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THE LEVEL OF AWARENESS AND USE OF RISK MANAGEMENT TECHNIQUES BY SMEs IN THE CONSTRUCTION INDUSTRY: A CASE OF KING WILLIAM'S TOWN AND PORT ELIZABETH

A DISSERTATION SUBMITTED IN FULFILLMENT OF THE REQUIREMENTS FOR THE MASTERS DEGREE PROGRAMME IN BUSINESS MANAGEMENT

BY

CHILIYA WILLIAM

DEPARTMENT OF BUSINESS MANAGEMENT FACULTY OF MANAGEMENT AND COMMERCE UNIVERSITY OF FORT HARE SOUTH AFRICA

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SUPERVISOR: MS. E.C. RUNGANI

ABSTRACT

The purpose of this study was to investigate the level of awareness and use of risk management techniques by SMEs in the construction industry conducting business activities in King William's Town and Port Elizabeth in the Eastern Cape Province of South Africa. A self-administered questionnaire was used to gather data from 82 SME owners or managers in the construction industry. The statistical Package for Social Sciences (SPSS) was used to analyse data. The Chi-square, cross tabulation and descriptive statistical tests were employed to analyse the data. The results of the study revealed that there is a low level of awareness and use of risk management techniques by SMEs in the construction industry. In addition, the results revealed that SMEs in the construction industry have a positive attitude toward risk management techniques. The results of the study recommend that the government, tertiary institutions, construction industry development board and SME owners or managers in the construction industry should work together to improve the level of awareness and use of risk management techniques.

Key terms: Risk management, risk management techniques, small and medium enterprises, awareness and use, construction industry.

DECLARATION

I, the undersigned, William Chiliya hereby declare that this dissertation is my own original work and has not been submitted, and will not be presented at any other University for a similar or any other degree award.

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Signature

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Date

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DEDICATION

I dedicate this work to my family and friends.

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CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION AND BACKGROUND TO THE STUDY

Small and medium enterprises (SMEs) are acknowledged as the backbone of most economies for both developed and developing countries (Organisation for Economic Co-operation and Development, 2004). Nieman, Hough and Nieuwenhuizen (2003) agree that SMEs play a critical role in employment creation, poverty alleviation, wealth creation and development of innovation in most developing and developed countries. In developing countries where most people are very poor, SMEs also act as a major source of income to a number of households (Organisation of economic co-operation development, 2004). In addition, SMEs also offer training opportunities as well as equitable distribution of income to poor and previously disadvantaged people in developing countries. Thus, SMEs can be viewed as imperative triggers for economic growth and poverty alleviation (Zaidi, 2013).

In South Africa, the contribution of SMEs towards the growth of gross domestic product and the reduction of unemployment rate is undisputable. Abor and Quartey (2010) are of the view that SMEs in South Africa occupy more than 91 percent of the formal business entities. According to Ngwenya (2012), SMEs contribute between 52 percent and 57 percent to gross domestic product and 61 percent to employment in South Africa. Currently South Africa is facing a high unemployment rate of 25.2 percent (Statistics South Africa, 2013). Given the fact that SMEs employ about 61 percent of the working population, it therefore means SMEs have a major role to play in reducing unemployment rate and poverty alleviation in South Africa.

Evidence obtained from empirical literature shows that SMEs contribute significantly to economies of most countries in the world and to South Africa in particular. However, these SMEs encounter severe challenges which hamper their growth and success. Musara and Fatoki (2011) point out that the failure rate of SMEs in South Africa is 75 percent within the first few years of operation. A number of studies

conducted conclude that access to finance and managerial skills are the major reasons for SME failures (Boateng, 2004:66; Bowen, Morara and Mureithi, 2009).

The challenges encountered by business firms have a negative effect on its profitability. The profit is crucial for the growth and success of a business firm since it should be re-invested in the business. Thus, any disruption of expected profit will seriously impact on SMEs survival in any sector of the economy. Bizco Business Consulting (2012) suggests that the survival of SMEs depends on managing risks. Thus risk management becomes a vital tool for the survival and success of SMEs. Risk is the possibility of something happening that impacts the attainment of organisational goals or objectives. It is the chance to either make a gain or a loss. It is measured in terms of likelihood and consequence. Therefore the effective management of risk enables the business owner to avoid losses, maximise potential of opportunities, and achieve certain desired goals. However, Smit and Watkins (2012) point out that SME owners or managers are ignorant relating to the risks faced by their enterprises.

Anderson and Terp (2006) defined risk management as a process that seeks to eliminate, reduce and control risks, enhance benefits, and avoid detriments from speculative exposures. Thus risk management maximises the potential success and minimises the probability of future losses of business firms. The risk management process consists of the following activities: planning for risks, analysing risks, developing risk response strategies and monitoring and controlling risks to determine how they have changed (Kerzner, 2009:746).

A study conducted by Bizco Business Consulting (2012) stressed the following risks as key to the success or failure of South African SMEs:

- Damage or destruction to property;
- Loss of profits or revenue;
- Loss or damage to property from theft or criminal activity;
- Legal costs or liability arising from accidental damages;
- Disability or accidental death, and associated medical expenses;
- Providing unemployment packages or having to reorganise a business and
- Legal Costs.

Insufficient funding and managerial skills have been identified as the major obstacles hampering the growth of SMEs. In addition SMEs have limited tangible assets and most of them do not keep proper accounting records. Thus, this increases the risk profile of the SME sector. Therefore by proper implementing risk management strategies, SMEs will be able to attract funding from banks and other investors. The investment in SMEs will improve on the assets which are also essential in providing prolonged business opportunities and competitive advantage. Failure to implement risk management techniques will result in payment of fines and loss of firm reputation.

In South Africa, there are a number of SMEs operating in different industries such as manufacturing, retailing, mining the construction industry. However, amongst these industries, the construction industry is subject to high risk, with complex and dynamic project environments. The most prevailing risks in this industry are: cost estimate of the project, time overruns and failure to achieve the required quality and conformity to operational requirements. In addition the construction industry also faces natural disasters such earthquakes, floods and injuries to workers (Siang and Ali, 2012).

Risk management is very important to SMEs in the construction industry. In construction projects, risk management can be used to identify the factors that have a negative impact on the project in attaining its objectives. Risk management will focus on aspects such as cost schedule or quality baselines, quantifying the associated potential impact of the identified risk and implementing measures to manage and mitigate the potential impact (Siang and Ali, 2012).

Studies focusing on risk management in the SME construction industry in South Africa are limited. Thus the objective of this study was to examine the level of awareness and use of risk management techniques by SMEs in the construction industry to fill in the gap in the literature.

1.2 STATEMENT OF THE PROBLEM

Across the region, SMEs are engaged in commercial trading, hotel businesses, construction, manufacturing, social services and various other sectors of the economy. However, a number of studies which have been conducted in South Africa show that there is a high failure rate of SMEs (Fatoki and Garwe, 2010). According

to Fatoki (2011), access to finance is the major challenge affecting the growth of SMEs. Fatoki and Garwe (2010) points out that between 50 percent to 60 percent of credit applications from SMEs to banks and lending firms are rejected. While the limited access to financing constrains SME growth, it also causes heightened emphasis on the cash flows that a business generates and hence the necessity to reinvest these earnings to bolster growth. Therefore, any interruption of expected earnings and any disaster or sudden misfortune will seriously impact a SME's financial power (OECD, 2010).

Ofori (2009) as cited by Appels (2010) confirms that the development and growth of SMEs in the construction sector is crucial for all countries, as a strong SME base has the capacity to produce high quality infrastructure for the country. However, SMEs in the construction sector faces numerous challenges when carrying out construction projects resulting in their failure. Firms operating in the construction industry often encounter challenges such as cost overruns, late completion of projects, lack of safety, poor or incorrect designs and management of construction projects (Flyvbjerg, 2005). SMEs in the construction industry experience all these challenges which hamper their growth and success. A number of tools and techniques have been designed to detect risks in the construction industry. However, the reality is that most small business owners in the construction industry do not fully comprehend the proactive role that insurance and sound risk management can play in the survival, growth and prosperity of their business. Yet every day, these business owners confront risk: both business risk and non-business risk. Studies conducted by Baloi and Price (2003) revealed that there is a significant gap between risk management techniques and their application in the construction industry.

According to Patsis (2007), studies on risk management in SMEs are limited and also many SME owners think they are not at risk because of the size of their business. Patsis (2007) further points out that most SME owners think that large corporations with more assets are the only ones at risk. This is not true because SMEs bear the same risks as much as that of larger corporations. The only difference is scale and severity of impact on the firm's balance sheet and income statement. Hence the study at hand sought to provide a more complete understanding of risk management techniques used by SME in the construction industry and provide new evidence on the existing literature on subject matter. For

the purpose of this study the researcher focused on techniques to manage the following risks: legal / compliance risk, financial stability risks, productivity risk, reputation and customer confidence since these types of risks are more prevalent in the construction industry.

1.3 RESEARCH OBJECTIVES

The research objectives of the study are:

- To establish the level of awareness on risk management techniques by SMEs in the construction industry.
- To investigate whether SMEs in the construction industry are implementing risk management techniques.
- To ascertain the attitude of SMEs owners or managers in the construction industry towards risk management techniques.
- To identify the reasons of not implementing risk management techniques to those SMEs who are not using any risk management technique and provide recommendations
- To contribute and provide a more complete understanding of risk management in SME in the construction industry in order to provide an appropriate risk management tool for SMEs.

1.4 HYPOTHESES OF THE STUDY

HA_0: SMEs in the construction industry are not aware of the risk management techniques.

HB_0: SMEs in the construction industry are not implementing risk management techniques.

HC_0: SME owners or managers in the construction industry have a negative attitude towards risk management techniques.

1.5 SIGNIFICANCE OF THE STUDY

The motivation of this study emanates from the fact that SMEs in the construction industry play a crucial role in the economy of South Africa and the whole world. Apart from providing the needed infrastructure, the construction industry also provides job

opportunities to a number of unemployed South African citizens and also stimulates economic activities for other SMEs in the other sectors of the economy. However, the construction SMEs encounter a number of risks which hamper their economic growth and performance. The risk management techniques identified may eventually improve the levels of employment, economic growth and also the performance of construction SMEs in the country. Risk management is an essential tool for the success and growth of SMEs. The study inevitably creates awareness on the importance of risk management amongst SMEs in South Africa and the whole world.

On completion, this research proposes policies and strategies to both SMEs and policy makers to minimise or eliminates challenges associated with risk management implementation in King William's town and Port Elizabeth. Thus, the study addresses the policy deficiency in trying to improve the implementation of risk management by SMEs in the construction industry.

1.6 LITERATURE REVIEW

This section presents the definition of risk, risk management; various risks found in the construction industry and in addition present theories which are relevant to the study.

1.6.1 Definition of risk

Cretu, Stewart and Berends (2011:63) defined risk as the exposure to the consequences of uncertainty. The authors further linked the definition to the construction industry. They proposed that in a construction project, risk is a chance of something happening that will have an impact on the objectives of the firm. It includes the possibility of loss or gain or variation from a desired or planned outcome, as a consequence of uncertainty associated with a particular course of action.

1.6.2 Risk Management

Anderson and Terp (2006) defined risk management as a process that seeks to eliminate, reduce and control risks, enhance benefits, and avoid detriments from speculative exposures. Therefore, the essence of risk management in business firms therefore becomes to maximise the potential of success and minimise the probability

of future losses. Risk management involves the following activities: planning for risks, analysing risks, developing risk response strategies and monitoring and controlling risks to determine how they have changed (Kerzner, 2009:746).

1.6.3 Types of risks in construction industry

In the construction industry there are different types of risk that firms experience. This section will discuss each type of risk.

Compliance Risks

Compliance risks refer to risks which arise as a result of failure to comply with the laws and regulations stipulated in a certain field or required by the government (Patsis, 2007). Failure to comply with the laws and regulations can cost business firms severely. In the construction industry, firms have to comply with laws with regard to drawing contracts, obtaining tenders and placing contracts, the actual undertaking of the project up to the post completion stage (Uff, 2003). Failure to follow the stated rules and regulations will result in firms losing the contract or paying fines on failure to meet the obligations of the clients and also the government standards.

Productivity Risk

Patsis (2007) defined productivity risk as the risks which result from operational losses and poor customer service delivery. Such risks may emerge from unavailability of basic production services and operation functions. Such risks may be relevant to all production activities that contribute in some way to the overall delivery of a product or service. In the construction industry, these types of risk may be: failure of the contractor to complete the construction project in time or the contractor may erect a substandard building.

Financial Stability Risks

Construction firms offer services to both the private and public sectors. In most cases these clients may delay to pay the contractor which results in a financial distress. This results in financial stability risk. The contractor will eventually fail to deliver the required services to the clients. Patsis (2007) state that financial stability risks may lead to major financial losses having impact directly or indirectly on the

financial stability of the organization, causing thus a failure to achieve stated goals and financial objectives. Evening

Reputation and Loss of Customer Confidence

This type of risks comes as a result of failing to deliver the required services to the customers. Customers are the most crucial assets of any business hence failure to satisfy them results in establishing a bad image of the business firm and eventually losing customer confidence. This type of risk has an adverse effect on the profitability of the firm (Patsis, 2007).

The efficient performance of construction firms is mainly constrained by cost overruns and failure to complete the project at the agreed time (Flyvjerg, 2005). Nassar, Nassar and Hegab (2005) argue that accurate estimation of cost is an important factor for a successful project cost management from the start of planning phase to the completion of construction. Akintoye and MacLeod (1997) studied the perceived risks and found that contractors and project managers in the United Kingdom use perceived risk as the likelihood of unforeseen factors occurring. The unforeseen circumstances would impact on successful completion of the construction project. Cost, time, and quality were the factors analysed constraining the successful completion of the project. The study concluded that analysing and controlling risks are the key to improving profit.

A number of studies conducted this far conclude that risk management is essential for the success and growth of business firms. However, for a long time it was believed that risk management is irrelevant to the value of the firm (Sprčić, Tekavčič and Šević, 2010). Hence theorists developed two classes of explanations for managers' preferences of risk management activities on behalf of their business firms. The two classes are:

- Risk management as a means to maximise shareholder value.
- Risk management as a means to maximise managers' private utility.

1.6.4 Theories of risk management

This section discusses the different theories of risk management.

A. Shareholder Maximisation Hypotheses

- **Financial distress**

Smith and Stulz (1985) developed the financial distress arguments for risk management. The theory states that by implementing risk management, a firm can increase its value thereby limiting dead weight losses of being bankrupt. This increase in value comes from the reduction in deadweight costs, and an increase in debt capacity, which in turn can benefit the firm through valuable tax shields or reductions in agency costs of excess free cash flow. Shapiro and Titman (1986) posits that the costs of financial distress include deterioration of valuable relationships with buyers and suppliers who value long-term access to the firm, for example to provide on-going service. SMEs in the construction industry mainly encounter financial distress since most of them are exposed to late payments by their clients.

- **Investment Policy**

A number of authors argue that firms which do not implement risk management strategies will eventually end up pursuing suboptimal investment policies (Stulz, 1996, and Froot, Scharfstein, and Stein 1993). Studies conducted by these authors stipulate that there is a strong link between cash flow and investment due to capital market imperfections, typically information asymmetries. When the firm's cash flows are low, obtaining additional financing is very costly, inducing the firm to scale back value-maximising investments. Risk management programs that break this dependence of investment on cash flow can maximise firm value. Froot, Scharfstein, and Stein's theory suggests that firms with key planned investment programs and costly external financing would be inclined to use risk management to avert the need to access costly external financing to continue these programs.

- **Taxes**

The tax-induced explanation for risk management, formalized by Smith and Stulz (1985) holds that in the presence of a convex tax schedule, firms would reduce

expected taxes by using risk management to fix the level of taxable earnings. Greater convexity of the tax schedule should lead to more risk management.

B. Managerial Utility Maximisation Hypotheses

- **Managerial Risk Aversion**

Smith and Stulz (1985) and Stulz (1984) focus on managerial risk aversion as a driver of corporate risk management. The theory states that managers whose human capital and wealth are poorly diversified strongly prefer to reduce the risk to which they are exposed. If managers judge that it will be less costly (to them) for the firm to manage this risk than to manage it on their own account, they will direct their firms to engage in risk management. Smith and Stulz's (1985) model predicts that managers with greater stock ownership would prefer more risk management, while those with greater option holdings would prefer less risk management, because stocks provide linear payoffs as a function of stock prices whereas options provide convex payoffs.

Signalling Managerial Skill

An alternative managerial explanation is advanced by Breeden and Viswanathan (1996) and DeMarzo and Duffie (1995), who focus on managers' reputations. In these models, outsiders cannot observe managerial quality, nor can they disentangle profits due to managerial quality as compared to exogenous market stocks. As a result, managers may prefer to engage in risk management so as to better communicate their skills to the labour market. Models where managers use hedging to signal their abilities presume that investors cannot separate results attributable to risk management from those attributable to ability.

- **Alternatives to Risk Management as Controls**

This theory states that firms should pursue on alternative activities that substitute for financial risk management strategies. Firms may engage in diversification instead of hedging or insuring, or could adopt conservative financial policies such as maintaining low leverage or carrying large cash balances to protect them against potential hardship. Greater use of these substitute risk management activities should be associated with less financial risk management.

The existing literature on risk management shows that there are gaps in implementing risk management techniques hence there is need to conduct an empirical study. The study at hand will apply the theories of risk management presented in this section.

1.7 RESEARCH METHODOLOGY

When conducting a research project, a specific logical sequence has to be followed in order to achieve the desired objectives. This is attainable by following a properly laid down research methodology. Research methodology refers to a framework which has to be followed when gathering and analysing the data for a research project. Churchhill (2010:58) defined research methodology is a blue print that is followed to complete a study. This section focuses on the research methodology employed in the study. The areas explored specifically included: research instrument, research technique, secondary data, the survey area, population, sample size, sampling technique and data analysis procedures. The study used a quantitative research design.

1.7.1 Research instrument

Research instruments refer to tools which are used to collect data from respondents. This study will make use of a questionnaire. A questionnaire is a document which consists of a set of questions which are used to extract information from respondents (Cant, Nel and Kotze, 2003:131). The questionnaire employed in this study was adapted from a questionnaire developed by Mursic (2011). This questionnaire has been tried and tested measuring scales for risk management. However, the researcher modified the questions from Mursic (2011) questionnaire to suit the study at hand. The nature and type of questions used in the questionnaire determines the quality of data to be gathered. The questions can be classified as open ended or closed ended questions. The open ended questions allow respondents to answer in their own words or opinions whilst the closed ended questions have pre-designed answers with a small or large set of potential choices (Cooper and Schindler, 2003:362). This study used both the open ended questions and closed ended questions in order to gather valuable information. In closed ended questions the researcher made use of a five point scale when measuring the difference in risk levels.

1.7.2 Research Technique

The researcher distributed self-administered questionnaires to respondents. A self-administered questionnaire allows the respondent to complete the questionnaire without the researcher's presence or interference. This technique leaves a little or no room for the researcher's intervention hence reduces interviewer bias and also minimises costs (Du Plooy, 2009:192).

1.7.3 Secondary data

Secondary data refers to the data which is readily available (Cant etal, 2003:166). The data is not designed specifically for the current research but can help in conducting a situation analysis. Secondary data may be obtained from available published material and it includes journals, books, conference reports, internet sources to mention a few. The researcher obtained information related to risk management from these sources and also consulted the Construction Industry Development Board for information on information about SMEs in the construction industry.

1.7.4 The survey area

This research project focused on construction SMEs conducting business activities within King William's town and Port Elizabeth. These areas were chosen mainly because of growing number of SMEs carrying out construction projects.

1.7.5 Population

The population refers to the entire collection of elements about which a researcher wishes to make an inference based on sample information (Weiers, 1988). The researcher obtained the total number of SMEs in the construction industry from the Construction Industry Development Board data base. The total population of active SMEs in the construction industry in King William's town and Port Elizabeth is 133.

1.7.6 Sample size

A sample is a representative of the population. It is mainly used when the population is large. The sample was calculated using the Rao-soft calculator. The researcher

used a confidence level of 95% and a margin of error of 5% and the recommended sample size from the given population is 99.

1.7.7 Sampling technique

The study made use of simple random technique. This technique ensures that each element to be selected from the population has an equal chance of being selected. The SME owners or managers in the construction industry were selected by chance since they all have an equal chance of being selected.

1.7.8 Data analysis Procedure

The data analysis procedure was conducted with the aid of statistician from the Statistics department at the University of Fort Hare and research. The statistical analysis package (SPSS version 19) was used to analyse the gathered data. The data was also analysed using descriptive statistics, Chi-square-tests and cross tabulation to determine the level of awareness and use of risk management techniques by SMEs in the construction industry.

1.8 RELIABILITY AND VALIDITY

In order to ensure reliability of the questionnaire, the researcher contacted the statistician reviewing the questionnaire for question phrasing and sequencing and eliminating unnecessary information from the questions. The reliability of the questionnaire was measured by pretesting it. A pre-test involves a trial run with a group of respondents to iron out challenges involved in answering the questions, the question structure, design and wording. This will be achieved by conducting a pilot study. In the pilot study stage, 30 questionnaires were sent to respondents and the response obtained was analysed by the Statistical Package for Social Sciences (SPSS).

The researcher implemented the following to ensure validity of the instrument.

To ensure content validity (the systematic examination of the test content to determine whether it covers a representative sample of the behaviour domain to be measured) a panel of experts such as the statistician and academic research supervisor were used to review the items and comment on whether the items cover a representative sample of the behaviour domain.

For Internal validity which refers to the confidence that is placed in the cause-and-effect relationship the researcher used the linear regression model to measure the strength and relationship between the dependent variables and independent variables. The Chi-Square test was also be used to determine whether an association (or relationship) between two categorical variables in a sample is likely to reflect a real association between these two variables in the population.

To guarantee external validity (the extent to which a finding applies or can be generalised to persons, objects, settings, or times other than those that were the subject of study) the researcher used a big sample size with a margin of error not more than five percent (5%) and a confidence level of ninety five percent (95%). Random sampling was also used when selecting the respondents to minimize bias on selection. Statistical validity which means the degree of statistical significance of a result was enhanced by testing the efficiency of the model construct using a hypothesised data set to check for effectiveness of the regression model, choosing a low significance value (p value) of less than 5%.

1.9 ETHICAL CONSIDERATION

In order to comply with ethics the researcher implemented the guidelines outlined below:

Participants should be comfortable

The researcher reminded respondents that they need not answer any question they prefer not to answer. The Researcher also ensured that interview times were scheduled with respondents in order to minimise disruption in the respondents' schedules.

Participants should not be deceived

While conducting the research the researcher ensured that participants or respondents were not deceived, through informing the respondents the true purpose and length of the research.

Participants should be willing and informed

The researcher ensured that all participants were willing and provided each respondent with a cover letter which informed the participants on the research topic, the objectives and how information obtained from the research would be used.

1.10 TIME FRAME

The time frame of study was between June 2012 and November 2013.

1.11 BUDGET

The budget allocated for the research was ten thousand Rand (R10 000).

1.12 DELIMITATIONS OF THE STUDY

This research project only focused on SMEs in the construction industry operating in King William's Town and Port Elizabeth in the Eastern Cape Province of South Africa. Therefore, results obtained from the study should not be generalised for all construction SMEs in South Africa as well as other SMEs operating in the other sectors of the economy. In addition, time and budgetary constraints also had an adverse impact on the results of the study.

1.13 ORGANISATION OF THE STUDY

- **CHAPTER ONE: AN INTRODUCTION TO THE RESEARCH PROBLEM**

This chapter covered the introduction and background to the study. The statement of the problem was discussed as well. In addition the chapter explored on the significance of the study, objectives of the study, the hypotheses, literature review, the research methodology and the limitations of the study.

- **CHAPTER TWO: AN OVERVIEW OF SMEs IN SOUTH AFRICA**

This chapter focused on the overview of SMEs on both the international and South African context. The definitions of SMEs in the South African context were also explored. The chapter further presented on the SMEs in the construction industry and their contribution to the South African economy. The chapter concluded by looking on the challenges faced by the construction industry.

- **CHAPTER THREE: RISK MANAGEMENT IN SMEs**

This chapter focused on risk management in SMEs in the construction industry. It included the definition of risk, risk management and determinants of risk management. The chapter also reviewed the theories in risk management.

- **CHAPTER FOUR: RESEARCH METHODOLOGY**

This chapter focused on the study area, the population, the organisation and design of the questionnaire, the methods of data collection and data analysis. The validity and reliability of the research instrument was also discussed. An examination of the applicable statistical tests for the gathered data, reliability and validity of the data as well as the limitations in the collection of the data was explored.

- **CHAPTER FIVE: ANALYSIS AND INTERPRETATION OF RESEARCH RESULTS**

The analysis and interpretation of data was presented in this chapter. The results obtained were compared with the findings of previous empirical studies and the theoretical framework on which the study is based.

- **CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS**

The chapter presented the conclusions and recommendations of the study. The chapter also presented on areas of future research and limitations.

1.14 CHAPTER SUMMARY

This chapter presented on the introduction and background of the study at hand. It has been established that SMEs play a crucial role in the construction industry. However, SMEs in the construction industry encounter a number of risks which hamper their growth and development. Risk management techniques have been identified as the most important tool to mitigate risks. The chapter also presented on the preliminary literature review, significance of the study, research methodology and the limitations of the study. The next chapter focuses on the overview of SMEs and the construction industry.

CHAPTER TWO

AN OVERVIEW OF SMEs AND THE CONSTRUCTION INDUSTRY

2.1 INTRODUCTION

The efficient delivery of adequate and high quality infrastructure plays a significant role in the socio-economic development of most, if not all countries throughout the world. Simuyemba (2000) maintains that the efficient and sufficient delivery of infrastructure stimulates the economic activities of other important sectors of the economy such as banking, retail, health, manufacturing, agriculture and education to mention a few. In most countries, it is the mandatory of the government to provide the highly needed infrastructure to the citizens of the nation. However, since the attainment of independence in 1994, the government of South Africa has failed to provide adequate infrastructure which is essential for socio-economic of the nation (Department of Public Works, South Africa, 2006). Statistics show that South Africa still faces a huge backlog for infrastructure delivery. In the State of the Nation Address in February 2012, the President of The Republic South Africa Jacob Zuma highlighted that the country needs approximately R3,5 trillion monetary value worth of infrastructure. The Construction Industry Development Board (CIDB, 2004), states that a high demand of infrastructure still lies in the housing, potable water, sewerage disposal, electrification, health, education and productive employment.

In light of the above mentioned challenges in infrastructure delivery, the government of South Africa has identified small and medium enterprises (SMEs) as an essential tool in curbing the high infrastructure backlog (Agumba, 2006). Agumba (2006) points out that SMEs are an essential vehicle of delivery from an infrastructural backlog currently facing South Africa.

This chapter provides a comprehensive definition of SMEs from both the international and South African perspectives. In addition, the chapter explores on the contribution of and challenges faced by SMEs both globally and in South Africa. Since this study is focusing on risk management in the construction industry, the chapter will further examine on the construction industry, SME contribution and classification of SMEs in the construction industry. The chapter concludes by examining challenges and risks encountered by SMEs in the construction industry.

Section 2.2 focuses on the definition of SMEs from both an international and South African perspective.

2.2 SMALL AND MEDIUM ENTERPRISE DEFINED

Most, if not all governments throughout the world have recognised the importance of SMEs in their contribution to employment creation, poverty alleviation, economic growth and development of innovation (Kongolo, 2010). Okurut, Olalekan and Mangadi (2012) agree that SMEs play a crucial role in employment creation and economic growth. Numerous studies conducted in South Africa show that large business firms occupy almost 9 percent of the formal business and the rest is occupied by SMEs (Abor and Quartey,2010). Voss, Wilke, Maack and Partner estimates that 99 percent of business firm in the European Union are SMEs. In Lebanon, SMEs are estimated to occupy more than 95 percent of all the business entities (SMEs and large firms) (Alasrag, 2011).

Despite this significant contribution to economies of most countries, authors and scholars have failed to come up with a conclusive definition for SMEs. A number of studies conducted this far show that most definitions follow the quantitative and qualitative lines. Quantitative factors are primarily the number of employees, the annual turnover (sales) and the balance sheet total. The qualitative factors require that a small firm should have a relatively small share of its market, be run by its owners and not be a subsidiary of a large firm (Neman and Nieuwenhuizen, 2009:8). Okubena (2007), highlights that SMEs are diverse depending on the country of origin since they operate within different structures, encounter different challenges and obtain different support. It therefore becomes of paramount importance to define SMEs in both the international and the South African perspectives. The following section explores the definition of SMEs on the international perspective.

2.2.1 International perspective on the definition of SMEs

In Germany, SMEs are defined using the quantitative definition (Fuhrmann, 2002). The quantitative definition focuses on the number of employees and the annual turnover to distinguish between small and medium enterprises. Table 2.1 on the next page depicts on the summarised definition of SMEs in Germany as proposed by Euhrman (2002).

Table 2.1 Classification of SMEs in Germany

Small Enterprises	**Midsize Enterprises**
Annual turnover worth Up to DM 1 million	Annual turnover worth DM 1 to 100 million
Up to 9 employees	10 to 499 employees

Source: Fuhrmann (2002)

In Europe, the definition of SMEs takes into account three important aspects namely: staff head count; annual turnover and annual balance sheet. Thus, SME definition also follows the quantitative approach. The European commission define micro, small and medium-sized enterprises (SMEs) as business enterprises that employ fewer than 250 employees and which have an annual turnover not exceeding 50 million euros, and/or an annual balance sheet total not exceeding 43 million euros (European Commission, 2005).

The government of Malaysia classifies business enterprises as micro; small or medium enterprises based on the annual sales turnover or of full time employees (SME Corp Malaysia, 2012). Table 2.2 shows the summarised definition of SMEs in Malaysia as identified by Haron, Ismail, Yahya, Khalid and Ganesan (2010:20).

Table 2.2 Summarised definition of SMEs in Malaysia

Sector	**Micro**	**Small**	**Medium**
Manufacturing, Manufacturing- Related Services and Agro-based	Sales turnover of less than RM250,000 OR full time employees less	Sales turnover between RM250,000 and less than RM10 million	Sales turnover between RM10 million and RM25 million OR full time

industries	than 5	OR full time employees between 5 and 50	employees between 51 and 150
Services, Primary Agriculture and Information & Communication Technology (ICT)	Sales turnover of less than RM200,000 OR full time employees less than 5	Sales turnover between RM200,000 and less than RM1 million OR full time employees between 5 and 19	Sales turnover between RM1 million and RM5 million OR full time employees between 20 and 50

Source: Haron, Ismail, Yahya, Khalid and Ganesan (2010:20)

2.2.2 SMEs DEFINED IN THE SOUTH AFRICAN PERSPECTIVE

The National Small Business Act of South Africa of 1996, as amended in 2003, describes an SME as "a separate and distinct entity including cooperative enterprises and non-governmental organisations managed by one owner or more, including its branches or subsidiaries if any is predominantly carried out in any sector or sub-sector of the economy mentioned in the schedule of size standards, and can be classified as an SME by satisfying the criteria mentioned in the schedule of size standards" (Government Gazette of the Republic of South Africa, 2003).

The summarised definition of SMEs as mentioned in the schedule of size standards as provided by the National Small Business Act of 1996 as amended in 2003 is highlighted in table 2.3 which follows:

Table 2.3 Schedule of size standards for the definition of SMEs in South Africa

Type of Firm	Number of Employees	Turnover (Million)	Balance Sheet amount (Million)
Small	1-49	Maximum R13	Maximum R5
Medium	51-200	Maximum R 51	Maximum R19

Source: Government Gazette of the Republic of South Africa (2003).

In South Africa, there are two common terms which are used interchangeably referring to small business, namely; Small and Medium Enterprises (SMEs) and Small, Micro and Medium Enterprises (SMMEs). However, these two terms are different depending on the classification of a business firm as whether small, micro or medium enterprises. The classification of enterprises as whether small, micro or medium enterprise depend on analysing different set of complex threshold. The National Small Business Act, 1996, as revised by the National Small Business Amendment Bill, 2003, classified business enterprises as whether small, micro or medium enterprises depending on the threshold per industry as illustrated in table 2.4

Table 2.4 The classification of SMMEs by industrial sector

Sector or sub-sectors in accordance with the Standard Industrial Classification	**Size or class**	**Total full-time equivalent of paid employees Less than:**	**Total annual turnover Less than:**	**Total gross asset value (fixed property excluded) Less than:**
Agriculture	Medium Small	100 50	R 5.00 m R 3.00 m	R 5.00 m R 3.00 m

	Very small Micro	10 5	R 0.50 m R 0.20 m	R 0.50 m R 0.10 m
Mining and Quarrying	Medium Small Very small Micro	200 50 20 5	R39.00 m R 10.00 m R 4.00 m R 0.20 m	R23.00 m R 6.00 m R 2.00 m R 0.10 m
Manufacturing	Medium Small Very small Micro	200 50 20 5	R51.00 m R13.00 m R 5.00 m R 0.20 m	R19.00 m R 5.00 m R 2.00 m R 0.10 m
Electricity, Gas and Water	Medium Small Very small Micro	200 50 20 5	R51.00 m R13.00 m R 5.10 m R 0.20 m	R19.00 m R 5.00 m R 1.90 m R 0.10 m
Construction	Medium Small Very small Micro	200 50 20 5	R26.00 m R 6.00 m R 3.00 m R 0.20 m	R 5.00 m R 1.00 m R 0.50 m R 0.10 m
Retail and Motor Trade and Repair Services	Medium Small Very small Micro	200 50 20 5	R39.00 m R19.00 m R 4.00 m R 0.20 m	R 6.00 m R 3.00 m R 0.60 m R 0.10 m

Wholesale Trade, Commercial Agents and Allied Services	Medium	200	R64.00 m	R 10.00 m
	Small	50	R32.00 m	R 5.00 m
	Very small	20	R 6.00 m	R 0.60 m
	Micro	5	R 0.20 m	R 0.10 m
Catering, Accommodation and other Trade	Medium	200	R13.00 m	R 3.00 m
	Small	50	R 6.00 m	R 1.00 m
	Very small	20	R 5.10 m	R 1.90 m
	Micro	5	R 0.2 m	R 0.10 m
Transport, Storage and Communications	Medium	200	R 26.00 m	R 6.00 m
	Small	50	R 13.00 m	R 3.00 m
	Very small	20	R 3.00 m	R 0.60 m
	Micro	5	R 0.20 m	R 0.10 m
Finance and Business Services	Medium	200	R 26.00 m	R 5.00 m
	Small	50	R 13.00 m	R 3.00 m
	Very small	20	R 3.00 m	R 0.50 m
	Micro	5	R 0.20 m	R 0.10 m
Community, Social and Personal Services	Medium	200	R13.00 m	R 6.00 m
	Small	50	R 6.00 m	R 3.00 m
	Very small	20	R 1.00 m	R 0.60 m
	Micro	5	R 0.2 m	R 0.10 m

Source: The Government Gazette of the Republic of South Africa (2003)

Table depicts that the major difference in the classification of SMEs by sector lies on the amount of total annual turnover and total gross asset value. However, the table

also shows one major difference on the maximum number of employees who fall under the medium category in the Agricultural sector. The maximum number of employees in the Agricultural sector who fall under medium category is 100 whereas all the other sectors of the economy is 200. The study at hand will use the definition proposed by the National Small Business Act of 1996 and amended in 2003.

In South Africa, it is estimated that there are between 2,4 to 6 million SMEs, which contribute immensely to social and economic development of the nation (Mahembe, 2011). The international and local/South African perspective definition of SMEs showed that there is a significant difference on defining the term SMEs. This therefore means that the contribution of SMEs to the economies of different countries may be different as well. Based on these facts, Section 2.4 examines on the contribution of SMEs globally.

2.4 CONTRIBUTION OF SMES GLOBALLY

The importance of SMEs from both developing and developed countries is completely undisputable. This is clearly evidenced by a number of studies which have been conducted on SMEs worldwide. Modern Ghana (2012) agrees that SMEs contribute significantly to the growth and success of most economies globally. Thus, most governments throughout the world have designed policies aimed at nurturing and fostering growth, development and success of SMEs. SMEs conduct their business activities in various sectors of the economy which include sectors such as mining, agriculture, information technology, construction and service sectors to mention but a few.

In Europe, SMEs accounts for 99 percent of all businesses (European Union, 2012). The European Union further states that SMEs provide 80 percent of all new jobs across Europe. In Japan, it is also estimated that SMEs accounts for more than 99 percent of all businesses (Economist Intelligence Unit, 2010). In addition SMEs in Japan employ the majority of Japanese citizens and also contribute immensely to the economic growth. The contribution of SMEs in the African continent as a whole is of a paramount importance since this continent is poverty stricken and most families live below the poverty datum line. To this end, SMEs become the most essential tool in uplifting the standards of the previously disadvantaged communities. It is estimated that SMEs contribute over 70 percent in employment and 30 percent to 40

percent towards gross domestic product in Africa. Globally, literature clearly shows that SMEs play two major roles globally, which are employment creation and contribution to the GDP. Section 2.4.1 discusses on the roles and contribution of SMEs to the South African economy.

2.4.1 Contributions of SMEs in the South African Economy

Globally, it is evidenced that SMEs play two (2) major roles in the economies of most countries which are employment creation and contribution towards GDP. The contribution of SMEs towards the South African economy is not completely different from SMEs in other countries. In South Africa, SMEs are commonly referred to as the economic engine of the nation.

According to the Statistics South Africa (2012), the unemployment rate in South Africa in the second quarter of 2012 was 24,9 percent. This unemployment rate declined slightly from the first quarter of 2012 which was pegged at 25,2 percent. Ngwenya (2012) points out that the 24,9 percent of unemployment rate comprises of people aged between 15-64 years who are actively seeking for employment. Ngwenya further points out that the unemployment rate can increase to 34 percent if the discouraged employment seeker who is not employed, available to work or start a business but did not take active steps to find work during the period in review. Studies also show that large businesses in South Africa failed to provide adequate jobs which can curb the high unemployment rate (SBP Business environment specialist, 2009). For instance for the period from 1985 to 2005, large firms produced less than 10 percent of all new jobs in South Africa. With unemployment as the country's central and most salient problem, a top priority must be to develop SMEs. The SME sector in South Africa is estimated to employ 61 percent of the labour force. This therefore means that the SME sector has a crucial role to play in curbing high unemployment rate.

The second major role which SMEs play in South Africa is contribution towards Gross Domestic Product (GDP). Basically Gross Domestic Product (GDP) of a country refers to the total value of goods and services produced in a country including the value of goods and services which are imported from other countries and subtract the value of goods and services exported to other countries. In South Africa, SMEs contribute immensely to a country's GDP by manufacturing goods and

the provision of services. Apart from being the producers of goods and services in different industrial sectors of the economy, SMEs also contribute to the GDP through the consumption of goods and services provided by other SMEs as well as by large business firms. To some extent, SMEs export their products to foreign countries thereby increasing foreign currency circulation in South Africa. Abor and Quartey (2012) points out that SMEs contribute approximately 52 percent to 57 percent to GDP.

In addition, SMEs also provide some ancillary contributions such as innovation development, investment, stimulates the business activities of large business firms and the financial sector (Rungani, 2009). Despite the above mentioned contributions, SMEs encounter numerous barriers which impede their growth, success and development, which result in a high rate of their failure. According to Venter and Farrington (2009), the failure rate of SMEs in South Africa is approximately between 70 percent and 80 percent. The high failure rate of SMEs raises several questions on the issue of unemployment reduction and poverty alleviation. Section 2.5 which follows discusses on the barriers which impedes the growth, success and development of SMEs.

2.5 BARRIERS IMPEDING THE GROWTH AND SUCCESS OF SMES IN SOUTH AFRICA

Section 2.4.1 showed that SMEs contribute significantly to economic growth and employment creation in South Africa. This results in a well-functioning of the economy. This section focuses on the factors which impedes the growth and success of SMEs. Numerous challenges have been identified as impeding the growth and success of SMEs. Ligthelm and Cant (2002:121) points out that most SMEs encounter challenges such as the lack of finance, managerial skill and environment which is conducive for business performance (the environment also include inadequate and inefficient infrastructure).

The most universal barriers impacting on the growth, success and development of most SMEs throughout the world is insufficient funding and poor managerial skills. Rungani (2009) agrees that insufficient funding is one of the key challenges/barriers affecting the growth and development of SMEs in South Africa. Lack of access to credit is almost universally indicated as a key problem for SMEs. Most banks and

other financing institutions are reluctant to offer financial assistance to SMEs because of their high risk profile nature (Experian, 2007). Insufficient funding from banks and other financing institutions results in high liquidation or failure of SMEs. SMEs also face numerous challenges such as high cost of credit, high bank charges and fees since they operate in a risky environment.

The high failure rate of SMEs is also attributed poor managerial skills. Managerial skills encompasses skills such as human resources skills, marketing skills, financial management skills and general management skills which are essential for the survival and success of SMEs. Zindiye (2010) argues that the possession of insufficient managerial skills results in a poor performance of SMEs. This therefore means that possession of insufficient managerial skills has a negative relationship with the performance of SMEs in South Africa (Luiz, 2002:27).

Poor and inadequate infrastructures pose a major challenge to SMEs in South Africa and most developing countries. The development of SMEs is mostly impeded by poor or obsolete infrastructure such as working premises, electricity, warehouses, transporting stock, communication facilities and acquiring infrastructure which is incompatible with the current technology (Raiz, 2012). SMEs may obtain the desired infrastructure; however, the supply is unreliable and costly. As mentioned in section 2.1, that there is a backlog of infrastructure delivery, this therefore means that there is very limited serviced land which is viable for both social and commercial use. In addition the acquisition of business or commercial land is very costly. Most SMEs are financially constrained hence cannot purchase the desired land or infrastructure.

In South Africa, it is acknowledged that there is a high failure of SMEs; however, the government of South Africa still recognises SMEs as an imperative tool which is aimed at socio-economic development of the nation. Thus, the government of South Africa is continuously researching on factors which are necessary for the growth and development of SMEs. Business Partners (2012) identified physical infrastructure as one of the factors which are necessary to foster growth, success and development of SMEs as well as large firms. Momoh (2011) attests that infrastructure is very important for the growth and life of the small enterprise as well as large business firms. Thus, the government of every nation strives to provide efficient and sufficient

infrastructure through the construction industry sector. Section 2.6 explores on the overview of the construction industry globally.

2.6 AN OVERVIEW OF THE CONSTRUCTION INDUSTRY GLOBALLY

The construction industry contributes immensely to the economies of most countries throughout the world. Economy Watch (2010) argues that the construction industry is one of the largest industries throughout the world. It is estimated that the construction industry contributes approximately 9 percent of the entire world economy (Confederation of International Contractors Associations, 2012). In Kenya, the construction industry is currently on an upward trend following rehabilitation and reconstruction of roads and bridges under the Kenya Urban Transport Infrastructure Program (Kenya Association of Manufacturers, 2010). In 2009, it was estimated that the construction industry employed more than 93 400 people. In Europe, the construction industry plays a pivotal role in sustaining the economy of the country. The construction industry contributes approximately 10 percent towards gross domestic product (GDP) and also offers 20 million jobs, mainly in the micro and small enterprises (European Commission, 2012).

2.6.1 A brief overview of the South African construction industry

The construction industry plays a pivotal role in sustaining the economies of both developing and developed countries. James, Rust and Kingma (2011) maintains that the construction industry is a key player in the South African economy. This is clearly evidenced by the resilience of the construction industry during the global recession period. Van der Merwe (2012) states that the construction industry increased its contribution to gross domestic product for the period between 2008 and 2009 by 8,4 percent. The impact of the recession was also cushioned by Soccer 2010 World cup which was hosted in South Africa. Mhlanga (2012) points out that the total income of the construction industry in 2011 was R268 100 million, which rose from R169 249 in 2007. It is also estimated that by the end of June in 2011, the construction industry as a whole employed 479 700 employees.

The South African government is currently facing a major challenge in curbing down a high unemployment rate of approximately 25,2 percent. According to the Department of Labour, South Africa (2010), the major component of the high

unemployment rate comprises of the unskilled workforce. However, the construction industry plays a crucial in absorbing all categories of labour force from the unskilled up to the skilled workers in the country. Ntsika (2001) maintains that the major component of the construction industry is occupied by SMEs. The majority of these SMEs employ workers on a contract/casual basis and in most cases, the greater number of these employees are immigrants from other developing countries which are currently facing economic hardship such as Zimbabwe, Malawi and Zambia (International Federation of Building and Wood Workers, 2004).

Statistics clearly show that the construction industry absorbs much of the labour force. However, the construction industry also contributes enormously to the statistics of employee injuries and fatalities. The injuries are mainly attributed to non-compliance to health and safety legislation, uneducated employers and employees (regarding health and safety), failure to implement any sort of health and safety measures. According to The Project Manager (2012), there were 9858 accidents and 93 fatalities in the year 2010, whilst in 2011 there were 8099 accidents and 50 fatalities in South Africa.

The activities of all firms in the construction industry in South Africa are solely controlled by the construction industry development board (CIDB). In order to control the activities of firms in the construction industry, the CIDB monitors the activities of firms in the construction industry. The construction industry development board have a mandatory of establishing and maintaining a national register of contactors (CIBD Act, No 38 of 2000). The CIBD allows contractors to register in any of the five classes of construction namely: the civil engineering, general building, mechanical engineering, electrical engineering and specialist work (CIBD, 2007). The CIDB further classifies construction firms in nine (9) grades (that is from Grade 1 to 9). In May 2010, the CIDB classified the construction firms into respective grades as displayed in Table 2.5.

Table 2.5 The CIDB National Register of Contractors as at May 2010.

Grade	***CE***	***EB***	***EP***	***GB***	***ME***	***SW***	***TOTAL GRADES***	***PERCENTAGE***
1	20.200	1.007	1.836	57.900	2.525	10.237	93.705	89.04
2	1.532	172	84	2.058	185	438	4.469	4.25
3	512	90	46	539	83	90	1.360	1.29
4	727	168	117	755	132	115	2.014	1.91
5	522	147	132	464	150	156	1.571	1.49
6	567	50	57	487	75	47	1.283	1.22
7	224	19	36	195	36	28	538	0.51
8	72	2	9	60	16	7	166	0.16
9	47	6	16	32	21	10	132	0.13
Total	***24.403***	***1.661***	***2.33***	***62.490***	***3.223***	***11.128***	***105.238***	***100.00***

Source: Construction industry development board (2010).

Table 2.5 above shows that 89.04 percent of the contractors fall within grade 1 of the CIDB national construction register. According to CIDB (2010), almost 89 percent of the registered firms in the construction industry are SMEs. Ntsika (2001) argues that SMEs dominate the entire construction industry, meaning they dominate on all the nine grades. Therefore there is need to examine SMEs in the construction industry. Section 2.7 which follows explores on SMEs in the construction industry.

2.7 SMES IN THE CONSTRUCTION INDUSTRY

The above literature clearly shows that SMEs contribute extensively to economic growth, poverty alleviation, unemployment reduction and equitable distribution. This is also true to SMEs in the construction industry. In addition, SMEs in the construction industry stimulate the economic activities of SMEs in the other sectors of the economy as well as large firms. However, there is also a major challenge of classifying and defining what constitutes small and medium enterprises in the construction industry. Section 2.7.1 provides a concise definition of SMEs in the construction industry.

2.7.1 SMEs in the construction industry defined in South Africa

The National Small Business Act (1996), amended in 2004 defines small contractors as those with a total turnover of between R3m to R6m, a total number of fulltime paid employees between 20 and 50 and a total gross asset value (fixed property) of between R0.5m to R1m, whereas medium contractors are defined as having a total turnover of between R6m to R26m, total full time paid employees between 50 to 200 and have a total gross asset value (fixed property) of between R1m and R5m. The definition of SMEs in the construction industry is in line with the definitions of SMEs in the other sectors of the economy since the definition focuses on both the quantitative and qualitative perspective of the definitions.

2.8 SMES IN THE CONSTRUCTION INDUSTRY ROLES TO THE SOUTH AFRICAN ECONOMY.

Mlinga and Wells (2002) maintain that the construction industry is an essential contributor to the socio-economic development of developing countries. Literature clearly reveals that SMEs dominate in the construction industry in South Africa. SMEs in the construction industry, just like any other SMEs in the other sectors play a crucial role in labour absorption, economic growth, innovation development, poverty alleviation and discover new markets (Agumba, 2006). The Government of South Africa also recognises SMEs in the construction as a pillar for socio-economic development, hence supports the activities of SMEs in the construction industry. Section 2.8.1 examines the roles which SMEs in the construction industry contributes to the South African government.

2.8.1 SMEs in the construction industry contribution to the South African economy

SMEs in the construction industry contribute to economic growth, poverty alleviation, employment, and innovation development. In addition, SMEs also contribute extensively to skill development and equitable distribution of income to previously disadvantaged communities in South Africa. Furthermore, SMEs in the construction industry play a crucial role in performing other activities which the government should undertake. Thus, the improvement of SMEs in the construction industry becomes a principal goal for any government. The government of South Africa often assigns SMEs to undertake some construction projects. Ofori (2009) points out that SMEs in the construction industry of South Africa has the capacity to produce high-quality infrastructure. South Africa. Info (2012) states that the government would gain if the firms which undertake its projects have the necessary capacity and capability to provide value for money by producing items of high quality, within the time and cost budgets.

Infrastructure plays a crucial role on the performance of both SMEs and large business firms throughout the world. The infrastructure which has been erected may be used as inputs to other business processes or create space to conduct other business activities. An empowering operating environment complemented by sufficient and efficient infrastructure is essential for supporting the growth and development of SMEs as well as large business firms. Thus, the Government continues to focus on addressing the gaps and enhancing further the physical and non-physical or soft infrastructure to create a conducive business environment for SMEs to prosper and to compete in the global market. In addition, the services provided by SMEs in the construction industry stimulate the economic activities of SMEs and other large business firms in the other sectors of the economy (SME Annual Report, 2010).

Despite the major contributions of SMEs in the construction industry, SMEs in the construction industry encounter the same challenges as faced by SMEs in the other sectors of the economy. However, SMEs in the construction industry encounter additional challenges which results in them failing to provide good quality and efficient infrastructure. It is estimated that most SMEs in the construction industry

survive for a period less than six months as a result of the complexity of the construction industry environment (Gillam, 2004). Section 2.9 explains on challenges which SMEs in the construction industry frequently encounter.

2.9 CHALLENGES/RISKS FACED BY SMES IN THE CONSTRUCTION INDUSTRY

SMEs in the construction industry encounter same challenges just like SMEs in the other sectors of the economy as explained in section 2.5. However, the major challenge facing SMEs in the construction industry is exposure to risk. Risk may be defined as the possibility of suffering harm or loss. In the construction industry the physical harm (accidents) may be to employees, clients or other stakeholders. The loss may be in monetary value. The complexity of construction projects creates greater risks for inefficiencies than those faced by other industries. This section focuses on the risks faced by SMEs in the construction industry.

SMEs in the construction encounter compliance risks. These are risks arise as a result of failure to comply with the laws and regulations stipulated in a certain field or required by the government (Patsis, 2007). Such risks may include obtaining tenders fraudulently, employing under age children and or not following the rules stated by the CIBD. In the construction industry, firms have to comply with laws with regard to drawing contracts, obtaining tenders and placing contracts, the actual undertaking of the project up to the post completion stage (Uff, 2003). Failure to follow the stated rules and regulations will result in firms losing the contract or paying fines on failure to meet the obligations of the clients and also the government standards.

Most construction activities are conducted as projects. Most SMEs fail to execute the assigned projects in the stipulated or agreed time, good quality and to meet the expectations of the clients. According to the Project Management Institute (PMI) (2004), project risk management is one of the nine most critical parts of project commissioning. This indicates a strong relationship between managing risks and a project success. This results in encountering a productivity risk. Patsis (2007) defined productivity risk as the risks which result from operational losses and poor customer service delivery. Such risks may emerge from unavailability of basic production services and operation functions. Such risks may be relevant to all

production activities/project that contribute in some way to the overall delivery of a product or service.

Construction firms offer services to both the private and public sectors. In most cases these clients may delay to pay the contractor which results in a financial distress. This results in financial stability risk. The contractor will eventually fail to deliver the required services to the clients. Patsis (2007) state that financial stability risks may lead to major financial losses having impact directly or indirectly on the financial stability of the organization, causing thus a failure to achieve stated goals and financial objectives.

Financial stability risk comes as a result of failing to deliver the required services to the customers. Customers are the most crucial assets of any business hence failure to satisfy them results in establishing a bad image of the business firm and eventually losing customer confidence. This type of risk has an adverse effect on the profitability of the firm (Patsis, 2007). Accurately estimating cost is an important factor for a successful project cost management from the start of planning phase to the completion of construction (Nassar, Nassar and Hegab, 2005). Bizco Business Consulting (2012) suggests that the survival of SMEs depends on managing risks. Thus, risk management becomes an essential tool to mitigate risks in the construction industry.

2.10 SUMMARY

This chapter comprehensively explored on the definitions of SMEs from both the international and local/South African perspective. The chapter also discussed on the contributions as well challenges faced by SMEs in the economy. Some of the major contributions discovered are extensive contribution to economic growth and employment creation. On contrary, some of the challenges identified are lack of funding, lack of managerial skills and conducive infrastructure. Since the main objective of the study is to establish the level of awareness and use of risk management techniques by SMEs in the construction industry, this chapter also examined on the construction industry both international and local context. In addition, the study further examined on the contribution of SMEs in the construction industry to the South African economy. The chapter concluded by examining on the

challenges/risks faced by SMEs in the construction industry. The risks identified compliance, financial and productivity.

Chapter three (3) which follows, comprehensively analyses the definition of risk, risk management, risk management techniques and relevant theories of risk management. The importance of risk management to SMEs in the construction industry is discussed.

CHAPTER THREE

RISK MANAGEMENT IN SMEs IN THE CONSTRUCTION INDUSTRY

3.1 INTRODUCTION

Chapter two discussed the literature with regards to SMEs, the construction industry and SMEs in the construction industry. The chapter concluded that SMEs operating in the construction industry encounter a number of risks which impede their growth and success. Risk management has been identified as a vital tool which can improve on the identification of risks, mitigating/eliminating risks and fostering sustainability of SMEs in the construction industry. However, Smit (2012) point out that most SME owners (SME owners in the construction industry included) in South Africa are unaware of risks and methods of assessing risks in the business environment.

Therefore, this chapter attempts to create awareness on the concept of risk, risk management and risk management techniques in the South African construction industry. In addition, this chapter discusses the theories relevant to risk management. Section 3.2 which follows explores the definition of risk.

3.2 DEFINITION OF THE CONCEPT OF RISK

Authors and scholars such as Correia, Flynn, Uliana and Wormald (2011:3-3); Quintal, Lee and Soutar, (2006) argue that a number of studies use the concepts risk and uncertainty interchangeably. It should be noted, however, that risk and uncertainty have a significant difference (Quintal, *et al.*, 2006).

Correia, *et al* (2010:3-3) defined uncertainty as it implies either that all the alternative possible outcomes cannot be identified or that no probability can be attached to the alternative possible outcomes. Uncertainty events in the construction may include events such as floods, bad weather conditions, earthquakes, political unrest and accidents. No one is capable of calculating the probability of floods or earthquakes' occurrence and or their impact on the outcome of the construction project in future.

The current researcher observes that most attach the word 'risk', to the possibility of something bad happening in their lives. A number of authors also agree with this definition (Oxford Dictionary, 2012; OHS Act South Africa, 2008:6). However, risk does not involve unpleasant outcome only, but can also yield to pleasant outcome as

well. In the field of risk management, risk may be defined as the probability of actual outcome deviating from expected outcome (Correia., et al, 2010:3-3). Table 3.1 summarises some of the differences between risk and uncertainty.

Table 3.1 The difference between risk and uncertainty

Description	**Risk**	**Uncertainty**
Likelihood of occurrence	Yes	No
Statistical analysis	Yes	No
Event identification	Yes	No
Subjective analysis	No	Yes
Measureable outcome	Yes	No
Complexity in calculation	Yes	No

Source: Maroge (2012)

The difference between risk and uncertainty is that under risk, one can attach probabilities on the likelihood of the occurrence of certain event and some statistical means are used to predict the likelihood of occurrence and outcome of risk in future, whereas under uncertainty, one cannot attach any probability on the likelihood of occurrence of an event and outcome of an adverse or beneficial event occurring in future. Under risk an event can be identified before occurrence whereas under uncertainty the event cannot be identified. The prediction on the occurrence and outcome under uncertainty is based on opinions as compared to risk is based on statistical analysis. Despite all the mentioned differences between risk and uncertainty, some of the authors suggest that risk and uncertainty are closely related since uncertainty leads to risk (Gostin, 2010:92).

The analysis of risk is more complex since it involves some mathematical computations. Olsson (2007:67) also attests that the measurement of risk is more challenging since it involves complex calculations. Despite all the difficulties encountered in the calculations, the decision maker has to attempt to understand

and interpret the results and make meaningful judgement. The best measure for risk is the standard deviation.

3.2.1 Project risk

Rahman and Chileshe (2012) claimed that risks exist in all construction projects as a result of the dynamic and complex environment in which they operate. The risks which are encountered in the construction industry are normally referred to as project risks. The name 'project risks' is derived from the fact that work undertaken in the construction industry is commonly referred to as 'projects', thus risks associated to projects is referred to 'project risks'. Burtonshaw-Gunn (2009:10) defined project risks as risks that can act either as a threat to the attainment of objectives of the project or opportunity that can benefit the project by increasing the contractor's ability of achieving project goals. The definition proposed by Burtonshaw-Gunn (2009:10) will be used throughout this study.

There are various benefits which accrue to firms in the construction industry by eliminating risks in the construction industry such as meeting the project's completion deadline, minimising costs, improved quality and reduction of accidents to both employees and clients (Rahman and Chileshe, 2012). However, most firms in the construction industry view risks as threats not opportunities (Klemeti, 2006). Mousa (2005) claimed that there has not been an inclusive study explaining the sources of risks in the construction industry. This also creates tension in viewing and understanding risks as opportunities than threats in the construction industry. Thus there is need for a thorough investigation and understanding of risks in the construction industry. Section 3.3 which follows discusses on the concept of risk management.

3.3 RISK MANAGEMENT

Basically, risk management can be defined as a way of handling risks within an organisation and boosting the firm's returns or profits. The Association for Project Management (2000) defines risk management as the process which enables the analysis and assessment of project risks. The risk management process comprises of various steps depending on the industry and professional level. The most prominent steps in the risk management steps includes: (i) risk identification (ii)

analysis and (iii) response actions and control (Garrido, Ruotolo, Ribeiro and Naked, 2011). The steps are explained briefly below.

Risk Identification: Risk identification encompasses gathering of information about current and past risk occurrences and other events that pose potential loss to the business. In order to identify the necessary risks, risk identification techniques have to be used. According to Burke (2009:276) as cited by Maroge (2012), risk identification process is in many ways the most important stage of risk management processes because if you cannot identify a project risk, it would be excluded from further analysis and consequently such risk cannot be managed or would impose difficulties to manage. Maroge (2012) further suggest that undisclosed risks may an adverse impact such as accidents, poor productivity and quality. There are various risk identification techniques which can be used. The risk identification techniques will be explained in subsequent sections.

Risk Analysis: Risk analysis entails the evaluation of past experience and current exposure to eliminate or limit substantially the impact of risk on cash, company image and employee morale and customer reputation. The essence of risk analysis is that it attempts to capture all feasible options and to analyse the various outcomes of any decision. For building projects, clients are mainly interested in the most likely price, but projects do have cost over-runs and, too frequently, the 'what if' question is not asked (Flanagan and Norman, 1993).

Risk analysis involves assessing the identified risks. This first requires that the risks are quantified in terms of their effect on cost, time or revenue. They can then be analysed by measuring their effects on the economic parameters of the project or process.

Response actions and control: This is the organisation’s response to significant risk areas, as well as its response to limit the liability associated with incidents that have occurred. According to PMI (2008:308), monitoring and controlling project risks is the process of implementing project risk response plans, tracking identified project risks, monitoring residual project safety risks, identifying new projects risks, and evaluating project risk process effectiveness throughout the project life cycle. Thus during this stage, project risk audits would be conducted to see how effective the risk management process has been.

Rahman and Chileshe (2012) conducted a study on the usage of risk management processes by firms in the construction industry in South Australia. The results of the study revealed that the majority (65.21%) of the respondents did not implement any risk management processes/practices. The results further showed that the minority of respondents only implemented risk management practices during the bidding phase only.

The above mentioned reasons for not implementing risk management techniques as well as attitudes towards risk poses challenges as to whether risk management is an essential tool for sustaining the growth of SMEs as well as large business firms. Thus, a number of theories have been developed to determine whether risk management is relevant or irrelevant to the value of the firm. Section 3.4 which follow focuses on the theoretical framework.

3.4 THEORATICAL FRAMEWORK

Some scholars argue that where there are high risks, there are also high returns (Bruss and Ferguson, 2002). This therefore means that businesses need to engage into risky projects in order to yield high returns. However, authors such as Smit (2012) argue that businesses have to be more focused on risk reduction. Hence a large debate has been created on the implementation of risk management in businesses. Thus, theorists developed two classes of explanations for managers' preferences of implementing risk management policies on behalf of their business firms. The two classes are as follows:

A) Risk management as a means to maximise shareholder value.

B) Risk management as a means to maximise managers' private utility.

3.4.1 Risk management as a means to maximise shareholder value

A. Shareholder Value Maximisation Hypotheses

The shareholder value maximisation hypothesis is based on the assumption that a firm will implement risk management policies in decision making only risk management is going to enhance on the firm's value and thus its shareholders' value. This value enhancement mainly arises from three sources which are listed below:

(1) Minimisation of the costs of financial distress

(2) Minimisation of taxes, and (3)

(3) Minimising the probability of the occurrence of the underinvestment problem.

Minimisation of the costs of financial distress

Smith and Stulz (1985) developed the financial distress arguments for risk management. The theory states that by implementing risk management, a firm can increase its value thereby limiting dead weight losses of bankrupt. This increase in value comes from the reduction in deadweight costs, and an increase in debt capacity, which in turn can benefit the firm through valuable tax shields or reductions in agency costs of excess free cash flow. Shapiro and Titman (1986) extend the costs of financial distress to include the deterioration of valuable relationships with buyers and suppliers who value long-term access to the firm, for example to provide on-going service. SMEs in the construction industry mainly encounter financial distress since most of them are exposed to late payments by their clients.

Investment Policy

A number of authors argue that firms which do not implement risk management strategies will eventually end up pursuing suboptimal investment policies (Stulz, 1996, and Froot, Scharfstein, and Stein 1993). Studies conducted by these authors stipulate that there is a strong link between cash flow and investment due to capital market imperfections, typically information asymmetries. When the firm's cash flows are low, obtaining additional financing is very costly, inducing the firm to scale back value-maximising investments. Risk management programs that break this dependence of investment on cash flow can maximise firm value. Froot, Scharfstein, and Stein's theory suggests that firms with key planned investment programs and costly external financing would be inclined to use risk management to avert the need to access costly external financing to continue these programs.

Taxes

The tax-induced explanation for risk management, formalized by Smith and Stulz (1985) holds that in the presence of a convex tax schedule, firms would reduce expected taxes by using risk management to fix the level of taxable earnings. Greater convexity of the tax schedule should lead to more risk management.

3.4.2 Managerial Utility Maximization Hypotheses

The managerial risk aversion hypothesis is based on an agency argument. It holds that managers will seek to maximize their personal wealth, at times, at the expense of shareholders. Specifically, when the interests of shareholders are not perfectly aligned with those of the managers, the latter may pursue risk management strategies designed to insulate their own personal wealth from the effects of changes in interest rates, commodity prices, or foreign currency values.

Managerial Risk Aversion

Smith and Stulz (1985) and Stulz (1984) focus on managerial risk aversion as a driver of corporate risk management. The theory states that managers whose human capital and wealth are poorly diversified strongly prefer to reduce the risk to which they are exposed. If managers judge that it will be less costly (to them) for the firm to manage this risk than to manage it on their own account, they will direct their firms to engage in risk management. Smith and Stulz's (1985) model predicts that managers with greater stock ownership would prefer more risk management, while those with greater option holdings would prefer less risk management, because stocks provide linear payoffs as a function of stock prices whereas options provide convex payoffs.

Signalling Managerial Skill

An alternative managerial explanation is advanced by Breeden and Viswanathan (1996) and DeMarzo and Duffie (1995), who focus on managers' reputations. In these models, outsiders cannot observe managerial quality, nor can they disentangle profits due to managerial quality as compared to exogenous market stocks. As a result, managers may prefer to engage in risk management so as to better communicate their skills to the labour market. Models where managers use hedging to signal their abilities presume that investors cannot separate results attributable to risk management from those attributable to ability.

Alternatives to Risk Management as Controls

This theory states that firms should pursue on alternative activities that substitute for financial risk management strategies. Firms may engage in diversification instead of hedging or insuring, or could adopt conservative financial policies such as maintaining low leverage or carrying large cash balances to protect them against

potential hardship. Greater use of these substitute risk management activities should be associated with less financial risk management.

3.5 RISKS IN THE CONSTRUCTION INDUSTRY

Kansal and Sharma (2012), point out that risk is more intense in the construction industry than in any other industry in the economy. However, it has been noted that SME owners (SME owners in the construction industry included) are unaware of risks and risk identification techniques, this section will discuss on the risks encountered in the construction industry. Mousa (2005) suggests that risks should be identified from their source and their boundaries should be clearly spelt. Thus, most risks are named and classified from their source and impact on various aspects of the economy. Patsis (2007) identified four sources/types of risks which have an impact on the performance of SMEs namely:

- Compliance risk;
- Productivity/operational risk;
- Financial Stability Risks and
- Reputation and Loss of Customer Confidence

3.5.1 Financial stability Risks

Financial stability risk is one of the most important risks which have to be managed effectively to ensure a smooth flow of all business activities. In simple terms, financial stability risk may be defined as the likelihood that a business may have cash flow problems, challenges in settling debts and meeting other financial obligations (Codjia, 2013). Financial stability risk is a broad term which encompasses a number of risks which are related to the financing of the business. Risks which are related to financial stability risks are discussed below.

3.5.1.1 Insolvency risks

Druces (2011) point out that risk of insolvency remains a major concern in the construction industry. The insolvency risk may be defined as the likelihood of a firm failing to meet its obligations as they become due. In other words, businesses are able to pay their obligations (creditors) using the assets of the firm, however, during insolvency, the liabilities of the firm will be exceeding the assets value. Davies, Cook

and Whiteson (2008) identified the following indicators for insolvency risk in the construction industry.

- Slow down on site/of service delivery
- Late payment
- Requests for advance payment and/or early payments
- Withholding of payment on the grounds of “dispute”
- Unexpected claims/claim building
- Sub-contractor contact re non-payment

3.5.1.2 Liquidity risk

Olsson (2002: 45) defined liquidity risk as the risk that amounts due for payment cannot be paid due to lack of available funds. A number of business people use insolvency and liquidity risks interchangeably. However, these two types of risks are different. Under the solvency risk, the firm’s liabilities will be exceeding the assets of the firm, whilst under liquidity risk; the firm’s assets will be exceeding liabilities but cannot be converted easily meet the current obligations. The liquidity risks maybe avoided by having sufficient cash circulating within the business. Dietrich (2006) points out that failure to meet the obligations and paying the creditors on time results in the poor reputation of the business and failure to obtain funding from banks and other funding institutions.

3.5.1.3 Credit risk

Credit risk may be defined as the likelihood of an individual or business defaulting to make a payment on an agreed date (Kendall, 1998: 119). Credit risk is common in the construction since some of the projects require large sums of money to be completed and in most cases clients normally default in payments. In countries such as Canada, professional the construction industry investigates on the challenges mainly faced by clients in default payment and develops tools which can address the challenges and attempt to minimise the credit risks in the construction industry (Canadian Construction Association, 2013).

3.5.1.4 Market risk

Businesses do not operate in a vacuum, hence have to keep abreast market forces. This risk is commonly known as the market risk. The market may emanate as a result of unexpected changes in market rates or prices. Faure (2005: 52) defines market risk as the risk that prices may change in an unanticipated direction. In the construction industry, this type of risk may result if the previously agreed cost is eroded by inflation currently prevailing in the market.

3.5.2 Compliance Risks

Just like any other sector in the economy, firms operating in the construction industry have to abide to certain rules, laws and regulations within the industry and also laws stipulated by the government. According to Kendall (1998: 182), legal or compliance risk is a loss caused to a company, by the non-compliance of that company with the relevant rules, laws and regulations governing its activities. In South Africa the rules and laws in the construction industry are governed by the construction industry development board (CIBD). The CIBD works in conjunction with the police of the Republic of South Africa to enforce these rules and regulations. Failure in complying with the rules may lead to payment of fines, loosing trading licences, closure of businesses, suspension or expulsion of top management and or employees. In the construction industry, firms have to comply with laws with regard to obtaining tenders, drawing of contracts, placing contracts and the actual undertaking of the project up to the post completion stage (CIBD, 2003).

The compliance risk may be avoided by complying with rules, laws and regulations passed on by the government or the regulatory board. In the South African construction industry, all contractors have to abide to the laws passed on by the CIDB and the government of South Africa. The laws should be enforced by the police of South Africa. To ensure compliance with the rules, laws and regulations, everyone (from top management to employees) involved in the project have to be well informed of the rules and regulations within the industry. This is achieved by employing people with the necessary skills and expertise in the construction industry as well as providing continuous training. Control mechanisms on compliance to rules and regulations should also be put in place (Dietrich, 2006).

3.5.3 Productivity/operational risk

According to Joosub (2006), productivity/operational risk are concerned with the adverse deviation of a firm's performance, due to the way in which the firm is operated as opposed to how the firm is financed. The risk arises from inadequate or poorly controlled systems and software applications used, risk management operations, accounting; management failure and or human errors fall in the productivity/operational risk. Inadequate information in security management may result in high productivity risks including high operating costs, operational failures, poor management, and lack of privacy and disruption of service to customers.

3.5.4 Reputation and Loss of Customer Confidence

Rayner (2003:43) defined reputation risk as any action or circumstance that could adversely or beneficially impact on the firm's image/reputation. Businesses may fail to retain its existing customers as well as attracting new customers as a result of portraying a bad image to customers. Studies show that it costs more in attracting new customers than retaining existing customers (Mahaso, 2012). In addition, the existing customers will act as intermediaries in attracting new customers.

In the construction industry, a firm may impair its image by providing poor quality projects, failing to meet deadlines, severe accidents when conducting projects, overcharging clients and breaching of rules, laws and regulations set by the government and the CIBD (Agumba and Fester, 2011). Maroge (2012) maintains that the construction industry in South Africa has for a long time developed a negative reputation in terms of coping with project schedules, cost, quality and safety.

Agumba and Fester (2011) claimed that SMEs in the construction industry in South Africa portrays a negative or bad image towards the delivery of quality infrastructure. Agumba and Fester (2011) further states that SMEs in the construction industry encounter challenges in estimating the cost of the project as well as meeting the project delivery deadline as agreed on signing the tender. The contractors will end up compromising quality with profit margins. In other words, contractors will strive to earn their normal profit and provide poor quality infrastructure to clients. However, Nkado and Mbachu (2002) highlights that the sustainability of firms in the

construction industries depends on the satisfaction of current customers by providing quality infrastructure.

It has been noted that risks can be detrimental or beneficial to the success of firms in the construction industry. This means that it is in the hands of the contactor to manage risks to either be beneficial or detrimental to the firm. However, most contractors view risks as an unpleasant to the success of business firms. This means that the identification of risks depends on the attitudes of the responsible person such as the manager or owner of the business. Kauffman (2005) point out that the identification of risks depends on the attitudes of the owner/manager. Thus, section 3.6 which follows discusses on the attitudes towards risk.

3.6 ATTITUDES TOWARDS RISK

Patsis (2007:8) highlights that most SME owners/managers think that they are not at risk because of the size of their businesses. However, Kauffmann (2005) is of the view that the SME sector as a whole has a high risk profile by nature. The belief by most SME owners/managers towards risk maybe explained as attitudes towards risk. Attitudes are defined by cognitive psychology as the predisposition to respond in a generally favourable or unfavourable manner with respect to the object of the attitude (Ajzen, 1987). According to the Oxford Dictionary (2013), an attitude may be defined as a settled way of thinking or feeling about something. The thinking or feeling about something may be moulded by the past or current experience. Thus, an individual's attitudes and past experiences shape the risk profile of each person.

Rahman and Chileshe (2012) conducted a study on the attitudes, perceptions and practices of contractors towards quality related risks in South Australia and the results on the attitudes towards risk showed that experience and judgement of the decision maker shapes his or her attitudes. Flanagan and Norman (1993: 23) as cited by Maroge (2012) agree that most of the contractors rely on intuition or experience than to risk identification. Smit (2012) noted that people have different risk profiles and each individual has a different attitude towards risky behaviour. This therefore means that the way in which individuals' process information pertaining costs and benefits to the business organisation is completely different.

In risk management field, the attitudes of decision makers towards risk are classified into three (3) categories namely:

- Risk averse
- Risk seeking and
- Risk neutral (Damodaran, 2007).

3.6.1 Risk averse

In simple terms, a risk averse person may be defined as a person who avoids/dislike risk. In risk management, a risk person will prefer a low but sure rate of return. A risk averse person may be defined as a person who is afraid of incurring a loss more than he values a potential gain. In the construction industry, the government or public sector is well known for delaying in payment of services rendered, but a contractor is guaranteed of getting his/her payment. Whilst on the other hand, some of the individuals or private sector is capable of settling their debts earlier than the government; this improves the liquidity of the contractor. However, if an individual/private sector defaults payment, the chances of recouping the payments is very slim. Given the risk averse scenario, the contractor may opt to render services to the government since the contractor is guaranteed of receiving his payment in future regardless of time taken. However, authors such as Loosemore et al. (2006:29) suggest that the aim of any project is not to avoid project risks but to take calculated risks, make more informed decision, identify opportunities and avoid surprises. Therefore, the ultimate objective of project risk management is to ensure that project objectives are attained.

3.6.2 Risk seeker

A risk seeker is completely opposite of the risk averse person. Instead, a risk seeking person is someone who prefers risk and considers risk as an opportunity and is prepared to accept loses which arises from undertaking a risky project. Piggott, Marra, Goodwin, Fackler and Denaux (2006:8) defined a risk seeker as a person who has a preference for more risky alternatives and is willing to accept an alternative that has higher upside potential even if it means taking on more downside risk. In a construction industry, risk seeking maybe linked to the process of bidding. Bidding is risky because the actual cost of the job is unknown. Thus, the bid should be high enough to make a profit but low enough to win the bidding. The result of

competition depends on the competitor's risk-taking behaviours, which are affected by the organization's risk attitudes (Kim and Reinschmidt, 2011). Tversky and Fox (1995) stated that risk-seeking is exhibited if a risky prospect is preferred to a sure outcome with equal or greater expected value.

3.6.3 Risk neutral

Between the two extremes are risk-neutral individuals. A Risk Neutral person is characterised as someone who always chooses the decision with the highest expected return, regardless of the risk. Risk neutrality is often assumed if the decision maker can eliminate the risk for instance by being able to diversify his or her portfolio totally (Gustafsson, 2000). It is represented as a description of an investor who purposely overlooks risk when deciding between investments. A risk neutral investor is completely indifferent to the risk involved in an investment and is only concerned about expected return. Generally, people tend to choose the risk-free option, even at the cost of a lower expected utility value. In the real world, however, it is extremely difficult to present 'zero risk' as a viable option (Nakayachi, 2000).

3.7 RISK IDENTIFICATION TECHNIQUES AND TOOLS

According to Burtonshaw-Gunn (2009:38), the identification of project risks is usually done by risk management team or chosen individuals with project experience followed by a second iteration by the entire team with the primary stakeholders. This means that everyone in the construction project have to take part in risk identification. There are various techniques and tools which can be used for risk identification. Pritchard (2005:36) suggests that risk management techniques employed to identify risks depends on the nature of the project. Table 3.2 which follows clearly shows some of the risk management techniques.

Table 3.2 Techniques, examples and templates for identifying risks

TECHNIQUE	STRENGTHS	WEAKNESSES
Assumptions & constraints analysis	1) Simple structured approach 2) Can be based on assumptions and constraints already listed	1) Implicit/hidden assumptions and constraints are often missed.

	in project chatter 3) Generate project specific risks	
Brainstorming	1) Allows all participants to speak their mind and contribute to the discussion 2) Can involve all key stakeholders 3) Creative generation of ideas	1) Requires attendance of key stakeholders at a workshop, therefore can be difficult to and expensive 2) Prone to Groupthink and other group dynamics 3) May produce biased results if dominated by a strong person (often management) 4) Often not well facilitated 5) Generates non-risks and duplicates, require filtering
Cause & Effect (Ishikawa)Diagrams	1) Visual representation of project promotes structured thinking	1) Diagram can quickly become over-complex
Check lists	1) Captures previous experience 2) Present detailed list of risks	1) Checklist can grow to become unwieldy 2) Risks not on the list will be missed 3) Often only includes threats, misses opportunities
Delphi technique	1) Captures input from technical experts 2) Removes sources of bias	1) Limited to technical risks 2) Depends on actual expertise of expects 3) May take longer time than available due to iterations of the experts inputs
Document	1) Exposes detailed projects	1) Limited to risks contained in

review	specific risks 2) Requires no specialist tools	project documentation
FMEA/Fault Tree Analysis	1) Structured approach, well understood by engineers 2) Good tool support	1) Focuses on threats not so useful for opportunities 2) Requires expert tool not generally available to those except experts
Force Field Analysis	1) Creates deep understanding of factors that affect project Objectives	1) Time-consuming and complex technique 2) Usually only applied to a single objective, so does not provide whole project view

Industry knowledge base	1) Captures previous experience 2) Allows benchmarking against external organizations	1) Limited to what has previously happened 2) Excludes project-specific risks
Influence Diagrams	1) Exposes key risk drivers 2) Can generate counterintuitive insights not available through other techniques	1) Requires disciplined thinking 2) Not always easy to determine appropriate structure
Interviews	1) Addresses risks in detail 2) Generates engagement of stakeholders	1) Time consuming 2) Raises non-risks, concerns, issues, worries etc, so requires filtering
Nominal Group Technique	1) Encourages and allows all participants to contribute 2) Allows for different levels of competence in common language	1) Can lead to frustration in dominant members who feel it is moving slowly

	3) To a large extent, Auto documenting 4) Provides ideal base for affinity diagramming (grouping by risk categories for use in the Risk Breakdown Structure and Root Cause Analysis)	
Post-project reviews/Lessons learned/Historical Information	1) Leverages previous experience 2) Prevents making the same mistakes or missing the same opportunities twice 3) Enhances the Organizational Process Assets	1) Limited to those risks that have occurred previously 2) Information is frequently incomplete: details of past risks may not include details of successful resolution; ineffective strategies are rarely documented 3) Creative generation of ideas
Prompt Lists	1) Ensures coverage of all types of risk 2) Stimulates creativity	1) Topic can be too high level
Questionnaire	1) Encourages broad thinking to the identify risks	1) Success depends on the quality of the questions 2) Limited to the topics covered by the questions 3) Can be a simple reformatting of a checklist
Risk Breakdown structure (RBS)	1) Offers a framework for other risk identification techniques such as brainstorming 2) Ensures coverage of all types of risk 3) Test for blind spots or omissions	None

Root-Cause Analysis	1) Allows identification of additional, dependent risks 2) Allows the organization to identify risks that may be related because of their common root causes 3) Basis for development of pre-emptive and comprehensive responses 4) Can serve to reduce apparent complexity	1) Most risk management techniques are organized by individual risk. This organization is not conducive to identifying the root causes 2) Can oversimplify and hide existence of other potential causes 3) There may be no valid strategy available for addressing the root cause once it has been identified
SWOT Analysis	1) Ensures equal focus on both threats and opportunities 2) Offers a structured approach to identify threats and opportunities 3) Focus on internal (organizational strengths and weaknesses) and external (opportunities and threats)	1) Focuses on internally generated risks arising from organizational strengths and weaknesses, excludes external risks 2) Tends to produce high level generic risks, not project-specific
System Dynamics	1) Exposes unexpected interrelations between project elements (feedback and feed-forward loops) 2) Can generate counterintuitive through other techniques 3) Produces overall impacts of all included events and risks	1) Requires specialised software and expertise to build models 2) Focuses on impacts but difficult to include the concept of probability

Source: Tworek (2010)

Table 3.2 shows some of the risk identification techniques, their strength as well as their weaknesses. This study will investigate on the techniques highlighted in table 3.2.

A number of studies which have been conducted worldwide this far show that brainstorming is mostly used in identification of risks in the construction industry (Tworek, 2010; Chihuri and Pretorius, 2010). Chihuri and Pretorius (2010) conducted a study on managing risk for success in a South African engineering and construction project environment and investigated on the usage of some of the available risk identification techniques. The results obtained in the study are shown in Table 3.3.

Table 3.3 Project Risk Identification

Risk identification techniques	**Number of respondents**	**Percentage**
Brainstorming	39	36
Interviews	25	23
Delphi techniques	13	12
Documentation reviews	6	6
Risk checklists	19	18
Assumption analysis	2	2
Diagramming techniques	3	3
Total	**107**	**100**

Source: Chihuri and Pretorius (2010)

The results on the usage of project risk identification techniques show that the brainstorming with 36 percent dominates in the category, followed by interviews (23 percent) and the least being assumption analysis (2 percent). Some of the respondents who chose the brainstorming technique highlighted the technique were preferred because of being most effective technique, as it involved dialogue and

participation from all the stakeholders; simplicity and reliability. There are also number of reasons which may have caused the respondents of selecting brainstorming as the main risk identification technique, for instance respondents were not aware of other techniques, their benefits as well as their weaknesses.

3.8 IMPEDEMENTS IN IMPLEMENTING RISK MANAGEMENT TECHNIQUES

Ahmed, Azhar and Ahmad (2002) are of the view that some contractors are not familiar with available techniques. The authors conducted a study in Florida evaluating risk management practices by general contractors and the respondents provided the following reasons for not implementing risk management within their organisations:

1) Lack of familiarity with risk management techniques.

2) The degree of sophistication involved in the techniques is unwarranted if compared with project size.
3) Doubts whether these techniques are applicable to the construction industry.
4) The majority of risks are contractual or construction-process related, and are fairly subjective, hence they are better dealt with based on experience from previous contracts.
5) Risk analysis of construction projects is seldom formally requested by clients.
6) They expect project management practice to manage risks.
7) Risk management techniques require availability of sound data, which is difficult to collect to ensure confidence.

Towers Perrin (2008) points out that properly managed, risk fuels growth and opportunity. Therefore business firms which strive to succeed on the business market should take into account the factors identified by Ahmed, Azhar and Ahmad (2002).

3.9 CHAPTER SUMMARY

The chapter explored the concepts risk, risk management and risk management techniques. The chapter also discussed on the theories which are related to risk management. In addition, the chapter explored on the impediments in implementing risk management techniques. Some of the challenges associated with implementing risk management techniques include lack of familiarity with risk management

techniques. The central focus of this study was to explore the awareness and use of risk management techniques by SMEs in the construction industry. Chapter four which ensues discusses the research methodology followed in this study.

CHAPTER FOUR

RESEARCH METHODOLOGY AND DESIGN

4.1 INTRODUCTION

In chapter one, it was established that the research study at hand seeks to empirically investigate the level of awareness and use of risk management techniques by SMEs in the construction industry in King William's Town and Port Elizabeth in the Eastern Cape Province of South Africa. This chapter therefore presents the research methodology and design which was employed to gather, process and analyse the data resulting in achieving the research objectives. Rungani (2009) defines research methodology as a 'blueprint' for the collection, measurement, and analysis of data in order to attain the objectives of a research study. Unrau, Krysik and Grinnell (1997:256) points out that research methodology uses two main approaches to solve research problems namely the quantitative and qualitative approaches. Mouton (1996:39) points out that the selection of a research methodology depends on the research problem and research objectives.

As propounded by Mouton above, this chapter therefore commences by restating the research problem presented in chapter one of the study. The chapter further discusses on the research design, data collection and analysis techniques and ethical considerations followed from the beginning up to the completion of the research project. The chapter concludes by summarising the whole chapter and highlighting on the contents of the subsequent chapter.

4.2 STATEMENT OF THE PROBLEM

Most countries worldwide recognise that SMEs play a pivotal role in socio-economic development of most nations. However, despite a significant contribution to socio-economic development, a number of authors argue that most SMEs do not perform to their full potential and as a result there is a high failure rate (Musara, 2010; Fatoki, 2010; Zindiye, 2008). In South Africa, it is estimated that the failure rate of SMEs is above 70% from the date of their conception (Van Eeden et al, 2003:13; Rigwena and Venter, 2004). Some of the studies conducted reveal that lack of funding, managerial skills and technological capabilities are the major challenges impacting on the growth and success of SMEs (Fatoki, 2010; Panya, 2012). Gillam (2004)

notes that SMEs in the construction industry has the highest failure rate and most of these SMEs fail within a period of six months from their conception date. Van Wyk (2003) points out that more than 1400 SMEs in the construction industry failed between the year 2000 and 2002 in South Africa. Patsis (2007) suggest that risk management is an essential tool which may cushion SMEs from a high failure rate. However, Smit (2012) argues that most SME owners in South Africa are unaware of risks and methods of assessing risks in the business environment. Patsis (2007) notes that most SME owners or managers think they are not at risk because of their size. Thus, the usefulness of risk management and risk management techniques to the SME sector in South Africa and most countries throughout the world remains debateable.

4.2.1 Research objectives

- To establish the level of awareness on risk management techniques by SMEs in the construction industry.
- To investigate whether SMEs in the construction industry are implementing risk management techniques.
- To ascertain the attitude of SMEs owners or managers in the construction industry towards risk management techniques.
- To identify the reasons of not implementing risk management techniques to those SMEs who are not using any risk management technique and provide recommendations
- To contribute and provide a more complete understanding of risk management in SME in the construction industry in order to provide an appropriate risk management tool for SMEs.

4.3 SCOPE OF THE SURVEY

Mount Royal University (2012) states that broad objectives are difficult to achieve hence have to be narrowed down to a more specific topic or focus. Musara (2010) note that research objectives may be narrowed down by specifying elements such as where was the study conducted, what was researched, and who was studied. This is commonly referred to as the scope of the survey. The following sub-sections discusses on the scope of the survey of the current study.

4.3.1 Focus of the research

The level of awareness and use of risk management techniques by SMEs in the construction industry: A case of King William's Town and Port Elizabeth.

4.3.2 Survey area

The survey area refers to the actual place where the research was conducted (Cooper and Schindler, 2003:186). This survey was conducted in King William's Town and Port Elizabeth in the Eastern Cape Province of South Africa. These two cities were chosen mainly because the increasing construction activities. Currently, one of the biggest infrastructural projects in South Africa is being undertaken in Port Elizabeth, at industrial development zone commonly known as Coega. In King William's town, there are also construction activities being undertaken such as the refurbishment to the shopping mall which was built in the 1990s which is estimated to be one of the biggest regional shopping centres in the province. The development of the mall is viewed to as a relief to thousands of residents seeking for employment as well convenience to the residents who normally travel to nearby cities such as East London to access certain stores.

4.4 POPULATION AND SAMPLING

The target population of the study at hand were SMEs in the construction industry that were actively registered with Construction Industry Development Board (CIDB) in South Africa. The researcher obtained the total number of SMEs in the construction industry from the Construction Industry Development Board (CIDB) data base. The CIDB is a very important board in South Africa which maintains the registers of all contractors and construction projects being undertaken. The population characteristics were defined by the National Small Business Act (1996), as amended in 2004. The National Small Business Act (1996), amended in 2004 defines small contractors as those with a total turnover of between R3m to R6m, a total number of fulltime paid employees between 20 and 50 and a total gross asset value (fixed property) of between R0.5m to R1m, whereas medium contractors are defined as having a total turnover of between R6m to R26m, total full time paid employees between 50 to 200 and have a total gross asset value (fixed property) of between R1m and R5m. Having thoroughly examined the characteristics defined by

the National Small Business Act (1996), amended in 2004, the information from the registers of the CIDB revealed that there are a total of 133 active and registered SMEs conducting construction business activities in King William's Town and Port Elizabeth.

4.4.1 Sampling

The collection of data from respondents requires a lot of resources such as time and monetary costs. Therefore it is not always possible to collect data from the entire target population. For instance in the current study, collecting data from all SMEs conducting construction activities in King William's Town and Port Elizabeth was very expensive and time consuming. Hence, the researcher collected data from a sample which had the same characteristics with the population. According to Babbie (2009:213), a sample is a representative of the population from which it is selected if the aggregate characteristics of the sample closely approximate those same aggregate characteristics in the population. Sekaram (2003:269) points out that there are two (2) types of sampling methods namely the non-probability sampling and probability sampling. However, for the purpose of this study, the researcher employed the probability sampling method.

4.4.2 Probability sampling technique

According to Sekeran and Boungie (2010:275), probability sampling refers to selection procedures in which elements are randomly selected from the sampling frame and each element has a known, non-zero chance of being selected. The probability sampling comprises of various sampling designs. Table 4.1 depicts on the sampling designs.

Table 4.1 Probability sampling design

SAMPLING DESIGN	DESCRIPTION	ADVANTAGES	DISADVANTAGES
Simple random sampling	All elements in the population are considered and each element has an equal chance of	High generalizability of findings.	Not as efficient as stratified sampling

	being chosen as the subject.		
Systematic sampling	Every nth element in the population is chosen starting from a random point in the sampling frame	Easy to use if sampling frame is available.	Systematic biases are possible.
Stratified random sampling	Population is first divided into meaningful segments; thereafter subjects are drawn in proportion to their original numbers in population. Based on criteria other than their original population numbers.	Most efficient among all probability designs. All groups are adequately sampled and comparisons among groups are possible.	Stratification must be meaningful. More time consuming than simple random sampling or systematic sampling. Sampling frame for each stratum is essential.
Cluster sampling	Groups that have heterogeneous members are first identified; then some are chosen at random, all the members in each of the randomly chosen groups are studied.	In geographic clusters, costs of data collection are low.	The least reliable and efficient among all probability sampling designs since subsets of clusters are more homogeneous than heterogeneous.

Area sampling	Cluster sampling within a particular area or locality.	Cost-effective. Useful for decisions relating to a particular location.	Takes time to collect data from an area.

Source adapted Sekaran and Bougie (2010:279)

After carefully analysing the advantages and disadvantages of the probability sampling methods in table 4.1, the researcher chose and employed the simple random sampling method in this study. The main objective of choosing the simple random method was that each member of the population had an equal likelihood of being selected and also there was little or no room for interviewer bias. This therefore means that each SME owner/manager in the construction industry in King William's Town and Port Elizabeth had an equal chance of being selected. The availability of a sampling frame from the CIDB allowed the use of simple random sampling technique.

4.4.3 Sample size

In Section 4.4.1, a sample has been defined as a representative of the population from which it is selected if the aggregate characteristics of the sample closely approximate those same aggregate characteristics in the population. Thus, a researcher should be in a position of identifying or determining an ideal sample size which represents the target population. Zindiye (2008:126) points out that there are no specific rules for determining sample sizes. Chimucheka (2012:97) argues that a sample size ought to be big enough to ensure that reliable and valid conclusions can be made about the population. In most cases the calculation of a sample size depends on the research approach employed and the nature of the population. The study at hand employed a rao-soft sample size calculator to compute the sample size. A rao-soft sample size calculator is a statistical software package which is used to compute sample sizes. The rao-soft sample size calculator relies on three most essential variables namely:

- margin of error;
- confidence level and
- response distribution.

The researcher assumed a 5% margin of error, 95% confidence level and 50% response distribution. The minimum sample size required for the study obtained from the computation using a population of 133 active SMEs in the construction industry was 99 contractors. The sample size is relatively small since there is a high failure rate of SMEs in the construction industry. Van Wyk (2003) agrees that there is a high failure rate of SMEs.

4.5 RESEARCH METHODOLOGY

In Section 4.1, it was established that the research methodology comprises of two main approaches which are used to solve research problems, namely the quantitative and the qualitative research. Musara (2010:88) agrees that research methods are classified into quantitative and qualitative research methods. Cooper and Schindler (2003:45) points out that quantitative research encompasses the systematic and scientific collection of primary data to investigate the quantitative properties and phenomena and their relationship with the intention of projecting the results to a wider population, whereas the qualitative research employs non-numerical means to understand a problem and provide a solution. Table 4.2 depicts different characteristics of quantitative and qualitative research.

Table 4.2 Characteristics of quantitative and qualitative research

QUANTITATIVE RESEARCH APPROACH	**QUALITATIVE RESEARCH APPROACH**
Objective	Subjective
Research questions: How many? Strength of association?	Research questions: What? Why?
"Hard" science	"Soft" science
Literature review must be done early in study	Literature review may be done as study progresses or afterwards
Test theory	Develops theory
One reality: focus is concise and narrow	Multiple realities: focus is complex and broad
Facts are value-free and unbiased	Facts are value-laden and biased
Reduction, control, precision	Discovery, description, understanding, shared interpretation
Measurable	Interpretive
Mechanistic: parts equal the whole	Organismic: whole is greater than the parts
Report statistical analysis. Basic element of analysis is numbers	Report rich narrative, individual; interpretation. Basic element of analysis is words/ideas.
Researcher is separate	Researcher is part of process
Subjects	Participants
Context free	Context dependent

Hypothesis	Research questions
Reasoning is logistic and deductive	Reasoning is dialectic and inductive
Establishes relationships, causation	Describes meaning, discovery
Uses instruments	Uses communications and observation
Strives for generalization Generalizations leading to prediction, explanation, and Understanding	Strives for uniqueness Patterns and theories developed for understanding
Highly controlled setting: experimental setting (outcome oriented)	Flexible approach: natural setting (process oriented)
Sample size: n	Sample size is not a concern; seeks "informal rich" Sample
"Counts the beans	" Provides information as to "which beans are worth counting"

Source adapted from Anderson (2006)

The study at hand employed the quantitative research methodology. The quantitative research method was mainly used because the study met the criteria characteristics depicted in table 4.2. Musara (2010:90) points out that quantitative research are classified as either descriptive (subjects usually measured once) or experimental (subjects measured before and after a treatment). A descriptive study establishes only associations between variables. An experiment establishes causality. A descriptive research was followed in this study. A descriptive research provides answers to questions of who, what, where and how of the phenomenon of interest (Gerbel-Nel et al., 2005:33). The descriptive research in this study established the

level of awareness and use of risk management techniques by SMEs in the construction industry.

4.6 RESEARCH DESIGN

According to Babbie and Mouton (2002:74), a research design is a plan or blueprint of how the researcher intends to conduct the study. It focuses on the end product, namely the kind of study that is being planned and what results are aimed at.

Aaker, Kumar & Day (2008:71) defines a research design is a detailed plan that is used to thoroughly guide a research study towards achieving research objectives. There are various benefits which accrue to the researcher by choosing the most appropriate research design such as saving time and money which results in acquiring reliable and valid results (Chimucheka, 2012:94). Bless and Higson-Smith (1995:63) proposes that it is essential to seek clarity on the focus of the study before deciding on the research design to be followed.

4.7 DATA COLLECTION METHODS

Basically, there are two main methods which are used for data collection namely, the primary and secondary data collection methods. The preference of one method from the other depends on a number of factors such as the focus of the research study, quantity and quality of data to be collected, skills of the researcher, and availability of resources such as money and time (Kumar, 2011:140). Kumar (2008:70) argues that researchers have to collect and analyse secondary data before collecting or gathering primary data. Thus, the data collection methods follow a logical or sequential order as well. The aforementioned data collection methods are explained in detail in the subsequent sections.

4.7.1 Secondary Data Collection

According to Srivastava and Rego (2011:6-2), secondary data is the data disseminated through some media like reports (external and internal), newspapers, handbooks, magazines and websites to mention a few. This therefore means that the data which is obtained in secondary data collection has been gathered/prepared and analysed by someone who is not the researcher of the current study. Secondary research is essential to provide the researcher with a clear background pertaining

the problem at hand. The major disadvantage of this method is that the researcher may not know the purpose or intentions of the person who conducted the previous research. Sources of secondary data which were consulted by the researcher in the study at hand includes; research textbooks, journal articles, CIBD news reports, newspapers, the CIBD website, internet and newspapers to mention but a few. Having identified flaws/gaps the researcher conducted a primary research. Phiri (2012:79) agrees that it is advisable to conduct a primary data collection if the researcher wishes to gain more insight concerning a specific area of study

4.7.2 Primary Data Collection

In contrast to secondary data, the primary data refers to the data which is collected for a specific research study (problem), and is of concern to the researcher. In addition, primary data is the data which is mainly collected for the first time (Cant et al., 2005:49; Gratton and Jones, 2010:8). Cant et al (2005:49) identifies three methods/techniques of conducting primary data collection namely, observational, experimental and survey research.

- **Observation**

Under the observation technique, the researcher observes and notes down the behaviour, characteristics or stimuli of the objects or participants of interest (Kumar, 2011:70). The researcher observes the participants or objects of interest physically or through the use of video cameras and the researcher should not alert the participants on his presence since they may alter their behaviour and distort the outcome of the research (Bless, Higson-Smith and Kagee, 2006:114).

- **Experimental**

According to Burt, Barber and Rigby (2009:22) defined experimental method of data method of data collection as a method of data acquisition is one in which some of the factors under consideration are controlled in order to isolate their effects on the variable or variables of interests. The major advantage which accrues to the researcher by employing the experimental technique is that the researcher is capable of obtaining precise results since the subjects of the research study will be under control (Burt et al., 2009:22).

- **Survey method**

Survey method is one of the prominent and frequently used methods of data collection (Dantzker and Hunter, 2012:122). Cant et al., (2005:89) state that a survey method or technique is used to gather primary data from participants through mail, telephone and or in person. Dantzker and Hunter (2012:122) argue that a survey method is more flexible which allows a researcher to collect more information of different types' for instance quantitative and quantitative data. Cant et al., (2005:89) identifies some advantages of using a survey method over other methods such as observation methods such as they offer fast, low-cost, proficient and reliable ways of acquiring information. In addition, surveys are essential in defining the characteristics of a large population.

After analysing the merits and demerits encompassed in each primary research methods, the survey method was identified as the most appropriate method to be employed in this study. Thus, the study at hand employed the survey method.

4.8 DATA COLLECTION INSTRUMENT

For this purpose of this study, a questionnaire was employed as a data collection instrument. A questionnaire is a document or a set of questions designed to accumulate/collect information from research participants (Musara, 2010:93). Questionnaires can be categorised as either structured or unstructured questionnaires (Nargundkar, 2007:56). According to Beri (2008:106), a structured questionnaire is a formal list of questions framed so as to get the facts. Beri (2008:106) highlights that under structured questionnaire, the researcher follows a formalised or sequence of questions when collecting data from the research participants. Whereas, when using an unstructured questionnaire, a researcher does not follow any sequence when collecting data from research participants (Kothari, 2006:102). The researcher may probe in to acquire more information as much as possible. The study at hand employed the structured questionnaire in form of a self-administered questionnaire. A self-administered questionnaire comprises a formalised set of questions which the researcher sent to the research participant to complete on his or her own without the researcher's intervention (Fink, 2003:22).

Lewis-Beck, Bryman and Liao (2004:1012) point out that a greatest number of researchers use self-administered questionnaires as data collection tools. Musara

(2010:93) attests that there are plenty of advantages which may accrue to a researcher by using a self-administered questionnaire as a data collection instrument. The self-administered questionnaire was employed in this study for the following reasons identified by (Cargan, 2007:117) unless otherwise stated:

- Self-administered questionnaires can cover a wide geographical area since they can be mailed to research participants.
- Self-administered questionnaires are relatively cheaper as compared to other methods such as interviews where the researcher has to be at the scene where the research is taking place.
- More and quality of information may be obtained since the research participant is guaranteed anonymity.
- Research participants provide meaningful since they have ample time to complete the questionnaire as compared to other methods such as interviews.
- Self-administered questionnaires have proved to have a higher response rate than other data gathering techniques such as mail surveys (Cooper & Schindler, 2003:369).
- Self-administered questionnaires encompasses of standardized instructions and questions, hence the results obtained from the survey tend to be uniform.

4.8.1 Questionnaire Design

The questionnaire was divided into six sections in quest to address the research objectives. The five sections are as follows:

Section A: This section dealt with information such as the age, status of the respondent (owner/manager) and educational qualifications. In addition, the section focused on the length on which one has been conducting construction activities, area of specialization and annual turnover. This information is vital to establish the level of awareness on the topic at hand as well as to classify construction firms in different categories (SMEs or large firms).

Section B: This section was designed to assess the research participant's knowledge and usage of risk management techniques. In addition, this section helps the researcher in ascertaining the importance of risk management techniques.

Section C: In this section, the researcher attempted to identify challenges impeding the usage of risk management techniques. Some of the questions/statements which were asked in this section are depicted in Table 4.3.

Table 4.3 Extract of factors impeding the usage of risk management techniques

1= strongly agree, 2= agree, 3= neutral, 4= disagree and 5= strongly disagree.

	1	2	3	4	5
There is insufficient knowledge of risk management techniques					
Lack of confidence in the available risk management techniques					
Owner/Manager's lack of expertise to lead the risk management team					
Lack of cooperation and commitment among construction team members					

Section D: This section was aimed at gathering information related to the SMEs owner or manager's attitudes towards risk management techniques.

Section E: This was the last section in the questionnaire and addressed on ways of promoting, understanding and use of risk management techniques in the construction industry.

4.8.2 Reliability and validity of the instrument

During the questionnaire design phase, the researcher consulted and sought clarity from the research supervisor and experts in the construction industry on some challenges and ambiguities on completing the questionnaire. The researcher noted

all the contributions from the research supervisor and experts in the construction industry and incorporated them in the questionnaire. After incorporating all the contributions made, the researcher consulted the statistician on the reliability and validity of the questionnaire.

According to Webb (2002:108), reliability refers to the consistency in reaching the same result when the measurement is made over and over again. Thus, if a questionnaire is measured repeatedly should produce identical scores throughout the tests. Andrew, Pedersen and McEvoy (2011:202) identify three (3) types of reliability namely; inter-observer reliability, test-retest reliability and internal consistency reliability. In this study, the internal consistency reliability was used. The researcher with the help of the statistician used the Cronbach's alpha test to measure internal consistency reliability. According to Andrew et al (2011:202), a Cronbach's alpha is essentially a correlation between the item responses in a questionnaire assuming the statistic is directed toward a group of items intended to measure the same construct. The Cronbach's alpha values lies between 0 and 1. Chimucheka (2012); Andrew et al (2011:202) points out that any values which lie between 0.7 and 0.9 are the most desirable. The five sections of the questionnaire were tested for reliability using the Cronbach's alpha and the results are depicted in table 4.4. SPSS version 19 was to compute the Cronbach's alpha tests for all the sections in the questionnaire.

Table 4.4 Questionnaire reliability test

SECTIONS	NUMBER OF SCALED VARIABLES	CRONBACH'S ALPHA
Section A	7	0.801
Section B	33	0.857
Section C	10	0.745
Section D	9	0.849
Section E	7	0.786

The results Table 4.4 obtained from the computation of the Cronbach's alpha denote that the questionnaire was reliable since the Cronbach's alpha value lies in between 0.7 to 0.9. The results in table 4.4 show that the questionnaire was viable to collect

reliable data. Chimucheka (2012:107) also agrees that Cronbach's alpha results which lie between 0.7 and 0.9 are ideal reliability tests.

Basically, validity of a questionnaire refers to the degree to which it measures what it is supposed to measure (Chimucheka, 2012:107). Rust and Golombok (1999:215) point out that there are several types of validity such as face validity, content validity, criterion validity and predictive validity. The researcher with the help of the research supervisor, the experts in the construction industry and the statistician critically discussed and focussed mainly on the content validity of the questionnaire. The content validity denotes to the relationship between the content in the questionnaire and its intended purpose. Chimucheka (2012:107) highlights that reliability and validity of a research project may be affected adversely by some errors during conducting the research study.

4.8.3 Errors

Cooper and Schindler (2006:279) highlights that there are two main errors which may have an adverse impact on the reliability of data namely; the response and non-response errors. This section discusses on the errors encountered during conducting the research.

Chimucheka (2012) points out that non-response error occur when the responses of participants differ in some systematic way from the respondents of non-participants. In most cases, a non-response error takes place when the researcher fails to identify his or her target population or target research participants (Cooper and Schindler, 2006:279). According to Roberts-Lombard (2002:117), a non-response error is a variation between the true mean value of the variable in the original sample and the true mean value in the net sample.

Response errors are the estimated inaccuracies that can be introduced by the researcher, the researcher or the respondents. The researcher may make the error in the design of the instrument or may not properly define the problem and the related information required. Response errors can also occur when the respondent deliberately or mistakenly provides incorrect answers to the survey questions (Cant et al., 2005:183). Cooper and Schindler (2006:279) note that response errors can also be as a result of the participant failing to give a correct or a complete answer.

Babbie and Monton (2002:97) as cited by Chimucheka (2012:107) states that a researcher can minimise the amount of errors in a research by adopting the following guidelines:

- using self-administered questionnaires where the researcher and respondents had direct contact;
- repeated visits to the respondents by the researcher;
- carefully constructing and pre-testing the questionnaire that was used to collect primary data; and
- removing sensitive questions from the questionnaire.

Polit and Hungler (1997) suggest that a pilot study or pre-test should be conducted to assess whether a research instrument envisage the type of information sought by the researcher. In this study, both response and non-response errors were encountered.

4.8.4 Pilot test

A pilot study involves the assessing or testing of a designed questionnaire in order to identify the existence of any possible challenges, threats or ambiguities which a research participant may encounter in completing the questionnaire (Musara, 2010:). Basically under a pilot study, a researcher sends a few questionnaires to a small fraction of the possible research participants and assess if any challenges exits in completing the questionnaire (Chimucheka, 2012:108). The researcher distributed 10 questionnaires to the pilot group. From the piloted group, it was established that there were several repeated and unimportant questions which would not assist in attaining the research objectives as well.

4.8.5 Questionnaire distribution and collection

The decision making towards risk management techniques awareness and use mainly lies in the hands of the owner or manager of the enterprises. Thus, the researcher issued out the questionnaires strictly to SME owners or managers since they are the people mainly responsible for risk management. In order to avoid the errors mentioned in Section 4.7.3 above, the researcher chose to deliver and collect

the self-administered questionnaires in person to and from the research participants. In addition, self- delivery of questionnaire is fast and cheap. The researcher issued out 99 questionnaires. A copy of the questionnaire employed in this study is contained in Addendum 1. Section 4.8 which follows explores on the data preparation phase.

4.9 DATA PREPARATION

After collecting data from research participants, the researcher has to analyse the data. However, there are some errors which occur when research participants are completing the questionnaire thereby distorting the quality of the results of the survey. Therefore, the researcher has to identify such errors and prepare the data for data analysis. The researcher followed the steps which suggested by Shukla (2010:39). The steps include data editing, data coding, data entry and data cleaning. The steps are discussed in detail below.

4.9.1 Data editing

Basically, data editing is the first step which is undertaken when a questionnaire is received from field world. In completing the questionnaire, not all research participants are able to follow and understand the requirements of some questions or may skip or alter some questions by mistake. Thus, all these errors may have a negative effect on the quality of the data; hence by thoroughly editing the questionnaire, researcher to identify some possible errors and omissions. According to Shukla (2010:39), the purpose of data editing is to generate data which is accurate; consistent with intent of the question and other information in the survey; uniformly entered; and arranged to simplify coding and tabulation. Some common errors made in the questionnaire are that an entry in the questionnaire may be incorrect or entered in the wrong place (Chimucheka, 2012:110). The researcher checked for any errors, omissions and inconsistences which existed in the questionnaires completed by research participants.

4.9.2 Data coding

In chapter 1 it was established that the data will be analysed using SPSS version 19. SPSS is computer software which is used to analyse data. Generally computer software use numbers, commonly known as codes to process information. However,

the collected data comprised of information such as crossings (X) and some words. Hence, the researcher had to do the data coding to ensure that the data can be processed electronically (Parameswaran, 2003:126). Zindiye (2008:236) defines coding as the assigning of a number or symbol to the answers so that responses can be grouped into limited categories. Thus, data coding refers to a process of converting collected data into computer readable format. Some of the codes which were used in this study are shown below.

Gender	Male	1	Female	2

Specify your highest qualification

Master's Degree and above	1	Certificate	5
Honours Degree	2	High School	6
Bachelor's Degree	3	Primary School	7
Diploma	4	No formal education	8

In the gender table if a research participant was a male, the researcher assigned a code of as indicated on the box adjacent to male, and if the participant was a female, the researcher assigned a coded of 2 adjacent on the box adjacent to the female box. The same applies to the levels of education were coded with a number which is adjacent to the level of education.

4.9.3 Data entry

Data entry is the process of transferring data received from the data collection instrument (in case of the study at hand, data from questionnaires) into the computer data base (Gupta, 2011:110). Data entry is also referred to as data transcribing (Gupta, 2011:110). Cant et al., (2005:161) points out that data entry is a process which includes the tasks that are involved with the direct input of the coded data into some specific software package that will then be used to manipulate and transform

the raw data into useful information. The researcher entered the coded data on a Microsoft excel sheet.

4.9.4 Data cleaning

Rubin (2009:280) states that there are various errors which can be incurred during the data coding process. Rubin (2009:280) further states that such errors include coding mistakes, misread written codes and optical scanning malfunctions. Chimucheka (2012:111) defines data cleaning as a process of checking coded and entered data for errors before starting data analysis is called data cleaning. Thus, data cleaning plays an essential role in refining the quality of data by making it “fit for use” by the end users of information through reducing errors in the data and improving their documentation and presentation (Chapman 2005).

4.10 DATA ANALYSIS

Data analysis is one of the most crucial steps in conducting a research project. Data analysis is only conducted after verifying that the data which has been coded and entered is reliable and accurate. Zikmund and Babin (2010:66) define data analysis as the application of reasoning to understand data that have been gathered. According to Chimucheka (2012:112), data analysis is when collected data is transformed into useful information. The researcher with the aid of the statistics department at the University of Fort Hare conducted the data analysis of the study at hand. The Statistical Packages for Social Sciences (SPSS) version 19 statistical software was used for data analysis. The data analysis for the current study included descriptive statistics, Pearson Chi-square test and Independent samples T-test. The results obtained from the data analysis are comprehensively spelt out in chapter five (5).

4.11 Ethical Considerations

According to Anastas and MacDonald (1994), research ethics is a special set of principles and rules, written and unwritten, that place particular parameters on the relationship between the researcher and the people who participate in or who may be affected by the research. In most cases people who are adversely affected by the outcome of the research project include research participants, some researchers, and the sponsors of the research project and or the users of the final information

from the research project. This therefore means that the researcher has some obligations/principles to follow from the beginning of the research project up to the end of the research project. In this study, principles proposed by Cone and Foster (2006) were followed. The principles are as follows:

- Evaluate the ethical acceptability of the research.
- Asses the degree of risk involved for participants.
- Ensure the ethical conduct of the research by you and others involved in it.
- Obtain a clear, fair, informed and voluntary agreement by participants to participate.
- Avoid deception and concealment unless absolutely necessary and justifiable.
- Respect the participant's right to decline or withdraw from participation at any time.
- Protect the participant from any physical harm, danger or discomfort possibly associated with the research procedures.
- Protect the participant from any emotional harm, danger or discomfort possibly associated with the research procedures.
- Debrief the participant after the data collection has been completed.
- Correct any undesirable consequences to individual participants that result from them participating in the study.
- Maintain strict confidentiality of any information collected about a participant during the research in accordance with agreements reached with the participant while obtaining informed consent.

In addition, the researcher obtained an ethical clearance letter certificate from University of Fort Hare's Research Ethics Committee (UREC) to conduct the study at hand. The ethical clearance certificate is contained in Addendum 3.

4.11 CHAPTER SUMMARY

The chapter presented on the research methodology and design followed in quest to achieve the research objectives. Details of the focus of the study, the research method, data collection methods, data collection instruments and data preparation employed in this study have been explored. The chapter also discussed on the data analysis procedure which was followed briefly and the ethical considerations which

were observed during and after conducting the research project. Chapter five which follows presents on the research findings obtained from the data analysis.

CHAPTER FIVE

ANALYSIS AND INTERPRETATION OF RESULTS

5.1 INTRODUCTION

The previous chapter discussed the research methodology and design which was employed in executing the study at hand. The focus of this chapter is to present and interpret the research results obtained from the data analysis. Self-administered questionnaires were hand delivered and collected from a sample of SME owners/managers in the construction industry in Port Elizabeth and King Williams Town in the Eastern Cape Province of South Africa. The data obtained from the questionnaires was coded and cleaned before being analysed in an attempt to reduce a number of errors and irregularities. The data was analysed using the Statistical Package for Social Sciences (SPSS) version 19. The statistical analyses that were conducted during the data analyses included the Chi-square test and descriptive statistics such as the mean and the standard deviations. In addition, frequency analysis which includes frequency tables, pie charts and graphs were used to aid the data analysis. The researcher obtained the assistance from a statistician at the Department of Statistics at University of Fort Hare as well as from the research supervisor to conduct the data analysis and interpretation.

Before analysing the data, the researcher followed a notion proposed by Rubin and Babbie (2009:117), who suggested that for data analysis and reporting to be valid and reliable, a response rate of at least 50 percent should be met or else the results will be invalid. A response rate refers to the number of questionnaires returned by research participants divided by the total number of questionnaires issued out to research participants (Rubin and Babbie, 2009:117). The response rate is presented in Table 5.1.

Table 5.1: Research participants' response rate

Questionnaire Flow	Total No. of questionnaires	Percentage (%)
Questionnaires issued out	99	100%
Questionnaires returned	87	88%
Spoiled questionnaires	5	5%
Response rate	**82**	**83%**

Comment

The results in Table 5.1 depicts that a total of 99 (100%) questionnaires were issued out to SME owners or managers conducting construction activities in King Williams Town and Port Elizabeth. Of the 99 questionnaires which were issued out to the respondents, only 87 questionnaires were returned by the research participants. However, of the 87 (88%) questionnaires which were returned, 5 (5%) of the questionnaires were improperly completed which resulted in them being discarded. This resulted in 82 questionnaires being analysed. Thus, the effective response rate of the study at hand was obtained as 83%. The effective response rate obtained was considered adequate to conduct a data analysis and reporting as proposed by Rubin and Babbie (2009:117) since it is above 50% which is the benchmark of conducting data analysis and reporting. The researcher obtained a high response rate since he communicated with the research participants before delivering the questionnaire. In addition, the researcher hand delivered as well as collected the questionnaires. This increased the response rate as suggested by Musara (2010:91).

The remainder of the chapter presents on the results and interpretations obtained from the questionnaires which were sent to SME owners/managers in the construction industry following a logical sequence as presented on the questionnaire. The questionnaire comprises of 5 sections. Section 5.2 which follows discusses on the empirical results obtained from a question to question basis.

5.2 PRESENTATION AND INTERPRETATION OF EMPIRICAL RESULTS

This section presents the research results and interpretations of the data which was gathered using self-administered questionnaires that were sent to a sample of SME owners/managers in the construction industry. The results are presented following the logical sequence provided on the questionnaire on either a table or figure (pie charts or graphs). In addition, the empirical results obtained in this study were also compared to the results of other empirical studies conducted either locally or internationally to check if they are consistent or inconsistent with the existing literature.

5.2.1 Section A: Demographic information and business characteristics

This section comprised of 7 questions related to the demographic factors of the respondents who responded on behalf of the enterprises they own or manage as well as the demographic factors of the enterprise they also own or manage. The factors which were examined in this section include the gender of the respondent, status in the business (owner/manager) and the highest educational qualification held by the respondent. The area of specialisation, period in operation, number of employees and annual turnover will also be discussed in this section. The demographic information of the owner/managers and business characteristics are presented in the tables, figures and graphs and the interpretation will follow. The questions will be restated as provided in the questionnaire.

5.2.1.1 Please indicate your gender by marking with an (X) in the appropriate box.

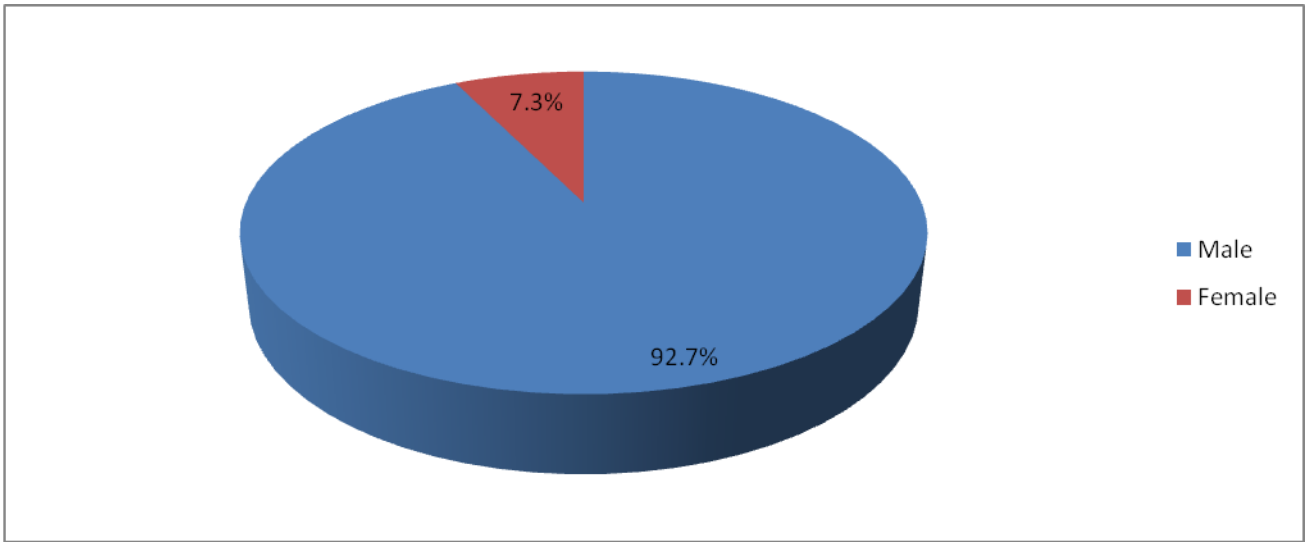
This question seeks to assess the gender of the research participants. The inclusion of this question was necessary to enable the researcher to make inferences concerning the respondents. The results of gender distribution are displayed in Table 5.2.

Table 5.2 Gender of respondents

Gender	Frequency	Valid Percentage (%)
Male	76	92.7
Female	6	7.3
Total	**82**	100

The results on the gender of the respondents are also statistically depicted in the pie chart in Figure 5.1.

Figure 5.1 Gender of respondents



Comment

The results show that males dominate in the construction industry occupying 92.7% of the industry whilst females occupying 7.3%. The results are consistent with a study conducted in South Africa by Geertema (2007:iv), who found out that women occupy approximately 10% of employment in the construction industry in South Africa as a whole. Geertema (2007:iv) further states that percentages of women professionally qualified or being leaders in the construction industry is even less.

Madikizela and Haupt (2010:9) conducted a study on influences on women's choices of careers in the construction industry in South Africa and found out that the challenging work environment, dangerous nature of construction, inability to work and influence a male dominated industry, discriminatory working environment and lack of knowledge of the industry were rated as being medium to high influences on other women choosing careers in other sectors instead of construction. The aforementioned influences act as barriers to women in working in the construction industry.

5.2.1.2 Status of research participants in the business.

The questionnaires were supposed to be completed by SME owners or managers only. This group of respondents was chosen mainly because they have the authority invested in them to decide on the awareness and implementation of risk management techniques. The findings are depicted in Table 5.3.

Table 5.3 Respondent's status in business

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Owner	69	82.1	84.1	84.1
	Manager	13	15.5	15.9	100.0
	Total	82	97.6	100.0	
Missing	System	2	2.4		
Total		84	100.0		

Comment

The findings in Table 5.3 reveal that 69 respondents representing 84.1% of the total respondents surveyed were the owners of the business whilst 13 respondents representing 15.9% of the total research participants were managers. The results of the survey show that the majority of research participants were SME owners. The results are consistent with a study conducted by Musara (2010:112). Musara (2010:112) conducted a study on 'the role played by Business Development

Services Providers (BDSs) in improving access to finance by start-up SMEs in the Buffalo City Municipality' and found out that 79% of the research participants were SME owners whilst 21% were managers. Musara (2010:112) highlights that most SME owners are always present on the job site to monitor all business activities.

5.2.1.3 Specify your highest qualification

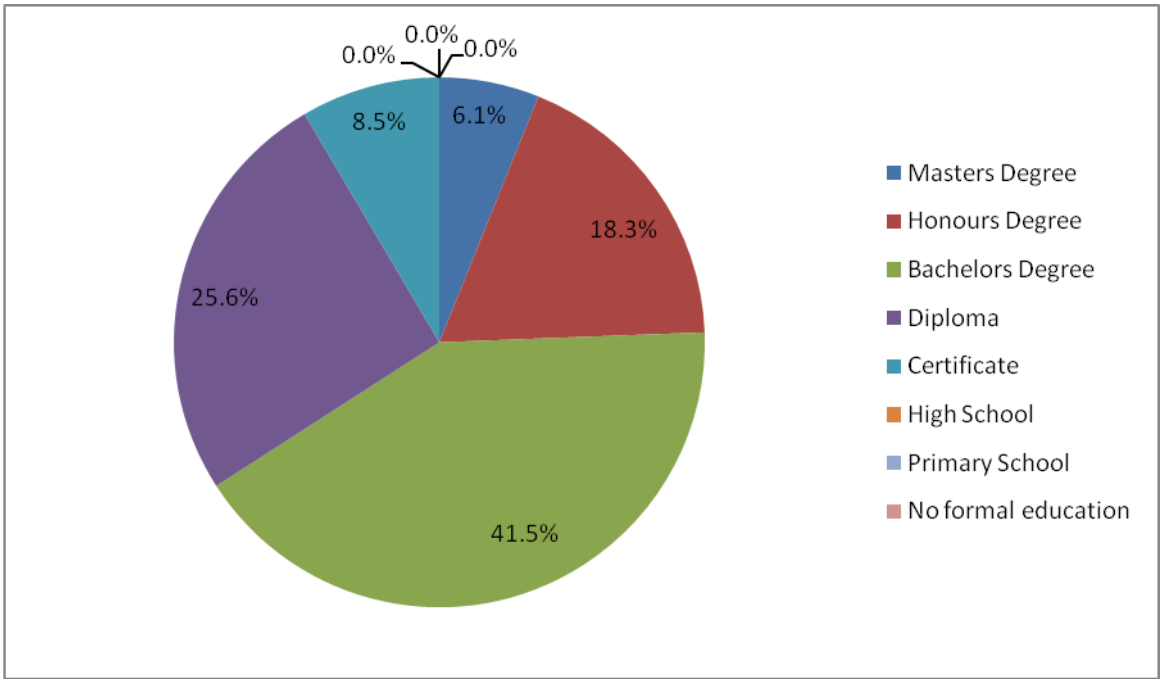
This question was included in the questionnaire to assess the highest level of qualification of the research participant. The level of education assists in a deeper understanding of the concepts of risk management and risk management techniques. The qualifications were classified into eight categories namely: master's degree and above, honour's degree, bachelor's degree, diploma, certificate, high school, primary school and no formal education. The results of the respondents' level of education are shown in Table 5.4.

Table 5.4 Respondent's educational level

Educational Level	Frequency	Valid percentage
Master's Degree and above	5	6.1
Honours Degree	15	18.3
Bachelor's Degree	34	41.5
Diploma	21	25.6
Certificate	7	8.5
Total	**82**	**100**

The results in table 5.4 are also displayed in Figure 5.2.

Figure 5.2 Respondents educational qualifications



Comment

The results show that majority of research participants hold bachelor's degrees at 41.5%, followed by diploma holders at 25.6% and honours degree with 15%. The results show that no research participant had qualifications below certificate level. This shows that 100% of the research participants had some formal education since they possess a certificate, diploma or a degree. The level of education possessed by research participants assured a relatively high level of awareness and quality of responses from the concepts and questions asked. The results of the current study are consistent with the findings by Agumba (2006:122), who conducted a study in the Gauteng Province and found out that personnel managing SMEs in the construction industry possessed at least a tertiary qualification. The results of the study conducted by Agumba (2006:122) revealed that 13 out of 15 research participants had diplomas to post-graduate qualifications.

5.2.1.4 Indicate your area of specialisation

This question was asked in order to assess the respondent's area of specialisation. The area of specialisation were categorised into six classes namely: residential,

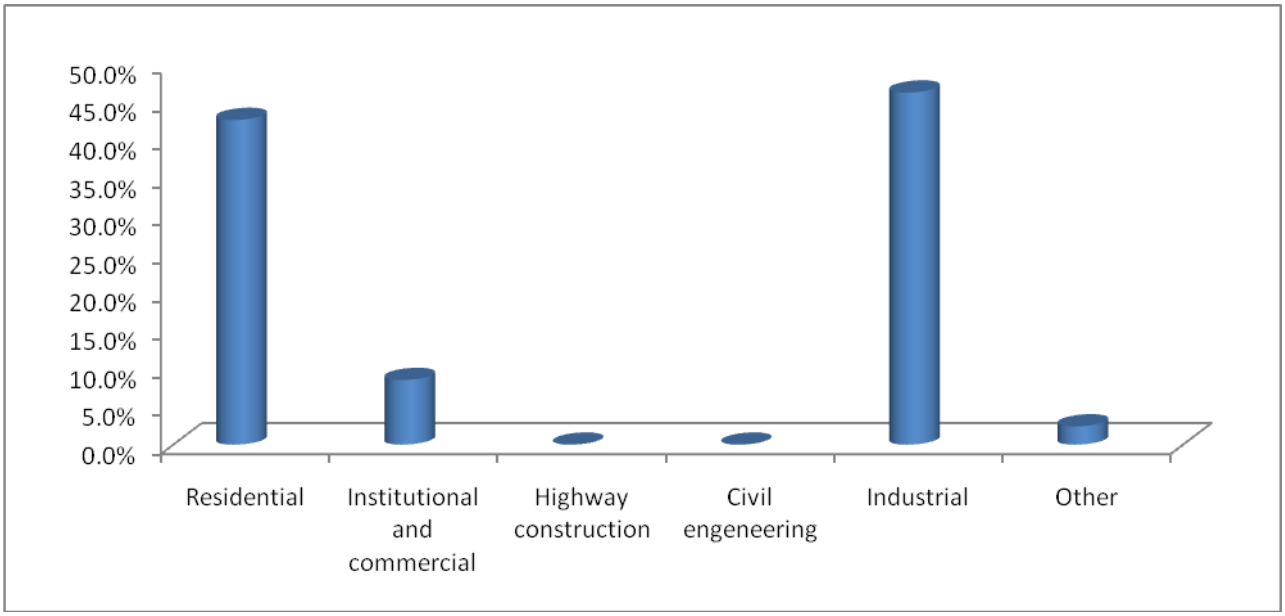
institutional and commercial, highway construction, civil engineering, industry and other. The results obtained on the respondent's area of specialisation are shown in Table 5.5.

Table 5.5 Respondent's area of specialisation

AREA OF SPECIALISATION	FREQUENCY	VALID PERCENTAGE
Residential	35	42.7
Institutional and commercial	7	8.5
Highway construction	0	0
Civil construction	0	0
Industry	38	46.4
Other	2	2.4
TOTAL	**82**	**100**

The results in Table 5.5 are also displayed in Figure 5.3.

Figure 5.3 Respondent's area of specialisation



Comment

The results presented show 42.7% of the respondents specialise in the residential construction, 8.5 % specialise in the institutional and commercial construction industry, 38 representing 46.4% specialise in the industrial construction and 2.4% specialise in the other sectors of the construction industry. The results also show that

there were no respondents who specialise in civil and highway construction. The results are consistent with a study conducted by Agumba (2006:70) who found out that there were no SMEs which specialised in the civil engineering. The results by Agumba (2006:70) further show that most SMEs in the construction industry dominated in the home improvement (residential construction) and building construction (industrial). The results obtained in this study are also in line with the aforementioned results.

5.2.1.5 Period in operation

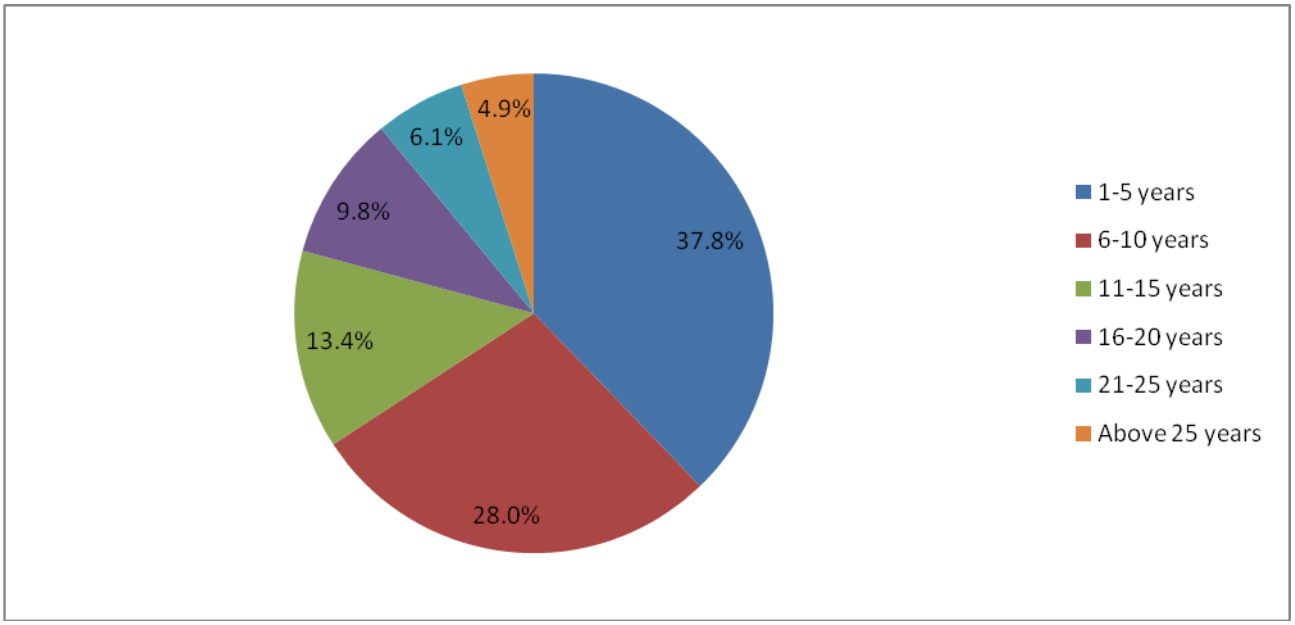
The question attempted to understand the length in which the SME has been in conducting business activities as a contractor. This question is important since the level of awareness and use of risk management techniques and understanding of risks in a specific industry may be improved by experience which an individual has been in an industry. Table 5.6 shows the results on the length of period of operation in years.

Table 5.6 Responses on the business period of operation (in years).

Period (In Years)	Valid percentage	Cumulative Percentage
1-5	37.8	37.8
6-10	28	65.8
11-15	13.4	79.2
16-20	9.8	89
21-25	6.1	95.1
Above 25	4.9	100
TOTAL	**100**	

The results in table 5.6 are statically shown in the pie chart in figure 5.4.

Figure 5.4 Respondent's period of operation



Comment

The results show that 37.8% of the respondents' firms have been in operation for a period between 1-5 years, followed by 6-10 with 28%. The results also show that the period above 25 was the least which occupied 4.9% of the research participants. The results further shows that 62.2% of SMEs in the construction industry have been in operation for a period more than 5 years. The results are consistent with findings by Agumba (2006:22), which show that 10 out of 15 SMEs investigated in Gauteng have been in operation for a period of more than 5 years. However, the results are inconsistent with the findings by Fatoki and Odeyemi (2010), who found out that the failure rate of SMEs is 75% within the first five years of operation.

5.2.1.5 Indicate the number of employees employed by your business

This question was asked in order to ascertain the size of the firm in line with the definitions proposed by the construction industry development board (CIBD) as well as defined by the National Small Business Act of South Africa of 1996 and as amended in 2003. The CIBD and the National Small Business Act of South Africa as amended in 2003 classifies the size of SMEs in relation to number of employees, annual turnover and the annual balance sheet totals. A summarised definition of the size of SMEs is shown in Table 5.7.

Table 5.7 Summarised schedule of size standards for the definition of SMEs in South Africa

Sector	Type of Firm	No. of employees	Turnover	Balance sheet total
Construction	Small	1-50	R5.00 m	R 1.00 m
	Medium	51-200	R 20.00 m	R 4.00 m

Source: Government Gazette of the Republic of South Africa (2003).

Table 5.7 shows that a firm which employees between 1-50 employees, has an annual turnover of R5.00 million and R1.00 million balance sheet total amount may be classified as small enterprises. Whilst a firm which employees between 51-200 employees, has an annual turnover of R20.00 million and R4.00 million balance

sheet total amount may be classified as medium enterprises. The sizes of SMEs in the construction industry in Port Elizabeth and King William's Town were measured using the definition by national small business act of South Africa of 1996 as amended in 2003 and the results are displayed in Table 5.8.

Table 5.8 Size of the business

No. of employees		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-50	52	61.9	63.4	63.4
	51-100	21	25.0	25.6	89.0
	101-150	5	6.0	6.1	95.1
	151-200	4	4.8	4.9	100.0
	Total	82	97.6	100.0	
Missing	System	2	2.4		
Total		84	100.0		

Comment

The results displayed in Table 5.8 show that 63.4% of the respondents who took part in the research study employed between 1 to 50 employees, 25.6% employed between 51 to 100 employees, 6.1% employed between 101 to 150 employees and finally 4.9 % of the respondents employed between 151 to 200 employees. In relation to the definition proposed by national small business act of South Africa of 1996 and as amended in 2003, the results show that 63.4% of the research participants are small enterprises and the remaining 36.6% are classified as medium enterprises. Thus, small enterprises dominate in the construction industry in King William's Town and Port Elizabeth.

5.2.1.6 Provide your business estimated annual turnover

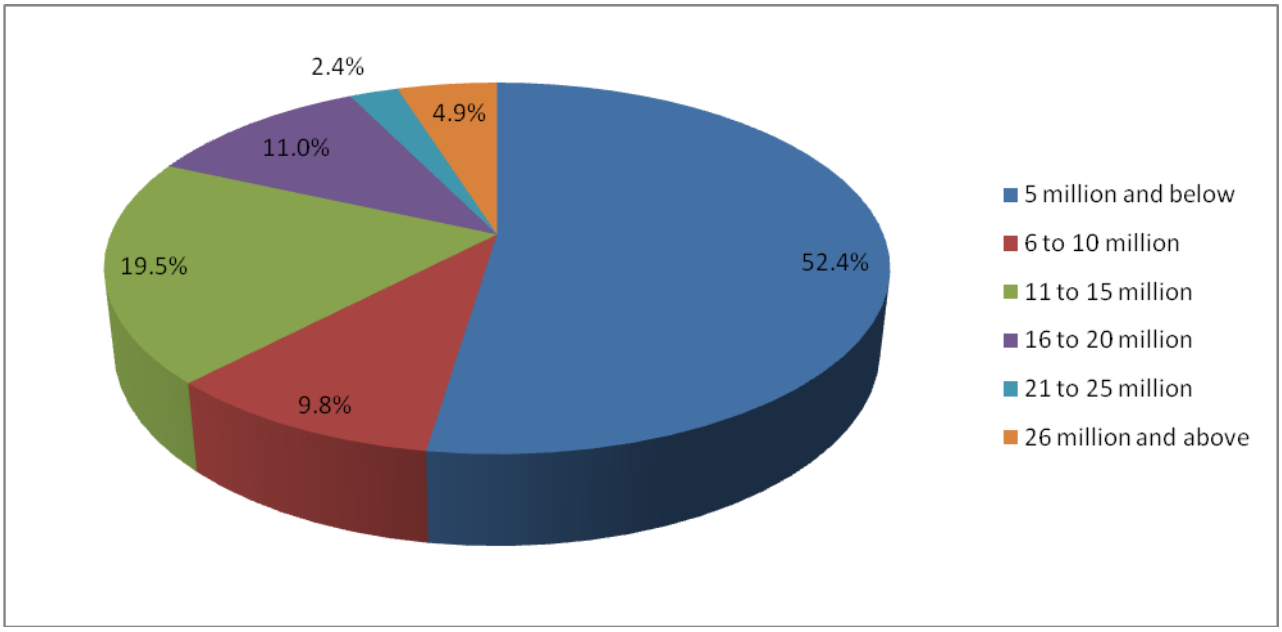
This question was also asked in order to classify enterprises in either small or medium category in line with the definitions proposed by the Construction Industry Development Board (CIDB) and National Small Business Act of South Africa of 1996 and amended in 2003. The results obtained are shown in Table 5.9.

Table 5.9 Respondent's range of annual turnover

Turnover		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5 million and below	43	51.2	52.4	52.4
	6 to 10 million	8	9.5	9.8	62.2
	11 to 15 million	16	19.0	19.5	81.7
	16 to 20 million	9	10.7	11.0	92.7
	21 to 25 million	2	2.4	2.4	95.1
	26 million and above	4	4.8	4.9	100.0
	Total	82	97.6	100.0	
Missing	System	2	2.4		
Total		84	100.0		

The results in Table 5.9 are also statistically portrayed in the pie chart in Figure 5.5.

Figure 5.4 Respondent's range of annual turnover



Comment

The findings show that the firms which were surveyed fulfilled the requirements of being classified as small and medium enterprises in line with the definition proposed by the Construction Industry Development Board (CIDB) and National Small Business Act of South Africa of 1996. According to the definition of SMEs in the construction industry in relation to annual turnover (small contractors with a maximum turnover of 5 million), 43 of the respondents representing 52.4% of the interviewed contractors fell in the small enterprises category. In addition, 40.3% fell in the medium enterprises category (firms which had an annual turnover between 6 to 20 million). The results further show that 7.3% of the firms surveyed had an excess of the required maximum turnover (had maximum turnover in excess of 20 million). However, these satisfied the requirements of the definition based on the number of employees. The results are consistent with the results by Agumba (2006) who found out that the majority of SMEs are small contractors.

5.2.2 Section B: The extent of awareness and use of risk management techniques

The section above, discussed on the results of questions obtained from Section A of the questionnaire which addressed issues on the demographic information of the respondents who responded on behalf of the enterprise they own or manage as well as information pertaining the enterprises. The purpose of this study was to establish the level of awareness and use of risk management techniques by SMEs in the construction industry. Therefore, this section focuses on the questions which were asked to assess the level of awareness and use of risk management techniques by SMEs in the construction industry.

5.2.2.1 Does your company have a risk management policy?

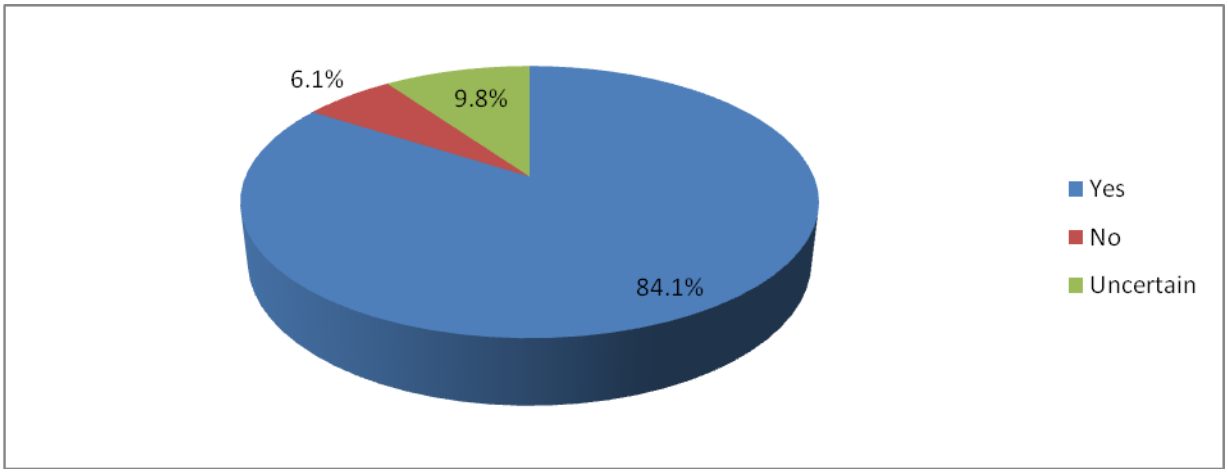
This section discusses on the availability of risk management policies within the firms of the respondents who were interviewed. The availability of risk management policies within firms also proves the level of awareness on risk management and risk management techniques. The findings on the availability of risk management policy are shown in Table 5.10.

Table 5.10 Availability of risk management policy

Policy		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	69	82.1	84.1	84.1
	No	5	6.0	6.1	90.2
	Uncertain	8	9.5	9.8	100.0
	Total	82	97.6	100.0	
Missing	System	2	2.4		
Total		84	100.0		

The results on the availability of risk management policy within SMEs in the construction industry presented in Table 5.10 above are also displayed in the pie chart in Figure 5.5 below.

Figure 5.5 Availability of risk management policy



Comment

The results show that 69 of the respondents, which represent 84.1% of the research respondents, had risk management policy in their businesses, 5 respondents, which represents 6.1% of the research participants had no risk management policy, whilst 9.8% of the research participants were uncertain on the availability of risk management policy. The results further reveal that the majority of research participants (84.1%) had risk management policy in place. The results are consistent with the results of a study conducted by Adnan, Omar and Jusoff (2008) who found out that for companies with formal statement on their risk management policy, it was found that 80.0 per cent have policy goals, policy objectives, policy strategies and 80.0 per cent have performance indicators. The results are also in line with the goals of the CIDB which maintains a register of all contractors in order to support risk management in the construction industry (Government Gazette, 2000).

5.2.2.2 Do you, either individually or as a team, determine which potential risks that are likely to happen in your project?

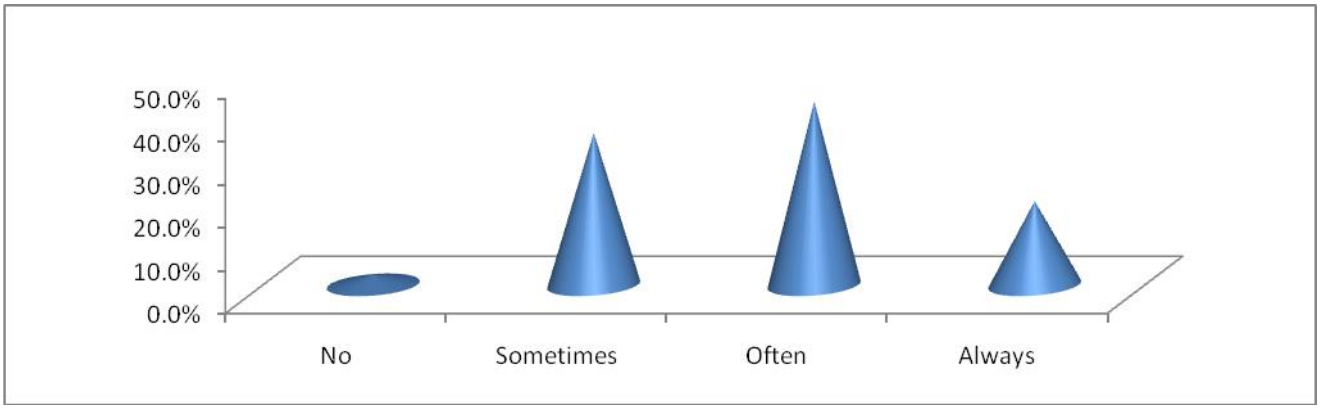
This question was asked in order to assess whether the SME owner or managers discusses on the risks inherent the construction industry. The results obtained on this question are depicted in Table 5.11.

Table 5.11 Frequency of discussion on potential risks in the industry

Potential		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	2	2.4	2.4	2.4
	Sometimes	29	34.5	35.4	37.8
	Often	35	41.7	42.7	80.5
	Always	16	19.0	19.5	100.0
	Total	82	97.6	100.0	
Missing	System	2	2.4		
Total		84	100.0		

The results displayed in Table 5.11 are also portrayed in the Figure 5.6 below.

Figure 5.6 Frequency of discussion on potential risks in the industry



Comment

The results displayed in Figure 5.3 show that 2.4% of the respondents who took part in the research do not discuss on the potential risks inherent construction projects, 35.4% sometimes discusses on the potential risks, 42.7% often discusses on the potential risks and 19.5% always discusses on the potential risks. The results further show that the minority of the respondents (19.5%) always discuss about risks

inherent the construction projects. However, the results of the study contradict with the objectives of the Health and Safety (2006:8), which states that discussions and assessment of risks should be carried out always on any work places. This suggests that SMEs in the construction industry should be encouraged to discuss about risks that are inherent construction projects always.

5.2.2.3 How often do you discuss about the following risks in your meetings?

This question was asked in order to identify the number of times in which SME owner/ managers discuss about risks namely: legal/compliance risk, productivity risk, financial stability and reputation and loss of customer confidence. The question was asked on a scale ranging from 1 to 5 where: 1= Never, 2= Rarely, 3= Occasionally, 4= Frequently and 5= Very frequently. The results on the frequency of discussing about risks in meetings are shown in Table 5.12.

Table 5.12 Discussion of risks by small and medium contractors

Nature of risk	N	Minimum	Mean	Std. Deviation
Legal/compliance risk	82	1	3.28	1.210
Productivity risk	82	2	3.72	0.920
Reputation and loss of customer confidence	82	2	3.76	0.810
Financial stability	82	1	3.43	1.066
Valid N (listwise)	82			

Comment

The results displayed in Table 5.12 show that the highest mean on discussions of risks by SMEs in the construction industry falls under the reputation and loss of customer confidence of 3.76 whilst carries the lowest mean of 3.28. The results further show that all SMEs in the construction industry discusses on legal/ compliance risks discusses on the legal/ compliance risk, productivity risk, financial stability risk, financial stability and the reputation and loss of customer confidence risks since all their means are above the neutral (3) point (Musara, 2010:119). The results are in line with the recommendations proposed by Bernstein, Russo and Laquidara-Carr (2011:1) who recommends that firms in the construction may mitigate risks by communicating with other team members throughout the projects.

5.2.2.4 Are you aware and use some of the following risk management techniques in identifying risks in construction projects?

Table 5.12 Awareness and use of risk management techniques

Risk management technique	Not aware	Aware only	Aware and use
Assumptions analysis	72.0%	12.2%	15.8%
Brainstorming	13.8%	63.0%	23.2%

Risk checklists	52.4%	36.6%	11.0%
Delphi technique	58.5%	32.9%	8.6%
Document review	20.7%	45.1%	34.2%
Interviews	4.9%	78.0%	17.1%
Diagramming techniques	59.8%	31.7%	8.5%
Other (Specify)			

The average/aggregated mean for the level of awareness and use of risk management techniques are displayed in table 5.13.

Table 5.13 Overall awareness and use of risk management techniques

Risk management technique	Mean	Standard deviation
Assumptions analysis	1.44	0.755
Brainstorming	2.10	0.601
Risk checklists	1.59	0.684
Delphi technique	1.50	0.653
Document review	2.13	0.733
Interviews	2.12	0.455
Diagramming techniques	1.49	0.653
Other (Specify)		

Comment

The results in Table 5.13 on overall of awareness and use of risk management techniques the show that document review has the highest mean of 2.13 and

assumptions analysis has the lowest mean of 1.44. However, the results show that there is low level of awareness and use of risk management techniques since the means fall below the neutral level 3 (refer to Addendum Three on descriptive and frequencies on awareness and use of risk management techniques). This means that there is a great need to improve on awareness and use of risk management techniques. The results obtained in this study are consistent with the results obtained in international studies. A study conducted in Brazil by Garrido, Ruotolo, Ribeiro and Naked (2011) revealed that there is low level of awareness of risk identification techniques.

5.2.2.5 Improvement made by the use of risk management techniques

In this section, research participants were asked to express their views on the improvement made on construction projects through the use of risk management techniques. The results are displayed in Table 5.14.

Table 5.14 Improvement made by the use of risk management techniques

Area of Improvement	Mean	Standard deviation
Minimise costs	3.91	0.789
Helps in meeting the project's deadline	3.95	0.815
Increased customer satisfaction	4.05	0.607
Meet building requirements	4.12	0.710
Minimise project failure	3.99	0.619
Minimise legal costs	3.95	0.665
Fraud prevention or detection	3.74	0.663
Improves project's quality	3.87	0.699
Reliable business information	3.79	0.733
Minimise occurrences of unforeseen events	3.85	0.722

Comment

The results in Table 5.14 shows that meeting the building requirements has the highest mean of 4.12, followed by increased customer satisfaction with a mean of 4.05 and fraud prevention or detection with a mean of 3.74 being the least. The results show that risk management techniques play a significant role on the improvement on the performance of SMEs in the construction since all the means fall above the neutral point.

5.2.3 Section C: Factors impeding the usage of risk management techniques

Questions in this section of the questionnaire were asked in an attempt to address an objective which reads as follows:

- To examine the reasons of not implementing risk management techniques to those SMEs who are not using any risk management technique and provide recommendations.

The questions comprised of statements which were ranked on a 5 point Likert scale where 1= strongly agree, 2= agree, 3= neutral, 4= disagree and 5= strongly disagree. The results obtained are displayed in Table 5.15.

Table 5.15 Factors impeding the usage of risk management techniques

	Mean	**Standard Deviation**
There is insufficient knowledge of risk management techniques	4.27	0.686
Lack of confidence in the available risk management techniques	3.98	0.702
Owner/Manager's lack of expertise to lead the risk management team	3.38	1.002
Lack of cooperation and commitment among construction team members	4.13	0.539

There is no guideline on the standard procedure of implementing risk management techniques	1.24	0.511
Resistance from staff and management	1.16	0.457
Benefit does not justify the effort	1.37	0.746
Risk management techniques require availability of sound data, which is difficult to collect to ensure confidence	1.40	0.664
Doubts whether these techniques are applicable to the construction industry	4.00	0.861
Lack of technology	1.60	0.829
Time constraints have an impact on the implementation of risk management techniques	4.11	0.737

Comment

The results in Table 5.15 show that there is insufficient knowledge of risk management techniques (4.27), lack of cooperation and commitment among construction team members (4.13) and time constraints have an impact on the implementation of risk management techniques (4.11) had the highest means, whilst resistance from staff and management (1.16), there is no guideline on the standard procedure of implementing risk management techniques (1.24) and Benefit does not justify the effort (1.37) had the lowest means. The results show that insufficient knowledge of risk management techniques is major constraint to the implementation of risk management techniques. This means that there is a lot of work which is needed to create more awareness on risk management techniques.

SECTION D: SME OWNER/MANAGER ATTITUDES TOWARDS RISK MANAGEMENT TECHNIQUES

14. To what extent do you agree or disagree on the following attitudes of SME owner/manager towards the implementation of risk management techniques in the construction industry, where:

1= strongly agree, 2= agree, 3= neutral, 4= disagree and 5= strongly disagree.

Table 5.16 Respondent's attitudes towards risk management techniques

	Mean	**Standard deviation**
The implementation of risk management techniques improve on the performance, productivity, budget and quality of construction projects.	4.28	0.594
Owner or manager should participate in the implementation of risk management techniques in the construction industry.	4.15	0.547
Owner or manager should disseminate information on the importance of risk management techniques to every employee within the business.	4.23	0.528
Risk management techniques are mainly ideal for projects with certain characteristic, for example new technology, multiple participants and unstable political conditions.	1.34	0.526
The implementation of risk management techniques increases unwarranted operational cost.	1.59	0.888
Risk management techniques should be implemented in all construction projects.	4.13	0.699
Risk management techniques should be employed continuously, meaning from the starting phase/stage to the ending phase.	4.29	0.555
Information obtained from risk management techniques should be incorporated in decision making.	4.20	0.576
Construction industry has a very good reputation in coping with risk.	1.48	0.652

Comment

The results in Table 5.16 show that risk management techniques should be employed continuously, meaning from the starting phase/stage to the ending phase (4.29), The implementation of risk management techniques improve on the performance, productivity, budget and quality of construction projects (4.28) and owner or manager should disseminate information on the importance of risk management techniques to every employee within the business (4.23) had the highest means while risk management techniques are mainly ideal for projects with certain characteristic, for example new technology, multiple participants and unstable political conditions (1.34), construction industry has a very good reputation in coping with risk (1.48) and the implementation of risk management techniques increases unwarranted operational cost (1.59) had the lowest means. In addition, the results show that the majority of respondents had a strong attitude towards risk management techniques since the majority of the means are above 3 which is the neutral point. Furthermore, the variables where the means are below the neutral points it shows that the respondents were in agreement that risk management plays a significant part in improving the project's performance for instance the implementation of risk management techniques increases unwarranted operational cost (1.59). The results shows that risk management techniques do not yield to unwarranted costs. The results also show that the construction industry have a bad reputation when it comes to coping with risks, since the mean for the variable for the construction industry has a very good reputation in coping with risk of 1.48 which falls below the neutral point. The results obtained in this study are consistent with the results from international studies. Adnan, Jusoff and Salim (2008) conducted a study on risk management assessment for partnering projects in the Malaysian construction industry and concluded that Malaysian construction industry has a bad reputation in managing the risk.

SECTION E: WAYS OF PROMOTING THE UNDERSTANDING AND USE OF RISK MANAGEMENT TECHNIQUES IN THE CONSTRUCTION INDUSTRY

Table 5.17 Ways of promoting awareness and use of risk management techniques

Statement	Mean	Standard deviation
Provide training and seminars on risk management and risk management techniques.	4.30	0.560
Introduce courses and programmes related to risk management in schools, colleges and universities.	4.22	0.545
SMEs in the construction industry should incorporate the importance and objectives of risk management.	4.20	0.508
Information on the importance and use of risk management techniques should be passed to every employee within the organisation despite their levels.	4.28	0.573
The owner/manager should be involved in implementing risk management techniques	4.29	0.55
Management should establish a risk management unit or department within the business.	4.23	0.573
Introduce a statutory requirement on risk management by the government or by the construction industry development board (CIBD).	4.13	0.561

Comment

The results in Table 5.17 show that the variables to provide training and seminars on risk management and risk management techniques (4.30), the owner/manager should be involved in implementing risk management techniques (4.29) and information on the importance and use of risk management techniques should be

passed to every employee within the organisation despite their levels (4.28) had the highest means while to introduce a statutory requirement on risk management by the government or by the construction industry development board (CIBD) (4.13), SMEs in the construction industry should incorporate the importance and objectives of risk management (4.20) and to introduce courses and programmes related to risk management in schools, colleges and universities (4.22) had the lowest means. The results show that the majority of the respondents are of the view that to provide training and seminars on risk management and risk management techniques is the major way which can be used to create awareness and use of risk management techniques.

5.3 HYPOTHESES TESTING

The purpose of this section is to present on the hypotheses testing. Hypothesis testing refers to the use of statistical means to determine whether the likelihood of a given hypothesis/statement is true or false and results in either the acceptance or rejection of the hypothesis (Zindiye, 2008:222). Morzuch (2005:23) points out that to have an effective hypotheses testing; the hypotheses have to be stated first. Therefore, this section begins by restating the hypotheses. Section 5.3.1 restates the hypotheses.

5.3.1 Hypotheses restated

HA_0: SMEs in the construction industry are not aware of the risk management techniques.

HB_0: SMEs in the construction industry are not implementing risk management techniques effectively.

HC_0: SME owners or managers in the construction industry have a negative attitude towards risk management techniques.

The above mentioned hypotheses were tested using the Chi-square test, cross tabulation and descriptive statistics. Chi-square and cross tabulation test were conducted to determine whether there were significant differences on the level of awareness and use of risk management techniques by demographic factors (status of the respondent, qualification and period in operation) presented in the

questionnaire. The aforementioned variables are essential in determining the level of awareness and use of risk management techniques. The Chi-square was calculated at 95% confidence level, which meant that the significance (p-value) was supposed to be less than 0.05 to be significant. The following section presents extracts of descriptive, chi-square and cross tabulation results on the level of awareness and use of risk management techniques based on the demographic factors provided in the questionnaire (status, qualification and period of operation). The demographic factors were tested on each of the seven (7) risk management techniques used in this study.

Status of the respondent and the level of awareness and use of Assumption and Constrains Analysis

Table 5.18 shows an extract of the results of cross tabulation and chi-square test between the status (owner/manager) and the level of awareness and use of Assumption and Constrains Analysis technique.

Table 5.18: Chi-square on awareness and use of Assumption and Constrains Analysis by status

Status	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
Owner	73.9%	11.6%	14.5%	100%	1.41	.870[a]	0.647
Manager	61.5%	15.4%	23.1%	100%	1.62		

The results in table 5.18 show that the majority, 73.9% owners and 61.5% managers were not aware of the Assumption and Constrains Analysis by status. The results also show that the minority 14.5% owners and 23.1% managers were aware and made use of the Assumption and Constrains Analysis by status. The results of a Chi-square test of association which was performed by cross tabulating two variables namely the status of the respondent and awareness and use of use of the Assumption and Constrains Analysis, a Chi-square value of 0.870 was obtained with a probability value of 0.674. Since the probability value obtained from a Chi-square test is greater than 0.05, it shows that the status of the respondent does not have a

significant impact on the level of awareness and use of the Assumption and Constrains Analysis. In addition, the means obtained are also below the neutral point (3) which shows that there is low level of awareness and use of the Assumption and Constrains Analysis regardless of the status of the respondent.

- **Status of the respondent and the level of awareness and use of Brainstorming**

Table 5.19 depicts the chi-square and cross tabulation which was conducted on the impact of the status of the respondent and the level of awareness and use of the brainstorming technique.

Table 5.19 Chi-square on awareness and use of Brainstorming technique

Status	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
Owner	14.5%	60.9%	24.6%	100%	2.10	1.226[a]	0.542
Manager	7.7%	76.9%	15.4%	100%	2.08		

The results in Table 5.19 show that the majority 60.9% of owners and 76.9% of managers are aware only of the brainstorming technique and the minority 14.5% of owners and 7.7% of managers are not aware of the brainstorming technique. In addition, the results further show that only 24.6% of owners and 15.4% of managers are aware and use the brainstorming technique. A chi-square test was conducted and a chi-square value of 1.226 and a probability value of 0.542. Since the significance value is greater than 0.05, it can be deduced that status of the responded does not have an impact on the level of awareness and use of the brainstorming technique. Despite the fact that the majority of the respondents are aware of the brainstorming technique, the means obtained from the cross tabulation show that there is a low level of awareness and use of the brainstorming technique.

- **Status of the respondent and the level of awareness and use of Risk Checking**

Table 5.20 presents the results obtained from cross tabulation and chi-square test on the Status of the respondent and the level of awareness and use of Risk Checking.

Table 5.20 Chi-square on awareness and use of Risk Checklist

Status	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
Owner	55.1%	37.7%	7.2%	100%	1.52	6.233[a]	0.044
Manager	38.5%	30.8%	30.8%	100%	1.92		

The chi-square test results between the status and the level of awareness and use of the risk checking technique revealed that there is a statistically significance difference on the status and the level of awareness and use of the risk checklist since the probability value (0.044) is less than 0.05. However, the means on the level of awareness and use of the risk checklist of both owners and managers fluctuated below the neutral point (3) and this implies that there is generally a lack of awareness and use of the risk checklist technique.

- **Status of the respondent and the level of awareness and use of the Delphi Technique**

Chi-square results in Table 5.21 indicate that the chi-square value was 2.733 and probability (sig) value of 0.255 was obtained. The Chi-square results also show that there are no statistically significant differences on the level of awareness and use of the Delphi Technique among the respondents when grouped by status held in the business.

Table 5.21 Chi-square on status and awareness and use of Delphi technique

Status	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
Owner	62.3%	30.4%	7.2%	100%	1.45	2.733[a]	0.255
Manager	38.5%	46.2%	15.4%	100%	1.77		

The results in Table 5.21 show that 63% of the owners who participated in the survey were not aware of the Delphi Technique whilst 38.5% of the managers are not aware of the Delphi Technique. The results also show that 30.4% of owners and 46.2% of managers were aware only of the Delphi Technique. The results further reveal that 7.2% of the owners and 15.4% of managers were aware and use the Delphi Technique. However, means of all categories (owner/managers) are relatively below the neutral point (3) which indicates a low level of awareness and use of the Delphi technique based on the status held in the business.

- **Status of the respondent and the level of awareness and use of Document review**

The results of the above mentioned test are displayed in Table 5.22.

Table 5.22 Chi-square on status and awareness and use of Document Review

Status	**Not aware**	**Aware only**	**Aware and use**	**Total**	**Mean**	**X^2 Value**	**Sig.**
Owner	18.8%	47.8%	33.3%	100%	2.14	1.540[a]	0.463
Manager	30.8%	30.8%	38.5%	100%	2.08		

The Chi-square results depicted in Table 5.22 reveal that there are no statistically significant differences on the level of awareness and use of the Document Review when grouped by status held in the business since the probability (sig) value (0.463) obtained is above 0.05. The results also show that 18.8% of owners and 30.8% of managers who participated in the survey were not aware of the Document Review technique. This shows that the majority of all groups were aware of the Document Review technique since the results of the respondents who are not aware of the Document Review technique are below 50%. However, the means on the level of awareness and use of the Document Review when grouped according to the status held by the respondent in the business fluctuated below the neutral point of 3 and

this show that there is generally a low level of awareness and use of the Document Review.

- **Status of the respondent and the level of awareness and use of Interviews**

The combined results of the Chi-square (0.272) in table 5.23 show that there is no statistically significant difference in responses to the level of awareness and use of the interview technique between the owners and managers of businesses.

Table 5.23 Chi-square on status and awareness and use of Interviews

Status	**Not aware**	**Aware only**	**Aware and use**	**Total**	**Mean**	**X^2 Value**	**Sig.**
Owner	5.8%	79.7%	14.5%	100%	2.09	2.605[a]	0.272
Manager	0%	69.29%	30.8%	100%	2.31		

The results in Table 5.23 show that the minority 5.8% of the owners and 0% of managers are not aware of Interview technique. This shows that the majority of the respondents were aware of the Interview technique since the rate of respondents who are not aware of the interview technique is below 50%. Despite a high rate of awareness of the Interview Technique, the results also show that 14.5% of the owners and 30.8% of the managers are aware and use the Interview technique. This shows that there is a low level of use of the interview technique. The results of the means of owners (2.09) and managers (2.31) show that there is a lack of awareness and use of the Interview technique since all the means fall below the neutral point (3).

- **Status of the respondent and the level of awareness and use of Diagramming technique**

The results which were obtained in testing the above test are depicted in table 5.21 below.

Table 5.24 Chi-square on status and awareness and use of Diagramming Technique

Status	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
Owner	58.0%	33.3%	8.7%	100%	1.51	0.608[a]	0.738
Manager	69.2%	23.1%	7.7%	100%	1.38		

The results displayed in in Table 5.24 show that the majority of the owners (58.0%) and managers (69.2%) are not aware of the Diagramming Technique. In addition, the results show that 8.7% of owners and 7.7% of managers who participated in the survey were aware and use the diagramming techniques. A combined Chi-square test was conducted to test if there was a significant difference on the level of awareness and use of the Diagramming technique by status of the respondent. The Chi-square results show that there is no significant difference on the level on the level of awareness and use of the diagramming technique by status since the probability (sig) value (0.738) obtained is less than 0.05.

- **Qualification of the respondent and the level of awareness and use of Assumptions Analysis**

Table 5.25 Chi-square on Qualification and awareness and use of Assumptions and analysis Technique

Qualification	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
Masters	80.0%	0%	20%	100%	1.40	5.559[a]	0.697
Honors	66.7%	20%	13.3%	100%	1.47		
Bachelors	73.5%	11.8%	14.7%	100%	1.41		
Diploma	61.9%	14.3%	23.8%	100%	1.62		
Certificate	100%	0%	0%	100%	1.00		

The results in Table 5.25 show that the majority of respondents are not aware of the Assumptions Analysis Technique depending on the level of qualification. More than 50% of the research participants were not aware of the Assumptions and awareness technique. The results of a Chi-square test which was conducted to test whether there is a significant difference on the level of awareness and use of the Assumptions analysis technique by the respondent's qualification since the p-value 0.697 is greater than 0.05. In addition, the means which were computed on each level of qualification show that there is a low level of awareness and use of the Assumptions Analysis technique.

- **Qualification of the respondent and the level of awareness and use of Braining Storming Technique**

The results which were obtained from the cross tabulation and the Chi-square test which were conducted to determine where there is a significant difference on the qualification of the respondent and the level of awareness and use of the Brainstorming technique are displayed in Table 5.26.

Table 5.26 Chi-square on Qualification and awareness and use of Brain Storming Technique

Qualification	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
Masters	40%	60%	0%	100%	1.60	8.512[a]	0.385
Honors	6.7%	66.7%	26.7%	100%	2.20		
Bachelors	20.6%	55.9%	23.5%	100%	2.03		
Diploma	4.8%	71.4%	23.8%	100%	2.19		
Certificate	0%	71.4%	28.%	100%	2.29		

Results displayed in Table 5.26 show that the majority of the respondents who participated in the study were aware of brainstorming technique. This is shown by the percentage of the respondents who were aware of the brainstorming which is above 50% in all qualification categories. However, the results further show that despite the fact that majority of the respondents were aware of the Brainstorming technique, only a small fraction of the respondents are aware and use the brainstorming technique. In addition, the results further show that there is a low level of awareness and use of the brainstorming technique since all the means of the academic categories are below the neutral point (3). A combined Chi-square test which was conducted to evaluate whether there is a significance difference on the level of qualification and the level of awareness and use of the brainstorming technique, the results showed that there is no significant difference since the p-value (0.385) is greater than 0.05 which is the recommended p-value.

- **Qualification of the respondent and the level of awareness and use of Risk Checklist**

A cross tabulation and a Chi-test of association was conducted on two variables namely the qualification and the Risk checklist technique. The results which were obtained from the cross tabulation and the Chi-square test of association are depicted on Table 5.27.

Table 5.27 Chi-square on Qualification and awareness and use of Risk Checklist

Qualification	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
Masters	60%	0%	40%	100%	1.80	18.184[a]	0.020
Honors	80%	20%	0%	100%	1.20		
Bachelors	38.2%	52.9%	8.8%	100%	1.71		
Diploma	61.9%	28.6%	9.5%	100%	1.48		
Certificate	28.6%	42.9%	28.6%	100%	2.00		

The results of the Chi-square test which was conducted showed that there is a significant difference on the level of awareness and use of the checklist technique depending on the qualification of the respondent. This is shown by the p-value of 0.020 which is less than 0.05. The results also show that there is a mixed level of awareness and use of the risk checklist depending on the qualification of the respondent. For instance there are 0% of respondents with an Honours Degree who were aware and use the Risk checklist, whilst 28.6% of the respondents who hold certificates are aware and use the checklist technique. However, the overall mean of each category show that there is low level of awareness and use of checklist technique since all the means are below the neutral point of 3.

- **Qualification of the respondent and the level of awareness and use of the Delphi Technique**

Table 5.28 Chi-square on Qualification and awareness and use of Delphi Technique

Qualification	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
Masters	40.0%	40.0%	20.0%	100%	1.80	10.977[a]	0.203
Honors	86.7%	0.0%	13.3%	100%	1.27		
Bachelors	50.0%	41.2%	8.8%	100%	1.59		
Diploma	57.1%	38.1%	4.8%	100%	1.48		
Certificate	57.1%	42.9%	0.0%	100%	1.43		

The results in Table 5.28 show that the majority of the respondents who took part in this study were not aware of the Delphi technique despite different levels of academic qualification. The results also show that only a minority of the respondents were aware and use the Delphi technique since less than 50% of respondents in each academic qualification category were aware and use the Delphi technique. The combined Chi-square on the qualification and the level of awareness and use of the Delphi technique show that there is no significant difference on the level of awareness and use of the Delphi Technique depending on different academic qualification since the p-value of 0.203 is greater than 0.05. In addition, the means of all academic qualification categories are below the neutral point (3) which shows that there is a low level of awareness and use of the Delphi Technique depending on the academic qualification of the respondent.

- **Qualification of the respondent and the level of awareness and use of the Document review**

The results which were on a Chi-square test conduct on the level of awareness and use of the Document Review technique is shown in table 5.29 on the next page.

Table 5.29 Chi-square on Qualification and awareness and use of Document Review Technique

Qualification	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
Masters	0.0%	40.0%	60.0%	100%	2.60	3.062[a]	0.930
Honors	20.0%	46.7%	33.3%	100%	2.13		
Bachelors	23.5%	41.2%	35.3%	100%	2.12		
Diploma	23.8%	47.6%	28.6%	100%	2.05		
Certificate	14.3%	57.1%	28.6%	100%	2.14		

The results displayed in Table 5.29 on the cross tabulation and Chi-square test show that there no significant differences in responses to the level of awareness and use of the document review technique depending on the on the selected educational qualifications since the p-value is greater than 0.05. The results also show that the majority of the respondents were aware of the Document review technique since the respondents who responded that they are not aware of the document review technique are below 50% from each qualification category. However, when the means were grouped according to the identified qualification category shows that there is a low level of awareness since all the means fall below the neutral point of 3.

- **Qualification of the respondent and the level of awareness and use of the Document review**

Table 5.30 on the next page depicts the results which were obtained from a cross tabulation and Chi-square test which was conducted to evaluate whether there is a significant difference on the level of awareness and use of the Document Review Technique depending on the level of academic qualification.

Table 5.30 Chi-square on Qualification and awareness and use of Interview technique

Qualification	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
Masters	0%	100.0%	0.0%	100%	2.00	6.359[a]	0.607
Honors	6.7%	80.0%	13.3%	100%	2.07		
Bachelors	5.9%	73.5%	20.6%	100%	2.15		
Diploma	4.8%	85.7%	9.5%	100%	2.05		
Certificate	0.0%	57.1%	42.9%	100%	2.43		

The combined Chi-square test results in Table 5.30 show that there is no statistically significant difference in the level of awareness and use on the interview technique when grouped according to the levels of academic qualification since the p-value (0.607) obtained is greater than 0.05. The results also show that the majority of the respondents who participated in the study were aware of the interview technique. The Honours category comprised the highest percentage (6.7%) of respondents who were not aware of the interview technique. In addition, the certificate level category comprised the highest level (42.9%) of awareness and use of the interview technique. However, the combined means on the level of awareness and use of the interview technique indicates that there are low level of awareness and use of the interview technique since all the means are below the neutral point of 3.

- **Qualification of the respondent and the level of awareness and use of the Diagramming Technique**

Table 5.31 depicts an extract of cross tabulation and Chi-square test results which were computed on the level of awareness and use of the diagramming technique in relation to academic qualification.

Table 5.31 Chi-square on Qualification and awareness and use of Diagramming technique

Qualification	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
Masters	60.0%	20.0%	20.0%	100%	1.60	11.386[a]	0.181
Honors	53.3%	40.0%	6.7%	100%	1.53		
Bachelors	67.6%	17.6%	14.7%	100%	1.47		
Diploma	47.6%	52.4%	0.0%	100%	1.52		
Certificate	71.4%	28.6%	0.0%	100%	1.29		

The results displayed in Table 5.31 show that the majority of respondents in all the categories of academic qualifications are not aware of the diagramming technique. The results also show that the minority of all respondents in all categories were aware and using the diagramming technique. The Master's level comprised of the highest number of respondents (20%) who were aware of the diagramming technique and this figure is below 50% which shows that there is a low level of awareness and use of the diagramming technique. In addition, the means also show that there is a low level of awareness and use of the diagramming technique since all the means are below the neutral point (3). Furthermore, the results show that there is no statistically significant difference on the level of awareness and use of the diagramming technique in relation to different academic qualification since the p-value (0.181) obtained is greater than 0.05.

- **Period of operation and the level of awareness and use of the Assumptions Analysis**

Table 5.32 shows the results which were obtained from a cross tabulation on the variables period of operation and the level of awareness and use of the assumptions analysis technique.

Table 5.32 Chi-square on Period of operation and awareness and use of Assumptions Analysis

Operation (In years)	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
1 to 5	64.5%	9.7%	25.8%	100%	1.61	8.101[a]	0.619
6 to 10	82.6%	8.7%	8.7%	100%	1.26		
11 to 15	63.6%	27.3%	9.1%	100%	1.45		
16 to 20	75.0%	12.5%	12.5%	100%	1.38		
21 to 25	80.0%	0.0%	20.0%	100%	1.40		
Above 25	75.0%	25.0%	0.0%	100%	1.25		

The results show that there is no statistically significant level of awareness and use of the Assumptions Analysis Technique in relation to different classes of period of operation since the p-value (0.619) is greater than 0.05. The cross tabulation results show that the majority of the respondents are not aware of the Assumptions technique since more than 50% of the respondents in all categories responded that they are not aware of the Assumptions Analysis Technique. The results also show that the age category between 1 to 5 years had the highest number of respondents (25.8%) who were aware and use the Assumptions Analysis technique. This shows that there is a low level of awareness and use of the assumptions and analysis technique. In addition, the means on the level of awareness and use of the assumptions analysis support that there is a low level of awareness and use of the assumptions analysis technique since all the means are below the neutral point of 3.

- **Period of operation and the level of awareness and use of the Assumptions Analysis**

Table 5.33 shows the results which were obtained from a cross tabulation on the variables period of operation and the level of awareness and use of the assumptions analysis technique.

Table 5.33 Chi-square on Period of operation and awareness and use of Brainstorming

Operation (In years)	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
1 to 5	3.2%	61.3%	35.5%	100%	2.32	11.421[a]	0.326
6 to 10	26.1%	56.5%	17.4%	100%	1.91		
11 to 15	18.2%	63.6%	18.2%	100%	2.00		
16 to 20	12.5%	87.5%	0.0%	100%	1.88		
21 to 25	20.0%	60.0%	20.0%	100%	2.00		
Above 25	0.0%	75.0%	25.0%	100%	2.25		

The results obtained from a cross tabulation reveal that the majority of the respondents who were surveyed responded that they were aware of the brainstorming technique. However, the results also show that the minority of the respondents in all categories were aware and use the brainstorming technique. The period 1 to 5 years had the highest number of respondents (35.5%) who were aware and use the brainstorming technique. The results of the means which were computed to assess on the level of awareness and use on the brainstorming technique revealed that the respondents in all categories had a low level of awareness and use of the brainstorming technique. The results of the Chi-square test showed that there is no statistically significant difference on the level of awareness and use of the brainstorming technique based on the various categories of period of operation.

- **Period of operation and the level of awareness and use of the Risk checklist**

A cross tabulation and a Chi-square test were conducted on the two variables namely: period of operation and the level of awareness and use of the risk checklist. The results are depicted in Table 5.34 on the next page.

Table 5.34 Chi-square on Period of operation and awareness and use of the Risk Checklist

Operation (In years)	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
1 to 5	58.1%	38.7%	3.2%	100%	1.45	20.018[a]	0.029
6 to 10	47.8%	39.1%	13.0%	100%	1.65		
11 to 15	36.4%	54.5%	9.1%	100%	1.73		
16 to 20	50.0%	0.0%	50.0%	100%	2.00		
21 to 25	80.0%	20.0%	0.0%	100%	1.20		
Above 25	50.0%	50.0%	0.0%	100%	1.50		

The results displayed in Table 5.34 show that there is statistically difference in the level of awareness and use of the risk checklist technique in relation to the business's period of operation. The results of the Chi-square test shown that the p-value (0.029) obtained is less than 0.05 which shows that there is a significant difference. The results of the cross tabulation showed that the majority of the respondents who took part in the study were not aware of the risk checklist. The results show that 21 to 25 years operation category had the highest number of respondents who were not aware of the risk checklist. The cross tabulation results also show that only the minority of respondents were aware and use the risk checklist. The 16-20 years operation category had the highest number of respondents (50%) who were aware and use the risk checklist. This shows that there is a low level of use and awareness since the rest of the categories are less than 50% on the aware and use of the risk checklist. The combined means on the level of awareness and use of the risk checklist of each category show that there is a low level of awareness and use of the risk checklist since all the means fell below the neutral point (3).

- **Period of operation and the level of awareness and use of the Delphi Technique**

Table 5.35 represents an extract of a cross tabulation and Chi-square test which was conducted on Period of operation and the level of awareness and use of the Delphi Technique.

Table 5.35 Chi-square on Period of operation and awareness and use of the Delphi Technique

Operation (In years)	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
1 to 5	54.8%	35.5%	9.7%	100%	1.55	11.181[a]	0.344
6 to 10	60.9%	26.1%	13.0%	100%	1.52		
11 to 15	27.3%	63.6%	9.1%	100%	1.82		
16 to 20	75.0%	25.0%	0.0%	100%	1.25		
21 to 25	80.0%	20.0%	0.0%	100%	1.20		
Above 25	100.0%	0.0%	0.0%	100%	1.00		

The results in Table 5.35 show that there is no statistically significant difference in the level of awareness and use of the Delphi technique based on various categories of period of operation since the p-value (0.344) obtained from the Chi-square test is less than 0.05. The cross tabulation results portray that the majority number of respondents who took part in the study were not aware of the Delphi technique. The results further show that only a minority of the respondents were aware and use the Delphi technique. The 1 to 10 years category had the highest number of respondents who were aware and use the Delphi technique. The means computed show that there is a low level of awareness and use of the Delphi technique since all the means are below the neutral point (3).

- **Period of operation and the level of awareness and use of the Document review technique**

Table 5.36 presents the results which were obtained from the Chi-square and cross tabulation of the two variables namely the period of operation and the level of awareness and use of the document review technique.

Table 5.36 Chi-square on Period of operation and awareness and use of the Document Review Technique

Operation (In years)	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
1 to 5	22.6%	54.8%	22.6%	100%	2.00	9.761[a]	0.462
6 to 10	17.4%	34.8%	47.8%	100%	2.30		
11 to 15	9.1%	45.5%	45.5%	100%	2.36		
16 to 20	25.0%	25.0%	50.0%	100%	2.25		
21 to 25	40.0%	40.0%	20.0%	100%	1.80		
Above 25	25.0%	75.0%	0.0%	100%	1.75		

Table 5.36 above displays the results of a cross tabulation and Chi-square which was conducted on Period of operation and awareness and use of the Document Review Technique. The results show that the majority of the respondents who were surveyed in all categories were aware of the document review technique. The results also show that the category 16 to 20 years had the highest number of respondents who were aware and use the document review, followed by 6 to 10 years with 47.8% and above 25 years being the least with 0%. The mean results show that there is a low level of awareness and use of the document review since they are all below the neutral point of 3.

- **Period of operation and the level of awareness and use of the Interview technique**

The results in Table 5.37 were obtained on the cross tabulation and Chi-square tests which was conducted on the operation and the level of awareness and use of the document review technique.

Table 5.37 Chi-square on Period of operation and awareness and use of the Interview Technique

Operation (In years)	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
1 to 5	0.0%	83.9%	16.1%	100%	2.16	14.903[a]	0.136
6 to 10	4.3%	82.6%	13.0%	100%	2.09		
11 to 15	9.1%	81.8%	9.1%	100%	2.00		
16 to 20	25.0%	62.5%	12.5%	100%	1.87		
21 to 25	0.%	60.0%	40.0%	100%	2.40		
Above 25	0.0%	50.0%	50.0%	100%	2.50		

The results displayed in table 5.37 show that there is no statistically significant difference on the level of awareness and use of the interview technique based on the period of operation since the p-value obtained is greater than 0.05. The results also show that the 16 to 20 years category had the highest number of respondents (25%) who responded that they were not aware of the interview technique, followed by 11 to 15 years (9.1%) and the least were 1 to 5 years and above 25 with 0% respondents. However, the results further show that the above 25 category had the highest number of respondents (50%) who responded that they were aware and use the interview technique followed by 21 to 25 years (40%) and the least being 11 to 15 years with 9.1%. However, the combined means on the level of awareness and use of the interview technique show that there is a low level of awareness since all the means are below the neutral point (3).

- **Period of operation and the level of awareness and use of the diagramming technique**

Table 5.38 shows the summarised results which were obtained from the cross tabulation and Chi-square test on the two variables which are the level of awareness and use of the diagramming technique and the period of operation.

Table 5.38 Chi-square on Period of operation and awareness and use of the Diagramming Technique

Operation (In years)	Not aware	Aware only	Aware and use	Total	Mean	X^2 Value	Sig.
1 to 5	58.1%	29.0%	12.9%	100%	1.55	8.344[a]	0.595
6 to 10	52.2%	43.5%	4.3%	100%	1.52		
11 to 15	63.6%	18.2%	18.2%	100%	1.55		
16 to 20	87.5%	12.5%	0.0%	100%	1.13		
21 to 25	60.0%	40.0%	0.0%	100%	1.40		
Above 25	50.0%	50.0%	0.0%	100%	1.50		

Table 5.38 shows the Chi-square value was 8.344[a] and the p-value was 0.595. Since the p-value was above 0.05, it can be concluded that there was no significant difference on the level of awareness and use of the diagramming technique. The results also show that the period between 16 to 20 years had the highest number of respondents (87.5%) who indicated that there were not aware of the diagramming technique, followed 11 to 15 years with 63.6% and the least being above 25 with 50%. This shows that the majority of the respondents were not aware of the diagramming technique. In addition, the results revealed that the category between 11 to 15 years have the highest number of respondents (18.2%) who were aware and use the diagramming technique followed by 1 to 5 years with 12.9% and the least being 16 to 20, 21 to 25 and above 25 with no respondents.

Based on the results and evidence obtained from the cross tabulations and Chi-square tests displayed from Table 5.17 to Table 5.38, do not reject the null hypotheses which states that:

- SMEs in the construction industry are not aware of the risk management techniques and

- SMEs in the construction industry are not implementing risk management techniques, are not rejected.

Therefore, it can be concluded that there is a lack of awareness and use of risk management techniques by SMEs in the construction industry. In other words, lack of awareness of risk management techniques yields to low level of usage of the risk management techniques. The results are consistent with a study conducted by Ahmed, Azhar and Ahmad (2002) in Florida in the United States who found out that risk analysis and management techniques are rarely used by the general contractors due to a lack of knowledge coupled with doubts on the suitability of these techniques for the construction industry. Garido, Ruotolo, Ribeilo and Naked (2011) conducted a study in Brazil and found that participants who took part in their survey had no overall knowledge of the techniques described in literature as possible to be applied to identify risks. Garido, Ruotolo, Ribeilo and Naked (2011) further points out that lack of overall knowledge of risk management techniques influences the implementation of techniques in the construction industry. Garido, Ruotolo, Ribeilo and Naked (2011) also states that nevertheless, it is understandable that the knowledge of these techniques does not guarantee that they will be applied by the organisations, which will choose what they consider the most familiar and reliable techniques. This is also true on the results obtained in this study, for instance, in Table 5.25, 85.7% of the respondents who hold diplomas were aware of the interview technique, and however, only 9.5% of the respondents were aware and use the interview technique. This shows that the level of awareness does not guarantee its implementation in the construction or any industry. Ntlhane (1995:106) points out that the owner/manager's risk perception and his attitude towards risk management influence the adequacy of the enterprise's risk management actions deployed. The attitudes of owner/managers were also tested in hypothesis number 3 which is restated below:

HC_0: SME owners or managers in the construction industry have a negative attitude towards risk management techniques.

HC_a: SME owners or managers in the construction industry have a positive attitude towards risk management techniques.

A non-parametric Chi-squared one–Variable Test was conducted for the above hypothesis to determine whether there was a negative or strong attitudes towards risk management techniques amongst the owners and managers of SMEs in the construction industry. Table 5.39 depicts an extract of the Chi-square results.

Table 5.39 Chi-square on attitudes towards risk management techniques

Statement	**X^2**	**DF**	**Sig**
The implementation of risk management techniques improve on the performance, productivity, budget and quality of construction projects.	30.902[a]	2	0.000
Owner or manager should participate in the implementation of risk management techniques in the construction industry.	47.732[a]	2	0.000
Owner or manager should disseminate information on the importance of risk management techniques to every employee within the business.	48.610[a]	2	0.000
Risk management techniques are mainly ideal for projects with certain characteristic, for example new technology, multiple participants and unstable political conditions.	53.951[a]	2	0.000
The implementation of risk management techniques increases unwarranted operational cost.	100.927[b]	4	0.000
Risk management techniques should be implemented in all construction projects.	50.000[c]	3	0.000
Risk management techniques should be employed continuously, meaning from the starting phase/stage to the ending phase.	38.732[a]	2	0.000
Information obtained from risk management techniques should be incorporated in decision making.	38.073[a]	2	0.000

Construction industry has a very good reputation in coping with risk.	34.122[a]	2	0.000

Table 5.39 illustrates the results which were obtained from non-parametric Chi-square test to assess on the owners/managers attitudes towards risk management techniques. Nine (9) statements were identified which highlight the attitudes of owner/managers attitudes towards risk management techniques. The results show that the p-values obtained in all statements were 0.000. **Since the p-values are less than 0.05 it therefore means that we reject the null hypothesis and conclude that SME owner/managers in the construction industry have a strong attitude towards risk management techniques**.

The results obtained in this study are consistent with a study conducted by Yusuwan, Adnan and Omar (2008), who conducted a study in Malaysia and used a five point Likert scale to measure the attitudes of the respondents. The results showed that the mean obtained from most statements was above the neutral point (3) and showed that the respondents had a strong attitude towards risk management techniques.

The results of the hypotheses testing conducted in the above sections are summarised in Table 5.40.

Table 5.40: Summarised hypotheses testing results

	Hypothesis statement	**Outcome**
HA_0	SMEs in the construction industry are not aware of the risk management techniques.	**Do not reject**
HB_0	SMEs in the construction industry are not implementing risk management techniques.	**Do not reject**
HC_0	SME owners or managers in the construction industry have a negative attitude towards risk management techniques.	**Rejected**

The results in table 5.40 show that the first two null hypotheses were not rejected, hence it can be was concluded that SMEs in the construction industry are not aware and are also not using risk management techniques in executing their construction projects. The third and the last hypothesis was accepted, confirming that SME owners and managers who responded in the survey had a strong attitude toward the risk management techniques.

5.4 CHAPTER SUMMARY

This chapter presented on the results of data which was collected from 82 SME owner/managers on the level of awareness and use of risk management techniques in the construction industry through the use of a self-administered questionnaire. The hypotheses testing was conducted using the Chi-square testing. The results of the hypotheses testing using the Chi-square resulted in accepting the hypotheses which states that SMEs in the construction industry are not aware of the risk management techniques and SMEs in the construction industry are not implementing risk management techniques. Hence, it becomes essential to create awareness and foster the implementation of risk management techniques in the construction industry. The chi-square result on the hypothesis which states that SME owners or managers in the construction industry have a negative attitude towards risk management techniques was rejected. The results were compared with the results of other studies to assess whether there is consistency or inconsistency. Chapter six which follows presents on the conclusion of the entire study, provide recommendations and propose areas of further research.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

According to (Ariola, 2006:18), after data have been analysed and results generated, the results must be summarised and tied together, analysis must be interpreted and findings and conclusions must be drawn as they relate to the research problem and on the basis of the findings, conclusions are drawn about hypotheses (if there are hypotheses tested). In the previous chapter, hypotheses were tested and the results were interpreted. Therefore, the purpose of this chapter is to present conclusions drawn from the findings and suggest recommendations. This chapter commences by presenting on an overview of the study. The chapter also provides a summary of the results of hypotheses testing. The conclusions and recommendations of the study will be drawn from the results of the hypotheses testing. In addition, the chapter will present on areas of further research and limitations of the study. Section 6.2 explores on overview of the study.

6.2 OVERVIEW OF THE STUDY

The study at hand investigated the level of awareness and use of risk management techniques by SMEs in the construction industry in King William's Town and Port Elizabeth. The study comprises of six (6) chapters and a brief summary of each chapter is discussed in subsequent sections.

6.2.1 Introduction and background

Chapter one presented on the introduction and background to the study conducted on the level of awareness and use of risk management techniques by SMEs in the construction industry conducting business activities in King Williams Town and Port Elizabeth in the Eastern Cape Province of South Africa. It was established that SMEs in the construction industry encounter numerous risks such as cost estimate of the project, time overruns and failure to achieve the required quality and conformity to operational requirements (Siang and Ali, 2012). The risks inherent in the construction industry result in a high failure of SMEs in the construction industry. Bizco business consulting (2012) suggest that the survival of SMEs depends on

managing risks. However, Watkins (2012) point out that SME owners or managers are ignorant relating to the risks their enterprises face with risk management techniques deployed reactively and ineffectively. In addition, there are limited studies which have been conducted in South Africa with regards to risk management and risk management techniques in South Africa. Therefore, the purpose of this study was to establish the level of awareness and use of risk management techniques by SMEs in the construction industry. Polonsky and Waller (2011:92) point out that the establishment of research objectives is essential for the attainment of research goals. The research objectives which were formulated for the study at hand are outlined below.

- To establish the level of awareness on risk management techniques by SMEs in the construction industry.
- To investigate whether SMEs in the construction industry are implementing risk management techniques.
- To examine the attitude of SMEs owners or managers in the construction industry towards risk management techniques.
- To examine the reasons of not implementing risk management techniques to those SMEs who are not using any risk management technique and provide recommendations
- To contribute and provide a more complete understanding of risk management in SME in the construction industry in order to provide an appropriate risk management tool for SMEs.

6.2.2 An overview of SMEs and the construction industry (Chapter two)

This chapter discussed briefly on the overview of SMEs on both the international and local (South African) perspectives. Ultimately, it has been established that SMEs as a whole contribute significantly towards employment creation, poverty alleviation, gross domestic product (GDP), innovation development, investment and stimulates the business activities of large business firms and the financial sector (Rungani, 2009). In addition, the chapter also discusses on the importance of SMEs in the construction industry as well as challenges faced by SMEs in the construction industry. Literature showed that SMEs in the construction industry encounter numerous risks such as the compliance risks, productivity risk, financial stability and

reputation and loss of customer confidence. The chapter concluded that risk management is an essential tool to reduce or mitigate risks inherent the construction industry.

6.2.3 Risk management in SMEs in the construction industry (Chapter three)

This chapter discussed on various definitions of risk management and also discussed on various risk management techniques. The chapter also explored on risk management in relation to the construction industry. It has been established that risks are more prevalent in the construction industry (Sharma and Kansal, 2012). The chapter further discussed on the impact of risk on performance of SMEs in the construction industry. Project Monitor (2013) suggests that risks relating to construction industry basically have an impact on cost estimate of the project, time overruns and failure to achieve the required quality and conformity to operational requirement. Risk management techniques have been identified as the most essential tools for mitigating risks. The chapter concluded that there are various challenges associated with implementing risk management techniques which includes lack of familiarity with risk management techniques, the degree of sophistication involved in the techniques are unwarranted if compared with project size and doubts whether these techniques are applicable to the construction industry.

6.2.4 Research methodology and design (Chapter four)

This chapter presented on the research methodology and design which was employed in conducting the current study. The research methodology comprised of two phases namely the literature review and the empirical study. The empirical research methodology and design encompassed aspects such as the survey area, population, sampling, research design, data collection methods and techniques and the methods used to conduct data analysis. The data collection instrument which was employed was the self-administered questionnaire. The data was analysed using SPSS and the statistical analysis which were employed included descriptive statistics, cross tabulation and Chi-square tests. Section 6.25 explores on the research results and interpretation.

6.2.5 Research results and interpretations (Chapter five)

As mentioned in section 6.2.4, the research methodology comprised of two phases namely the literature review and empirical study. The literature review showed that there are gaps pertaining risk management techniques in SMEs in the construction industry, which attributed to the necessity of conducting an empirical study. The results of the empirical study were presented in chapter five. The results of the study revealed that there is generally a low level of awareness and use of risk management techniques by SMEs in the construction industry. The results also showed that SMEs in the construction industry have a strong attitude towards risk management techniques. The results of the study were also compared with other studies (local and internationally) to assess whether they were consistence of inconsistence. Hofstee (2006:157) suggest that conclusions for a study should be linked with the thesis statements. Therefore, the following section discusses the conclusions drawn from the empirical study relation to the hypotheses statements formulated in chapter one. The hypotheses statements are restated below.

HA_0: SMEs in the construction industry are not aware of the risk management techniques.

HB_0: SMEs in the construction industry are not implementing risk management techniques.

The hypotheses stated above were statistically tested using the Chi-square, descriptive statistics and cross tabulation. The results showed that there was a low level of awareness and use of risk management techniques by SMEs in the construction industry. Therefore, the null hypotheses which states that SMEs in the construction industry are not aware of the risk management techniques and SMEs in the construction industry are not implementing risk management techniques are not rejected.

The results were consistent with the results of a study conducted by Ahmed, Azhar and Ahmad (2002) in Florida in the United States who found out that risk analysis and management techniques are rarely used by the general contractors due to a lack of knowledge coupled with doubts on the suitability of these techniques for the construction industry. The results are also consistent with the results of study

conducted in Brazil by Garido, Ruotolo, Ribeilo and Naked (2011); the results revealed that respondents who participated in the survey had no overall knowledge of the techniques described in literature as possible to be applied to identify risks. Garido, Ruotolo, Ribeilo and Naked (2011) further points out that lack of overall knowledge of risk management techniques influences the implementation of techniques in the construction industry.

HC_0: SME owners or managers in the construction industry have a negative attitude towards risk management techniques.

A non-parametric Chi-square test was conducted to assess the owners/managers attitudes towards risk management techniques. Nine (9) statements from section D of the questionnaire were used to the attitudes of SME owners/managers towards risk management techniques. The results of the study revealed that the respondents had a strong attitude towards risk management techniques since the significant (p-values) of all statements were less than 0.05. Therefore, the null hypothesis which states SME owners or managers in the construction industry have a negative attitude towards risk management techniques was rejected and concluded that SMEs in the construction industry had a strong attitude toward risk management techniques.

The results were consistent with the results of a study conducted by Yusuwan, Adnan and Omar (2008), who conducted a study in Malaysia and used a five point Likert scale to measure the attitudes of the respondents. The results showed that the mean obtained from most statements was above the neutral point (3) and showed that the respondents had a strong attitude towards risk management techniques.

6.3 RECOMENDATIONS

The main objective of the study was to establish the level of awareness and use of risk management techniques by SMEs in the construction industry conducting business activities in King William's Town and Port Elizabeth in the Eastern Cape Province of South Africa. The results revealed that there is a low level of awareness and use of risk management techniques. Therefore, this section presents on possible recommendations to improve the level of awareness and use of risk management techniques by SME owners or managers in the construction industry. In addition, recommendations are directed to the construction industry development

board (CIDB), government, schools and tertiary institutions as they play a crucial role in improving the level of awareness and use of risk management techniques.

6.3.1 SME owners or managers

In the literature review, it was established that SME owners or managers play a crucial role in the implementation of risk management techniques. However, the results obtained from the empirical study revealed that SME owners and or managers have a low level of awareness and use of risk management techniques. Hence, SME owners or managers should make use of risk management programmes, short courses or lessons provided by tertiary institutions and schools in order to improve their level of awareness and use of risk management techniques. In addition, SME owners and managers should encourage employees to take advantage of risk management programmes offered by schools and tertiary institutions to improve their level of awareness and use of risk management techniques since they are the ones mainly involved in executing construction projects and are at risk often. The improved level of awareness and use of risk management techniques will also improve the quality of the construction projects.

6.3.2 Construction Industry Development Board

The construction industry development board (CIDB) maintains the registers of all contractors. In addition, the CIDB also ensures that all contractors remain compliant to the stipulated by the board. However, a number of cases such as fraud and corruption have been reported. Therefore the CIDB should actively report all cases of non-compliance to the legislation of the CIDB and the code of conduct. The CIDB can also inhibit non-compliance to the legislation and code of conduct by pursuing the following activities:

- The CIDB should develop and enforce a universal auditing mechanism which should be used by all construction contractors. If any non-compliance cases are identified, fines and penalties should be charged to defaulting parties.
- The CIDB should employ individuals who are responsible for assessing the compliance and non-compliance of laws and legislation formulated by the CIDB. The employees will also have a mandate of conducting site inspection to ensure that contractors are implementing risk management techniques.

- The CIDB should develop a universal Code of Conduct which regulates the actions, practices and procedures of parties engaged in construction contracts.

6.3.3 The Government

The results on ways of promoting awareness and use of risk management techniques in Table 5.16 in chapter five (5) revealed that most respondents (mean of 4.13) are of the view that introducing a statutory requirement on risk management by the government or by the construction industry development board (CIBD) may improve the awareness and use of risk management techniques. Therefore, the government should continuously work with the CIDB in enforcing rules and legislation which improves compliance in risk management. In addition, the government should offer incentives to contractors implementing risk management techniques and also promote programmes which improve the level of awareness and use of risk management techniques.

6.3.4 Schools and tertiary education

The results in table 5.16 showed that provide training and seminars on risk management and risk management techniques had the highest mean (4.30) as a way of promoting the awareness and use of risk management techniques. In addition, most of the respondents are of the view that introducing courses and programmes related to risk management in schools, colleges and universities (with a mean of 4.22) is an essential of promoting the level of awareness and use of risk management techniques. This therefore means that schools and institutions of tertiary education have a critical role to play in creating awareness and use of risk management since they have the necessary expertise and required resources.

6.4 LIMITATIONS OF THE STUDY

Due to time and budgetary constraints, the study at hand on focused on SMEs conducting construction activities in King William's Town and Port Elizabeth in the Eastern Cape Province of South Africa. In addition, some of the questionnaires which were sent out were not returned or were spoiled. To be precise, results in table 5.1 in chapter five showed that 12% did not cooperate or spoiled the questionnaires. Based on the noted limitations, care should be exercised in the

interpretation and the application of the results of this study and the generalisation of the findings to the whole of South Africa.

6.5 AREAS FOR FURTHER RESEARCH

The results of the study showed that there is a low level of awareness and use of risk management techniques by SMEs in the construction industry. The results also show that the majority of the respondents proposed that the provision of training and seminars on risk management and risk management techniques and the introduction of courses and programmes related to risk management in schools, colleges and universities improves the ways of promoting awareness and use of risk management techniques. Therefore, future research studies may be conducted to assess to what extent to education and training improve the level of awareness and use of risk management techniques.

6.6 CONCLUSION

This chapter presented on conclusions, recommendations and areas of further research for a study conducted to investigate the level of awareness and use of risk management techniques in the construction industry. The results of the study revealed that there is a low level of awareness and use of risk management techniques by SMEs in the construction industry. In addition, the results revealed that SME owners and managers have strong attitude toward risk management techniques. It has been recommended that the government, the CIDB, tertiary institutions and the SME owners and managers have to work towards enhancing the level of awareness and use of risk management techniques.

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