yet validated. To gain in-depth knowledge, the researcher reviewed reports from previous projects assuming that they were all accurate. Moreover, the target respondents answered

all the survey questions leading to the researcher assuming that the questions were answered in good faith. Without a doubt, construction entities are dependent on the effectiveness and efficiency of scope management for revenue growth through performance, cost and time management (Worthington & Higgs, 2014). The last assumption made by the researcher was that the target respondents are familiar with the fact that, scope management involves both functional and technical performance, cost of labour and project time.

1.9 Delimitations

Yin, (2014) defines delimitations as the borders of a study. This research was confined to the boundary set by the title. The first delimitation is that of the geographic region in which the study was carried out which is the eastern part of South Africa, Mpumalanga. Moreover, the eligibility of participants was also another factor delimiting the study.

1.10 Overview of Chapters

This research is split into six chapters as follows:

Chapter One - Introduction: The research introduction and or background, problem statement, research question(s), aim of the research, and objectives are dealt with in this chapter. The chapter basically introduces the research setting.

Chapter Two - Literature Review: This chapter is related to detailed investigation of available literature on scope creep management within the construction industry in South Africa. The literature review is based on secondary sources that include but are not limited to web references, books, and journal articles.

Chapter Three - Research Methodology: Chapter three delineates the research design and methodology employed to answer the three research sub-questions to achieve the research objectives. In addition, the chapter addresses the research methods, data collection, data analysis and target population of this study.

Chapter Four - Data Presentation: The chapter focuses on visual and descriptive presentation of primary and or secondary data collected.

Chapter Five - Discussion of Findings: This chapter analyses the collected data, linking the findings with the research aim, questions and objectives.

Chapter Six - Conclusions and Recommendations: The final chapter presents general research conclusions, limitations of the research, recommendations and areas for further research.

CHAPTER TWO - LITERATURE REVIEW

2.1. Introduction

This chapter reviews literature of the study focusing on causes and impacts of scope creep within the South African construction industry. It also presents a methodology of the literature review as well as definition of concepts including, project management, project scope management and project scope creep. The literature further examines the causes of scope creep such as value adding change, project lifecycle, poor scope definition, poor communication, ignoring stakeholder requirement and expectations and underestimating complexity. This section also presents the effects of scope creep, the conceptual framework adopted in the research and concludes with key findings of literature review.

2.2. Scope Management Theory

The scope management theory was coined by Fayol (1917). According to Witzel and Warner (2015), the works of Fayol (1917) enhanced the theory of scope management through planning of projects, creating baselines for projects, reporting project progress, managing change and project close out. Without any doubt, scope management as an act of time, cost and performance makes part of the process for project planning while the baseline of a project bases scope management to project goals (Fayol, 1917).

Project leaders should not only focus on monitoring project progress but should also initiate scope changes during a project thus making project reporting key. Fayol, (1917) was of the idea that, project completion and closeout is key in determining the overall project success. Moreover, strategies of scope management became a key segment of the process of project management by linking the five project management pillars mentioned in the previous paragraph while constantly referring to the initial scope and enhancing the project stakeholders scope management appreciation (Fayol, 1917).

The attempt by project managers to manipulate strategies for scope management together with developer and owner cooperation have resulted in contractors obtaining more contracts (Trejo, 2014). According to Thakurta, (2013), most of the project managers enhancing the dialog of strategies for scope management and handling of project scope with stakeholders have improved project success rates. Moreover, project leaders uplifted the need for scope change inclusion resulting in improved scope management strategies (Thakurta, 2013).

In concurrence with Thakurta (2013), Tisak (2015), and Donmez (2014), Trejo (2014), stressed the links for management of scope strategy leading to enhanced handling of scope management by project managers with improved lasting strategies. Moreover, advances of scope management strategy give rise to budget and program structure optimisation and established study amalgamation with links to recognised philosophies (Donmez, 2014).

Improved scope management strategy custom has resulted in program, budget, and financial alterations with better-quality outcomes. Gharaibeh (2013) detailed that, enhanced scope placing stemmed from longstanding policy advances to the budget makeup (Gharaibeh, 2013). Furthermore, while Gharaibeh (2013) disregarded project quality, Beringer, Jonas, and Kock (2013) remarked that, enhanced client response stemmed from the developed project portfolio management structure and positioning during strategic constructs to scope management strategy by focusing not only on budget and schedule, but quality as well.

In addition, this leads to improved risk management collaboration that produces efficiency for project portfolio management position for distinct undertakings (Teller, 2013). For instance, better interpretation and approach with consumer indicators and identifiers of risk has raised prearranged efficiency (Teller, 2013). Equally important, the improved descriptions of understanding and strategy has boosted production in terms of quality enhancements, budgeting, and schedule arrangement, consequently giving proof of the efficiency of the strategy of scope management. According to (Hora and Dutta, (2013), better productivity for cost, strategies, and variety has advanced the likelihood of company partnerships through elevated scope dealing.

Kester, Hultink, and Griffin, (2014) assert that normalisation of latest product development has led to enhancements of scope with the usage of an advanced framework for management of project portfolio. Allen, Alleyne, Farmer, McRae, and Turner (2014) similar to Hora and Dutta (2013), realised that the strategy for scope management is associated with costs of a project. Owing to a qualitative approach, Allen et al., (2014) discovered that rates of success for scope management strategy declined because of insufficient stakeholder participation, absence of project manager, intensified profundity of scope, and an imprecise cost breakdown (Allen et al., 2014).

Allen et al., (2014) pursued to determine the project management critical success factors. Allen et al., (2014) completed the appliance of vital accomplishment factors like cost, time, scope, project leader sufficiency, and stakeholder participation boosted the likelihood of successful projects. Hora

and Dutta (2013) and Kester et al., (2014) recognised essential accomplishment factors including cost without setting out to do so, whereas Allen et al., (2014) were concerned with improving scope management strategy by means of cost relations with key success factors from the start. The five tenets of project management which are, communication, leadership, motivation, negotiation, and performance management, arose from scope management theory (Naor, Bernardes and Coman, 2013). The major active implementation of scope management strategy is that project leaders should utilise a method that integrates the five tenets. Failing to execute all five tenets reduces the likelihood of project achievement.

2.2.1 Communication

Without a doubt communication is a significant constituent of scope management plan. Bartusevics and Novickis (2015) stated diminished scope management strategy communication efficiency. Bartusevics and Novickis (2015) are of the view that, to improve scope management strategy, there is a strong need to increase usage of software models. Moreover, Du Randt et al., (2014) classified the communication of scope management as a key schedule but not budget accomplishment. Findings from a 2013 study by Gharaibeh ranked the communication clearness of scope management strategy communication amongst the top 10 lessons, problems, and solution factors.

Furthermore, the findings from the study by Gharaibeh (2013) determined that, if contractors, subcontractors and their suppliers receive poor explanations of scope management processes from project managers, client queries and expenses related to scope creep increased while stakeholder communication also suffered. Gharaibeh (2013) added onto the findings from Du Randt et al., (2014) which focused on the achievement of communication goals of scope management strategy based on cost, time, and quality. Research by Gharaibeh (2013) expanded communication goals of the scope management strategy with further descriptions from actual project leaders.

2.2.2 Leadership

Without a doubt, construction projects success is a function of leadership effectiveness. Research carried out by Nowak (2014), investigated strategies of scope management and their connections to engineering to achieve sustainability practices in development. Nowak (2014) studied 43 energy, road and deforestation project designs that had sustainability requirements and were under appeal. The research findings concluded that there was a substantial relationship between leadership of scope management strategies and the decisions made by environmental personnel within the appeal cases.

While the research by Nowak (2014) focused on strategy leadership deficiency focused on scope management, the research by Parker, Charlton, Rubeiro, and Pathak (2013) discovered various successes in scope management strategy leadership through practices of project management including but not limited to the project management book of knowledge.

2.2.3 Motivation

Unquestionably, successful strategy implementation is also dependent on the construct of motivation. According to Hora and Dutta (2013), motivation is linked to scope management strategy throughout a project in combination with digital applications that are geared to track scope changes. Trejo (2014) observed that an increase in computer applications usage in assisting with motivation of scope management strategy resulted in mixed results compared to when drivers including but not limited to transactional leadership are added to the mix were motivation for project leaders was raised.

2.2.4 Negotiation

In any case, project managers participate in negotiating with stakeholders to ensure the use of scope management strategies that are effective. Moyer, Gadsby, and Morris (2017) stressed the need for organisational policy adjustments to ensure that an effective scope management strategy negotiation can last. Lukas (2017) supported the works of Moyer et al., (2017) by stating that, policy changes are a predecessor to effective scope management strategy negotiation.

2.2.5 Performance Management

Based on the notion of scope strategy management effectiveness, it is without reservation that performance management practices are improved by agility and flexibility. This is supported by the findings of Spalek (2014) who maintained that when implementing scope management strategy, active project management is a healthier method when compared to traditional project management. The argument of Spalek (2014) was based on the fact that in tracking real time scope management strategy changes, project managers find it easier to adopt an active approach. Pawlowski and Pawlowski (2015) also confirmed the views of Spalek (2014) through effective strategy on scope management utilisation for performance management by project managers and observed the need to switch to an active approach from a more traditional approach.

2.3 Alternative Theories and Concepts of Scope Management

The previous section focused on the theory of the five scope management tenants which are, communication, leadership, motivation, negotiation, and performance management. This section focuses on other theories and scope management strategy concepts that have been recommended and deliberated on by scholars and project stakeholders.

2.3.1 Fuzzy decision analysis

According to Farshad, Hamed and Reza (2017), fuzzy decision analysis is of paramount importance in the success of scope management strategy as well as the triple constraints of time, cost, and scope. Sommer, Schmitt, Clatworthy, Bramucci, Wheeler and Ratnayake (2016) also maintained an approach like Farshad et al., (2017) but included the relevance of quality management to any approach.

2.3.2 Employee happiness and organisational success

Berlato and Correa (2017) are of the view that, scope management strategy is greatly impacted by factors such as culture, society and organisation. Furthermore, Berlato and Correa (2017) acknowledged the importance of cost, time, and scope but mainly focused on employee happiness and organisational success. The emphasis was more on the need to incorporate human challenges of balancing a career and family when measuring the effectiveness scope management strategy of project leaders.

2.3.3 Demand and Supply

According to Moyer et al., (2017), demand and supply does not always follow predictable patterns when compared to the private sector. Having observed these challenges within government agencies, Shehzad (2016) encouraged approaches of policy management in the enhancement of the effectiveness and efficiency of strategies on scope management. Shehzad (2016) and Moyer et al., (2017) agree on the need for more research to verify statistical significance for their respective theories and consequent increase in innovation and education opportunities for project leaders which may contain an answer for enhanced scope management strategy for project leaders.

2.4 Definition of Concepts

The following subsection defines in detail, the various concepts adopted in this research.

2.4.1 Project Management

Proper and effective management of projects forms an important and critical aspect of the successful execution of projects. The Project Management Institute (PMI) (2017) define project management as the utilisation of appropriate tools, experience and skills that are required for the realisation of project goals. Wysocki (2011:29) is of the view that project management is “an organized common-sense approach that utilizes the appropriate client involvement in order to meet sponsor needs and deliver expected incremental business value”.

2.4.2 Project

According to PMI, (2017:4), a project is “a temporary endeavour undertaken to create a unique product, service or result.”

2.4.3 Project Management Knowledge Areas

According to PMI (2017:23-24) project management knowledge areas can be defined as numerous interconnected project management areas, demarcated distinctly by the different knowledge requirements and practices. The ten project management areas as defined by the PMI (2017) are;

- Integration Management
- Scope Management
- Time Management
- Cost Management
- Quality Management
- Human Resource Management
- Communications Management
- Risk Management
- Procurement Management
- Stakeholder Management

2.4.4 Project Schedule Management

PMI (2017:24) defines project schedule management as the procedure necessary in ensuring the successful delivery or completion of a project. The project schedule provides a detailed plan to project stakeholders which presents the “how” and “when” of deliverables (PMI, 2017:175). All stakeholders should be involved in the creation of a schedule management plan with the project manager(s) playing a leading role. Wysocki (2011:70) is of the view that project schedule management also serves as a control platform throughout the project since the schedule is not only a planning activity. According to Larson and Gray, (2014:130), in ensuring realistic and accurate forecasts, project scheduling must be done by industry professionals experienced in the process.

2.4.5 Project Cost Management

According to PMI (2017), project cost management deals with the financing and budgeting side of a project. It involves continuous monitoring of expenses against the project budget to ensure that a project is delivered within budget or at least to avoid huge cost overruns. Moreover, Kerzner (2017) is of the view that, if cost management is done well, it can provide the project team with an idea of how the project is progressing.

2.4.6 Project Quality Management

Quality management forms part of the triple constraint and is important in projects. According to PMI (2017), project quality management incorporates the criteria for quality at the project planning, management and control stages to fulfil client and or end user expectations.

2.4.7 Project Scope

Project scope refers to all the specifications and features that are required for the delivery of agreed products, services, or results (Richman, 2006). Schwalbe (2014) further indicated that project scope denotes all work as well as the processes that is undertaken in product or service creation.

2.4.8 Project Scope Creep

Scope creep according to Golan and Ziarko (1995) stems from either inappropriate expectation management of project users or the act of altering or changing project objectives. Hurst and Hanessian (1995) however argued that, in order to avoid project scope creep, a link must be established between specific business objectives. In another study, Kerzner (2017) referred to scope

creep as the continuous addition of project scope. Scope creep according Teye Amoatey and Anson (2017) refers to changes in project scope objectives by project managers without prior consultation with other stakeholders of the project. For the purpose of this study, the author defines scope creep as the unapproved deviations or changes to agreed project scope during the project execution.

2.4.9 Scope Change Management

The management of scope according to Martinelli and Milosevic (2016) forms a very critical aspect of projects and its successful completion on time and within budget. The management of scope thus involves resisting unforeseen future changes as much as possible. Although Davis and Radford (2014) argue that scope change is inevitable and that recommendations must be made in order to minimise the impact of such changes. According to PMI, (2017) scope management refers to ensuring that all features that define the project are executed for the success of the project. Other scholars such as Larson and Larson, (2009); Moustafaev, (2014) and Wysocki, (2011) defined scope management by enforcing strict guidelines with the aim of ensuring that only agreed features are implemented.

2.4.10 Scope Management Procedure

For the purpose of effective management of project scope and scope control Schwalbe (2014) described five main proposes which include:

Collecting requirements

This comprises of the defining documents that describe the features and functions of the product to be produced by stakeholders. This document includes requirements documentation and requirements management plan.

Defining scope

This involves the studying of all project documents and requirements to create a scope statement which indicates the boundaries of the project.

Creating the work break down structure (WBS)

This involves the breaking down of the project into workable small packets and more manageable components. These components comprise of the work break down structure and WBS dictionary.

Verifying scope

This involves the engagement of the project sponsor and customer in the verification of the scope. It also involves the verification of the deliverables to determine whether they match with the scope statement.

Controlling scope

This involves setting up measures to control changes to the project scope. As part of managing the change requests, scope changes should be sent to the project manager for evaluation together with the project team and other stakeholders. The justified scope change request would then be sent to the project sponsor or author for approval or otherwise. If approved all project documents must be modified to reflect new scope changes. These procedures and measures ensure that scope is controlled and managed effectively.

2.5 Scope Creep

Existing scope creep literature suggests that defining scope creep is distinct due to the various causes and impacts. APM (2006:158) defines scope creep as “the term sometimes given to the continual extension of the scope of some projects”. The definition by APM assumes that scope creep seldom occurs in projects and extends the project scope. As has been noted before, various literature focuses on the project triple constraint but contrary to that, the definition by APM neglects these aspects. The PMI (2017:722) utilises a broader scope creep definition which includes “the uncontrolled expansion to product or project scope without adjustments to time, cost and resources.”

Orlando (2013) is of the view that scope creep must be prevented because it is characteristically damaging to projects. Larson and Gray (2014:105) found that most projects experience time overruns due to the expansion of the project scope caused mainly by scope creep. Based on the notion of Greiman (2013), the continuous changing of project requirements, specifications and priorities often results in scope creep. On the other hand, Anson (2017) argues that project management, clients and other stakeholders have a tendency of changing the objectives of a project without prior notice or engagement with parties directly involved in the project work.

Nevertheless, Sokowski (2015) takes the view that undocumented and expanded original project scope with no scope change agreement(s) with all stakeholders involved results in scope creep. In

addition, Greiman (2013) agrees that the uncontrolled project scope growth is as a result of changing scope definitions which occurs without any consideration of impacts to the project triple constraint and delivery process

Moreover, Kerzner (2017) reports that the dynamic nature of projects results in scope creep due to unforeseen factors but also emphasises the need to control scope creep to avoid it from blowing out of proportion. As can be noted from the various descriptions of scope creep thus far, the definitions generally have a similar meaning. Furthermore, as Teye, Amoatey and Anson (2017) put it across, scope creep negatively impacts projects and stakeholders.

Although changes to a scope are familiar, failure to control scope creep gives a negative picture to the project management team and stakeholders. According to the research by Teye Amoatey and Anson (2017), scope creep literature review concludes that, “scope creep could be viewed as any uncontrolled and unexpected changes in project requirements that extend the initial boundaries of the project”.

2.5.1 Scope Creep Causes

As mentioned earlier, this research aims to evaluate causes and impacts of scope creep within construction contracts for Mpumalanga Province in South Africa. There are various causes of scope creep identified from literature that are summarised in Table 2.1.

Table 2.1: Causes of Scope Creep

Cause	Source
Project Life Cycle	Larson and Gray (2014), Davis and Radford (2014) and Kerzner (2017)
Poor Scope Definition	Kerzner (2017), Greiman, (2013) and Larson and Gray, (2014), Carkenord, (2014), Farok and Garcia, (2016), Shirazi, Kazemipoor and Tavakkoli-Moghaddam (2017), Teye Amoatey and Anson, (2017), Davis and Radford (2014:99)

Poor Communication	Kerzner, (2017), Turk, (2010), Inder and Rivera, (2007).
Neglecting Stakeholder Requirements and Expectations	Hussain (2012), Carkenord, (2014), Larson and Gray (2014), (Greiman, 2013), (Kerzner, 2017).
Project Organisation Systems	Moneke and Echeme (2016), Shirazi et al., (2017), Shapiro and Lorenz, (2000).
Underestimating Complexity	Greiman (2013), Farok and Garcia (2016), Kerzner, (2017), Hussain (2012)
Lack of Change Control	Kerzner, (2017), Nielsen and Almlie (2011) and Salapatras, (2000), Turk, (2010), Wich, (2009).

2.5.2 Impacts of Scope Creep

Greiman, (2013); Larson and Larson, (2009); Larson and Gray, (2014) and Moneke and Echeme, (2016) affirm that most of the literature on project management agree that project cost and time overruns are mainly as a result of scope creep. Moreover, Kerzner (2017) adds that scope deviations affect the project delivery process leading to delays and increased costs due to scope creep. Literature review of Prabhakar and Quah (2008) on project scope creep states that the most common negative consequences are missed deadlines and over-spending. Wich (2009:3) proposes that a wandering scope will not only affect cost and time but is catastrophic in every imaginable aspect of a project.

On the other hand, scope creep can in some instances lead to unforeseen scope modifications which yield better results by giving products a competitive advantage (Kerzner, 2017:751). Besides cost overruns and delays, scope creep makes the project quality poor (Moustafaev, 2014:315). As mentioned before, if the customer definitions of quality are ambiguous, it can ultimately ruin the project in the eyes of the customer even though instructions were followed by the project management organisation. Scope creep in specific areas of a project can have a significant impact due to the interdependent nature of project life cycles and objectives, thereby influencing other areas in the project (Madhuri et al., 2018:82). These dependencies are one of the primary causes for the

severe financial impacts scope creep has on projects, as the overturn of previous scope change decisions are proved to be costly (Kerzner, 2017:261).

As such, scope creep is a self-perpetuating cost factor leading to even more scope creep by compounding problems as the project progresses. With a widening scope due to scope creep, the intricacy of interactions and interdependencies amongst work packages and tasks in the WBS grows until it causes project delay, further aggregating pressure on the project organisation. The increased pressure can, in turn, lead to even more unauthorized decisions in and in-between departments. The accuracy of cost and schedule estimates are thereby diminished, resulting in more scope creep than initially identified (Shapiro & Lorenz, 2000:4).

Existing literature reports widely of the fact that in most cases the effect of scope creep in construction project among other things includes delays in projects and cost overruns (Greiman, 2013). This is confirmed by Kerzner (2017) who argued about the detrimental consequence of scope creep on project success due to deviation which culminate into project delays and project cost increases. Prabhakar and Quah, (2008) further argues that existing literature on scope creep in the software development sector reveals that a significant number of such project exceeds project schedules and budgets.

Wich (2009) also posited that, beside the cost, the failure of the project to bring the stated results in terms of clients due to non-conformance to specification remains. Unlike the above negative effects of the scope creep, Kerzner (2017) brings to the fore that in some cases the advantage of having unplanned modifications of the scope provides improved outcomes which enhances the competitive advantage of the products. This provides a rare evidence of the positive impact of scope creep. According to Moustafaev (2014), scope creep also has an impact on the quality of output. This is important because quality is perceived based on the customer requirements.

Moreover, due to the independent nature of the project organisations, scope creep puts undue pressure on various departments which results in even more unauthorized decisions in-between departments thereby negatively affecting quality of the project output (Shapiro & Lorenz, 2000).

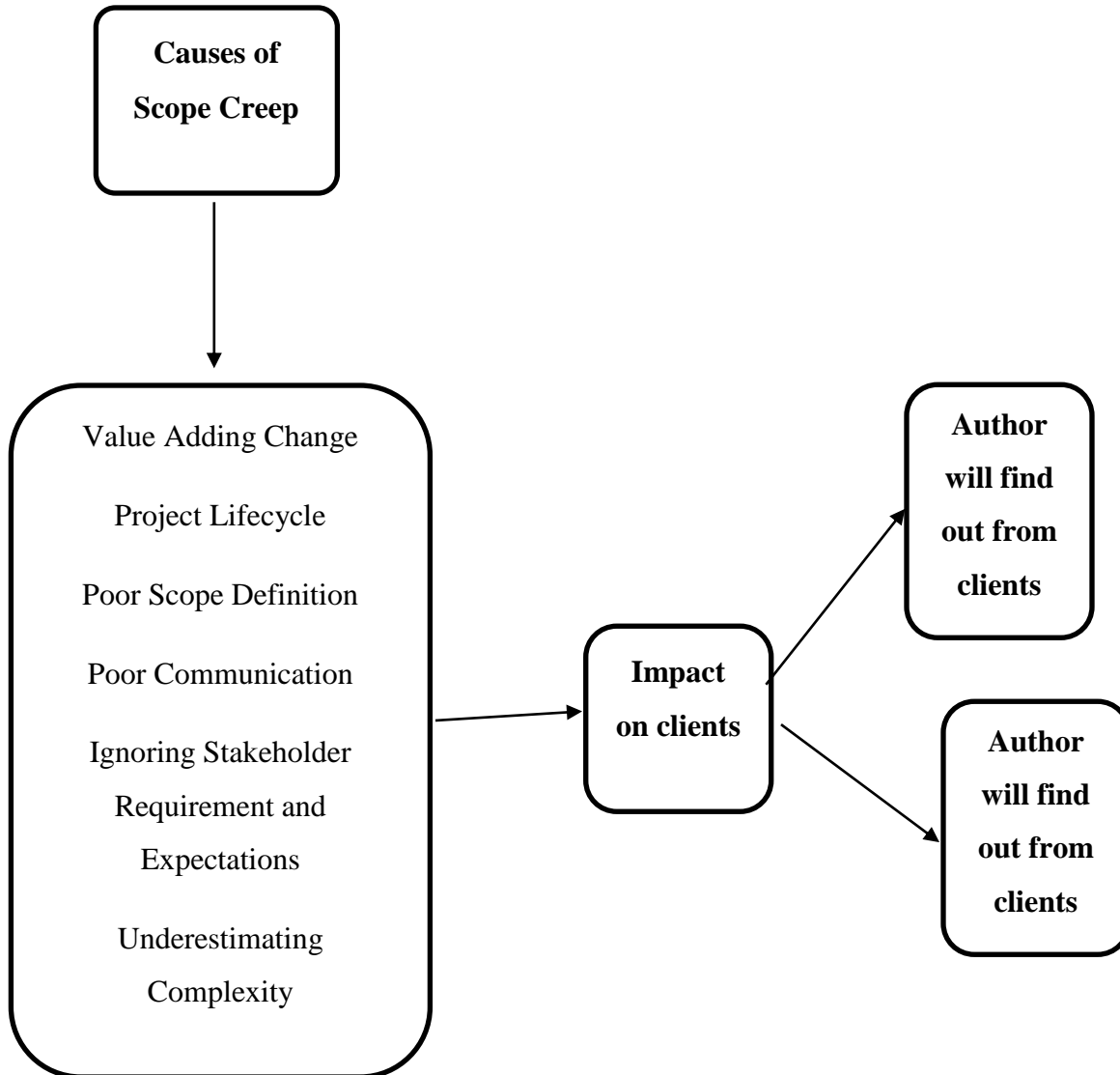


Figure 2.1: Conceptual Framework of the Study

Based on literature reviewed, the researcher proposes a conceptual framework which identifies seven causes of scope creep / change to include value adding change, project lifecycle, poor scope definition, poor communication, neglecting stakeholder requirement and expectations, understanding complexity and lack of change control. The researcher proposes that these scope creep / change causes will have negative effects on projects which shall be explored in the study.

2.5.3 Perspectives on Scope Creep

Without a doubt, academic project management literature focussing on scope creep, as has been noted with the definitions, varies greatly. The literature review has discovered that there are two main scope creep stances where it is inevitable and should be dealt with decisively when it occurs or that

proper scope definition and change management help to entirely prevent scope creep. However, literature on such perspectives is unclear and deficient, as no studies are dedicated to deliberating this specific issue.

Without a doubt, the achievement of the research aim and objectives as well as the answering of the research questions is partly dependent on the theories concerning perspectives on scope creep. The PMBOK does not take an understood position concerning the perspective on scope creep. According to APM (2006), the scope is observed in order to ensure that scope creep does not occur at all, meaning that the APM posture on scope creep is that it can be removed by sufficient planning. The stance conveys the insinuation that projects that experience scope creep are at fault on their own through not monitoring or defining the project scope thoroughly enough in the initiation and planning phase of the project life cycle.

2.5.3.1 Inevitable but Controllable

In project management literature, it appears to be a broader consensus that both scope creep and scope change are linked and unavoidable. Most of the research work by various researchers affirms that, scope creep is a normal occurrence in projects and contend that project managers should accept the fact that it is bound to happen in any project (Greiman, 2013; Meredith & Mantel, 2011; Walker, 2012; Wysocki, 2011). On the other hand, Kerzner (2017:751) to some extent ironically contends that project managers who believe that scope creep is preventable do so by using “magical charms, potions and rituals”. The research rejects the motivation that scope creep is preventable as merely not true and opposes the idea that scope creep is preventable in its entirety.

Lamont (2013) concurs with Kerzner (2017) and affirms that the dangerous scope creep effects cannot be prevented and that the thought of preventing such effects is nothing but “wishful thinking”. Be that as it may, the scholars only provide little arguments as to why the other authors have a different opinion on scope creep or fail to deliberate on the various features and similarities of those projects with more changes that are not controlled. Without any doubt, change within projects is constant therefore the occurrence of scope creep also becomes inevitable and expectations become unrealistic (Wysocki, 2011). Teye, Amoatey and Anson (2017) further substantiate the stance by Wysocki (2011) as they suggest that completely preventing scope creep is a near impossible task and if stakeholders try to do so, the task is extremely difficult.

During the analysis of the five topmost scope creep causes, Larson and Larson (2009) discovered that it is impossible and unavoidable to control scope creep. On the other hand, Hoylandskjaer (2019) was of the idea that, since it is impossible and unavoidable to control scope creep, all projects will experience cost and time overruns unless the main project objectives become unattainable due to extreme obstacles on the project.

Moreover, Farok and Garcia (2016) are of the view that, complete prevention of scope creep is impossible in most cases depending on the project type, size and other different traits of the original project. In conclusion, scope creep should be removed from all projects as evidenced by the scholarly work presented in this section. However, with projects becoming more complex coupled with the need to incorporate green building standards into designs, scope creep is inevitable and requires buy in from all stakeholders to ensure that when it occurs, the impacts will not derail the project.

2.5.3.2 Preventable

Without any doubt, opinions on the prevention of scope creep carry more implications when compared to arguments on how scope creep is unavoidable. The research presents all project management literature defending the probability of scope creep prevention. As such, the research also includes arguments from scholars on why and what measures they apparently believe can prevent scope creep. Davis and Radford (2014) argue that, the only way to prevent scope creep is through regularly reviewing project scope and progress to assess alignment of the scope and outcomes of a project.

APM (2006:33) underpins this claim by suggesting that scope monitoring ensures that scope creep cannot occur. On the other hand, there are indications that a well-written scope is enough to avoid scope creep (Bellenger, 2003:58). The assertion that scope creep is preventable or does not have an influence on projects is also noted by Madhuri et al., (2018:72) on the presumption that the agile project management model is used. The assertion that agile project management is the cure for scope creep is supported by Sliger (2010). According to Hunsberger (2011:48), whether a project manager uses traditional or agile project management methods, scope creep still needs control management to harness it.

Without any doubt, the topic of traditional project management versus agile project management methods remains debatable. Moneke and Echeme (2016:172) provide another angle to the topic of prevention. The researchers claim that total prevention of scope creep is advantageous over solving

it by managerial efforts, thereby fortifying the viewpoint that scope creep is indeed preventable. Inder and Rivera (2007:4) identified data-driven risk-analysis as preventable measures against scope creep by laying the groundwork for more well-informed decisions, preventing uncontrolled spirals of change and finally argues that “prevention is the best medicine”.

Further arguments for eliminating scope creep entirely are made by Barry, Mukhopadhyay and Slaughter (2002:134) who demonstrate that project managers should employ time-limits extensively, thereby enabling the scoping of projects within a tightly defined and controlled planning horizon, resulting in realistic timespans. Doing so, according to Barry et al., (2002), will prevent scope creep. Although vague in the arguments as to which measures are appropriate against scope creep making it preventable, Prabhakar and Quah (2008:49) note that, preventing scope creep is possible if the correct measures are performed at the initial phases of the project.

2.6 Key Findings of the Literature Review

From the literature, it could be inferred that in as much as scope creep is a problem for clients in the construction industry, factors such as improper definition of project scope, poor communication, ignorance of stakeholder requirements and expectations, lack of change control and underestimating project complexity cause scope creep in the construction industry. Moreover, the literature augments that a negative relationship exists between scope creep and project outcomes which brings about delays in project execution and cost overruns. It could therefore be concluded that, scope creep needs to either be eradicated or minimised and controlled if project managers and project stakeholders want to achieve project success in terms of meeting project time schedules; project cost schedules as well as meeting project quality standards.

2.7 Summary

This chapter analysed existing literature on scope management theories, defined the research study concepts and introduced and discussed the concept of scope creep which is the main area of focus for the study. As evidenced by the literature review findings, scope creep is a serious problem which requires teamwork from all stakeholders involved for successful delivery of projects. The following chapter presents the research methodology adopted in this study to collect, present and analyse findings.

CHAPTER THREE - RESEARCH METHODOLOGY

3.1. Introduction

The previous chapter focused on the analysis of the available scope creep management literature. This chapter is made up of sections comprising the philosophy, methods, design, as well as analysis of the research data. A description of the methods and design applied is provided under research design while the technique with which the data were analysed in addition to an account of the process is described under data analysis.

3.2. Research philosophy and approach

Blumberg, Cooper, and Schindler (2011) posit that, there are mainly two distinguishing philosophies which guide research studies which are identified as positivism (scientific) and interpretivism. Positivism paradigm is defined as accurate and specific measurement of quantitative data as well as the use of deductive approach for the purpose of establishing causal laws which facilitate human behaviour prediction (Blumberg, Cooper & Schindler 2011; Neuman 2011). The philosophy concentrates on information and figures relating to the problem of the research.

The interpretivist paradigm, on the other hand, postulates the experiences of humans that are naturally subjective and defined by the context in which people live. Without a doubt, the interpretivist approach helps in understanding specific business problems. According to Blumberg et al., (2011) and Neuman (2011), interpretivism usually makes use of a small sample to understand and solve a problem. The positivism research philosophy is adopted in this research. This is since the paradigm provides a base for solving the research problem. The study entails the testing of theoretical assumptions and hypotheses.

3.3. Research Approaches

Research approaches are classified into quantitative and qualitative due to their dominance in literature. The study adopts the quantitative approach, which is a scientific approach grounded on the positivist paradigm (Creswell, 2014). The justification for this approach lies on the fact that, it focuses on data that is collected in concurrence to the problem statement from an enormous population. Data analysis works on objectivity (avoids individual emotions and feelings or context

of the environment) and measures it via actions and opinion which aids in describing the data rather than data interpretation.

Moreover, it enables the relationship between variables to be examined. Creswell (2014) further asserted that, the use of a large sample size in quantitative studies enables researchers to generalise the findings to the known population of the study. Thus, the use of the quantitative methodology enabled the researcher to successfully examine the causes and impacts of scope creep from the perspective of the clients in the construction industry.

3.4. Research Design

The research used surveys as the chief research method since the goal of the researcher was to collect data or information from large samples of the population. According to McIntyre, (1999) this research method is most appropriate for the collection of demographic data which provides accurate description of the sample composition. The study used research questionnaires as the data collecting tool for data on the causes and effects of scope creep using survey methods due to affordability during administration compared to other methods and furthermore enable the researcher to generalise the study findings (Bell, 1996).

3.5. Population and Sampling

Singh, (2015) defines population as every individual or group that a researcher seeks to study and understand their views with regards to a subject. The population of the study comprise of the construction professionals in Mpumalanga province. Sample size is a representative of the population utilised by the researcher and from whom inferences are made (Babbie, 2013). This study uses 55 respondents as the sample size comprising construction, civil and electrical engineers, project managers, administrators, and end-users.

Creswell (2014) defines sampling as a procedure involving the selection of people, events and or behaviours used in conducting a study. The research makes use of both purposive and convenience sampling techniques (Singh 2015). The justification for the use of purposive sampling is based on the premise that respondents of the study must meet a specific selection criterion of the researcher. By implication, target respondents who meet the criteria are chosen for the study. The study also uses convenience sampling which is premised on the fact that the researcher gathers relevant information

from employees, who would be free and keen to take part in the research during data collection period (Singh 2015).

3.6. Development of the Research Instrument

The study makes use of mixed questionnaires which comprise of both open and closed-ended questionnaires (see Appendix B). The questionnaire comprises of three parts, the first section deals with demographic data and the section is made up of six (6) questions followed by a section assessing the causes and impacts of scope creep which seeks to achieve the research objectives and has two (2) main questions in tabular format and lastly a section on suggestions and or additional comments on scope creep which has two (2) questions. The questionnaire is adapted from literature review findings.

3.7. Data collection Protocol

Informed consent forms were provided at the start of each survey for respondents to read before completing the survey. Saunders, Lewis and Thornhill, (2016) affirm that delivery and collection of questionnaires could be done by the researcher and that it is of importance that the questionnaires should be accompanied with a cover letter indicating the time for collection. The advantage of the questionnaire is that the response rate is relatively high and can achieve 98% (Saunders et al., 2016). Furthermore, Saunders et al., (2016:477) suggest that “within organisational research, questionnaires can be easily delivered as a hyperlink with an email to employees provided all of the samples have access to and use the email”. Hyman and Sierra (2016) affirm that mailed questionnaires are more complex in comparison to telephone administered questionnaires where response choices are few and to the point.

The advantages of using a self-administered mail questionnaire according to Regmi, Waithaka, Paudyal, Simkhada and Van Teijlingen (2016) are as follows:

- Provides the participants time to respond on their schedule;
- They are less costly and more self-explanatory; and
- Consume less time filling them out.

However, the disadvantages of using a mailed questionnaire according to Hyman and Sierra (2016) are as follows:

- Response takes longer when compared to a telephone interview;
- Questions are too long leading to respondents responding differently; and
- Other considerations such as prior introductory email, easier self-administration, and follow-up emails.

3.8. Ethical Risks and Mitigation Strategy

The ethical risk to this study included but was not limited to the possibility of exposing the identity of the respondents through the collection of the demographic data. As part of the mitigation strategy, the researcher obtained an ethics clearance certificate (see Appendix A) from the university's ethics committee which was used to convince targeted respondents about the credibility of the research.

3.9. Validity and Reliability

Darawsheh, (2014) is of the view that, researchers are constantly seeking for trustworthiness, credibility, transferability, and confirmability with power and flexibility, not reliability and validity. Furthermore, Darawsheh (2014) noted that, to prevent subjectivity and enhance the quality of their study, researchers utilise constructs such as credibility, transferability, dependability and confirmability.

Bajpai and Bajpai, (2014) defines validity as the measure of accuracy of a research instrument in relation to the measurement of the variables of the study. The validity of the instruments is insured using two approaches. First, the instrument is given to experts in the field of study to evaluate and ensure that the instrument helps to achieve the aim and objectives of the research and to answer the research questions. Secondly, a pilot study is carried out for the purpose of the internal validity improvement. Singh (2015) asserts that a correlation coefficient of 0.7 and above is appropriate for construct validity.

Reliability is measure of consistency with the research instrument after it is repeated as well as ensuring that measurement errors are eliminated (Bajpai & Bajpai, 2014). The researcher uses Cronbach's coefficient as a measure of the instrument reliability with Cronbach's alpha value of 0.7 and above being appropriate test for the overall reliability (Singh, 2015).

3.10. Data Analysis

The demographic data such as age, gender, tenure, educational background is presented and analysed using descriptive statistics in a form of percentages and frequencies. In analysing the cause and effect of the scope creep, the study makes use of mean ranking analysis to rank the different cause and impact so that highest and lowest could be identified. The analysis also makes use of graphical information generated by google forms directly from the responses received.

3.11. Summary

The research methodology was discussed in this chapter. The sampling and target population sections were preceded by the data collection methods section. Furthermore, the chapter also explains how the validity and reliability is achieved including the ethical considerations that the research will adhere to. The next chapter presents findings from the survey.

CHAPTER FOUR - DATA COLLECTION, PRESENTATION, ANALYSIS AND RESULTS

4.1 Introduction

The previous chapter discussed the research methodology adopted in this research to achieve the research aim and objectives and to answer the research questions. This chapter presents demographic survey findings. The chapter deals with findings on professional background of respondents, age, academic qualifications and work experience respectively.

4.2 Data Collection

As stated in the introduction of this chapter, this section provides an overview of the demographic information of all the respondents who completed this survey. A total of 55 construction professionals were targeted and 44 completed the survey, giving a response rate of 80%. The 80% response rate was higher than the 20-30% response rate for a questionnaire survey that was conducted in the construction industry as cited by Ramly, Chan, Mustapha, Noor and Sharoja (2015).

The research survey questionnaire was emailed using a link to construction professionals. Prior to sending the questionnaire link to the participants, an introductory email on the objectives of the study and requesting their consent for participation was sent a week prior. In addition, it was mentioned on the consent letter that respondent names would be kept anonymous and findings on the research report would be shared with the participants upon request.

Respondents were initially given a month to respond, during which 25 responses were obtained which converts to a 45% response rate. After that, an email reminder was sent after a week, leading to an increase to the final 44 overall respondents which converts to the final 80% response rate. One of the major challenges experienced during the data collection was that of the link not working on email accounts other than Gmail since google forms works better with Gmail accounts. Some participants however provided their work email addresses, making it difficult for them to respond until the link was resent to their personal accounts.

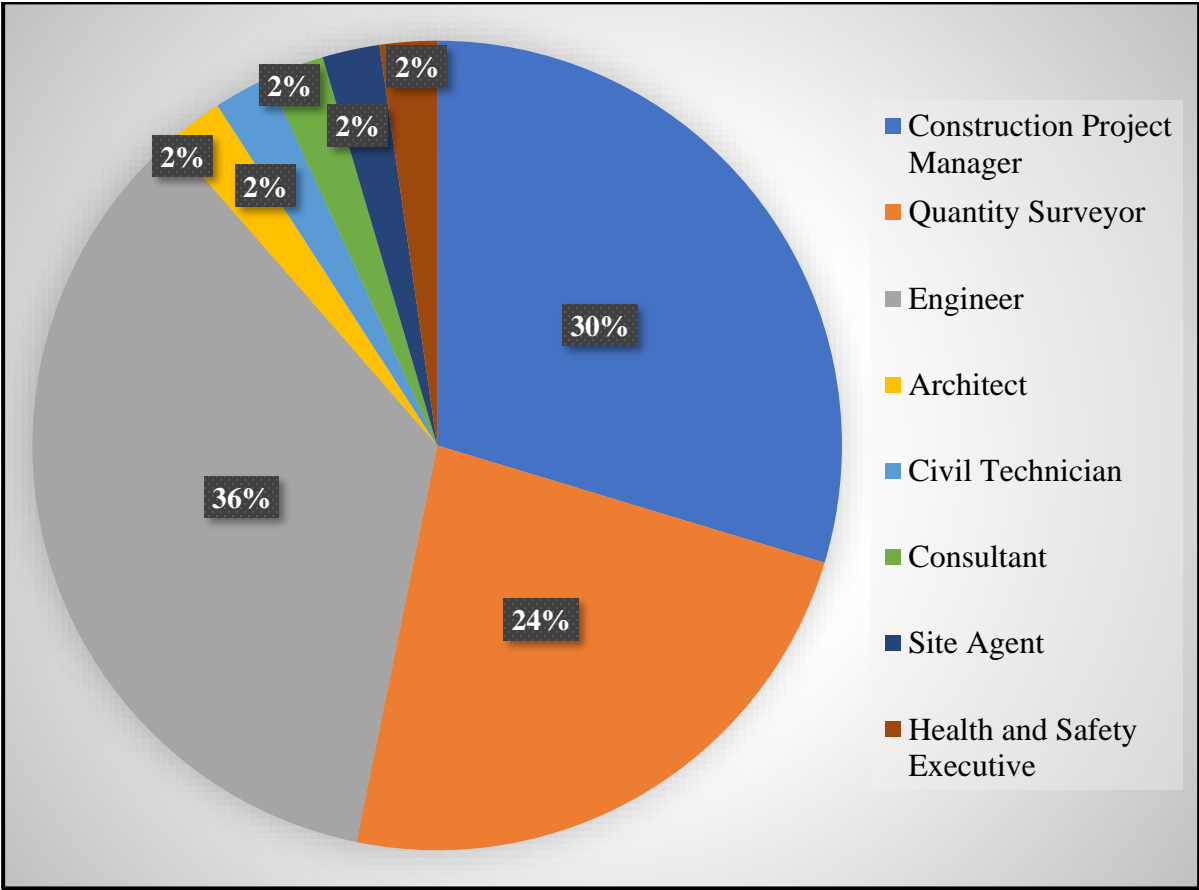
4.3 Data Presentation

This subsection focuses on the presentation of findings.

4.3.1 Professional Background of the Respondents

Figure 4.1 provides a summary of the professional background of the respondents. The majority (36%) of the respondents have an engineering background, followed by construction project managers (30%) and quantity surveyors (24%). The rest of the respondents constitute 2% of the total responses. It is important to mention that 1 out of the 44 respondents was not willing to share their professional background and as a result 43 responses were received on this question.

Figure 4.1: Professional Background

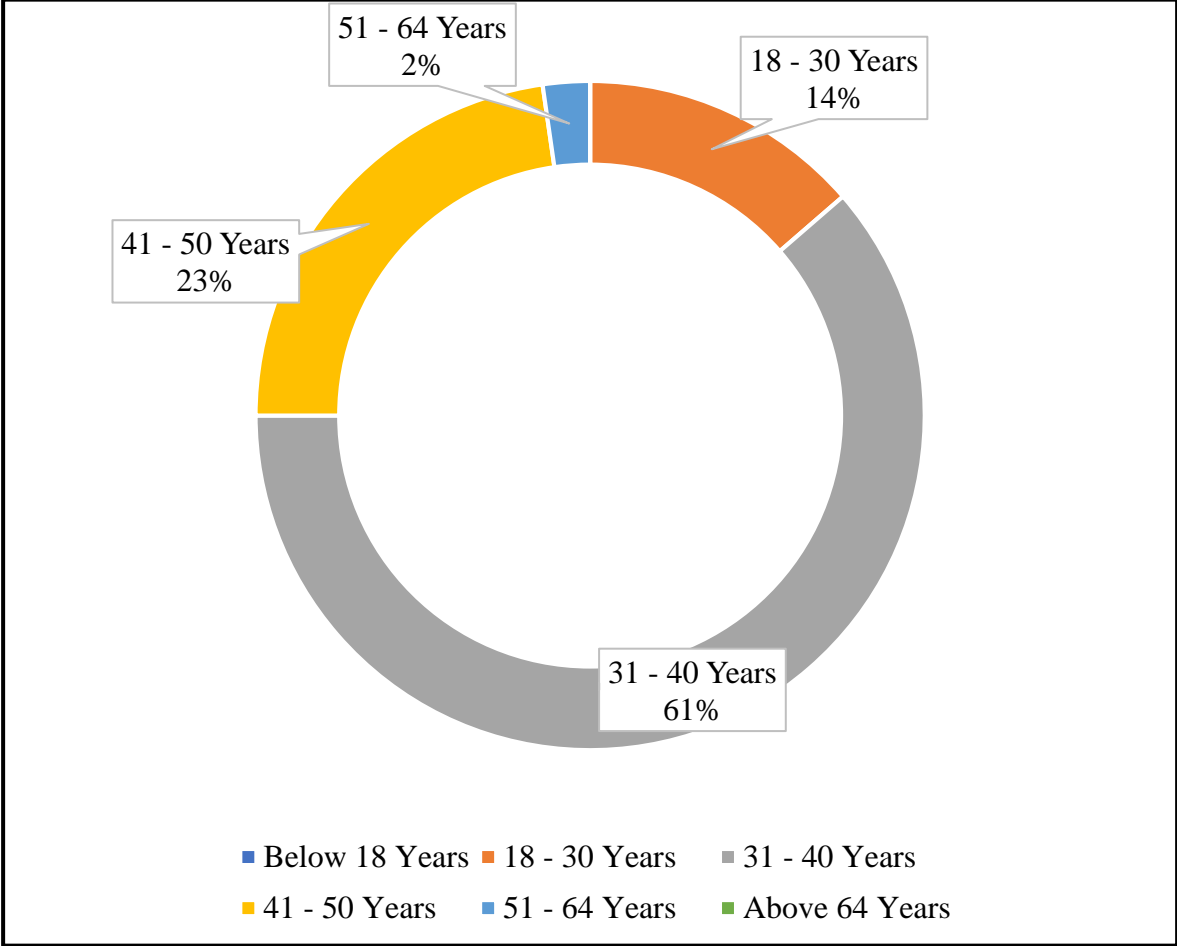


4.3.2 Age of Respondents

Figure 4.2 illustrates the age categories of the respondents. Findings show that a majority (61%) of the respondents are aged between 31 and 40 years, followed by the age category of 41 to 50 years (23%), and then the 18 to 30 years category (14%). Lastly, the age category of 51 to 64 years which constitute 2% of total responses. There were no responses from the above 64 years category. A conclusion can therefore be made that, most of the respondents are economically active and will thus

provide valuable feedback since they most likely encounter scope creep challenges in the projects that they are involved in.

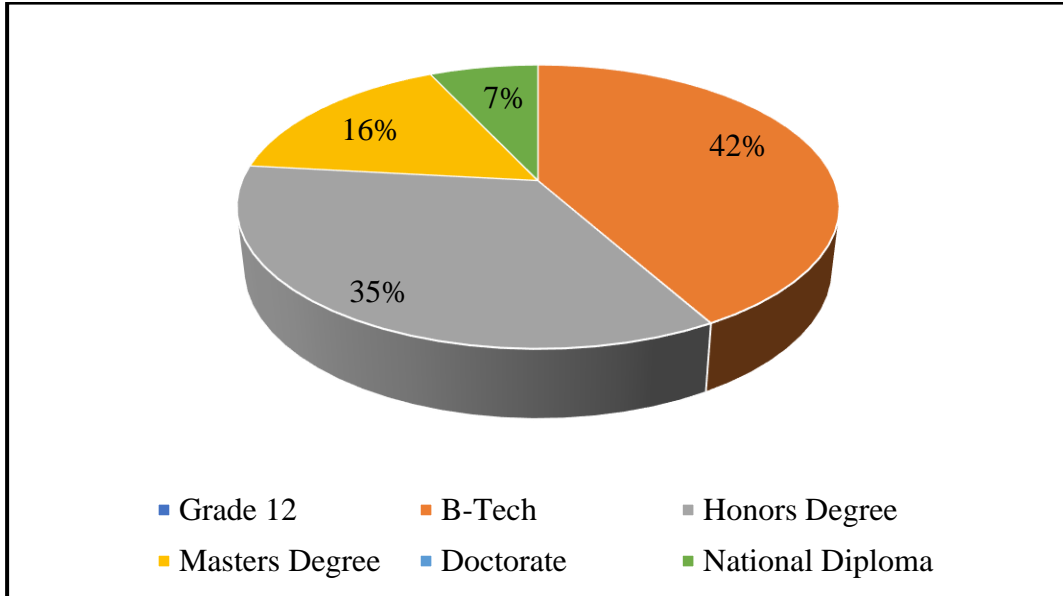
Figure 4.2: Age of Respondents



4.3.3 Academic Qualifications of Respondents

According to the Association for Project Management (APM) (2009), competence expresses the likely outcome or performance standard attained as a result of applying a combination of knowledge, personal attitude, and skills and experience in a certain function. It is for this reason that the researcher sought to determine the academic qualifications of the respondents. The results show that a majority (42%) of the respondents hold a B-Tech followed by those who hold an honours degree (35%) whilst 16% of the respondents hold a master’s degree. The least number of respondents hold a national diploma (7%) as shown in Figure 4.3. One respondent was not willing to share academic qualifications obtained.

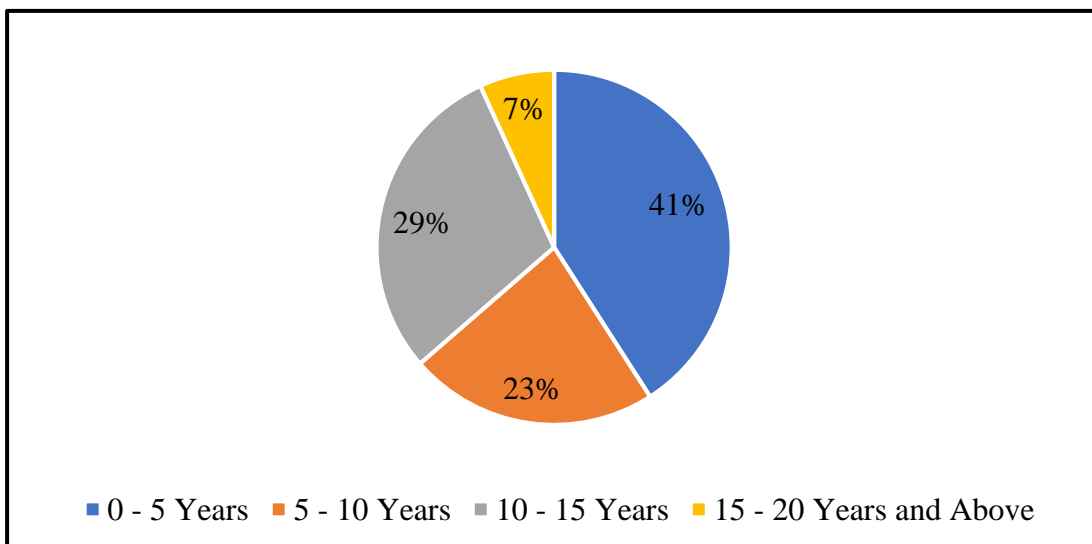
Figure 4.3: Academic Qualifications



4.3.4 Respondents Work Experience

As stated in the APM (2009) definition, skills and experience are a key function of competence. As shown in Figure 4.4, most (41%) respondents have less than 5 years of experience. This is followed by respondents who have experience levels of between 10 to 15 years (29%), meanwhile, 23% of the respondents have experience levels of between 5 to 10 years. Lastly, a lesser number of respondents (7%) have experience levels of more than 15 years. The fact that most of the respondents are highly experienced, supports the findings of this research.

Figure 4.4: Work Experience



This subsection focused on presentations of survey findings mainly covering Section A of the questionnaire. The following subsection analyses the main findings of the research focusing on the crux of the research aim and objectives.

4.4 Data Analysis

From the quantitative ordinal data obtained through Section B of the questionnaire, Table 4.1 presents the results of the Mean Score (MS), Standard Deviation (SD), and coefficient of variation (CV). The MS, SD and CV are used in ranking the causes of scope creep. In circumstances where two or more items or variables share the same MS, the lower or lowest SD is assigned the higher or highest importance ranking. Factors with the highest MS score are given the highest ranking in the analysis.

The six constructs measured under the outcomes/objectives range from X to Y corresponding to a given level of agreement as outlined below:

Table 4.1: Data Analysis Constructs

Mean Score	Level of Agreement
0.00 - 1.50	Strongly Disagree
1.51 - 2.50	Disagree
2.51 - 3.50	Undecided
3.51 - 4.50	Agree
4.51 - 5.00	Strongly Agree

From Table 4.2, *poor scope definition* has the highest MS of 4.341 (in the range of agree) and is ranked topmost amongst the 6 constructs. This is followed by *underestimating complexity* 4.227 (in the range of agree) and thirdly, *poor communication* with a MS of 4 (in the range of agree). *Ignoring stakeholder requirement and expectations* is ranked number 4 with a MS of 3.75 (in the range of agree). The 5th ranked cause of scope creep is *value adding change* which has a MS of 3.432 (in the range of undecided). By and large, the lowest-ranked item was *project lifecycle*, with a MS of 3.386

(in the range of undecided). Attached in Appendix C is a further comprehensive presentation of the findings. In summary, the findings show that the respondents somewhat agree with the identified causes of scope creep.

Table 4.2: Findings on the Causes of Scope Creep

Causes of Scope Creep	MS	SD	CV	MS
Poor Scope Definition	4,341	1,033	0,238	1
Underestimating Complexity	4,227	0,937	0,222	2
Poor Communication	4	0,93	0,233	3
Ignoring Stakeholder Requirement and Expectations	3,75	1,241	0,331	4
Value Adding Change	3,432	1,129	0,329	5
Project Lifecycle	3,386	1,104	0,326	6

Table 4.3 presents the MS, SD, and CV used in assessing the impacts of scope creep. The six constructs measured under the outcomes/objectives range from X to Y corresponding to a given level of agreement as outlined below:

Table 4.3: Analysis of MS, SD and CV

Mean Score	Level of Agreement
0.00 - 1.50	Very Low
1.51 - 2.50	Below Average
2.51 - 3.50	Average
3.51 - 4.50	Above Average
4.51 - 5.00	Very High

The rankings presented in Table 4.4 show that the top three ranked impacts of scope creep are, *poor scope definition* with a MS of 4.341 (in the range of above average), *underestimating complexity* with a MS of 4.182 (in the range of above average), and *poor communication* with a MS of 4.023 (in the range of above average). The bottom 3 ranked constructs are, *ignoring stakeholder requirement and expectations* with a MS of 3.909 (in the range of above average), *value adding change* and *project lifecycle* are tied with a MS of 3.341 (in the range of average). It can be concluded that the respondents strongly support the impact of the constructs on scope creep. Attached in Appendix D is a further detailed presentation of the findings.

Table 4.4: Findings on the Impacts of Scope Creep

Impacts of Scope Creep	MS	SD	CV	MS
Poor Scope Definition	4,341	1,033	0,238	1
Underestimating Complexity	4,182	0,971	0,232	2
Poor Communication	4,023	1,067	0,265	3
Ignoring Stakeholder Requirement and Expectations	3,909	1,217	0,311	4
Value Adding Change	3,341	1,055	0,316	5
Project Lifecycle	3,341	1,055	0,316	6

4.5 Results

This subsection focuses on the various strategies that can be adopted to improve scope creep within the construction industry. The strategies are based on the various responses gathered during data collection. Evidence gathered shows that, organisations should be strict on the selection of project managers and that project scope must be clearly defined from the onset and properly communicated to the responsible personnel who will then communicate to their respective teams. Without a doubt, majority of the respondents support these two steps and are of the view that if properly implemented, scope creep will be significantly reduced within the industry.

Equally important, the respondents also propose the need for learning from previous projects, involvement of relevant stakeholders and or role players such as principal agents and project managers with relevant experience as some of the steps required to reduce scope creep during

projects. Moreover, the project team must also learn how to scope, involve every team member if possible when scoping and follow process or project lifecycle to reduce scope creep.

Furthermore, some of the respondents are of the view that, there is a need to ensure that, all parties are involved at the beginning of the project and to hold scope review meetings to ensure all requirements are catered for. For multidisciplinary scope, all disciplines should be contacted so that their inputs can be considered. In any case, proper feasibility studies should be conducted for better solutions which will ensure that scopes are detailed correctly.

In addition, end users should consider involving relevant specialists in early front-end loading activities such as drafting of project charters via a request for information exercise typically for work outside their core speciality. Again, clients should employ contractors who have knowledge of work and capacity as well as a consultant with experience that can provide a clear and comprehensive estimate of the scope of work. It is also key for the project stakeholders to have service level agreements (SLAs) that are strictly adhered to.

Most of the research participants are of the opinion that, the SA construction industry underestimate the time and value of detailed engineering design phase since in most instances, engineering and project management practitioners are of the impression that a basic design is suitable for tender award and allow contractors to bid for construction without having allowed for projects to go through detailed engineering design phase. However, it is only recently that engineering practitioners have design reviews and share lessons learnt from various projects to close gaps within the engineering field which is a first step in reducing scope creep from an engineering design perspective. Therefore, the construction sector must be willing to pay for detailed engineering design and allow for this to be challenged before even allowing for execution or funding for construction to start.

Lastly, an expert must be consulted and tasked to draft a clear scope of work and works information. Moreover, scope development needs to be done before undertaking the project and the introduction of penalties can also assist to reduce scope creep. Finally, the project team must also carry out feasibility studies in all works before issuing for construction.

4.6 Summary

This chapter discussed the data collection process, presented and analysed survey findings focusing mainly on the demographic and ordinal responses of the respondents. Following this is a chapter which gives a comprehensive discussion of the findings.

CHAPTER FIVE - DISCUSSION OF FINDINGS

This research aimed to evaluate the causes and impacts of scope creep in construction projects for Mpumalanga Province in South Africa. To achieve this aim, the researcher determined the causes and impacts of scope creep in construction projects through the literature review method. The literature review findings were then evaluated by engineering and construction professionals through an online questionnaire survey. Online questionnaire survey results are evaluated in comparison with literature findings to provide additional information to the existing body of knowledge.

5.1 Causes of Scope Creep

The research identified various causes of scope creep which were evaluated through online survey. The findings are discussed in the following subsections

5.1.1 Poor Scope Definition

Findings from a 2016 study by Banda and Pretorius showed that, well defined projects exhibited good indicators of project performance compared to poorly defined projects. It is with no exception that the findings of this research rank poor scope definition as the topmost cause of scope creep. Project stakeholders should ensure that project scope is defined in a manner understood by the project team to ensure successful delivery of projects. The construction and engineering industries usually penalise contractors for unsuccessful delivery of projects, but it should also be stated that most of these penalties result in disputes that may take time to be settled or might never be settled. Moreover, these disputes will in turn delay the delivery process. It is therefore imperative for the project stakeholders to have a proper understanding of the project scope during the initiation stage.

5.1.2 Underestimating Complexity

De Rezende and Blackwell (2019), concluded that, dimensions including but not limited to structure, uncertainty, pace, dynamics, novelty, socio-politico and institutional fragmentation define complexity of projects. Without any doubt, the fourth industrial revolution (4IR) is upon us and requires upgrading and or development of infrastructure compatible to the revolution. Furthermore, the effects of global warming have also resulted in the need for sustainable practices during the development of construction process. The Brundtland report (1987) defines sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. All these developments have resulted in the designing of

complex buildings and infrastructure. Thus, findings from the research suggest that underestimating of project complexity is the second most cause of scope creep and project stakeholders should thus never underestimate project complexity.

5.1.3 Poor Communication

Without any doubt, the construction and engineering industry is risky and complex and due to various skills, cultures, values and professions possessed by the industry stakeholders, effective communication is key (Hussain, Othman, Gabr and Aziz, 2018). Findings from this research suggest that poor communication is the third most popular cause of scope creep which also requires constant monitoring to ensure project delivery success. Olanrewaju, Tan and Kwan (2017), suggest that poor communication can be solved through noise reduction or controlling on site and honesty among stakeholders.

5.1.4 Other

The other identified causes of scope creep include, ignoring stakeholder requirements and expectations, value adding change and project lifecycle. Although these causes are not ranked highly from the findings, it is pivotal for the project team to address these challenges to ensure successful delivery of projects.

5.2 General Findings

Generally, the research findings from the online survey agree with the literature review findings. With regards to the rankings presented in Table 4.1, the top-three causes and or impacts of scope creep are poor scope definition, underestimating complexity and poor communication with a MS ranging between 4 and 4.341, SD ranging between 0.93 and 1.067 and a CV ranging between 0.222 and 0.238. The findings have been discussed in detail under section 5.1.

As has been mentioned throughout the study, scope creep makes it difficult for planning, budgeting, and execution of projects and as such proper project planning, proper research for the different technologies needs to be done before placing contracts. Most of the participants are of the opinion that lack of proper training is a major cause of scope creep while some are of the view that at times it is intentionally done to maximise profit. Moreover, respondents are of the view that, the procurement departments should avoid a situation whereby a few contractors are approved for many projects as this affects efficiency and effectiveness.

Evidently, scope creep leads to delays in projects and if projects can be planned properly by, inter alia, using enough resources at this stage before moving on to execution phase, a lot of unnecessary scope creep can be avoided. Nevertheless, some respondents are of the view that, a lot of scope creep is not really scope creep but design aspects that were already necessary from scratch but were not factored in due to spending less time on front end planning and sometimes allowing unreasonably short project duration due to not focusing on front end planning. The quotation below is from one of the respondents' views on the issue of scope creep.

“What I have picked up in the few years that I have been in the industry is that, the old experienced contractors can pick up when there is a discrepancy or information missing on the scope, they then keep quiet until the project is awarded to them then they start raising issues and claiming compensation events. So, it is their way of making money in a project.”

Survey findings also show that during the inception stage of a project, the roles of the project team members are not defined clearly and as such, there is a strong need for all project members including procurement need to be involved from the beginning of the project. Moreover, interface management needs to be realized that is, in each project team there must be a dedicated member who will identify all the interfaces from the different disciplines and make sure that nothing is missed and that all tasks are done in time by all team members.

In any case, clients need to avoid scope changes as it is costly and has a negative impact on the construction industry which normally operates on low margins resulting in many of the projects running out of funds or poor-quality projects. Therefore, an integrated approach is required within the construction and built environment field, where all disciplines can participate in all projects without fear of being pushed aside for budget constraints. This will go a long way in allowing for accurate scope development, minimizing creep and excellence in the execution of projects, including socio-economic impact.

In brief, it is key to have a construction plan that will clearly state the process to be followed for submitting scope changes and again project contingency definition should not be general but fully specified and priced prior to awarding of contracts as much as possible to control costs. Without reservation, if all projects are planned properly at the beginning, then it will be easy for all parties to play a role in the scope definition phase and input their views on the scope. One of the respondents is of the view that.

“Participation of all relevant stakeholders is very important, ensuring that accountability is held with all role players, always using the worst-case scenario approach when developing a scope and lastly hindsight/history from previous similar projects is the best guideline through documented evidence.”

In conclusion, a scope that is not clearly defined brings a lot of confusion during project execution, there is therefore a need for the planners, engineers, procurement, and other relevant parties to thoroughly engage and agree on the scope of work to avoid scope creep. Scope changes must be allowed to a certain level.

5.3 Summary

This chapter discussed the survey findings linking them with literature findings from chapter 2. It is clear from the findings that, the project delivery impact caused by scope creep is hugely negative and therefore there is a strong need for project teams to come up with strategies of reducing or eliminating the impacts to ensure successful project delivery. The next chapter provides a conclusion and recommendations of the research.

CHAPTER SIX - CONCLUSION AND RECOMMENDATIONS

6.1 Overview

It is evident from literature and the research findings that scope creep is unescapable in any project thus requiring project stakeholders to enhance their management techniques to incorporate the concept. As has been noted throughout the research, management of project scope entails enormous effort. From the primary data collected through the survey as well as secondary data obtained from existing literature on the topic, it is quite clear that the reason behind determining whether scope creep is good or bad is inferred. Without a doubt, anything that threatens the project structure should be rejected, however, it is also key to note that, things are not always simple since the additional workload results in scope changes which in turn affects the responsiveness of the project team to any change possibilities.

Without reservation, management skills are key during scope change regardless of whether it has been authorised or not. From time to time, unintended and unintentional alterations can be enormously resourceful in the future. As such, it can be argued that, a key issue at stake is that of the degree or extent of permissibility and acceptability of incorporating changes to the project scope.

In any case, project managers should not be intimidated by scope creep, but the project stakeholders should emphasize the need for better management of the concept to ensure project success. Luckily, for one to avoid scope creep, it requires the creation and adoption of tailor-made service for clients through assessment of needs and provision of solutions aimed at delivering a standard that is greater than satisfactory. Without reservation, this helps to manage factors such as poor stakeholder management, addition of new objectives and documentation challenges which always delay project execution and implementation.

6.2 Conclusion

The research examined the causes and effects of scope creep within the South African construction industry. Furthermore, the research identified practical strategies that can be adopted to reduce the occurrence of scope creep. The researcher constructed and circulated a questionnaire amongst construction professionals including but not limited to construction project managers, quantity surveyors, engineers, and architects. Most of the research participants revealed that they often experience scope creep within their projects. As mentioned before, common causes of scope creep

identified are poor scope definition, underestimating complexity, and poor communication. The implication for this is that, most construction projects are not delivered on time and within budget.

According to Newton (2015), differing perceptions on what ought to be done as per instruction from the client through the deliverables of a project may greatly result in misunderstanding the actual project requirements. Equally important, the project scope should be understood and agreed upon by all stakeholders before commencement and checked regularly during the project to avoid or minimise changes that can affect the budget, delivery time and quality of the product. As part of the research contribution, section 5.3 provided a suggestion of various strategies that can be adopted to limit or eliminate the occurrence of scope creep within the construction industry.

Without a doubt, this research helps construction industry stakeholders to have an in-depth understanding of the causes and effects of scope creep on project delivery. As has been noted earlier, research findings suggest that, scope creep impacts awareness and effective and efficient systems of scope control help to reduce the effects of scope creep. Furthermore, project stakeholders should strive to reduce or eliminate scope creep through better understanding of project management dynamics. The outcomes assist with improving service delivery within the construction industry.

6.3 Limitations

Yin (2014) simply defines limitations within qualitative studies as shortcomings. On the other hand, limitations can also be defined as actual or potential drawbacks foreign to the realm of influence of the researcher (Yin, 2014). Without a doubt, limitations have the potential to negatively affect study findings. The first limitation of this study was dependence on the knowledge and thoughts of project teams within the construction industry in Mpumalanga, for precise data on scope management strategy.

The study was limited geographically as construction professionals based in Mpumalanga Province, South Africa, were surveyed. However, most of these professionals oversee projects that are taking place within the other provinces; thus, findings can be generalised to include the whole of the Republic of South Africa. This research was also limited in the determination of the financial implication of scope creep as most construction firms were not willing to divulge such sensitive information.

This research focused on the causes and impacts of scope creep within construction projects in South Africa. Moreover, the research is grounded on perceptions of the various scope creep causes and impacts identified by project stakeholders including but not limited to construction project managers, quantity surveyors, engineers, and architects. Since scope creep can be viewed as a technicality within the construction industry, another limitation was that, the survey questions appeared complex to an ordinary person. Moreover, surveys can result in the failure by target respondents to properly understand questions unlike during interviews where probing for deeper understanding can be done resulting in skewed rather than neutral views. However, all these limitations do not necessarily impact the research findings and conclusions thus, they are valuable to the construction industry professionals.

6.4 Contributions of the Study

Based on literature and survey findings, it is key to ensure that, stakeholder expectations are managed through a comprehensive project plan. Unquestionably, projects stakeholders should employ an experienced project manager since they possess knowledge of better managing or even eliminating scope creep. Project stakeholders should aim to reduce continuous change as it results in the overall loss of project control making the project manager key in accommodating changes and requesting for information from the master plan.

Moreover, the project management team should implement suggestions made in this research to enhance business practices while ensuring project success. Furthermore, the research findings help to improve implementation strategies for scope creep and enhancing growth and profitability within the construction sector. As has been mentioned in the research, improving scope management strategy understanding by the project team also enhances the scope-range framework within the construction industry (Kolympiris & Kalaitzandonakes, 2013).

Mirza et al., (2013); Sussman et al., (2014) and Tisak, (2015) are of the view that, improved strategies of scope management are a direct result of accurate strategy descriptions. Sussman et al., (2014) also support the point that, increasing scope management strategy knowledge enhances scope assumptions and attributes. In brief, the importance of scope management strategy began with processes of scope change in the built environment sector. According to Thakurta, (2013), improved project efficiency is a result of improvements in the framework for budget inflexibilities.

6.5 Further Research

It is critical to quantify the impacts of scope creep to improve decision making within the construction industry. Therefore, further case study research is required to determine the financial impacts of scope creep.

Without a doubt, prevention of scope creep is better than the remedial actions of managing scope creep. It is therefore important to have a research focusing entirely on the various ways of preventing scope creep.

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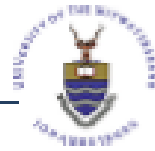
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Appendix A – Ethics Clearance Certificate

School of Construction Economics & Management

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SCHOOL OF CONSTRUCTION ECONOMICS AND MANAGEMENT RESEARCH ETHICS COMMITTEE

CLEARANCE CERTIFICATE

PROTOCOL NUMBER CEM/2016/NM1

PROJECT TITLE

The causes and impact of scope creep in engineering projects

INVESTIGATOR(S)

Nomzandaza Mnguni (1557846)

SCHOOL/DEPARTMENT

SCHOOL OF CONSTRUCTION ECONOMICS AND MANAGEMENT

DATE CONSIDERED

01/05/2020

DECISION OF THE COMMITTEE

Approved conditionally with respect to the declaration

EXPIRY DATE

30th April 2021

DATE

1/5/2020

CHAIRPERSON

Dr. Kola Jasan

cc: Supervisor: : Prof Sam Laryea

DECLARATION OF INVESTIGATOR (S)

To be completed in duplicate and ONE COPY returned to the Secretary Michelle Kirsten at the CEM reception desk.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. I agree to completion of a yearly progress report.

Signature

_____/_____/_____
Date

Appendix B - Research Questionnaire

The Causes and Impact of Scope Creep in the South African Construction Industry

Section A: Demographic Information

A1. Kindly indicate your professional background.

- Architect
- Engineer
- Quantity Surveyor
- Construction Project manager
- Other (*please specify*)

A2. Please indicate your age category (Years) (*Tick applicable*)

- Below 18 years
- 18 - 30 years
- 31 - 40 years
- 41 - 50 years
- 51 - 64 years
- Above 64 years

A3. Please indicate your highest academic qualification. (*Tick applicable*)

- Grade 12
- B - Tech
- Honors degree
- Master's degree

- Doctorate degree
- Other (*please specify*)

A4. Current position held in organisation?

(please specify)

A5. Main responsibility performed in your current position?

(please specify)

A6. Number of years you have been employed by your current employer?

- 0-5 years
- 5-10 years
- 10-15 years
- 15-20 years and over

Section B - Causes and Impacts of Scope Creep

B1. Please rate the following causes of scope creep on a scale of 1 – 5. (5 – Strongly Agree, 4 – Agree, 3 – Undecided, 2 – Disagree, 1 – Strongly Disagree)

Causes of Scope Creep	1	2	3	4	5
Value Adding Change					
Project Lifecycle					
Poor Scope Definition					
Poor Communication					
Ignoring Stakeholder Requirement and Expectations					
Underestimating Complexity					

B.2 Please rate the impact of the following causes of scope creep on project execution on a scale of 1 – 5. (5 – Very High, 4 – Above Average, 3 – Average, 2 – Below Average, 1 – Very Low)

Causes of Scope Creep	1	2	3	4	5
Value Adding Change					
Project Lifecycle					
Poor Scope Definition					
Poor Communication					
Ignoring Stakeholder Requirement and Expectations					
Underestimating Complexity					

Section C- Suggestions

C1. What are your suggestions or strategies to improve scope creep within the South African construction industry?

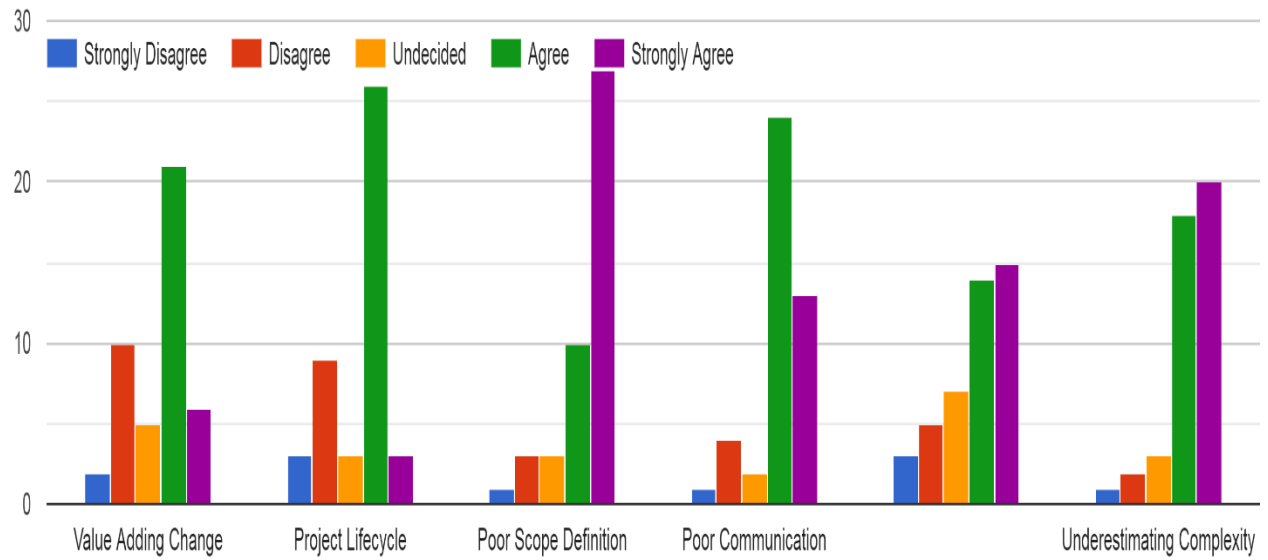
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C2. Do you have any other comments on scope changes in projects in South Africa?

.....

Appendix C – Findings on Causes of Scope Creep

Please rate the following causes of scope creep.



Appendix D – Findings on Impacts of Scope Creep

Please rate the impact of the following causes of scope creep on project execution.

