

Challenges of the construction industry in the Free State

Tsepo Abner Tsimong

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Supervisor: Prof Helena van Zyl

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DECLARATION

“I hereby declare that the Field Study hereby submitted for the Magister in Business Administration at the UFS Business School, University of the Free State, is my own independent work and that I have not previously submitted this work, either as a whole or in part, for a qualification at/in another university/faculty.

I also cede copyright of this work to the University of the Free State.”

Name: Tsepo Abner Tsimong

Date: 20 November 2019

ABSTRACT

The construction industry plays a significant role in the economy of South Africa, and it is a crucial contributor to the gross domestic product (GDP) of the country. However, recent economic trends show that the contribution of the construction industry to the GDP in South Africa is declining. This poor performance is attributed to the challenges that the construction industry is currently facing. The Free State province is among the provinces where infrastructure developments are slacking. Thus, the purpose of this study was to investigate the challenges facing the construction industry in the Free State. The study aimed at establishing what the challenges are as well as to propose strategic interventions that may improve the performance of the construction industry in the Free State.

This study followed a quantitative approach and made use of the two forms of a quantitative study, namely: descriptive research and explanatory research. The former enabled the researcher to describe the characteristics of the current situation of the construction industry in the Free State. In contrast, the latter allowed the researcher to identify the degree and nature of cause-and-effect relationships in the activities of the construction industry. The study collected data through a questionnaire survey using the online survey tool Survey Monkey. The link to the questionnaires was distributed via email and WhatsApp. WhatsApp was used as a distribution platform since most people use smartphones and have quick access to their WhatsApp messages. It therefore made it easier for many people to access the questionnaire and respond quicker. The respondents to the survey were purposely selected through the quota sampling method. This sampling method enabled the researcher to strategically select respondents based on their unique characteristics so that those sampled were relevant to the research questions.

The analysis and interpretation of the collected data were based on the 104 completed and usable questionnaires received from the 200 respondents invited to participate. Univariate analysis was performed through frequency tables, bar charts, pie charts, measures of central tendency and measures of dispersion. The data were further analysed using the relative importance index (RII) method to determine the relative importance of the various factors and challenges of the construction industry in the Free State. In terms of demographics, the results showed that the majority of the respondents (63.46%) were males, while females only made up 36.54%.

The RII ranking method showed that the five most important issues facing the construction

industry at the time of the study according to the respondents were: (1) lack of application of proper construction management tools and techniques by consultants and project site staff (RII = 0.730); (2) poor qualifications and inadequate experience of contractors' supervisors (RII = 0.722); (3) ineffective planning and scheduling of projects (RII = 0.720); (4) delays in producing design documents (RII = 0.717); and (5) no application of construction management procedures on the part of the client which contributes to late detection of construction problems (RII = 0.704). The results also showed that most of the small and medium enterprises (SMEs) in the construction industry in the Free State fail mainly due to their inability to develop long-term strategies, their lack of access to funding, delayed payments by clients, significantly high start-up costs and their inability to compete with big construction firms.

Based on the results, it was concluded that the root problem of the challenges in the construction industry in the Free State lies in project management activities. The project and construction management role carries a large responsibility in construction projects because most projects fail or incur high extra costs due to poor project and construction management techniques. Thus, it was recommended that contractors must undertake regular training on effective planning and execution of construction projects, which will result in the efficient and effective management of construction projects. In the long run, construction industry performance will improve and subsequently contribute significantly to the economic growth of the Free State and the country at large.

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CHAPTER 1: INTRODUCTION AND SCOPE OF STUDY

1.1. INTRODUCTION AND BACKGROUND

The construction industry in the Free State province of South Africa has been faced with various dynamic challenges. These challenges have impacted the construction industry negatively, in particular, construction-related businesses. As a result, the construction industry's economic contribution to gross domestic product (GDP) in the Free State continues to decline due to the lack of effective measures to combat the challenges. Existing literature indicates that extensive research has been conducted around challenges in the construction industry; however, very little of this research contains information specific to the construction industry in the Free State.

In general terms, South Africa's construction and engineering sector is currently in a poor cycle. In 2016, it had an index trading at 69% lower than in 2009 (KH Plant, 2016). In 2015, PricewaterhouseCoopers (PwC) conducted a study of nine top construction companies, listed on the Johannesburg Stock Exchange (JSE). They found that eight out of those nine companies showed a decrease in market capitalisation, with an overall decrease of 38% when compared to the previous year (PwC, 2015).

Furthermore, according to Statistics South Africa (2018: 16), the construction industry recorded a decrease of R8.33b in turnover received based on the year-on-year difference between December 2018 and December 2017, while other sectors recorded an increase in turnover received in 2018 when compared to the previous year. These figures are clear indicators that South Africa's construction industry as a whole is facing serious challenges. Therefore, it is essential to devise solutions to these challenges since the construction industry is a key contributor to the country's economy.

In the Free State, infrastructure development has been slacking, with some projects left incomplete for over five years. This challenge is felt in both private and public projects but is experienced most keenly in the public domain. One of the key concerns is the skills capacity and business sustainability in the industry. Consultants and contractors from outside the province lead some of the construction projects in the province. The arrival of 38 engineers from Cuba in the province in 2015 initiated a huge debate on whether the province has enough engineers and project managers who are qualified to deliver construction projects (Lotriet, 2015).

These developments have contributed to high levels of unemployment in the province. In the third quarter of 2018, the Free State recorded the highest unemployment rate (36.3%) in the country (Statistics South Africa, 2018). The Free State's low economic growth due to high unemployment levels is in part due to its poorly performing construction industry.

The construction industry is a volatile sector in any economy. Therefore, any investment in construction, in most cases, has a strong correlation with economic growth (Windapo & Cattell, 2010: 247). Consequently, when economic growth is low, the construction industry also struggles. Research has identified several issues that challenge and influence the performance, development and growth of the construction industry (Windapo & Cattell, 2013: 66). This study will build upon this research to investigate the current challenges of the construction industry in the Free State.

The Free State province is divided into five districts: Xhariep, Motheo, Lejweleputswa, Thabo Mofutsanyana and Fezile Dabi. This study was only conducted in the Motheo, Fezile Dabi and Thabo Mofutsanyane districts.

12 PROBLEM STATEMENT

The construction industry in the Free State has been experiencing acute development and growth challenges for some time. These challenges seem to be intensifying and increasing in complexity. The declining market capitalisation of top construction companies and their reduced business performance show that the industry is going through a difficult phase. Key role players in the construction industry such as contractors, construction managers, engineers, business leaders and government are not working together to determine effective solutions that would encourage industry growth and increased economic contribution. Failure to address construction industry challenges will eventually lead to increased unemployment rates, which will further damage the already struggling economy of the Free State and the country at large.

The following research questions guided this investigation:

- What are the current challenges of the construction industry in the Free State?
- What are the factors that lead to the failure of small and medium enterprises (SMEs) in the construction industry in the Free State?
- How can government, engineering professionals and business leaders mitigate the challenges facing the construction industry in the Free State?

1.3 RESEARCH OBJECTIVES

1.3.1. Primary Research Objective

The primary research objective of this study was to determine the current challenges facing the construction industry in the Free State.

1.3.2. Secondary Research Objectives

The secondary research objectives of this study were to:

- Discuss the challenges of the construction industry;
- Investigate factors that cause SMEs in the constructions industry in the Free State to fail, and relevance of this objective to the study; and
- Identify effective measures that project managers, engineers, government and businesses can employ to address the construction industry challenges in the Free State.

1.4 RESEARCH METHODOLOGY

This section discusses how this research was conducted in terms of the research design, sampling strategy and data collection methods.

1.4.1 Research Design

This field study followed a quantitative research method. This method enabled the researcher to assess the current status and level of the challenges facing the construction industry in the Free State. For this field study, two quantitative research types were followed, namely:

- Descriptive research to describe the characteristics of the current situation of the construction industry in the Free State; and
- Explanatory research to identify the degree and nature of cause-and-effect relationships within the construction industry in the Free State.

1.4.2 Sampling Strategy

Non-probability sampling was used for this research, particularly quota sampling. Quota sampling, like purposive sampling used in qualitative research, enables the researcher to strategically select respondents based on their unique characteristics so that those sampled are relevant to the research questions (Bryman, Bell, Hirschsohn, Dos Santos, Du Toit &

Masenge, 2014: 186). Respondents in this field study included engineers, project managers, architects, quantity surveyors, occupational health and safety consultants, property developers and owners of construction companies in the Free State.

According to Bryman et al. (2014: 180), quota sampling aims to produce a sample that reflects a population. Therefore, the results of a quota selected can be used to generalise the research findings. This approach enabled the researcher to generalise the findings across the Free State even though the study was only conducted in three of the major towns in the region, namely Bloemfontein, Kroonstad and QwaQwa. (See 1.5 Demarcation of Field of Study below for more on why the study was limited to these towns.)

The construction industry in the Free State has approximately 2 000 role players who fall within the categories of targeted respondents for this field study mentioned above. This larger group formed the population for the study. The questionnaire was distributed to 100 people who are based in Bloemfontein and to 50 people in each of the other two towns covered by the study, which led to a sample size of 200.

1.4.3 Data Collection Method

This study used questionnaires as the primary and only method of data collection. A self-administered questionnaire was used since it is cheaper and quicker to administer. An online survey tool, namely Survey Monkey, was used for collecting data. Individuals with limited or no internet access received printed questionnaires. The content on the online platform and the printed version was the same to ensure consistency. A response rate of at least 50% was achieved by writing a strong cover letter and by following up with those invited to encourage their participation.

1.4.4 Data Analysis

Once the data collection process was completed, various quantitative data analysis techniques were employed to make sense of the information collected. According to Bryman et al. (2014: 312), not just any statistical analysis technique can be used on any variable; techniques must be matched appropriately to the types of variables collected. All the options in the online questionnaire were pre-coded automatically by the online survey tool. The options provided in the printed questionnaires were pre-coded by the researcher. Therefore, the data collected were grouped accordingly, allowing for effective statistical analysis of the information gathered.

The pre-coded questionnaire consisted of the following variables: dichotomous, nominal,

ordinal and interval. The code 999 was allocated for missing data where respondents mistakenly or by choice did not to provide an answer. Univariate analysis was achieved through frequency tables, bar charts, pie charts, measures of central tendency and measures of dispersion.

The data were also analysed using the RII method to determine the relative importance of the various challenges of the construction industry in the Free State. Factors and challenges were ranked from the most important to the least important based on the collected data.

1.4.5 Ethical Considerations

The researcher aimed to uphold the ethics prescribed for conducting business research. Therefore, the first step was to obtain the informed consent of respondents. Bryman et al. (2014: 124) explains that the principle of informed consent demands that respondents should be fully informed about the research process. The researcher, therefore, informed respondents of what the study entails and aims to achieve in such a way that their unforced consent could be obtained.

According to Fouka and Mantzorou (2011: 6), anonymity is protected when participants' identity cannot be linked to the personal responses provided during the research process. Confidentiality means that respondents in a research study are at liberty to give or withhold whatever information they wish to give or withhold (Fouka et al., 2011: 6). The study maintained confidentiality and anonymity by taking care to report the findings in such a way that neither the individuals who participated nor the organisations they represented were identifiable.

Permission to conduct the research was requested from the top management in the various organisations represented by the individuals that took part in the study.

1.5. DEMARCATION OF FIELD OF STUDY

The field of study for this research is construction management. Construction management focuses on project management techniques which administer the planning, design and construction of a project. Its key purpose is to deliver infrastructure projects while managing cost, time and quality. The fundamental focus of this study was to determine the challenges affecting construction industry growth and development. The focus scope ranged from SMEs to the largest role players in the construction industry in the Free State.

The study was conducted in Bloemfontein, Kroonstad and QwaQwa. These towns are

located in three strategic districts in the Free State province, being Motheo, Fezile Dabi and Thabo Mofutsanyane, respectively. These three towns were selected because they are currently at different levels or phases in terms of economic growth, infrastructure development, commercial environment, and demographic and geographic characteristics. Therefore, respondents sampled from these different places could provide information based on their unique environments and experiences while at the same time being representative of the current situation in the Free State as a whole.

1.6. CHAPTER LAYOUT

Chapter 1: Introduction and Scope of Study

The first chapter introduces the research problem and highlights the research questions, which are the basis for the research objectives. It provides a brief overview of the challenges facing the construction industry in general. It demarcates the field of study and explains the methodology used to undertake the study.

Chapter 2: Literature Review

This chapter focuses extensively on reviewing the existing literature regarding the challenges facing the construction industry. The arguments presented from the various sources form the basis of this study. Focus is placed on the most current challenges, which relate to construction management, engineering practices and business performance.

Chapter 3: Research Methodology

This chapter describes how and which methods were used to gather the necessary data on the challenges facing the construction industry in the Free State. It explains the research design followed, sampling strategy employed, data collection methods used and the ethical considerations taken into account.

Chapter 4: Findings and Analysis

Following the collection of data, chapter four focuses on the extraction, interpretation and analysis of the gathered data. The findings are compared with the literature review to compare the data on the current challenges with the available literature. Effective analysis in this chapter provides a good basis for determining good recommendations in the next chapter.

Chapter 5: Recommendations and Conclusion

The fifth and final chapter establishes conclusions based on the field study and the analysed data. Recommendations are also discussed. These recommendations serve as suggestions to combat the challenges currently facing the construction industry in the Free State.

1.7. CONCLUSION

The construction industry in the Free State and across South Africa shows a decline in performance and contribution to GDP because it is facing various challenges that hinder improvement and growth. The main objective of this study was to investigate what the current challenges in the construction industry in the Free State are. The study followed a quantitative approach, and self-administered questionnaires were used to collect data. Quantitative data analysis techniques were employed for consolidating and reporting the findings of this study. The study adhered to business research ethics. This chapter ended with the chapter layout for this study to provide an overview of the discussion of this field study.

CHAPTER 2: LITERATURE REVIEW

2.1. INTRODUCTION

This chapter provides an organised overview of the existing research on the construction industry and the challenges that the industry is facing. An overview of the construction industry is provided, and the various challenges in the industry are explored. Prior studies identified diverse challenges in the construction industry, and these are compared with the current challenges in the construction industry of the Free State. This chapter also provides measures on how industry challenges have been mitigated as recorded in the existing literature. The chapter furthermore looks into some of the critical success factors for construction projects to inform the efforts of business leaders, government and construction project managers to improve the state of the construction industry in the Free State.

2.2. ROLE OF THE CONSTRUCTION INDUSTRY

The construction industry is a prime indicator of economic activity, and governments often use it not only to stimulate economic growth but also to encourage economic recoveries from recessions (Baloyi & Bekker, 2011: 52). The construction industry contributes to the socio-economic growth of a country by improving quality of life and providing infrastructure such as hospitals, roads, schools, and other basic facilities. Thus, it is important that construction projects get completed in the scheduled time, on budget and according to the quality anticipated (Saidu & Shakantu, 2016: 100). The construction industry is an economically important industry in any country (Haupt & Harinarain, 2016: 78). According to Wibowo (2009: 1), it contributes by supplying the infrastructure and physical structures of a country to house other industries, by creating jobs, by contributing to a country's GDP, and by providing basic needs such as housing to the population. In South Africa, the construction industry contributes approximately 2.2% to the GDP of the country (Statistics South Africa, 2019: 8–10), indicating that it plays a significant role in the lives of many South Africans and the economy of the country.

2.3. CHALLENGES IN THE CONSTRUCTION INDUSTRY

According to Ngowi (2002: 149), some of the key challenges in the construction industry are project cost and time overruns, incorrect procurement systems, structures with poor quality, failure to handle infrastructure and housing needs resulting from rapid urbanisation, and not adopting best practices. Other challenges identified in literature are compliance of construction professionals to ethical standards (Adeyinka, Jagboro, Ojo & Odedriran, 2014:

863), risk management (Nketekete, Emuze & Smallwood, 2016: 1), excessive claims on construction projects (Akinradewo & Oladinrin, 2018: 1872), health and safety on construction sites (Umeokafor, Umeadi & Isaac, 2014: 882) and environmental sustainability of construction projects (Abolore, 2012: 951). According to Construction Review Online (2015), the top five challenges facing the construction industry are the constant rise of project costs, corruption issues, lack of skilled labour, site safety and capital supply constraints. While these challenges affect all construction firms and other stakeholders in the industry, emerging construction companies struggle the most, and some often fail to survive these industry challenges.

2.3.1. Project Management Issues

Sound project management practices are central to ensuring the success of any project. At the heart of project management is a project manager. Gurry (2016: 68) describes a project manager as someone who has obtained experience in the engineering and/or construction fields with projects which in general are in the infrastructure, manufacturing, process or mining fields. However, project managers require more than only formal qualifications and experience to deliver projects successfully. According to Gewanlal and Bekker (2015: 33), there are important project manager attributes that influence project success in the construction industry. Gewanlal and Bekker (2015: 45) found that the top ten ranked attributes of a competent project manager in the construction industry across various categories in the order of their significance were communication skills, leadership style, integrative planning, ability to define and follow strategic direction, decision-making and problem-solving skills, supervision of the project team, level of involvement in the project, ability to determine cost-time trade-offs, time planning, and emotional intelligence. From this list, it can be observed that the factors that rank high are those associated with communication, leadership, strategic direction, problem-solving and supervision (Gewanlal & Bekker, 2015: 46).

Similarly, Zulch (2016: 3) found that the success of any project manager depends on effective communication. Stone (2015: 24) also suggests that communication and proactive problem-solving are two essential skills for a successful project outcome. Construction projects often fail due to the lack of these project manager attributes since they are essential for effective management of project activities.

Project management comprises management of various activities such as cost control planning, engineering, documentation, material management, construction work, human

resource and contract administration (Gurry, 2016: 69). Successful delivery of construction projects requires project managers to be able to manage these activities effectively. Issues resulting from poor project management include but are not limited to poor project scope definition and poor scheduling of construction activities (Gurry, 2016: 69) which eventually leads to two of the biggest challenges in the construction industry, namely project cost and time overruns (Al-Najjar, 2008: 5).

2.3.1.1. Poor or incomplete definition of project scope

Defining project scope is one of the essential steps in project planning. A project scope that is properly defined and managed leads to delivering a product of high quality, according to agreed cost and also in the specified schedules (Mirza, Pourzolfaghar & Shahnazari, 2013: 722). According to Gurry (2016: 69), project scope refers to a part of project planning which entails determining and documenting a comprehensive list of tasks, goals, deliverables, costs and deadlines. Documentation of the scope of a project describes the project's boundaries, establishes each team member's responsibilities and sets up the relevant procedures that will be used to verify and approve the completed work (Gurry, 2016: 69). Mirza et al. (2013: 723) argue that the project scope focuses on the work that is required to create the project deliverables. Therefore, the project scope is specific to the work that is required to complete the objectives of the project.

The challenge in the construction industry is the project managers' inability to define and manage the project scope properly. An incomplete project scope definition in the early stages of a project's life cycle has been argued to be a common source of difficulty in the process of construction project development (Fageha & Aibinu, 2013: 154). Fageha and Aibinu (2013: 154) further argue that having a properly defined project during the pre-project planning stage is essential for the successful execution of a project as well as achieving a satisfactory project outcome. For private investors and government, properly defining the project scope is particularly important since it helps with deciding whether or not to commence a project. According to Fageha and Aibinu (2013: 155), the definition of the project is very important in the public sector since projects are primarily meant to serve and benefit communities, whereas projects in the private sector aim at benefiting investors. The resulting consequence of a poor definition of the project scope is cost and time overruns (Gurry, 2016: 69).

2.3.1.2. Project cost overruns

Project cost overruns occur when the actual cost of the project is in excess of the original

budget set aside for the project (Al-Najjar, 2008: 5). Similarly, Shehu, Endut and Akintoye (2014) define cost overruns as the difference between the final cost of the project and the cost agreed as stipulated in the project contract. Apart from a poorly defined project scope, there are other factors which may lead to project cost overruns. Inaccurate cost estimation, poor project management, lack of skilled labour on construction projects, material price increases, poor cost control and reworks are argued to be key contributors to project cost overruns (Durdyev, Omarov, Ismail & Lim, 2017: 5). Al-Najjar (2008: 16) suggests that inadequate planning, changes in designs, variations in the cost of construction materials and unpredictable weather environments are primary factors that result in projects exceeding their allocated original budget.

Although cost overruns in construction is a global phenomenon, there may be different factors causing variation from country to country because of differing economies, geographical locations and construction environments (Ahady, Gupta & Malik, 2017: 2550). According to these authors, some such factors causing variation are construction complexity, political environment, materials, equipment, project funding and the presence of various interest groups such as consultants, contractors, project owners and end-users.

Durdyev, Omarov, Ismail and Lim (2017: 5) suggest that key contributors to project cost overruns include but is not limited to inaccurate estimation, lack of a skilled workforce, poor project management, financial difficulties faced by the contractor, escalation in material prices, poor cost control and reworks. According to Al-Najjar (2008: 16), the four factors that influence cost overruns are design changes, inadequate planning, unpredictable weather conditions and variations in the cost of construction materials. These aspects have even more effects if there are no contingency plans in place.

A study undertaken by Pakistan, Nasir, Gabriel and Choudhry (2011: 73) to determine the cost and time overruns in highway projects lists the following top ten factors that contribute to cost overruns in order of significance: price escalations on major construction materials, land acquisition and resettlement, inadequate planning, additional work, poor cost control by the contractor, delay in decisions by the client, corrupt practices, inadequate duration of the contract period, and inaccurate quantity and cost estimation. According to Baloyi and Bekker (2011: 51), increases in the costs of construction material was the single largest contributor to cost overruns experienced during the construction of stadia in South Africa prior to the 2010 FIFA World Cup. The common contributors to project cost overruns in literature are price escalations on main construction materials, changes in the scope of work, rework and improper project planning and management.

Construction materials constitute a significant cost component in any form of construction project. Therefore, poor management of materials during construction activities on site affects projects' performance to a large extent (Albert, Shakantu & Ibrahim, 2018: 1789). Phu and Cho (2018: 2133) describe material management as a process that coordinates planning, evaluating the requirement sourcing, purchasing, transporting, receiving and storing, handling and controlling of construction materials, while minimising waste and optimising profitability through the reduction of material cost. Proper material management is very important because it can greatly reduce cost overruns.

Another major contributor to cost overruns is rework. Rework refers to doing something at least one extra time as a result of non-conformance to requirements or specifications (Aiyetan, 2014: 755). The objective of rework is to rectify mistakes or poorly executed work to ensure that the overall work completed is of good quality. Aiyetan argues that rework can create very costly ripple effects, which may lead to delays and disruptions in the project. The solution to avoid rework and ensure proper management of materials is the implementation of effective project management practices which in turn encourage completion of construction projects in budget and on time.

2.3.1.3. Project time overruns

Completing projects in the planned timeframe is a major challenge in the construction industry. Building contractors are always striving to balance the constraints of the project, which are project scope, time and cost (Ali & Beheiry, 2015: 120). Thus, from the contractor's perspective, a successful construction project is one that achieves the required scope prescribed by the client in the shortest possible time and at minimum possible cost (Ali & Beheiry, 2015: 120). However, construction projects are often not delivered successfully at the minimum cost and in the shortest possible time.

In construction, delays refer to additional days of work to complete or start a particular project or activity (Das & Emuse, 2018: 2166). Das and Emuse (2018: 2166) suggest that since there are several variables and unpredictable factors which affect construction processes, delays during a project's life cycle are inevitable. The different forms of delays in construction all have significant cost implications. Ahmed, Azhar, Castillo and Kappagantula (2002: 5) offer four broad categories into which delays can be grouped, namely non-excusable delays, excusable non-compensable delays, excusable compensable delays and concurrent delays.

Delays may occur due to factors in the control of the project manager, contractor or client. According to Das and Emuse (2018: 2170), some of the client-related factors which can

cause delays in construction include delay in site handover to the contractor, delay in progress payments for work completed, lateness in approving design documents, poor communication and coordination, slow decision making, and suspension of work. Persistent occurrence of delays can lead to time overruns.

According to Al-Najjar (2008: 10), time overruns can be categorised into three areas, namely those over which neither party has any control, those over which the client has control and, lastly, those over which the contractor has control. Apart from delays, there are other factors which may contribute to time overruns, which include changes in designs, inadequate planning, poor productivity of labour and resource shortages (Al-Najjar, 2008: 10). Nasir et al. (2011: 74) provide the following list of the top ten contributors to time overrun in order of significance: delays in progress payments by the client, incapability of the contractor to do the job, delay in site delivery to the contractor, ineffective planning and scheduling, land acquisition and resettlement, delay in decision-making by the client, poor site management by the contractor, delay in obtaining permits, relocation of services and, lastly, scope changes resulting in additional work. According to Kamanga and Steyn (2013: 83), factors that lead to time overruns include poor project management skills, inadequate planning and lack of skilled subcontractors. These research studies indicate that delay in progress payments by the client is a major contributor to time overruns.

Delayed payments cause severe cash-flow problems for contractors and often result in devastating effects further down the contractual payment chain (Ansah, 2011: 27). Therefore, timeous progress payments enable the contractor to perform accordingly, thus ensuring the flow of construction activities. Several factors can lead to delays in progress payments. According to Ansah (2011), potential causes of delays in payments include poor financial management by the client, withholding of payment by the client for various reasons as provided for in many standard construction contracts, conflict between parties because payment is often a major subject of disputes, and lastly, disagreeing on the valuation of work completed.

The issues identified in this section relate to project management. Therefore, effective and efficient project management practices can help define and manage the project scope, avoid cost and time overruns in the delivery of construction projects.

2.3.2. Collapsing Structures

According to literature, structures fail mainly due to poor quality of work and non-conformance to requirements. In the construction industry, the understanding of the required

minimum client quality requirements in both processes and products remains a challenge (Kakitahi, Alinaitwe, Landin & Rodrigues, 2014: 771). According to Emuze and Mhlwa (2015: 1224), in South Africa, non-conformance to quality requirements in construction projects results in schedule and cost overruns to the detriment of the client. For many construction firms, quality processes and site activities are important to satisfy external and internal stakeholders as well as to build the firm's reputation (Emuze & Mhlwa, 2015: 1225). Businesses generally compete on reputation for quality, price, reliability and delivery; for this reason, quality is recognised as crucial to competitive advantage in the construction industry (Oakland & Marroszeky, 2005: 3–4). Quality in construction work is also one of the critical factors that reduce incidents of rework (Emuze & Mhlwa, 2015:1226).

2.3.2.1. Poor quality structures and non-conformance to requirements

Deviations from quality affect clients and, even more so, contractors (Emuze & Mhlwa, 2015: 1226). Non-conformances to requirements affect the contractor in that it produces penalties in the form of rework, which can result in a significant reduction in productivity (Rivas, Borcharding, Gonzalez and Alarcon, 2010: 314). Emuze and Mhlwa (2015: 1226) argue that work that does not comply with requirements could suggest that the main contractor's quality management and control are inadequate. Therefore, quality work and conformance to requirements must always be encouraged on the construction site to avoid reworks or defects which may cause structures to collapse.

Collapsing structures cause people to die or suffer serious injuries. Engineers' inability to undertake appropriate investigations on site, calculate design loads accurately, prohibit the use of sub-standard building materials, produce proper design layout, comprehend structural analysis and relevant principles of design lead to structural failures (Folagbade, 1997 cited in Ogunlade, Taiwo and Kayode, 2012: 127).

Other factors that lead to structural failures, according to Ogunlade, Taiwo and Kayode, (2012: 128), include:

- Lack of performing soil tests and generating the necessary reports to assist with design decisions;
- Handling of structural designs and details by individuals who pretend to have the required knowledge;
- Lack of coordination between the professional project team and the local town planning authority;
- Non-conformance to specifications and requirements by unskilled and unqualified

personnel;

- Generally bad and poor construction practices;
- Making use of sub-standard building materials;
- Absence of suitable supervision by professionals;
- Improper implementation of relevant building regulations;
- Unlawfully converting buildings, which leads to structural deficiencies;
- Compromising attitudes of some employees of the town planning authority;
- Absence of sanctions against professionals and landlords who do not comply with requirements; and
- Lukewarm attitudes of governments to punish offenders.

Reducing the number of incidents involving structural failures requires proper project management to ensure that these factors are avoided. Improving skills and workmanship performance on construction sites are central to delivering high-quality projects.

2.3.2.2. Poor workmanship

The key factor behind poor quality work and non-conformance to requirements is poor workmanship on construction sites. Bodill (2015: 113) argues that South Africa's construction industry has a persistent shortage of skills. In general, South Africa is unable to produce enough skilled professionals who have the ability and knowledge to do the job (Construction Review Online, 2015). According to Windapo et al. (2013: 67), the report issued by the Construction Industry Development Board (CIDB) in 2004 suggested that the skills supplied to the market through Further Education and Training (FET) programmes were in numerous cases not suitable to the needs of the construction industry, thus resulting in a skills gap. Some contractors entrust unqualified and unskilled personnel with the responsibility of erecting structures, leading to detrimental effects on construction projects and the industry in general.

According to Windapo (2016: 2), both skilled and unskilled labour is necessary to ensure successful completion of a construction project. Labour costs on large construction projects account for a significant portion, about 40%, of the final cost (Kazaz, Manisali & Ulubeyli, 2008: 95). Contractors, therefore, often rely more on unskilled labour because it is cheap to enable them to maximise their profits. However, this practice eventually compromises quality and conformance to requirements. Similarly, Baloyi and Bekker (2011: 58) suggest that some of the contractor-related factors that contribute to cost and time overruns include

shortages of skills, poor resource and time planning, lack of coordination between subcontractors, poor site management and poor labour productivity. Management of workmanship on a construction site is crucial for ensuring the delivery of high-quality projects which are completed in the planned time and budget.

Poor workmanship is often more evident in big projects where multiple subcontractors are employed. In such a case, the main contractor employed by the client contractually employs one or more general contractors depending on the need to execute some portions of the project (Adebowale & Ayodeji, 2015: 1115). From the construction manager's point of view, having more subcontractors on site can be complex and very challenging to manage, since it requires constant monitoring of all construction works for quality control. The contractor's effectiveness is determined by the ability of its construction site managers to manage this complex environment and to control the construction work team effectively (Egbu, Ellis & Gorse, 2004: 18). To maintain that level of effectiveness and subsequently achieve the project objectives, Adebowale and Ayodeji (2015: 1117) suggest that the construction site manager must be versatile. To improve the performance of construction workers as a tool for improving construction project performance, industrial and academic interventions in the construction industry are required (Adebowale & Ayodeji, 2015: 1116).

Mbande (2010) argues that a country or region's skills constraints should be addressed as part of eradicating poverty. Instead of using foreign skills to implement infrastructure in a developing country, the native population should be upskilled and used in infrastructure development as a means to address poverty.

2.3.3. Risk Management

Construction projects are exposed to diverse risks which can become problematic to the project when unmanaged. Risk management is a crucial knowledge area in project management in the construction industry. Mohamid (2013: 45) argues that many construction projects fail due to prevalent risks. According to Nketekete, Emuze and Smallwood (2016: 1), because various challenges such as cost and time overruns, non-conformance to quality standards, and competition limitations impede project performance, incisive risk management practices are required. Implementing risk management practices result in potential cost savings (Schieg, 2006: 77). Accordingly, risk management at a project level is focused on keeping unwanted risk to an acceptable minimum in a cost-effective manner (Buertey, Abeere-Inga & Kumi, 2012: 226).

Increases in project uncertainty subsequently increase project budget, planning effort, duration of the project, number of project activities, design cycles and reviews, management attention and effort, system engineering effort and quality management effort (Buertey, Abeere-Inga & Kumi, 2012: 229–230). However, the adoption of risk management practices increases transparency and avoid many problems due to proactive action from the onset; as such, the project becomes prepared for inevitable problems (Schieg, 2006: 78). The challenge in many construction projects is that risk management practices are not implemented properly. Furthermore, risk management process steps are often not followed effectively, thus resulting in unfavourable consequences on the project, such as cost overruns, legal battles and delays.

The risk management process follows a series of steps through which the consequences of various risks are mitigated, enabling the project manager to retain control over the project (Schieg, 2006: 78). The first step in the risk management process is risk identification (Tembo-Silungwe & Khatleli, 2017: 1). Identifying the type of risk enables construction managers and other project participants to develop relevant mitigation measures that would ensure effective risk control. In a study aiming at using the relevant risk factors in the construction industry as a base for critical analysis to recommend areas of improvement in project risk management, Tembo-Silungwe and Khatleli (2017: 6) highlight various risk factors that are found mainly in developing countries, as outlined in Table 2.1.

Table 2.1: Common risk categories and associated risk factors in the construction industry

Risk Category	Risk Factors
Cost	Cost overruns, poor cost management and control
Delay	Time overruns, delays in solving disputes, time limitations, tight schedule of project activities, impractical schedules
Design	Changes in design changes, defects on designs, delays in issuing detailed design drawings
Financial	Delayed progress payments, fluctuating exchange rates (in the case of imported project material), financial failure of client, uncertainty in construction material price, competition levels, financial failure of contractor
Environment	Extreme weather conditions, unexpected ground conditions on the construction site

Risk Category	Risk Factors
Vis major (force majeure)	Natural hazards such as tornado, earthquake and hurricane which do not involve human intervention
Management	Construction management, site management, project management
Productivity	Shortage of manpower, inadequate staff by contractor, low efficiency of equipment, unavailability of equipment, maintenance of construction equipment, productivity of labour, resource risk, delay in construction work
Coordination and cooperation	Poor communication, cooperation between consulting professionals (engineers, architects, quantity surveyors) and the contractor
Legal	Struggle in obtaining permits, changes in regulations
Client-related	Interference by client, changes in designs
Project-related	Engineering risks, complexity of the project, inadequate site investigation, construction site conditions, poorly defined project scope
Contractor-related	Capabilities of contractor in relation to experience, liability, failure of subcontractor, subcontractor default, proper methods of construction
Corruption	Fraudulent practices, payment of bribes
Political	Government actions and changes in regulations, public risk
Social	Culture, human factors

Source: Tembo-Silungwe and Khatleli (2017: 6)

Other research studies found the major risk types to be inadequate site investigation; poor technical risk specification; experience of contractor; communication; weather conditions; natural disasters; risks relating to the environment; new technology; shortage of resources such as labour, equipment and materials; delayed project completion; and rescheduling of construction site activities (Akinbile, Ofuyatano, Oni & Agboola, 2018:192). The key factors that affect risk have been found to be the availability of resources, project complexity, skills and experience of staff, and time constraints (Akinbile et al., 2018: 193).

Once the risk is known, Nketekete et al. (2016: 6) suggest that the next step is to investigate the occurrence probability and impact of that risk, which is achieved through undertaking a risk analysis and assessment. After analysis and assessment of the risk, the relevant measures of response to control the risk must be applied. According to Schieg (2006: 80), measures for controlling a risk can either be cause-related or effect-related. Cause-related

measures are those that are focused on avoiding or reducing risks, while effect-related measures focus on reducing or safeguarding against the amount of damage or loss that can be anticipated if the damage- or loss-entailing event occurs (Göcke, 2002: 169). Risks must also be monitored continuously to control the effectiveness of risk control measures (Schieg, 2006: 80).

Nketekete et al. (2016: 6) illustrate the flow of the risk management process as in Figure 2.1 below.

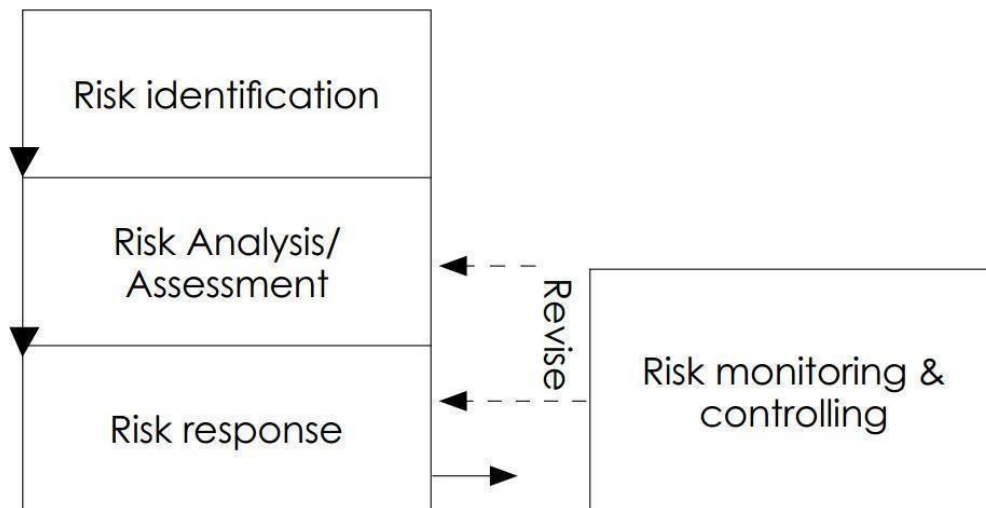


Figure 2.1: Risk management process

Source: Nketekete et al. (2016: 6)

2.3.4. Health and Safety Issues

According to Ogwueleka and Mendie (2014: 826), the construction industry involves dangerous activities. Tadesse and Israel (2016: 1) similarly argue that the construction industry is associated with very specific hazards, which may include work undertaken at heights, work with electrical equipment, having more than one trade and more than one contractor working on a single site with lack of coordination and proper supervision, contractual work as opposed to permanent employment, lack of adherence to regulations and standards by workers, as well as less regulation and enforcement than other sectors. Therefore, construction sites are constantly at risk of accidents and injuries.

Smallwood (2002: 218) argues that accidents in the construction industry are inevitable and believes the industry itself is characteristically dangerous. Injuries on construction sites are often severe and can become very costly to a business. In general, occupational injuries can result in direct costs such as employment losses, disabilities and loss of productivity onsite (Tadesse & Israel, 2016: 1). Tadesse and Israel further hold that the impact of occupational

health and safety hazards faced by the construction workers in developing countries is 10 to 20 times higher than those in developed countries. Therefore, appropriate implementation of safety and quality management is crucial to control hazards and waste as well as improve project success (Ogwueleka & Mendie, 2014: 826). Proper safety management is associated with huge reductions in cost, significant improvements in efficiency and best returns on shareholders' investments (Boniface, 2016: 106).

The understandably poor safety record in the construction industry is a widespread consensus (Umeokafor, Umeadi & Issac, 2014: 883), despite proper laws and regulations that govern its activities and practices. Umeokafor et al. (2014) argue that it is not sufficient to formulate health and safety laws because compliance to the law is appropriate if the aims of the laws are realised. In a study of the determinants of construction companies' compliance with health and safety regulations in South Africa, Windapo and Oladapo (2012: 439) found the five key factors that contribute to the level of non-compliance with the Occupational, Health and Safety Act (OHSA) in ranking order to be management's negligent attitude, lack of knowledge, absence of training, a firm's aim to cut costs, and lack of severe penalties for non-compliance. When the leaders of an organisation neglect the appropriate practices prescribed in health and safety regulations, the probability is greater that the entire organisation will have the same negligent attitude. Thus, Windapo and Oladapo (2012: 439) argue that the attitude of the top management towards health and safety is critical because it drives the organisation's overall attitude and culture on health and safety.

Because health and safety regulations are legislated to safeguard lives as well as to improve quality of construction work and processes (Windapo and Oladapo, 2012: 442), it is crucial for contractors and all other stakeholders in the construction industry to comply with these regulations. However, SMEs' compliance with health and safety is generally not highly regarded. According to Boniface (2016:111), most SMEs in the construction industry are often not well motivated to perform activities safely. During the early growth stages of SMEs, investment costs for required and relevant safety practices without clear, visible and immediate returns were found to be key causes for their poor commitment to ensure that substantial funds are invested to promote safety initiatives (Boniface, 2016: 111). Boniface further argues that SMEs that do invest in various safety measures do so only because it is part of regulatory compliance when registering with relevant professional bodies. Sometimes, SMEs only embrace safety measures when opportunities for subcontracting in construction projects become available.

2.3.5. Environmental Issues

Abalore (2012: 951) argues that buildings, one of the products of the construction industry, provide shelter, places of work, places of learning and leisure; furthermore, the built environment provides a synthesis of environmental, social and economic issues. However, infrastructure development also has a negative impact on the natural environment. Due to increasing concerns over the condition of the natural environment, ideas around sustainable practices are also gaining attention (Abalore, 2012: 951). As awareness of sustainable development increases, the construction industry faces challenges of reducing carbon emissions, energy consumption and other negative impacts on the environment while maintaining high economic sustainability and constructability performance (Zhong & Wu, 2015: 748). Sustainable practices in the construction industry rely on decisions undertaken by various participants during the process of construction, including firm owners, managers, engineers, designers, governments and many others (Abisuga & Oyekanmi, 2014: 113).

In construction, sustainability involves implementing suitable practices with regard to material choices, their sources, construction methodologies and design philosophies in order to improve performance, decrease the project's environmental burden, minimise waste and be more ecologically friendly (Abalore, 2012: 952). Construction materials play a critical role in achieving and maintaining sustainability (Abisuga & Oyekanmi, 2014: 114). According to Zhong and Wu (2015: 748), the construction industry adds to the increase of carbon emission levels in various ways, such as through the manufacturing process of raw materials and transportation of finished goods. The two main materials in the construction industry are concrete and steel, which have high embodied energy (Zhong & Wu, 2015: 749).

Because of its environmental impact, the construction industry must consider sustainable building materials. According to Kibert and Bosch (1998) (cited in Abisuga and Oyekanmi, 2014: 114), sustainable materials display the following characteristics:

- Adequate levels of environmental performance characteristics should be determined.
- All the materials' life cycle aspects should be considered in their entirety.
- No permanent environmental contamination should occur during the material life cycle.
- The production and application of the material should be energy efficient.
- No materials should be combined into compositions that cannot be disassembled.
- They are generally more affordable than they are commonly perceived.
- Deconstruction after use in building should be possible.

- They provide improved indoor air quality.

Abalore (2012: 955) argues that sustainable practices in the construction industry should not only be pursued because they are beneficial for the environment and humans, or because environmental legislation calls for compliance; such sustainable practices should be pursued because they substantially increase financial profits and long-term competitiveness of a firm. However, if not managed properly, construction work and its associated activities can continue impacting negatively on the built environment to a great extent (Abalore, 2012: 959).

2.3.6. Claims and Legal Issues

Claims are a daily part of contracts in the building and construction industry (Jenner, 2012: 48). Excessive claims contribute to additional project costs and also lead to sour relationships among project stakeholders (Akinradewo & Oladinrin, 2018: 1872). Contractual agreements cause disputes in construction projects. According to Povey, Cattell and Michell (2006: 46), regardless of everyone's best efforts, disputes still arise, leaving the successful completion of the project relying on the speedy and efficient resolution of disputes.

The challenge with claims is that claims tend to be formulated on a global basis, instead of being based on individual events which show cause and effect in each case (Jenner, 2012: 48). A global claim (Jenner, 2012: 48) refers to a claim issued by a contractor against a project owner on the following grounds:

- For additional time to complete the work, additional financial compensation, or both, which is established on several events, for which the owner is responsible, having disrupted or delayed the contractor in performing the work, and possibly having caused the contractor to suffer loss or incur expense; but
- It is not possible, or practicable, to identify the actual delay or disruption caused by each of the individual events, as well as to determine the financial implication caused by each event.

In a quantitative study of the magnitude of construction claims in construction projects, Akinradewo and Oladinrin (2018: 1872) determined the frequency of different forms of construction claims and listed them from the most frequent to the least frequent: different site condition claims, change claims, contract ambiguity claims, additional work claims, acceleration claims, and delay claims. It is clear that claims are a critical risk factor that may influence a construction project's time and cost significantly (Akinradewo & Oladinrin, 2018:

1881). Therefore, if participants in a construction project, and especially project managers, neglect the risk posed by construction claims, it may result in adversarial relationships and substantial losses.

2.3.7. Corruption and Unethical Practices

Corruption in the construction industry affects industry growth and economic performance. Bowen, Edwards and Cattell (2012: 885) argue that corruption is a pervasive stain on the construction industry in several countries, including South Africa. Moreover, the engineering and construction industry has been identified as the most corrupt industry in the world (De Jong, Henry & Stansbury, 2009: 105). For this reason, it is important that everyone operating or linked to the construction industry understand that corruption does exist, that it is a serious problem, that it comes in different forms, that it takes two or more people, and that its cost goes beyond money (De Jong et al., 2009: 106). Corruption impacts project quality and cost. According to Bowen et al. (2012: 886), corruption compromises the quality of completed projects, affecting the safety and satisfaction users. It may also increase project costs. Corruption is a serious challenge to the construction industry, and it can only be properly managed if it is well understood.

There are various definitions of corruption. According to Merriam-Webster's Dictionary (2009), corruption is dishonest or illegal behaviour, especially by powerful people, for example, government officials. De Jong et al. (2009: 107) suggest that corruption can also refer to an enticement to do wrong through applying unlawful or improper means. From a legal point of view, the Prevention and Combatting of Corrupt Activities Act, No. 12 of 2004 states in Chapter 2, section 3(1) that:

Any person is guilty of the offence of corruption if he or she directly or indirectly-

- (a) accepts or agrees or offers to accept any gratification from any other person, whether for the benefit of himself or herself or for the benefit of another person; or*
- (b) gives or agrees or offers to give to any other person any gratification, whether for the benefit of that other person or for the benefit of another person,*

in order to act, personally or by influencing another person so to act, in a manner-

- (i) that amounts to the-*
 - (aa) illegal, dishonest, unauthorised, incomplete, or biased; or*
 - (bb) misuse or selling of information or material acquired in the course of the exercise, carrying out or performance of any powers, duties or functions arising out of a constitutional, statutory, contractual or any other legal obligation;*

- (ii) *that amounts to-*
 - (aa) *the abuse of a position of authority;*
 - (bb) *a breach of trust; or*
 - (cc) *the violation of a legal duty or a set of rules,*
- (iii) *designed to achieve an unjustified result; or*
- (iv) *that amounts to any other unauthorised or improper inducement to do or not to do anything.*

Corruption can involve different role players such as government officials, funders, owners, engineers, contractors, material suppliers, equipment suppliers, lenders and regulatory agencies (De Jong et al., 2009: 107). The construction industry suffers various kinds of corruption. According to Bowen, Edwards and Cattell (2012: 886), the forms of corruption found in the construction industry include bribery, collusion, fraud, price-fixing and kickbacks. According to Phiri and Smallwood (2010: 107), corruption in the construction industry can take the form of extortion, bribery, nepotism, graft, cronyism and embezzlement. De Jong et al. (2009:107) are also in agreement and argue that the main forms of corruption are bribery and kickbacks, fronting companies, fraud, bid-rigging, collusion, and conflicts of interest. An example of how corruption can happen in a construction project is that a person involved in a project may divert funds from the project by requesting kickbacks from the contractors in exchange for awarding a contract, paying invoices, or approving additional services (De Jong et al., 2009: 107). Demanding kickbacks in exchange for favours is arguably the most common way of stealing money from a construction project because it can be achieved easily, it is hard to detect, and it is very lucrative.

Various factors lead to corruption. Broadman and Recanatini (2001: 388) argue that corruption is rooted in poorly functioning legal systems and in various policies that undermine industry competition and free trade. The main factors that contribute to corruption in the construction industry are power, greed, selfish desires and success (Phiri et al., 2010: 109). Bauer (2005: 65) suggests that corruption is like a disease that thrives on the human vices of greed and lust for power through wealth. Hence, a person involved in corruption is never satisfied with what they have; they constantly want more.

Corruption in the construction industry leads to additional project issues such as cost overruns and, sometimes, the collapse of a construction project. When bribes and kickbacks replace quality in contractor selection processes, project reliability and quality are lowered, and the people who need the project are the ones that ultimately suffer (De Jong et al., 2009:

107). Therefore, corruption must be combated to ensure successful delivery of projects and to avoid exorbitant cost implications or compromised quality in construction projects.

Scholars have suggested various means and efforts to combat corruption. Government officials and contractors should be well counselled to be content with what they have (Ayodele, Ogunbode, Ariyo & Alabi, 2011: 158). Ayodele et al. (2011) further argue that construction professionals in practice must be monitored very closely by their respective professional bodies so that any erring professional may be brought to book immediately without any fear or favour. Regulation should be tightened (Mwaipungu & Allopi, 2014: 764). Those found guilty of corruption should be punished with ineligibility to compete on construction projects for a certain period (Shakantu, 2006: 47). Shakantu (2006) adds that corruption is a crime; therefore, offenders should be indicted, and those who are found guilty should be convicted.

A more rational system for awarding contracts and a more transparent method for paying contractors for completed work should be put in place to reduce corruption (Mwaipungu et al., 2014: 764). According to Buys and Van Schalkwyk (2015: 83), ethical conduct plays a crucial role in the moral correctness of a contracting business; therefore, relevant professional bodies for contractors should educate their members about ethics discipline and applicable codes of conduct by holding regular training sessions. Although sometimes difficult, implementation of ethical guidelines and policies is also a possible solution for reducing corruption (Shakantu, 2006: 47). Whistleblowing or reporting unethical conduct is also vital in the fight against corruption. According to De Jong et al. (2009: 111), ignoring corruption is the same as condoning it.

De Jong et al. (2009) propose a five-part programme aimed at starting a positive action against corruption. The programme entails:

- Educating everyone working in the profession on the real cost of corruption in their country;
- Shining a bright spotlight on corrupt practices wherever a person sees them;
- Making it publicly unacceptable to be involved in corrupt activities;
- Encouraging organisations to implement anti-corruption management measures in their various organisations as well as on their projects; and
- Educating the next generation of contractors, owners, engineers, government leaders, equipment and material suppliers, and lenders on the real cost of corruption.

As the fight against corruption continues, Ratshisusu (2014: 588) argues that the settlements by the Competition Tribunal in July 2013 marked a breakthrough in the investigation of collusive tendering in South Africa's construction industry.

2.3.8. Low Survival of Small and Medium Enterprises

SME construction businesses are key players in the construction industry in the Free State since they contribute to the province's economic growth by alleviating poverty and creating jobs for many people (Aigbavboa & Thwala, 2014: 772). However, despite this essential role, Mahembe (2011) argues that SMEs across the globe and in South Africa face many challenges that hinder entrepreneurial growth, resulting in a high failure rate: South Africa is among the lowest construction SME survival regions in the world. According to Mahembe (2011), the challenges facing construction SMEs include lack of management skills, availability of funding and access to credit, building relationships with customers, appropriate technology and recognition by large companies in the construction industry.

In a study analysing the challenges facing emerging contractors in the Nelson Mandela Metropolitan in Port Elizabeth, Ncwadi and Dangalazana (2006: 193–194) found that the main challenges for most emerging contractors were the ability to develop long-term strategies, the ability to compete against big construction companies, the ability to provide a decent and safe working environment, lack of incentives from government to encourage emerging contractors, lack of access to funding from commercial banks, significantly high business start-up costs, lack of access to projects that are bonded by commercial banks, inability to access capital equipment, lack of cooperation from suppliers, poor cash flow, interest rates, crime, and delayed payments.

According to Wentzel, Smallwood and Emuze (2016: 1477), construction SMEs often encounter difficulties in acquiring construction projects, fail to achieve the main goals and objectives of the organisation, and are not able to gain cost advantages over their immediate competitors. These factors negatively influence SMEs' performance and may cause them to go out of business. Ihua and Siyanbola (2012: 171) identified five critical challenges that hinder the performance of small-sized enterprises as limited access to credit, inadequate infrastructure, high costs of running the business, inconsistent economic policies, and multiple taxes and corruption. Mafimidiwo and Iyagba (2015: 101) argue that the major challenges facing small-sized contractors are lack of access to finance and high interest rates.

2.3.8.1. Lack of access to capital

Based on the above-mentioned studies, the main challenge facing SMEs in the construction industry is the lack of access to capital that limits their performance. In general, lack of sufficient financing is a major restraint during the formation of new ventures and at later stages because businesses require additional capital inflow to support their expansion and growth (Ladzani, Nieuwenhuizen & Nhlapo, 2011: 1463). Commercial banks do not have confidence in emerging contractors, and, as a result, they give their projects to big and well-established contractors (Ncwadi & Dangalazana, 2006: 194). According to Windapo and Cattell (2013: 68), since the dawn of the global economic crisis, which started towards the end of 2007, banks' lending criteria have become very stringent. The recent poor economic climate caused banks to limit investor confidence (Construction Review Online, 2015), resulting in difficulties for small- and medium-sized contractors to access credit to finance their operations.

2.3.8.2. Tax compliance

Musviba (2017: 62) argues that tax has been the downfall of otherwise successful small businesses. He argues that small business owners commit the following seven fatal yet common tax mistakes:

- Failing to register for value-added tax (VAT) when they meet the requirements for compulsory registration;
- Failing to provide the South African Revenue Services (SARS) with supporting documents when the business is selected for verification or audit;
- Missing the deadlines for submitting tax returns;
- Delaying payment of VAT and employee taxes to use these funds for cash flow;
- Not referencing business payments correctly to make it easier for SARS to correctly allocate amounts to the appropriate tax type and tax period;
- Combining business expenses with personal expenses; and
- Disguising employees as independent contractors to avoid paying employee taxes.

By committing these mistakes, businesses may suffer serious financial problems due to penalties (Musviba, 2017: 65). Persistent failure to comply with tax and other statutory requirements could result in the catastrophic collapse of a business. Datta (2000) suggests that the key areas which require modernisation to tackle the severe challenges facing the

construction industry are profitability, research and development, training, price and cost, dissatisfaction of clients and fragmentation.

2.4. CRITICAL SUCCESS FACTORS FOR CONSTRUCTION PROJECTS

According to Tshiki (2015: 19), critical success factors (CSFs) refer to the conditions, characteristics or variables that can have a major impact on the success of a project when properly maintained or managed. Garbharran, Govender and Msani (2012: 92) argue that CSFs are those inputs added to the project management system which directly increase the probability of attaining project success. The construction industry has five dimensions of project success, namely client satisfaction, budget performance, contractor satisfaction, functionality and project manager/team satisfaction (Tshiki, 2015: 20). These five dimensions cover several CSFs which influence project success in the construction industry.

In a study to determine the CSFs for construction projects, Hove (2017: 39) concluded that construction project success is mainly influenced by procurement factors, financial factors, manpower factors, client-related factors, project management, quality and risk management. Although Leadership, technical factors, communication, and health and safety factors were identified as minor factors, they also have a reasonable impact on project success (Hove, 2017: 39). Similarly, Tshiki (2015: 21–24) suggests that the critical factors that influence project success are the level of maturity of the organisation delivering the project, the project manager's leadership qualities, the project manager's competency in identifying and managing risk, the methods used for procurement and contracting, ability of the custodian of the project to maintain the delivered infrastructure, fitness-for-purpose of the delivered project, proper definition and understanding of the project objectives by all stakeholders, and an adequate interpretation and understanding of project documentation and designs by the project team.

The CSFs identified by Hove (2017) and Tshiki (2015) align well with the four COMs model discussed by Garbharran et al. (2012: 93), which consists of comfort, competence, communication and commitment. According to Garbharran et al. (2012: 93), the comfort component means that successful projects promote the involvement of all stakeholders; the competence component involves utilisation of up-to-date technology, past experience, competent teams and awarding of projects to the right contractor; the commitment component emphasises the importance of the support of top management, political support, and clear project objectives and scope; and, lastly, the communication component refers to the importance of leading, integrating people, and taking decisions in project success. The

aspect of awarding construction projects to the qualified contractor is crucial for the success of the project.

Construction projects must be granted to qualified and experienced contractors. Contractors with higher qualifications that are more likely to deliver better performance should be considered, especially for big projects (Muzondo & McCutcheon, 2018: 25). Contractors with more technical qualifications and years of experience also perform better (Muzondo et al., 2018: 25). The importance of using qualified and experienced contractors does not mean that SMEs should never be used. For of skills transfer and growth of small- and medium-sized construction firms, incubation programmes may be considered. A business incubation programme is an organised effort to bring together a well-established contractor and an emerging firm to facilitate the development conditions and support systems that will ensure successful business operations (Temtime, 2004: 30).

2.5. CONCLUSION

Recent studies of the challenges in the construction industry indicate that the industry's main problems are poor definitions of project scope, cost and time overruns, collapsing structures due to poor quality work and unskilled labour force, poor risk and project management practices, non-compliance with health and safety requirements, corruption, and environmental damage. Deviating from prescribed quality standards exacerbates time and cost overruns. The success of construction projects significantly hinges on the efficiency of construction site managers and individual site supervisors. Identifying risk, the first step in the risk management process, enables construction managers to determine the nature and type of various risks from which they can develop relevant mitigation measures for effective risk control.

Risk management practices in construction projects impact project cost, completion time, project quality, productivity, project health and safety, and sustainability of the environment. Proper risk management encourages cost-effective measures that contribute to the successful completion of construction projects.

Although contractors were often found to be non-compliant, the health and safety regulations and guidelines in the construction industry have been developed to protect lives and to improve the quality of construction processes and products. Therefore, it is very important that contractors and project managers promote safe practices on construction sites at all times.

Entrepreneurship has been identified as a strategy for alleviating poverty and creating jobs. However, SMEs face various critical challenges which hamper business performance and growth. Lack of access to finance is a major problem for many SMEs.

Lastly, sound project management practices can help to identify and manage CSFs to ensure successful delivery of construction projects.

CHAPTER 3: RESEARCH METHODOLOGY

3.1. INTRODUCTION

This chapter provides insight into how the research was conducted. According to Kallet (2004: 1229), the main focus of the methodology section is how the data were collected or generated and how it was analysed. The methodology section describes the actions that were taken when investigating the research problem and it also provides the rationale for applying specific procedures and techniques in identifying, selecting, processing and analysing information to understand the problem. It thus enables the reader to critically evaluate the overall reliability and validity of the study (Kallet, 2004: 1229).

Reliability and validity are the two most essential and fundamental features when evaluating any tool or measurement instrument for a good research (Mohajan, 2017: 58). Furthermore, according to Singh (2014: 78), reliability and validity increase transparency while decreasing opportunities for inserting researcher bias into an academic research. By definition, reliability is the degree to which measures are free from error and therefore yield consistent results (Thanasegaran, 2009: 35). This can be achieved through the use of a consistent measurement or data collection procedure. On the other hand, validity refers to the credibility of experimental results and the degree to which the results can be generalised across the general population of interest (Kallet, 2004: 1230). Therefore, by employing various types of sampling strategies and data collection methods for obtaining true information; a researcher can improve the reliability and validity of the collected data (Mohajan, 2017: 59).

Accordingly, this chapter aims to describe the methodology followed for the research design, sampling strategy and data collection to achieve the research objectives. This chapter also describes the data analysis techniques and methods used. It concludes with a brief discussion of ethical considerations and possible limitations of the research.

3.2. RESEARCH APPROACH

This research followed a quantitative design. A quantitative design comprises data generation in quantitative form which can be subjected to rigorous and formal quantitative analysis (Kothari, 2004: 5). Bryman et al. (2014: 31) describe the quantitative method as a distinctive approach that involves numerical data collection, considers the relationship between research and theory as deductive, embraces an objectivist conception of social reality and follows a natural science approach in general terms.

The quantitative approach was chosen for this study because conclusions based on the results of quantitative research can be generalised when the sample size is large enough (Ayres, 2019). Furthermore, statistical methods offer reliable information and allow for quick data collection and analysis. The quantitative approach enabled the researcher to assess the current status and level of the challenges facing the construction industry in the Free State. The study employed a descriptive research approach to describe the characteristics of the current situation of the construction industry in the Free State province. It used an explanatory research approach to identify the degree and nature of cause-and-effect relationships.

3.3. RESEARCH DESIGN

A research design provides a framework for the collection and analysis of data (Bryman et al., 2014: 100). Kothari (2004: 31) defines a research design as the conceptual structure within which research is conducted; it comprises the blueprint for data collection, measurement and its analysis. Research design is important because it enables the various operations of research to run smoothly; it makes the research more efficient, thereby producing maximal information with minimal expenditure of time, effort and money (Kothari, 2004: 32). Bryman et al. (2014: 100) names five research designs: experimental, cross-sectional, longitudinal, case study and comparative. This research followed a case study design. According to Bryman et al. (2014: 110), a case study design consists of a detailed and intensive analysis of one or more cases which the researcher plans to study in-depth. In this field study, the researcher sought to determine and intensively analyse the challenges of the construction industry in the Free State.

The study made use of a descriptive and an explanatory case study. Bryman et al. (2014: 100) argue that these two forms of case studies enable the researcher to expand on trends and themes which have already been discovered by survey research. They enable the researcher to come to a detailed understanding of a particular phenomenon.

3.4. SAMPLING STRATEGY

A good sampling strategy is crucial for the success of research. Kothari (2004: 55) describes a sample strategy as a definite plan for obtaining a sample from a given population; it prescribes the technique or procedure that the researcher will adopt when selecting the sample. There are two primary sampling strategies, namely non-probability sampling and probability sampling.

This research used non-probability sampling, specifically quota sampling. Quota sampling is convenient and relatively inexpensive (Kothari, 2004: 59). Because quota sampling is a form of purposive sampling, it enables the researcher to strategically select respondents based on their unique characteristics so that those sampled are relevant to the research questions (Bryman et al., 2014: 186). The relevant respondents for this field study included engineers, project managers, architects, quantity surveyors, occupational health and safety consultants, property developers and owners of construction companies in the Free State.

Bryman et al. (2014: 180) argue that the aim of quota sampling is to produce a sample that reflects a population so that the results from the selected quota can be used to generalise the research findings. Using this approach enabled the researcher to generalise the findings across the Free State even though the study was only conducted in three towns, namely Bloemfontein, Kroonstad and QwaQwa.

The construction industry in the Free State has approximately 2000 role players who fall in the aforementioned categories of targeted participants for this field study. All these role players constituted the population for the research. The questionnaire was distributed to 100 people based in Bloemfontein, 50 people in Kroonstad and 50 people in QwaQwa. This study therefore had a sample size of 200 which spanned engineers, project managers, architects, quantity surveyors, occupational health and safety consultants, property developers and owners of construction companies in the Free State.

3.5. DATA COLLECTION METHOD

This research study used questionnaires as the primary and only method for data collection. A self-administered questionnaire was used because it is convenient for respondents; it is also cheaper and quicker to administer (Bryman et al., 2014: 192). However, a general disadvantage of using questionnaires is their strict and fixed format which eliminates the possibility for more in-depth observations (Bell, 2014: 178). Survey Monkey, an online survey tool, was used for collecting data.

The link to the questionnaire was distributed via email and WhatsApp. WhatsApp was considered the most convenient distribution platform since most people use smartphones and have quick access to their WhatsApp messages. It therefore made it easier for many people to access the questionnaire and respond quicker. Provision of printed questionnaires was made for respondents with limited or no internet access. The content of the online platform and the printed version was kept the same for consistency. Plans to achieve a response rate of at least 50% included writing a strong cover letter and following up with

those invited to encourage their participation.

3.5.1. Questionnaire Layout

The questionnaire included a cover letter detailing the purpose of the study. The cover letter explained that responses from the survey would be used for this research study which would be submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the University of the Free State (UFS).

The questionnaire was divided into four sections, as outlined below.

Section A

This section contained questions related to demographic data, such as gender, age, ethnicity, town or city of residence in the Free State, education level, years of experience and role in the construction industry.

Section B

This section contained questions that sought to establish the state of the construction industry in the Free State by investigating the challenges it faces. The questions probed the respondents' experience of completed, ongoing and incomplete construction projects in the province. The questions also sought to investigate the key factors that lead to the failure of SMEs in the construction industry. The issues listed as options for certain questions in this section were deduced from the literature review as well as from the researcher's industry experience.

Section C

The questions in this section aimed to determine measures that can be implemented to address the challenges of the construction industry in the Free State. The strategies listed in this section were informed by the current trends in the construction industries of growing economies in Africa and other parts of the world. Some of the listed strategies came from similar studies previously undertaken, as discussed in the literature review. These strategies were included in the questionnaire to determine the most suitable measures for addressing the challenges faced by the construction industry in the Free State according to the perspectives of the respondents.

3.5.2. Question Design

Formulation of the questions in all the sections took the research objectives into account.

The general principles suggested by Bryman et al. (2014: 205–207) when designing questions were also taken into consideration. As a result, the following were avoided:

- Ambiguous terms
- Long questions
- Double-barreled questions
- Very general questions
- Leading questions
- Questions that include negatives
- Jargon, acronyms and slang technical terms

3.6. DATA ANALYSIS

The data collected by the questionnaires were analysed using various quantitative data analysis techniques. According to Bryman et al. (2014: 312), not just any statistical analysis technique can be used on any variable; techniques must be matched appropriately to the types of variables collected. All the options of the online questionnaire were automatically pre-coded by the online survey tool. The data collected were grouped accordingly for effective and efficient statistical analysis. The options of the printed questionnaires were manually pre-coded by the researcher. The pre-coded questionnaire intended for this study consisted of the following variables: dichotomous, nominal, ordinal and interval. The code 999 was allocated for missing data where respondents mistakenly or by choice did not provide an answer.

Univariate analysis was performed using frequency tables, bar charts, pie charts, measures of central tendency and measures of dispersion. Further analysis of the data was undertaken using the RII method to determine the relative importance of the various factors and challenges of the construction industry in the Free State based on the data collected. These factors and challenges were ranked from the most important to the least important. A five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was adopted and transformed to RIIs for each factor or challenge as follows:

$$RII = \frac{\sum W}{A \times N}$$

where W is the weighting given to each factor by the respondents (ranging from 1 to 5), A is the highest weight (i.e. 5 in this case), and N is the total number of respondents. The RII value had a range from 0 to 1 (0 not inclusive). The higher the value of RII, the more

important was the factor or challenge facing the construction industry (Sambasivan & Soon, 2007: 520). The major findings are discussed in detail in chapter 4.

3.7. RESEARCH ETHICS

The researcher has to take various ethical issues into account during this study. Firstly, the researcher had to obtain the informed consent of participants. According to Bryman et al. (2014:124), the principle of informed consent demands that participants should be fully informed about the research process. All the participants were fully informed about the process and purpose of this research and gave their informed consent to participate prior to taking the survey. The researcher ensured that the unforced consent of participants was obtained. The researcher also understood that participants were at liberty to give or withhold whatever information they wished to give or withhold (Fouka et al., 2011:6).

Since the individuals invited to participate belonged to different organisations, the privacy and confidentiality policies of those organisations were considered. Confidentiality and anonymity were maintained by ensuring that neither participating individuals nor their organisations were identifiable in reporting the findings of the study. By keeping the names of the participants as well as the organisations to which they belong strictly confidential, the ethics code of the UFS was also met. According to Fouka and Mantzorou (2011: 6), anonymity is protected when participants' identity cannot be linked to the personal responses they provide during the research process.

3.8. CHALLENGES AND LIMITATIONS

The researcher encountered several challenges and problems while undertaking this study. The first key challenge was obtaining a sufficient number of participants. The researcher had to compile a database with contact details of potential participants with cellphone numbers and email addresses. The researcher also visited relevant organisations in the construction industry to attract more participants. This process was time-consuming, and some organisations denied the researcher access to their employees. Obtaining permission from the management of organisations and gaining access to participants was a major challenge in this study.

Another challenge was time and cost. The three towns where the research was conducted are located over 200km from each other. As a result, the cost of conducting the research was high, which became a limitation. Because the time to conduct the research was also limited, the use of questionnaires for data collection was considered instead of more time-consuming methods such as focus groups and interviews.

Questionnaires as data collection method have limitations because they were fixed with a set format. This limitation prevented the opportunity for in-depth observations by the researcher. Another limitation of using questionnaires was that the researcher had no opportunity to probe participants to elaborate on their answers. The questions had to be limited because long questionnaires tend not to be answered.

3.9. CONCLUSION

This chapter outlined and justified the methodology followed in conducting this field study. The quantitative approach used involved the generation of numerical data subjected to quantitative analysis. The overall design of the research involved a combination of a descriptive and an explanatory case study. Non-probability sampling enabled the researcher to purposely select participants who were relevant to the study. The sample size of 200 individuals had different construction industry experiences and came from different organisations in the Free State. Questionnaires were used for collecting data as they are effective, convenient and quick to administer. Although the study posed challenges and limitations, the researcher developed means to overcome the problems to complete the research successfully. The major findings of the research are discussed in more detail in chapter four.

CHAPTER 4: DATA ANALYSIS AND INTERPRETATION

4.1. INTRODUCTION

This chapter presents and discusses the results of data collected from the survey. A structured questionnaire was sent to professionals in the construction industry, including government officials, engineering consultants, contractors, property developers, construction and project managers, architects and business leaders. Out of the 200 invitations, 104 completed and useable responses were obtained to achieve a 52% response rate, 2% above the targeted response rate. The collected data were analysed and interpreted using various quantitative tools such as diagrams, frequency tables and measures of dispersion.

4.2. RESULTS OF THE SURVEY

The results presented here follow the structure of the questionnaire, namely demographic information of respondents first, challenges in the construction industry in the Free State second and recommendations for strategies to address these challenges last. Each of the headings correspond with the headings and questions used in the survey.

4.2.1. SECTION A: Demographic Information

The questionnaire collected the following demographic information to determine the background information of the respondents:

- Gender
- Race
- Age
- City/town of residence in the Free State
- Highest educational qualification
- Profession
- Role in the construction industry
- Years of experience in the construction industry
- Type and size of construction projects involved in

4.2.1.1. Please indicate your gender

Figure 4.1 below shows a graph of the percentage distribution between male and female respondents. The majority of the respondents, 63.46%, were male, while females only made up 36.54%.

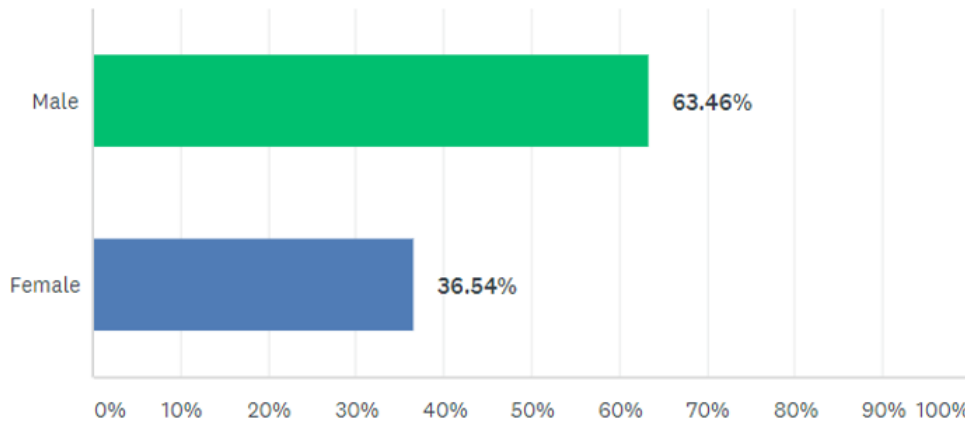


Figure 4.1: Percentage distribution of respondents' gender

4.2.1.2. Which race or ethnicity best describes you?

Figure 4.2 below reveals that the majority of respondents were black (55.77%), 29.81% were white, 13.46% were coloured and only 0.96% were Indian. No respondents belonged to the Asian ethnic group.

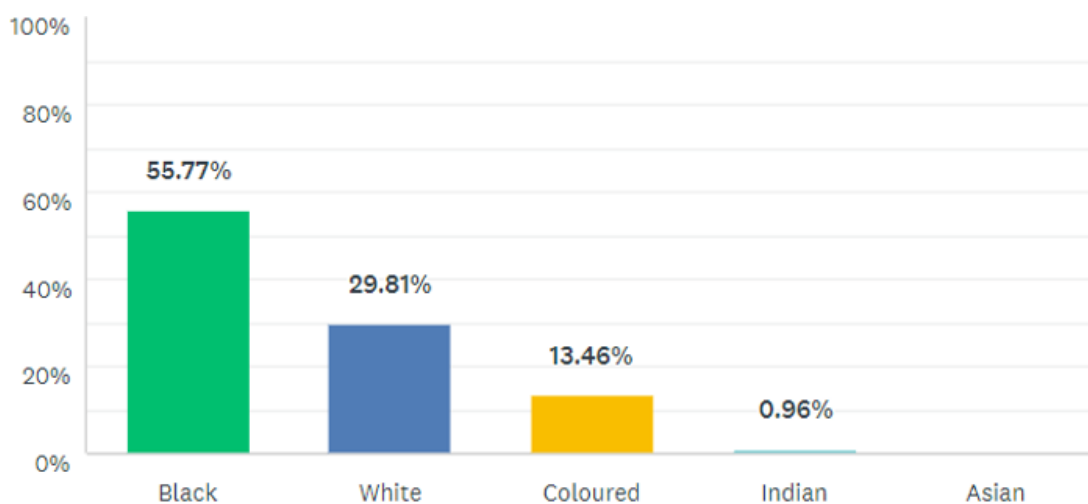


Figure 4.2: Percentage distribution of respondents' race

4.2.1.3. Please indicate your age

Figure 4.3 below shows that the majority of respondents (41.35%) were between the ages of 30 and 39. Respondents aged 20–29 and 40–49 made up 23.08% and 19.23% of the total respondents, respectively. Only 16.35% of respondents were 50 years old and above.

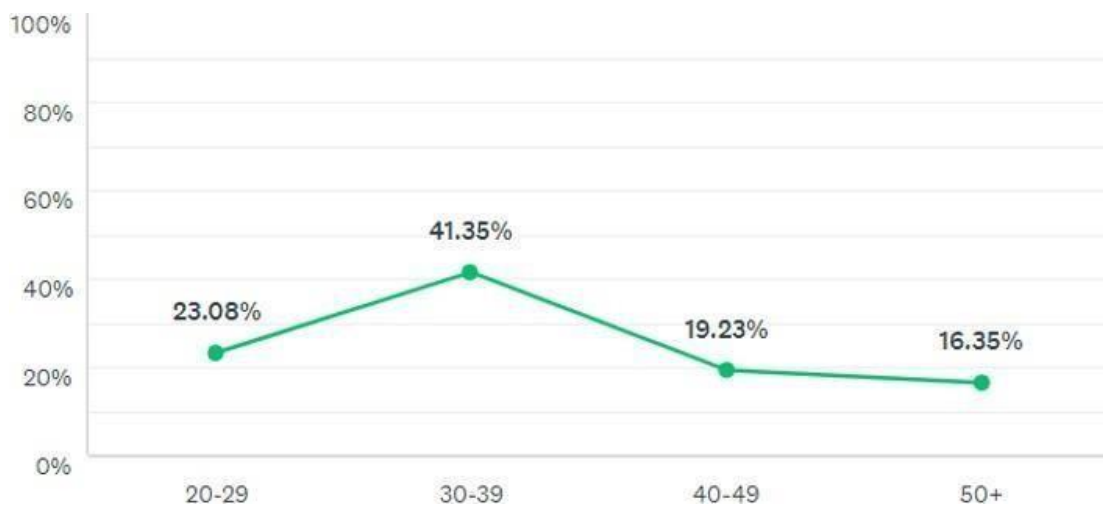


Figure 4.3: Percentage distribution of respondents' age

4.2.1.4. In which town/city are you currently residing?

Figure 4.4 shows that 50.96% of the respondents resided in Bloemfontein at the time of the survey, while 27.88% resided in QwaQwa and 20.19% in Kroonstad.

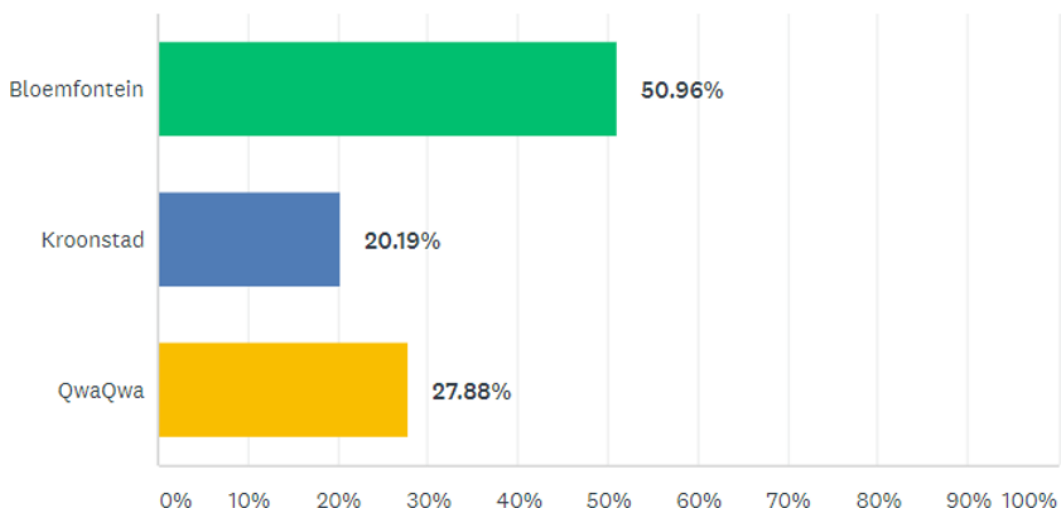


Figure 4.4: Respondents' town/city of residence

4.2.1.5. Please indicate your highest educational qualification

Figure 4.5 shows the respondents' highest level of educational qualification. Respondents with an undergraduate degree or diploma constitute the majority at 44.23% of total

respondents. Those with honours degrees or postgraduate diplomas make up the second biggest group at 40.38%. Respondents with matric certificates and masters' degrees constitute 7.69% and 6.37%, respectively. Only 0.96% of respondents had a doctorate degree.

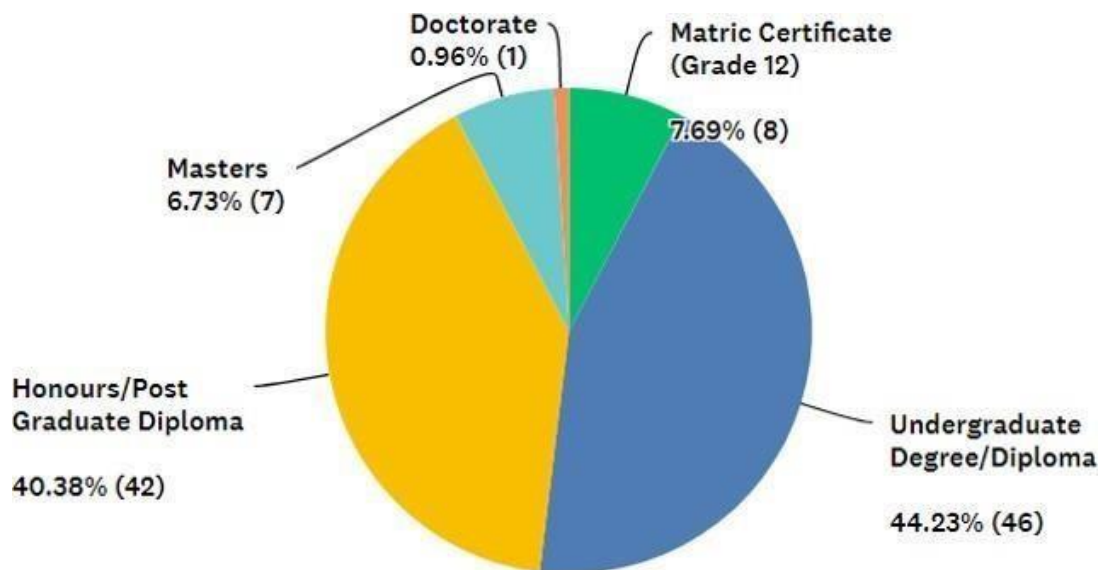


Figure 4.5: Respondents' highest education qualification

4.2.1.6. Which of the following best describes your profession?

Table 4.1 shows that most respondents were civil engineers, at 19.23% of overall respondents. The second-largest group of respondents were electrical engineers at 16.35%. Only three site agents/engineers participated in the survey, representing 2.88% of the total number of respondents.

Table 4.1: Frequency table of respondents' professions

Profession	Number	Percentage
Architect	5	4.81%
Quantity surveyor	9	8.65%
Structural engineer	8	7.69%
Electrical engineer	17	16.35%
Mechanical engineer	14	13.46%
Civil engineer	20	19.23%
Project manager	10	9.62%
Construction manager	7	6.73%
Contract manager	4	3.85%
Property developer	6	5.77%

Profession	Number	Percentage
Site agent/engineer	3	2.88%
Total	104	100%

4.2.1.7. What is your role in the construction industry?

Table 4.2 shows that 35.58% of respondents were working in the public sector. Private developers constituted 28.85%, while 21.15% and 13.46% were working as consultants and contractors, respectively.

Table 4.2: Frequency table of respondents' roles

Role	Number	Percentage
Private client/developer	30	28.85%
Public client/government	37	35.58%
Contractor	14	13.46%
Consultant	22	21.15%
Total	104	100%

4.2.1.8. How many years of experience do you have in the construction industry?

Figure 4.6 reveals that 33.98% of respondents had less than five years of experience in the construction industry. Those with six to ten years' experience made up 33.98% of the overall number of respondents. Respondents with experience ranging from 11 to 15 years and 16 to 20 years constituted 19.42% and 10.68% respectively. Only 1.94% of respondents had 21 years or more of experience.

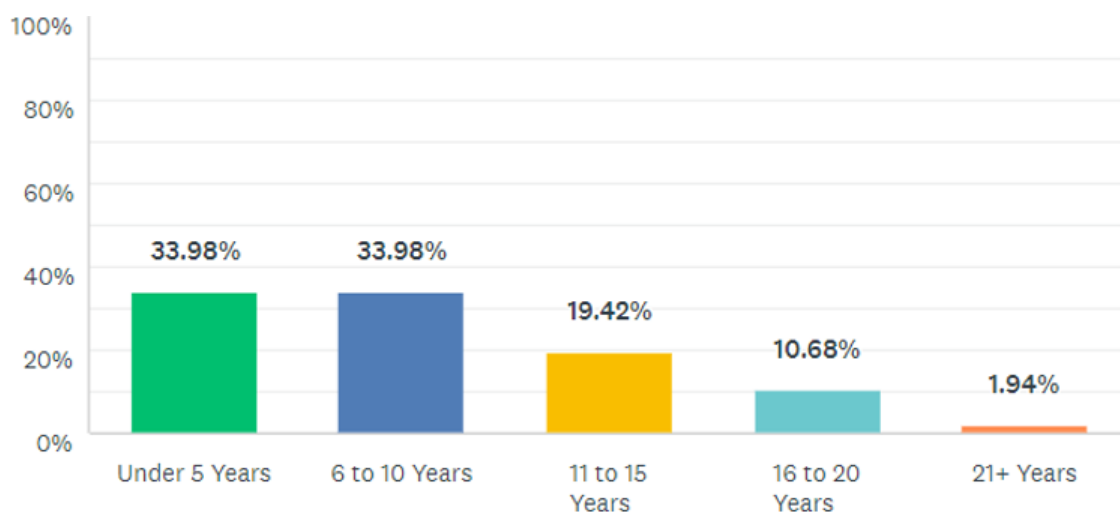


Figure 4.6: Respondents' years of experience in the construction industry

4.2.1.9. Which type of construction projects are you mainly involved in?

Figure 4.7 reveals that the majority of respondents were mainly involved in residential and commercial building projects, constituting 35.29% of respondents. Another 25.49% of respondents were mainly involved in maintenance and renovations projects.

Further results indicate that 18.63% of the respondents are primarily involved in roads and transport projects. Only 9.80% and 6.68% of respondents were mainly involved in power generation and transmission, and telecommunications projects, respectively. The remaining 5.77% of respondents were mostly involved in other types of construction projects.

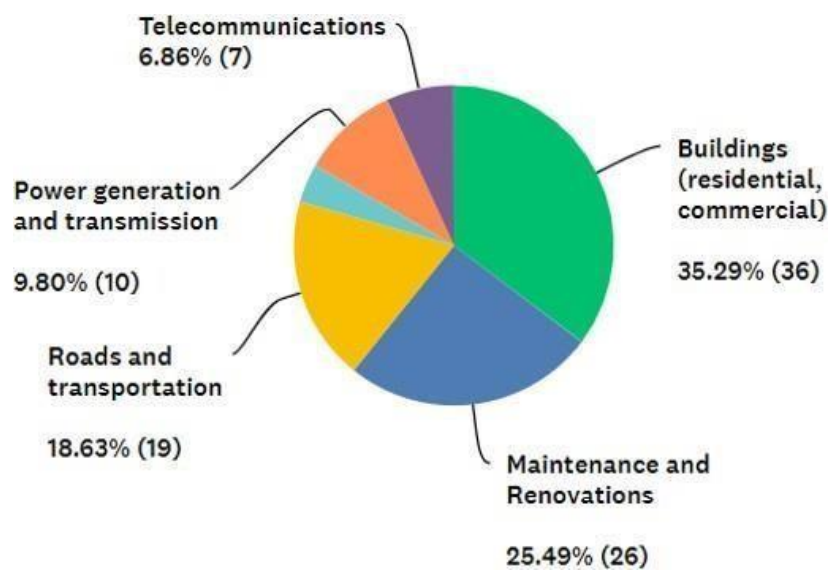


Figure 4.7: Respondents' main type of project involvement

4.2.1.10. What is the largest project based on the contract amount that you were involved in the past 5 years?

Figure 4.8 shows that the two ranges of contract amounts that most respondents indicated was their largest project in the past five years, at 23.30% each, were for projects ranging from R2,000,001 to R5,000,000 and from R10,000,001 to R50,000,000. Only 0.97% of respondents were involved in projects with contract amounts of R200,000,001 and above.

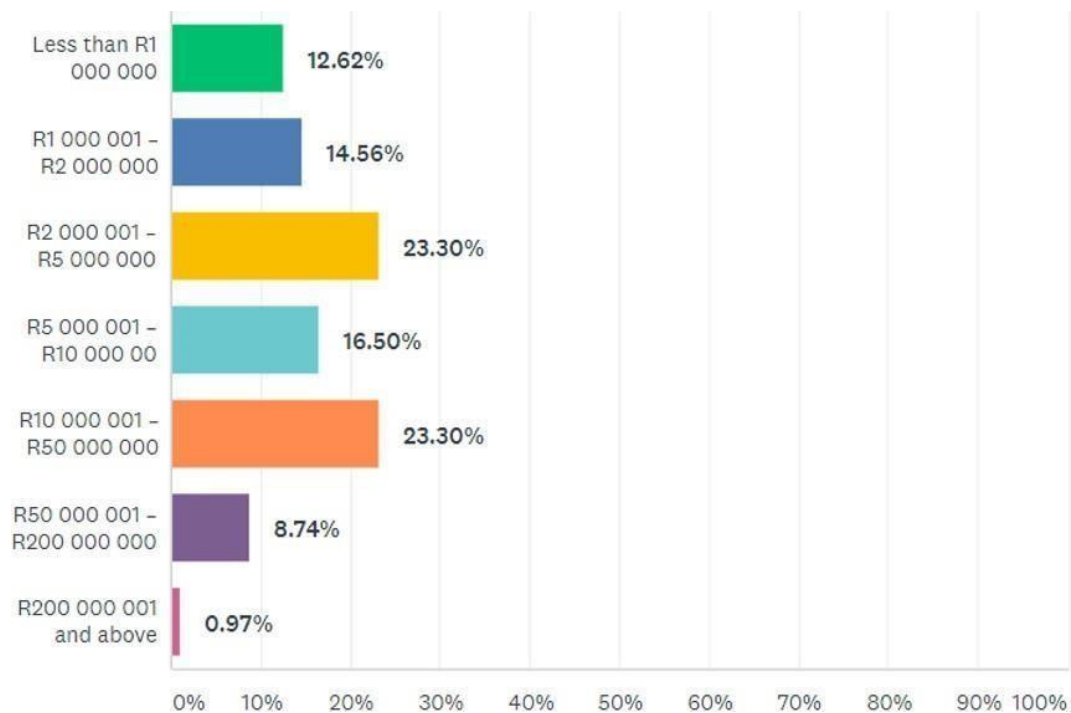


Figure 4.8: Largest project contract amount the past five years

4.2.2. SECTION B: Challenges of the construction industry in the Free State

The primary objective of this study was to investigate the challenges facing the construction industry in the Free State at the time of the study. This section presents results to questions related to that objective based on the perceptions of the respondents.

4.2.2.1. In the construction projects where you were/are involved, how frequently were the following issues encountered?

A five-point Likert scale ranging from 1 (none of the time) to 5 (all of the time) was used to capture the frequency of the issues encountered.

The data were analysed using a combination of two methods, namely measures of dispersion (mean and standard deviation) and RII. The results are shown in Table 4.3. The RII shows the ranking of project issues in terms of their importance, where the highest index means that the issue is the most important or significant. Based on the ranking, the five most important issues are: (1) lack of application of proper construction management tools and techniques by consultants and project site staff (RII = 0.730); (2) poor qualifications and inadequate experience of contractors' supervisors (RII = 0.722); (3) ineffective planning and scheduling of project (RII = 0.720); (4) delays in producing design documents (RII = 0.717); and (5) no application of construction management procedures on the part of the client which contributes to late detection of construction problems (RII = 0.704).

The least important issue with the smallest RII of 0.528 is differing or unexpected geo-technical conditions during construction. Second and third least important are shortage of labour (RII = 0.628) and insufficient equipment (RII = 0.629).

Table 4.3: Means, standard deviations and RII of issues in construction projects

Issues encountered in construction projects	Mean	Standard deviation	RII	Rank
Mistakes in quantity surveys (poor estimates)	3.42	0.86	0.684	15
Delivery of substandard materials	3.40	0.94	0.680	16
Damage of material during transportation	3.39	1.05	0.678	17
Incomplete drawings/specifications	3.50	1.01	0.700	7
Design errors and omissions	3.31	1.03	0.662	27
Excessive extra works	3.46	1.01	0.692	10
Delays in producing design documents	3.58	0.94	0.717	4
Excessive variations in quantities	3.48	0.91	0.695	9
Frequent variation orders	3.46	0.89	0.692	10
Rework due to wrong drawings	3.40	1.11	0.680	16
Slow decision-making	3.45	1.04	0.689	12
Long period for approval of tests and inspections	3.38	1.02	0.676	18
Lack of knowledge by the consultant's supervision staff regarding new construction methods, materials and techniques	3.44	1.15	0.687	13
Lack of application of proper construction management tools and techniques by consultants and project site staff	3.65	1.15	0.730	1
Conflicts between drawings and specifications	3.44	1.13	0.687	13
Frequent design changes requested by clients during construction	3.43	1.07	0.685	14
Inaccurate initial project scope estimate	3.26	1.06	0.652	31
Slow payment procedures adopted by client in making progress payments	3.58	1.12	0.717	4
Unrealistic time estimation	3.38	1.04	0.675	19
Executive bureaucracy at client's offices	3.30	1.04	0.660	29
Appointment of incompetent contractors	3.38	1.02	0.676	18
Poor communication and coordination by client and other parties	3.39	1.05	0.678	17

Issues encountered in construction projects	Mean	Standard deviation	RII	Rank
Delays in work approval	3.25	0.99	0.651	32
Client-initiated variations	3.28	1.04	0.657	30
Insufficient contractor cash flow/difficulties in financing projects	3.50	1.06	0.701	6
Poor qualifications and inadequate experience of contractors' supervisors	3.61	1.09	0.722	2
Ineffective planning and scheduling of project	3.60	1.13	0.720	3
Equipment allocation problems	3.37	1.09	0.674	20
Materials management problems	3.33	1.13	0.666	24
Misinterpretation of drawings and specifications	3.46	1.04	0.691	11
Rework due to errors during construction	3.40	1.14	0.680	16
Poor communication and coordination with other parties	3.40	1.15	0.680	16
Poor contractor's site management and supervision	3.38	1.05	0.676	18
Conflict between/with contractor and other parties (consultant and client)	3.32	1.18	0.664	25
Improper construction methods implemented by contractor	3.31	1.16	0.661	28
Late delivery of materials and equipment	3.26	1.18	0.652	31
Inadequate definition of the project scope	3.34	1.04	0.668	23
Legal disputes between/with various parties	3.38	1.11	0.676	18
Unrealistic project construction duration as specified in the contract	3.38	1.06	0.676	18
No financial incentives for contractors to finish ahead of schedule	3.45	1.06	0.689	12
No application of construction management procedures on the part of client which contributes to late detection of construction problems	3.52	1.04	0.704	5
Unrealistic schedule programme submitted by contractor	3.48	1.07	0.696	8
Shortage of construction materials on site	3.30	1.17	0.661	28
Shortage of technical personnel	3.23	1.14	0.646	33
Insufficient equipment	3.15	1.12	0.629	39
Shortage of fuel	3.18	1.10	0.635	37
Shortage of labour	3.16	1.08	0.631	38
Price escalation	3.28	1.07	0.657	30
Low level of equipment operators' skills	3.30	1.06	0.661	28
Unqualified workforce	3.23	1.08	0.645	34

Issues encountered in construction projects	Mean	Standard deviation	RII	Rank
Low productivity of labour	3.22	1.10	0.643	36
Delays attributed to third-party testing of materials	3.18	1.18	0.635	37
Differing or unexpected geo-technical conditions during construction	2.64	1.03	0.528	40
Effect of rain on construction activities	3.34	1.02	0.669	22
Effect of hot weather on construction activities	3.34	1.20	0.669	22
Theft of contractor's resources	3.25	1.09	0.651	32
Vandalism of works (in progress or finished)	3.31	1.10	0.663	26
Industrial action (strike/sit-in)	3.35	1.06	0.671	21
Health and safety incidents	3.22	1.13	0.644	35

4.2.2.2. To what extent do you agree or disagree with the following factors that are suggested as causes to the failure of Small and Medium Enterprises (SMEs) in the construction industry in the Free State?

A five-point Likert scale which ranges from 1 (strongly disagree) to 5 (strongly agree) was used to capture respondents' views of the factors that lead to the failure of SMEs in the construction industry in the Free State. Figure 4.9 shows that the majority of respondents, on average, 44.42%, agree that the issues listed are key causes of failure for most SMEs.

Of the respondents, 34.65% strongly agreed that the inability of SMEs to develop long-term strategies was a cause of their failure. Only 3.96% of the respondents disagreed, and none strongly disagreed that the inability to develop long-term strategies is a cause of SME failure. Of the respondents, 18.81% strongly agreed that the lack of access to funding also leads to the failure of SMEs. Furthermore, 49.50% of respondents, almost half of the total number of respondents, agreed that significantly high start-up costs lead to failure of SMEs.

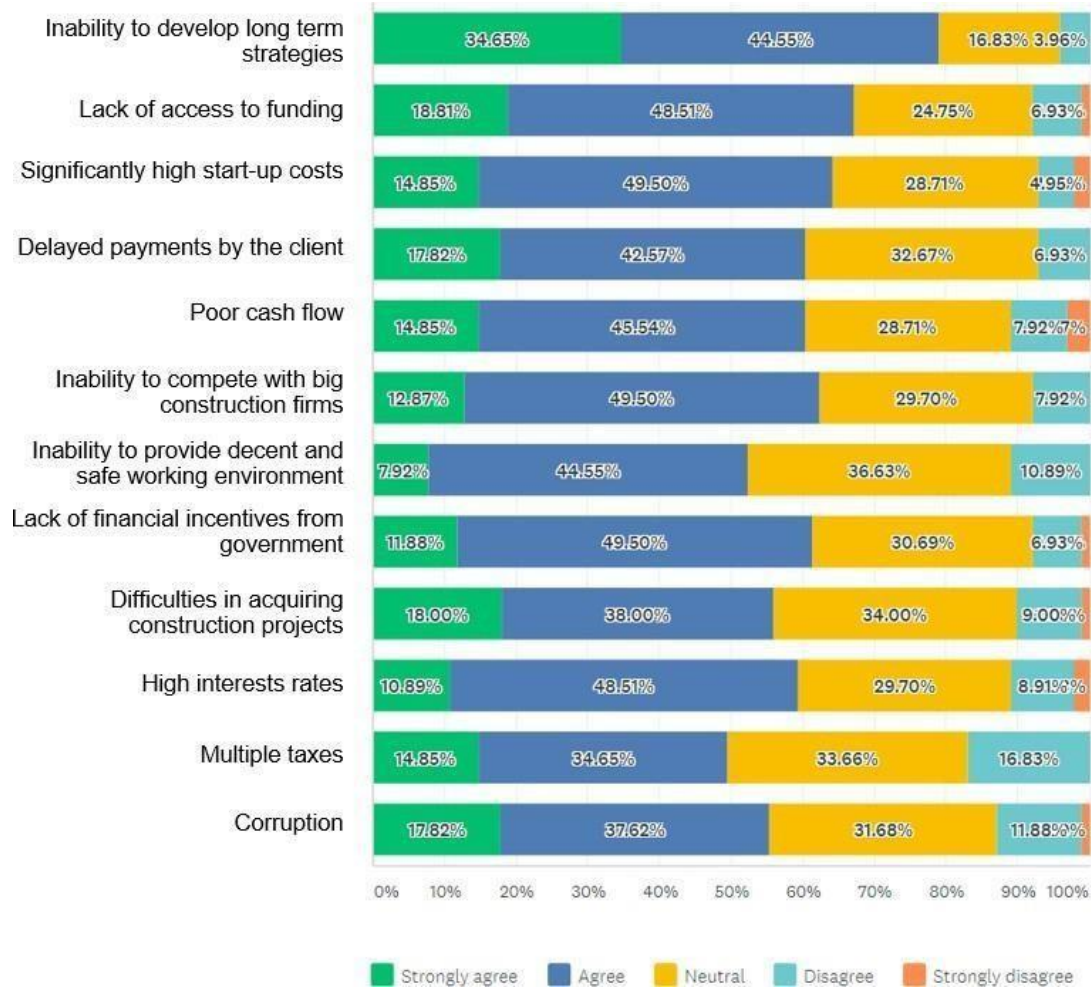


Figure 4.9: Participants' views of factors that cause SMEs to fail

Table 4.4 presents the means, standard deviations and RII for the factors that cause the failure of SMEs. According to RII, the five most important issues that lead to failure of SMEs are: (1) inability to develop long term strategies (RII = 0.820); (2) lack of access to funding (RII = 0.754); (3) delayed payments by the client (RII = 0.743); (4) significantly high start-up costs (RII = 0.741); and (5) inability to compete with big construction firms (RII = 0.735).

Table 4.4: Means, standard deviations and RII of factors that lead to failure of SMEs

Factors that cause SMEs to fail in the Free State	Mean	Standard deviation	RII	Rank
Inability to develop long term strategies	4.10	0.91	0.820	1
Lack of access to funding	3.77	0.97	0.754	2
Significantly high start-up costs	3.70	0.95	0.741	4
Delayed payments by the client	3.71	0.94	0.743	3
Poor cash flow	3.61	1.04	0.723	8

Factors that cause SMEs to fail in the Free State	Mean	Standard deviation	RII	Rank
Inability to compete with big construction firms	3.67	0.89	0.735	5
Inability to provide decent and safe working environment	3.50	0.88	0.699	11
Lack of financial incentives from government	3.64	0.91	0.729	6
Difficulties in acquiring construction projects	3.63	1.02	0.726	7
High interests rates	3.57	0.97	0.715	10
Multiple taxes	3.48	1.05	0.695	12
Corruption	3.59	1.06	0.719	9

4.2.3. SECTION C: Recommendations on how to address the challenges of the construction industry in the Free State

This section presents the results of the recommended strategies that could be implemented to address the challenges facing the construction industry in the Free State.

4.2.3.1. To what extent do you agree or disagree with the following recommendations on how to address the challenges of the construction industry in the Free State?

A five-point Likert scale which ranges from 1 (strongly disagree) to 5 (strongly agree) was used to capture the views of respondents regarding the possible strategies that could be implemented to address the challenges facing the construction industry in the Free State.

Table 4.5 shows that the highest-ranking strategy based on respondents' feedback is to offer financial incentives to contractors as a means to encourage efficient completion of construction projects within the allocated time and budget (RII = 0.864). Following this one, three equally-important strategies in second place are to promote effective construction site management and supervision (RII = 0.837), undertake effective strategic planning (RII = 0.837), and provide clear information and communication channels (RII = 0.837).

The results also show that the two equally least-important strategies, according to respondents, are to ensure proper material procurement (RII = 0.751) and to appoint experienced contractors (RII = 0.751). To conduct frequent progress meetings (RII = 0.765) occupies the second-lowest rank.

Table 4.5: Means, standard deviations and RII of recommended strategies

Recommendations to address the challenges of the construction industry in the Free State	Mean	Standard deviation	RII	Rank
Promote effective construction site management and supervision	4.18	0.73	0.837	2
Undertake effective strategic planning	4.19	0.70	0.837	2
Provide clear information and communication channels	4.19	0.81	0.837	2
Use proper and modern construction equipment.	4.14	0.84	0.827	4
Use appropriate construction methods	4.12	0.80	0.824	5
Ensure proper project planning and scheduling	4.09	0.82	0.818	6
Adhere to construction drawings and specifications	3.93	0.94	0.786	15
Ensure proper coordination between the client, consultants and the contractor	4.01	0.95	0.802	9
Have complete and suitable design at the right time	3.93	0.96	0.786	15
Ensure utilisation of the latest technology	3.95	0.89	0.790	13
Use suitable construction methods to suit each specific project	4.00	0.84	0.800	10
Ensure collaborative working during the delivery of construction projects	3.99	0.95	0.798	11
Conduct frequent progress meetings	3.82	1.01	0.765	19
Ensure proper material procurement	3.75	0.95	0.751	20
Appoint highly experienced technical team	3.94	0.92	0.788	14
Allocate adequate project duration	3.85	1.07	0.771	18
Decrease number of variation orders	3.87	0.89	0.775	17
Appoint experienced contractors	3.75	1.11	0.751	20
Ensure timely supply of material	3.90	0.97	0.781	16
Proper project implementation and management	4.09	0.97	0.817	7
Allow for material price escalation in the original tender document	3.97	0.98	0.794	12
Encourage good workmanship	4.08	0.89	0.816	8
Properly implement local regulations	3.97	0.97	0.794	12
Minimise disputes between all parties	4.09	0.94	0.817	7
Provide financial support to SMEs and ensure effective development programs	4.15	0.83	0.829	3
Offer financial incentives to contractors as a means to encourage efficient completion of construction projects within the allocated time and budget	4.32	0.83	0.864	1

4.3. DISCUSSION OF RESULTS

The results in this chapter provide a better understanding of the current most significant

issues and challenges facing construction projects and the construction industry in the Free State.

The demographic information collected shows that there is a diversity of race, skills, experience and nature of construction projects in the Free State. Males constituted 63.46% of the total number of respondents, indicating that the construction industry in the Free State is dominated by males. In a similar study conducted by Sibiya, Aigbavboa and Thwala (2016: 225), 61% of respondents were males, suggesting that the construction industry is generally dominated by males.

The results showed that 41.35% of respondents were aged 30 to 39. This finding with that of years' experience suggest that the majority of the people involved in the construction industry in the Free State are relatively young yet adequately experienced. They thus have the capacity to improve the conditions of the construction industry in the Free State.

The majority of respondents were civil engineers, suggesting that the construction industry consists of more civil engineers than any other discipline. This is because civil engineering is at the center of all types of construction activities.

An equally shared majority of 46.60% of respondents were involved in construction projects whose biggest contract amount in the past five years ranged from R2 million to R5 million and R10 million to R50 million. This finding suggests that the Free State has a good balance between small- to medium-sized projects and large- to mega-sized projects. Therefore, both small to medium enterprises and larger enterprises have a role to play in the industry in the province.

Sections B and C of the survey sought to answer the research questions of this study. Their findings are discussed below.

4.3.1. Research Question 1

Research question 1 of this study is:

- What are the current challenges of the construction industry in the Free State?

Table 4.6 lists the top ten challenges facing the construction industry in the Free State in order of importance based on all respondents' feedback.

Table 4. 6: Top ten challenges in order of importance

Challenges of the construction industry in the Free State	Mean	Standard deviation	RII	RANK
Lack of application of proper construction management tools and techniques by consultants and project site staff	3.65	1.15	0.730	1
Poor qualifications and inadequate experience of contractors' supervisors	3.61	1.09	0.722	2
Ineffective planning and scheduling of project	3.60	1.13	0.720	3
Delays in producing design documents	3.58	0.94	0.717	4
Slow payment procedures adopted by client in making progress payments	3.58	1.12	0.717	4
No application of construction management procedures on the part of client which contributes to late detection of construction problems	3.52	1.04	0.704	5
Insufficient contractor cash flow/difficulties in financing projects	3.50	1.06	0.701	6
Incomplete drawings/specifications	3.50	1.01	0.700	7
Unrealistic schedule programme submitted by contractor	3.48	1.07	0.696	8
Excessive variations in quantities	3.48	0.91	0.695	9
Excessive extra works	3.46	1.01	0.692	10
Frequent variation orders	3.46	0.89	0.692	10

The top three challenges are closely related. Consultants and site staff may fail to apply proper construction management tools and techniques as a result of inadequate experience. Construction projects often fail because those who are entrusted with the responsibility of supervising and managing the work are not well equipped with the necessary skills to do so. Furthermore, inadequately experienced supervisors are unable to plan and schedule activities of a construction project effectively. Therefore, these three top issues indicate that most construction projects fail due to poorly skilled construction managers on site.

The fourth most important challenge identified is delays in producing design documents. Delays in producing design documents happen when consultants miss deadlines to issue drawings and bills of quantities. One of the key reasons that lead to this problem is poor allocation of resources.

The fourth-ranked challenge is slow payment procedures by the client in making progress payments, affecting the cash flow of contractors and therefore hindering the progress of activities on site. Accordingly, insufficient contractor cash flow or difficulties in financing projects is listed as the sixth most important challenge because finance is a crucial component in the success of construction projects.

Incomplete drawings or specifications, unrealistic schedule programmes submitted by contractors, excessive variations in quantities, excessive extra works and frequent variation orders complete the list of top ten challenges. Ultimately, all of these top ten challenges may lead to project cost and time overruns. Similar results were observed in a study to determine cost and time overruns in highway projects in Pakistan. In that study, Nasir, Gabriel and Choudhry (2011: 73) present the following top ten factors that caused cost overruns in their order of importance as price escalation on major construction materials, land acquisition and resettlement, inadequate planning, inadequate government policies and priorities, additional work, poor cost control by the contractor, delay in decision by the client, corrupt practices, inadequate duration of the contract period, and inaccurate quantity and cost estimation.

In the same study, Nasir, Gabriel and Choudry (2011: 74) provide a list of the top ten contributors to time overruns in order of their importance as delay in progress payments by the client, incapability of the contractor to do the job, delay in site delivery to the contractor, ineffective planning and scheduling, land acquisition and resettlement, delay in decision-making by the client, poor site management by the contractor, delay in obtaining permits, relocation of services and, lastly, scope changes resulting in additional work.

The similarities observed between this study and that of Nasir, Gabriel and Choudry (2011) show that the challenges of the construction industry in the Free State are also encountered in other parts of the world.

4.3.2. Research Question 2

Research question 2 of this study is:

- What are the factors that lead to the failure of SMEs in the construction industry in the Free State?

On average, 19.80% of respondents strongly agreed, 46.93% agreed, 26.53% were neutral, 6.14% disagreed and only 0.59% strongly disagreed that the top five factors that lead to the failure of most SMEs in the construction industry are inability to develop long-term strategies, lack of access to funding, delayed payments by the client, significantly high start-up costs, and inability to compete with big construction firms, as shown in Table 4.7.

Table 4. 7: Top five factors that cause SMEs to fail

Factors that cause SMEs to fail	Mean	Standard deviation	RII	RANK
Inability to develop long term strategies	4.10	0.91	0.820	1
Lack of access to funding	3.77	0.97	0.754	2
Delayed payments by the client	3.71	0.94	0.743	3
Significantly high start-up costs	3.70	0.95	0.741	4
Inability to compete with big construction firms	3.67	0.89	0.735	5

Most SMEs in construction are unable to develop long-term business strategies due to the lack of entrepreneurial and leadership skills. Some construction firms are established to access government tenders for the owners to enrich themselves. This motivation results in a lack of long-term vision, and when things do not go their way, the business collapses.

Lack of access to funding is another challenge for most SMEs since finance forms the core of every business. In the context of the Free State, most SMEs struggle to enter the construction industry market due to significantly high start-up costs, while those that are already in business struggle to compete with big construction firms due to lack of finance and poor cash flow. Cash-flow problems occur largely because of delayed progress payments by the clients. These findings show how critical the financial component is to the success of small businesses.

4.3.3. Research Question 3

Research question 3 of this study is:

- How can government, engineering professionals and business leaders mitigate the challenges facing the construction industry in the Free State?

Table 4.8 shows, in order of importance, the top ten recommended strategies based on all responses that government, business leaders and professionals in the construction industry can implement to address the challenges that are facing the construction industry in the Free State.

Table 4.8: Top ten recommended strategies

Recommended strategies	Mean	Standard deviation	RII	RANK
Offer financial incentives to contractors as a means to encourage efficient completion of construction projects within the allocated time and budget	4.32	0.83	0.864	1

Recommended strategies	Mean	Standard deviation	RII	RANK
Promote effective construction site management and supervision	4.18	0.73	0.837	2
Undertake effective strategic planning	4.19	0.70	0.837	2
Provide clear information and communication channels	4.19	0.81	0.837	2
Provide financial support to SMEs and ensure effective development programs	4.15	0.83	0.829	3
Use proper and modern construction equipment.	4.14	0.84	0.827	4
Use appropriate construction methods	4.12	0.80	0.824	5
Ensure proper project planning and scheduling	4.09	0.82	0.818	6
Proper project implementation and management	4.09	0.97	0.817	7
Minimise disputes between all parties	4.09	0.94	0.817	7
Encourage good workmanship	4.08	0.89	0.816	8
Ensure proper coordination between the client, consultants and the contractor	4.01	0.95	0.802	9
Use suitable construction methods to suit each specific project	4.00	0.84	0.800	10

Contractors are the main role players in a construction project since they have the biggest responsibility to ensure delivery of the physical project. Therefore, respondents suggested that offering financial incentives to contractors to encourage efficient completion of construction projects in the allocated time and budget will improve their performance. It can eventually lead to improved project management practices by construction supervisors and consultants. This finding is in line with the second strategy that encourages the promotion of effective construction site management and supervision.

Also ranked second most important is undertaking effective strategic planning. Strategic planning is essential for construction projects and running a business. Most businesses prosper because they are proactive and plan ahead. Another strategy also ranked second most important encourages effective communication. Once there is a plan in place, everything must be communicated effectively to all the parties. An effective flow of information ensures timely execution of project tasks.

Ranked third is that SMEs must be provided with sufficient financial support and also have access to effective development programmes. In a country like South Africa, where the rate of unemployment is high, SMEs are crucial to providing employment. However, in the construction industry where big companies make it difficult for SMEs to compete due to their lack of capital, access to finance becomes crucial for the survival and growth of SMEs.

Ranking number four and five respectively are the use of proper and modern construction equipment and the adoption of appropriate construction methods. These two strategies assist in producing quality work that is achieved more efficiently. They also ensure sustainable construction practices which are important for the environment.

Ensuring proper project planning and scheduling is the sixth most important strategy. This strategy promotes effective preparation and management of construction projects and related activities. It requires effective coordination of activities and proper communication. Interlinked with this strategy is the seventh most important strategy, which encourages proper project implementation and management. Implementation relies primarily on planning and scheduling activities. If project teams develop proper plans, implementation and management are not a problem.

Another strategy also ranked seventh is to minimise disputes between all parties. Conflicts and disputes often arise between contracted parties, such as between the client and contractor or between the client and consultants. In most cases, conflicts and disputes lead to extended project duration and additional cost, so minimising them are beneficial to all parties and the project in general. Contracted parties must always ensure that they understand the legal requirements of their contracts. Consultations between contracted parties must take place regularly to ensure that potential risks can be addressed before they escalate to disputes.

Encouraging good workmanship is the eighth most important strategy identified. Often contractors employ more unskilled labour than required since it is cheap. Furthermore, some activities become rushed during the construction process, but it often compromises the quality of the work. Therefore, good workmanship must always be encouraged.

The last two recommended strategies ranked at number nine and ten respectively are to ensure proper coordination between the client, consultants and the contractor, and to use suitable construction methods that suit each specific project. The former aims to enhance communication channels between the three key project stakeholders. Proper coordination between these three parties ensures timeous progress payments, effective implementation of decisions and instructions, and proper project management. The tenth ranked strategy encourages effective allocation of resources and adoption of advanced, sustainable and environmentally friendly construction methods which are specifically suited for each type of project. This will ensure efficiency in the delivery of construction projects.

4.4. LIMITATIONS OF THE STUDY

Various challenges were encountered during the collection of data in this study. The first key challenge was obtaining a sufficient number of respondents for the survey. The researcher had to create a database with contact details such as cellphone numbers and email addresses to circulate the survey link to the potential respondents. The researcher visited several organisations in the construction industry to attract more respondents. This process was time-consuming, and some organisations denied the researcher access to their employees. Obtaining permission from management and gaining access to respondents was a major challenge in this research.

Another challenge was time and cost. The collection of data was limited to three towns in the Free State. However, these towns are located over 200km from each other. As a result, the cost of conducting the research was high, which became a limitation. Moreover, time to conduct the research was also limited. Thus, questionnaires were chosen for data collection instead of more time-consuming methods such as focus groups and interviews.

As a data collection method, questionnaires pose limitations. They are fixed and have a set format. They therefore eliminated the opportunity of in-depth observations by the researcher. Another limitation of using questionnaires was that the researcher had no opportunity to probe respondents to elaborate on their answers. A limited number of questions also had to be used because long questionnaires tend not to be answered.

An overall limitation of the study is that it focused primarily on three key stakeholders of the construction industry, which are clients (both government and private), consultants and contractors. Other stakeholders such as labourers, labour brokers, economists, politicians, and the related professional bodies and associations were not included. The perspectives of these stakeholders on the matters that were investigated were not captured in this study for combined analysis. However, the sample of respondents was purposely selected to ensure that participants were acquainted with the content of the questions.

4.5. CONCLUSION

This study sought to investigate the key challenges currently facing the construction industry in the Free State. A questionnaire was designed and distributed among the three major stakeholders of the construction industry, namely clients, consultants and contractors. The main challenges of the construction industry were identified and the ten most important

challenges were found to be: (1) lack of application of proper construction management tools and techniques by consultants and project site staff, (2) poor qualifications and inadequate experience of contractors' supervisors, (3) ineffective planning and scheduling of projects, (4) delays in producing design documents, (5) no application of construction management procedures on the part of the client which contributes to late detection of construction problems, (6) insufficient contractor cash flow or difficulties in financing projects, (7) incomplete drawings or specifications, (8) unrealistic schedule programme submitted by contractor, (9) excessive variations in quantities, and (10) frequent variation orders.

The investigation found that the five most important factors that cause SMEs to fail to be: (1) inability to develop long-term strategies, (2) lack of access to funding, (3) delayed payments by the client, (4) significantly high start-up costs, and (5) inability to compete with big construction firms.

The results from the survey show similarities with previously conducted studies in this field.

The suggested strategies based on the perspectives of the respondents can only address the challenges facing the construction industry in the Free State if they are implemented effectively.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1. INTRODUCTION

Chapter five gives a concise summary of this study by presenting the overall approach followed, highlighting the key findings and drawing conclusions from the results. The chapter presents recommended strategies that may be implemented to address the challenges faced by the construction industry as determined by this study. The chapter closes by proposing possible areas for further research.

The primary objective of this study was to investigate the current challenges facing the construction industry in the Free State. This study was undertaken because the current performance of the construction industry in the Free State and South Africa in general is deteriorating. Statistics South Africa (2019: 10) shows that the construction industry's contribution to GDP is declining. Since quarter one of 2017 until quarter two in 2019, the construction industry's contribution to growth in GDP has alternated between 0% and -0.1% (Statistics South Africa, 2019: 10). The growth rates in industry value added and GDP for the construction industry in quarters one and two of 2019 were -2.3% and -2.5% respectively (Statistics South Africa, 2019: 12). There is an urgent need for the province and the country to diagnose the challenges facing the construction industry and to implement turnaround strategies.

To achieve the primary objective of this study, secondary objectives were formulated. The secondary research objectives were to:

- Discuss the challenges of the construction industry;
- Investigate factors that cause SMEs in the constructions industry in the Free State to fail, and relevance of this objective to the study; and
- Identify effective measures that project managers, engineers, government and businesses can employ to address the construction industry challenges in the Free State.

5.2. RESEARCH APPROACH

This field study employed a quantitative approach. Quantitative data were generated and subjected to rigorous quantitative analysis using statistical techniques such as frequency tables, diagrams, measures of central tendency, measures of dispersion and RII. Frequency tables were used to present the count and percentage of each of the categories for the

different variables. Diagrams in the form of pie charts, bar graphs and line graphs were used to display quantitative data for effective interpretation and analysis. Calculating arithmetic means as a measure of central tendency was used to determine the average results for collected data. Standard deviations were computed to evaluate how much each result deviated from the mean. Lastly, the factors investigated were ranked in order of importance using RII.

Data were collected using self-administered questionnaires. The survey was created using the Survey Monkey platform and distributed to respondents through WhatsApp and email. This approach eliminated the need to physically travel to the three parts of the Free State where this study was conducted. Time and distance as limitations of the study were mitigated by using these digital survey tools. There was provision of physical questionnaires that were printed, however, these were not used since all the respondents had access to internet. Out of the 200 invitations sent to potential respondents, 104 usable survey responses were received. The data were analysed, and key findings were made.

5.3. KEY FINDINGS AND CONCLUSIONS

The main focus of the survey was to investigate the key challenges facing the construction industry in the Free State, the primary objective of this study. The survey link to the questionnaire was distributed only to the three major stakeholders of the construction industry, namely clients, consultants and contractors. The ten most important challenges of the construction industry in the Free State in order of their importance were identified to be the following:

- Lack of application of proper construction management tools and techniques by consultants and project site staff;
- Poor qualifications and inadequate experience of contractors' supervisors;
- Ineffective planning and scheduling of project activities;
- Delays in producing design documents;
- No application of construction management procedures on the part of the client which contributes to late detection of construction problems;
- Insufficient contractor cash flow or difficulties in financing projects;
- Incomplete drawings or specifications;
- Unrealistic schedule programme submitted by contractor;

- Excessive variations in quantities; and
- Frequent variation orders.

Most of these challenges reveal that the core problem in most construction projects is poor project management. Lack of care and skill is another key underlying issue that leads to challenges in the industry and the eventual failure of projects. Failure of construction projects has drastic implications on the economy of the province and the country at large. When construction projects fail, money and jobs are lost, important aspects for promoting economic growth. Issues and challenges on construction sites can have a far-reaching impact on the entire construction industry and the economy. It is, therefore, essential to identify the key challenges at the lower operational level of the industry to improve the situation at a higher functional level.

Some of the challenges presented in the results are similar to those identified in other studies. The most common issues noted in other studies are:

- Improper planning by the contractor;
- Poor site management by the contractor;
- Inadequate contractor experience;
- Slow payment procedures adopted by the client in making progress payments;
- Insufficient contractor cash-flow or difficulties in financing projects;
- Problems with subcontractors;
- Availability and failure of equipment;
- Lack of effective communication between parties involved in the project;
- Changes in scope resulting in variation orders; and
- Mistakes during the construction phase.

The effects resulting from these problems include cost and time overruns, disputes, arbitration, litigation and even abandonment of the project. Unfortunately, when a project is abandoned, people lose their jobs. In South Africa, lost jobs add to the already high unemployment rate. Challenges in the construction industry must be managed effectively to avoid such unfavourable consequences.

The literature reviewed focused predominantly on different types of construction projects and

the issues encountered on construction sites. Very little literature focuses on the broader impact that the performance of construction projects has on the outlook of the construction industry. This study has extended the scope of existing literature by also focusing on the role of business leaders and government in ensuring the growth of the construction industry by reviewing the key factors that lead to failure of SMEs in the construction industry.

SMEs are deemed to be a potential solution to the unemployment problem in the Free State and South Africa as a whole. The government has developed initiatives that are supposed to provide support to up-and-coming SMEs. Despite these efforts, most SMEs face challenges that often lead to their failure. This investigation revealed the five most important factors that cause SMEs in the construction industry in the Free State to fail to be:

- Inability to develop long-term strategies;
- Lack of access to funding;
- Delayed payments by the client;
- Significantly high start-up costs; and
- Inability to compete with big construction firms.

Starting a construction firm in South Africa is often viewed as a lucrative business due to the potential income offered by government tenders. Some construction companies are established without conducting thorough market research, and they fail to stay in business due to the failure of developing long-term business strategies. Most SMEs also struggle to access starting capital, resulting in cash-flow problems that eventually lead to the collapse of the business.

In addition to the lack of access to funding, slow payment procedures by clients in making progress payments also leads to cash-flow challenges for SME contractors. The payment cycle of clients, especially government, need to be transformed to reduce the financial challenges of construction companies, especially SMEs. SMEs that lack proper finance and adequate business strategies fail to compete with big construction firms. Big firms that are well established have adequate financial resources and own most of their plant and equipment. Therefore, effective strategies are needed to support SMEs.

According to the respondents, the following are the ten best strategies in order of importance that can be possible remedies to the challenges of the construction industry:

- Offer financial incentives to contractors as a means to encourage efficient completion of construction projects within the allocated time and budget;
- Promote effective construction site management and supervision, undertake effective strategic planning, provide clear information and communication channels;
- Provide financial support to SMEs and ensure effective development programmes;
- Use proper and modern construction equipment;
- Use appropriate construction methods;
- Ensure proper project planning and scheduling;
- Promote proper project implementation and management;
- Minimise disputes between all parties;
- Encourage good workmanship;
- Ensure proper coordination between the client, consultants and the contractor; and
- Use suitable construction methods that suit each specific project.

However, these proposed strategies can only work if they are implemented effectively. Previous studies have also proposed possible solutions to the challenges of the construction industry. However, the same challenges are still prevailing. In many cases, the plans aimed at improving processes and systems in the construction sector remain written on paper and do not make it to the implementation phase. It will take all stakeholders to turn things around in the construction industry of the Free State.

5.4. RECOMMENDATIONS

Based on its most important findings, this study makes the following recommendations:

- Clients must be encouraged to employ qualified and experienced project managers on construction projects. Project management plays a significant role in the successful delivery of construction projects. When this aspect is not executed properly, various other aspects of the project also become problematic.
- Contractors must undertake regular training on effective planning and execution of construction projects. It will ensure that they manage construction projects more efficiently and effectively, thus ensuring successful completion of projects in time and budget.

- Contractors must strive to hire qualified labourers and ensure good workmanship at all times. It will guarantee the quality of work produced, resulting in satisfied clients.
- Clients must be encouraged to define their requirements clearly and to provide a complete scope before the commencement of any construction project. It will result in better management of construction activities and will also reduce the number of variation orders that normally arise when the scope changes during the construction stage. Ultimately, it will decrease the possibility of time and cost overruns.
- To avoid cash-flow problems for contractors, SMEs in particular, they should strive to manage their financial resources with care and plan their cash flow more effectively by utilising received progress payments. Contractors should use advance payments received at the start of the project, when applicable, to finance project activities and not divert the funds elsewhere.
- To counteract slow payment procedures by the client which results in cash-flow problems for contractors, a clause can be introduced in the contract whereby the client is required to pay the contractor the amount certified in an interim payment certificate within seven calendar days of the date of issue of the payment certificate.
- Since it is common practice for contractual agreements to include a performance guarantee clause, the payment guarantee clause should be worded so that if a properly issued payment certificate is not paid within the specified period, the contractor may demand his/her payment from the guarantor.
- Contractors should be encouraged to buy their own plant and equipment from the proceeds of their contracts so that they do not need to hire equipment, which reduces their profit margins.
- Consultants should be contractually bound to issue designs and other technical information within a stipulated time to ensure that the required information reaches the relevant parties in time. It will also promote effective communication between all parties, resulting in properly coordinated activities.
- Government must revisit their small business development initiatives and ensure that their programmes are easily accessible to all SMEs. Furthermore, fair opportunities must be granted to all SMEs so that they can grow to become strong firms that offer employment to many South Africans who are currently unemployed. This approach

will help boost the economy of the Free State and, ultimately, of the country.

- Since the growth of the construction industry is hampered by corruption, it is highly recommended that measures must be put in place to detect corruption in the construction sector and that all individuals and firms found to be involved in corrupt activities should be subsequently blacklisted. Positive action against corruption can be started by:
 - Educating everyone who is working in the profession on the real cost of corruption in their country;
 - Shining a bright spotlight on corrupt practices wherever a person sees them;
 - Making it publicly unacceptable to be involved in corrupt activities;
 - Encouraging organisations to implement anti-corruption management measures in their organisations as well as on their projects; and
 - Educating the next generation of contractors, owners, engineers, government leaders, equipment and material suppliers, and lenders on the real cost of corruption.

5.5. RECOMMENDATIONS FOR FUTURE RESEARCH

This study of the challenges of the construction industry in the Free State is broad and could have been approached from different perspectives. While the study mainly adopted the construction and project management perspective, further research studies can be undertaken in the following recommended areas:

- Investigate how current changes, known as the Fourth Industrial Revolution (4IR), will affect the construction industry. This investigation can help all stakeholders become better prepared for the prospects and challenges that the 4IR will bring to the construction sector.
- Determine how the use of emerging technology can help construction and project managers be more effective in their work and deliver best project management practices that will improve the performance of the construction industry.

5.6. CONCLUSION

The researcher conducted this study with the aim to investigate the current challenges that are facing the construction industry in the Free State. This study was informed by the recent

poor performance of the construction industry across South Africa, whereby its contribution to GDP was observed to be on a constant decline. This study was designed to investigate what the key contributing factors to this poor performance are, especially in the Free State.

The literature study revealed some of the key challenges in the construction industry to be project time and cost overruns, inappropriate procurement systems, poor quality of structures, constant rising of project costs, corruption issues, lack of skilled labour, site safety, capital supply constraints, and failure to preserve the environment. Based on this background, a survey of the challenges facing the construction industry in the Free State was undertaken.

The researcher applied the quota sampling method to strategically select respondents based on their unique characteristics so that those sampled were relevant to the research questions. The respondents included engineers in various disciplines, project and construction managers, architects, quantity surveyors, occupational health and safety consultants, government officials, property developers and owners of construction companies in the Free State. The quantitative study used a questionnaire to collect data from the respondents.

The results from the questionnaire revealed that the root problem of the challenges in the construction industry in the Free State lies in project management. The project and construction management role carries a large responsibility in construction projects because most projects fail or incur high extra costs due to poor project and construction management techniques.

If the recommendations based on the findings of this study are taken into consideration by all the stakeholders in the construction industry in their respective functions, it would improve the performance of construction projects. Moreover, it would also create an opportunity for much-needed employment in the Free State and foster economic growth in the province and the country.

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ANNEXURE A: COVER LETTER



University of the Free State
UFS Business School
Bloemfontein

Dear Participant,

INVITATION TO PARTICIPATE IN A RESEARCH SURVEY

I, Tsepo Abner Tsimong, hereby invite you to participate in a research survey: **Challenges of the construction industry in the Free State**. Responses from the survey will be submitted in partial fulfilment of the requirements of the degree of Master of Business Administration at the University of the Free State, Bloemfontein. The construction industry in the Free State has been experiencing acute development and growth challenges for some time. The objective of this study is to investigate the challenges that are currently facing the construction industry in the Free State.

Participation is voluntary and you may withdraw from the study at any time. Your anonymity is assured and all responses shall be treated as confidential. The expected duration to complete the survey is 10 minutes.

If you have any pertinent questions or require further information, please feel free to contact me on 073 278 1553 or 2015351220@ufs4life.ac.za. My supervisor, Prof. Helena van Zyl, may also be contacted on vanzylh@ufs.ac.za.

Thanking you in advance.

Yours Sincerely,
Tsepo Tsimong

ANNEXURE B: QUESTIONNAIRE

QUESTIONNAIRE ON THE CHALLENGES OF THE CONSTRUCTION INDUSTRY IN THE FREE STATE.

GENERAL INSTRUCTIONS:

Please answer **ALL** the following questions by marking with an “X” inside the relevant block or writing down your answer in the space/s provided.

SECTION A – BIOGRAPHICAL INFORMATION

1. Please indicate your gender.	Male		Female	
2. Which race/ethnicity best describes you?	Black			
	White			
	Coloured			
	Indian			
	Asian			
3. Please indicate your age.	20 to 29			
	30 to 39			
	40 to 49			
	50 and older			
4. In which town/city are you currently residing?	Bloemfontein			
	Kroonstad			
	QwaQwa			
	Other:.....			
5. Please indicate your highest educational qualification.	Matric Certificate (Grade 12)			
	Undergraduate Degree/Diploma			
	Honours/Postgraduate Diploma			
	Masters			
	Doctorate			
	Other:.....			
6. Which of the following best describes your profession?	Architect			
	Quantity Surveyor			
	Structural Engineer			
	Electrical Engineer			
	Mechanical Engineer			
	Civil Engineer			

	<table border="1"> <tr><td>Project Manager</td><td></td></tr> <tr><td>Construction Manager</td><td></td></tr> <tr><td>Contract Manager</td><td></td></tr> <tr><td>Property Developer</td><td></td></tr> <tr><td>Site Agent/Engineer</td><td></td></tr> <tr><td>Other:.....</td><td></td></tr> </table>	Project Manager		Construction Manager		Contract Manager		Property Developer		Site Agent/Engineer		Other:.....			
Project Manager															
Construction Manager															
Contract Manager															
Property Developer															
Site Agent/Engineer															
Other:.....															
7. What is your role in the construction industry?	<table border="1"> <tr><td>Client/Developer</td><td></td></tr> <tr><td>Contractor</td><td></td></tr> <tr><td>Consultant</td><td></td></tr> <tr><td>Sales</td><td></td></tr> <tr><td>Other:.....</td><td></td></tr> </table>	Client/Developer		Contractor		Consultant		Sales		Other:.....					
Client/Developer															
Contractor															
Consultant															
Sales															
Other:.....															
8. How many years of experience do you have in the construction industry?	<table border="1"> <tr><td>1 to 5 Years</td><td></td></tr> <tr><td>6 to 10 Years</td><td></td></tr> <tr><td>11 to 15 Years</td><td></td></tr> <tr><td>16 to 20 Years</td><td></td></tr> <tr><td>21 Years and Above</td><td></td></tr> </table>	1 to 5 Years		6 to 10 Years		11 to 15 Years		16 to 20 Years		21 Years and Above					
1 to 5 Years															
6 to 10 Years															
11 to 15 Years															
16 to 20 Years															
21 Years and Above															
9. Which type of construction projects are you mainly involved in?	<table border="1"> <tr><td>Buildings (residential, commercial)</td><td></td></tr> <tr><td>Maintenance and Renovations</td><td></td></tr> <tr><td>Roads and transportation</td><td></td></tr> <tr><td>Bulk water projects</td><td></td></tr> <tr><td>Power generation and transmission</td><td></td></tr> <tr><td>Telecommunications</td><td></td></tr> <tr><td>Other:.....</td><td></td></tr> </table>	Buildings (residential, commercial)		Maintenance and Renovations		Roads and transportation		Bulk water projects		Power generation and transmission		Telecommunications		Other:.....	
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Telecommunications															
Other:.....															
10. What is the largest project based on the contract amount that you were involved in the past 5 years?	<table border="1"> <tr><td>Less than R1 000 000</td><td></td></tr> <tr><td>R1 000 001 – R2 000 000</td><td></td></tr> <tr><td>R2 000 001 – R5 000 000</td><td></td></tr> <tr><td>R5 000 001 – R10 000 000</td><td></td></tr> <tr><td>R10 000 001 – R50 000 000</td><td></td></tr> <tr><td>R50 000 001 – R200 000 000</td><td></td></tr> <tr><td>R200 000 001 and above</td><td></td></tr> </table>	Less than R1 000 000		R1 000 001 – R2 000 000		R2 000 001 – R5 000 000		R5 000 001 – R10 000 000		R10 000 001 – R50 000 000		R50 000 001 – R200 000 000		R200 000 001 and above	
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R50 000 001 – R200 000 000															
R200 000 001 and above															

SECTION B – CHALLENGES IN THE CONSTRUCTION INDUSTRY IN THE FREE STATE

Please indicate your answers by marking with an “X” under the options provided.

11. In the construction projects where you were/are involved, how frequently were the following issues encountered?

Issues encountered in construction projects	All of the time	Often	Fairly often	Occasionally	None of the time
Mistakes in quantity surveys (Poor estimates)					
Delivery of substandard materials					
Damage of material during transportation					
Incomplete drawings/specifications					
Design errors and omissions					
Excessive extra works					
Delays in producing design documents					
Excessive variations in quantities					
Frequent variation orders					
Rework due to wrong drawings					
Slow decision-making					
Long period for approval of tests and inspections					
Lack of knowledge by the consultant's supervision staff regarding new construction methods, materials and techniques					
Lack of application of proper construction management tools and techniques by consultant's project and site staff					
Conflicts between drawings and specifications					
Frequent design changes requested by clients during construction					
Inaccurate initial project scope estimate					
Slow payment procedures adopted by client in making progress payments					
Unrealistic time estimation					
Executive bureaucracy at client's offices					
Appointment of incompetent contractors					
Poor communication and coordination by client and other parties					
Delays in work approval					
Client-initiated variations					
Insufficient contractor cash flow/difficulties in financing projects					

Issues encountered in construction projects	All of the time	Often	Fairly often	Occasionally	None of the time
Poor qualifications and inadequate experience of contractors' supervisors					
Ineffective planning and scheduling of project					
Equipment allocation problems					
Materials management problems					
Misinterpretation of drawings and specifications					
Rework due to errors during construction					
Poor communication and coordination with other parties					
Poor contractor's site management and supervision					
Conflict between/with contractor and other parties (consultant and client)					
Improper construction methods implemented by contractor					
Late delivery of materials and equipment					
Inadequate definition of the project scope					
Legal disputes between/with various parties					
Unrealistic project construction duration as specified in the contract					
No financial incentives for contractors to finish ahead of schedule					
No application of construction management procedures on the part of client which contributes to late detection of construction problems					
Unrealistic schedule programme submitted by contractor					
Shortage of construction materials on site					
Shortage of technical personnel					
Insufficient equipment					
Shortage of fuel					
Shortage of labour					
Price escalation					

Issues encountered in construction projects	All of the time	Often	Fairly often	Occasionally	None of the time
Low level of equipment operators' skills					
Unqualified workforce					
Low productivity of labour					
Delays attributed to third-party testing of materials					
Differing or unexpected geo-technical conditions during construction					
Effect of rain on construction activities					
Effect of hot weather on construction activities					
Theft of contractor's resources					
Vandalism of works (in progress or finished)					
Industrial action (strike/sit-in)					
Health and safety incidents					

12. To what extent do you agree or disagree with the following factors that are suggested as causes to the failure of Small and Medium Enterprises (SMEs) in the construction industry in the Free State?

Factors that cause SMEs to fail in the construction industry	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Inability to develop long term strategies					
Lack of access to funding					
Significantly high start-up costs					
Delayed payments by the client					
Poor cash flow					
Inability to compete with big construction firms					
Inability to provide decent and safe working environment					
Lack of financial incentives from government					
Difficulties in acquiring construction projects					
High interests rates					
Multiple taxes					
Corruption					

SECTION C: RECOMMENDATIONS ON HOW TO ADDRESS THE CHALLENGES OF THE CONSTRUCTION IDUSTRY IN THE FREE STATE

13. To what extent do you agree or disagree with the following recommendations on how to address the challenges in the construction industry in the Free State?

Recommendations on how to address the challenges of construction industry in the Free State	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Promote effective construction site management and supervision					
Undertake effective strategic planning					
Provide clear information and communication channels					
Use proper and modern construction equipment.					
Use appropriate construction methods					
Ensure proper project planning and scheduling					
Adhere to construction drawings and specifications					
Ensure proper coordination between the client, consultants and the contractor					

Recommendations on how to address the challenges in construction industry in the Free State	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Have complete and suitable design at the right time					
Ensure utilisation of the latest technology					
Use suitable construction methods to suit each specific project					
Ensure collaborative working in during the delivery of construction projects					
Conduct frequent progress meetings					
Ensure proper material procurement					
Appoint highly experienced technical team					
Allocate adequate project duration					
Decrease number of variation orders					
Appoint experienced contractors					
Ensure timely supply of material					
Proper project implementation and management					
Allow for material price escalation in the original tender document					
Encourage good workmanship					
Properly implement local regulations					
Minimise disputes between all parties					
Provide financial support to SMEs and ensure effective development programs					
Offer financial incentives to contractors as a means to encourage efficient completion of construction projects within the allocated time and budget					

Thank you for taking time to complete this questionnaire

*****THE END*****