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**INFLUENCE OF SAFETY COMPLIANCE ON PERFORMANCE OF SMALL  
AND MEDIUM CONSTRUCTION FIRMS IN NAIROBI COUNTY**

**Sammy Kihoro**

**MBA/100594/17**

**A Dissertation Submitted in partial fulfillment of the requirements for the Degree of  
Master of Business Administration**



**Strathmore University**

**Nairobi, Kenya**

**September 2020**

## DECLARATION

I declare that this dissertation has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the dissertation contains no material previously published or written by another person except where due reference was made in the dissertation itself.

Signed  Date 26/06/2020

Sammy Kihoro MBA/100594/17



The thesis of Sammy Kihoro was reviewed and approved by the following:

Signed  Date 26/06/2020

Dr. Joseph Onyango

Senior Lecturer, Strathmore University Business School

## ABSTRACT

The purpose of this study was to examine how safety compliance influences performance among small and medium construction enterprises in Nairobi County. The specific objectives were to determine the influence of leadership involvement in safety, safety management practices, staff safety training, and investment in safety on the performance of SME construction firms in Nairobi County. Accident theory formed the theoretical framework of the study. The study subscribed to the pragmatic research philosophy and used a descriptive research design. The target population was 1,231 contractor firms registered by the National Construction Authority in Classes 5-8, which are categorized as small and medium enterprises. The sample size was determined as 302 managers; out of whom 142 managers were reached. A structured questionnaire was used in data collection. The statistical analysis was done using descriptive statistics, Pearson ( $r$ ) correlation and multiple regression analysis. The findings show that the model achieved 85.6 % and this effect was statistically significant. Safety management had the largest positive effect on contractors' business performance followed by safety training, and safety investment. The study concludes that safety management, safety training, and safety investment had a positive and significant effect on business performance of small and medium enterprises contractors. However, it is this study's conclusion that safety leadership had a negative but statistically significant effect on contractors' business performance. The study recommends that management should develop internal safety identification and rewarding programs to motivate staff to adopt safety practices in the organization. The study further recommends for safety training to be extended to project stakeholders and also having a compulsory training program for firm staff. The study further recommends for firms to invest in safety practices such as promoting safety in the workplace by printing of pamphlets and posters, safety advertising boards, and banners. There is a need to study further the extent to which safety implementation affects the performance of Small and Medium Construction Enterprises contractors with other parameters like capital, marketing, human resources management, and other aspects, which are all important to the contribution of performance in a business.



## TABLE OF CONTENT

<b>DECLARATION</b> .....	<b>i</b>
<b>ABSTRACT</b> .....	<b>ii</b>
<b>TABLE OF CONTENT</b> .....	<b>iii</b>
<b>LIST OF FIGURES</b> .....	<b>vii</b>
<b>LIST OF TABLES</b> .....	<b>viii</b>
<b>LIST OF ABBREVIATIONS/ACRONYMS</b> .....	<b>ix</b>
<b>ACKNOWLEDGMENTS</b> .....	<b>xi</b>
<b>DEDICATION</b> .....	<b>xiii</b>
<b>CHAPTER ONE</b> .....	<b>1</b>
<b>INTRODUCTION TO THE STUDY</b> .....	<b>1</b>
1.1 Introduction.....	1
1.2 Background to the Study.....	1
1.2.1 Small and Medium Enterprises in Kenya’s Construction Sector .....	4
1.2.2 Safety Legal Framework in Kenya.....	5
1.3 Problem Definition.....	65
1.4 Research Objectives.....	76
1.5 Research Questions.....	7
1.6 Scope of the Study .....	7
1.7 Significance of the Study.....	7
<b>CHAPTER TWO</b> .....	<b>98</b>
<b>LITERATURE REVIEW</b> .....	<b>98</b>
2.1 Introduction.....	98
2.2 Theoretical Review .....	98
2.2.1 Accident Theory .....	98
2.3 Empirical Review.....	109
2.3.1 Safety Leadership Involvement and Performance .....	109
2.3.2 Safety Management Practices and Performance .....	1244
2.3.3 Safety Training and Performance .....	1413
2.3.4 Investment Safety and Performance .....	1514
2.3.5 Performance.....	1615
2.4 Literature Summary and Research Gaps.....	1816
2.5 Conceptual Framework.....	1817
2.6 Operationalization of Study Variables.....	1917

<b>CHAPTER THREE .....</b>	<b><u>2019</u></b>
<b>RESEARCH METHODOLOGY .....</b>	<b><u>2019</u></b>
3.1 Introduction.....	<u>2019</u>
3.2 Research Philosophy.....	<u>2019</u>
3.3 Research Design.....	<u>2120</u>
3.4 Population and Sampling .....	<u>2120</u>
3.4.1 Target Population .....	<u>2120</u>
Table 3.1: Target Population.....	<u>2120</u>
3.4.2 Sampling Design and Sample Size.....	<u>2221</u>
Table 3.2: Sample Distribution .....	<u>2221</u>
3.5 Data Collection Instrument.....	<u>2322</u>
3.6 Research Quality .....	<u>2322</u>
3.6.1 Validity Tests.....	<u>2322</u>
3.6.2 Reliability Tests .....	<u>2423</u>
3.7 Data Analysis and Presentation .....	<u>2423</u>
3.7.1 Exploratory Factor Analysis.....	<u>2524</u>
3.8 Ethical Issues in Research.....	<u>2524</u>
<b>CHAPTER FOUR.....</b>	<b><u>2625</u></b>
<b>PRESENTATION OF RESEARCH FINDINGS.....</b>	<b><u>2625</u></b>
4.1 Introduction.....	<u>2625</u>
4.2 Response Rate.....	<u>2625</u>
4.3 Background Information.....	<u>2625</u>
4.3.1 Age.....	<u>2625</u>
4.3.2 Respondents' Gender.....	<u>2625</u>
Table 4.1: Gender of Respondents.....	<u>2726</u>
4.3.3 Firm Age.....	<u>2726</u>
4.3.4 Firm NCA Categorization .....	<u>2726</u>
4.3.5 Type of Projects Contractors Undertake .....	<u>2827</u>
4.3.6 Frequency of Injuries.....	<u>2827</u>
4.3.7 Nature of Injuries.....	<u>2928</u>
4.3.8 Causes of Injuries .....	<u>2928</u>
4.4 Exploratory Factor Analysis .....	<u>3029</u>
4.4.1 Sampling adequacy test (Kaiser-Meyer-Olkin (KMO) and Bartlett's sphericity test) .....	<u>3029</u>

4.4.2 Bartlett’s Test of Sphericity.....	<u>3130</u>
4.4.3 Safety Leadership involvement .....	<u>3130</u>
4.4.4 Safety Management .....	<u>3332</u>
4.4.5 Safety Training .....	<u>3433</u>
4.4.6 Safety Investments.....	<u>3534</u>
4.4.7 Business Performance.....	<u>3635</u>
4.5 Leadership Involvement in the Safety and Performance of SME Construction Firms .....	<u>3837</u>
4.5.1 Descriptive Statistics for Leadership Involvement.....	<u>3837</u>
4.5.2 Correlation Analysis between Business Performance and Safety Leadership .....	<u>3837</u>
4.6 Influence of Safety Management Practices on Performance of SME Construction Firms .....	<u>3938</u>
4.6.1 Descriptive Statistics for Safety Management Practices .....	<u>3938</u>
4.6.2 Correlation Analysis between Business Performance and Safety Management .....	<u>4039</u>
4.7 Influence of Staff Safety Training on Performance of SME construction firms .....	<u>4140</u>
4.7.1 Descriptive Statistics for Safety Training.....	<u>4140</u>
4.7.2 Correlation Analysis between Business Performance and Safety training....	<u>4240</u>
4.8 Influence of Investment Safety on the Performance of SME Construction Firms ..	<u>4241</u>
4.8.1 Descriptive statistics for Investment Safety .....	<u>4241</u>
4.8.2 Correlation Analysis between Business Performance and Safety Investments .....	<u>4342</u>
4.9.1 Descriptive statistics for Performance.....	<u>4443</u>
4.9.2 Overall Correlation analysis .....	<u>4543</u>
4.10 Regression Analysis.....	<u>4946</u>
<b>DISCUSSIONS, CONCLUSIONS, AND RECOMMENDATIONS .....</b>	<b><u>5149</u></b>
5.1 Introduction.....	<u>5149</u>
5.2 Discussions .....	<u>5149</u>
5.2.1 Leadership involvement in safety and performance of SME construction firms .....	<u>5149</u>
5.2.2 Safety Management Practices on Performance of SME Construction Firms	<u>5149</u>
5.2.3 Staff Safety Training on Performance of SME Construction Firms .....	<u>5250</u>
5.2.4 Investment Safety on Performance of SME Construction Firms .....	<u>5351</u>

5.3 Conclusions.....	<u>5351</u>
5.4 Recommendations.....	<u>5452</u>
5.4.1 Recommendations for Policy.....	<u>5452</u>
5.4.2 Recommendations for Action.....	<u>5452</u>
5.4.3 Recommendations areas for Further Research .....	<u>5553</u>
<b>REFERENCES.....</b>	<b><u>5654</u></b>
Appendix I: Questionnaire for Site Managers .....	<u>6562</u>
Appendix II: Strathmore Ethical Approval.....	<u>7068</u>
Appendix III: Research Permit .....	<u>7169</u>



## LIST OF FIGURES

Figure 2.1: Conceptual Framework .....	<u>1825</u>
Figure 4.1: Respondents' Age.....	<u>2633</u>
Figure 4.2: Age of firms.....	<u>2734</u>
Figure 4.3: Type of Projects Undertaken by Contractors .....	<u>2835</u>
Figure 4.4: Nature of Injuries Experienced in Contractor Firms .....	<u>2936</u>
Figure 4.5: Histogram for Normality Tests.....	<u>4753</u>
Figure 4.6: Normality P-P Plot .....	<u>4853</u>



## LIST OF TABLES

Table 2.2: Operationalization of Study Variables.....	<u>1926</u>
Table 3.1: Target Population.....	<u>2128</u>
Table 3.2: Sample Distribution.....	<u>2229</u>
Table 3.3: Reliability Scores for Pilot Study.....	<u>2431</u>
Table 4.1: Gender of Respondents.....	<u>2734</u>
Table 4.2: NCA Categorization among Contractors.....	<u>2835</u>
Table 4.3: Number of Injuries among Contractors.....	<u>2936</u>
Table 4.4: Causes of Injuries among Contractors.....	<u>3037</u>
Table 4.6: Coefficients of Kaiser-Meyer-Olkin Measure of Sampling Adequacy.....	<u>3037</u>
Table 4.7: Bartlett’s Test of Sphericity.....	<u>3138</u>
Table 4.8: Exploratory Factor Analysis of Safety Leadership.....	<u>3138</u>
Table 4.11: Rotated Component Matrix of Safety Management.....	<u>3441</u>
Table 4.12: Exploratory Factor Analysis of Safety Training.....	<u>3441</u>
Table 4.13: Rotated Component Matrix of Safety Training.....	<u>3542</u>
Table 4.14: Exploratory Factor Analysis of Safety Investments.....	<u>3643</u>
Table 4.15: Rotated Component Matrix of Safety Investments.....	<u>3643</u>
Table 4.16: Exploratory Factor Analysis of Business Performance.....	<u>3744</u>
Table 4.17: Rotated Component Matrix of Business Performance.....	<u>3744</u>
Table 4.18: Leadership Involvement in Safety Descriptive Statistics.....	<u>3845</u>
Table 4.19: Correlation between Business Performance and Safety Leadership.....	<u>3946</u>
Table 4.20: Safety Management Descriptive Statistics.....	<u>4047</u>
Table 4.21: Correlation between Business Performance and Safety Management.....	<u>4047</u>
Table 4.23: Correlation between Business Performance and Safety training Correlations.....	<u>4249</u>
Table 4.24: Investment in Safety Descriptive Statistics.....	<u>4350</u>
Table 4.25: Correlation between Business Performance and Safety Investments.....	<u>4450</u>
Table 4.27: Pearson Correlation Coefficient.....	<u>4652</u>
Table 4.28: Lagrange Multiplier.....	<u>4752</u>
Table 4.29: Durbin Watson Statistics.....	<u>4854</u>
Table 4.30: Collinearity Statistics.....	<u>4954</u>
Table 4.31: Regression Model Summary.....	<u>4955</u>
Table 4.32: ANOVA Statistics.....	<u>4955</u>
Table 4.33: Regression Coefficients.....	<u>5055</u>

## LIST OF ABBREVIATIONS/ACRONYMS

<b>BLS</b>	Bureau of Labor Statistics
<b>EFA</b>	Explorative Factor Analysis
<b>HSE</b>	Health, Safety, and Environment
<b>ILO</b>	International Labour Organization
<b>KMO</b>	Kaiser-Meyer-Olkin
<b>KNBS</b>	Kenya National Bureau of Statistics
<b>NACOSTI</b>	National Commission for Science, Technology, and Innovation
<b>NCA</b>	National Construction Authority
<b>OSH</b>	Occupational Health and Safety
<b>OSHA</b>	Occupational Safety and Health Act
<b>PCA</b>	Principal Component Analysis
<b>PPEs</b>	Personal protective equipment
<b>SU-IERC</b>	Strathmore University – Institutional Ethics Review Committee
<b>WIBA</b>	Work Injury Benefits Act
<b>SME</b>	Small medium enterprises



## ACKNOWLEDGMENTS

I wish to extend my gratitude to my parents Kihoro and Wambui who laid the foundations for my academic progression and in the process expanded my horizon to limitless potential. To my wife Lucy who complimented me with both moral and financial support, very necessary in the journey. I also extend a lot of love, lessons and gratitude to my children Maxine, Ronald, Washington, Winston and Joy. They ensured there was no turning back and, in the process, motivated me to lead this academic journey for all of us from the front, a very welcome challenge. My supervisor, Doctor Onyango is a pusher, a motivator and with immense positive guidance. He's a lesson I will carry with me throughout my life. God bless all.



## DEDICATION

I dedicate this dissertation to my wife Muthoni and kids Wambui, Kihoro, Wambuga, Kahuho and Nduta



# CHAPTER ONE

## INTRODUCTION TO THE STUDY

### 1.1 Introduction

The construction industry has a long history of accidents, some of which may not be serious. In contrast, a significant number have led to severe physical damage and even death in the construction sites. This has generated significant interest in exposure to these risks not only from the firm but also from academia and regulatory bodies of the sector. Theoretically, safety practices and complying with safety regulations have been identified as among the key contributors to safe working spaces, which means fewer occurrences of injuries and fatalities that may occur in a construction site (Ahmed, 2019). This chapter outlines the study's background, problem statement, purpose, objectives, research questions, significance, and scope.

### 1.2 Background to the Study

Due to their design, construction projects and operations are distinguished by the high risk of hazard exposure. The primary reasons as to why accidents happen at construction sites are linked to the distinctive nature of the construction industry, how humans behave, technical elements, hazardous working conditions, and inadequate safety management. All these elements lead to working methods and practices that are dangerous (Chong & Low, 2014). Accidents experienced in construction sites are not unique to developed or developing nations but are rather experienced globally, though at different degrees in either region. There is an astonishing difference in the accident rates between countries that are developed and those that are developing (Rajaprasad & Chalapathi, 2014).

Every year, approximately 60,000 fatalities arise in construction across the globe, and this means that every nine minutes, a construction fatality occurs (Hämäläinen, Takala, & Saarela, 2006). In Finland, the construction industry contributed to 7.685% of all non-fatal work injuries (Kurppa, 2015). In America alone, there are more than 900 fatal accidents that are reported in construction work places annually with non-fatal injuries exceeding 200,000 (Bureau of Labor Statistics, 2018). Chong and Low (2014) reported that from 2000 – 2009, 6.52 % of all accidents that occurred in all industries arose from Malaysian construction firms. The Kenyan sector recorded 40 fatalities and 383 non-fatality cases between 2010 and 2011 (Kibe, 2016).

Safety compliance can be described as normal primary activities that are mandated and employed by people to take care of their safety in their workplaces. This includes putting on protective gear or observing work safety procedures (Neal & Griffin, 2006). It can also be described as the practices people carry on to reduce the occurrence of accidents such as putting on a helmet, wearing a jacket or hand gloves, and observing the safety procedures that are stipulated (Mashi, 2014). Safety compliance is conduct that can significantly impact the safety record of the firm. It involves the level to which employees observe the rules, laws, and practices laid by the organization, even without their employer keeping an eye on them (Podsakoff, MacKenzie, Paine, & Bachrach, 2000).

Safety compliance is associated with the safety conditions, and it is also described as the conduct of observing all the regulations in an organization's major safety activities (Griffin & Neal, 2000). It explicates the actions that employees need to perform based on the guidelines set aside by the safety board to prevent accidents in the workplace. These guidelines differ from organization to organization, depending on the sensitivity of the task (Mahmood, 2010). Taylor (2010) suggests that ignoring or inability to comply with safety precautions leads to accidents that are likely to reduce the company's yearly profits by 30%. This cost becomes even more costly when it impacted the organization's social reputation.

Ikpe, Hammond, Proverbs, and Oloke, (2011) noted that the expenses incurred by observing health and safety rules (dedication and development to safety) were more than the expenses brought about by the accidents or the price of safety by a ratio of roughly 3:1 meaning that 62% gain returns to 38% gaining loss). Ikpe et al. (2011) assert that preventing accidents (that is observing safety regulations) is more beneficial than the safety expenses caused by the accidents by a ratio of an estimated three to one. Phillips' (2011) conclusions imply that observing health and safety rules leads to saving considerable costs.

There is evidence from past studies that compliance in safety and health regulations leads to improved performance in both project and business performance among construction firms. Arewa and Farrel (2012) assessed how compliance to health and safety regulations impacted financial returns among construction SMEs and asserts that observing safety and health regulations reduced costs by cutting the financial risk associated with legal

fees and fines. This cost was also increased by its negative impact on human resources among SME construction firms.

Several researchers have explored the factors that contribute to safety compliance among construction firms. Agwu (2012) investigated the effect of total safety management as an improvement strategy among selected Nigerian firms. They found that adherence to safety management practices resulted in improved organization performance in enhanced performance and increased profitability. Okoye, Ezeokonkwo, and Ezeokoli (2016) studied the effect of enhancing the knowledge of employees on health and safety practices on project performance and found that knowledge enhancement in safety practices improved the performance of construction firms in Nigeria thus indicating that safety training was a determinant for safety compliance.

Zin and Ismail (2012) conducted an extensive and thorough literature appraisal from journals, articles, as well as conference proceedings on elements contributing to the improvement of the construction workers' observance to safety protocols. This study found that management commitment, presence of a safety and health officer, safety communication, safety management system, safety incentives, and an effectual training establishment of guidelines and rules positively improved safety adherence in the Malaysian construction projects.

Sweden is one of the nations that have the lowest injury rates in construction projects. Grill (2018) research among Swedish construction firms revealed that construction managers were highly involved and rule-oriented, which may explain the low injury rates reported among Swedish firms. Olutuase (2014) study found that senior management and engineers who were expected to provide oversight safety functions throughout construction sites demonstrated low safety leadership except for fear of accident occurrence or until probably there is an incidence and this contributed to a higher ratio of accidents in Nigeria construction projects.

Investing in safety measures and practices has also been shown to have positive effects for safety in the construction industry. Feng, Teo, Ling, and Low (2014) study established that the safety performance of building projects is determined by safety investments. Enshassi, Choudhry, Mayer, and Shoman (2008) study concluded that the injury rate increased among subcontractors in The Gaza Strip when there was less safety-related

investment. Kemei, Kaluli, and Kabubo (2017) found that reluctance to invest in safety was one of the major factors that contributed to fatalities and injuries in construction projects in Kenya.

Cooper (2015) defined leadership involvement in safety measures as the various approaches describing the desired state, aligning the organization to this state, and taking on flexible efforts aimed at compelling the importance of adherence to safety regulations. Safety management refers to ensuring that safety complaints are investigated; promote dialogue between safety representatives with employees in the firm, providing time for safety inspections, and adequate representation of health officers whose goal is to observe safety levels are maintained in the organization (Zin & Ismail, 2012).

Safety training is the process of gaining precise skills or understanding in maintaining a safe environment in a construction project. The safety training is precious as it enables the employees to foretell impending accidents or near misses (El-nagar, Hosny, & Askar, 2015). Feng (2013) defines investment in safety as the costs that are incurred in the organization to realize safety performance such as costs in employment, safety equipment, facilities, necessary training, ensuring regular inspections, creating incentives and safety innovation costs.

Despite the importance leveraged on safety compliance, the Kenyan sector has shown a trend that shows poor adoption of safety practices and safety compliance among contractor firms, more so, small contractor firms. Muiruri (2012) admits that safety observance with health and safety necessities is lacking. This is because Kenyan employers rarely comply with the law, and this leaves their workers exposed to unhealthy working conditions. Gacheru (2015) alluded that collapsed building cases, which later caused deaths and property loss, were prevalent due to non-compliance with the mandated safety regulations and standards. Otido and Omwenga (2019), investigated factors impacting NCA on authorizing construction projects in the city's CBD and revealed that there was a lack of sufficient capacity for contractors to guarantee the observance of regulations.

### **1.2.1 Small and Medium Enterprises in Kenya's Construction Sector**

The National Construction Authority (NCA) regulated the Kenyan construction sector, and it comprises 18,000 contractors, 50 % of these contractors being local (Ngugi, Kaluli,

&Abiero-Gariy, 2017). The percentage of licensed contractors is highest at Building Works, with 43%, followed by 34% by Roads, Water at 10%, and Electrical works at 9%, and Mechanical representing 3% (NCA, 2014). There are approximately 12,500 construction firms in Kenya, 7,800 firms are licensed, and the remaining 4,700 firms are not licensed [KNBS], 2016).

The sector is dominated by SME contractors, that total 75% with NCA7 31%, NCA6 22%, NCA8 15%, and NCA5 at 11%. Major contractors total 21% with NCA4 13%, NCA3 4%, NCA2 2% and NCA1 3%. Men own 71% of the firms, while 21% of the firms were jointly owned. 7% are owned by women (NCA, 2014).

### **1.2.2 Safety Legal Framework in Kenya**

The International Labour Organization sets the basic international standards on safety and health (ILO, 2013). These standards are founded on recommendations made by international health and safety conventions. The most significant and wide-ranging convention is the 155 convention of 1981, which affects all workers in all areas of financially viable activity. In Kenya, the Constitution of Kenya 2010 in Article 41 on Labour relations established the Industrial Court to ensure that the regulations are passed into law (Ng'ang'a, Ngigi, Siboe, Ongundo, & Wanyona, 2016).

Other legislation relating to employees and employers are Occupational Safety and Health Act, 2007, Employment Act, 2007, The Kenyan Worker and the Law, The Labour Relations Act, 2007, the Labour Institutions Act, 2007, and The Work Injury Benefits Act, 2007. These legislations are integrated from the 1998 ILO Declaration on Fundamental Principles and Rights at Work, whose goal is to make sure all companies adhere to basic human rights are guaranteed in all institutions both officially and socially (Ng'ang'a et al., 2016).

The Occupational Health and Safety (OSH) services in Kenya follow two key legislations: the Occupational Safety and Health Act (OSHA), 2007, and the Work Injury Benefits Act (WIBA) 2007. OSHA, 2007 aims to ensure that people at work and those not directly associated with an organization are protected from the hazards and risks that may arise from actions of the organization while from carrying out duties in the organization. WIBA, 2007 aims to insure employees of their welfare should an injury occur or should a complication or disease develop during the employment period (Oluoch, Ndeda, & Njogu, 2017).

### **1.3 Problem Definition**

The construction sector is key in the financial growth and development in Kenya, as evidenced by its impact on the country's gross domestic product (GDP) in recent years (Mwangi, 2016). The industry is also key in the generation of employment opportunities to a majority of semi-skilled and low skilled workers, thus improving the living standards of a large population of the country (Ondara, 2017).

As in other sectors, promoting the safety of workers in this sector leads to improved employee wellbeing and maintains the performance of workers. In this industry, employers have to ensure that there is adequate provision of safety equipment, which improves the working environment, which enhances performance. This may, however, increase cost both financially and time-wise because compliance is very involving. Some firms embrace safety compliance with the seriousness it deserves while others are ignorant of the same. A majority of firms, therefore, fall in between the two extremes (Ondara, 2017).

The evidence indicates that accidents still occur frequently though the statistics are somewhat conflicting (Mwangi, 2016; Kemei et al., 2017). In 2000, the construction industry documented 902 accident cases consisting of 56 fatal accidents in 2000 and 846 non-fatal accidents. Between 1999 and 2004, the construction industry fatalities and injuries for each of these years were 1,528, 1,923, 1,332, 1,599, and 1,387 (Mwangi, 2016). The industry recorded 40 fatalities and 383 non-fatality cases between 2010 and 2011 (ILO, 2013). These statistics point to a lack of safety compliance in the construction industry which contributes to the fatal accidents.

In the literature, safety compliance in the construction industry has been attributed to safety investment (Feng et al., 2014; Enshassi et al., 2008; Kemei et al., 2017), safety training (Okoye et al., 2016; Zin & Ismail, 2012), leadership involvement in safety (Grill, 2018; Oluotase, 2014), and safety management practices (Agwu, 2012; Zin & Ismail, 2012). The extent to which these factors are practiced and implemented in construction firms in Kenya and how this affects their performance is an area of research that has not explored to which this study aims to fill the gap.

## 1.4 Research Objectives

The study aimed to;

- i. Determine the effect of leadership involvement in safety on construction firm performance in Nairobi County
- ii. Establish the effect of safety management practices on construction firm performance in Nairobi County
- iii. Determine the effect of staff safety training on construction firm performance in Nairobi County
- iv. Establish the effect of investment on safety equipment on construction firm performance in Nairobi County

## 1.5 Research Questions

- i. To what extent does safety leadership involvement in safety influence the performance of SMCEs in Nairobi County?
- ii. To what extent do safety management practices influence the performance of SMCEs in Nairobi County?
- iii. To what extent does staff safety training influence the performance of SMCEs in Nairobi County?
- iv. To what extent do safety investments influence the performance of SMCEs in Nairobi County?

## 1.6 Scope of the Study

The study was limited to investigating the impact of the influence of safety compliance factors on performance among Nairobi SMEs. Special focus was put on safety management, safety leadership, and safety investments, and staff safety training on the performance of Small and Medium Construction Enterprises. The study focused on the firms that are registered with the NCA. The study targeted managers of construction firms as study participants for this research. This study started in August 2019 and was completed in April 2020.

## 1.7 Significance of the Study

To policy and decision-makers in the construction sector, this study will be significant since it assesses the factors impacting performance among construction projects. This information is useful for regulators in the construction sector to make amendments to

policy and give guidelines that can contribute to better performance in construction sites. Second, clients, contractors, and staff of building and construction benefit from safer construction sites if recommendations from this study are adopted by contractors. The study also showed the role clients should play in ensuring that safety practices are followed in construction sites, which can decrease the frequency of accidents in construction sites. Managers of contractor firms can use the information for this study to promote safety cultural practices in their organizations and construction sites.

Lastly, the study is significant to scholars and academicians as it can be used as reference material and as a source of information on project performance and how safety regulations impact SME performance. Further, it provides areas that are worth revisiting by future researchers on construction projects.



## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter is a discussion of the literature relevant to this study. It is composed of two main sections that consist of theoretical review and empirical review. The theoretical reviews, presents, discusses and justifies the selection of certain theories adopted for this research. The empirical review entails past studies that have been conducted on the research subject. Other sections included are the research gap, conceptual framework, and chapter summary.

#### **2.2 Theoretical Review**

In the first section, the theory relevant to this study is addressed. The study adopted accident theory.

##### **2.2.1 Accident Theory**

An accident theory is a collection of propositions to illustrate the principles of causation of accidents. Similarly, an accident model is a simplified description, of a system or process, to assist presentations of accident occurrence based on an accident theory (Awala & Hasegawa, 2017). There are various accident causation theories. According to W.H. Heinrich (1931) the domino theory posits that 88% of all accidents are due to unsafe acts of people, 10% due to unsafe actions and 2% by “acts of God”. A five-factor accident sequence in which each factor would trigger the next step in the manner of toppling dominoes lined up in a row as follows: Ancestry and social environment; worker fault; unsafe act together with mechanical and physical hazard; accident; damage or injury. This study, however limits its scope to the Epidemiologic Theory also known as the Multiple Causation Theory. Gordon (1949) is the first proposer of the epidemiologic theory of accidents. Gordon considered accident as an ecologic problem. This research states that the causative factors in accidents have been seen to reside in agents, in the host and in the environment (Ali, Kamaruzzaman, & Sing, 2010).

The theory of multi causation is that the contributing causes combine together in a random fashion to result in an accident. During accident investigation, there is a need to identify as many of these causes as possible. The theory of multi causality has its basis in epidemiology. Gordon (1949) points out that accidental injury could be considered with

epidemiological techniques. Gordon (1949) believed that if the characteristics of the 'host' (accident victim), of the agent (the injury deliverer), and of the supporting 'environment' could be described in detail, more understanding of accident is the result of a complex and random interaction between the host, the agent and the environment (Ali et al., 2010).

The suitability of the theory in this study is its use in other disciplines as a means of examining causal factors in a relationship. This study aims to examine the relationship between safety compliance factors and business performance of contractor firms. The first component of the theory argues that tendencies may predispose worker to certain actions (predisposition characteristics) or peer pressure, poor attitude, and risk taking (situational characteristics). This suggests that construction workers are predisposed to accidents if the firm does not invest in safety, managers and supervisors do not lead in safety practice, lack of safety training, and disregards of safety practices in the workplace. These factors independently or altogether increase the risk of an accident occurring at a construction site.

### **2.3 Empirical Review**

This section presents past empirical studies previously conducted on the study variables. The empirical literature is presented in terms of the global, regional, and local context.

#### **2.3.1 Safety Leadership Involvement and Performance**

Tam, Zeng, and Deng (2004) conducted a study that aimed at recognizing factors that contributed to inadequate construction safety management in China. One of these elements was safety leadership, and it was sub-divided into three major factors that comprised safety policy, motivation and safety concern. A descriptive survey research design was adopted, and it sampled 102 contractors who participated by answering a questionnaire. The findings revealed that the top leaders of the organization were not concerned about safety awareness among employees. The study did not assess how leadership affects firm performance. The study also did not use any theoretical foundations in its research. This study aims to link safety leadership with the business performance of Small and Medium Construction Enterprises.

Skeppers and Mbohwa (2015) examined the relationship between safety leadership, leadership behavior, and safety performance among South African construction firms. A cross-sectional study involving 348 respondents based in Gauteng State was carried out.

Several theories based on several perspectives formed the basis of this study. These perspectives included the traits of the leaders, participant theories, behavioral theories, among other theories. The results showed that the visibility and conduct of leadership practiced by safety, caring, coaching, and controlling affected the safety culture along with safety performance in the construction sector. This study found no link between the safety leadership and business performance of construction firms. Further, there was no classification of the types of firms being assessed.

In Australia, Daniel (2015) explored the safety leadership concepts within the Australian construction system. The study adopted an exploratory research methodology based on post-positivist methodology analysis. The study adopted a contingency leadership theory. The sample of the study was 20 Construction managers, project managers, managers, and general managers selected using purposive sampling from various Australian-based projects, which were all under a single multinational company. The data was gathered using interviews. The results showed that safety leadership components were the demonstration of displaying safe behaviors, safety engagement with workers, and safety promotion. The study does not associate safety leadership and business performance, and the research was restricted to a large construction company.

Grill (2018) assessed the significance of active transactional, transformational, participatory, laissez-faire leadership, and rule-oriented behavior on safety outcomes among Swedish construction companies. Adopting the full-range leadership theory, a cross-sectional survey design consisting of 811 construction employees at 85 construction sites was adopted. The results indicated that Swedish construction managers are highly involved and rule-oriented, which may explain the low injury rates reported among Swedish firms. The study did not assess how safety leadership affects the business performance of construction firms. The sample of the study also included both large and small construction companies. It thus did not account for any differences that have been seen in past studies. This is a distinction that the study intends to make by focusing its investigation on Small and Medium Construction Enterprises.

Olutuase (2014) investigated safety management among Nigerian construction firms. Implementing a case study approach, 111 respondents were chosen from 244 employees registered in a firm. Data was collected through interviews and observation checklists. Safety leadership was conceived as designating security duties for trained staff, direct

engagement with employees on safety, on-time, and sufficient supply of personal protective equipment (PPEs) and frequent carrying out of safety audits. Findings indicated that leaders and engineers who were supposed to be instrumental in initiating organizational change were largely unconcerned about certain safety regulations except for when an accident occurs or when something important is expected to happen. This study did not subscribe to any theories and also did not measure how safety leadership was associated with the performance of the organization.

### **2.3.2 Safety Management Practices and Performance**

Durdyev, Mohamed, Lay, and Ismail (2017) examined the factors impacting safety performance among construction firms in Cambodia. Adopting a descriptive survey design, which was conducted among 92 stakeholders responsible for construction safety performance, selected using purposive sampling techniques. The study applied the stakeholder management theory. The data was administered using the drop-and-pick method. Using exploratory factor analysis, study results revealed that management and organization was one of the principal component factors which included sub-factors such as top management lacking adequate safety knowledge, lack of incentive and dedication to promoting safety awareness programs, lack of training, compliance monitoring, poor choice of subcontractors, insecurity, lack of emergency plans and procedures, tight agendas, and overlapping activities. The study did not link safety management with the business performance of construction companies.

In Sri Lanka, Priyadarshani, Karunasena, and Jayasuriya (2015) assessed factors impacting safety performance among construction firms. This study aimed to develop a model for measurement of the level of safety management on projects in the industry. Random sampling was used to sample 40 civil engineers, project managers, quantity, architects, surveyors, and safety supervisors who were chosen from contracting and consulting firms. The data was collected using questionnaires. The safety management framework was composed of managerial commitment, implementation, management measures, individual involvement, economic investment, and project nature. In safety management measures, safety plans, records, meetings, training, and rewards/incentives were identified as indicators. This study did not use any theories and did not associate safety management with the business performance of construction firms.

Jokkaw and Tongthong (2016) analyzed factors affecting safety management status and assessed the safety management conditions in Cambodian construction firms. The target population was 30 local and international contractors operating in 2011-2012, where a sample of 30 project managers, of which 24 belonged to local contracting firms, while six belonged to global contracting firms. The study applied the stakeholder management theory. The study used questionnaires administered using the face-to-face approach. The study found that safety management in construction assignments can be evaluated in terms of safety training, safety policy, and safety program. Assessment is enabled by having a safety committee, site accidents/incident investigation, hazard analysis and control program, Personal Protection Equipment (PPE), promotion of safety, health assurance courses, and emergency procedures. The study did not associate safety management to the business performance of construction firms. Moreover, the study included international firms in the sample and failed to adopt any theoretical foundation for the research.

In India, Dheeraj and Jaishree (2017) explored the major safety provisions, and also a detailed study has been conducted on safety management procedures in construction sites. A desk research approach with field visits was adopted for the research. The study used secondary data and field visits to gather information. The dimensions for safety management studied were organizational safety policy, meeting, safety training, inspection, penalties, and the attitude of the employees towards safety. Conclusions were that safety management is the most crucial part of construction work as it guarantees that the workers work in a safe operating environment where instances of accidents are minimized and easy to contain, thereby increasing performance and profits for the firm. The study did not provide a sample of the materials reviewed or construction sites visited. The study further does not subscribe to any theoretical foundations.

In Nigeria, Olutuase (2014) investigated the level of safety management in the country's construction sector. Espousing a case study approach which drew 111 staff members from a population of 244 middle and low-level employees, different methods were used to access the safety management system of the firms' compliance with global standards. The safety management system was conceptualized into five elements: corporate safety leadership, safety training, risk management, effective response, and operational control. The results showed that poor documentation and incompetence were the main features

that led to the underperformance of the safety management structure system. This study did not subscribe to any theories and also did not measure any association between safety management and performance of construction companies.

### **2.3.3 Safety Training and Performance**

El-nagar et al. (2015) researched developing an index for safety performance among Egyptian construction projects. Adopting the employment systems theory, the study adopted a questionnaire survey that was conducted among 238 contractors selected from a population of 1,955 contractors registered at the Federation for Construction and Building Contractors in Egypt. Safety training was measured by periodic training for staff, staff training to use safety clothing and equipment, and workers' experience and background of safety training. Further, the study revealed that employees had received sufficient training on the importance of the use of safety material. Employees' training is instrumental since it focuses on the employees, supervisors, staff and project managers. This study does not associate safety training and performance among construction firms, and the research sample did not distinguish between large and small firms' safety training practices.

Wahab, Rajab, Shaari, Rahman, and Saat (2014) investigated how safety training practices impact safety performance among companies in the Malaysian vehicular sector. A correlation research design selecting 696 staff from the car and automotive manufacturers in Malaysia using a systematic sampling design. The effect of the independent variables was measured using simple linear regression analysis. Safety training was measured using proxies such as safety awareness and understanding in dealing with emergencies in organizations, staff training in first aid, and following the safety rules and regulations. The findings highlighted that safety training practices were a major element of the safety performance of the firm. This was a Malaysian-based study on the country's automotive industry, while this study aims to examine the construction sector. This study does not link safety training with the business performance of the firm.

Bahn and Barratt-Pugh (2014) studied how safety training affects the construction sector, presenting both the opinions of the stakeholders from their investigation returns and through the examination of statistics on lost time injury/fatality. Findings showed that training was key in reducing work-related injuries as well as changing mindsets to safety training. The findings revealed how safety training might impact the development of safety knowledge hence safety performance. The method of delivery of safety training

also impacted performance. They challenged that when training becomes more “engaging,” it is more effectual, thus leading to “greater knowledge possession, and better safety performance and low accident and injury rates among firms.”

#### **2.3.4 Investment Safety and Performance**

Feng, Teo, Ling, and Low (2014) investigated the effects of safety culture, safety investments, and project hazards on safety performance among construction firms in Singapore. A cross-sectional survey was adopted. Several data collection methods were involved in a population of 47 projects. The sample of the study was 23 study participants from a population of 117 contractors. The study adopted the Risk Homeostasis and risk compensation theories. Bivariate correlation and multiple regression were conducted to examine the correlations between variables. Safety investment was operationalized as a compulsory in-house training cost, cost incurred to acquire safety equipment, to ensure that the facility is firm with safety facilities, meeting the safety inspection costs and costs incurred to create incentives and promotional material relating to the benefits of compliance to safety protocols. The findings suggested that the level of investment significantly contributes to safety performance. The project’s trial size was limited to analyzing 23 contractors who had overseen the construction of 47 building projects.

Enshassi, Choudhry, Mayer, and Shoman (2008) conducted a study directed at identifying, recognizing, evaluating, and characterizing factors that contribute to the safety performance of subcontractors in the Gaza Strip (Palestine) based on their relative importance. Quantitatively, sixty questionnaires were distributed to subcontractors who were selected randomly, out of which 34 were used in the analysis. Qualitatively, thirty factors were identified from the literature review. The findings showed that safety investment is comparatively low since it is not in the country’s culture. However, more investment was made on public projects compared to investment in private ventures. Conclusions were that the rate of injury was significantly higher, with less investment in safety precaution materials. This study did not distinguish between small and large firms. Furthermore, the study did not use any theory as a guide, and there was no attempt to associate safety investments with the business performance of construction firms.

Kemei et al. (2017) evaluated occupational safety and health among projects in Nairobi. Questionnaires were instrumental in data collection from 41 construction sites across Nairobi and identified elements that contributed to the frequency of accidents. The

research adopted a cluster sampling approach to selecting respondents. The study mentions Heinrich's theory in the discussion. The findings revealed that reluctance to invest in safety was among the factors contributing to the frequency of accidents. The study did not attempt to link investment on safety to performance among construction firms. The sample size was relatively small and did not take into consideration the size of the firms executing the construction project.

Sun (2010) assessed Return on Investment (RoI) on safety management programs among Australian projects. The research adopted a case study approach and focused on six construction projects whose data on performance was available. The study revealed that in the region, construction firms made more investment in safety products and protocols than in other industries. This enhanced safety performance and increased financial performance since the reduced instances of accidents occurring resulted in better saving rates. The study adopted a case study approach, and there is a need for further research to see if this relationship can be generalized to other construction companies.

### **2.3.5 Performance**

There are several ways of describing the performance, depending on the context of the study. Performance indicators are classified either financially or non-financially (Anumba, Carrillo, & Ghassani, 2005). The non-financial measures include the employees, customer characteristics, product performance, business effect on the environment, and process performance. The financial indicators are market share, return on capital, the number of new customers, return on investment, and sales.

Baker and Reid (2005) identified two major categories of construction firm performance, these being efficiency and effectiveness measures. The former referred to good quality management and the ability to deliver construction projects within set standards. These included adherence to schedule, profitability budget, safety, technical specification, and absence of any legal proceedings and claims. These measures were applied to evaluate success at the construction project implementation phase, thus encouraging result-oriented thinking. Effectiveness measures, on the other hand, referred to user satisfaction with the end product of the project. Construction firm performance was measured using the key metrics of cost variance (CV), time variance (TV), and quality control (Ondara, 2017).

The empirical evidence (Arewa & Farrel, 2012; Agwu, 2012; Okoye et al., 2016) suggests that compliance with safety practices is key to the organizational performance of construction firms. However, this evidence is not in the Kenyan construction industry, a gap that this study will fill. Moreover, the organizational performance variable has been measured by project performance of construction firms with less evidence of the use of business performance as a parameter for organizational performance, a gap that this study fills.

Tajuddin et al. (2015) conceptualize the performance of construction firms into business performance and project performance. The elements of project performance are safety and health, quality, timeliness, value, scope, environment, cost, participants' satisfaction, user/client's satisfaction, and overall success. The elements of business performance include the level of customer satisfaction, profit growth, repeat business, turnover growth, market share, new clients, and the reputation in general. Traditionally, firm performance has been evaluated in terms of the success of the different projects it engages in. Business performance delves into the business aspect of the specific firms. Business performance will be assessed vis-à-vis safety compliance.

Organizational performance has different meanings depending on the interpreter's perception, industry, and research context, and it can be referenced both financially and non-financially (Anumba, Carrillo, & Ghassani, 2005). The non-financial measures comprise characteristics of the consumers, the effect of business on society, staff, or characteristics of people, product performance, as well as process performance. Conversely, the financial performance includes the market share, return on capital, new customers, number of new customers, return on investment, and sales.

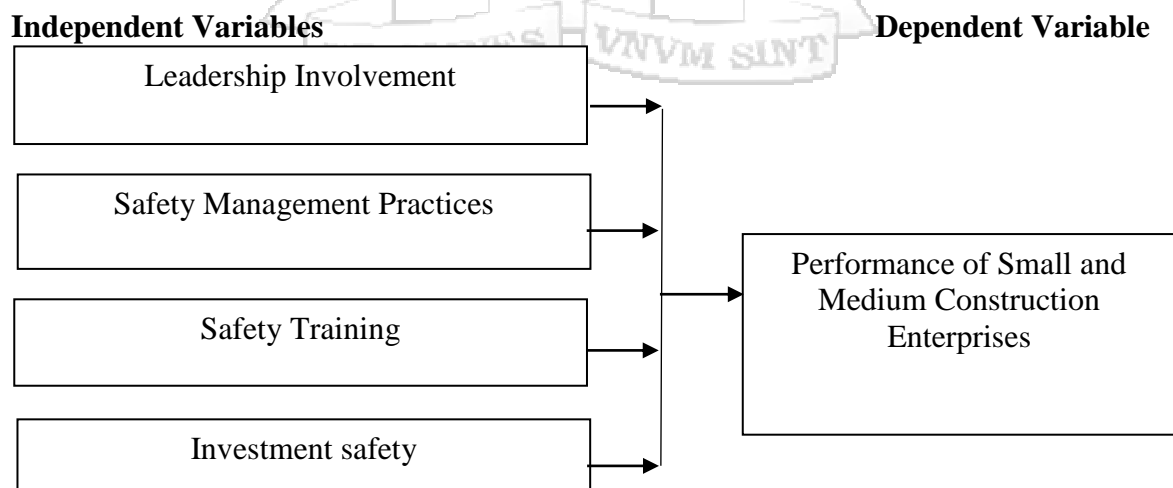
In measuring performance in the construction sector, there are two significant categories of performance, which are efficiency and effectiveness measures. The measure of efficiency refers to good quality management and the ability to deliver construction projects within set standards. These included adherence to schedule, budget, profitability, safety, technical specification, and the lack of any legal claims plus proceedings (Ondara, 2017). These measures are applied to evaluate success in the construction project implementation phase, thus encouraging result-oriented thinking. The measures of effectiveness refer to user satisfaction with the end product of the project (Leong, Zakuan, Saman, Ariff, & Tan, 2014).

## 2.4 Literature Summary and Research Gaps

The evidence shows that there are studies that have explored the role of leadership in safety but these studies (Tam et al., 2004; Skeepers & Mbohwa, 2015; Daniel, 2015) did not explore the association between this variable and business performance of contractor firms. The literature shows that much research has been conducted in the context of large construction firms (Grill, 2018) and international firms (Jokkaw & Tongthong, 2016). This is a research gap that the study fills by examining safety compliance and business performance of SME contractor firms. Third, majority of the studies (Enshassi et al., 2008; Dheeraj & Jaishree, 2017) do not base their research on theoretical foundations. This study was based on the accident theory which is an important theory in understanding the factors that contribute to accidents in the construction sector if recommendations to reduce accidents are to be made. Fourth, some studies have examined the importance of safety investment (Kemei et al., 2017; Feng et al., 2014), safety training (Wahab et al., 2014), safety management (Jokkaw & Tongthong, 2016; Dheeraj & Jaishree, 2017) in the construction sector, however, there was no attempt to establish the effect of safety investments on business performance of firms which this study aimed to achieve.

## 2.5 Conceptual Framework

Figure 2.1 is a conceptual framework. It is a diagrammatical presentation detailing how the variables are related. For each of the variables, a list of indicators is also presented.



**Figure 2.1: Conceptual Framework**

## 2.6 Operationalization of Study Variables

Table 2.2 shows how each of the variables will be measured and from which sources of the literature that these indicators were used. Table 2.2: Operationalization of Study Variables

Variable	Indicator	Measure	Supporting Literature
Leadership involvement	<ul style="list-style-type: none"> <li>• Safety commitment in the workplace.</li> <li>• Safety commitment to projects.</li> <li>• Safety coaching &amp; responsibility</li> <li>• Safety motivation</li> <li>• Safety policies &amp; objectives</li> <li>• Safety resources allocation</li> <li>• Promoting safety culture</li> </ul>	5- point Likert scale	Lu & Yang (2010); Wu et al. (2008)
Safety management practices	<ul style="list-style-type: none"> <li>• Recognizing &amp; rewarding safety practices</li> <li>• Compliance to legal &amp; statutory requirements</li> <li>• Integration of safety into business strategy</li> <li>• In-house inspections</li> <li>• Risk management</li> <li>• Involvement of stakeholders</li> </ul>	5- point Likert scale	Chourdhy et al. (2008); Jokkaw & Tongthong (2016); Olutuase (2014);
Safety training	<ul style="list-style-type: none"> <li>• On job safety training &amp; coaching</li> <li>• Safety induction &amp; training</li> <li>• Safety training certifications</li> <li>• Compulsory/statutory training</li> <li>• Training of stakeholders</li> <li>• Personal Protective Equipment &amp; equipment/tools training</li> </ul>	5- point Likert scale	Abdelhamid & Everett (2000); El-nagar et al., (2015); Feng (2013)
Investment safety	<ul style="list-style-type: none"> <li>• Staffing costs,</li> <li>• Safety equipment and facilities costs</li> <li>• Training costs</li> <li>• Safety inspections and meetings costs</li> <li>• Safety incentives and promotions costs</li> <li>• Safety innovation costs</li> </ul>	5- point Likert scale	Feng (2013); Teo & Feng, (2011)
Performance (Dependent Variable)	<ul style="list-style-type: none"> <li>• Profit growth</li> <li>• Market share</li> <li>• New clients</li> <li>• Repeat business</li> <li>• Level of customer satisfaction</li> <li>• Overall reputation</li> </ul>	5- point Likert scale	Tajuddin et al. (2015)

Source: Researcher (2019)

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

The research methodology that present the study blueprint followed is detailed in this chapter. It consists of research design, population and sampling, target population, sampling technique, data collection methods, quality of research, data analysis, and ethical issues in research.

#### **3.2 Research Philosophy**

Research philosophy can be defined as the development of research assumption, its knowledge, and nature (Lancaster, 2005). There are four main trends of research philosophy: the positivist, interpretivist, pragmatist, and realistic research philosophies (Žukauskas et al., 2018). The realistic research philosophy is based on the principles of positivist and interpretivist research philosophies and is based on assumptions that are necessary for the perception of subjective nature of the human. The pragmatist research philosophy claims that the choice of research philosophy is mostly determined by the research problem. Researchers who prescribe to this philosophy are “free” to choose the methods, techniques, and procedures that best meet their needs and scientific research aims (Mkansi & Acheampong, 2012).

The interpretivist research philosophy views the social world can be interpreted in a subjective manner. The greatest attention here is given to understanding of the ways through which people experience the social world. Interpretivist research philosophy is based on the principle which states that the researcher performs a specific role in observing the social world (Saunders, Lewis, & Thornhill, 2007). The positivist research philosophy claims that the social world can be understood in an objective way. In this research philosophy, the scientist is an objective analyst and, on the basis of it, dissociates himself from personal values and works independently (Mkansi & Acheampong, 2012).

The pragmatist research philosophy was adopted as the study sought to collect and analyze information to make inferences on problem under study. The researcher selected the preferred research design, quantitative approach, survey instrument to collect data, stratified sampling to select the sample from the population, use of descriptive and inferential statistics to analyze the data. The pragmatist philosophy provided these privileges.

### 3.3 Research Design

A research design refers to the overall strategy that is selected to integrate the different components of the study in a coherent and logical way, thereby, ensuring that it effectively addresses the research problem; it constitutes the blueprint for the collection, measurement, and analysis of data (Liberty & Miller, 2003). The descriptive research design was adopted for this study as it seeks to provide a description of a phenomenon of interest. Descriptive research aims to make measurable or observable data collected to produce categorization or description of the variables or combinations of the variables (Neeru, 2012). This study aimed to measure the relationship between independent variables (safety training, safety leadership, safety investments, and safety management) and dependent variable (business performance).

### 3.4 Population and Sampling

#### 3.4.1 Target Population

The target population constitutes all individuals who meet the required criteria in a study (Alvi, 2016). The study's target population included SME contractor firms registered in Nairobi County by NCA, which fall under classes 5-8, as shown in Table 3.1 as the units of analysis. According to the MSME Act of 2012, micro SMEs have an annual turnover of Ksh 500,000 (\$5,000), recruiting an average of 10 individuals annually. Small enterprises, on the other hand, are responsible for between \$5,000 to \$50,000 annual turnovers, hiring between 10-49 individuals. Medium enterprises account for \$50,000 and US\$8 Million annual turnovers, employing 50-99 people (Wamuyu, 2017). The target population of the study was 1,231 firms.

**Table 3.1: Target Population**

<b>Contractor categories</b>	<b>Population</b>
NCA 5	186
NCA 6	299
NCA 7	257
NCA 8	489
<b>Total</b>	<b>1,231</b>

**Source: Republic of Kenya (2019)**

### 3.4.2 Sampling Design and Sample Size

Stratified random sampling was applied to the study, and it involves dividing the target population into several sub-categories for easier analysis (Berinstein, 2000). A sample is then taken from these sub-categories. Proportionate sampling was implemented in the determination of the corresponding sample size for each of the sub-categories. The Yamane (1967) formula was used in the determination of the sample size, which consisted of 302 respondents. The units of observation are site managers from the firms. The final figure, according to the formula, was 142 respondents.

$$n = \frac{N}{1 + N(e^2)}$$

Thus, the sample of contractors in Nairobi County is;

$$\begin{aligned} n &= 1,231 / 1 + 1,231 (0.05)^2 \\ &= 1,231 / 4.08 \\ &= 301.9 = 302 \end{aligned}$$

Simple random sampling was instrumental in analyzing the sample. It is a form of probability sampling whereby units composing a population are allotted numbers from which a set of random numbers is then created. Units that have these numbers become incorporated in the sample (Fowler, 2009). This was applied to the list of sampled firms which were generated using Microsoft Excel software. To obtain a sample of on-site project supervisors from the firms, the researcher recruited an on-site project supervisor using convenience sampling from each of the firms selected using simple random sampling. Convenience sampling involves including members of a sample into a study based on their accessibility, willingness, and readiness to be engaged in a research.

**Table 3.2: Sample Distribution**

<b>Contractor categories</b>	<b>Population</b>	<b>Sample</b>
NCA 5	186	45
NCA 6	299	73
NCA 7	257	63
NCA 8	489	121
<b>Total</b>	<b>1,231</b>	<b>302</b>

### **3.5 Data Collection Instrument**

The study adopted a quantitative data collection approach. Quantitative research methods are research methods dealing with numbers and anything that is measurable in a systematic way of investigation of phenomena and their relationships. These methods are applied in answering questions regarding how different variables are related to the aim of explaining, calculating, and controlling a phenomenon (Kumar, 2005).

The study used these methods as they sought to collect data on the variables, measure the relationships between variables, and make inferences without altering the states of the variables. A structured questionnaire was adopted in the collection of quantitative data. It had six sections: background information of respondents, information on safety leadership, safety management, safety training, safety investments, and business performance. A 5-point Likert scale was developed to implore the respondents to indicate how much they agreed with statements on the study variables.

The instrument was administered using help from two research assistants. The research assistants were recruited from the undergraduate studies and were sensitized on the objectives of the study and the survey instrument. The researcher got in touch with the selected firms and informed them of the pending visits to their firms for introduction to a project supervisor to fill put the survey on behalf of the firm. The questionnaires were interview-administered where possible but in some cases the drop off and pick up method was used. These methods have been recommended in the research literature as approaches that can enhance a study's response rate as high as possible.

### **3.6 Research Quality**

#### **3.6.1 Validity Tests**

John (2015) defines validity as the degree of accuracy of the research instrument. It can be external or internal. External validity refers to elements of the external population. Here, it is important to ensure that research results obtained can be extracted from other populations operating in similar environments. Internal validity assesses the level of familiarity with the research instrument with the variables being studied. Kember and Leung (2008) recommend using constructs and questionnaire items from past studies to assess the search instrument's internal validity. External validity was established by having a refined inclusion and exclusion criteria where only firms that fall under the SME and building contractors will be targeted.

### 3.6.2 Reliability Tests

Reliability is a measure of the level of consistency of an instrument, including internal consistency, stability, and equivalence (Neuman, 2012). Cronbach's Alpha was adopted in the determination of a research instrument's reliability, and it gives an evaluation of the accuracy or uniformity of the research questions with the study objectives (Kember & Leung, 2008). To do this, the researcher conducted a pilot study among 10 participants from the population who were not included in the final sample of the study. A universal accepted rule is that a value of 0.6-0.7 points out accepted levels of reliability (Sitjma, 2009). The study aimed to achieve a Cronbach value that is above 0.6. Table 3.3 indicates the findings of the reliability tests, which show that the study variables each had a reliability score of more than 0.6 which is acceptable in research

**Table 3.3: Reliability Scores for Pilot Study**

<b>Variable</b>	<b>Reliability score</b>
Safety Leadership	0.720
Safety Management	0.678
Safety Training	0.605
Safety Investments	0.688
Business Performance	0.647
<b>Overall Instrument Score</b>	<b>0.668</b>

### 3.7 Data Analysis and Presentation

Marshall and Rossman (2011) depict data analysis as arranging, organizing, and conversion of raw data into meaningful information. Descriptive and inferential statistical tools were used to analyze the data. Descriptive statistics are numbers that sum up the details intending to describe what happened in the sample (Thompson & Panacek, 2008). The descriptive statistics were presented as frequencies, percentages, standard deviation, and means to recapitulate the data and observe trends and spread of data. The explorative factor analysis (EFA) identified the important factors under each objective as used in (Chua, 2014). Factor analysis is carried out using a correlation matrix of variables of interest. The variables are subdivided into factors. These factors represent a weighted mean of the original data, which are latent in the variables that cannot be observed (Hair, Black, & Babin, 2010). The Pearson ( $r$ ) correlation was the main inferential statistic tool adopted to measure how the variables were related. Multiple Regression analysis was then applied in the determination of the influence of independent variables on the dependent variables. Before carrying out the regression analysis, diagnostic tests were

carried out to ensure adherence to the assumptions of the multiple regression model. This includes multicollinearity, autocorrelation, normality tests, and heteroscedasticity tests. The following equation was adopted;

$$Y = a + bX_1 + cX_2 + dX_3 + eX_4 + \epsilon_j$$

Where:

Y = Business performance

a = Constant, b, c, d, and e are coefficients of X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub> and X<sub>4</sub> respectively.

X<sub>1</sub> = Leadership involvement

X<sub>2</sub> = Safety management practices

X<sub>3</sub> = Safety training

X<sub>4</sub> = Safety investments

$\epsilon_j$  = Error term

### 3.7.1 Exploratory Factor Analysis

The data of the independent and dependent variables were subjected to factor analysis. This is a data reduction technique that is carried out using a correlation matrix of variables of interest. The factors are combined with a set of variables. This factor represents a weighted mean of the original data, which are latent variables, i.e., variables that cannot be observed. Factor analysis, which uses principal component analysis and Varimax rotation, was used to extract factors subject to Kaiser-Meyer-Olkin (KMO), Bartlett tests, and an eigenvalue cut off of 1.0.

### 3.8 Ethical Issues in Research

The researcher sought permission from the Strathmore University – Institutional Ethics Review Committee (SU-IERC) before embarking on the project. The researcher then applied for a research permit from the National Commission for Science, Technology, and Innovation (NACOSTI). Before embarking on the data collection process, the researcher acquired qualified and well-trained research assistants who were directed to treat all the respondents respectfully. They sought permission before engaging the respondents and assured them that their participation was voluntary. The respondents were also informed that the data collected would be treated with confidentiality and that their identities would not be revealed. All other ethical guidelines were adhered to during the duration of the study.

## CHAPTER FOUR

### PRESENTATION OF RESEARCH FINDINGS

#### 4.1 Introduction

This chapter presented the study findings which are presented in sections of response rate, background information of respondents, and the firms selected for this sample. This is with strict adherence to the research objectives.

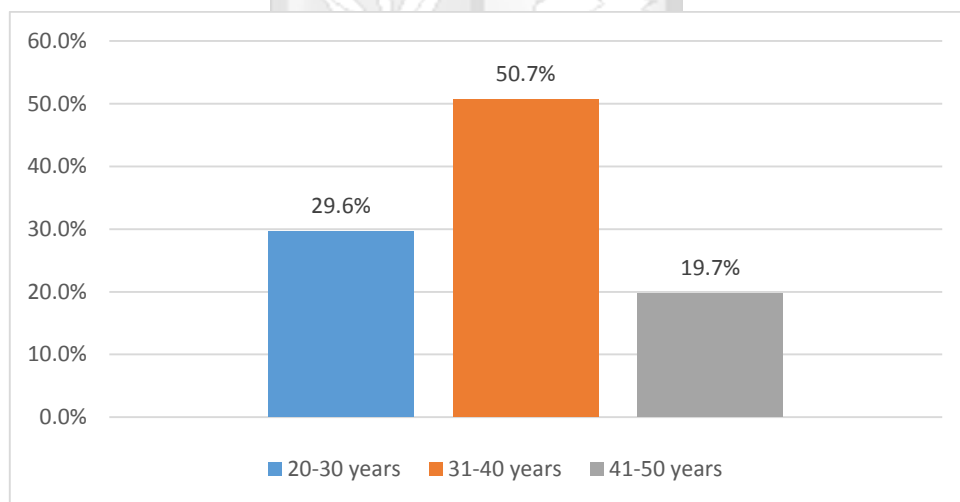
#### 4.2 Response Rate

Out of the 302 questionnaires distributed, the study was able to get back 142 questionnaires that were used in the analysis. Average response rate of academic studies range between 40% and 60% (Nulty, 2008). This study was able to obtain a 47% (142) response rate, which was deemed adequate for statistical analysis.

#### 4.3 Background Information

##### 4.3.1 Age

Findings indicated that (50.7%) of the respondents were between 31-40 years, those between 20-30 years were 29.6 %, and 19.7 % were between the age of 41-50 years, as shown in Figure 4.1.



**Figure 4.1: Respondents' Age**

##### 4.3.2 Respondents' Gender

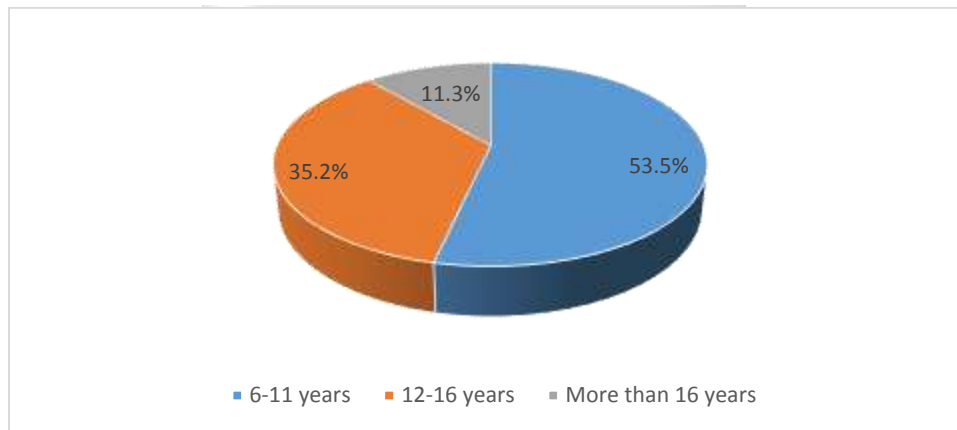
Table 4.1 is a representation of the participant's gender distribution, which indicated that most respondents were male, and this represented 93.7%, and female respondents accounted for 6.3%.

**Table 4.1: Gender of Respondents**

<b>Gender</b>	<b>Frequency</b>	<b>Percent</b>
Male	133	93.7
Female	9	6.3
<b>Total</b>	<b>142</b>	<b>100.0</b>

### 4.3.3 Firm Age

Most of the sampled firms were 6-11 years old and represented 53.5 % of the sample, 35.2 % was between 12-16 years, and 11.3 % had been in operation for more than 16 years, as seen in Figure 4.2.



**Figure 4.2: Age of firms**

### 4.3.4 Firm NCA Categorization

The study was interested in establishing the NCA categorization for the respondents of sampled firms. The findings showed that most firms belonged to the NCA 8 category as represented by 50.7 %, 30.3 % belonged to NCA 6 category, 11.3 % belonged to the NCA 7 category, and those in NCA 5 category represented 7.7 % of the respondents as evidenced in Table 4.2.

Table 4.2: NCA Categorization among Contractors

NCA Levels	Frequency	Percent
NCA 8	72	50.7
NCA 6	43	30.3
NCA 5	11	7.7
NCA 7	16	11.3
<b>Total</b>	<b>142</b>	<b>100.0</b>

### 4.3.5 Type of Projects Contractors Undertake

Figure 4.3 indicated the results of the type of projects the selected firms in the sample were engaged in. The results show that 55% were engaged in commercial construction projects, 3.5 % did residential only. In comparison, 41.5% did both commercial and residential construction projects.

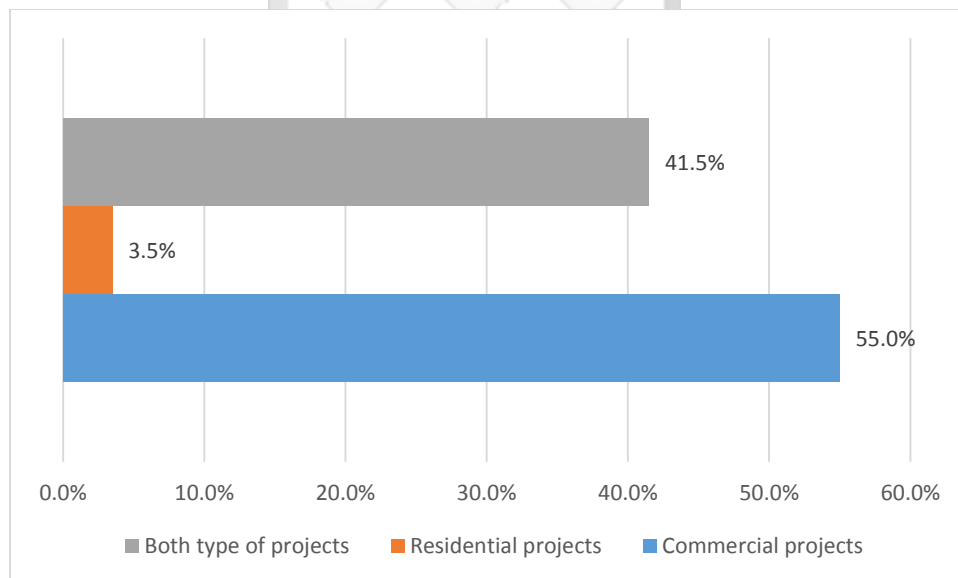


Figure 4.3: Type of Projects Undertaken by Contractors

### 4.3.6 Frequency of Injuries

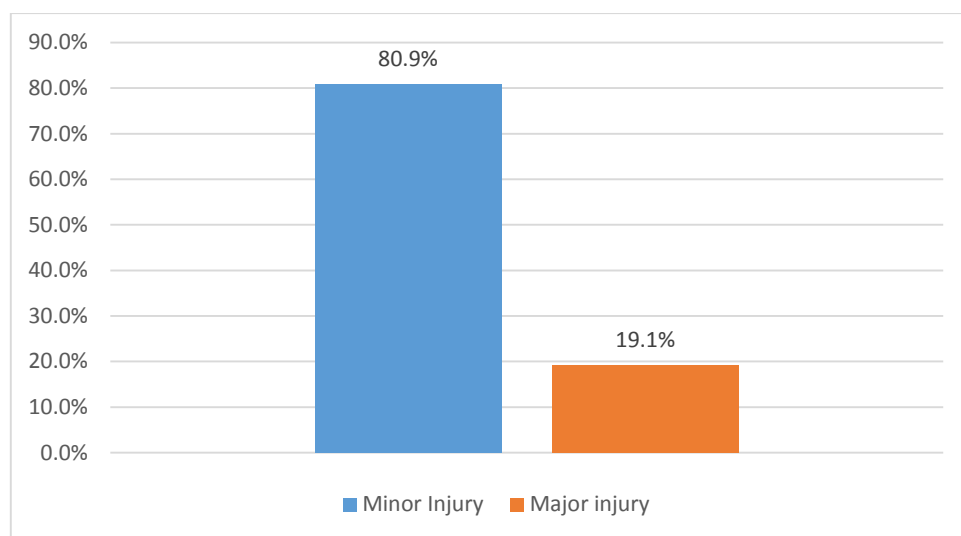
The research was interested in discovering the number of injuries that the firms had experienced. In line with this, the results show that 66.2 % had 1-5 injuries in the last year, 22.5 % had no injuries in the past year, and 11.3 % had experienced 6-10 injuries in the past year, as evidenced in Table 4.3.

**Table 4.3: Number of Injuries among Contractors**

Number of injuries	Frequency	Percent
None	32	22.5
1-5	94	66.2
6-10	16	11.3
<b>Total</b>	<b>142</b>	<b>100.0</b>

#### 4.3.7 Nature of Injuries

The findings show that most injuries were minor, as cited by 80.9 % of the responding firms, with the rest 19.1 % citing experiencing major injuries, as shown in Figure 4.4.



**Figure 4.4: Nature of Injuries Experienced in Contractor Firms**

#### 4.3.8 Causes of Injuries

Table 4.9 illustrates the main causes of the selected contractor firms. The findings show that hit by moving or falling objects was the most cited cause by 34.5 % of respondents; this was followed by others (bruises, knocks, burns) mentioned by 27.3% of the firms, being trapped between stationary and moving objects cited by 24.5%. Contact with electricity was cited by 4.5 % of firms, and 6.4 % resulted from falls from height.

**Table 4.4: Causes of Injuries among Contractors**

Causes of Injuries	Frequency	Percent
Fall from height	7	6.4
Vehicle collisions	3	2.7
Hit by moving or falling objects	38	34.5
Being trapped between stationary and moving objects	27	24.5
Contact with electricity	5	4.5
Others (Bruises, Knocks, burns)	30	27.3

#### 4.4 Exploratory Factor Analysis

The data of the independent variables, namely Safety leadership, Safety Management, Safety Training, and Safety Investments, together with that of Business Performance, were subjected to factor analysis. The factors are combined with a set of variables. This factor represents a weighted mean of the original data, which are latent variables, i.e., variables that cannot be observed. Factor analysis uses principal component analysis and Varimax rotation to extract factors subject to Kaiser-Meyer-Olkin (KMO), Bartlett tests, and an eigenvalue cut off of 1.0.

##### 4.4.1 Sampling adequacy test (Kaiser-Meyer-Olkin(KMO) and Bartlett's sphericity test)

Kaiser-Meyer-Olkin (KMO) was useful in the determination of the appropriateness of the application of factor analysis to yield distinct and reliable factors or determine important latent variables (Maat, Zakaria, Nordin, & Meerah, 2011). The correlation is stronger when the values are closer to 1; hence, they can be used to generate factors or constructs variable. Table 4.6 below presents the coefficients of KMO of the variables.

**Table 4.6: Coefficients of Kaiser-Meyer-Olkin Measure of Sampling Adequacy**

Variables	KMO index
Safety Leadership	0.771
Safety Management	0.556
Safety Training	0.692
Safety Investments	0.548
Business Performance	0.539

Table 4.6 indicates that all KMO coefficients are greater than 0.5 for all the variables clearing the way for factor analysis.

#### 4.4.2 Bartlett's Test of Sphericity

Bartlett's test of sphericity was performed to test the relationship between the questions and the variables. The intention is to combine the questions into new clustered variables (constructs). Bartlett's test determines whether the null hypothesis that the correlation matrix has an identity matrix is true (Maat et al., 2011). Table 4.7 shows the approximate of Chi-square (Approx.), degree of freedom (df), and level of significance (Sig.).

**Table 4.7: Bartlett's Test of Sphericity**

Variables	Approx. Chi-Square	df	Sig.
Safety Leadership	1094.605	21	0.000
Safety Management	914.559	10	0.000
Safety Training	1060.108	15	0.000
Safety Investments	780.556	15	0.000
Business Performance	700.102	10	0.000

From table 4.7 above, the p-values (Sig.) were all 0.000. At the 95% significance level, this showed that Bartlett's test of sphericity was satisfied. The variables were determined to be correlated clearing way for factor analysis. The findings of the explorative factor analysis are discussed below.

#### 4.4.3 Safety Leadership involvement

##### 4.4.3.1 Factors extraction

The principal component analysis is used to identify variables that account for more variability and extract new factors based on the total variance explained, as illustrated in Table 4.8 below.

**Table 4.8: Exploratory Factor Analysis of Safety Leadership**

Component	Total Variance Explained			Extraction Total	Sums of Squared	of Cumulative
	Initial Eigenvalues	Extraction	Loadings			
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.723	67.470	67.470	4.723	67.470	67.470
2	1.196	17.087	84.557	1.196	17.087	84.557
3	0.587	8.384	92.941			
4	0.231	3.294	96.235			
5	0.149	2.122	98.357			
6	0.071	1.011	99.367			
7	0.044	0.633	100.000			

Extraction Method: Principal Component Analysis.

Components in the first column represent the numbers of the variables used during Factor Analysis. The initial eigenvalues are the variances of the factors to be extracted. The first factor had the highest variance levels due to its high Eigenvalues. The value of the variance will reduce until there is no more variance among the factors. The percentage of variance represents the percent of total variance accounted by each factor, and the cumulative percentage gives the cumulative percentage of variance account by the present. Table 4.8 shows the extracted factors. Two of the factors had eigenvalues, which were higher than 1. Factor 1 was responsible for 67.47% of the variability, while factor 2 was responsible for 17.087 % of the variability. Combined, they account for 84.557% of the total variability. All the constructs or Items were found to belong to these two factors. They exhibited characteristics that were acceptable since they met the minimum criteria, which require that the factors have a value of 0.5 or higher. Therefore, all the items indicated Safety leadership, and hence none was excluded from the analysis.

#### 4.4.3.2 Factor Rotation

After extraction of factors, the variables were subjected to Varimax rotation. The Rotated component Matrix represents the rotated factor loadings, which are the correlations between the variables, and the factors are presented in Table 4.9 below. The factor column shows the extracted rotated factors, namely Safety leadership1 and Safety leadership2, and the components are as shown in Table 4.9.

**Table 4.9: Rotated Component Matrix of Safety Leadership**

	Rotated Component Matrix	
	Component 1	Component 2
The leadership motivates staff to practice safety procedures in construction projects	0.966	0.102
The firm's leadership allocates resources for safety in construction projects	0.950	0.187
The leadership of the firm has developed safety policies and objectives	0.730	0.584
The firm's leadership promotes the implementation of safety culture in the workplace	0.691	0.306
The firm's leadership is committed to safe practice in construction projects		0.975
The firm's leadership is involved in the coaching staff to safety practice in construction projects	0.506	0.755
The firm's leadership engages employees in safety practice in the workplace	0.580	0.691

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

#### 4.4.4 Safety Management

##### 4.4.4.1 Factors Extraction

The principal component analysis was instrumental in the identification of variables that account for more variability and extraction of new factors based on the total variance explained, as illustrated in Table 4.10.

**Table 4.10: Exploratory Factor Analysis of Safety Management**

Component	Total Variance Explained			Extraction Sums of Squared Loadings		
	Total	Initial Eigenvalues		Total	% of	
		% of Variance	Cumulative %		Variance	Cumulative %
1	3.250	65.008	65.008	3.250	65.008	65.008
2	1.106	22.114	87.121	1.106	22.114	87.121
3	0.547	10.941	98.062			
4	0.089	1.783	99.845			
5	0.008	0.155	100.000			

Extraction Method: Principal Component Analysis.

The two factors had an Eigenvalue of 1.0 and above and explained a cumulative variance of 87.121%. All the constructs or Items were found to belong to these factors since the primary factor loading value was above 0.5. Therefore, all the items indicated Safety Management factors, and hence none was eliminated.

##### 4.4.4.2 Factor Rotation

After extraction of factors, the variables were subjected to Varimax rotation. The Rotated component Matrix represents the rotated factor loadings presented in Table 4.10 below. The factor column shows the extracted rotated factors, namely Safety Management1 and Safety Management2, and the components are as evidenced in Table 4.11.

**Table 4.11: Rotated Component Matrix of Safety Management**

	Component	
	1	2
The firm engages stakeholders in safety management	0.974	
The management of the firm conducts risk analysis and management in the workplace	0.800	0.323
The firm's management endures safety is integrated into business strategy	0.786	0.228
The firm's management has a system for recognizing and rewarding safety practice and behavior in the workplace		0.995
The management conducts and implements in-house safety inspections in the workplace	0.510	0.855

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

#### 4.4.5 Safety Training

Exploratory factor analysis using orthogonal Varimax rotation and principal component were carried out on constructs indicating Safety training factors. Findings are as addressed in Table 4.12.

##### 4.4.5.1 Factors Extraction

The two factors were identified as having an Eigenvalue of 1.0 and above and explained a cumulative variance of 86.514%. All the constructs or Items were found to belong to these factors since the primary factor loading value was above 0.5. Therefore, all the items indicated Safety Training factors, and hence none was eliminated.

**Table 4.12: Exploratory Factor Analysis of Safety Training**

Total Variance Explained						
Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.139	68.981	68.981	4.139	68.981	68.981
2	1.052	17.533	86.514	1.052	17.533	86.514
3	0.587	9.776	96.290			
4	0.144	2.401	98.690			
5	0.056	0.933	99.623			
6	0.023	0.377	100.000			

Extraction Method: Principal Component Analysis.

#### 4.4.5.2 Factor Rotation

After extraction of factors, the variables were subjected to Varimax rotation. The Rotated component Matrix represents the rotated factor loadings. These show the correlation between variables and factors, as presented in Table 4.12 below. The factor column shows the extracted rotated factors, namely Safety Management1 and Safety Management2 and the components are as seen in Table 4.13.

**Table 4.13: Rotated Component Matrix of Safety Training**

<b>Rotated Component Matrix</b>		
	Component	
	1	2
The firm engages stakeholders in safety management	0.974	
The management of the firm conducts risk analysis and management in the workplace	0.800	0.323
The firm's management makes sure safety is integrated into business strategy	0.786	0.228
The firm's management has a system for recognizing and rewarding safety practice and behavior in the workplace		0.995
The management of the firm conducts and implements in-house safety inspections in the workplace	0.510	0.855

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

#### 4.4.6 Safety Investments

Exploratory factor analysis was applied to constructs indicating safety investment factors.

Principal component and orthogonal Varimax rotation analysis methods were applied to the factors to reveal findings in Table 4.14.

#### 4.5.6.1 Factors extraction

Findings showed that two factors had an Eigenvalue of 1.0 and above and explained a cumulative variance of 85.255%. All the constructs or Items were found to belong to these factors since the first-factor loading was above 0.5. Therefore, none of the factors were eliminated.

**Table 4.14: Exploratory Factor Analysis of Safety Investments**

<b>Total Variance Explained</b>						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
	1	3.418	56.959	56.959	3.418	56.959
2	1.698	28.297	85.255	1.698	28.297	85.255
3	0.470	7.834	93.089			
4	0.223	3.710	96.799			
5	0.155	2.576	99.375			
6	0.038	0.625	100.000			

Extraction Method: Principal Component Analysis.

#### 4.4.6.2 Factor Rotation

After extraction of factors, the variables were subjected to Varimax rotation. The Rotated factor loadings are presented in Table 4.15. The extracted rotated factors were Safety Investments1, and Safety Investments2, and the components are illustrated in Table 4.15.

**Table 4.15: Rotated Component Matrix of Safety Investments**

<b>Rotated Component Matrix</b>		
	Component	
	1	2
The firm invests in compulsory safety training courses and costs of in-house safety training and orientation sessions	0.928	
The firm invests in safety inspections and safety meetings	0.914	0.333
The firm invests in salaries paid to safety personnel, such as safety managers, safety officers, safety coordinators, safety supervisors	0.868	
The firm invests in the purchase of equipment, materials, machines, and tools, to protect staff	0.863	
The firm invests in the use of new technologies, methods, procedures, or tools to improve safety performance	0.105	0.951
The firm invests safety promotion in the workplace by the printing of pamphlets and posters, production of safety advertising boards and banners		0.939

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

#### 4.4.7 Business Performance

Exploratory factor analysis was applied to constructs indicating business performance. Principal component and orthogonal Varimax rotation analysis methods were applied to the factors to reveal findings in Table 4.16.

#### 4.4.7.1 Factors Extraction

**Table 4.16: Exploratory Factor Analysis of Business Performance**

Component	Total Variance Explained					
	Total	Initial Eigenvalues		Total	Rotation Sums of Squared Loadings	
		% of Variance	Cumulative %		% of Variance	Cumulative %
1	3.229	64.584	64.584	3.141	62.826	62.826
2	1.098	21.964	86.548	1.186	23.723	86.548
3	0.431	8.614	95.162			
4	0.223	4.463	99.626			
5	0.019	0.374	100.000			

Extraction Method: Principal Component Analysis.

Results showed that two factors were identified as having an Eigenvalue of 1.0 and above and explained a cumulative variance of 86.548%. All the constructs or Items were found to belong to these factors since the primary factor loading value was higher than 0.5. Therefore, none of the items indicating business Performance factors were eliminated.

#### 4.4.7.2 Factor Rotation

After extraction of factors, the variables were subjected to Varimax rotation. The resultant rotated factor loadings are presented in Table 4.17 below. The extracted rotated factors were Safety Investments1, and Safety Investments2, and the components are as shown in Table 4.16.

**Table 4.17: Rotated Component Matrix of Business Performance**

	Rotated Component Matrix	
	Component 1	Component 2
The company has been able to reach new clients	0.976	
The company has been able to maintain its profit growth	0.928	0.152
The company has been able to gain repeat business from its clients	0.882	-0.224
The company has a fair market share in the construction industry	0.741	-0.428
The overall reputation of the company is positive		0.964

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

## 4.5 Leadership Involvement in the Safety and Performance of SME Construction Firms

The first objective was establishing how leadership involvement in safety impacted performance of construction firms. The respondents were presented with seven statements to which they were requested to indicate how much they agreed with statements along a scale of 1-5, with the scale ascending from 1 to 5.

### 4.5.1 Descriptive Statistics for Leadership Involvement

The findings show respondents agreement that leadership was committed to safe practice in construction projects, as shown by a mean score of 4.30. Leadership also motivated staff to practice safety procedures in construction projects (M=4.24). That leadership developed safety policies and objectives (M=4.24) shown in Table 4.18.

**Table 4.18: Leadership Involvement in Safety Descriptive Statistics**

Safety leadership statements	N	Mean	Std. Deviation
The firm's leadership is committed to safety practice in construction projects	142	4.3	0.605
The firm's leadership is involved in coaching staff to safety practice in construction projects	142	4.03	0.807
The leadership motivates staff to practice safety procedures in construction projects	142	4.24	0.583
The leadership of the firm have developed safety policies and objectives	142	4.24	0.798
The firm's leadership engages employees in safety practice in the workplace	142	3.89	0.572
The firm's leadership allocates resources for safety in construction projects	142	4.09	0.833
The firm's leadership promotes implementation of safety culture in the workplace	142	4.22	0.916

### 4.5.2 Correlation Analysis between Business Performance and Safety Leadership

Spearman correlation analysis was utilized in the determination of how leadership involvement in safety influences the performance of Nairobi-based construction SMEs. Spearman's rank correlation analysis assessed how independent variables Safety

Leadership1 and Safety Leadership2 (two factors generated using PCA) and the dependent variable (Business Performance) are related and findings are in Table 4.19.

**Table 4.19: Correlation between Business Performance and Safety Leadership**

		Business Performance	Safety Leadership1	Safety Leadership2
Business Performance	R	1.000	-.260**	.388**
	P-value		0.002	0.000
	N	142	142	142
Safety Leadership1	R	-.260**	1.000	-0.159
	P value	0.002		0.059
	N	142	142	142
Safety Leadership2	R	.388**	-0.159	1.000
	P value	0.000	0.059	
	N	142	142	142

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

Table 4.18above reveals that business performance and Safety Leadership1 have a moderate relationship. Business Performance and Safety Leadership1 had a negative and statistically significant correlation at 1% significance level ( $R_s = -0.260$ ,  $p\text{-value} = 0.000 < 0.01$ ). Safety Leadership2 had a moderate positive correlation with business performance which was statistically significant at 1% level of significance ( $R_s = 0.388$ ,  $p\text{-value} = 0.000 < 0.01$ ).An increase in leadership motivation for staff to practice safety in the firm would result to reduced business performance. On the other hand, an increase in firm’s leadership commitment to safe practices in construction would see an increase in business performance.

#### **4.6 Influence of Safety Management Practices on Performance of SME Construction Firms**

Objective two was determining how safety management practices impacted the performance of construction SMEs. Six statements were presented to the respondents to which they were asked to indicate how much they agreed with certain statements along a scale of 1-5.

##### **4.6.1 Descriptive Statistics for Safety Management Practices**

The respondents agreed that the firm’s management enforces compliance to legal and statutory requirements as indicated by the 4.00 mean and 0.000deviationsas shown in Table 4.20. However, findings attest that respondents disagreed that the firm’s

management has a system for recognizing and rewarding safety practices and behavior in the workplace, as shown by 2.91 mean and 1.347 deviations. Additionally, respondents moderately agreed with most of the safety management practices, which suggest that the management of contractor firms did not apply safety management practices in their firms.

**Table 4.20: Safety Management Descriptive Statistics**

Safety management statements	N	Mean	Std. Deviation
The firm's management has system for recognizing and rewarding safety practice and <del>behaviour</del> behavior in the workplace	142	2.91	1.347
The firm's management enforces compliance to legal and statutory requirements	142	4.00	0.000
The firm's management makes sure safety is integrated into business strategy	142	3.39	0.841
The management of the firm conducts and implements in-house safety inspections in the workplace	142	3.50	0.797
The management conducts risk analysis/management in the workplace	142	3.64	1.013
Stakeholders are engaged in safety management	142	3.52	1.159

#### 4.6.2 Correlation Analysis between Business Performance and Safety Management

Spearman correlation analysis was used in the determination of the impact of safety management practices on the performance of construction SMEs. It identified how Safety Management1 and Safety Management2 are related (two independent factors generated using PCA) with Business Performance as exhibited in Table 4.21.

**Table 4.21: Correlation between Business Performance and Safety Management**

		Business Performance	Safety Management1	Safety Management2
Business Performance	R	1.000	-.610**	.280**
	P-value		0.000	0.001
	N	142	142	142
Safety Management1	R	-.610**	1.000	0.123
	P value	0.000		0.144
	N	142	142	142
Safety Management2	R	.280**	0.123	1.000
	P value	0.001	0.144	
	N	142	142	142

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

Table 4.21 show the existence of a negative relationship between business performance and Safety Management1. Business Performance and Safety Management1 was negative and statistically significant at 1% significance level ( $R_s = -0.680$ ,  $p\text{-value} = 0.000 < 0.01$ ). Safety Management2 had a positive correlation coefficient with a statistical significance level of 1% ( $R_s = 0.280$ ,  $p\text{ value} = 0.000 < 0.01$ ). This means that implementing a rewarding system for safety practice in the firm would result to an increase in business performance. An increase in engaging stakeholders in safety management would result in reduced business performance. This means that firms should focus safety management for their staff only.

#### **4.7 Influence of Staff Safety Training on Performance of SME construction firms**

Objective three was the determination of the effect of safety training on performance among SME construction firms. Six statements were presented to the respondents to which they were asked to show how much they agreed with statements along a 1-5 scale.

##### **4.7.1 Descriptive Statistics for Safety Training**

The results show that most rankings of statements were between the score of 2 and 3, suggesting that the respondents were in disagreement and moderate agreement with the safety training among the selected firms. Table 4.21 shows that respondents disagreed that the firm had a compulsory safety training program in place ( $M=2.95$ ) and that the firm has a safety training program for stakeholders ( $M=2.84$ ).

**Table 4.22: Safety Training Descriptive Statistics**

<b>Safety training statements</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>
The firm promotes safety training and coaching	142	3.37	1.387
The firm has a safety induction and training programme	142	3.42	1.222
The firm has a safety training certification program	142	3.71	1.176
The firm has a compulsory safety training program in place	142	2.95	0.925
The firm has a safety training program for stakeholders	142	2.84	0.872
The firm conducts personal protective equipment training programs	142	3.53	1.128

#### 4.7.2 Correlation Analysis between Business Performance and Safety training

Spearman correlation analysis was instrumental in the determination of how Safety training practices influenced performance among SME construction firms. It identified how much Safety training one and Safety training2 (two independent variable factors generated using PCA) and Business Performance were related as illustrated in Table 4.23

**Table 4.23: Correlation between Business Performance and Safety training Correlations**

		<b>Business Performance</b>	<b>Safety Training1</b>	<b>Safety Training2</b>
Business Performance	R	1.000	-.367**	.737**
	P-value		0.000	0.000
	N	142	142	142
Safety Training1	R	-.367**	1.000	.168*
	P value	0.000		0.046
	N	142	142	142
Safety Training2	R	.737**	.168*	1.000
	P value	0.000	0.046	
	N	142	142	142

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

The findings in Table 4.22 indicate a weak relationship between business performance and Safety training1. The relationship was negative and statistically significant at 1% significance level ( $R_s = -0.367$ ,  $p\text{-value} = 0.000 < 0.01$ ). Safety training2 had a strong positive correlation coefficient which was statistically significant at 1% level of significance ( $R_s = 0.737$ ,  $p\text{ value} = 0.000 < 0.01$ ). This means that an increase in safety induction and training programme would result in reduced business performance. This means that firms should focus in providing on the job training in safety for staff. However, having a safety training programme for staff would see an increase in business performance.

#### 4.8 Influence of Investment Safety on the Performance of SME Construction Firms

Objective four was the determination of how investment safety impacted the performance of construction SMEs. Six statements were presented to the respondents to which they were implored to show how much they agreed with the statements on a 1-5 scale.

##### 4.8.1 Descriptive statistics for Investment Safety

Table 4.23 indicated that respondents agreed that the firm invested in purchasing equipment, materials, machines, and tools to protect staff, as shown by a 4.09 mean and a

deviation of 0.833. However, moderate agreement with other statements indicated poor investment in safety among sampled firms.

**Table 4.24: Investment in Safety Descriptive Statistics**

<b>Investment in safety statements</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>
The firm invests in salaries paid to safety personnel, such as safety managers, safety officers, safety coordinators, safety supervisors	142	3.30	1.539
The firm invests in purchase of equipment, materials, machines, and tools, to protect staff	142	4.09	0.833
The firm invests in compulsory safety training courses and costs of in-house safety training and orientation sessions	142	3.37	1.188
The firm invests in safety inspections and safety meetings	142	3.36	0.878
The firm invests safety promotion in the workplace by the printing of pamphlets and posters, production of safety advertising boards and banners	142	3.27	0.996
The firm invests in use of new technologies, methods, procedures, or tools in order to improve safety	142	3.54	0.759

#### **4.8.2 Correlation Analysis between Business Performance and Safety Investments**

Spearman correlation analysis was used in the determination of how Safety Investment practices influence performance among SME construction firms in Nairobi County. It checked how Safety Investments<sub>1</sub> and Safety Investments<sub>2</sub> (two independent factors generated using PCA) were related to the dependent variable (Business Performance) as indicated in Table 4.25.

**Table 4.25: Correlation between Business Performance and Safety Investments**

		Business Performance	Safety Investments1	Safety Investments2
Business Performance	R	1.000	-.399**	.660**
	P-value		0.000	0.000
	N	142	142	142
Safety Investments1	R	-.399**	1.000	0.033
	P-value	0.000		0.693
	N	142	142	142
Safety Investments2	R	.660**	0.033	1.000
	P-value	0.000	0.693	
	N	142	142	142

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

According to Table 4.24, Business Performance and Safety Investments1 have a weak relationship. Business Performance had a negative and statistically significant relationship with Safety Investments1 at 1% significance level ( $R_s = -0.399$ ,  $p\text{-value} = 0.000 < 0.01$ ). Safety Investments2 had a positive correlation coefficient which was statistically significant at 1% level of significance ( $R_s = 0.660$ ,  $p\text{ value} = 0.000 < 0.01$ ). The findings suggest that investing in compulsory safety training courses and costs of in-house training and orientation sessions would result in decreased business performance. Investments in new technologies, methods, procedures or tools to improve safety in construction projects would see an increase in business performance.

#### 4.9 Performance of SME construction firms

The dependent variable was utilized in examining performance among construction SMEs. Six statements were presented to the respondents, and they were implored to indicate how much they agreed with them on a 1-5 scale.

##### 4.9.1 Descriptive statistics for Performance

Table 4.26 indicated that respondents agreed that the firm able to reach new clients as shown by a mean score of 4.12 and standard deviation of 0.577. The respondents moderately agreed with other statements. The findings suggest contractor firms sampled were able to attract new clients into their business. However, the responses show that

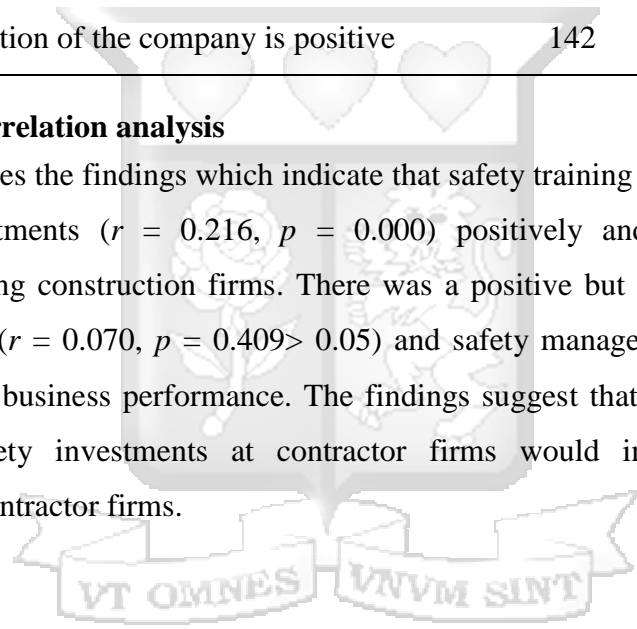
reaching customer satisfaction was the lowest ranked statements on business performance of sampled contractors.

**Table 4.26: Performance of Construction Enterprises Descriptive Statistics**

<b>Performance of Small and Medium Construction Enterprises</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>
The company has been able to maintain its profit growth	142	3.86	0.904
The company has been able to reach new clients	142	4.12	0.577
The company has been able to gain repeat business from its clients	142	3.97	0.445
The company has a desirable level of customer satisfaction	142	3.30	1.05
The overall reputation of the company is positive	142	3.72	0.612

#### **4.9.2 Overall Correlation analysis**

Table 4.27 illustrates the findings which indicate that safety training ( $r = 0.367, p = 0.000$ ) and safety investments ( $r = 0.216, p = 0.000$ ) positively and significantly affect performance among construction firms. There was a positive but insignificant effect of safety leadership ( $r = 0.070, p = 0.409 > 0.05$ ) and safety management ( $r = 0.075, p = 0.375 > 0.05$ ) and business performance. The findings suggest that an increase in safety training and safety investments at contractor firms would increase the business performance of contractor firms.



**Table 4.27: Pearson Correlation Coefficient**

		<b>Safety Leadership</b>	<b>Safety Management</b>	<b>Safety Training</b>	<b>Safety Investments</b>
Safety Leadership	Pearson Correlation Sig. (2-tailed)	1			
Safety Management	Pearson Correlation Sig. (2-tailed)	.929**	1		
Safety Training	Pearson Correlation Sig. (2-tailed)	.656**	.863**	1	
Safety Investments	Pearson Correlation Sig. (2-tailed)	.745**	.861**	.928**	1
Business Performance	Pearson Correlation Sig. (2-tailed)	0.070 0.409	0.075 0.375	0.367** 0.000	0.216** 0.010

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

#### 4.9.3 Diagnostics Tests

This section entails the diagnostic tests carried out before the multiple regression.

##### 4.9.3.1 Test for Heteroscedasticity

Heteroscedasticity refers to situations where the variance is not constant, which violates the assumptions of the error term (Brooks, 2012). Lagrange Multiplier tests for heteroscedasticity. It is calculated using  $R^2$  from the auxiliary regression and multiplying it by the number of observations, that is,  $TR2 \sim \chi^2(n)$  where  $n$  is the number of regressors in the auxiliary regression. The hypothesis is stated below;

$H_0$ : The variance is constant

$H_1$ : The variance is not constant

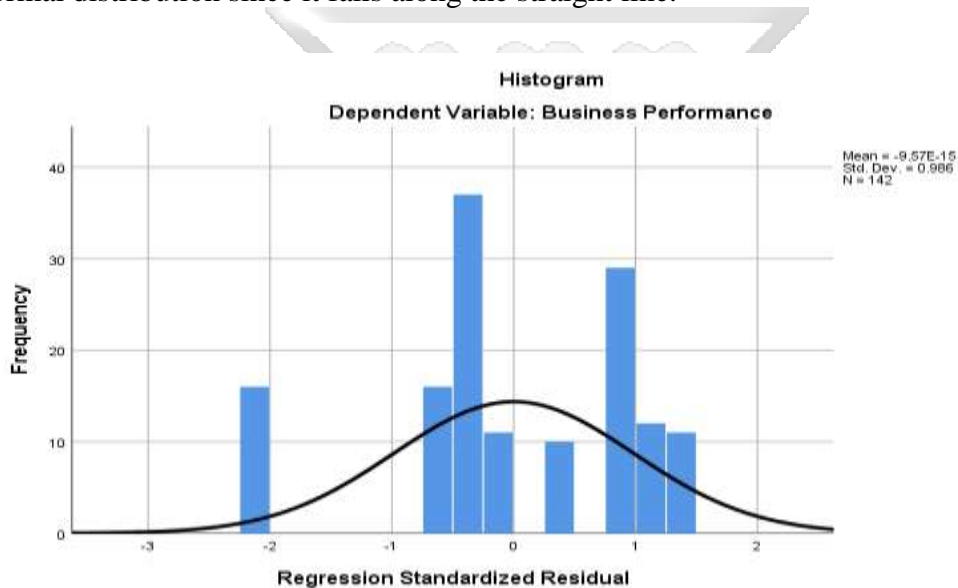
Table 4.28 shows how the calculated Lagrange Multiplier (LM) where the LM value is greater than Chi-square tabulated values; hence we fail to reject the null meaning the variance is constant. This is rejected if LM less than tabulated value.

**Table 4.28: Lagrange Multiplier**

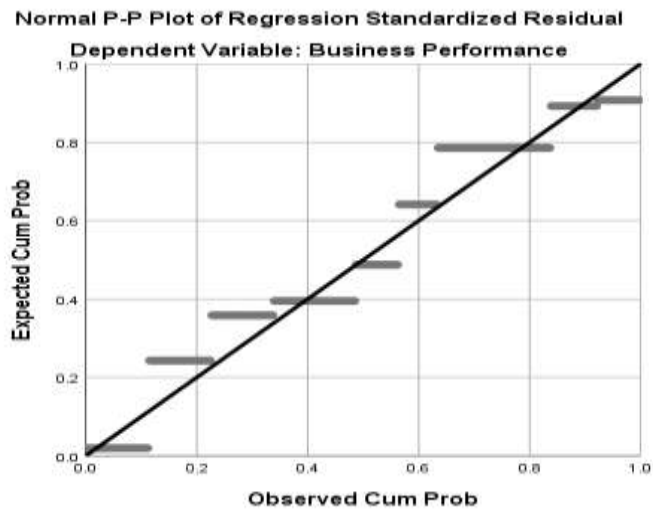
<i>Model</i>	<i>R2</i>	<i>No. of observations</i>	<i>LM</i>	<i>Tabulated value (X2) at 5%</i>
Overall	0.52	142	121.552	(4, 0.05) = 9.49

**4.9.3.2 Test for Normality**

A histogram was used to check for normality by having a normality curve drawn on the histogram. If the histogram is well covered by the normality, density curve, it implies the data is normal. From the table below, the histogram is well curved with a Q-Q plot implying that the data is normal. Also, the normal P-P plot shows that the variable has a normal distribution since it falls along the straight line.



**Figure 4.5: Histogram for Normality Tests**



### Figure 4.6: Normality P-P Plot

The majority of the bars are in the curve, and the data points are acceptable along the straight line.

#### 4.9.3.3 Test for Autocorrelation

Autocorrelation refers to a situation where the residuals in our model are correlated, which will have a negative influence in our model that is correct inference cannot be made. The hypothesis is;

H<sub>0</sub>: There is no autocorrelation

H<sub>1</sub>: There is autocorrelation

Durbin Watson statistic was used in testing for autocorrelation. If the calculated Durbin Watson statistics are closer two, we reject the null hypothesis. Table 4.29 shows the DW statistics = 2.404.  $\cong 2$ ; hence the null hypothesis is rejected, leading to the conclusion that there is no autocorrelation. This is rejected if the values are close to 1 or 4.

**Table 4.29: Durbin Watson Statistics**

Model	Durbin-Watson
1	2.404

a. Predictors: (Constant), Safety Leadership<sub>2</sub>, Safety Leadership<sub>1</sub>, Safety Training<sub>2</sub>, Safety Management<sub>2</sub>, Safety Training<sub>1</sub>, Safety Investments<sub>2</sub>

b. Dependent Variable: Business Performance<sub>1</sub>

#### 4.9.3.4 Multi-collinearity Tests

Multi-collinearity refers to situations of the high correlation between independent variables in our model, which results in a high coefficient of determination. Variance inflation factor (VIF) was used in testing for the statistical significance of multi-collinearity. Table 4.30 present the findings of the multi-collinearity Check Using Tolerance and VIFs. The  $VIF < 10$  (Carter & Lee, 2001); hence we can conclude that the presence of multi-collinearity is statistically insignificant.

**Table 4.30: Collinearity Statistics**

Model	Collinearity Statistics	
	Tolerance	VIF
Safety Investments2	0.227	4.400
Safety Training1	0.275	3.642
Safety Training2	0.215	4.661
Safety Management2	0.245	4.085
Safety Leadership1	0.195	5.117
Safety Leadership2	0.333	3.000

#### 4.10 Regression Analysis

A multiple regression analysis was carried out to find out the effect of the independent variables on the dependent variables. Table 4.31 highlighted the results from the model summary, which indicates that the coefficient of determination ( $R^2$ ) is 0.856, meaning that the proposed model influences 85.6 % of the variation in business performance.

**Table 4.31: Regression Model Summary**

Model	R	R Square	Adjusted R Square	Std. The error of the Estimate	R Square Change	Change Statistics			
						F Change	df1	df2	Sig. F Change
1	.925 <sup>a</sup>	0.856	0.849	0.388	0.856	133.479	6	135	0.000

a. Predictors: (Constant), Safety Leadership2, Safety Leadership1, Safety Training2, Safety Management2, Safety Training1, Safety Investments2

b. Dependent Variable: Business Performance1

**Table 4.32: ANOVA Statistics**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	120.661	6	20.110	133.479	.000 <sup>b</sup>
	Residual	20.339	135	0.151		
	Total	141.000	141			

a. Dependent Variable: Business Performance1

b. Predictors: (Constant), Safety Leadership2, Safety Leadership1, Safety Training2, Safety Management2, Safety Training1, Safety Investments2

Table 4.32 indicates the Analysis of Variance (ANOVA) results, which show that the  $F$ -statistics ( $F = 133.479$ ,  $p$ -value  $< 0.001$ ) meaning the statistical significance of the model.

**Table 4.33: Regression Coefficients**

		Unstandardized Coefficients			
Model		B	Std. Error	t	Sig.
1	(Constant)	(0.000)	0.033	0.000	1.000
	Safety Investments	0.470	0.069	6.853	0.000
	Safety Training	0.517	0.062	8.293	0.000
	Safety Management	1.091	0.066	16.509	0.000
	Safety Leadership	-1.047	0.057	-18.495	0.000

The regression coefficients in Table 4.33 indicates that increasing one unit in safety leadership led to a -1.0475 decrease in business performance; an increase in safety management resulted to a 1.091 increase in business performance; an increase in safety training led to a 0.517 increase in business performance, and an increase in safety investments led to a 0.470 increase in business returns. The findings further show that these effects were significant at a 95 % confidence level. Thus, the proposed model became;

$$Y = 0.000 + \text{Safety Leadership} * -1.1047 + \text{Safety Management} * 1.091 + \text{Safety Training} * 0.517 + \text{Safety Investments} * 0.470 + \epsilon_j$$

## CHAPTER FIVE

### DISCUSSIONS, CONCLUSIONS, AND RECOMMENDATIONS

#### 5.1 Introduction

The discussion, conclusion, and recommendations of the study are presented in this chapter. These are presented in line with the research objectives. The chapter also presents areas of future research.

#### 5.2 Discussions

##### 5.2.1 Leadership involvement in safety and performance of SME construction firms

Aim one was to establish how leadership involvement in safety influences performance among SME construction firms. An examination of the descriptive statistics showed respondents moderately agreed that firm's leadership engaged employees in safety practice in the workplace. The respondents agreed that leaders were committed to safe practice, coached staff in safety practice, motivated staff to practice safety procedures, developed safety policies, allocates resources for safety, and promoted the safety culture in the firm. The regression findings indicated that leadership involvement negatively and significantly affected the business performance of firms. The result agrees with studies that have found no relationship between leadership safety and performance of construction firms. For example, Tam et al's (2004) study in China on poor construction safety management that did not establish a relationship between the safety leadership variable and the performance of the contractors' firms.

This finding does not corroborate past studies that established positive effects of leadership in safety compliance for business performance. Choudhry (2017) research on achieving safety and performance in construction projects found a link between safety leadership of project managers on the performance of construction projects. Similarly, Grill (2018) assessment of leadership behavior for construction site safety outcomes among Swedish construction companies found a high occurrence of rule-oriented and participative leadership behaviors among construction managers at Swedish construction sites explained the relatively low injury rates and good performance among construction firms.

##### 5.2.2 Safety Management Practices on Performance of SME Construction Firms

The second objective of the study was to establish how safety management practices influence performance among construction SMEs. The regression findings revealed that

safety management practices positively affect business performance among firms. The descriptive statistics indicated respondents' agreement that the firm's management enforces compliance with legal and statutory requirements. The majority of responses were in moderate agreement with safety management practices. The descriptive findings also revealed respondents' disagreement that the firm's management has a system for recognizing and rewarding safety practices and behavior in the workplace.

The findings support Cheng, Ryan, and Kelly's (2011) research finding that detailed safety management practices positively impact performance among construction firms. Safety management practices involving the sharing and distribution of information on safety procedures improved the performance of projects. This was also supported the findings of Choudhry (2017), which found that supervisors encouraged safe work habits. Interviews showed that safety and performance were advantageous for all supervisors. They like to encourage safe work practices that lead to improved performance. The findings also corroborate the findings of Dheeraj and Jaishree (2017) study on safety management procedures in construction sites which recognized that safety management is key to the success of construction firms since it guarantees safety to the employees and reduces chances of accidents occurring during the construction period thereby increasing performance and profits.

### **5.2.3 Staff Safety Training on Performance of SME Construction Firms**

In the determination of how staff safety training affects the performance of construction SMEs, a snapshot at the descriptive statistics indicated that respondents disagreed and moderately agreed with safety training statements. The detailed responses showed disagreed that the firm had a compulsory safety training program in place and that the firm had a safety training program for stakeholders. These descriptive findings showed that safety training was not highly practiced among the sampled firms. The findings show that safety training had a positive and statistically significant effect on business performance of construction SMEs.

This finding supports previous studies that have found positive effects of staff training in safety enhanced performance of the firm. For instance, Enshassi, Choudhry, and Alqumboz (2009) research in Pakistani construction industry found that performance of construction firms and projects was increased by identifying hazards and including them in the safety program, which helps the worker to avoid hazards and thus preventing a

worker from being injured. This result was also supported by Jovita, Chibuzor, Onyemachi, and Osondu(2018) research on safety and health management and organizational performance which found evidence to support the hypothesis that safety and health training positively affected employee output and overall firm performance and thus increased the business performance of the organization.

#### **5.2.4 Investment Safety on Performance of SME Construction Firms**

To determine the influence of investment safety on the performance of construction SMEs, the findings indicated that safety investments affected. However, it had the least effect on performance. The descriptive findings indicated that firms invested in acquiring equipment, machines, materials, and tools to protect staff. However, the findings show that respondents moderately agreed that firms invested in safety promotion in the workplace by printing posters and pamphlets, production of banners, and billboards with safety advertising. The respondents also moderately agreed that the firm invests in safety inspections along with safety meetings, and these factors could contribute to the least effect of investment in safety in the business performance of sampled firms.

This finding corroborates Jovita et al.'s (2018) argument that a healthy workforce exhibits higher levels of performance than unhealthy working environments. The number of accidents becomes significantly reduced, bringing more benefits arising from costs saved to treat injured employees and the recruitment of new employees to replace the indisposed workforce. Huang et al.'s (2007) research also supports these conclusions since their findings revealed that investment in safety precaution material saved costs owing to reduced injuries, illnesses, and fatalities. Besides, employers often discover that alterations made to improve safety in the workplace can lead to significant enhancements to their organization's performance and financial performance. Shirali, Savari, Ahmadiangali, and Salehi's (2016) study further established that safety investments positively and significantly impacted the quality index, performance among employees and competitive level of the firm and higher rates of production.

### **5.3 Conclusions**

The findings showed that leadership in the sampled firms did not engage employee in safety practice in the workplace as is expected as a best practice for managers to lead the safety practice in the organization. The study, therefore, concludes that leadership

engagement in safety compliance did not have any effect on business performance of construction SMEs.

Second, findings indicated that safety management practices positively and significantly impacted the business returns of SME construction firms. However, the sampled firms did not have a system for recognizing and rewarding safety practice and behavior in the workplace. This study, therefore, concludes that firms' management enforcing compliance with legal and statutory requirements of safety had the most effect on the business performance of firms.

Third, findings indicated that staff safety training positively and significantly impact on business performance of SME construction firms, and this was statistically significant. However the firms did not have a safety training program for stakeholders. The study, therefore, concludes that training staff in safety procedures and hazards significantly impact performance among construction firms.

Fourth, results revealed that investment in safety had a positive and significant impact on the business performance of SME construction firms. Nevertheless, the firms did not have awareness and communication efforts towards promoting safety in the workplace. The study, therefore, concludes that firms investing in the purchase of equipment, materials, machines, and tools, to protect staff had a better business performance than those firms that did not.

## **5.4 Recommendations**

### **5.4.1 Recommendations for Policy**

Regarding policy, recommendations were for contractor firms to be monitored and regulated to enhance the investment of safety measures in construction firms. The study further recommends that contractor firms should be regulated to improve in-house training for their staff in safety procedures and protocols, which was moderately adopted as revealed by the descriptive findings.

### **5.4.2 Recommendations for Action**

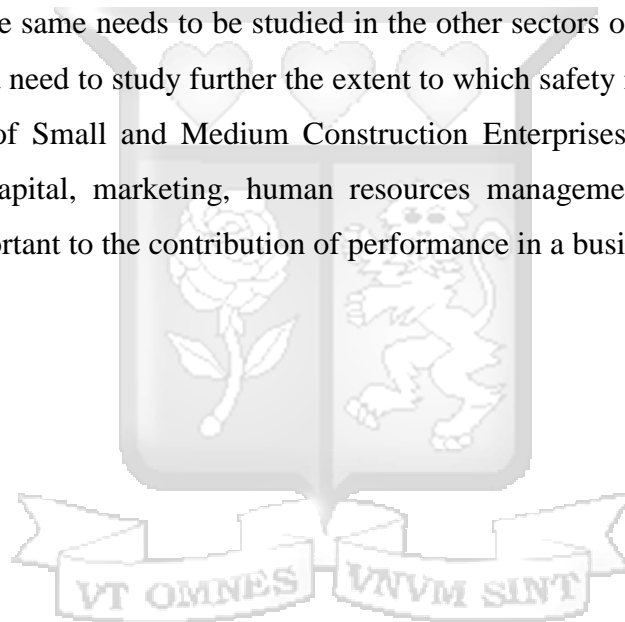
The study recommends that SME contractor firms should invest more on safety leadership by sensitizing supervisors and managers on the importance of engaging staff on safety practices in sites. This can be achieved by enrolling managers and supervisors in safety training programs which they can then implement in the organization and in

project sites. In terms of safety management, the findings showed that firms did not have a system for recognizing and rewarding safety behavior.

The study, thus, recommends that management should develop internal safety identification and rewarding programs to motivate staff to adopt safety practices in the organization. The study further recommends for safety training to be extended to project stakeholders and also having a compulsory training program for firm staff. The study further recommends for firms to invest in safety practices such as promoting safety in the workplace by printing of pamphlets and posters, safety advertising boards, and banners.

#### **5.4.3 Recommendations areas for Further Research**

Although safety aspects improve profitability of SMEs contractors in Nairobi County's building sector, the same needs to be studied in the other sectors of contractors and other regions. There is a need to study further the extent to which safety implementation affects the performance of Small and Medium Construction Enterprises contractors with other parameters like capital, marketing, human resources management, and other aspects, which are all important to the contribution of performance in a business.



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APPENDICES

**Appendix I: Questionnaire for Site Managers**

**Section 1: Background Information**

1. Please indicate your age?

20 – 30 years [ ]

31 – 40 years [ ]

41 – 50 years [ ]

More than 50 years [ ]

2. Please indicate your gender?

Male [ ]

Female [ ]

3. Please indicate age of the firm?

1 – 5 years [ ]

6 – 11 years [ ]

12 – 16 years [ ]

More than 16 years [ ]

4. Which NCA category does your firm belong to?

NCA 5 [ ]

NCA 6 [ ]

NCA 7 [ ]

NCA 8 [ ]

5. What construction projects does your firm execute in most cases?

Residential projects [ ]

Commercial projects [ ]

Both [ ]

Other (*Specify*) .....

6. a. How many injuries have your firm experienced in the last year?

None [ ]

1-5 [ ]

6-10 [ ]

More than 11 [ ]

b. What was the nature of these injuries?

Minor injury (did not require any hospital treatment) [ ]

Major injury (required hospital treatment) [ ]

7. How many fatalities did the firm experienced in the past year?

None [ ]

1-5 [ ]

6-10 [ ]

More than 11 [ ]

8. What were the leading causes of these injuries and fatalities?

Fall from height [ ]

Vehicle collisions [ ]

Hit by moving or falling objects [ ]

Being trapped between stationary and moving objects [ ]

Contact with electricity [ ]

Other (*Specify*) .....

**Section 2: Safety Leadership**

The following statements refer to safety leadership. Please indicate your level of agreement with these statements.

Safety leadership statements	Strongly disagree (1)	Disagree (2)	Moderately agree (3)	Agree (4)	Strongly Agree (5)
7 The firm's leadership is committed to safe practice in construction projects					
8 The firm's leadership is involved in coaching the staff to safety practice in construction projects					
9 The leadership motivates staff to practice safety procedures in construction projects					
10 The leadership of the firm has developed safety policies and objectives					
11 The firm's leadership engages employees in safety practice in the workplace					

12	The firm's leadership allocates resources for safety in construction projects					
13	The firm's leadership promotes implementation of safety culture in the workplace					

### Section 3: Safety Management

The following statements refer to safety management. Please indicate your level of agreement with these statements.

Safety management statements	Strongly disagree (1)	Disagree (2)	Moderately agree (3)	Agree (4)	Strongly Agree (5)
14 The firm's management has a system for recognizing and rewarding safety practice and behavior in the workplace					
15 The firm's management enforces compliance and legal and statutory requirements					
16 The firm's management makes sure safety is integrated into business strategy					
17 The management of the firm conducts and implements in-house safety inspections in the workplace					
18 The management of the firm conducts risk analysis and management in the workplace					
19 The firm engages stakeholders in safety management					

### Section 4: Safety Training

The following statements refer to safety training statements. Please indicate your level of agreement with these statements.

Safety training statements		Strongly disagree (1)	Disagree (2)	Moderately agree (3)	Agree (4)	Strongly Agree (5)
20	The firm promotes an on job safety training and coaching					
21	The firm has a safety induction and training program					
22	The firm has a safety training certification program					
23	The firm has a compulsory safety training program in place					
24	The firm has a safety training program for stakeholders					
25	The firm conducts personal protective equipment training programs					

### Section 5: Safety Investments

The following statements refer to safety investment. Please indicate your level of agreement with these statements.

Safety investments statements		Strongly disagree (1)	Disagree (2)	Moderately agree (3)	Agree (4)	Strongly Agree (5)
26	The firm invests in salaries paid to safety personnel, such as safety managers, safety officers, safety coordinators, safety supervisors					
27	The firm invests in the purchase of equipment, materials, machines, and tools, to protect staff					
28	The firm invests in compulsory safety training courses and costs of in-house safety training and orientation sessions					
29	The firm invests in safety inspections and safety					

	meetings					
30	The firm invests safety promotion in the workplace by the printing of pamphlets and posters, production of safety advertising boards and banners					
31	The firm invests in the use of new technologies, methods, procedures, or tools in order to improve safety performance					

### Section 6: Business Performance

The following statements refer to business performance. Please indicate your level of agreement with these statements.

Business performance statements		Strongly disagree (1)	Disagree (2)	Moderately agree (3)	Agree (4)	Strongly Agree (5)
32	The company has been able to maintain its profit growth					
33	The company has been able to reach new clients					
34	The company has been able to gain repeat business from its clients					
35	The company has a desirable level of customer satisfaction					
36	The overall reputation of the company is positive					

## Appendix II: Strathmore Ethical Approval



12<sup>th</sup> March 2020

Mr Kihoro, Sammy  
sammy@powergroupte.com

Dear Mr Kihoro,

**RE: Influence of Safety Compliance On Performance of Small and Medium Enterprises Construction Firms in Nairobi County**


This is to inform you that the SU-IERC has reviewed and **approved** your above research proposal. Your application approval number is SU-IERC0639/20. The approval period is **12<sup>th</sup> March, 2020 to 11<sup>th</sup> March, 2021**.

This approval is subject to compliance with the following requirements:

- i. Only approved documents including (informed consents, study instruments, MTA) will be used
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by SU-IERC.
- iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to SU-IERC within 72 hours of notification
- iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to SU-IERC within 72 hours
- v. Clearance for export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days upon completion of the study to SU-IERC.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://oris.nacosti.go.ke> and also obtain other clearances needed.

Yours sincerely,


  
Dr. Virginia Gichuru,  
Secretary; SU-IERC


Cc: Prof Fred Were,  
Chairperson; SU-IERC



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### Appendix III: Research Permit

  
REPUBLIC OF KENYA

  
NATIONAL COMMISSION FOR  
SCIENCE, TECHNOLOGY & INNOVATION

Ref No: 773575 Date of Issue: 27/April/2020


**RESEARCH LICENSE**




**This is to Certify that Mr., SAMMY KINGORI KIHORO of Strathmore University, has been licensed to conduct research in Nairobi on the topic: INFLUENCE OF SAFETY COMPLIANCE ON PERFORMANCE OF SMALL AND MEDIUM ENTERPRISES CONSTRUCTION FIRMS IN NAIROBI COUNTY for the period ending : 27/April/2021.**

License No: NACOSTI/P/20/4771

773575  
Applicant Identification Number

  
Director General  
NATIONAL COMMISSION FOR  
SCIENCE, TECHNOLOGY &  
INNOVATION

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