UNIVERSITY OF NAIROBI

A FRAMEWORK FOR ENHANCING THE PERFORMANCE OF HEALTH AND SAFETY COMMITTEES ON SMALL AND MEDIUM SIZE CONSTRUCTION SITES IN KENYA

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A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF DOCTOR OF PHILOSOPHY IN CONSTRUCTION MANAGEMENT IN THE DEPARTMENT OF REAL ESTATE, CONSTRUCTION MANAGEMENT AND QUANTITY SURVEYING AT THE SCHOOL OF THE BUILT ENVIRONMENT, UNIVERSITY OF NAIROBI

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DECLARATION

This thesis is my original work and has not been presented for an award of a degree in any other university.

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DEDICATION

This thesis is a special dedication to:

The Almighty God who has brought me to such a level in life.

My parents Johnson and Zipporah

My lovely wife Ruth.

My great children Patience Tet, Favour and Johnson Praise.

My Brothers and Sisters:

Late Renson, Rachael, Late Alice, Jayne, David, Daniel, Paul, Gezzy and Josephine.

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In the name of the Father, the Son and the Holy spirit Amen. I thank and worship the Almighty God for providing me with the strength to complete my PhD research paper. This accomplishment would not have been possible without the Almighty God's favour, as well as the support and patience of my family. As a result, my heartfelt appreciation must go to my father and mother for encouraging me to embark on this great undertaking. I am grateful to them for instilling in me the attitude of excellence and excellent moral standards. I thank my lovely wife Ruth for praying for me daily during the long hours of study. To my children Patience, Favour and Praise you are the reason of my studying. I wish to express my gratitude and deep appreciation to my brothers and sisters for their constant motivation.

I would like to convey my heartfelt appreciation and gratitude to my supervisors, Dr. Qs Isabella Njeri Wachira-Towey and Dr. Ing. Christopher Mbatha, for their ongoing guidance, advice, support, and encouragement during the process of producing this report. God bless you all.

INSPIRATION

"Improving occupational safety and health in the construction industry is a slow but achievable process" "It took the United Kingdom 40 years to improve H&S in the construction industry; How can African countries make such a transition?" The trend internationally is that countries are moving away from legislative enforcements of H&S regulations to a culture change among stakeholders through an all-inclusive approach (Neale, 2013).

And if one prevails against him, two shall withstand him; and a threefold cord is not quickly broken. (Ecclesiastes 4:12)

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LIST OF ABBREVIATIONS AND ACRONYMS

ANCF	Australia National Collaborative Framework
ANOVA	Analysis of Variance
BORAQS	Board of Registration of Architects and Quantity Surveyors
CDM	Construction Design and Management
CI	Construction Industry
CIDB	Construction Industry Development Board
CSFs	Critical success factors
DOSHS	Directorate of Occupational Safety and Health Services
EASHW	European Agency for Safety and Health at Work
EBK	Engineers Board of Kenya
ECI	European Construction Institution
H&S	Health and Safety
HSC	Health and Safety Committee
HSE	Health and Safety Executive
IEK	Institution of Engineers of Kenya
ILO	International Labour Organization.
ISO	International Organization for Standardization
KDAs	Key Developer Actions
KPIs	Key Performance Indicators
KRAs	Key Result Areas
MSHDS	Material Safety and Health Data Sheet
SME	Small and Medium Enterprise
NBI	National Buildings Inspectorate
NCA	National Construction Authority
NCF	National Collaborative Framework
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Act
PC	Principal Contractor
PMI	Project Management Institute
PPE	Personal Protective Equipment

QMS	Quality Management System
RBT	Risk Based Thinking
RR	Risk Ranking
SCM	Safety Control Measures
SE	Safety Element
SEI	Site Employees Involvement
SMEs	Small and medium size Enterprises
SOPs	Standard operating procedures
SPMF	Safety Performance Monitoring Matrix
SPMT	Safety Performance Measurement Tool
SPSS	Statistical package for social sciences
SSWP	Safe System of Work Plan
TCAF	Tripartite Collaboration Approach Framework

ABSTRACT

The Occupational Safety and Health Act of 2007 (OSHA 2007) was enacted to provide for the safety, health, and welfare of all persons present at workplaces. The Act makes provisions for the occupier to establish health and safety committees (HSCs) at their work places in a bipartite arrangement whose membership is drawn from the occupier's (contractor) top management representative and the employees engaged in the workplaces. The main role of the HSCs is to review the working conditions with a view of identifying inherent risks in the processes and advise the management on probable mitigation measures to undertake to eliminate them before maturing to accidents that lead to loss of property or even death. This makes the HSCs the most crucial instrument in ensuring compliance with OSHA 2007. The effectiveness of the HSCs currently relies on the level of contractor commitment and employees' involvement in those committees.

The premise of the study was that despite the enactment of OSHA 2007, the construction industry in Kenya has continued to exhibit poor health and safety as exemplified by the continued accidents and incidents particularly in the small and medium size enterprise (SME) construction sites suggesting that the HSCs in these sites are not effective. This study therefore aimed at developing a framework towards enhanced performance of HSCs on the SME construction sites in Nairobi. The specific objectives of the study were: to establish the level of performance of HSCs, to determine the contractor commitment, employees', and developer involvement in HSCs, to explore the relationship between the level of contractor commitment, employees' and developer involvement against the performance of HSCs and to formulate a framework towards enhanced performance of HSCs on the SME construction sites in Nairobi. The study was underpinned by three theories namely synergy, stakeholder and systems theories. The research design adopted for this study was a survey and data were collected using self-administered questionnaires from a sample size of 153 SME construction sites in Nairobi selected using stratified random sampling. The respondents comprised of developers, contractors, and employees on the construction sites. A response rate of 82% was obtained and deemed adequate for the study. Quantitative data analysis was carried out using SPSS version 25.

The study used 24 parameters to measure the level of OSHA 2007 compliance. The study found the level of compliance with the OSHA 2007 on construction sites to be at 62%. Of the 24 parameters measured, HSC performance was the second least compliant ranked at 23. This finding affirmed the assumption that HSCs could be the major contributor to low compliance

and hence need for further interrogation. The study established the level of performance of HSCs to be at 40%. Given that the expected performance is 100%, the established performance was deemed unacceptable since HSCs are the main drivers of OSHA compliance on construction sites. The findings further established that the level of contractor commitment, employees' and developer involvement was 64%, 54% and 56% respectively. Based on the correlational analysis, it was further established that performance of HSCs was significantly influenced by contractor commitment (0.662), employees' involvement (0.708) and developer involvement (0.639) at 0.01 significance level. Further, multiple regression analysis revealed that higher levels of compliance were associated with higher levels of contractor commitment, employee and developer involvement in the HSCs on construction sites. Given the absence of the developer in the current composition of the HSCs, the study established an overwhelming support at 92% for statutory onboarding of developer in the functioning of HSCs on construction sites in Nairobi as the most effective method of enhancing occupational health and safety. Consequently, the study formulated a framework for onboarding of the developer branded the Tripartite Collaborative Approach Framework (TCAF). The TCAF is based on collaboration and building of synergy amongst project stakeholders (namely developer, contractor, and employee) and identifies key developer actions (KDAs) and key performance indicators (KPIs) as tools for monitoring the performance of the HSCs on sites. It is proposed to replace the current bipartite approach that is ineffective and not aligned with ILO 1992 stipulations by affording a different approach which should be adopted to enhance OSH performance in SME construction sites.

The study recommends adoption of the TCAF through statutory involvement of the developer in the functioning of HSCs to enhance its effectiveness. Consequently, a review of the OSHA 2007 is necessary to enable full implementation of the TCAF in accordance with the ILO guidelines. Such review of the Act should stipulate KDAs and KPIs towards the enhanced performance of HSCs.

CHAPTER ONE: INTRODUCTION

1.1 Background to the Problem

Unhealthy and dangerous incidents on Kenyan building sites date back to the late 1990s. According to the Building Audit Report (2016), the first known dangerous incident in Nairobi occurred in the 1990s, when the Sunbeam building partially collapsed, killing 35 people. The Sunbeam building was built and held privately. As housing demand expanded due to rural-urban migration and population growth, the industry experienced haphazard development exacerbated by a lack of professional ability to support the same (NCA, 2020).

These developments have failed in their functionality while others have physically collapsed in the process of construction. Images on *Plate 1.1* below shows rescue operation underway on collapsed buildings under construction in Nairobi, Kenya. Such incidences continue to be reported in the Kenya media.

Plate 1.1: Rescue operation in collapsed buildings in Nairobi
Source; (NCA, 2021).

The prevalence of unhealthy and dangerous construction incidents has caused a great deal of avoidable misery to stakeholders in Kenya's built environment. Statistics from National Construction Authority (NCA, 2022), indicate that, the number of buildings collapsing in Kenya have been on a rising trajectory as shown in *Figure 1.1*. As a result of these unneeded unhealthy and dangerous incidents, the government responded with zeal and took efforts to eliminate these unpleasant and costly incidents.

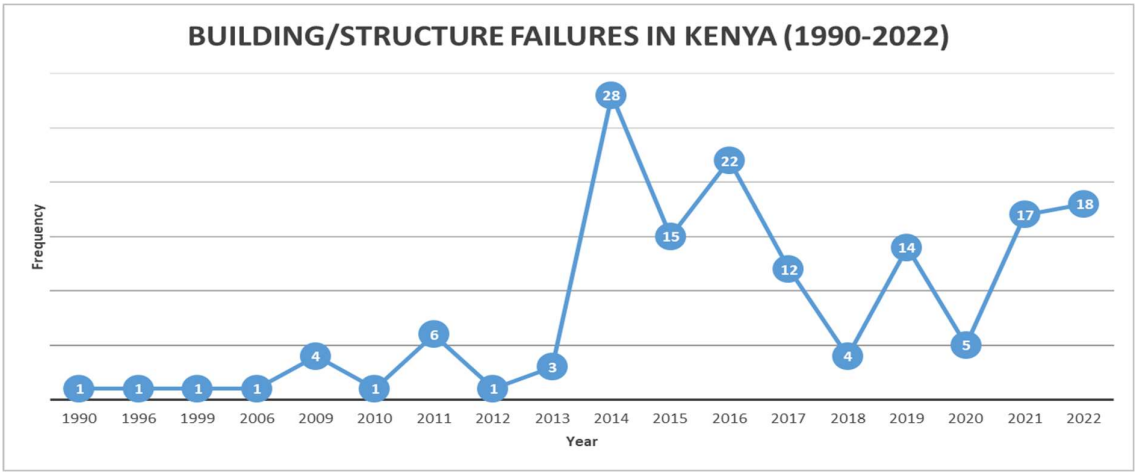

Figure 1.1: Frequency of building failure in Kenya
Source: (NCA, 2022)

The Occupational Health and Safety Act of 2007 (OSHA, 2007) was one of the measures enacted by the government. This was in accordance with the standards established in the 1992 ILO convention, which obliged member countries to domesticate health and safety management issues (ILO, 1992). The Act of Parliament established the National Council for Occupational Safety and Health and provided for the health, safety, and welfare of workers and all others legally present at workplaces. The National Council is founded on a Tripartite Approach, with representation from three arms: employers represented by the Federation of Kenya Employers (FKE), workers represented by the Central Organisation of Trade Unions (COTU), and the government represented by the Minister of Labour or his representative.

The OSHA 2007 standard specifies the duties and responsibilities of occupiers and employees in the workplace in order to ensure health and safety (Bernstein, 2013; Muiruri, 2014). OSHA 2007 provisions, for example, compel occupiers to form health and safety committees (HSCs). HSCs are formed when the total number of employees in a given workplace is twenty or more. The health and safety committee rules (HSC, 2005) regulate the formation and operation of workplace committees that assist training, accident reporting, and auditing of H&S conditions. Safe working conditions have been found to prevent accidents on construction project sites while also providing stakeholders with the certainty of meeting project deadlines and thereby minimising liability costs when completely implemented on a construction project (Francis, 2016).

According to the National Construction Authority, the H&S conditions on Kenyan building projects are extremely dangerous, with regular reports of loss of life and property (NCA, 2020).

This position is exemplified by Muiruri (2014) who points at the below expectation performance of contractors on construction projects as being an attitude issue. Contractors demonstrate a widespread cynicism towards OSHA 2007 compliance, and this negative attitude, along with contractors' reluctance to observe rules governing occupational health and safety, exposes employees to hazardous working circumstances. Building collapses in Kenya have been linked by stakeholders to unsafe working conditions (Kirombo, 2020).

A study carried out by Otido and Omwenga (2019) to ascertain the impact of NCA's regulatory mandate in enhancing compliance on construction projects found that contractors lacked the willingness (commitment) towards compliance with regulatory regimes. *Plate 1.2* shows NCA officer suspending construction activity for non-compliance and eventual collapse of the building to due non-compliance with building regulations respectively in Nairobi, Kenya. These plates point to the fact that non-compliance to H&S regulations compromises the working conditions which eventually lead to building collapse with accompanying consequences of loss of life and investment on a given site.

Plate 1.2: Non-compliant site and an eventual collapse a of non-compliant site
Source: (NCA, 2022)

The Directorate of Occupational Safety and Health Services (DOSHS) is responsible for keeping track of workplace incidents and accidents. According to DOSHS (2021), the number of incidents, accidents, and fatalities on construction project sites in Kenya in FY 2019/2020 was 236 and 32, respectively. The partial or non-adoption of OSHA 2007 on construction sites has been a significant factor to hazardous and unhealthy incidents on Kenyan construction sites (NCA, 2021).

Many of the unsafe and unhealthy incidences have taken place on small and medium size construction projects. According to the NCA (2020), the contractors who execute the construction projects with the highest incidences of unsafe and unhealthy activities are the ones falling under the categories of the small and medium size contractors. These small and medium size categories are: NCA 8, NCA 7, NCA 6 and NCA 5. These contractors are capable of carrying out projects up to Kshs. 100 million (1 USD = Kshs. 150) in value.

A report available on the NCA website, on causes of building collapses in the country, shows that projects executed by the small and medium size contractors were more prone to accidents than those in other categories (NCA, 2020). Private developers fund the majority of the work done by these types of contractors. These cadre of developers are individuals trying to put up their own residences or small commercial developments. These building developments on most occasions are between one to seven storeys.

Contractors in the categories of NCA 4, NCA 3, NCA 2 and NCA 1 execute work with project value from Kshs 100 million (1 USD = Kshs 150) to unlimited value. These projects are funded locally or internationally and hence endowed with sufficient resources to adequately take care of all aspects of the project. A big percentage of these projects are executed by multi-national construction companies with wide experience in the construction industry. These construction companies have a history and a reputation to uphold. The involvement of multi-nationals in the execution of these category of projects brings on board expertise and precision that aides in the early identification of risks and their prompt elimination before evolving into hazards that could pose serious H&S dangers at the workplaces. These multi-nationals have well established HSCs that assures total compliance to OSHA 2007.

Furthermore, the fear of being blacklisted by their country of origin and losing business is a strong disincentive to engaging in any activity that could lead to unhealthful and unsafe work practises. These features urge contractors in these categories to demonstrate a strong commitment to workplace H&S. On the other hand, small and medium-sized contractors are frequently single-project practitioners who are not interested in a long-term career in the construction sector. They make little or no commitment to appropriate H&S practises because their primary goal is to complete the project in record time and profit the most from it (NCA, 2020).

Reports of hazardous and unhealthy incidents continue to flood the newspapers and television screens to the point where hearing of an accident on a construction site is no longer news in Kenya, as shown by Qs David Gaitho, NCA Board Chair (NCA, 2021): -

> "*This indeed is a disturbing trend and something has to be done urgently to safeguard the construction industry against sustained loss of life and investments. A collaborative approach has to be taken by industry players if this war has to be won at the shortest time possible*".

According to Raza *et al*. (2022), influence of stakeholders on safety decreases with the project phase. Stakeholders active in the initial stages of a project, such as the architect, engineer, and planners while requesting the project brief from the developer, have more effect on the project than stakeholders who join the project later in the process, such as during the implementation phase. It is absurd to note that the contractor, who is frequently blamed for accidents on construction sites, has little control over what happens there because some of these tragedies are the consequence of errors, omissions, or commissions that could have been rectified long before the project was implemented. This should not be the case. *Figure 1.2* shows the safety influence curve proposed by Szymberski (1997).

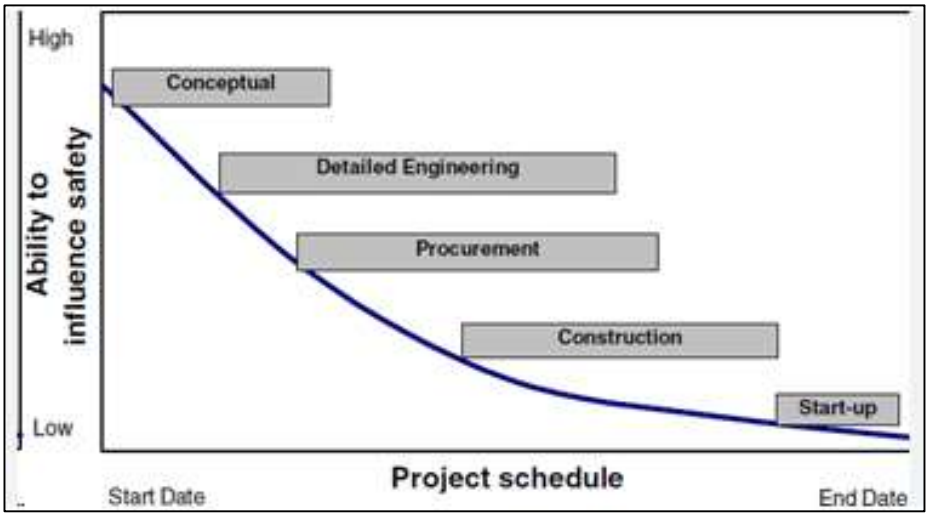

Figure 1.2: Safety Influence curve
Source: (Szymberski,1997)

The contractor is rarely involved in the preconstruction and is only active in the project during the implementation phase and therefore has limited say over decisions made prior to his engagement that may affect how H&S is managed during the implementation phase. The only stakeholder who has the advantage of being involved in all the project phases, from conception to implementation and handover, is the project developer. This position necessitates that he adequately briefs the consultants.

It is critical to provide enough briefing to consultants at the outset so that all H&S requirements that may have a negative effect on the project during the implementation phase are sufficiently designed against. As a result, the developer's involvement in the project towards H&S should not be ceded or significantly delegated (Haupt & Akinlolu, 2021). Unfortunately, on many small and medium-sized construction projects, that responsibility is completely given to the contractor during the implementation phase via veiled contractual stipulations. During the

project implementation phase, the contractor and employees assume those tasks. These roles are executed majorly vide the HSCs. It is hence vital that the HSCs be efficient and discharge those roles in total compliance with requirements of OSHA 2007. This will ensure that the well-being of workers at a construction site is well-taken care of (Kiganda, 2016).

Employer engagement and employee involvement are required for the HSCs to function efficiently and effectively. However, data kept on the developers' workplaces suggest a low degree of contractor engagement and employee involvement in the HSCs, suggesting the prospect that this significantly influences site H&S performance (Kai *et al*., 2016). Employees engaged in construction activities in Kenya, according to a research carried out by the National Construction Authority, are 75% either semi-skilled or totally unskilled (NCA, 2016). This group of workers is responsible for the majority of construction activities in Kenya, as they are in many other countries where construction is primarily done manually. Though the majority of jobs on construction projects are performed manually, they demand a high level of skill. This requirement disadvantages workers working in the Kenya construction sector to a great extent.

Unfortunately, the sector does not stipulate the minimum qualification that a person must have before working in the construction industry because qualifications are only required for highly skilled positions. Contractors have taken advantage of this loophole to hire people with no prior training or expertise. This group of workers is in charge of performing the majority of manual duties in an unhealthy and dangerous environment. The National Construction Authority (NCA) requires that employees working on construction site should be accredited (NCA, 2016), with provision for accreditation of experienced-based employees that is not rigorous. This further opens doors for unskilled workers to work on sites as they seek for relevant experience for accreditation. On the construction sites, training is normally informal (Wachira, 2008) with no structured mechanisms to which these employees can follow in gaining skills and experience which can lead to their qualification for accreditation by NCA. Even the ones accredited provisionally on site have no training on H&S as the only criterion used by the NCA is the reference from the contractor on the ability to execute some basic trade tasks.

Workers have been identified as significant contributors to building site accidents in Nairobi (Mwangi, 2016). They have contributed to accident causations due to their negligence, laxity, abject violation of safety procedures and their non-involvement in accident prevention efforts. Many employees have acquired skills through continuous exposure to construction activities

which has given them a level of competency that has sustained them in employment as most employers prefer engaging workers who have some level of competency and experience. Unfortunately, these cadre of employees are underpaid and work in deplorable working conditions due to their ignorance of their basic rights (Kirombo, 2020). It is not yet known the amount of training accorded to the employees on construction sites in Kenya, but Mwangi (2016) estimates that majority of construction workers undergo an average of 2 hours of training in H&S in comparison to an average of 2 days in other sectors like manufacturing.

The few hours of training could incapacitate employees and hence make them ineffective in discharging their roles in the HSCs. This coupled with contractors' disinterest in the OHS matters, calls for intervention that could trigger contractor commitment and employee's involvement towards OSHA 2007 compliance. Intervention could come from the developer who wields the greatest influence in the project cycle (Maliha *et al*., 2021).

1.2 Statement of the Problem

Developers sign contracts with contractors to execute projects that meet their specifications. These contracts however do not specify the role of developers in the HSCs in the implementation phase of the projects hence the responsibility of H&S is assigned entirely to the contractor and employees in the bipartite approach through HSCs in compliance with OSHA 2007. This arrangement calls for commitment and involvement from the contractor and employees respectively in the management of H&S on construction project sites. OSHA 2007 requires contractors with twenty or more employees to establish HSCs. Much as this requirement could be complied with, and in view of the characteristics described above, it is of great concern that construction sites of the contractors in the brackets of NCA5 to NCA8 continue to experience unsafe and unhealth accidents/incidences. This brings to fore, the view that may be, the HSCs so established could be satisfying the regulatory compliance and not enhancing the compliance with the OSHA 2007 on these construction sites. However, this has not been investigated.

The persistent media reports on unhealthy and unsafe incidences in the construction sector point at an approach that is not living up to the spirit behind its very existence. The construction industry has no data on the impact of the established HSCs have towards the enhancement of H&S conditions on the construction project sites in Kenya. This status could be a contributing reason to the general apathy in the H&S management on construction sites in Kenya.

Limited information exists on the level of contractor commitment and employee involvement in HSCs towards compliance with OSHA 2007. Of greatest concern are the small and medium size construction projects which are not endowed with many resources to mount mega H&S management programs. The developer's level of intervention towards enhanced contractor commitment and employee involvement is limited as no express platform exists where they could directly influence the management of H&S on construction sites. Could the establishment of such a platform upon which the three key players namely; developer, contractor and employees could synergistically work together to enhance H&S conditions on construction project sites in Kenya enhance OHS performance?

The lack of knowledge on the level of contractor commitment, employee involvement and the impact of the absence of a platform upon which stakeholders could proactively and synergistically work together towards OSHA 2007 compliance, casts a dark cloud on the level and effectiveness of the HSCs on the small and medium size construction sites in Kenya. This study accordingly set out to fill this knowledge gap.

1.3 Research Questions

1. What is the level of performance of HSCs in compliance with OSHA 2007 on the small and medium size construction sites in Nairobi?
2. What is the extent of developer involvement, contractor commitment and employees' involvement in HSCs on the small and medium size construction sites in Nairobi?
3. What is the relationship between the level of contractor commitment and employees' involvement against the level of performance of the HSCs?
4. What approach can be formulated towards enhanced performance of HSCs on the small and medium size construction sites in Nairobi?

1.4 Aim of the Study

The aim of the study was to develop a framework for enhancing the performance of HSCs on the small and medium size construction sites in Nairobi.

1.5 Objectives of the study

1. To establish the level of performance of HSCs in compliance with OSHA 2007 on the small and medium size construction sites in Nairobi.
2. To determine the extent of developer involvement, contractor commitment, and employees' involvement in HSCs on the small and medium size construction sites in Nairobi.

3. To explore the effect of developer involvement, contractor commitment and employees' involvement on performance of HSCs.
4. To formulate a framework towards enhanced performance of HSCs on the small and medium size construction sites in Nairobi.

1.6 Research Hypothesis

This study is anchored on the below hypothesis.

1.6.1 Null Hypothesis

The level of performance of HSCs on the small and medium size construction sites is not significantly influenced by the extent of contractor commitment, employees' involvement, and developer involvement in the HSCs.

1.6.2 Alternate Hypothesis

The level of performance of HSCs on the small and medium size construction sites is significantly influenced by the extent of contractor commitment, employees' involvement, and developer involvement in the HSCs.

The research hypothesis has however been broken down into various sub hypotheses for each of the individual relationships between the independent and dependent variables as demonstrated in the conceptual framework later in Chapter Two. These have been presented as follows;

H_0^1: Contractor commitment does not have a significant effect on the Performance of HSCs

H_0^2: Employee Involvement does not have a significant effect on the Performance of HSCs

H_0^3: Developer Involvement does not have a significant moderating effect on the relationship between Contractor Commitment and Performance of HSCs

H_0^4: Developer Involvement does not have a significant moderating effect on the relationship between Employee Involvement and Performance of HSCs

H_0^5: Developer Involvement does not have a significant effect on the Performance of HSCs

1.7 Significance of the Study

The significance of this study is the enhancement of performance of HSCs on construction sites by riding on both the systems and the stakeholder theories. These theories are advanced through the formulation of a tripartite collaborative approach framework in the management of HSCs in the small and medium size construction sites. This is in a bid to raise the level of compliance with OSHA 2007 on the SME construction sites in Nairobi. Despite the large number of studies

having addressed the concept of H&S management, limited research has focused on stakeholder collaborations towards compliance enhancement with OSHA 2007 on SME construction sites. In particular, the researcher is not aware of any research that has referred to the performance of HSCs on SME construction project sites in a developing country like Kenya. Majority of existing studies have overwhelmingly replicated the already tested models to enhance their inadequacies.

This study explores the extent to which stakeholders' collaboration enhances the level of performance of HSCs on the SME construction sites. The study adds to a growing amount of empirical data on construction H&S in developing countries. This study's most important contribution is the development of a Tripartite Collaborative Approach Framework (TCAF). Key Developer Actions (KDAs) and Key Performance Indicators (KPI) are identified as significant parameters in the TCAF that need to be considered towards effective performance of the HSCs. The approach enables stakeholders to partner and build synergy, which leads to enhanced compliance with OSHA 2007. It further identifies weaknesses exhibited on the SME construction sites in the bipartite approach towards compliance with OSHA 2007. It proposes the development of policy direction to guide the capacity building approach for the SME contractors. In addition, it identifies the factors that suppress contractor commitment and employees' involvement towards compliance with OSHA 2007 and proposes intervening measures to mitigate those suppressing factors.

1.8 Scope of the Study

The study focuses on the performance of HSCs on the private building construction sites in Nairobi, Kenya. Nairobi City County was taken as the study area because it takes the lion share of the Kenya government's investment of close to Kshs. 190.6B (1 USD = Kshs 150) towards bridging the housing deficit. The study targeted registered projects with the National Construction Authority (NCA), whose project values range between Kshs 5 to 100 million (1 USD = Kshs 150). The study entailed gathering primary data from multiple current construction sites in Nairobi for analysis.

The level of performance of the HSCs was limited to compliance with the OSHA 2007 during the project implementation phase. These activities were taken as a function of contractor commitment, employee, and developer involvement in the activities of the HSCs on the SME construction sites. At the time of data collection, only ongoing construction projects were evaluated. This was important so that only live primary data could be collected and didn't cost

much effort for the respondents to recollect the information. Hence the data collected was deemed to be realistic.

The unit of analysis for this study is building construction projects. The study confines itself to SME private building construction projects executed by contractors in the categories of NCA 8, NCA 7, NCA 6 and NCA 5 having project values ranging between Kshs 5 to 100 million (1 USD = Kshs 150). These are projects as captured in the list of registered projects in Nairobi Regional Office of the NCA for the FY 2021/2022. These categories of projects were selected as they constitute the bulk of construction activities and are executed by private developers; a segment of the industry that has recorded the highest incidences of unsafe and unhealthy occurrences in Nairobi.

Enhancement of compliance with OSHA 2007 on the SME construction sites will consequently improve the overall H&S of the construction industry. Higher value construction projects with project sums above of Kenya shillings 100 million (1 USD = Kshs 150) are always executed by categories of contractors NCA 4, NCA 3, NCA 2 and NCA 1. These categories of contractors are endowed with resources and a lot of studies have been done as concerns the management of HSCs at this level. The projects in this bracket are on most times executed by multi-national companies with well-established H&S management systems. This research design limits itself to the roles of developers, contractors, and employees on the SME construction projects. The findings of the study are for Nairobi County, but necessary generalization can be made as a guide to what could be happening elsewhere in Kenya.

1.9 Delimitations and exclusions of the Study

The boundaries set on the scope of this research are:

i. This study focused only on SME contractors who handle projects with values of less than Kshs 100 million (1 USD = 1 Kshs 150).
ii. While acknowledging the multiplicity of actors (regulators, consultants, county and national governments) in matters of construction health and safety, the study limits itself to the roles of developers, contractors, and employees on the SME construction projects' HSCs only.
iii. Health and safety performance on construction sites in Kenya is impacted by many acts of parliament and their regulations but the study limits itself to the OSHA 2007 and its regulations only.

iv. The research did not focus on the conflicting roles of the health and safety regulators courtesy of the many acts as indicated in (iii) above or the power relationship thereof.

1.10 Assumptions of the Study

The following assumptions were made in this study: -

1. The safety policies and regulations in Kenya are well formulated, and the only issues that come into play are the managerial practices which vary from project to project. These managerial practises are used to establish whether a project's performance is compliant or non-compliant.
2. The compliance criteria for all the projects - both small and medium size - have equal weightings.
3. The continuous variables can be obtained from the variable rankings and are pragmatic in this investigation. As a result, the rankings generate continuous numerical data.

1.11 Outline of the Study

This study report is organized into five chapters.

Chapter One: broadly introduces the subject under study, highlights the problem statement, study aim, objectives, research questions and hypotheses. Further, study assumptions, justification and significance of the study are highlighted. Finally, it sets out the scope and limitations of the study and definition of the operational terms in the study.

Chapter Two is a compilation of related literature on previous research findings on the subject of study in order to uncover existing bodies of knowledge and research gaps that might be exploited. It then concentrates on theories and concepts relevant to the topic of research, resulting in a conceptual framework for investigation.

Chapter Three: describes the methodological approach used in the inquiry. It describes the research methodology, design, target population, sample and sampling methodologies, data gathering methods, measures taken to increase dependability, and data analysis procedures.

Chapter Four: Presents the results of the data analysis and their interpretation, as highlighted in the study findings and presents the process for the formulation of the tripartite collaborative approach framework for the enhancement of collaboration amongst the three stakeholders in the HSCs.

Chapter Five: Discusses the research findings and gives the conclusions and recommendations made from the study findings. Further states the contribution of the study to the existing body of knowledge as well as identify outstanding research gaps to be undertaken in the future.

1.12 Definition of Operational Terms

1. **Bipartite**- involving or made up of two separate parts (Oxford English dictionary-9th Edition). In this study's context, these two parties are contractors and employees (Occupational Health and Safety Act, 2007).
2. **External stakeholders**- Persons who are not directly involved in the implementation of the project but are affected by the project such as community members (Freeman, 1984).
3. **Health**- Protection of people's bodies and minds from illness caused by workplace materials, processes, or procedures, whereas safety is protection of people from physical injury (Hughes & Ferrett, 2008).
4. **Internal stakeholders**- Persons who are directly involved in implementation of the project such as project employer, project management consultants (architects, engineers, and quantity surveyors) and project contractors, sub-contractors, workers (Freeman, 1984).
5. **Occupational Health and Safety**- The prevention and maintenance of the highest degree of physical, mental and social well-being, the prevention of ill-health among workers caused by their working conditions, the protection of workers from factors adverse to their health in their employment, and the placing and maintaining workers in occupational environments adapted to their individual and psychological conditions (ILO, 2005).
6. **Occupier**- someone who operates at a place of work, whether as the owner or not, and includes an employer (OSHA, 2007). In this study, the Occupier has been taken to be the Contractor.
7. **Project collaboration**: Working relationships in which stakeholders contribute their best efforts to the achievement of project objectives without receiving monetary compensation (Pala, *et al*., 2014).
8. **Risk-** A probability of injury, harm, loss, liability, or any other bad event caused by external or internal liabilities (ISO 9001:2015 QMS).
9. **Safety**- State in which no danger of a damage causing accident exists (Hughes & Ferrett, 2008).
10. **Safety management-** refers to the tangible practices, responsibility and performance related to safety cited from (Mearns, *et al*., 2003).

11. **Safety training-** is defined as knowledge given to employees for them to work safely and with no danger to their wellbeing (Law, *et al*., 2006).
12. **Tripartite**- having three parts or involving three people, groups etc. (Oxford English dictionary-9th Edition). In this study's context, these three parties include developers, contractors, and employees.
13. **Developer**- an individual or organization who engages a team of professionals and a contractor to carry out construction work for them (PMI, 2008). For purposes of this study the term developer includes all persons appointed to represent the developer's interests such as clerk of works, architects, quantity surveyors, etc.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter first presents an overview of the existing literature on H&S in the construction industry on both the global and local fronts. The areas covered are: importance of construction industry and global perspectives on H&S management. It then narrows down to look at the industry based on the study objectives with the intent of highlighting what has been achieved and followed by identification of gaps to be explored in the current study. Theories that relate to the performance of HSCs are highlighted. Finally, the theoretical and conceptual frameworks for the study are presented.

2.2 Importance of Construction Industry

The construction industry's importance in relation to national economies world over is very significant. A report by Michael (2021), projected that the industry accounted for 13.2% of the world's Gross Domestic Product (GDP) in 2020, signifying great influence on the world's economy. The degree of basic infrastructure, such as roads, housing, and communication, reflects this status. Backward and forward linkages account for a sizable portion of construction's economic growth. Construction processes use products and services from other industries; hence the performance of the industry effects the health of a particular nation's economic stability. When the economy grows, so does the industry. The opposite is also true.

Despite the acknowledged positive effects brought about by the construction industry, there are also negative aspects linked with the same industry. These negative attributes notably in Occupational Health and Safety (OHS) have tainted the image of an industry that has for so long contributed immensely to the world's GDP. To better understand these OHS negative attributes that continue to bedevil this earworthy noble industry, the study shall approach the subject from two fronts; a global and local perspective.

2.3 Occupational Health and Safety (OHS)

2.3.1 A Global Perspective of Occupational Health and Safety (OHS)

The OHS subject is a multidisciplinary field concerned with the protection of people's health, safety, and welfare at workplaces (Adebiyi *et al*., 2019). It is estimated by the International Labour Organization (ILO, 2011), that approximately 2.3 million workers succumb to injuries or work-related sickness and diseases globally. Non-fatal work-related diseases impact an additional 160 million workers each year, and 313 million workers are wounded (ILO, 2022). The economic impact on global enterprises is substantial. According to the ILO, work-related injuries and diseases cost the globe more than 4% of its annual GDP (ILO, 2022). This is

especially important in developing countries where workers in industries such as manufacturing, agriculture, and construction labour in dangerous situations. Disabilities and deaths caused by hazardous work conditions are major sources of poverty in families because they result in the loss or incapacity of the primary breadwinners in the afflicted households. Targets 3.9 and 8.8 on Health and Safety in the 2030 SDGs prescribe measures to improve working conditions. Target 3.9 aims to drastically reduce the number of fatalities and diseases caused by hazardous substances, pollution, and contamination of the air, water, and soil. Target 8.8, on the other hand, strives to defend labour rights and ensure a safe and secure working environment. It is consequently critical for stakeholders in industries such as construction to comprehend the significance of H&S failures in their jurisdictions in order to encourage them to thoroughly design policies and frameworks aimed at zero tolerance for unhealthy and unsafe workplace practises.

2.3.2 Gravity of OHS Failure in the Construction Sector

Statistics available from the ILO (2005) estimates that over 60,000 fatal accidents occur on construction project sites worldwide yearly. This number of accidents translates to one construction fatality per every sixth of an hour. The construction industry therefore accounts for a whopping 17% of all fatal workplace accidents (ILO, 2005). In its 1992 Code of Practice "Safety and Health in Construction (SHC)", the ILO identified various stakeholders that had a stake in the management of H&S on a construction project site (ILO, 1992).

The ILO (1992) recommended, among other things, that national laws in various states include developers and professionals, in addition to employers and employees, because they, too, have a duty of care towards OSH in relation to their contribution to a construction project. Section 2.1.7 of the ILO code of practise specifies the demand for national safety regulations as responsibility of various construction participants. In response to the ILO code of practise suggestions, the United Kingdom's (UK) Health and Safety Executive (HSE) developed its own code of practise called 'Respect for People (RFP)', which fostered good working relationships and stakeholder accountability. It emphasises the importance of considering OSH in all stages of the construction process (HSE, 2013). This position has been adopted by various jurisdictions, including the United Kingdom, and has opened the door for additional contributions from different scholars who emphasise the need for a shift from a focus on the contractor as bearing sole responsibility for all ills confronting construction H&S to a universal stakeholder approach.

2.3.3 Stakeholder Role Play

As several experts have stated, H&S on a building site necessitate a collaborative effort by all stakeholders (Haupt *et al*., 2020; Raliile & Haupt, 2020; Khoza, 2020). According to the definition by Weiss (2014); a stake is defined as an interest or a share while stakeholder is defined as a person with a stake in an undertaking. Further, Maloney and Cameron (2004), describe stakeholders as individuals or groups that benefit from an organization. They emphasise that an organisation can cause harm or violate stakeholders' rights. Other researchers have classified stakeholders as internal or external. Internal stakeholders are individuals who are directly involved in the project's implementation such as project employer (developer), project consultants, contractors, sub-contractors and site workers. External stakeholders, on the other hand, have been defined as individuals who are not directly accountable for the project's daily implementation but are affected by it. Community members and industry regulators are examples of such stakeholders (Benn *et al*., 2016).

This study concentrated on the internal stakeholders who are directly involved in the project implementation as defined by Weiss (2014) namely, the developer, contractor, and employees. The construction industry's low H&S performance can be attributed to a lack of a collaborative engagement framework among project internal stakeholders. The absence of collaboration among internal stakeholders affects the level of compliance with occupational H&S regulations (Machfudiyanto *et al*., 2017; Mausumi, 2017). Latief *et al*. (2017) affirms that collaboration emerges as an important strategy that stakeholders adopt in organizing project work and have it accomplished as per specification. It is recognised as a major factor to project success. Collaboration thus provides a method for stakeholders to put together a team of experts needed for a project's successful implementation. This necessitates complete integration and focus on the part of team members in order to achieve project objectives.

Compliance to H&S regulations is a key factor towards project success. A project is seen to have succeeded when the stakeholder’s requirements are fulfilled hence the calls for enhanced effort towards reduction or elimination of unhealthy and unsafe incidences on construction projects. High level of collaboration among internal stakeholders assures project success which is an indicator of collaboration among internal stakeholders (Lamba *et al*., 2019). A number of efforts have been put in towards this course.

European Agency for Safety and Health at Work (2004) presents a number of initiatives towards prevention of accidents in construction workplaces. For example, the silent book is a

visual presentation that highlights what to do and what not to do on a construction site. This approach has resulted in a significant reduction in the number of accidents on Swedish construction sites (EASHW, 2004). The lack of a tool for monitoring H&S management on construction projects in Finland was a significant hindrance to efforts to ensure a safe working environment. As a result, the Ussimaa Occupational Safety and Health Inspectorate, in collaboration with the Finnish Institute of Occupation Health and Safety, created "The TR Method" for assessing OHS levels on construction project sites. The TR Method is distinguished by its user-friendliness, which is achieved through collaboration between employers and employees. This enables critical players to collaborate effectively. The results show a 20% reduction in accident frequency during the prior 4-year period of its implementation (EASHW, 2004). It has since been established scientifically that the companies that have adopted the use of the TR' method, have reported up to 500 fewer accidents annually in comparison to those companies that use alternative methods (EASHW, 2004).

Another initiative is the Safe-T-Certificate as recognized throughout Northern Ireland, Republic Ireland, and Great Britain. Companies have to be certified to confirm that they have put in place management systems that conform to the minimum H&S criterion (Safe-T-Cert, 2022). Further initiatives include the use of the Safe System of Work (SSW). This is a wordless document that allows all workers to communicate, regardless of reading or language ability (HSC, 2005). This strategy heavily relies on pictograms to convey information about hazards and methods for mitigating them. At the World Health and Safety Congress held in Florida, this system was recognised as the most innovative in the construction sector (HSC, 2005).

In the same vein, the United Kingdom developed the Construction Design and Management (CDM) regulations, while Australia has the Safe System of Work (SSW), both of which offer guidance for the legal stipulations and obligations for all stakeholders in the construction process in terms of workplace H&S. Australia developed a National Collaborative Framework (NCF) to drive H&S management through procurement and project management practises, in addition to providing regulatory roles and obligations for stakeholders participating in the construction value chain (NCF, 2005). Under this agreement, developers take several critical management steps and incorporate them into their safety culture (Lingard *et al*, 2005). Following widespread adoption of this framework in the Australian construction sector; H&S management has exponentially been enhanced. A significant aspect of this approach is the collaborations between stakeholders.

These instances demonstrate that the time has come for individual countries to implement safety management programmes to aid in the reduction/elimination of harmful practises. Indeed, the instances show a significant reduction in the number of accidents and incidents on construction sites. A slew of organisations has followed suit and are working quickly to implement individualised integrated management systems inside a common framework, with the goal of efficiently controlling the overall arrangement for Safety, Health, Environment, Quality, and, more recently, Security (SHEQS). Countries such as Hong Kong have implemented a variety of activities such as legislation, law enforcement, safety promotion, and training (OSHA, 1970). These initiatives are geared towards enhanced H&S at the workplace (Mohammed *et al*., 2019). These legislative changes have worked in Hong Kong, particularly through encouragement of training in the industry.

Studies in South Africa suggest that enhanced legislation does not necessarily lead to enhanced H&S compliances on construction project sites. According to CIDB (2009), published statistics report no significant decline in the number of accidents, despite legislative changes. The same case could mirror closely with the Kenya situation where despite increased legislation like the establishment of bodies to regulate the professional practice of Engineers, Architects, Quantity Surveyors and Contractors in Kenya, there seems to be no significant reduction of unsafe activities in the construction sector in Kenya. The Board of Registration of Architects and Quantity surveyors (BORAQS), the Engineers Board (EBK), and the National Construction Authority (NCA) that regulate the professional practice of persons involved in the construction activities in Kenya construction industry have been in existence for not less than ten years. These professional bodies deal with persons who understand the processes and procedures of construction and who on many occasions are not directly involved in the activities of construction at a close proximity and may not be hurt as a consequence of unsafe or unhealthy activity on site. This could be construed to mean that H&S management should be handled at the lowest level with intervention directed to the actual people that are affected by the unhealthy and unsafe environment, in this case the workers.

The workers engaged in the construction activity are informally/casually employed which precludes their joining Trade Unions hence they have no organization that regulates their behaviour in the work environment (Wachira, 2008). Although NCA has tried to register workers in the construction industry with an intention of profiling for the sake of capacity building of the workers, data (NCA, 2020), indicates that only 5% of the total industry labour force is in its database, out of a predicted 3 million construction workers. This lack of

organisation, along with inadequate social protection, makes it difficult to implement targeted interventions outside of the workplace.

From the above examples in literature the study can conclude that indeed collaboration plays a key role in the enhancement of H&S at workplaces. This is particularly in view of success of the various initiatives that individual nations have put in place to onboard relevant stakeholders for a buy-in towards enhanced H&S at workplaces. These initiatives have been successful in reduction in the level of accidents on construction project sites. Further, the concept of collaboration having worked on construction sites in the developed countries can be adopted for implementation in the Kenyan situation.

2.3.4 Role of the Firm Size

Efforts have been taken at national level and not much has been mentioned on a localized front like on a construction site run by small and medium enterprise (SME) contractors. As explained above, if such efforts were directed to persons that are directly affected by acts of omissions or commissions, the results could be different. In contrast, this study looks at the SME construction sites which may not be endowed with many resources and the level of compliance with regulations could be wanting.

The NCA (2016), found that that the level of employees that had low literacy levels was very high and a big chunk of them didn't have technical training. This could mean that their level of understanding of technical H&S language could be wanting and hence adherence to best practices towards H&S may not be feasible. These cadre of employees are the ones that carry out labour intensive activities on the SME construction sites in Kenya. This could explain why OHS issues are frequently disregarded in SMEs and supports findings that SMEs have a high frequency of major injuries and fatalities (Khoza, 2020). In Australia, for example, the OHS policy shift towards a more self-regulated framework has caused substantial issues for SME contractors who have failed to meet the requisite levels of H&S on their projects (Lamba *et al*., 2019).

Large firms have no major challenges in handling OHS risks (Machfudiyanto et al., 2017). This could be the reason why SMEs register high incidences of unsafe and unhealthy incidences compared to the large size enterprises (Kheni et al., 2010; Legg et al., 2015). Large corporations may have highly skilled individuals and the means to implement OHS capacity building programmes for their employees (Payne *et al*., 2017). Further, the large firms could be sticking to the stipulated construction procedures and at the same time adhering to the H&S protocols

(Gibb *et al*., 2015). The large enterprises may be on the level of multi-nationals, with a huge stake in terms of their reputation, which is tied to future contracts with a brand name to keep.

This position is not any different from the local scene in Kenya. The large volume contractors in the categories of NCA 1 to NCA 4 execute work worth millions, if not in billions of Kenya Shillings and have timelines to keep which bars them from losing unnecessary time going through investigations and suspensions that may arise in case of an incident on site. They have a reputation to keep and hence they aspire to have minimum or nil reports of site accidents. According to a report released by the National Building Inspectorate (NBI, 2021) on the state of the construction industry, it was found that most unhealthy and unsafe buildings were found to exist in the low- and middle-income estates of Nairobi. These areas have most projects executed by the SME construction companies in the categories of NCA 5 to NCA 8. These companies fall in the bracket of SME categories as per NCA classification. It is worth noting that these companies are indigenous whereby most of them have sole ownership. They exhibit low levels of efficiency and professionalism in their undertakings. This could be as a result of low capacity on equipment, personnel and capital.

NCA (2021) in the study to establish the capacity of indigenous construction companies to execute large volume-projects, found out that indigenous construction firms were deficient in finances, equipment, and manpower. This position is slightly changing courtesy of various intervening measures the government of Kenya together with other stakeholders are putting in to alleviate this condition. Some of these interventions include the requirement to have 30% of the mega projects subcontracted to the local contractors as enshrined in the Public Procurement and Asset Disposal Act (2015). Multinational corporations are required to transfer specialised talents to domestic enterprises, therefore improving their capabilities. Furthermore, the government has implemented incentives, such as low-interest financing models, to assist indigenous enterprises in obtaining credit for the acquisition of equipment and supplies for the awarded projects (NCA, 2021).

2.3.5 OSH in Developing Nations

To further assist in having a clear understanding on how various developing countries are currently handling the aspect of H&S in their jurisdictions, the experiences and findings of different jurisdictions have been highlighted and discussed; with a view of picking learning points. These studies include both developing and developed nations. In Africa, Botswana,

Egypt, Ghana, Malawi, Nigeria, and Tanzania are preferentially selected to give the status on H&S across the continent.

2.3.5.1 OHS in Botswana

In 2010, 23,200 persons were employed in Botswana's construction industry, with 6.2% working in the formal sector (Musonda *et al.*, 2012). The majority of industry personnel worked in the informal sector. During the same time period, the industry had a death rate of 0.26 per 1,000 workers which translates to 26 deaths per 100,000 workers (Musonda & Smallwood, 2017). According to Tau and Seoke (2013), this was the highest of any sector, with a compensation rate five times that of the others. The authors also point out that the industry is still behind on record keeping when it comes to H&S statistics, so the number of unrecorded incidents could be higher than what is recorded. H&S was not a major concern for designers in Botswana, and they were not incentivized to incorporate H&S into their designs to avoid hazards in construction projects (Musonda & Haupt, 2009). The authors also note that developers do not include H&S needs in the briefs supplied to designers, which has an impact on the H&S designs that professionals may recommend. This failure could be intentional or the result of a developer oversight (Musonda & Smallwood, 2017). Professional designers are expected by their code of ethics to apply their professional expertise and guide the developer on what is best for the industry rather than hiding behind the guise that they have not been sufficiently briefed on the project needs. According to the author, this is a case of professional negligence on the side of the designers.

According to Rout and Sikdar (2017), the level of influence towards H&S hazard identification and elimination decreases down the project cycle. The planning stage of a construction project cycle is the critical stage of a project where internal stakeholders, such as the developer and designer, have the most influence on how H&S issues will be addressed downstream. This necessitates collaboration and knowledge sharing among stakeholders even during the construction design stage of a project cycle is the important step in which internal stakeholders are involved. project's design phase. Because of the extent of influence at this stage of the project, developer, and designer involvement in the beginning phase of the project is critical for better compliance with OSH in workplaces.

2.3.5.2 OHS in Egypt

Egyptian labour regulations include provisions addressing H&S needs (Mahmoud & Yusuf, 2019). However, they appear to be ineffectual to a significant extent because organisations

were not required to give employee training or keep accident records (Said *et al*., 2019). Employees have minimal rights in terms of OHS compliance, and no workplace inspections are conducted by H&S Officers (ElSafty *et al*., 2012). Furthermore, punishments for offenders following a reported accident were imposed arbitrarily and were insufficient (Li & Poon, 2013). This Egyptian scenario could be cutting across many countries in developing nations where record keeping is below ILO acceptable standards. Despite low returns on accident reporting, the actual number of unsafe and unhealthy incidences could be very high (Said *et al*., 2019). Fear of punishment and lax enforcement procedures may be indicators of the terrible situation. When an institution lacks internal self-regulation mechanisms, it should have robust enforcement mechanisms in place. This circumstance is unexpectedly absent in the Egyptian context, in violation of ILO requirements that mandate domestication of OSH processes that satisfy international standards.

2.3.5.3 OHS in Ghana

OHS is managed by numerous ministerial departments in Ghana's building industry. OHS laws are fragmented and dispersed haphazardly across numerous pieces of legislation (Aasonaa, 2023). Workplace inspections, surveys, workplace registration, active promotion of H&S, and training are all carried out in these departments, which are dispersed haphazardly throughout several pieces of legislation (Williams *et al*., 2023). Statutory inconsistency appears to have resulted in apathy in the H&S management on construction project sites (Hervie & Oduro-Nyarko, 2018). Though not much is on record about the extent of accidents in the construction sector in Ghana, Williams *et al*. (2019) and Donkoh and Aboagye-Nimo (2017), cite lack of government commitment as demonstrated by logistical constraints facing many departments in carrying out their mandates towards OHS in workplaces.

The scattered Ghanaian departments with multiple mandates oversighting H&S could be the undoing and a probable reason for low H&S in workplaces. Furthermore, as seen, Ghana's workplace safety is governed by several pieces of legislation, and there is no central command centre in charge of dealing with safety and health issues. The country could consider enacting an OSHA that could be an umbrella to all legislations and provide collaboration between various agencies handling H&S in the workplace. This challenge faces the Kenya construction sector to a large extent. Various legislations on matters H&S are also spread out in various regulatory arms of government. The County Government Act (No. 17 of 2012), the Engineers Act 43, 2011, the National Environment and Management Act 1999, and the Water Resources Management Authority Act 2016, amongst others. These various pieces of legislations just like

in the case of the Ghanaian construction sector sometimes causes confusion as who is solely responsible for the enforcement and oversighting of H&S on construction sites. One is left confused and to wonder whether the industry is not overly regulated. Learning from the case of Ghana, overregulating an industry does not necessarily lead to a safer and healthier industry.

2.3.5.4 OHS in Malawi

Simukonda *et al*. (2020) are of the view that most developing nations depict high apathy towards H&S awareness and implementation hence management commitment towards H&S compliances is significantly low. Malawi's National Construction Industry Act No. 19 of 1996 handles construction and H&S in the country, as well as assisting in the development of the National Construction Industry Council (NCIC), which registers industry participants and coordinates training (Chiocha *et al*., 2019). Despite the formation of these essential institutions, the sector is still far from having fully functional H&S systems, nor does it have internationally recognised awards for demonstrating best practises in OHS (Malema, 2021). The low levels of awareness in Malawi towards safety in the workplace could be as a result of limited resources that inhibits training in the workplaces. Interdependence among players could be encouraged to build synergy and hence lean on one another's strengths towards enhanced safety efforts in the workplace (Simukonda, 2019). Collaborative effort could be the missing link.

2.3.5.5 OHS in Nigeria

According to some experts, very few indigenous construction enterprises recognize the impact that best H&S practices have on total worker H&S (Adeagbo *et al*., 2019; Isah, 2019; Onuvava, 2016). Best H&S practises are scarce in the Nigerian construction business, and some employers regard them as "not required" (Gbajobi *et al*., 2018). Surprisingly, many multi-nationals in the construction business have higher levels of H&S compliance than their domestic counterparts (Adeagbo *et al*., 2019). This "imported" compliance has worked effectively with multi-nationals who undertake large projects, which is not the case with domestic construction enterprises (Onuvava, 2016).

The domestic construction companies continue to have a significant number of recurring injuries, including falls from great heights, being struck by falling materials or moving trucks, and electrocution, among other injuries. Furthermore, inadequate legislative structures and a lack of enforcement of H&S standards may be important contributors to high accident rates, which are unacceptable in any civilised society (Isah, 2019). As a member of the United Nations, this country has adopted and domesticated many conventions, including the ILO,

which mandates the domestication of various laws. As a result, many acts have been enacted, including the Factories Act of 2004, the Workman's Compensation Act of 1987, and the Labour, Safety, Health, and Welfare Bill of 2012 (Adeagbo *et al*., 2019). Looking at the Nigerian case and as earlier seen in other countries, multiple legislations and forced enforcements cannot assure H&S compliances in workplaces. As earlier noted, where stakeholders have worked together compliance has been enhanced and records of unsafe and unhealthy incidences have immensely nose-dived. Kenya construction industry also faces some of these culture issues.

2.3.5.6 OHS in Tanzania

Tanzania's construction industry accounts for 25-45 percent of the total occupational fatalities in the country (Mrema *et al*., 2015). On construction sites, there is little focus on H&S because the primary goal is to complete the projects on time and within budget (Gervas, 2021). Despite increased streamlining of H&S through legislation, this is to the detriment of a healthy and safe industry. Among these landmarks are the Contractors Registration Board Act (CRBA), which was enacted in 2010, and the National Construction Council Act, as revised in 2007 (Gervas *et al*., 2022). The Board is charged with regulating and developing a competitive and sustainable sector, as well as ensuring that contractors follow H&S laws during project implementation phases (Matiko, 2013). Provisions in the rules of practise encourage professionals to design and build projects that are completely compliant with acceptable H&S requirements (Mrema *et al*., 2015). Improved legislation, as in the case of Tanzania, has not abolished incidents on sites, since studies conducted elsewhere show that it is only a cultural change that directly changes how participants act in a specific way (Gervas *et al*., 2022). Maybe, it’s time that the Tanzania workplace changes the approach and adopts a collaborative approach in H&S. Encouraging professionalism alone without direct commitment and involvement of other key stakeholders may not result in much shift in the way things are carried out in the construction sector in a given jurisdiction. Just like Kenya that has many professional bodies who have been around for minimum twenty years in practice continue to register low H&S compliances, Tanzania construction sector too continues to grapple with low H&S compliances in its construction sites.

2.3.5.7 Lessons Learned from the Developing Nations

The study concludes that compliance with H&S regulations in most developing nations is low despite all of them having established regulatory frameworks that govern OHS in workplaces.

The many pieces of legislations depict high levels of ambiguity coupled with overriding mandates between various agencies that have mandates towards the enforcement of the OHS laws on construction project sites. The level of employees' contributions in H&S matters is very low. Employees are only expected to adhere to a set of rules which they may not understand the consequences that could arise from non-compliance. Contractors display low level of commitment towards OHS compliances as they consider profit with minimum cost on OHS as their driving force on projects. From the foregoing, it is not yet clear the level of performance of HSCs on construction sites and how the performance has impacted on the overall compliance with OHS in workplaces.

2.3.6 OHS in Developed Nations

To have a different perspective on the H&S management at workplaces, the study reviewed H&S management as practiced in few selected nations in the developed world. Developed nations examined include Singapore, China, Canada, Australia, United Kingdom, and the United States of America.

2.3.6.1 OHS in Singapore

The construction sector in Singapore under the Singapore Building and Works of Engineering Construction (BOWEC), lists 13 elements in their regulations that constitute good H&S practices. These practices include the following; formulation of H&S policy, compliances with internal rules and regulations, documentation of construction procedures and processes, regulation of contractors' practice, conduct of project inspections, emergency preparedness and hazard identification and analysis (Buniya *et al*., 2021).

Unlike the Kenyan case where the level of OHS compliance is pegged on the number of employees employed on the project at a given time according to OSHA 2007, the level of OHS compliance is pegged on project value. Projects whose value amount to S$5million have requirements for provision of a safety supervisor on the site while a comprehensive H&S plan should be provided for projects worth S$10million (Li & Poon, 2013). Further, procurement practices require a 10% of the contract sum be presented as a provisional sum to be expended towards H&S and H&S performance is taken a notch higher by restricting poor performing contractors to undertake only public projects (Li & Poon, 2013).

2.3.6.2 OHS in the People's Republic of China (PRC)

H&S in China at enterprise level has three main components: the safety technology section, the bipartite management-labour work (safety committee), and a trade union OHS monitoring

committee (Cao *et al*., 2021). The management of OHS takes a tripartite approach at the enterprise level. The safety technology section is charged with the responsibility of the overall design and implementation of the OHS equipment and programs (Zhou *et al*., 2019). Duties include training workers, identifying and correcting hidden OHS hazards, correcting and improving OHS problems, organizing inspections, carrying out recuperation plans for workers at hazardous jobs, scheduling regular physical check-ups for all workers, and distributing OHS supplies such as PPEs (Walker, 2015).

The joint management-worker OHS committee has 8 to 15 members, including members from each department, an OHS officer from the safety technology division, and OHS monitoring representatives from skilled workers, professionals, and unions. The joint body is presided over by the enterprise's general manager (Zhou *et al*., 2019). The committee is in charge of monthly enterprise-wide inspections, as well as quarterly and pre-holiday OHS inspections. Employer-worker committees have had the most influence in reducing cases of dangerous and unhealthy workplace incidents in China (Tong *et al*., 2022). According to Meng and Chan (2022), administrative policies in the workplace concerning H&S are well expressed in the People's Republic of China (PRC). All industry stakeholders' responsibilities are clearly defined. The different regulations provide sufficient clarity on the level of duty for officers manning H&S, worker training, hazard detection, management, and analysis (Su *et al*., 2021). Workers' compensation measures are also outlined for people who may be injured on the job (Wei *et al*., 2008). The PRC has also developed provisions for online reporting of dangerous and unhealthy incidents on-site where photographic proof is used (Xiaoyong & Wendi, 2012). Because the sector has a clear regulatory framework for the duties and obligations of project parties, China's workplaces are tightly regulated and compliance levels are high.

The role of stakeholders, as integrated in various legislations, is critical. Because of the interactive character of all parties participating in the project, there is sufficient hazard identification and analysis in project implementation, resulting in early detection and eradication of potential instances. The industry and workplaces are more mature unlike the developing countries which are still struggling in various areas including the safety culture. A key point to learn from the PRC construction industry is the real time reporting of incidences based on the online platform with attachment of photographs as evidence of what could be happening and the extent of damage. The OSHA 2007 makes provisions on the timelines for incident reporting but many of the of the timelines are not attained due to the challenges in

technology and low infrastructure in communication. With the wide spread of 5G network across the country, adoption of online reporting will encourage real time reporting of incidences and hinder tampering of evidence that will aid in investigations. It is now even easier to have real time and online reporting anywhere in Kenya as smart phones are common and capable.

2.3.6.3 OHS in Hong Kong

The use of Total Quality Management (TQM) as a Safety Management System (SMS) in the Hong Kong construction industry has resulted in a considerable decrease in the number of unhealthy and unsafe incidents (Chan & Aghimien, 2022). The Total Quality Management Systems (TQMS) is a management system founded on the premise that every employee must be committed to maintaining high standards of work in all aspects of a firm's operations in order to achieve zero-accident numbers (Rowlinson, 2016). The TQMS method promotes the integration of H&S throughout the procurement value chain, as well as employee involvement in H&S management. It adheres to the ISO 9001 QMS criteria for continuous process improvement and believes that all accidents are avoidable (Tsang *et al*., 2019).

The adoption of TQM in management of H&S is a big milestone and particularly the culture of continuous improvement coupled with employee involvement. Developing nations need to embrace this culture with the help of collaborative framework that encourages all-inclusive stakeholder involvement in H&S management towards zero tolerances on workplace accidents. However, culture change takes long period before wide adoption possibly due to resource scarcity which could be a major impediment towards a faster adoption of management approaches like the TQMS in developing nations in comparison to the developed nations. Consequently, a collaborative approach similar to the Total Quality Management System approach could be a timely cure for developing nations who still grapple with reported high rates of accidents on their work sites. An approach that encourages inclusivity of all stakeholders in the H&S at work sites should be most in the construction sector.

2.3.6.4 OHS in Australia

Just like many developed nations of the world, Australia has high standards on H&S at workplaces (Woolley *et al*., 2020). This coupled with the ILO requirements of domesticating the OSH standards within an organizational context, has led to near zero accident returns. The Building and Construction Improvement Act (BICA, 2005) that stipulates the H&S regulations in the workplaces takes a preventive approach towards H&S management. A key feature in the

adopted approach is the requirement for employee involvement in the management of H&S in workplaces (Behm & Culvenor, 2011). The individual states of Australia have adopted H&S rules that match the national approach while taking local state difficulties into account when developing intervention measures for H&S management (Woolley *et al*., 2020). One of the reasons for the enhanced levels of safety in Australia could be the understanding of the unique local challenges and the setting of prioritized solutions state-wise (Pillay, 2013). The preventive approach and worker involvement have been drivers behind enhanced H&S in Australia (Bahn & Barratt-Pugh, 2013).

Developing nations could adopt this approach in enhancing H&S on construction sites considering unique challenges of each region and stating area specific solutions. A collaborative approach where workers are involved like the Australia case could be a bigger contributor to the solutions of H&S concerns on construction projects in developing nations as legislations alone, as has been shown in the Australian case is not sufficient. Further, a national wide approach may not be a cure to H&S issues as some locations could be having unique characteristics that may not allow a copy and paste approach in solving H&S issues.

A country like Kenya has diversity in cultures, geographical terrain, infrastructure developments, literacy levels among other aspects that may dictate selection of a H&S approach for a given locality. Nairobi County has well-articulated physical planning regulations that dictates the type of development that can be constructed in a given part of the city. The Physical Planning Act (PPA, 2021) provides zoning requirements for the type of development to be constructed in various areas in the county where developments categorized as either being low, medium and high-density population zones. The high-density areas in Nairobi have borne the highest brunt of unsafe developments and further contributed the highest number of contractors who have executed the SME construction projects. Just like the Australian case, based on regional diversity, the approach to be taken in the Nairobi case may not be a copy pasting approach towards enhancement of H&S in Kenya. This should adopt a localized approach with local conditions being put into consideration as intervening approaches towards enhanced OSHA 2007 compliances are designed.

2.3.6.5 OHS in the United Kingdom

As a developed nation, the United Kingdom has a well-established H&S legislation framework that has been changed to address evolving and contemporary workplace trends. The Health and Safety at Workplaces Act (1974), which has been revised, governs worker H&S. One

amendment resulted in the adoption of the Construction Design and Management Regulations (CDMR) 2007, which define the duties of stakeholders throughout the construction cycle (Martinez-Aires *et al*., 2015). It is the duty of all project stakeholders to ensure H&S compliance throughout the construction life cycle (Mahmoudi *et al*., 2014). Hazard prevention, the appointment of safety officers, training and information sharing, work supervision to ensure correct procedures are followed, worker consultation and involvement to guarantee welfare is taken care of throughout the whole life cycle are some of the main features in the CDMR (Umar *et al*., 2022). Furthermore, the developer accepts full responsibility for the impact of their H&S decisions, including the welfare of the workers, whereas architects and contractors have sworn duties to guarantee the CDMR (2015) is implemented. The project manager, who may be a construction H&S professional, is in charge of H&S coordination (Martinez-Aires *et al*., 2015).

Developing nations could borrow a leaf to keep abreast with the workplace challenges and review their H&S regulations based on evolving workplace conditions. Consultation and involvement of stakeholders is thus identified as a key component in H&S management. May be developing nations could enhance collaboration among stakeholders just as the GB to enhance compliance on construction sites. Notably, the involvement of workers in the H&S activities according to the CDMR regulations could be a main contributor to enhanced safety levels in workplaces as the GB case.

2.3.6.6 OHS in the United States of America

The Occupational Safety and Health Act (OSHA, 1970) is the core H&S legislation in the USA. The construction regulations are broad and prescriptive, with standard interpretations for each provision of the regulations, which are related to questions from institutions or the general public. Injury tracking systems show that there has been a decrease in fatalities and injuries across all sectors of the construction industry. Extensive research and training in the workplace, combined with industry participation, has had a favourable impact on improved H&S compliance on construction sites and is likely to be the cause of a decrease in the number of accidents on construction sites in the United States. This indicates a high level of cooperation among stakeholders.

Further, the USA has long established the construction sector into four categories (i.e., commercial, industrial, infrastructure, and energy and utilities) unlike the Kenya sector that categorizes its building sector under two categories namely, private or public. The detailed categorization could help in the identification of the individual needs and proposing customized

solutions for a given sector of the workplace. Extensive research and having a feedback mechanism in the running of H&S aspects are good practices worth emulating. Resources to facilitate research could be an impediment and feedback analysis to inform our actions could be key towards enhanced compliance with OSH as this informs continuous improvement as per ISO 9001 QMS.

2.3.6.7 OHS in Canada

The Canadian Centre for Occupational Health and Safety (CCOHS) based in Ontario is the only legislation that governs H&S in Canada. The Canadian Occupational Health and Safety Act, Revised Statute of Ontario (RSO), 1990, c. 0.1, controls H&S practise and contains general practises and compliance criteria. The Ontario Regulation 213/91 for Construction Projects (1991), as modified, addresses the standards for construction workers and looks to be fairly prescriptive in its complexity (Hardy & Howe, 2015). The H&S regulations in Canada are industry specific, very detailed and prescriptive (Construction Safety Association of Ontario, 2016).

Developing nations could develop sector specific guidelines to oversight the H&S specific to the respective sectors. Canada might have been able to achieve this level of H&S due to their highly developed systems and sufficient resources. Further the H&S regulations are sector specific and very detailed in prescription. In contrast, the OSHA 2007, regulations are generic and covers all workplaces irrespective of the industry under review. Clearly one prescription cannot be a cure to all forms of ailments in all sectors under the sun. Revision of the OSHA 2007 in Kenya to have each sector have it is own OHS regulations is important like the Canadian case. Having prescription that are sector specific, will address the underlying uniqueness and complexity the construction industry operates and trigger policy makers and researchers to create sector specific solutions that will adequately address the challenges facing the H&S in the sector.

2.3.6.8 Lessons Learned from the Developed Nations

This research explores some gaps that inform what should be done to enhance the H&S conditions on the SME construction projects in Kenya. From the above discussion, industrialised countries have well-established systems of managing H&S that include all stakeholders in a given workplace. A holistic quality management system that is all-encompassing and fosters stakeholder participation at all phases of the project is the ideal way. Continuous improvement is encouraged, and in some circumstances, such as in Singapore, a

specific proportion of the entire contract value is set aside to cover H&S management on construction projects. Further, reprimands exist for contractors who exhibit persistent return to unsafe and unhealthy activities on the construction activities in the form of downgrade, suspension, or tender restrictions. Inadequate resources and a reactive approach to H&S issues pose challenges for underdeveloped countries. A shift in this approach from reactive to proactive, continuous improvement, and, most importantly, a collaborative approach to sharing limited resources for H&S management could be an appropriate solution to the perpetual reports of inadequate performance in most developing countries in terms of OSHA regulations.

From the above literature review, the approach taken by the developed countries is a national level approach that encourages key stakeholders to play their individual roles based on a set of regulations. This approach seems to work well in the developed countries courtesy of the available resources, well advanced and functional systems and the prevailing H&S culture. They have incorporated workers in the H&S management and the developer is held responsible for any incidences on construction sites. The approach doesn't accommodate the challenges that arise from low literacy levels, scarce resources, low level of mechanization and a huge population that is unemployed and with no or minimum technical knowledge in the field of construction. This calls for adoption of an approach that considers these prevailing industry challenges in developing countries like Kenya whilst allowing for utilization of available local resources to assure compliance.

This understanding takes us then to a place where we critically look at the way OSHA 2007 has been enforced and what specific challenges continue to impede the effective adoption of this law on the Kenya construction sector.

2.3.7 Efforts to Enhance H&S in Study Location

On January 5, 2015, then-President Uhuru Kenyatta authorised the Ministry of Land, Housing, and Urban Development (MOLH&UD) and the Nairobi City County Government (NCCG) to perform an audit of Nairobi buildings to determine which were unfit for human occupancy (GoK, 2016). He specifically mentioned the city's Eastland neighbourhood as the location where the audit should be focused because most structures in these neighbourhoods are prone to collapse. On January 22, 2015, the president issued a new directive to MOLH&UD, NCA, and NCCG (GoK, 2016). Prior to this directive, the government established a number of commissions of inquiry in order to develop various intervention measures to combat the widespread collapse of buildings in the country, the most recent of which was a 2013 study of

the security and safety of the built environment in Nairobi Metropolitan Region by the then Ministry of Nairobi Metropolitan Development (NMD, 2013). These committees' recommendations have yet to be completely implemented. The methodology entailed researching development trends and identifying regions with possibly increased risks of building collapse through the collecting and documentation of information on areas where collapsed buildings under construction occurred. The data sources were primarily secondary data sources from prior research and statistics on building collapses. The committee noted that zones with high levels of illegal developments in Nairobi also had high incidences of collapsed buildings; most of the unsafe projects were being executed by private developers, who lie in the bracket of SME projects according to NCA categorization; and the projects were projects were valued up to Kshs 100 million (1 USD = Kshs 150). Part of the report as is presented on *Table 2.1* below. The report categorizes the projects based on the risk levels being high risk, medium risk and low risk projects and the projects are respectively zoned as 1, 2 and 3, based on risk levels. The risk levels are based on the probability of having an unsafe and unhealthy construction project in the given locality. The high-risk areas in Nairobi are based in the areas of Umoja, Huruma, Mathare North, Tasia2&3, Dandora, Baba Dogo, Kariobangi Light Industries, Kawangware, Kangemi, Zimmermann, Githurai, Embakasi, Pipeline, Mwiki / Kasarani.

Table 2.1: Categorization of Nairobi based on levels of safety risks on sites

Zone	Location	Risk level	Number of projects FY 2020/2021
1.	Umoja, Huruma, Mathare North, Tassia2&3, Dandora, Baba Dogo, Kariobangi Light Industries, Kawangware, Kangemi, Zimmermann, Githurai, Embakasi, Pipeline, Mwiki / Kasarani	High Risk	**123**
2.	Old Eastlands, Eastleigh, Dagoretti, South B&C Denholm, Buru, Nairobi West, Kahawa, Ruai, Njiru.	Medium Risk	**156**
3.	CBD, Parklands, Westlands, Lavington, Kileleshwa, Woodley, Muthaiga, Karen/Langata,Springvalley	Low Risk	**176**

Source: Adopted from (NBI, 2021)

2.3.8 Enforcement of OSHA 2007

The Occupational Safety and Health Act (OSHA, 2007) was enacted with the primary objective of improving workplace safety and well-being. On the other hand, the Work Injury Benefits Act 2007 (WIBA 2007) was enacted to ensure that workers who experience work-related

injuries or contract work-related diseases get reimbursed. There is an inspection and enforcement mechanism in place to guarantee industry parties' compliance with OSHA 2007. The Directorate of Occupational Safety and Health Services (DOSHS) is in charge of OSHA 2007 enforcement. DOSHS' primary responsibilities include: inspection of workplaces to ensure compliance with H&S laws, assessment of workplace pollutants for control purposes, investigation of occupational accidents and diseases with the goal of preventing recurrence, examination and testing of work equipment, training on OSH, first aid and fire safety, and architect approval, among others. Workplaces are not short of legislation governing how H&S should be administered.

Apart from the OSHA 2007, legislations and institutions that service the H&S conditions at work places include: The Mining Act, Cap. 306, No. 2, 2009; the Public Health Act, Cap. 242, 2017; the Biosafety Act, the Food, Drugs and Chemical Substances Act, Cap. 254, 1989; the Energy Act, No. 12, 2006; the Employment Act, No. 11, 2007; the Radiation and Protection Act, Cap. 243, 1982 and the Standards Act, Cap. 496, 1974; the Pest Control and Product Act, Cap. 346, 1983; the Petroleum (Exploration and Production) Act, Cap. 308, 2019. Government Agencies like the National Construction Authority (NCA); the National Environmental Management Authority (NEMA), Water Resources Management Authority (WARMA) and the County Governments among other institutions have in their respective governance instruments with provisions that touch on how H&S should be attended to in their areas of jurisdiction. These institutions have indeed played a significant role in promoting H&S at workplaces.

Despite their significant efforts to improving fair working standards, the construction industry continues to have unhealthy and unsafe working conditions. Diverse pieces of legislation and regulators may be exempt from assuming responsibility for unhealthy and unsafe working conditions in construction workplaces because they are not required by law to bear overall responsibility for workplace H&S. Their role is complimentary e.g., DOSHS is charged with the overall mandate towards enforcement of H&S at work places. DOSHS is a state department of labour within the Ministry of Labour and Protection Services. The Directorate's mandate is to guarantee OSHA compliance in order to achieve worker safety and health. Despite the fact that the OSHA 2007 has extremely explicit and comprehensive requirements in legislation that control the conduct of persons and the general environment at Kenyan workplaces, the construction industry continues to register a high number of accidents and incidents.

2.3.9 Current challenges in the enforcement of OSHA

The enforcement of the OSHA 2007 faces problems that do not appear to be easily addressed. Continuous allegations of unhealthy and unsafe working conditions indicate a dearth of DOSHS in the workplace. The number of inspections performed and the number of officers performing workplace inspections represent the presence of DOSHS in workplaces. H&S inspectors are obliged to visit workplaces to ensure that all parties follow the standards of OSHA 2007. According to a report by the Kenya National Bureau of statistics, the total number of workplaces that were supposed to be inspected by DOSHS, were estimated to be 140,000 (KNBS, 2020). According to the data, just 4,000 workplaces were investigated, accounting for only 2.9% of all workplaces. This is against the International Labour Organization requirements (ILO, 2022), that all workplaces be continually inspected to assure workplace compliance with OHS requirements. This low number of workplace inspections could be explained by the low staffing levels by the DOSHS. According to KNBS (2020), out of a population of 47.5 million people, 18 million Kenyans are employed. 3 million Kenyans are employed in the formal sector whereas 15 million are employed in the informal sector across the country (KNBS, 2020). According to the ILO (2013), DOSHS had hired 71 professionals as OSH officials, with only 29% having technical qualifications. In Kenya, there were 140,000 workplaces that required inspection (ILO, 2013). This level of 29% as staff having technical qualifications, is far below what could be sufficient to effectively inspect the 140,000 workplaces leaving most workers exposed to OSH hazards. The counties are even worse off in terms of inspections. Only 29 counties have engaged OHS officers with technical officers engaged numbering 43 (ILO, 2013). The remaining 18 counties had no OHS officers on their payroll. The extent of effectiveness of inspections towards OSHA 2007 compliance in workplaces is left to every one's guess. *Figure 2.1* shows the distribution of officers under the DOSHS in Kenya. Notably, Nairobi with a population of 4 million people, it is manned by a paltry 14 OHS officers stationed at the head office to take care of all workplaces including construction projects (ILO, 2013). This partly contributes to their low performance towards OSHA 2007 compliance.

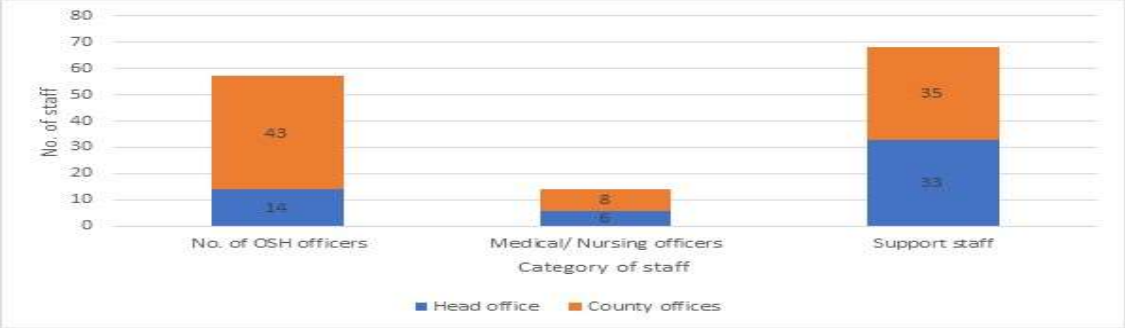

Figure 2.1: Distribution of DOSHS Staff
Source; (ILO, 2013)

Capacity building of technical staff towards OHS in Kenya is still low with only 75 institutions in the whole country that offer OSH related trainings. There are three types of chartered OSH training and educational institutions: 1.) Fire Safety Training Institutions (FSTI), which provide basic fire safety training at workplaces, such as fire marshals; 2.) Occupational Safety and Health Training Institutions (OSHTI), which train workplace OSH committees and raise OSH awareness; and 3.) First-Aid Training Institutions (FATI), which provide statutory basic first-aid training for workplace first-aiders (ILO, 2013). *Figure 2.2* shows the categories of OSH-approved training institutions in Kenya.

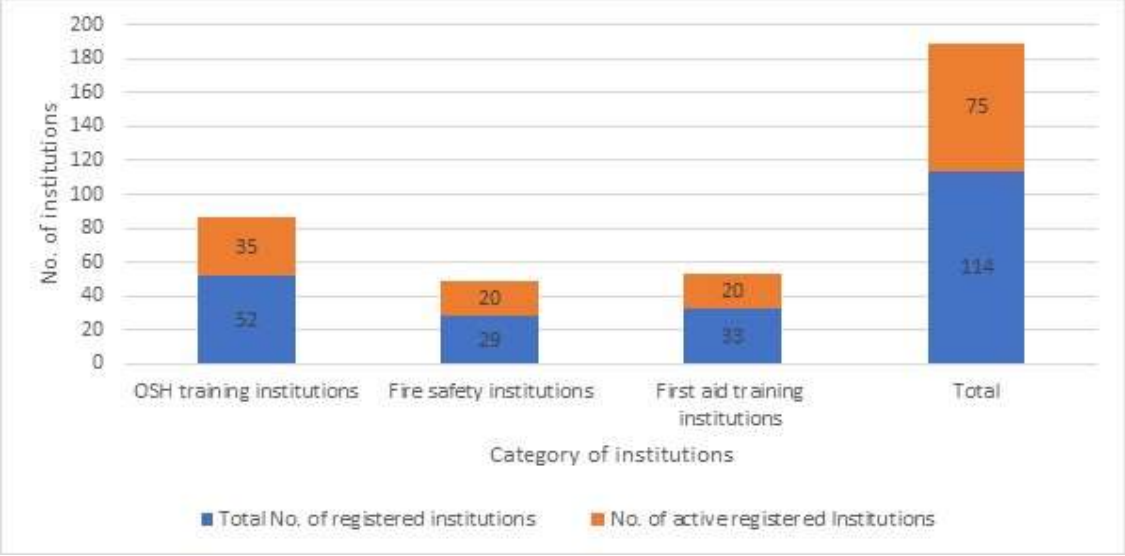

Figure 2.2: OSHA Approved Training Institutions
Source; (ILO, 2013)

Increased ignorance in workplace OHS predisposes workers to unhealthy and risky practises. A shift in this position will necessitate a significant investment by stakeholders in trainings that would normally take place in educational institutions. As a result, many workplaces go

uninspected, significantly compromising workplace OHS. Many unethical managers may take advantage of the lack of government oversight to engage in unhealthy and risky practises that endanger workplace well-being.

DOSHS also certifies the abilities and capability of technical personnel involved in workplace inspections for OHS. By 2012, only 60% of the 329 registered and vetted individuals were active, with the remaining 40% inactive for unknown reasons (ILO, 2013). This exacerbates the lack of OSH personnel. Recruiting inactive trained personnel could help the war on unhealthy and harmful workplace incidents. It is undoubtedly troubling that public funds be spent on worker training, but the benefits of such massive expenditure are not realised. If prospects for employment in the official sector are not available, qualified officers should be employed in the private sector, particularly on small and medium-sized building sites where such a resource is lacking.

The informal sector is becoming an increasingly important contributor to Kenya's economy. It is the country's greatest employer in aggregate. This industry accounts for more than 80% of all new jobs created countrywide. However, the industry is characterised by non-compliance with government rules, which results in the lowest performance in terms of H&S in their workplaces. The segment is dominated by Small and Medium Enterprises (SMEs) that typically have ease of entry and exit; operates informally and on a small scale; engage casual laborers, with minimum or no technical qualifications at all; and mostly enterprises are family owned and market driven. It is the government's responsibility to ensure the safety of all employees because OSH measures should be promoted and implemented to protect employees' health and safety while at work.

The construction sector has many such enterprises in the form of contractors operating in the categories of NCA 5-NCA 8 according to the National Construction Authority categorization (NCA, 2011). These categories of contractors continue to report unsafe and unhealthy incidents during their construction activities due to low compliances with OSHA 2007. Fundamentally the compliance with OSHA 2007, is premised on the fact that the employer (occupier) shall establish HSCs that shall bring on board employees who shall be involved in all efforts towards a healthy and safe working environment. The enforcement of this requirement shall be based on the staffing levels as given on Table 2.2.

Table 2.2: Break down of OHS Technical Officers in Kenya

Category	Registered Approved Persons	Active Approved Persons
Designated H&S Practitioners	77	38
OSH Advisors	75	49
Fire Safety Auditors	49	30
Hoists and Lift Examiners	19	14
Air Receivers and Cylinders for Compressed, Liquefied and Dissolved Gases Examiners	32	20
Boilers, Steam Receivers and Steam Containers Examiners	32	19
Cranes, Lifting Machines, Chains, Ropes and Lifting Tackle Examiners	28	18
Air Quality Monitors	3	0
Refrigeration Plant Examiners	13	9
Totals	**329**	**197**

Source: Adopted from (OSHA, 2007)

The construction industry is in a unique position due to the complexity and transient nature of its processes, with parties and activities constantly changing as the construction project develops. The various phases of project implementation necessitate diverse trades, and the challenges to OSHA compliance change over time. For example, one phase of the project faces the risk of excavation collapse, the next phase faces handling challenges, and yet another phase faces falling objects or slips caused by construction activities. These fluctuating circumstances determine the frequency and range of trainings provided to onsite staff, as even employees working on-site leave at the end of their assignment. For the construction jobsite to have adequately prepared H&S personnel, project management will be obliged to engage sector specialised OHS trained skill areas, since standard trainings may not suffice.

The training institution with the mandate to train and build capacity of workers in OHS is the National Council for Occupational Safety and Health (GoK, 2022). This 22-member body is in charge of developing and revising OSH legislation and policy. To properly carry out its mandate, the organisation consults, coordinates, and collaborates with important stakeholders at both the national and enterprise levels. As a result, employees are represented at the national level by an appointed member of the Central Organisation of Trade Unions - Kenya (COTU-K), whilst employers are represented by a member appointed by the Federation of Kenya Employers (FKE). Other members include government officials from several ministries and agencies, as well as appointed occupational safety and health practitioners. This tripartite

approach towards OSHA 2007 policy formulation and industry advisory has indeed guided workplaces towards betterment of working conditions in many workplaces across industries.

At the enterprise level, OSHA 2007 takes a great departure from what is practiced at the national level and takes a bipartite approach. The bipartite approach is practiced via the HSCs as anchored by the Safety and Health Committees Rules provisioned under the Act. The employer or occupier of any workplace that regularly employs at least 20 people is required by both the Rules and the Act to establish an HSC in the workplace with a fair representation from workers and management. This is the probable the threshold where HSCs would be feasible and effective. When discussing on workplace OSH concerns, the committee may invite or interview specialists from time to time, and the Director of DOSHS or his aides may attend sessions organised by the committee. The employer and his employees have a platform to work jointly to ensure workplace H&S through HSCs. Given, these challenges are unlikely to be surmounted soon, there is need to explore other possibilities, hence the proposal to on board the developer on the HSC on a tripartite platform.

2.4 Functions of the HSCs

OSHA 2007 makes provisions for the formulations of HSCs at workplaces. The HSCs consist of safety representatives from the employer top management and the workers in the following proportions:

a) In workplaces which have between twenty and one hundred employees, at least three safety representatives each from the employer and from the workers;
b) In workplaces which have between one hundred and one thousand employees, at least five safety representatives each from employer and the workers;
c) In workplaces with one thousand or more employees, at least seven safety representatives each from the employer and the workers.

The occupier is required by law to nominate a competent person, who must be a member of the management team, to be accountable for the factory or workplace's safety, health, and welfare no later than six months after it begins operations. The individual nominated will serve as the committee's secretary. The representatives shall be from:

a) the management, shall include the occupier or his dully authorized representative, and other persons appointed for the purpose of the rules by the occupier; and
b) the workers, shall be elected by the workers in accordance with the rules as set out in the OSHA, 2007.

The occupier shall organise and supervise the election of workers' representatives in accordance with a procedure agreed upon between the occupier and the workers. The elections must result in equitable representations for all occupier units, as well as gender parities and geographical balancing. The guidelines further provide that the committee's chair shall be the occupier or his duly selected nominee. The committee representatives serve for three years and are eligible for re-election or reappointment for one more term. According to OSHA (2007) , the functions of HSCs that assure compliance with the act in a given workplace are: -

a) *establishing a schedule of inspections of the workplaces for each calendar year;*
b) *conduct H&S inspections at least once in every three months;*
c) *in the event of an accident or harmful occurrence, inspect, investigate, and provide recommendations to the occupier;*
d) *detect workplace dangers and incidences of illness among workers and give recommendations to the occupier;*
e) *gather statistics on accidents, harmful occurrences, and cases of illness as primary data for intervention planning, and resource allocation;*
f) *evaluate workplace complaints about workers' health, safety, and welfare and provide recommendations to the occupier based on their findings;*
g) *provide advice on the sufficiency or otherwise of any safety and health precautions for specific hazardous employment or activities;*
h) *establish efficient communication channels between management and workers on H&S issues;*
i) *organise such contests or events as are required to carry out the committees' mandates;*
j) *hold seminars and worker education programmes, as well as providing information about workplace safety, health, and welfare, and*
k) *accomplish any additional responsibilities required to provide a safe and healthy working environment.*

The foregoing functions must be performed by HSCs in accordance with the spirit of the OSHA 2007 drafters as it works to ensure OHS. HSCs are made up of occupier and employee representatives who are willing to collaborate in identifying and resolving workplace H&S issues. The HSC's efficient operation necessitates the cooperation of the entities that have sent representatives to the committees. In the absence of support from the nominated entities, the HSC may become incapacitated and unable to meet industry standards.

The regulations governing the establishment and functions of HSCs are generic in the sense that they apply to all industries, regardless of the underlying difficulties that may be sector specific. Failure to acknowledge the inherent issues that face industries with a lot of peculiarities, as indicated in best practises from developed nations, could be a hindrance to the achievement of the otherwise good approach to OHS compliances. The construction business, for example, has distinct characteristics that may not be shared by other industries such as manufacturing or hospitality.

The construction sector is transient, with actors coming and going as the project moves forward. It is a single sector that employs nearly all professions, opens doors to all cadres of employees, and has the biggest number of employees with low technical competencies. Adoption of the HSC method based on the generic model may thus have a negative impact on the success of the OSHA 2007 functionality. Studies must be conducted to determine whether the generality of the OSHA 2007 as created disenfranchises any sector of the economy based on its generality. This study looks at how effective the HSCs have been towards OSHA 2007 compliance on the SME construction projects. *Table 2.3* gives a summary of the adopted HSCs functions for the study.

Table 2.3: HSC functions towards compliance with OSHA 2007

Item	Function Description
1	Investigating complaints relating to workers' health, safety
2	Maintaining accidents register
3	Advising on the adequacy of any safety and health measures
4	Identifying occupational hazards and cases of ill health
5	Conducting safety inspections
6	Investigating accidents
7	Scheduling of inspections
8	Facilitating trainings on H&S in workplaces
9	Organizing promotional activities necessary for enhanced H&S management
10	Maintaining a record of minutes for the past HSC meetings
11	Conducting HSC meetings as per schedule

Source: Adopted from OSHA (2007)

To be effective, the HSCs must operate in an atmosphere of cooperation which is crucial towards effective promotion and monitoring of sound occupational health and safety programs. This calls for active involvement of employees in the committees which can result in healthier and safer workplaces. The employees input their abilities towards identification of hazards, risk assessment, control or elimination and enhance informed decision making and expert sharing.

Additionally, the employees are likely to show an enhanced willingness and commitment towards OHS, because of their direct participation in decisions that affect their well-being on the sites. For effective working of these HSCs therefore, there should be sufficient employer commitment and employee's involvement. This study critically looks at these two aspects of contractor commitment and employee involvement in HSCs towards compliance on construction sites in Kenya.

It should be clear that the enforcement of OSHA 2007 on construction sites is not foreseeable in Kenyan context because of the myriad of challenges that bedevil DOSHS which may not be entirely within its purview. Literature review establishes that the staffing levels are very low with some counties missing out on OHS technical officers in their employment. Further, it was established that the training institutions that handle OHS training are in their formative stages and continue to register low enrolment numbers. In addition, a bulk of the graduates from these institutions are not in any form of employment, further complicating the aspect of capacity building towards OHS compliance in the construction sector. With low or absence of enforcement by government agencies, rogue employers are unwilling to comply with regulations that may have some financial obligations. This is common for low and medium size enterprises, whose key motivation to their very existence is profit and nothing else. In the absence of effective inspection by DOSHS, low number of technical inspectors and training institutions, the HSC offers the best opportunity to improve H&S hence it is the focus of this study.

2.5 Contractor Commitment towards OSHA 2007 Compliance

Williams *et al*. (2023) note that legal and institutional governance frameworks on OHS in developing nations have minimal impact at workplaces. This is because the majority of contractors are SMEs operating in their home markets, where H&S regulations are not strictly enforced. Due to a lack of suitable resources available to government entities responsible for occupational health and safety administration, enforcement of H&S legislation remains a challenge (Kirombo, 2020). Other actions, such as cooperation amongst stakeholders, could compensate for the inadequacy of enforcement resources by maximising the inherent strengths of individual stakeholders on the project.

The key stakeholder on a construction project with ominous responsibility towards OHS is the contractor (occupier). Fugar and Ashiboe-Mensah (2013) define a contractor as a person or company with a formal contract to undertake the activities of construction. The National

Construction Authority of Kenya (NCA, 2011) also defines the contractor as a person who carries on the business of construction for reward or valuable consideration for any other person and is authorized to take control over the type and quality of work. He is responsible also for the supply of labour or materials and overseeing of staff in the project implementation. In addition to the responsibilities stated above, the contractor is responsible for ensuring a work environment is free of dangers that are responsible for, or are likely to cause death or serious injury to their personnel (Maliha *et al*., 2021).

The contractor is expected to give site employees with safety training. Section 6c of the OSHA 2007 mandates contractors (employers) to safeguard the health, safety, and welfare of all workers. This entails providing the required information, teaching, training, and monitoring to protect the H&S of all workers in the workplace. Management can only effectively ensure compliance on building sites if they are committed to their clarion call (Dina & Purba, 2022). Cao *et al*. (2021) define management commitment as the demonstration of the extent to which the organization's top management exhibit both positive and supportive attitude towards workers' H&S. Raliile and Haupt (2020) notes that management commitment plays a significant role in enhancing H&S in workplaces. Khoza (2020) asserts that a positive perception on the level of dedication by the employer drastically reduces the number of accidents on construction sites. Clearly, management practices have a direct bearing on the number of unsafe and unhealthy incidences in workplaces (Haupt *et al*., 2019).

The primary goal of positive management practises is to prevent workplace accidents. Various authors' studies in Canadian enterprises discovered that management administrative practices are an essential component in reducing dangerous incidents on construction sites (Gallina, 2009; Gibb *et al*., 2015). Policies and practises that encourage workers to meet safety criteria, as well as involve employees in decision making, have significantly reduced the number of workplace mishaps (Che Ibrahim *et al*., 2022). Mahmoud and Yusuf (2019) noted that there are many management practices which enhance H&S at workplaces including: rewards and training opportunities for employees to enhance their skills.

Training and experience are important determinants of workplace H&S. There have been studies that show a link between contractor dedication and the incidence of accidents in the job (Aasonaa, 2023). Understanding this relationship is critical because it will assist decision makers in determining what ails the sector and developing methods to increase contractor loyalty.

From the above reviewed literature, the following key attributes to contractor commitment towards H&S were identified as given on *Table 2.4*.

Table 2.4: Attributes of Contractor Commitment towards H&S Compliance

Item	Attributes of contractor commitment towards H&S compliance
1	Onboarding employees in the formulation of a H&S guiding policy
2	Providing opportunities for employees to train on H&S
3	Giving employees Personal Protective Gear
4	Employing a qualified H&S officer
5	Periodic inspections to pre-empt unsafe/unhealthy conditions
6	Timely induction of employees on materials, processes and technologies
7	Engagement of employees with proper understanding on safe systems of work
8	Incorporating employees in the establishment of emergency plans and procedures
9	Securing work permits for plant, equipment, materials and waste disposal areas

Source: Adopted from (OSHA 2007, Aasonaa, 2023, Che Ibrahim *et al*., 2022, Haupt *et al*., 2019)

It is evident from the studies carried out by various authors that indeed the contribution of employers (contractors) is key in the enhancing H&S on a given construction site. As proven by several scholarly papers, failure by the contractor to appropriately fulfil their duties on the construction project may result in unhealthy and unsafe incidents on construction project sites. Due to contractor disinterest in HSCs on building sites, Kenya's construction sector may be reporting high proportions of dangerous and unhealthy incidents. As a result, it is critical that this study investigate the level of contractor commitment with the goal of finding gaps that would influence intervening steps towards improved H&S in the industry. The key attributes presented on *Table 2.4* above were used as yardsticks in this study to help understand the level of contractor commitment in HSCs on construction projects in Kenya. Further, the study sought to find out what consequence arise from that level of commitment on the compliance towards OSHA 2007.

2.6 Employees Involvement towards H&S Compliances

Participatory minded managers consult with their employees in decision making in matters H&S in their workplaces. As a result, the employer and employees work as a cohesive one. Participation necessitates both mental and emotional participation, and it motivates team members to contribute to group goals while also sharing responsibility equally. According to Ogetii (2019), there are two compelling reasons to incorporate employees in the design of safety programmes. First, employees are frequently the best source of recommendations for management regarding potential hazards and the best strategy to eliminate those hazards.

Second, employee involvement tends to urge employees to buy into the programmes, lest they be perceived as imposed or rammed down their throats.

Employee participation in OHS training during contract implementation has been highlighted as a guaranteed way of improving workplace H&S (Tukesiga, 2022). Moreover, Dina and Purba (2022) opine that, such training sessions should be graced by top management. In a study by Umar *et al*. (2022), conducted on employee attitudes towards H&S at workplace, established that employees play an important role in establishing a good physical working environment. Employee participation in OHS training during contract implementation has been highlighted as a guaranteed way of improving workplace H&S. According to Chan and Aghimien (2022), safety training is "knowledge of safety given to employees in order for them to work safely and without risk to their well-being."

According to Williams *et al*. (2023), a clear policy statement and H&S training play a vital role in minimizing workplace accidents. As a result, successful H&S training helps workers develop a sense of belonging and so become more responsible for workplace safety. Communicating clearly the company's goals for employee H&S improves the working environment. Woolley *et al*. (2020) opine that ineffective communication may hinder employees from participating in the enhancement of H&S activities in the workplace.

2.7 Kenyan Perspective on Employee Involvement with OSHA 2007 compliance

Data from the NCA indicate that, the construction industry in Kenya, currently has a total of 511,676 persons in employment (NCA, 2016). The employees are categorized as unskilled, semi-skilled and skilled workers. *Table 2.5* gives a summary of the distribution of industry workers as extracted from the NCA data base.

Table 2.5: Worker Distribution in the construction industry in Kenya

Description		% Population
Skilled workforce		25%
Semi-skilled		33%
Unskilled		42%
Women		19%
Age bracket	Below 25 Years	7%
	25- 30 Years	48%
	30-35 Years	29%
	35-40 Years	9%
	40-45 Years	3%
	Above 45 Years	4%

Source: (NCA, 2016)

The Kenyan constitution designates people between the ages of 18 and 35 as youths, thus based on the data above, the young population in the construction industry accounts for 84% of the total workforce. Seventy-five percent of the 84% labour force is unskilled or semi-skilled. These figures can work both to the benefit and detriment of Kenya's construction industry. The sector benefits from a pool of young individuals who are eager to take on responsibilities and are of an age where they can be trained in new skills. On the other side, because of poor training levels, the industry is most vulnerable to increased OHS concerns. Workers are predisposed to workplace dangers and injuries due to a lack of basic awareness of work operations.

The low literacy levels of employees in the Kenya construction sector means that the employees may not be able to discharge their roles in the HSCs unless they are sufficiently endowed with skills and knowledge. Consequently, they enter the HSCs at a disadvantaged position to their partner, the contractor who could be experienced and endowed with sufficient resources. This requires a committed contractor to empower the employees the requirements of H&S before they can effectively participate in the HSCs. This calls upon the employees to be willing to undergo training and have a positive attitude towards complying with the requirements on the processes and procedures that encourage H&S at workplaces.

According to OSHA 2007, the empowered employees have some roles to play towards enhanced H&S compliance and are seen to be involved in H&S management as per the areas highlighted on *Table 2.6*.

Table 2.6: Employee involvement in HSCs

Item	Surrogates of employee involvement in HSCs
1	Participating in the planning of H&S training
2	Attending H&S trainings
3	Putting on of personal protective gear as provided by the employer
4	Adhering to approved safety procedures
5	Adherence to standard operating procedures
6	Actively participating in H&S meetings
7	Exhibiting an understanding of emergency procedures
8	Ability to capture and report on any work site hazards
9	Proactive in the training and induction of colleagues in matters H&S
10	Acquiring licenses and permits to operate equipment and machines on site

Source: Adopted from (OSHA, 2007)

Given the critical responsibilities that employees play in improving workplace H&S, their low literacy levels prevent them from effectively participating in HSCs without enough capacity from the contractor/employer. According to studies, many contractors regard employee capacity building as an unnecessary investment that does not directly contribute value to site activities (Donkoh & Aboagye-Nimo, 2017; Gbajobi *et al*., 2018). In respect of this, H&S environment in the construction sector continue to report accidents on sites as workers being weak partners in the bipartite H&S arrangement in HSC are left at the mercy of the contractor. This could partly explain why there has been consistent reports of high numbers of accidents on construction sites.

In this day and age, where efficiency and productivity in H&S conditions dictate production processes, intervention is unavoidable in order to shift the old-time narratives. The developer who continues to lose investment owing to accidents is best positioned to emerge and assist in alleviating the misery that workers are forced to endure as a result of persistent workplace accidents. In this situation, one is driven to speculate on the extent of employee participation in the HSCs tasked with overseeing workplace H&S. How can the developer who suffers much loss due to prevalence of accidents in his workplace intervene to minimize accidents on construction project sites? This study investigates the answers to these questions in order to highlight intervening techniques that the developer might use to improve compliance with OSHA 2007. The position of the developer in the OSHA 2007 arrangement needs review to informing the intervening measures.

2.8 Developer Intervening roles towards HSCs Compliance

A developer is an individual or organization which commissions the activities necessary for the implementation of a project to meet his specifications after entering into a binding contract with implementing parties (Masterman, 2003). The developer is also the head of the procurement value chain, hence his decisions influence the H&S standards on a construction project. Raza *et al*. (2022) are of the view that decisions made by the developer influence the H&S standards on a construction project and note that attainment of acceptable H&S standards on a given project will remain elusive if developers have no direct involvement in the project. According to Hervie and Oduro-Nyarko (2018), in order to achieve the ultimate goal of zero tolerance on injuries and accidents at workplaces, developer intervention is a prerequisite. Umeokafor (2018) did acknowledge that the successful implementation of H&S on construction projects can be attained through the influence of developers.

In their paper, Musonda *et al*. (2013) suggest that accidents are caused by improper responses to specific limitations and the environment. Consequently, developer responses are actions and/or inactions in response to limitations that emerge during the implementation of a project. These responses include: mid-way reduction in the project budget, new procurement criteria, alteration in the project scope and specifications, accelerating the project implementation pace or change in project design. All these factors impact on the H&S of the project and are directly affected by the developer's intervention. Umar *et al*. (2022) are of the opinion that developer intervention is based on prescription, regulations, and coercion. They mention financial assistance, prequalification criteria, safety management, audits, proper paperwork, and safety standards before bidding as some of the influencing roles played by developers on construction projects in terms of H&S. Gervas *et al*. (2022) opine that developers spend resources after accidents have occurred instead of proactively spending on preventive actions. This kind of spending is living by chance.

According to Onuvava (2016), H&S improvements at workplaces rely essentially on the kind of leadership that developers provide. They recommend that the leadership on the H&S should come from the developer himself. Chiocha *et al*. (2019) argue that apart from leadership, H&S monitoring by the developer was important in the management of safety on construction places. This calls for active participation of developers in the whole project cycle.

Developers' leadership demands for a clear awareness of workplace H&S issues. This understanding will help to clarify the issue of design briefs and specifications for the project's implementers. The developers must accept responsibility for preventing workplace hazards (Simukonda *et al*., 2020). For this to be achieved, the developer must take utmost consideration in the ordering for works, supervision, and issuance of instructions that have a bearing on the project specifications. Additionally, Tay (2017) asserts that developers are responsible for setting the bar in matters H&S in workplaces. Since the contractor has direct contact with the employees on a construction site, the developer has an obligation to include stipulations addressing worker H&S during the procurement process.

Some contract provisions favour the contractor and free the developer of any blame or responsibility for H&S on construction projects. Consider the Joint Building Council (JBCC) contract conditions. Contractual terms in the format specified by the Joint Building Council (JBC, 2004); under clause 11.1 states, "*The contractor shall be liable for and shall indemnify the developer against any expenses, liability, loss, claim, or proceedings whatsoever arising*

under any statute or at common law in respect of personal injury to or death of any person arising out of or in the course of or caused by the carrying out of the works, unless the injury or death is due to any act or neglect of the developer or of any person for whom the developer is responsible". Clause 12.1 of the same document requires the contractor to keep such insurance as is required to cover the contractor's or subcontractor's liability for physical injuries or fatalities caused by the execution of the works (JBC, 2004). These two clauses contractually absolve the developer from responsibilities in the implementation phase of the project and prepares the contractor to compensate the injured persons in case of accidents in the implementation phase of the project.

Further, it is worth noting that the anticipated harm is to the worker who is involved in the construction activity, yet no provision is given on how the worker could come in and reduce the chance of injury or accidents in the workplace. The contractor will keep insurance and the developer contractually release himself from the daily running of the project with the understanding that in case the employees find themselves in an accident, the contractor has put in place compensation to cater for the loss. These contractual obligations have provided for compensation to employees in case of injuries or fatalities in the workplaces.

Developers on the other hand, stand to suffer from losses of time, investment, and accompanying lawsuits in case of injury or fatalities on construction projects. The cost of a life lost cannot be equated with any amount of compensation and persistent accidents on construction sites increase the number of claims will eventually make the cost of insurance costlier. No insurance will be willing to invest in very high-risk businesses and the high cost of premiums will be transferred to the developer and in return affect the project cost. But then, why go the long way, when a cultural change resulting from direct developer intervention, could result in enhancement of acceptable working conditions in the workplace.

According to Khoza (2020), developers are in the best position to bring about the much-desired institutional cultural change towards enhanced H&S improvements in workplaces. Budgetary allocations, project objectives, timelines and performance criteria are key developer decisions that have direct influence on H&S of a project. Maliha *et al*. (2021) are of the opinion that better H&S performance are achieved when developers proactively get involved in setting safety objectives, selecting competent and safe contractors, and participating in H&S management during construction implementation phase. Alhajeri (2014) opines that developers continue to put emphasis on the traditional project objectives, such as time, cost, and quality,

as opposed to H&S. Developers must recognise that safety supplements the quality and quantity of a given project. Ultimately, developer involvement in safety will result in lower construction costs. While SME developers may lack the finances and experience to execute complete H&S interventions, nothing precludes them from inquiring about the safety performance of their contractors and monitoring the degree of safety during construction project implementation. Haupt and Akinlolu (2021) suggest that developers should become acquainted with the expenses of accidents in order to commit to financially supporting contractors' efforts to increase workplace health and safety.

Furthermore, including safety standards in their pre-qualification and tendering processes demonstrates their commitment to providing a healthy and safe working environment (Raza *et al*., 2022). A direct involvement in the oversight of H&S activities during the project's implementation phase can provide further evidence. The developer's direct intervening role could include providing safety guidelines, requiring a formal safety plan, using permit systems for hazardous tasks, requiring contractors to hire a safety supervisor, and conducting frequent safety audits. Safety must also be included as an issue in periodic reporting and discussions between developers and contractors (Umeokafor, 2018).

Su *et al*. (2021) further identifies communication as being a key feature towards achievement of developer-led H&S initiatives in work places while Cao *et al*. (2021) assert that developers could contribute to the H&S at workplaces by being involved during construction project review, selection of safe contractors, incorporation of safety requirements in contracts, and being active in managing the H&S requirements during the construction stage.

In their Policy Statement 350 on construction site safety, the American Society of Civil Engineers (ASCE, 2019) states that developers are responsible for:

1) *Assigning overall responsibility and authority for project safety to a specific organisation or individual.*
2) *Appointing someone or a group to create a coordinated project safety strategy and monitor safety performance during construction.*
3) *Through contract documents, assign responsibilities for final approval of shop drawings and details.*
4) *Making prior safety performance a contractor selection criterion.*

It recognizes the fact that H&S management have to start right at the approval of shop drawings, detailed design, contractor selection and the implementation phase. All these phases

call for developer involvement. Mausumi (2017) opines that, the construction industry of South Africa identifies some of the developer obligations as far as H&S management in workplaces are concerned. These obligations of the developer in construction contracts are extracts from the South Africa OSHA (South Africa OSH Act No.85- of 1993); which requires developers to:

1) *Develop H&S requirements and make them available to prospective contractors bidding on or assigned to conduct the work.*
2) *Provide the main contractor with any information that may impact a person's health and safety at work as soon as possible in writing.*
3) *Ensure that tendering contractors have made allowances for the cost of H&S measures and that, before picking the main contractor, you are reasonably convinced that he has the requisite abilities and resources.*
4) *Take reasonable procedures, including periodic audits (at least monthly), to verify that a subcontractor does not perform work that is inconsistent with the main contractor's H&S plan or poses a hazard to H&S.*

Lessons learned from both the American and South African construction industries emphasize on the intervening roles of developers towards acceptable H&S standards at workplaces. It is noted that indeed the overall responsibility towards H&S is to the developer; only that such responsibility could be delegated to other parties through contractual agreements, but the developer is still the custodian in the oversighting role that the delegated persons deliver as per the contract. Continuous monitoring and audits are encouraged to ensure that the working conditions are in tandem with the strategic direction as given by the developer and only contractors who meet the threshold towards OSH good standing and capabilities are engaged in the works.

This intervening role by developers in America and South Africa, could partly demonstrate why the OSH in these countries could be better than in many developing nations of the world including Kenya. In the face of regular reports of unsafe and unhealthy incidences in Kenya construction industry, these questions beg answers: (i) have developers put in any effort towards reduction in the number of accidents in construction projects in Kenya? (ii) if yes, what was the platform upon which they used to intervene? (iii) looking at the number of accidents on the Kenya construction sites, it is clear that in case there currently exists an intervening platform for developers, then that platform requires an overhaul or improvement.

The OSHA 2007 does not mention the role of developer towards H&S compliance hence the developer has no direct and statutory role in the management of H&S on construction projects in Kenya. All his responsibilities are delegated in contracts to the contractor, but the developer must take reasonable steps to confirm that the contractor is indeed actualizing his wishes, and nothing is going wrong. In the Kenyan context, it appears as if very many things continue to go wrong. The developer's arm's length approach towards H&S compliances only to resurface once accidents have taken place means a lot of time and resources are expensed through investigations to unearth the cause of the accident and what didn't go right. This reactive approach taken by developers does not benefit the industry and of utmost importance the developer.

This study therefore explores the questions; (i) what is the level of developer involvement in the HSCs? (ii) do we have a platform upon which the developer can use to influence the activities of employees and contractor in the HSCs towards enhanced OSHA 2007 compliance? These questions if correctly answered will help in boosting of efforts towards enhancing contractor commitment and employees' involvement in HSCs on Kenya construction projects.

Establishment of a platform that brings together the developer, contractor, and employees in the enhancement of H&S working conditions will be a first step in enhancing performance at work sites. Developers have roles that if granted platforms to operate from can indeed influence greatly the H&S status on construction projects in Kenya. The main hindrance to attaining that level of intervention is the weakness in the OSHA 2007, which has no direct provision of developer responsibility particularly in the bipartite arrangement. Some of the available methods that developers use are highlighted on Table 2.7 below.

Table 2.7: Developer roles towards H&S management on construction projects

Item	Surrogates of developer intervening roles
1	Allocation of resources (budget allocation)
2	Engagement of qualified contractor for the works
3	Engagement of professional for the works
4	Engagement of a safety officer/safety consultants
5	Including prior safety performance as a criterion for contractor engagement
6	Participation in safety meetings
7	A clause in the contract that insists on safety adherence
8	Have a safety policy that underlines roles and responsibilities for contractor and his staff
9	Participate in safety inspections

Source: Adopted from (ASCE, 2019, South Africa OSH Act No. 85-of 1993)

From the above literature review some of the areas that developers, contractors, and employees could make their contributions towards enhanced performance of the HSCs on construction sites are summarized on Table 2.8 below.

Table 2.8: Stakeholder Contribution towards performance of HSCs

Item	Developer	Contractor (Occupier)	Employees
1	Allocation of resources (budget allocation)	Provision of safety policy in the company	Participation in safety trainings
2	Engagement of qualified contractor for the works	Provision of safety training for staff	Putting on of PPEs
3	Engagement of professional for the works	Provision of PPEs to staff	Observations and compliance to safety protocols
4	Engagement of a safety officer/safety consultants	Engagement of safety officer	Adherence to standard operating procedures
5	Including prior safety performance as a criterion for contractor engagement	Conducting of safety inspections	Participate in safety meetings
6	Participation in safety meetings	Conducting of safety inductions to staff	Understand emergency procedures
7	A clause in the contract that insists on safety adherence	Implementation of safe working systems	Report any work site hazards
8	Have a safety policy that underlines roles and responsibilities for contractor and his staff	Establishment of emergency plans and procedures	Participate in peer training of colleagues in matters safety
9	Participate in safety inspections	Acquisition of compliance safety certificates to plant and equipment	Correct use of equipment, tools and materials on site.

Source: Adopted by Author from Literature Review

This study then, has a noble task to formulate a working formula that brings on board the three key stakeholders towards greater participation in HSCs. While the bipartite approach as adopted in the HSCs has served the construction well as seen on the large-scale construction projects, the SME projects do suffer reported high incident rates necessitating a review of the bipartite approach.

2.9 Effect of Contractor Commitment and Employee Involvement on HSC Performance

2.9.1 Influence of Contractor Commitment towards HSC compliance

Latief *et al*. (2017) found out that there was a relationship between management practices and the level of accidents on construction project sites. In the study, the frequency of incidents

decreased when management provided training and involved employees in the development of safety policies. Another study discovered a link between management commitment and the number of accidents (Pal *et al*., 2017). It was shown that well-trained staff had an impact on the decline of workplace injuries and accidents. Research by Gbajobi *et al*. (2018) established that management practices associated with worker insurance, safety incentive providing PPEs, accident record keeping, safety orientation for new workers and workers safety training had an influence on the accident cost and accident frequency. According to the survey, the most important explanations for the high accident rates on construction sites were a lack of training programmes for workers and supervisors. The lack of worker participation in safety decisions was also highlighted as a significant cause of on-site accidents.

A further study by Hardy and Howe (2015), examined relations management practices on safety culture for 116 trucking firms in USA. The study found a statistically significant link between training and its impact on safety culture in terms of enhancing safety performance. Furthermore, training is a cultural indicator in enhancing safety performance, and having a reward system with a consistent-training method has been demonstrated to promote the safe atmosphere on construction sites (Raliile & Haupt, 2020).

Both positive and negative attitudes towards safety in the workplace held by management have great effect on the workers' behaviour (Simukonda *et al*., 2020). According to Woolley *et al*. (2020), as most accidents are caused by human factors rather than working environment, attitudes have been found to raise or decrease the occurrence of accidents. According to Panuwatwanich and Nguyen (2017), professional development and training are vital in lowering the number and severity of workplace accidents. It is considered that organisations should strive to build and sustain a safety culture by ensuring that workplace safety is regarded as a high priority and respected at all levels of the workforce. Zhou *et al*. (2019) are of the opinion that management has the capacity to demonstrate to employees that safety is more essential than productivity, especially when staff are under pressure to complete tasks as soon as possible owing to project deadlines. Similarly, remuneration for safety is critical in emphasising and motivating personnel to support safety practises. Additionally, prior job experience is connected with improved safety outcomes, as is not discouraging employees from reporting injuries. Li and Poon (2013) opine that having in place risk analysis in the design stage and expanding the use of sound HR practices is found to help improve overall safety.

2.9.2 Influence of Employees' involvement towards OHS on sites

According to studies, weak or non-existent H&S safeguards contribute to high incidence of injury and accident (Meng & Chan, 2022; Tong *et al*., 2022). An examination investigating the relationship between employee training and the level of accidents discovered that trained personnel reported fewer dangerous and unhealthy incidents than their non-trained counterparts (Maliha *et al*., 2021). Effective H&S programmes necessitate the development of HSCs, which allow all employees within an organisation to participate (Malema, 2021).

Most successful OHS organisations constantly encourage employee involvement in decision making and carefully examine employee proposals for enhancing OHS. Comprehensive safety programmes are more likely to result in fewer accidents, reduced worker's compensation claims and litigation, and fewer accident-related expenses. Employee participation is essential in any successful safety programme. Employees are frequently involved in organisations by establishing HSCs (Gervas, 2021) as strongly promoted in all ILO OSH standards. For collaborative OSH committees and similar arrangements to be effective, proper information and training must be supplied (Buniya *et al*., 2021). Employees and their representatives are involved in OHS implementation, and effective social dialogue and communication networks are established (ILO, 2011).

It is widely acknowledged that workers are frequently more aware of workplace hazards than management (Haupt *et al*., 2020). Involving workers in H&S procedures increases employee commitment, which may be linked to their desire to carry out something that he or she has come up with or engaged in its creation. Employees receive a sense of ownership and enhanced responsibility as a result of this form of involvement. According to Su *et al*. (2021), employees are more likely to adapt to incremental adjustments introduced into a safety programme over time than they are to accept major changes imposed on them suddenly. Again, employee participation is critical.

Employees are usually the best aware about potential hazards specific to their job, as well as solutions to avoid these hazards. Management only needs to tap into this knowledge possessed by employees by involving them in all programmes pertaining to H&S in their specific areas of competence. Furthermore, improvements can be executed significantly more efficiently with voluntary employee involvement than with coercive implementation with no input from employees (Kirombo, 2020).

Harper & Koehn (1998) research on how Mason construction Inc. was able to scoop the Construction Industry Safety Excellence (CISE,1997), awards found insurmountable benefits from a strong H&S programme that instils a culture of employee involvement in H&S decision making procedures. Mason Construction took specific efforts, with an emphasis on safe work methods and processes. Mason Construction, Inc. has witnessed a significant reduction in work accidents since the implementation of its current safety programme in 1992. This decrease in accidents has resulted in reduced incidence rates, a lower rate of experience modification, lower worker's compensation insurance rates, and fewer monetary losses from worker's compensation claims. Furthermore, decreased downtime has directly resulted in higher productivity. Employee involvement in the execution of H&S practises considerably improves safety standards on construction projects over time, according to remarkable safety systems and records at organisations such as Mason Construction, Inc. Accidents at work occur as a result of a lack of information, training, or supervision, as well as errors in judgement, laziness, or negligence (Cao *et al*., 2021). It was discovered that safety at building sites around Saudi Arabia revealed some concerning statistics: 25 per cent of contractors failed to offer new workers safety orientation, 25 per cent failed to supply personal protective equipment, 25 per cent failed to provide on-site first-aid, and 38 per cent lacked qualified safety professionals (Onuvava, 2016).

Individual responsibility towards H&S on the construction project is the use of personal protective gear. This includes the wearing of helmets, gloves, and boots, as well as checking the safety performance of equipment (Kemei *et al*., 2016). This calls for individual commitment and a culture shift in the way employees perceive the H&S at the workplaces. Panuwatwanich & Nguyen (2017) affirm perception as a precursor to achieving desired safety behaviour among employees. When achieved, the required degree of safety conduct will help to reduce workplace accidents and incidents.

From the above literature review, this study identified the participatory role that employees on a given workplace have to play to enhance H&S conditions. Employees who are involved in H&S programs exhibit a higher level of buy-in towards regulatory compliances on OHS than those who are not involved (Buvik & Rolfsen, 2015). Further, the study notes that individual employees have significant personal responsibility towards maintaining a safety culture by deliberately deciding to collaborate with the employer towards enhanced OHS compliances in construction projects. This then implies that failure by employees to be involved in the HSCs will weaken the performance of those committees with an ultimate consequence of low

compliance towards OHS on construction projects. The construction industry is notoriously known as an industry that continues to report high incidences of unsafe and unhealthy incidences despite having a much-regulated environment. The OSHA 2007 makes provision for the collaborative working among stakeholders using the bipartite approach in the HSCs. The committees accord an opportunity for employees to be involved in the activities that govern the H&S in workplaces; but it is not yet established how such level of involvement has impacted on the level of compliance with the OSHA 2007 on construction sites in Kenya. This study will therefore inquire on the level of employee involvement in HSCs from a Kenyan perspective as detailed in the subsequent sections.

2.10 A Case for a Tripartite Collaborative Approach

H&S management is typically focused on the construction phase, where the contractor is held accountable for OSHA 2007 compliance. This is achieved by providing facilities and a safe workplace for his employees to operate. The key parties as per the OSHA 2007 being the employer and his employees operating under the guidelines of the HSCs. This is what we refer to as the bipartite approach towards OSHA 2007 compliance. It is expected that parties in the HSCs will synergistically work together towards compliance with the requirements as stipulated in the OSHA 2007. The H&S conditions in the Kenyan construction industry that are characterized by continuing accidents, suggest that OSHA compliance is deficient. The procurement value chain as per the conventional methods brings on board the contractor who later engages employees. The developer has an advantage over all other parties involved in the project as the custodian of information in his purview unknown to any of the contracting parties. The contractor comes in at an advanced stage in terms of timing in the project cycle. The incorporation of a partner that is present in all project phases is important for ensuring institutional memory. This role can only be played by the developer. The case of the bipartite approach therefore requires reconsideration, particularly for the SME construction projects in Kenya. The involvement of the developer in the planning and implementation phase of OSHA 2007 requires the formulation of a platform that will be a boost to the bipartite approach. The three stakeholders working together towards OSHA 2007 calls for a tripartite approach. Developers have a critical coordination role in ensuring that H&S matters are addressed, and information is disseminated across the building supply chain. Developers are in the best position to lead the cultural change required to increase OSHA 2007 compliance since they are project drivers from concept to completion. Developers make critical decisions about project budgets, quality, performance objectives, and schedules, all of which have an impact on the

pressures and constraints that can affect H&S during construction. However, it is now commonly recognised that better H&S results can be obtained on a project when all stakeholders collaborate throughout all stages of the project. As seen in the instances below, a collaborative engagement framework is crucial.

Various industries have forms of collaborations that have contributed to enhanced working conditions in places of work. These arrangements have always been on voluntary arrangements towards collaborative working. According to Hardy and Howe (2015), these are arrangements of relationships among contracting parties, professional services, industry suppliers, and other relevant parties that allow meeting the objectives of a construction project or series of projects in a cost-effective and mutually beneficial manner. This configuration may be agreed upon by the various parties involved via necessary framework agreements. It has nothing to do with traditional types of partnering in which construction companies have a preferential connection with developers. Hardy and Howe (2015) identifies five types of voluntary collaborative arrangement namely; (i) project partnering, (ii) strategic partnering, (iii) alliances, (iv) framework agreements, and (v) construction consortia. The characteristics of each arrangement are considered in more detail below.

2.10.1 Project Partnering

This refers to contracts taken into for a specific project. Typically, the project's principal parties agree formally to collaborate, which may be bolstered by the signing of a 'partnering charter' alongside specific measures, such as an agreement that if a dispute arises, it will be resolved through non-legal procedures or a stipulation that cost savings are to be distributed according to a pre-determined formula (Harrat *et al*., 2021). By taking such steps, the developer is foregoing specific rights or benefits that they could have otherwise retained in the belief that doing so will foster the development of a collaborative environment in the project, with everyone working towards a single goal, and that the end result will be better (OECD, 2016). Suppliers may be offered monetary incentives to enter into such agreements, such as the opportunity to increase their profit by sharing project cost savings with the developer. They may also believe that a more collaborative culture will result in improved communication and reduced management time (Chen *et al*., 2006). As noted above, there are no promises that this will occur, and the majority of the actions taken to foster collaboration will fall outside of each party's contractual duties. Some contractual details, such as how savings will be appraised and distributed, may be included.

2.10.2 Strategic Partnering and Framework arrangements

Both include the developer picking a set of supply interests to carry out a series of projects via methods that (if the developer is a public entity) meet the norms of the Public Procurement Directives. The arrangements could cover certain categories of projects or be in place for a set period of time (Kangilaski, 2014). The public procurement directives specify a time constraint for the establishment of a framework. As a result of these agreements, the developer has voluntarily agreed to give up a power, in this case the power to nominate contractors and other participants to future projects (Shevtshenko *et al*., 2015). By establishing a framework agreement or engaging into a strategic partnership agreement, the developer agrees to limit their choice of contractors, etc. for the defined set of works to firms within the framework or partnering agreement (Faris *et al*., 2022).

Framework arrangements and strategic partnering facilitate project partnering relating to individual projects, but they are also strategies of promoting collaborative conduct in its own right. They are forms of engagement that aid in the formation of collaborative relationships, and the firms governed by the agreements gain a better shared understanding of the developer's operations and demands.

2.10.3 Alliances

Alliances are an especially effective form of project partnering whereby the developer and primary supply interests form a joint special purpose vehicle to carry out the project. The personnel are seconded to it from the various entities represented in the alliance, who then function as a single unit, with the alliance having its own structure of organisation, financial accounts, and so on. The developer shares risks and rewards through the joint organisation (Deepjyoti *et al*., 2021). In its strongest form, the developer and suppliers each are shareholders in the jointly-owned company (Nath *et al*., 2021). Alliances have proven to be beneficial in complex infrastructure projects. There is no assurance that the outcome will be beneficial, as there is with project partnership, but the developer believes that working with the other stakeholders in this manner will result in a more successful project (Chen *et al*., 2006). It should be noted that the term 'alliance' is used as a general description of partnering-type arrangements in some studies. However, the term is employed in a more limited meaning in this study.

2.10.4 Construction Consortia

Construction consortia are formed when enterprises decide to collaborate in order to compete for specific projects, possibly by offering complementary services or by developing new products and services jointly (Deepjyoti *et al.*, 2021). Their purpose is to better the competitive position of the enterprises involved, who willingly limit their ability to work with other firms by entering the consortium (Faris *et al.*, 2022). They may express this mutual commitment in legal contracts, as in other sorts of voluntary arrangements, and strengthen it through revenue-sharing agreements, for example. At its most extreme, the parties may agree to form a jointly-owned firm that can bid on projects (Shevtshenko *et al.*, 2015).

Contrary to most other types of collaboration, construction consortia are partnerships between supply interests and do not involve the end client. However, one consortia member may be the developer for the others, such as a contractor working with specialised suppliers and subcontractors (Faris *et al.*, 2022). Collaboration among supply firms is, of course, common; many firms collaborate on a daily basis and have done so for years, if not decades (Chen *et al.*, 2006). As a result, a building consortium must include aspects that set it apart from other commercial processes, such as an agreement restricting collaboration to the consortium's members or specific tactics to encourage collaboration.

2.10.5 Summary of Construction Collaborations

A common element in all of the above-mentioned types of collaboration is that at least one of the parties believes that if they are willing to give up some power, freedom, or potential benefit, they will achieve a better outcome for themselves - and if the arrangements involve a number of parties giving up such a power, freedom, or potential benefit, there is an expectation that each will benefit, i.e., ‘mutually beneficial' as defined above. Importantly, there is no guarantee that the selected 'voluntary arrangement' will end up resulting in a better outcome; a better result is expected at the point when the arrangement is established (e.g., based on past experience), but the arrangement is built on the parties' belief that it will be beneficial.

Because many different parties are involved in each construction project, there is a lot of collaboration, and many projects are effectively finished without any specific attempts to develop collaborative ways of working. At the same time, there have been several examples of different interests failing to cooperate, resulting in costly legal fights. As a result, it was vital that the arrangements investigated in the study represent something other than "business as usual," and that there be evidence that they resulted in advantages for everyone involved.

Collaboration occurs ultimately because the various parties to the partnership believe it is in their best interests to do so; the arrangements must, over time, create benefits for all parties or they will fail. Engineering construction has substantial - and positive - experience with partnering and other types of collaboration, and this expertise has been one of the driving forces behind the promotion of voluntary arrangements in other areas of building. However, the 'approaches' to collaboration promotion mentioned in the paper were aimed in a localised environment with few partners on short projects.

However, an example of a framework that onboards the developer in the H&S management exists in the Australian construction sector under the Office of the Federal Safety Commissioner (OFSC, 2005). The Australian framework operates at two levels. The first level involves the identification of all key stakeholders that have an influence over the management of OHS in the project cycle. The second level establishes the stage, the tasks and assigns responsibilities. The assignment of tasks and responsibilities is done throughout the project cycle with Key Result Areas (KRAs) marked out. This takes place for the design, procurement, construction and completion stages of a project. The framework provides the stages and the tasks to be executed by the developer at each stage. The project stakeholders must implement all of the KRAs outlined in the framework and integrate them into the organization's safety culture to ensure that they are maintained and continuously improved.

The 'Leadership Matrix' is a critical component of this system. This matrix identifies project participants' (stakeholders') roles and responsibilities in respect to the allocated building tasks. Suggested roles and duties are presented (against the three project participant types, namely developer, contractor, and employees). This is a radical departure from standard project delivery approaches such as design and build, where the project implementer/contractor is solely responsible for health, safety, and security. *Table 2.9* highlights some KRAs as adopted from the Australian health and safety management framework (OFSC, 2005)**.**

The collaborative framework as given in the Australian case contain implementation checklists. These are intended to help project participants identify, agree on, and document a task-specific allocation of roles and responsibilities. Kenya construction industry needs a model that will help reduce accidents and use the limited resources towards OHS on construction projects.

Table 2.9: Key Result Areas (KRAs) in the Framework

KRA	Appointment of the OHS Team
Action	At the start of a project, agencies should identify senior team members with adequate OHS expertise who will be responsible for overseeing OHS throughout the project lifecycle.
Phases	▪ Phase 0—Demonstrate the need ▪ Phase 1—Conceptualize the need
Description	• Appointment of project H&S team and a senior employee named as the agency's representative throughout the project lifecycle. This person should be fully committed to all H&S processes. • Initially, a senior-level agency representative will lead the H&S team; but, as the project progresses, the post may be rotated to a senior officer of one of the other significant stakeholders (for example, consultants, contractors) as their commitment to the project grows. • Members of the project H&S team should be knowledgeable of and competent in H&S issues related to the management of the design and building processes, as well as the final operation of a facility. • As the project advances, the team composition may vary. The agency, on the other hand, will always have membership on the H&S team, and members are going to represent a vertical slice of the project's organisational layout, ranging from senior management to middle management to workforce and operational levels.
Key benefits	▪ Single point of contact ▪ Clear responsibilities for H&S ▪ Project H&S champion
Desirable outcomes	▪ A developer H&S advocate for the project, who will provide OHS leadership and monitoring throughout the project's lifespan. ▪ A developer H&S crew for the project, that will provide OHS guidance and supervision throughout the duration of the project.
Performance measure	▪ Appoint relevant persons to create the OHS team ▪ Appoint a senior agency representative with project H&S responsibilities
Documents	▪ H&S team effectiveness checklist ▪ Desired behaviours of HS team members ▪ Training requirements/competencies for H&S team members

Source: (OFSC, 2005)

A Tripartite framework is desirable as a best practice for OSHA compliance as indicated by literature review. The framework so developed shall be one that suits the Kenyan context that is faced with challenges of scarcity of resources. Optimal utilization of scarce resources calls for synergetic approach among stakeholders through collaborations that are systemic in form. The formulation of the framework shall then be underpinned on three theories namely; the *theory on synergy*, *stakeholder theory* and the *systems theory*. These theories are discussed in detail as follows;

2.11 Theories Underpinning Formulation of the Tripartite Framework

Towards formulation of the tripartite framework, three key theories are identified and explored with an aim to highlighting their contribution towards H&S performance on construction projects. The three theories namely; theory on synergy, stakeholder theory and finally the systems theory have been discussed as follows.

2.11.1 Synergy Theory

Synergy represents a dynamic process that entails joint action by parties in which the total effect is greater than the sum of the effects when parties are acting in isolation (Benecke *et al*. 2007; Feldman & Hernandez, 2022). According to this notion, internal stakeholders on a building site may generate more value by functioning as one system rather than as separate entities. Holtström and Anderson (2021) define synergism as "the interaction of different entities so that their combined effect is greater than the sum of individual efforts". These two definitions capture the spirit behind the thinking of HSCs towards enhancement of compliance towards OSHA 2007. Noting the scarcity of resources exhibited by the SME contractors, there is a need for building synergy among players that will help sharing of resources with a common aim of achieving the H&S at the construction sites.

The individual efforts by the key players could be harnessed by creating synergy amongst players towards occupational health and safety compliance through an enabling framework. Weak contractor commitment and low employee involvement could be reversed through formulation of a synergistic framework. The inability to deliver a healthy and safe environment by both the contractor and employees in the HSCs could be as a result of lack of a synergistic framework. It's important to note that the individual efforts can only be harnessed to bear anticipated results through an input output process in a given system. It is important to understand the systems theory that underscores the relationship between the parties, resources and outputs that come out of the interrelationships in a given environment.

2.11.2 Stakeholder Theory

The stakeholder theory is the general theory that is adopted in this study to explain the HSC performance on construction sites in Kenya. This theory is adopted to highlight the interdependence among the project stakeholders on a construction workplace. The performance of HSCs on a construction site relies on the interrelationships and the synergy that is attained through working together. Freeman (1984) is often credited for bringing stakeholder theory to the forefront of management literature, and his examination of the concept's origins provides

an overview of the numerous ideas that are credited with its early development. The theory focusses on the company interaction with the surrounding environment.

The stakeholder's fiduciary principle states that; organizations have obligations to provide a duty of care (protection) for the subject under them. From the above theory and principle, we adduce that stakeholders for a construction project operating within HSCs have to work within set boundaries and have obligations for care for those who need such care. The contractor and developer work under set OSHA 2007 and have obligations to provide a healthy and safe working environment.

A stakeholder is therefore a single person or a group of individuals whose activities can affect, or be affected by, the organization (Freeman, 1984). Stakeholders have the power to positively or negatively affect an organization (Parmar *et al*., 2010), by influencing the organization's goals, activities, improvement and functions (Benn *et al*., 2016). Stakeholder theory has emerged as a new narrative for understanding three interconnected organisational problems: the challenge of creating value, the problem of integrating ethics and capitalism, and the problem of management mindset (Lamba *et al*., 2019). According to Parma *et al* (2010), organization executives pursue profits and lose sight of ethics. Since managerial activities have a wide impact on a range of people Harrison *et al*. (2015) suggest that managers and academics need to rethink the conventional ways of conceptualizing the responsibilities of a firm.

Stakeholders in the construction sector include developers, designers, project managers, contractors, suppliers, employees, subcontractors, governments, insurance companies, and competitors among others (Mausumi, 2017). A significant portion of the literature identifies primary and secondary stakeholders. Primary stakeholders are those with a direct impact on an organisation and with whom formal or contractual agreements exist. Secondary stakeholders are individuals who are not directly involved in the organization's activities but have the ability to affect the organization's decisions (Harrison *et al*., 2015).

According to Greenwood and Freeman (2011), stakeholder theory is significant for a variety of reasons. To begin with, it does not distinguish between corporate logic and human or ethical logic, because all workers are stakeholders, and as stakeholders, they are human beings. Second, workers are frequently the essential meaning of any business strategy. As a result, stakeholder theory defines business models as how an organisation makes customers, suppliers, employees, communities, and financiers better off, and how making one better off makes the

others better off (Greenwood & Freeman, 2011). They go on to outline the organization's goal, ideals, and relationship to society.

The stakeholder theory suggests a shared process where the developer is at the centre of all management actions (Bevan & Werhane, 2011). This is consistent with the proposed tripartite collaborative approach framework (TCAF), in which the developer plays a significant role in making crucial choices on H&S on construction projects because they have the most clout.

In the current research, stakeholder theory has been applied and conceptualized in order to understand the relationship between the roles of internal stakeholders (developer, contractor and employees) against the performance levels of the HSCs in compliance with the OSHA 2007 on the SME construction sites in Kenya. The study uses the stakeholder theory to discuss the influence of the developer, contractor and employee's interaction in finding a balance between respective responsibilities and the prevention of accidents.

2.11.3 Systems Theory

Chikere and Nwoka (2015) refer to a system as a set of social, technological or material partners cooperating on a common purpose. On the other hand, other scholars like Laszlo and Krippner (1998) viewed a system as a set of related and interacting sub-systems performing functions directed at reaching a common goal. This viewpoint is also propagated by Lai and Huili Lin (2017), and Friedman and Allen (2017). Although the general aspects of the definitions are similar, the differences stem largely from what individuals may be focusing on. The numerous definitions of systems theory all agree on the general concept. A system is thus defined as "a coherent entity as a whole, but with parts that are interdependent and interactive among themselves and the immediate environment for a common objective and purpose." According to the above description, the properties of systems provide a chance to conduct research in order to provide alternative answers to emerging complex challenges.

According to Leighninger (2018), the systems concept integrates both synthetic and analytic methods, in line with the thoughts of Laszlo and Krippner (1998). While Bertalanffy (1968) conceives a system as consisting of objects, environment, boundary, throughput- (process), input, output, and a feedback mechanism. The components of a system are conceptually related to one another in an interactive and synergistic manner.

A system is needed to add value to the input in order to produce the desired output relevant to the system's existence. The importance of systems theory in tackling societal problems cannot be overstated. The important benefits of systems theory, according to Lai and Huili Lin (2017),

are the expanding of theoretical elements of inquiries, the ability to deal with complicated situations, and a focus on the environment to begin feedback for survival.

Friedman and Allen (2017) view the multi-disciplinary attributes of systems as significant benefits to research fraternity. Systems theory provides a foundation for solving complex problems that have plagued humanity for centuries, regardless of H&S. Two difficulties tend to stand out in all system definitions. These elements are interdependence and synergism. Interdependence and synergism are important aspects in the formation of functional HSCs. The functional and harmonious interaction between project stakeholders is critical to achieving committee objectives. A fractured and disjointed committee will be weak and incapable of achieving its goals. Furthermore, the absence of amicable coexistence among players may result in some players refusing to participate in the management of HSCs. Appreciation of the systems theory plays a significant role towards understanding the input of the contractor and employee involvement and the outcome of that input in terms of the reduction of accidents in construction projects in Kenya.

HSCs are systems that operate under some controls that should be well monitored to assure expected outcomes. The systems theory is thus the overarching platform upon which the tripartite framework shall be formulated.

2.12 Knowledge Gap

Despite the large number of studies having addressed the concept of H&S management (Aasonaa, 2023; Williams *et al*., 2023; Umeokafor *et al*., 2023; Raza *et al*., 2022; Gervas *et al*., 2022; Meng & Chan, 2022; Tong *et al*., 2022; Chan & Aghimien, 2022; Umar *et al*., 2022; Che Ibrahim *et al*., 2022; Dina & Purba, 2022; Faris *et al*., 2022; Feldman & Hernandez, 2022), they have not addressed the following:

1. Focus on the systems theory and compliance with regulatory requirements on the SME construction sites with particular reference to developing countries.
2. Establish empirical relationships amongst the four variables (or their surrogates) as done in the current study.
3. Identify key developer actions that are capable of enhancing the level of contractor commitment and employees' involvement in HSCs towards enhanced compliance with OSHA 2007 on SME construction sites.
4. Synthesize a tripartite collaborative approach framework (TCAF) for Kenya as has been formulated in this study

This study adds to the theory and practise of the systems approach in the workplace as a first empirically established step in increasing H&S regulations acceptance on a construction site. The development of a TCAF opens the door to future research into the explanation of these links, particularly when considering systems theory in the context of construction H&S. As a result, this study contributes to a growing corpus of empirical research on construction H&S in developing nations and its link to industry stakeholders.

2.13 Conceptual Framework

The conceptual framework is presented in *Figure 2.3*. The current stipulations of the OSHA 2007 provide for involvement of two stakeholders in H&S management in the work places. These are occupiers (employers) and employees. However, the construction work place is a unique one in the sense that there are two sets of employers, the developer and the contractor. Since the contractor is the direct employer of the site workers and also the one with more presence on site, in most cases, he is the one presumed to be the occupier. The provisions of the OSHA call for representation of both the occupier and employees in the running of HSCs. Therefore, the developer is not obligated to involve themselves in H&S management and specifically the running of HSCs. However, in some cases, developers voluntarily participate even when there is no express statutory requirement.

It is clear from the foregoing that based on the current provisions, the performance of HSCs is dependent on the extent of contractor commitment and employee involvement. In the conceptual framework, this is represented by H_1 and H_2. Reviewed literature especially from developed countries demonstrated that developers play a vital role in H&S management. This study sought to establish three ways in which developer involvement would affect HSCs performance. In the first and second scenarios, the research explored the moderating effect developer involvement would have on contractor commitment versus HSCs performance (H_3) and employee involvement versus HSCs performance (H_4). Finally, the study sought to find out if developer involvement had a direct influence on HSCs performance (H_5). These relationships have been demonstrated on the conceptual framework presented on *Figure 2.3*.

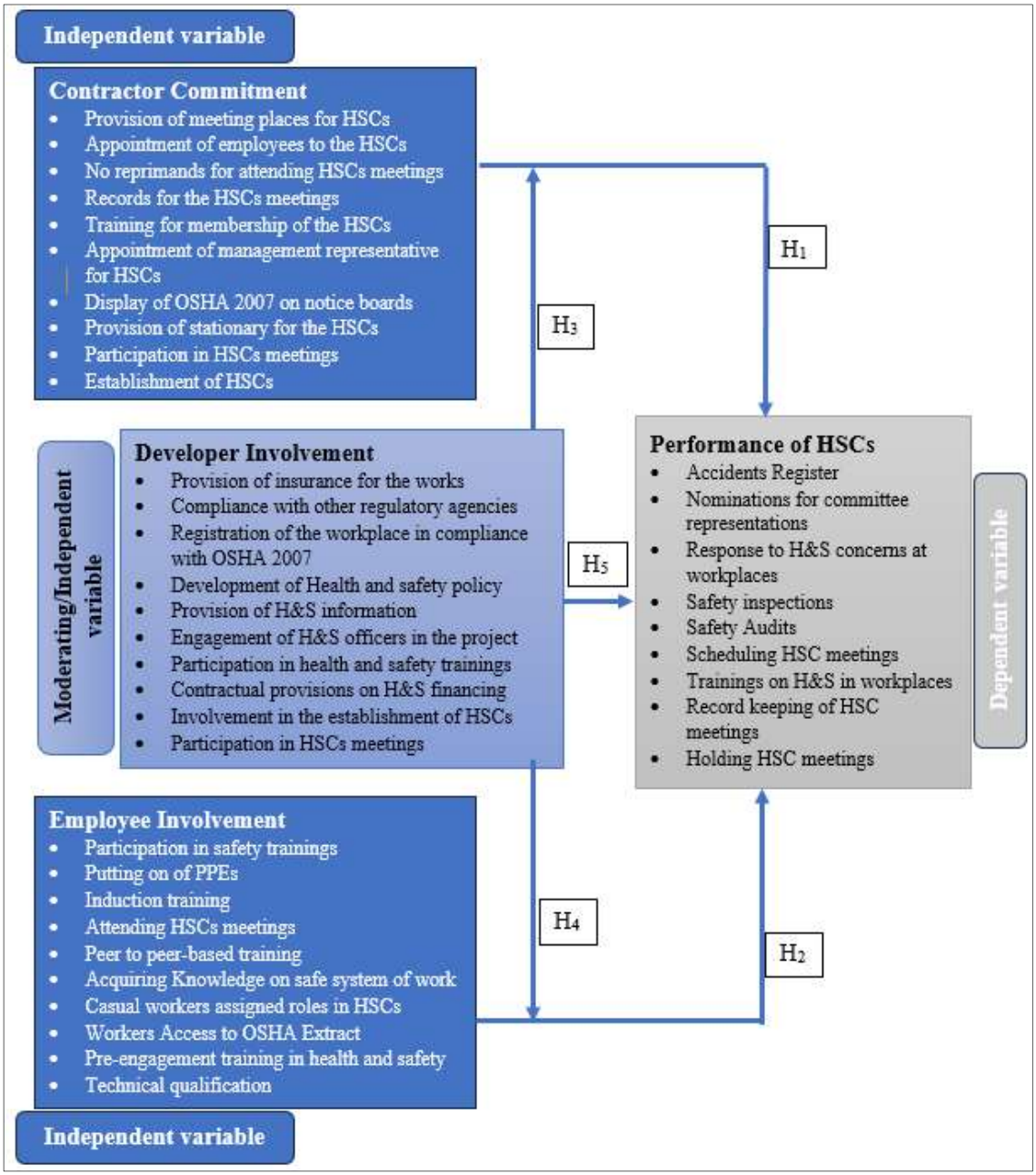

Figure 2.3: Conceptual Framework
Source: (Author, 2023)

2.15 Summary

Chapter Two has examined the existing body of knowledge in the topic of study and demonstrated that there is a research gap to be exploited. The methodology for data collection, analysis and formulation of collaboration framework is detailed in the next chapter.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter details the procedures used in undertaking the study. It highlights the research philosophy that underpins the study and elaborates on the research design adopted in carrying out the study. It describes the target population, sampling techniques, data collection methods, and data analysis. It also describes how the data's reliability and validity were assessed, as well as how the results were analysed. The chapter concludes by discussing the formulation of the tripartite collaborative approach framework. Clarity in these procedures would enable any interested party to replicate research and obtain similar results whenever need arises.

3.2 Research Philosophy

Broadhurst *et al*. (2012) define research as the process of collecting, analysing, and interpreting data to understand a phenomenon. The research process is scientific in nature because it follows a predefined procedure, and it is also systematic because it includes the definition of the research objective, evaluation of data collected, and writing up the findings, all of which occurs within a predetermined framework and in accordance with existing guidelines (Greener, 2008). Research philosophy refers to a researcher's vision of the world and presents the foundation upon which the research procedure lies. It is underpinned by assumptions and undertakings (Silverman, 2006). Saunders *et al*. (2003) posited, "Assumptions are so basic that without them, the research problem itself could not exist". Sekaran (2003) opines that those epistemological endeavours and ontological assumptions about the nature of the world improve the harmonisation and formulation of research philosophy, impacting the selection of appropriate research approach and methodologies. These two are further discussed in the follow up sections below.

3.2.1 Ontology

Ontology is the study of the nature of reality. It explains knowledge and reality assumptions. It calls into question a researcher's beliefs about how the world works, as well as the researcher's commitment to specific points of view (Bryman, 2012). Saunders *et al*. (2003) identified two aspects of ontology as objectivism and subjectivism. They explained that objectivism depicts reality, and that social entities exist outside of social actors. On the other hand, subjectivism contends that social phenomenon is the result of perceptions and subsequent acts of social actions involved with their existence.

Therefore, the ontology for this research study is objectivism which is also referred to as realism (Cohen *et al*., 2007). It is the belief that objects exist independent of the observer

(Schutt, 2012). Consequently, a discoverable reality exists independent of the researcher (Bryman, 2012). Realists objectively study the world in search of absolute comprehension of an objective reality (Scotland, 2012). Meaning exists fully in objects, not in the researcher's conscience, and obtaining this meaning is the researcher's purpose (Cohen *et al*., 2007). The researcher in this study explored the world of H&S management in construction sites as an independent and external observer. The performance of HSCs and its determinants i.e., developer involvement, contractor commitment and employee involvement formed the subject of inquiry and was taken to exist independent of the researcher, who neither had any influence on the variables nor immersed his feelings into the data collection process.

3.2.2 Epistemology

Epistemology is concerned with knowledge and its contents. Epistemology, according to Saunders *et al*. (2003), is concerned with what constitutes acceptable knowledge in a field of study. It discusses the idea of knowledge, how we know what we know, what justifies our beliefs, and what evidentiary standards we should apply while pursuing truths about the world and human experience (Schutt, 2012). In essence, epistemology describes 'how' the researcher knows about the reality and assumptions; and how to acquire and accept knowledge (Cohen *et al*., 2007). Scotland (2012) noted that, while not necessarily critical, failing to think through philosophical problems that lead a research investigation might have a serious impact on the quality of the outcome of a research study, which is the fundamental purpose of research design. To understand the nature, value, and status of scientific information generated by a research endeavour, researchers can take inspiration from important paradigms within epistemological streams. The two major research paradigms are positivism and interpretivism (Bryman, 2012). The former was used in this study. The paradigm of interpretivism lays emphasis on the examination of text to determine entrenched meanings, especially regarding how people use language and symbols to define and construct social practices to understand people's actions and behaviours (Schutt, 2012). It is for this reason that this paradigm was not adopted.

Positivism ties rationally to pure scientific laws. It is dependent on facts to meet the four criteria of logical consistency, relative explanatory power, falsifiability, and survival (Goldkhul, 2012). According to Scotland (2012), positivist theories must correspond to empirical facts while remaining falsifiable, and theoretical assertions in research must be intimately related to one another. A falsifiable, consistent, and explanatory theory must explicitly explain or predict competing theories; consequently, a falsifiable, consistent, and explanatory theory must be able

to survive empirical tests. Consequently, the study presented the null hypotheses in the previous chapters. Positivism tries to quantify the variables of a social phenomenon and strongly believes that natural science methodological techniques can be used to social sciences (Goldkhul, 2012). Similarly, responses were quantified in Likert scales which enabled statistical testing of the hypotheses. Additionally, the described methodology allows for replicability of the study just as in natural scientific research.

According to Saunders *et al*. (2003), the positivist paradigm depicts humans and physical matter as being extremely similar, which lends itself to identical measurement procedures. This may explain why the positivist paradigm finds it very convenient to tackle research challenges in three steps: diagnosis, design, and change (Schutt, 2012). Furthermore, Scotland (2012) stated that the positivist researcher constantly attempts to attain research objectives by testing theory in order to improve predictive understanding of specific events. According to Saunders *et al*. (2003), only observable facts established based on a hypothesis drawn by depending on the principles of a contemporary theory will lead to reliable study outcomes. The positivist paradigm is an ideology that only considers research results that are based on plausible and recognised scientific techniques.

This study followed a well-defined structure that underpins the positivist approach. The research began by defining the research objectives and the research questions, and from this came the research hypotheses. The project then took a staged approach, beginning with a review of relevant literature, followed by the construction of the conceptual framework, questionnaire design, and pilot delivery of the surveys. The second phase consisted of the data collection, while the analysis and presentation of data collected fell in the third phase. In the fourth phase, the resulting framework from the data analysis is presented, conclusions are drawn, and recommendations made.

According to the preceding, the positivist paradigm is the overarching paradigm of this research study because it involves the testing of hypotheses formulated from existing theory and the identification of observable social realities that exist objectively and externally to the researcher. A hypothesis was formulated which was used to explain effect relationships, which can be used to predict outcomes. The hypothesis for the study was; the low performance of the HSCs was as a result of low contractor commitment, employee and developer involvement in the HSCs on the SME construction sites in Nairobi.

3.3 Research Logic

The deductive and inductive approaches to research logic are the two basic types of reasoning in research (Schutt, 2012). The two are separate methods of reasoning which follow different conceptual approaches when conducting research as discussed in the following section.

3.3.1 Inductive Approach

The inductive approach refers to the practise in which theory follows the data (from theory to method, to data, and finally to discoveries), rather than vice versa as with deduction. Greener (2008) defines the inductive research approach as "the collection of qualitative data from personal interviews with the goal of understanding what is happening within a specific circumstance." They went on to say that the researcher depends on facts obtained, such as personal interviews, to create theory with the goal of understanding what is going on in a certain situation. The inductive approach entails making sense of research findings, and the end result is the formation of a hypothesis (Naoum, 2007).

3.3.2 Deductive Approach

Deductive research approaches operate from the more general to the specific; it often proceeds from theory to data (theory, method, data, findings), sometimes known as a top-down approach (Cooper & Schindler, 2006). It entails developing hypotheses based on current theory and then devising a research method to test the idea (Welman, 2005). According to Cooper and Schindler (2006), deductive research approach employs hypothesis formed from theory suggestions, which entails deducing conclusions from assertions. Bryman (2012) asserts that in the natural sciences, the deductive research strategy is the dominant approach in which laws remain the basis of explanation, allows for the anticipation of events, anticipates their occurrence, and so allows for their control. Accordingly, Cooper and Schindler (2006) introduces the procedure through which deductive research was to follow in implementation:

1. Developing a hypothesis from a theory
2. Operationalizing the hypothesis
3. Putting the operational hypothesis to the test
4. Investigating the specific outcome of the investigation
5. Modifying the theory if needed

This study takes the deductive approach in conducting the research. Three key theories guide this study namely the systems theory, the stakeholder's theory and lastly the theory on synergy (collaboration). A hypothesis is developed based on the theory on synergy (collaboration) that states that: the resultant product is greater than the sum total of individual efforts working

independent of one another. The individual input by the contractor and employees working independently gives less output in comparison to the output arising from a concerted effort by the contractor and employees working synergistically in the HSCs. In consequence, a null hypothesis follows this theory which states that the performance of HSCs is not dependent on the input of developer, contractor, and employees in the HSCs. This is either is rejected or accepted based on the data and findings from research questions as formulated based on the objectives of the study. The collected data was used to test the hypothesis using correlational and multiple regression analysis.

3.4 Research Theory

The breadth of the theoretical foundation that underpins a research discipline demonstrates the level of maturity attained by researchers in the field. One of the criteria of a mature field, according to Greener (2008), is the presence of a solid theoretical foundation. Previous researchers have made various attempts to define theory, resulting in its depiction in a variety of ways depending on distinct philosophical viewpoints. According to Bryman (2012), theory is "an ordered set of assertions about a generic behaviour or structure assumed to hold throughout a significantly broad range of specific instances". Creswell (2003) define theory as "a network of suppositions advanced to enhance the conceptualization and explanation of a specific social or natural phenomenon". As a result, hypotheses are formed to emphasise a disagreement about the links that exist between two or more ideas utilising an explanatory method. Concepts are the theoretical ideas used to organise elements that share one or more common features. They symbolise the organisation of theories and hypotheses. A theory is a model, framework, or set of premises or hypotheses used to explain and comprehend a phenomenon (Sekaran, 2003).

This study is anchored on three key theories namely; systems theory, stakeholders' theory and the theory on synergy. Riding on these theories, this study postulates that stakeholders working collaboratively on a given platform will give an output that has greater impact than when individual stakeholders work independently of one another. Greater synergy is attained when developer, contractor and employees work together in the HSCs towards compliance with OSHA 2007. This calls for a tripartite platform that provides the environment for that collaboration unlike the existing HSC platform. The tripartite approach as proposed provides a platform for the developer, contractor, and employees to synergistically work together. This relationship will be possible when considered based on the stakeholder theory which postulates that all persons involved in a process have a stake or interest and pose a level of influence based

on the stage in the process. Identification of hazard causing action on a construction site and its elimination will lead to a failed accident and hence zero tolerance on accidents in the built environment. The construction project works in stages and every stage has responsibility and key stakeholder engaged. The developer who does not engage qualified contractor, allocate resource for safety in the contract will have initially failed in his obligation to enhance safety. Further, if the contractor does not have resources from the contract to engage and train workers on safety matters the employees will not be well equipped to carry own works in safe ways. The employees on the other hand have to be willing to attend training and put on safety gear to be able to enhance safety on the site, this will require collaborations. This is typically an input and output process- as conclusively depicted in the systems theory. The systems theory emphasizes that unsafe act at one level will definitely lead to unsafe act at another level if not corrected at the initial level.

3.5 Research Approach

Since the research was deductive in nature, the approach adopted in this study was quantitative. Bryman (2012) affirms that a quantitative approach combines natural scientific model practices and standards, particularly positivism, and represents a perspective of social reality as an external, objective reality. A Likert scale provided an interface between opinions that was transformed into numbers for ease of manipulation and assignment of meaning (Saunders *et al*., 2003). The study used the Likert scale to investigate the level of contractor commitment, developer, and employee involvement in HSCs towards compliance with OSHA 2007.

3.6 Research Design

A research design provides a structure for data gathering and analysis. The design allows researchers to fine-tune research methodologies appropriate for the topic and ensure the success of their studies (Cohen *et al*, 2007). The research design adopted for this study is the cross-sectional also known as survey research design. This design was selected because the study intended to generalize its findings on the population from which the sample was drawn. A cross-sectional design involves collecting data on multiple cases at a single point in time to collect an array of quantitative or quantifiable data in regards to two or more variables, which is then examined to detect patterns of association (Bryman, 2012). Data collected entailed self-administered questionnaires filled simultaneously by developers, contractors, and employees. The data was quantitative, and this enabled the researcher to identify the relationship between the developer involvement, contractor commitment and employee involvement against the performance of HSCs on construction sites. This design allows multiple data collection for various variables instantaneously.

3.7 Research Location

The construction industry in Kenya has continuously recorded enhanced reports of unsafe occurrences. These events have been tragic as lives have been lost and property in millions of Kenya shillings destroyed. This study makes inquiries on the existing safety delivery approaches for construction activities in Nairobi County with a view to develop a framework that enhances safety on the SME construction projects in Kenya. The location of the study is Nairobi City County which is the county hosting the capital of Kenya. The selection of Nairobi City County as the study location is premised on the fact that, Nairobi is information rich, accessible and has a long history of cases of collapse of buildings under construction. Building collapses in Nairobi's heavily populated suburbs have undone improvements made in Kenya's construction industry. These areas are identified by the (NBI, 2016) as high-risk areas prone to building collapses and hence subject of the current study. Kenya has been on the global spotlight since the 2016 building collapse, where scores of lives and property was destroyed in that incident. Nairobi continues to report cases of unsafe activities despite the region having the highest number of registered contractors (NCA, 2021). *Figure 3.1* below shows the map of Nairobi City County.

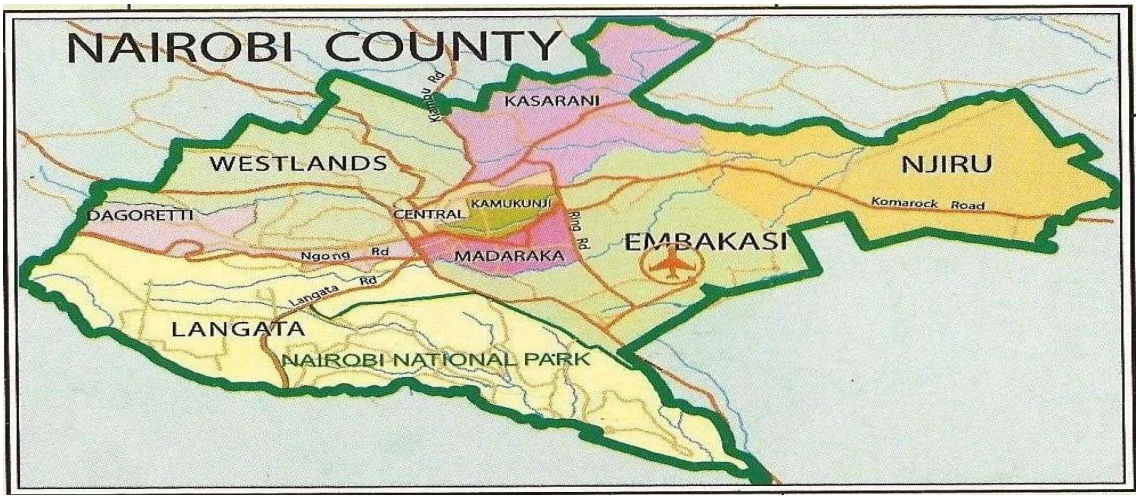

Figure 3.1: Map of Nairobi City County
Source; (NCCG, 2022)

3.8 Target Population and Sample Size

According to Sekaran (2003), a research population is a collection of physical objects, items, or people who have specific characteristics that a researcher intends to explore or comprehend. In other words, it is a well-defined group of individuals or items with similar and binding traits that are questionable in a study. Since a research population is the centre of

a scientific investigation, the ideal scenario is to test all of the individuals or objects in a study in order to achieve trustworthy, valid, and accurate results (Mugenda & Mugenda, 2003).

Kothari (2004) asserts that a sample is a subset of participants that is representative of a larger population and is large enough to support statistical and non-statistical examination. The sample enables a researcher to perform a study on people picked from a certain community in order to generate conclusions that will be generalised to the entire population (Mugenda & Mugenda, 2003). In this view, the population "gives" the sample and subsequently "takes" inferences from the sample's results (Bell & Bryman, 2011). The purpose of the study, the level of accuracy needed, the nature of the population under examination, the expected response rate, and whether the research is quantitative or qualitative can all influence sample size (Creswell, 2003).

In this study, the research population was 250 projects comprising all registered SME projects under construction in Nairobi at the time of data collection i.e., March-April, 2022. The projects were as per the register provided by the NCA Nairobi Region Office for the FY 2021/2022 (NCA, 2022) constituting the sampling frame from which the sample was drawn as shown in *Appendix III*.

A host of scholars have given guidance on the characteristics of sample sizes. According to Bryman and Cramer (2011), sample size must be large enough to represent the universal population. In addition, sample size should be able to give enough information on the study and be easy to analyse (Bell & Bryman, 2011).

Yamane (1967) formula was used in determining the sample size as follows;

Where n = $\frac{N}{1+Ne^2}$

n = sample size

N = total population

e = margin of error (0.05)

Total population N =250 (private projects as given in the NCA register)

Sample Size= 250/ (1+250(0.05) *2) where margin of error is 0.05

n = 153 projects

Table 3.1: Sampling procedures

Stratum	Population	Proportion	Sample Size
NCA5	62	0.254	38
NCA6	124	0.496	76
NCA7	34	0.136	21
NCA8	30	0.120	18
Totals	**250**	**1.000**	**153**

Source: (Author, 2023)

3.9 Sampling Techniques

Sampling was done to obtain an optimal sample size representation of the study's target population thereby enhancing validity by minimizing sampling error. A stratified random sampling using random tables was employed to select the sample from the 153 projects in the strata of NCA 5, NCA 6, NCA 7 and NCA 8. This also aided in the selection of key informants for the study namely the developer/representative, contractor/representative and employee/representatives. The target population, sample frame, sample size determination, and sample sizes for the survey are shown in *Table 3.2* below:

Table 3.2: Target Population, Sample Frame, Sampling Technique and Sample Size

Item No.	Target Population	Sample Frame	Sampling Technique	Sample Size
1.	NCA 5- 62 Project values<100M	Register of projects from NCA, Nairobi regional office: FY 2021/2022	Stratified random sampling $\mathrm{n} = \frac{N}{1+Ne^2}$ Yamane formula	38
2.	NCA 6- 124 Project values<50M	″	″	76
3.	NCA 7- 34 Project values<20M	″	″	21
4	NCA 8- 30 Project values<10M	″	″	18

Source: (Author, 2023)

3.10 Data Collection

The data was collected using self-administered questionnaires. This method encourages respondent's anonymity and hence enhances truthfulness and validity of the responses as there is no interviewer error or bias. Undergraduate construction management students were used as research assistants in data collection. They were selected because of their knowledge and familiarity with the construction industry. The research assistants were first taken through two sessions of training each lasting three hours to ensuring they were fully conversant with all the questions before being sent to the field. The self-administered questionnaires were physically served to the respondents based on the sample size as given on Table 3.2. The questionnaire had four main sections which were each responded to by one of the three respondents: performance of HSCs (clerk of work/developer), developer-related factors (site agent/contractor), effective ways of involving developers in H&S matters (site agent/contractor), and effect of incorporating the project developer in the HSC management (employee/ NCA accredited site supervisor). The rationale behind this was ensuring objectivity in the responses such that a category of respondents would not self-evaluate themselves. This eliminated bias in the data collected and improved the validity of the research findings. The questionnaire is as shown on *Appendix II*. The biggest challenge experienced in the field while collecting data was the length of time respondents took to complete a questionnaire. In quite a number of cases, the respondents required the questionnaire to be collected on a future date. Some had not even filled the questionnaires in those future dates.

3.11 Pilot Study

The questionnaire was piloted on three professional experts namely an architect, quantity surveyor and a construction manager. The professionals possessed more than ten years' experience in the management of construction projects in Kenya. Amendments were made to the questionnaire according to the feedback and suggestions received. However, none of the pilot study participants were included in the main research. Bryman and Bell (2007) stressed the importance of questionnaire pilot testing in that it helps: to assess the validity and reliability of study variables before proceeding with the actual study; to determine the time needed to complete the questionnaire; to provide an opportunity for any missing information to be gathered and, to clarify any ambiguities in the questionnaire.

Responses from the pilot study informed the adjustments that were made on the questionnaire to enhance validity, simplicity, precision and reduce ambiguity. The results of the questionnaire pre-testing are given on Table 3.3.

Table 3.3: Results of Pre-Testing of Questionnaires

Questionnaire Type	Response Rate	% of Questions Responded to	% of Questions Not Responded to
Self-administered open ended	99%	98%	1%

Source: (Author, 2023)

3.12 Operationalization of Study Variables

This study had four main variables namely; performance of HSCs, developer involvement, contractor commitment, and employees' involvement. Further questions were added in the questionnaire in order to assist the researcher formulate the tripartite framework. These included: factors that limit contractor commitment and employees' involvement in HSCs; developer intervening actions towards enhanced contractor commitment and employees' involvement in HSCs; and contractor, developer, and employees' buy-in towards collaborations in enhancing performance of HSCs on construction sites. The conceptual and operational definitions of the variable are shown on *Table 3.4*. Performance of HSCs was measured using a dichotomous question regarding whether there was compliance or not. These frequencies were converted to percentages to obtain a continuous scale. Developer involvement, contractor commitment and employees' involvement were measured using a Likert scale which resulted into ordinal data. Each of the 3 explanatory variables were expected to exhibit a positive influence on the effective variable. The same process used to measure performance of HSCs was used to measure factors that limit contractor commitment and employee involvement in HSCs, and developer's role in enhanced contractor commitment and employee involvement in HSCs.

3.13 Data Analysis

Computer based statistical package for social sciences (SPSS) version 25 software was used in the analysis of the data collected. Raw data obtained from the field survey was cleaned, formatted and category coded to facilitate analysis. Descriptive and inferential statistical procedures were employed to analyse the data.

3.13.1 Descriptive Statistical Analysis

Responses to Likert scale questions were numerically weighted and quantitatively examined using descriptive statistical analysis techniques. Descriptive statistical analysis is a method of determining the distribution of scores or measures by using central tendency statistics such as mean, mode, and median (Mugenda & Mugenda, 2003). The descriptive statistical analyses

Table 3.4: Operationalization of Study Variables

Descriptor/Variable	Conceptual definition	Operational definition	Scale	Expected Influence on Y
Performance of HSCs (Y)	Extent with which HSCs complied with OSHA 2007 in performing their functions.	List of HSCs functions as spelt out in OSHA 2007 based on a checklist of 11 items.	Nominal/ Dichotomous/ Continuous	None
Developer involvement (X)	State or quality of being dedicated to a cause, activity'; particularly project employer towards H&S on construction sites	Extent to which the developer supported the functioning of the HSCs, measured using a Likert scale of 1-5, on 10 items of the variable.	Ordinal	+ve
Contractor commitment (X)	Obligation of contractor towards compliance to H&S regulations	Extent to which the contractor supported the functioning of the HSCs, measured using a Likert scale of 1-5, based on 10 items.	Ordinal	+ve
Employees involvement (X)	Obligation of employee to participate more in safety decision making	Extent to which employees were involved in the functioning of HSCs, measured using a Likert scale of 1-5, based on 10 items.	Ordinal	+ve
Factors that limit contractor commitment and employee involvement in HSCs	Challenges faced by contractors and employees in their involvement in HSCs	Extent to which contractors and employees found it hard to participate in HSCs based on a checklist of 25 items	Nominal/ Dichotomous/ Continuous	None
Developer's role in enhanced contractor commitment and employee involvement in HSCs	Supporting effort by developers in the way contractors and employees played their role in HSCs	Extent to which developers supported contractor commitment and employee involvement in HSCs based on a checklist of 23 items	Nominal/ Dichotomous/ Continuous	None
Developer and employees' buy-in towards collaborations in enhancing performance of HSCs on construction sites	Stakeholder with highest influence in HSCs	Level of influence by parties towards HSCs performance, based on a checklist of 3 items	Nominal/ Continuous	None
	Effect of involving developer in HSCs management	Extent of effect of involving developer in HSCs management measured using a Likert scale of 1-5,	Ordinal	None
	Effect of Tripartite Collaborative approach framework in HSCs	Extent to which a tripartite approach framework could enhance performance of HSCs, based on a checklist of 1 item	Nominal	None

Source (Author, 2023)

carried out included mean, standard deviation, variance, skewness, standard error of skewness, kurtosis, standard error of kurtosis, range, and frequency distributions.

3.13.2 Inferential Statistical Analysis

Inferential statistical analysis enables generalizations to be made from the analyzed data. The inferential statistical analyses carried out in this research involved correlation of the independent variables with dependent variables and multiple linear regression to test the study hypotheses at a statistically significant level of 0.01.

3.13.2.1 Correlational Analysis

Pearson's correlation test was used to establish any existing relationships between the individual sets of relationships among the dependent and independent variables. Since there were four variables in total, six sets of relationships were predicted as shown on *Table 3.5* below. SPSS was used to run the Pearson's correlation analysis at a significant level of 0.01. As shown earlier in the conceptual framework, developer involvement was viewed both as a dependent (X_3) and a moderating variable (Z).

Table 3.5: Predicted bivariate relationships

	Y	**X_1**	**X_2**	**X_3 (Z)**
Y	×	√	√	√
X_1	×	×	√	√
X_2	×	×	×	√
X_3 (Z)	×	×	×	×

Source: (Author, 2023)

3.13.2.2 Multiple Regression Analysis

Multiple regression is a conceptual tool for examining functional correlations between one dependent variable and a number of independent variables. Regression analysis was relied upon to establish patterns of relationships between performance of HSCs and independent variables (contractor commitment, employee involvement and developer involvement) in terms of a linear equation, as well as to determine the strength of such relationships in terms of departure from linearity.

Because the dependent variable, performance of HSCs, was measured using 11 surrogates, they were transformed (by computing their mean) in SPSS v25 to establish a single dependent variable. Similarly, the same procedure was carried out on the data for the independent

variables each of which had been measured using ten surrogates. The multiple regression equation has been presented below;

HSC $=\alpha + \beta_1 CC + \beta_2 EI + \beta_3 DI + \varepsilon$

Where:

HSC - Performance of HSC on a construction site (dependent variable).

α - is constant,

β - Regression coefficient; $(Hypothesis\ testing; \beta \neq 0$ for at least one β)

CC - Extent of Contractor Commitment (CC)

EI - Extent of Employees Involvement (EI)

DI - Extent of Developer Involvement (CI)

ε - error of fit (the assumption is that it will be small enough to be ignored)

3.13.4 Hypotheses Testing

This study had a main research hypothesis presented in the first chapter. This hypothesis stated that Performance of HSCs was significantly influenced by Contractor Commitment, Employee Involvement and Developer Involvement. This hypothesis was tested using both correlational analysis and multiple regression. The former was used to measure the individual relationships between the independent variables and the dependent variable. As demonstrated in the conceptual framework, Developer Involvement was treated both as an independent and a moderating variable. Hypothesis regarding the moderating effect of Developer Involvement on the other two sets of individual relationships was tested using multiple regression. The null hypotheses were rejected if the calculated p-value was less than 0.01.

3.14 Data Presentation

Descriptive data was presented in form of frequency distribution tables, pie charts, and bar graphs. Information obtained from the correlational and multiple regression analysis was presented in form of tables.

3.15 Validity

Kothari (2012) defines validity as the measure of accuracy with which the results represent the phenomenon under investigation or whether the results from the sample represent the target population. To achieve validity in this study, the researcher ensured that the questions covered all the relevant topics of the objectives. Pilot testing and expert review helped assess and improve the validity. Additionally, the research findings were compared to results in previous

studies in order to establish or negate existence of patterns. The research's validity was further increased by using random sampling techniques to verify that the selection was made by chance rather than through a biased technique. Prior to random sampling, stratified sampling was required to improve population homogeneity. The validity of the research was ensured by an optimum sample population and increased response rates.

3.16 Reliability

According to Mugenda and Mugenda (2003), reliability measures the extent to which research instruments produce consistent results after repeated trials. The design of the research instruments was made to eliminate or minimize errors. Additionally, the questions were simple, clear and precise. In this research, reliability was tested using Cronbach's alpha (α) values which is a measure of the instrument's internal consistency. Internal consistency test evaluates the instrument's consistency and seeks answers about how successfully a sequence of items measures a given behavior or feature within the test. Estimates of reliability were based on the average intercorrelations among all single items inside a test in order for it to be internally consistent. The acceptable threshold was set at 0.7 as stated in Mohajan (2017). The results of the reliability test have been presented in chapter four.

3.17 Methodology for Formulating the Tripartite Collaborative Approach Framework (TCAF)

The analysis and interpretation of the collected data formed the basis upon which the proposed collaborative approach framework was formulated. In the formulation of the framework, theories on synergy, stakeholder and the system theory were amalgamated with the key developer actions (interventions) as identified both from literature and findings from the survey to formulate the framework. Detailed discussions on the process of formulation are given in chapter four.

3.18 Ethical Considerations

The main purpose of ethics in research is to ensure that all participants are protected from coming to any harm as a result of the project (Mason, 2019). In this study, the researcher undertook the following measures to protect the rights of the respondents:

A research permit *(Appendix IV)* was obtained from the National Commission for Science, Technology and Innovation (NACOSTI) as required by law to collect data from the study location. A letter of authorization *(Appendix V)* was obtained from the university. The researcher also prepared a letter of introduction *(Appendix I)* for presentation to the respondents. Participants were fully informed, both verbally and in the introductory letter, that their involvement in the study was optional, confidential, and anonymous, and that their non-

participation would have no effect on them. Furthermore, they would be informed that even if they consented to participate, they would be allowed to withdraw at any moment throughout the study, with no consequences, and all components of the research were described to the participants. During this study, information gathered from, on, or about a participant was kept secret. Personal data (such as names) were left out of the data collection instruments to ensure the confidentiality of the data collected from respondents.

3.19 Summary

This chapter discussed the research methodology adopted for the study. It highlighted the significance of the study location. Further, a discussion was made on the target population, sample size determination and data collection instrument. It detailed how variables were to be measured and analysed. In addition, a discussion has been done on how the validity and reliability of the data collected through the given instruments were to be assured. Finally, the ethical considerations of this research were presented.

CHAPTER FOUR: DATA ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter covers data analysis and discussion. It starts by presenting the responses as received from the field, their interpretation followed by an analysis. This is then followed by discussion of the research findings. This has been done according to the study objectives which included:

1. To establish the level of performance of HSCs in compliance with OSHA 2007 on the small and medium size construction sites in Nairobi.
2. To determine the extent of developer involvement, contractor commitment, and employees' involvement in HSCs on the small and medium size construction sites in Nairobi.
3. To explore the effect of developer involvement, contractor commitment and employees' involvement on performance of HSCs.
4. To formulate a framework towards enhanced performance of HSCs on the small and medium size construction sites in Nairobi.

4.2 Response Rate and Reliability Test Results

Out of a target population of 250 construction sites, a sample size of 153 was established, and questionnaires administered. A total of 125 sites returned their questionnaires representing a response rate of 82%. This was deemed adequate since the threshold recommended by Mugenda and Mugenda (2003) is 50%. The results of the reliability test using Cronbach's alpha (α) values which is a measure of the instrument's internal consistency are presented on *Table 4.1.* Given that the acceptable threshold was set at 0.7 as stated in Mohajan (2017), the scores show that all the results are reliable and adequate for analysis.

Table 4.1: Reliability Test Results

No	Variable	N of items	α value	Remarks
1	Performance of HSC	11	0.788	Acceptable
2	Contractor commitment	10	0.889	Acceptable
3	Employee involvement	10	0.895	Acceptable
4	Developer involvement	10	0.918	Acceptable

Source: (Author, 2023)

4.3 Background Information

The background information section of the questionnaire sought to establish the professions of the persons representing the developer, the contractor, and employees on the project. This information indicates the level of training for the persons involved in the oversight of H&S on

construction projects. The positions targeted were that of the clerk of works, site agent, and NCA accredited site supervisors. Other information collected under the background section included; the project contract sum, contract period, percentage of works completed and the government institutions that had inspected the projects and issued any prohibition orders. The information helped to confirm the accuracy and context of the study sample.

4.3.1 Clerk of Works

The clerk of works (CoW) is the developer's representative on the projects. They inspect workmanship, quality and safety of work on construction sites and reports back to senior managers and clients. Out of 125 sites who responded, only 78 (62%) had a developer representative on site at the time of administering the questionnaires. Further inquiry was made on their level of academic qualifications and experience in the industry as seen in *Figure 4.2*. All the clerk of works belonged in a given profession namely, Civil Engineers, Architects, Quantity Surveyors or Construction Managers. It is regrettable to note the absence of developer representatives on 38% of the projects, indicating that, the developer interests towards OSHA (2007) compliance on those projects is unsupervised. Projects with rogue contractors that require close supervision before meeting developer specifications, are therefore likely to capitalize on the absence of developer representative to take short cuts and eventually result in unlawful and hazardous activities that could be detrimental to the H&S of the workers involved in construction activities.

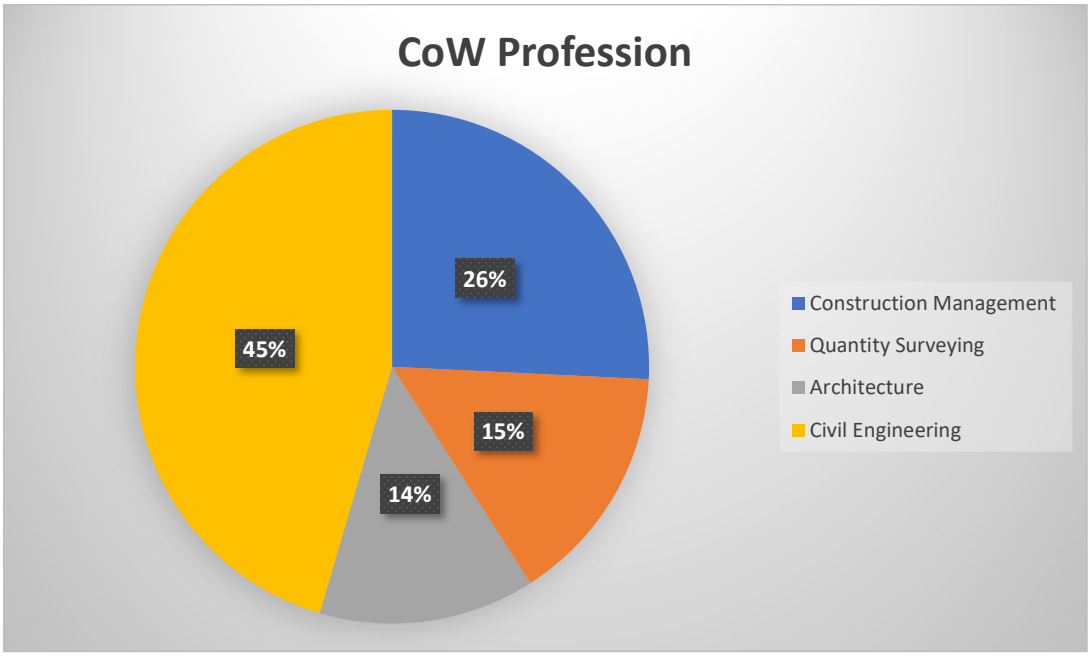

Figure 4.1: Clerk of works profession
Source; (Author, 2023)

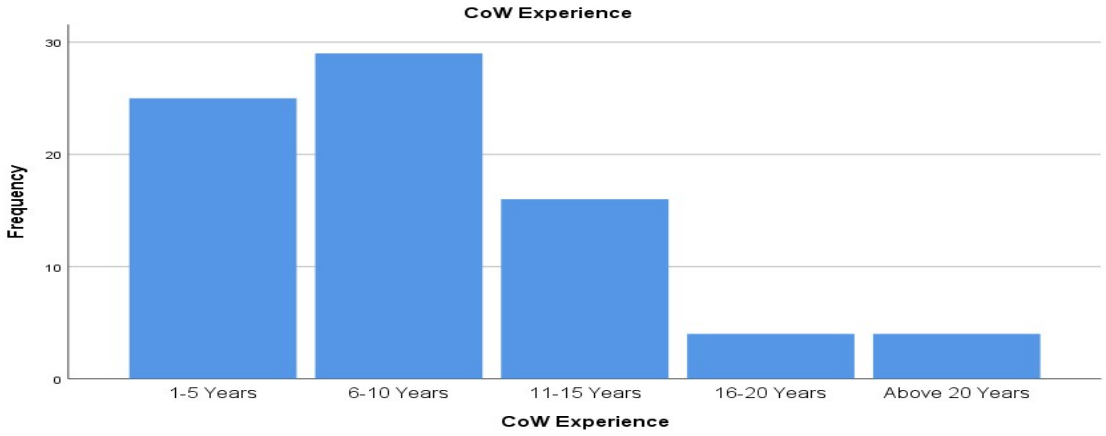

Figure 4.2: Clerk of works experience
Source; (Author, 2023)

The findings show that the civil engineering profession was most popular for most of the clerk of works at 45.5%. This could be courtesy of the versatility of the civil engineering profession which encompasses some skills in the other professions and the emphasis on structural stability of the products. This notwithstanding, there is a need to have a balanced supply of professions in the industry as no single profession can adequately take the place of the other profession. The findings in *Figure 4.2* shows that most of the clerk of works experience was above 6 years. The proportion of low experienced clerk of works with experience of up to 5 years is fairly large. This could be attributed to the young population earlier reported in *Table 2.5* whereby 55% of the construction labour force was categorized as below 30 years. They were however considered to be competent enough to provide credible and accurate responses.

4.3.2 Site Agent

The site agent is the contractor's representative on site, who receives all instructions from the developer or his agent in form of contract documentation and executes the instructions to meet the developer expectations. A good understanding of H&S requirements as enshrined in the OSHA 2007 is important for proper execution of the inherent requirements as, the site agent chairs or is the secretary of the HSCs. The study found that out of 125 sites 99 had a site agent present at the time of administering the questionnaires representing 79%. The results as are presented in Figure 4.3 below indicate that the site agent's professions are almost similar to those of the clerk of works namely. 21% of the sites didn't have a site agent and not much was found on record to explain why they didn't have a qualified and dedicated contractor representative. This could potentially compromise the H&S conditions on construction projects as it is unknown who could be coordinating the HSCs on such projects. This could be a

contributor to poor performance of HSCs and low OSHA compliances on construction sites or suggest that the persons working as site agents on the projects were not qualified and hence didn't want to be identified as site agents. The duty of coordinating HSCs on projects belongs to site agents in almost all cases.

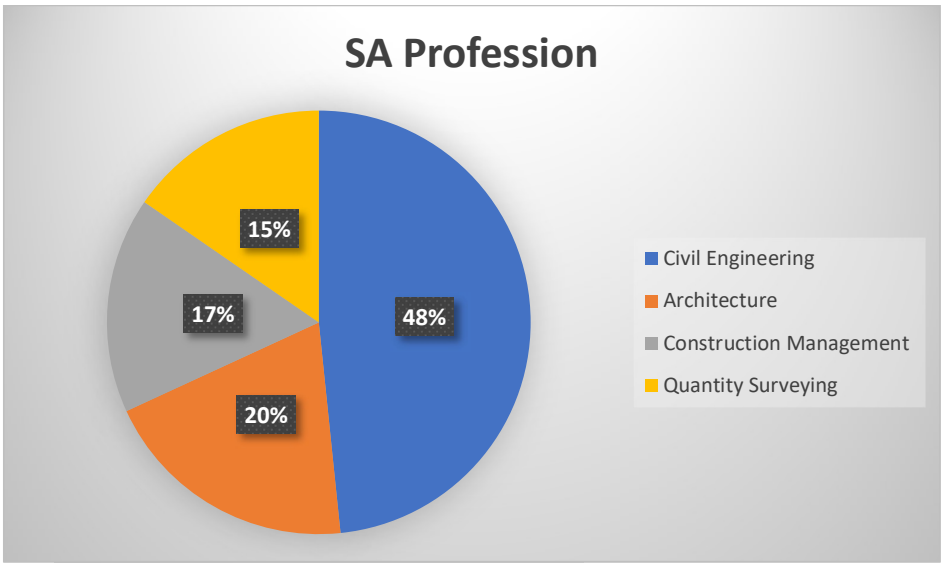

Figure 4.3: Site Agent Profession
Source; (Author, 2023)

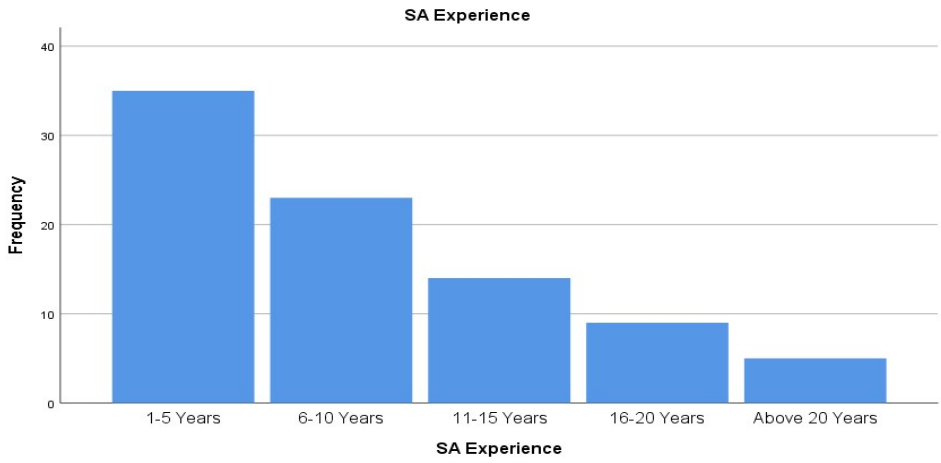

Figure 4.4: Site agent experience
Source; (Author, 2023)

The site agents' detail about their working experience in terms of the number of years they had been actively engaged in construction activities are presented in *Figure 4.4* below. The findings indicate that majority of the site agents (66%) had a working experience of more than 6 years. This was an indication that the respondents had adequate experience thus enhancing the credibility of the collected data. However, a significant proportion of the site agents (34%)

had a working experience of less than 5 years. This could also be attributed to the young population earlier reported in *Table 2.5* whereby 55% of the construction labour force was categorized as below 30 years. They were however considered to be competent enough to provide credible and accurate responses.

4.3.3 Contract Sum

The questionnaire sought to establish the contract sum for the ongoing construction project. The scope of the study included projects was capped at Kshs 100 million (1 USD = Kshs 150). 116 respondents (93%) indicated the project value while 9 failed to disclose with majority of them claiming it was confidential and others did not have the information. The results have been shown in *Figure 4.5*. Approximately half of the projects had a value of more than Kshs 60 million (1 USD = Kshs 150). A considerable number of projects were worth between Kshs 21-60 million (n=44, 38%) and only a handful projects had a value of less than Kshs 20 million (n=13, 11.2%). Establishing the project value is important as it confirms that 100% of the 93% of the projects were in the target population of projects handled by contractors in the range of NCA5-NCA 8. This ratifies that the sampling procedure was consistent with the sample design.

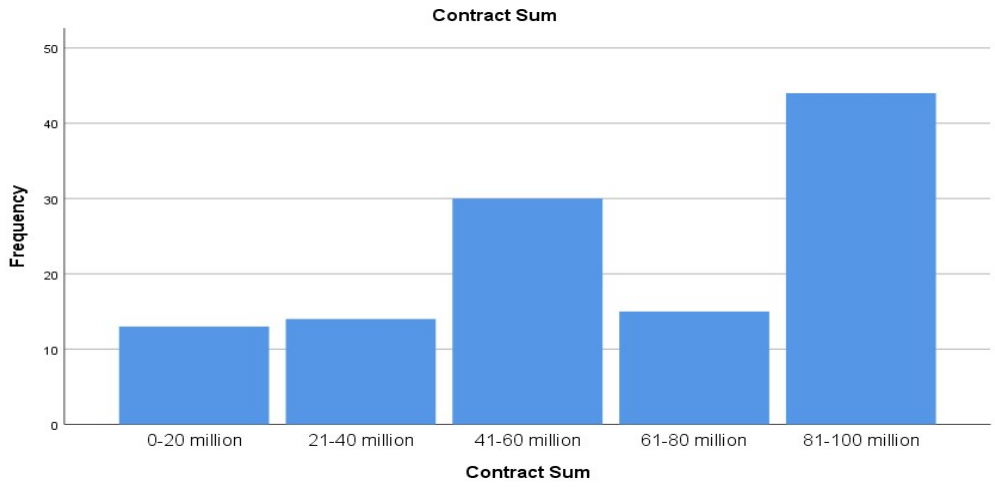

Figure 4.5: Project Contract Sum in Kenya shillings
Source; (Author, 2023)

4.3.4 Contract Period

Respondents were required to give information regarding the duration of the construction projects sampled. The results have been presented in *Figure 4.6*. Majority of the projects were above 12 months (n=73, 59.8%) while only a handful were less than three months (n=6, 4.9%). This information is important to the study as concerns the aspect of frequency and participation

in HSC meetings which indicates commitment on the part of the contractor and employee's involvement in those meetings. According to OSHA 2007, quarterly reports are to be submitted and evidence of a schedule for the planned meetings is a pointer of right intentions. The contract periods help in sourcing information on absence or presence of incident records and the frequency of DOSHS staff inspections on the projects for the past period.

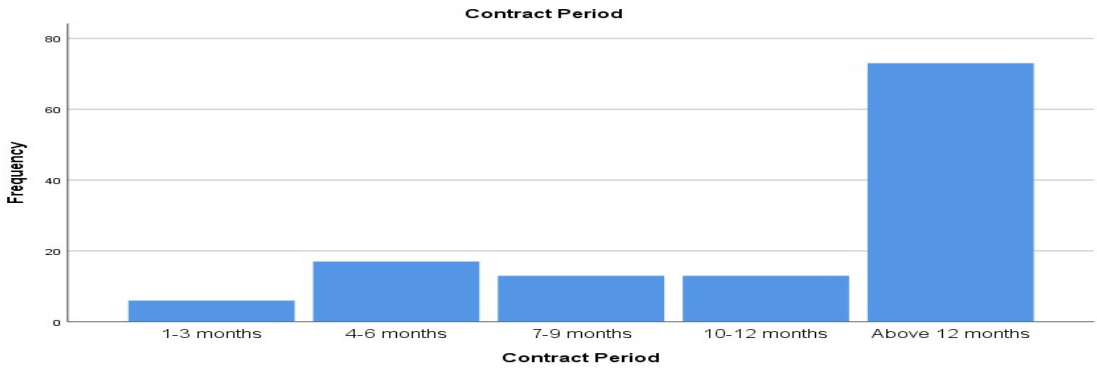

Figure 4.6: Project Contract Period
Source; (Author, 2023)

4.3.5 Percentage Complete

The research sought to establish the stage at which the ongoing project were in terms of percentage of works completed. The results have been presented in *Figure 4.7*. This information was important to the study as it helps validate the responses and the records kept on the projects.

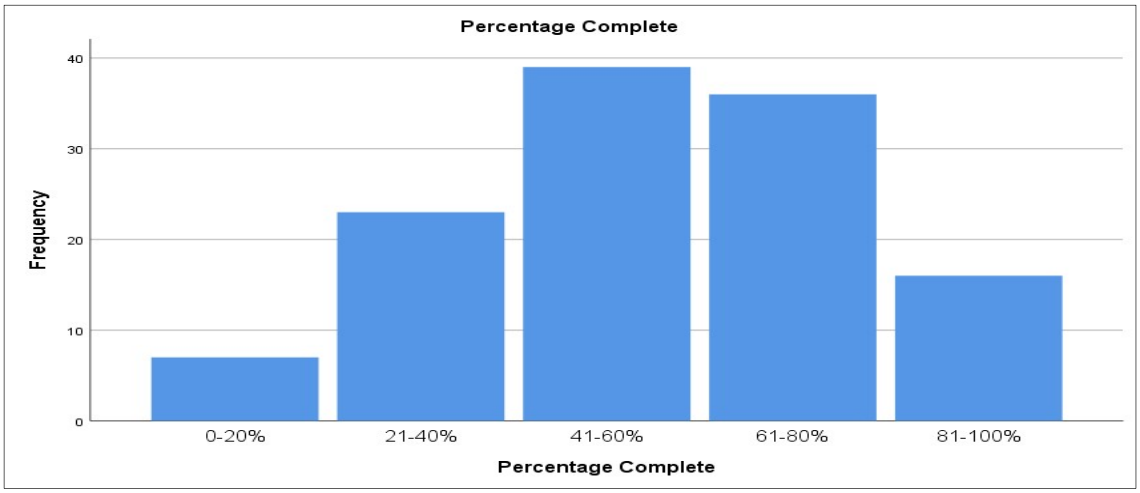

Figure 4.7: Percentage Complete
Source; (Author, 2023)

Moreover, it is expected that projects in advanced stages should have complied with a good number of H&S aspects in compliance with the OSHA 2007 and records maintained on the project site as captured in minutes of various meetings by the HSC. The varied project timelines afford the study an opportunity to identify trends that could be synonymous with project times enabling deductions towards OSHA 2007 compliance.

4.3.6 Frequency of Inspection by Government Agencies

The research sought to establish the frequency at which government agencies had visited and inspected the construction sites. The results are as seen in *Figure 4.8*. The most visiting agency was NCA with a frequency of 60 (50.0%) while the least visiting agency was DOSHS with a frequency of 3 (2.5%). Despite DOSHS having the greatest mandate towards OSHA compliance, findings indicate that its officers made the least inspections on the construction projects possibly due to the deficiencies in the agency's capacity to effectively enforce the OSHA 2007 as discussed in the literature review.

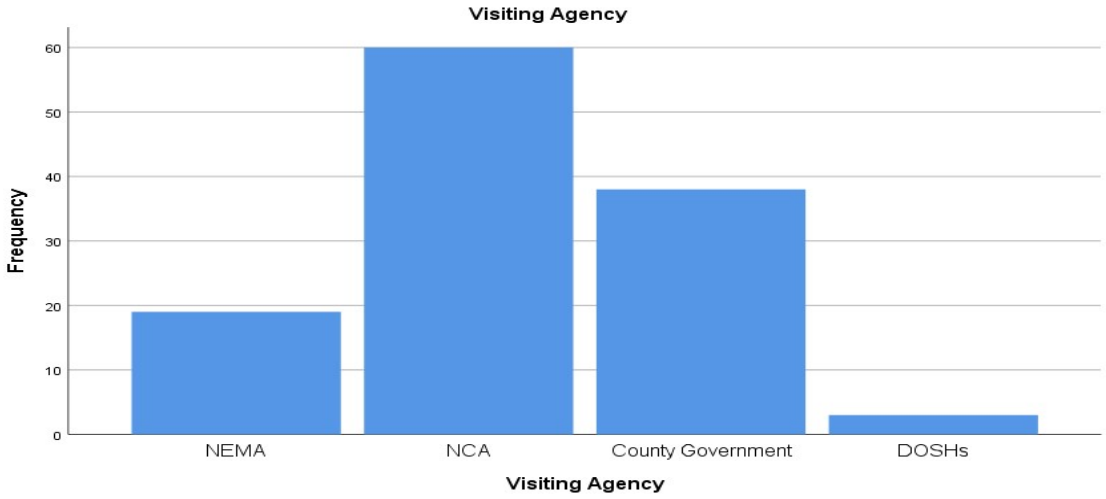

Figure 4.8: Visiting Government Agencies towards OSHA 2007
Source; (Author, 2023)

4.3.7 Level of OSHA 2007 compliance on construction sites in Nairobi

An introductory question was made towards establishing the level of compliance with OSHA 2007 regulations on construction sites using 24 indicators. The results and their ranking are presented on *Table 4.2* where the level of compliance for each variable was expressed as a percentage of the total responses. The overall level of OSHA 2007 compliance as per the data collected in the study stood at 62%. This is indeed very worrying, considering that OSHA 2007 encompasses factors that directly relate to life and death issues at workplaces and as such the ideal compliance level is 100%. While nations in the developed world are operating at zero

tolerances on accidents, this nation is still courting accidents by operating at 38% non-compliance. Worst complying indicators were those that directly relate to HSCs. It is worth noting that out of 125 respondents, a paltry 20% had established HSCs and a mere 15% held HSCs meetings. This represents 72% of those with established HSCs. The data further indicated that 50% of the activities are lone ranger activities done by the contractor as a contractual obligation or a regulatory requirement that has to be complied with. Extracts from OSHA 2007 are absent on many project site boards exacerbating stakeholder ignorance towards their rights and obligations towards H&S. At this level of performance, one has to critically relook at the level of contractor commitment and employee involvement to ascertain whether these critical stakeholders are indeed playing their roles in HSCs as anticipated during the enactment of the OSHA 2007.

Table 4.2: Level of Compliance with OSHA 2007 on Construction projects in Nairobi

No.	OSHA 2007 H&S Regulation	Yes	No	Total	Missing	Compliance	Rank
1	Wholesome drinking Water	119	6	125	0	**95%**	1
2	Availability of first Aid Box	116	7	123	2	**94%**	2
3	Personal Protective clothing	109	16	125	0	**87%**	3
4	Safety warning signs on site	102	17	119	6	**86%**	4
5	Displayed H&S Policy	99	21	120	5	**83%**	5
6	Provided washing Facilities	97	27	124	1	**78%**	6
7	Clothes changing areas	95	28	123	2	**77%**	7
8	Sufficient washrooms	94	30	124	1	**76%**	8
9	Emergency escape routes	92	31	123	2	**75%**	9
10	H&S Officers	84	34	118	7	**71%**	10
11	Safety Training	86	35	121	4	**71%**	11
12	Induction Training	78	44	122	3	**64%**	12
13	First Aid Training	79	46	125	0	**63%**	13
14	Maintained Accidents Register	72	51	123	2	**59%**	14
15	DOSH Registration	68	49	117	8	**58%**	15
16	Provided resting facilities	61	61	122	3	**50%**	16
17	Conducted H&S Inspections	59	62	121	4	**49%**	17
18	Management in HSCs	51	64	115	10	**44%**	18
19	Daily Safety Inspections	53	68	121	4	**44%**	19
20	Safety Audits	52	70	122	3	**43%**	20
21	Display of OSHA Notice board	50	68	118	7	**42%**	21
22	Reward for H&S	43	79	122	3	**35%**	22
23	Established H&S Committee	25	97	122	3	**20%**	23
24	Conducted HSC Meetings	18	104	122	3	**15%**	24
	Mean	**75.1**	**46.5**	**121.5**	**3.5**	**62%**	

Source: (Author, 2023)

The minimum level of compliance reported across the construction sites was 15% while the highest was 95% as seen on *Table 4.2*. The overall mean reported across the sites was almost similar to that calculated across the variables. The skewness and kurtosis values reported were 0.128 and -0.640 respectively as shown on *Table 4.3*. This was within the normality range of -1 to +1. This therefore means that the distribution for the level of OSHA compliance was normal as further exemplified in *Figure 4.9*. The data collected in the field as concerns the level of OSHA 2007 compliance is indeed a true reflection of what is exhibited on the ground as it satisfies the statistical requirements for a survey data.

Table 4.3: Distribution Characteristics for the Level of Compliance with OSHA 2007

S/N	N	125
1	Mean	62.16%
2	Std. Deviation	18.546
3	Variance	343.963
4	Skewness	0.128
5	Std. Error of Skewness	0.217
6	Kurtosis	-0.640
7	Std. Error of Kurtosis	0.430
8	Minimum	15%
9	Maximum	95%
10	Range	70%

Source (Author, 2023)

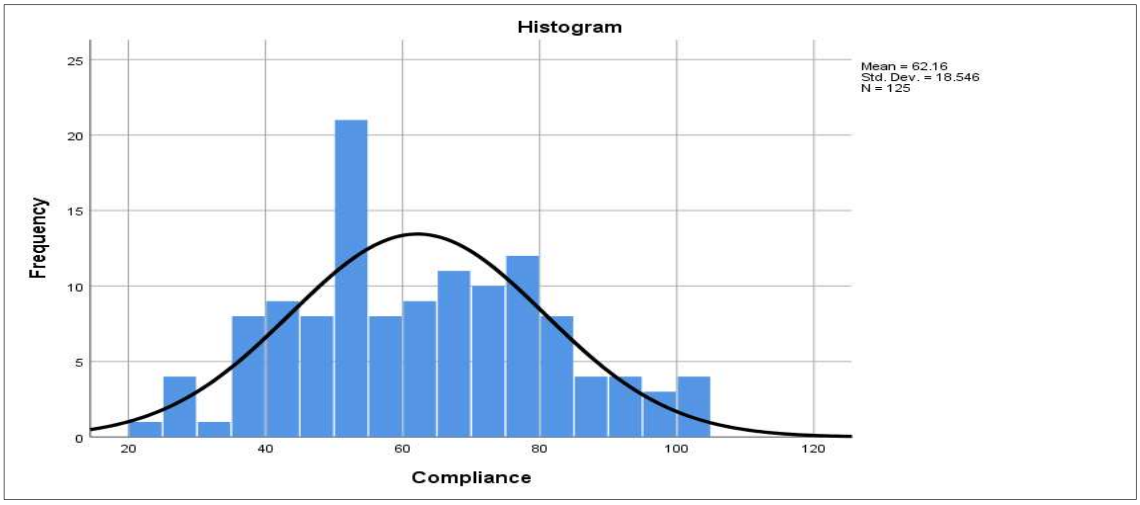

Figure 4.9: Level of Compliance with OSHA 2007
Source; (Author, 2023)

A study carried out by the NCA (2020) to establish the causes of building failures amongst other factors established that non-compliance to statutory requirements was a major contributor

to building failures during the implementation phase in Kenya. It was observed that in a span of 10 years from 2009 to 2019, over 200 lives have been lost coupled with a corresponding economic loss in investments of over Kshs.2.4 billion (1 USD = Kshs150) due to buildings failure and collapse (NCA, 2020). These findings are in tandem with the findings by Kemei (2015), who established that the fatality rate in the Kenya construction industry was on all high compared to countries like the United Kingdom, China, and South Africa. The fatality rate in that report indicated that Kenya registered a fatality rate of 62.5 persons in 100,000 as compared to 0.4, 3.8, and 25.5 respectively for United Kingdom, China, and South Africa respectively. As one can deduce, the developed nations are moving towards zero tolerance of any form of non-compliance to regulations which has given rise to low fatality rates on their construction projects. Many developed nations were at one point experiencing low H&S performances before they took initiatives that changed the status of H&S at their workplaces.

4.3.8 Summary of the Background Information

The sampling frame adopted satisfied the study expectations as all the projects fall in the target population of on-going building projects whose value is below Kshs 100 million (1 USD = Kshs 150) that is, projects being carried out by contractors in the categories NCA5 - NCA8 according to the National Construction Authority categorization (NCA, 2014). It was further noted that the DOSHS which has the full mandate to oversight the OSHA 2007, was not impactful on construction projects. This may indeed compromise their enforcement roles and urgent action needs as noted the by the ILO (ILO, 1992). This then re-emphasizes the need for urgent intervening measures that are alternatives to the prevailing options of attaining OSHA 2007 compliance through HSCs. The compliance levels to the OSHA 2007 as per the findings in this study are significantly inadequate at 62% against a mandatory requirement level of 100%, hence a need arises as on finding ways to enhance this compliance. Given that HSC was found to be the least performing OSHA compliance indicator, it was picked for further investigation.

4.4 Level of the Performance of HSCs on SME Construction Sites

A key aspect towards compliance with OSHA 2007 is the establishment of HSCs. The committees act as a platform upon which the contractor's top management and his employees find a forum upon which they collectively work together towards enhancing the H&S working conditions. As seen in the background information, out of the 125 projects surveyed only 20% (n=25) of the projects had formally established HSCs. A list of 11 functions falling under HSCs were presented to the respondents to indicate their status of compliance on their construction

sites. As shown on *Table 4.4*, it was evident that even in cases where formal HSCs were not established, there was some level of compliance with regard to matters which were supposed to be performed by HSCs. Though the OSHA 2007 strictly gives HSCs the H&S management mandate, it seems some of those roles are either being played by single individuals or through some informal arrangements on construction sites. These could be as a result of efforts by other regulatory bodies such as NCA, County Governments, among others. It could also suggest voluntary engagements by developers and/or contractors in instances where the awareness of OSHA 2007 requirements is lacking.

Table 4.4: HSCs Performance on Construction Sites in Nairobi

Compliance Requirement	Yes	No	Total	Missing	% Performance	Rank
Investigate complaints relating to workers' health, safety	72	51	123	2	59%	1
Maintained accidents register	61	61	122	3	50%	2
Advise on the adequacy of any H&S measures	59	62	121	4	49%	3
Identify occupational hazards and cases of ill health	51	64	115	10	44%	4
Conducts safety inspections	53	68	121	4	44%	5
Investigate accidents	52	70	122	3	43%	6
Has a schedule of inspections	50	68	118	7	42%	7
Facilitates trainings on H&S in workplaces	43	79	122	3	35%	8
Organize promotional activities for enhanced H&S management	41	76	117	8	35%	9
Maintained a record of minutes for the past HSC meetings	25	97	122	3	20%	10
Held HSC meetings as per schedule	18	104	122	3	15%	11
			Mean performance		**40%**	

Source: (Author, 2023)

Table 4.5: Distribution Characteristics for the Level of HSCs Performance

S/N	N	125
1	Mean	39.64%
2	Std. Deviation	20.991
3	Variance	440.624
4	Skewness	-0.098
5	Std. Error of Skewness	0.217
6	Kurtosis	-0.224
7	Std. Error of Kurtosis	0.430
8	Minimum	0%
9	Maximum	100%
10	Range	100%

Source (Author, 2023)

The performance of the HSCs as reflected in *Table 4.4* was found to be 40%. This meant that even though only 20% of the construction sites had well-structured HSCs, the HSCs duties were being performed to an overall level of 40% in all the construction sites. The performance was determined by the delivery on the main key aspects as outlined in the OSHA rules on the functions of HSCs. Given that these are statutory regulatory issues, the expected compliance is 100% both in the establishment of HSCs and performance of their duties. The establishment of the HSCs and effective performance of their duties should not and cannot be voluntary or left at the discretion of any of the parties engaged in a construction project. It is this culture which has led to the continued occurrence of accidents on construction sites in Kenya. This position is corroborated by Ogetii (2019) who asserts that the high number of construction site accidents is due to inadequate collaboration by all project stakeholders. In the developed nations and some developing nations, the situation is different. Kirombo (2020) points out that comparatively, Kenya registers an annual fatality rate of 62.5 persons in 100,000 as compared to 0.4, 3.8, and 25.5 respectively for United Kingdom, China, and South Africa respectively. Wendy *et al*. (2012) gives a fatality rate of 1.9 deaths per 100,000 persons in Australia. These findings signify that a higher regulatory compliance significantly influences safety performance hence moving towards zero tolerance of any form of non-compliance to regulations would potentially give rise to the low fatality rates on construction projects. The non-compliance to HSC requirements on Nairobi sites is therefore of concern as a significant contributor to poor OSH performance warranting its focus of this study.

4.5 Extent of Contractor Commitment, Employee Involvement, and Developer Involvement in HSCs

According to OSHA 2007 the main actors on a construction project that have greatest responsibility as matters H&S are the contractor and employees. These two actors execute their roles through a bipartite arrangement in the HSCs hence understanding the level of contractor commitment and employee's involvement in the HSCs is critical in the assessment of their relationships with the level of OSHA 2007 compliance on construction projects in Kenya. The questionnaires elicited responses on the contractor attitude towards facilitating HSCs and the capacity of the employees towards effective performance in the HSCs.

4.5.1 Extent of Contractor Commitment in HSCs

Ten indicators were used to establish the level of contractor commitment towards the effective functioning of HSCs. These were to a large extent attitudinal parameter (Likert scale of 1-5) as shown by the contractor towards effective functioning of HSCs. The results have been

presented on *Table 4.6*. The highest parameter was provision of meeting spaces. However, as seen earlier, a paltry 20% construction sites had established HSCs. Further, with no cost implications, the meeting spaces could be part of the building under construction and hence an easier way of meeting OSHA requirement on that aspect but with no commitment to support HSCs in the work places. The challenge is the facilities provided towards meetings which in terms of provision of stationary for the participants in the meeting records a mean of 3.06 and the contractor or his representative hardly participates in HSCs meetings given the mean of 2.83. The contractor participation in HSC meetings translated to 57% which was considered to be very low given that the contractor should be represented in all HSC meetings. With regard to establishment of HSCs, the obtained mean of 1.17 translated to 23% which corroborated the earlier figure of 20% obtained in the background section. This *inter alia* meant that the study had achieved internal validity.

Table 4.6: Extent of Contractor Commitment towards HSCs

No.	Area of commitment	N	Mean	Std. Dev.	Rank
1	Provision of meeting places for HSCs	121	3.86	1.213	1
2	Appointment of employees for the HSCs	121	3.75	1.240	2
3	No reprimands for attending HSCs meetings	121	3.74	1.015	3
4	Records for the HSCs meetings	119	3.50	1.213	4
5	Training for membership of the HSCs	120	3.49	1.181	5
6	Appointment of management representative for HSCs	119	3.47	1.213	6
7	Display of OSHA 2007 on notice boards	118	3.22	1.289	7
8	Provision of stationary for the HSCs	120	3.06	1.428	8
9	Participation in HSCs meetings	119	2.83	1.367	9
10	Establishment of HSCs	118	1.17	1.932	10

Source: Author, 2023

The overall mean for the level of contractor commitment was 3.209 (64%). This translated to a percentage level of 64% which could be described as low given that the mandatory level is 100%. Contractor commitment has been described as a key aspect in H&S management on construction sites. Laryea and Mensah (2010) point out that there is need for maximum contractor commitment especially on matters to do with provision of PPEs and ensuring construction sites have safe systems of work. Donkoh and Aboagye-Nimo (2017) state that the contractor, who executes the work during the construction stage of procurement, is frequently and rightly blamed for on-site mishaps. This is because he is directly involved in almost all the activities occurring on site.

4.5.2 Extent of Employee Involvement in HSCs

Ten indicators were used to measure the extent to which employees were involved in the HSCs in compliance with the OSHA 2007. These indicators were measures that signify the capacity of employees to effectively participate and/or contribute in the successful functioning of HSCs. As shown on *Table 4.7*, the overall mean for the level of employee involvement was 2.71 (54%) and was noted to be comparatively lower to the earlier reported level of contractor commitment.

Table 4.7: Extent of Employees' Involvement in HSCs

No.	Area of involvement	N	Mean	Std. Dev.	Rank
1	Participation in safety trainings	124	3.46	1.315	1
2	Putting on of PPEs	124	3.39	1.286	2
3	Induction training	123	3.17	1.458	3
4	Attending HSCs meetings	122	2.91	1.521	4
5	Peer to peer-based training	121	2.71	1.695	5
6	Acquiring Knowledge on safe system of work	122	2.70	1.661	6
7	Casual workers assigned roles in HSCs	124	2.64	1.914	7
8	Workers Access to OSHA Extract	124	2.60	1.453	8
9	Pre-engagement training in H&S	122	2.07	1.903	9
10	Possession of Technical Qualification	124	1.45	1.698	10

Source: Author, 2023

The statistical results depict the status of employee involvement in HSCs on construction sites in Nairobi. Based on the above findings, the study establishes that parameters like employee participation in trainings is very high suggesting the readiness and willingness of employees to participate in any available and relevant training that will build their capacity towards competency in H&S. This situation is made even worse by the absence of OSHA abstracts on project sites as shown in the captured data. The abstracts could enlighten employees on their rights as they engage their services in the construction activities. The employees operate from a disadvantaged position and their ability to adequately participate and contribute to the success of HSCs is highly compromised from a point ignorance. It is also regrettable to note that most employees are on short term basis which may not accord them a reasonable period of training and hence they prioritize work at the expense of capacity building further exposing them to unsafe and unhealthy conditions on the work environment.

Further, the employer may not trust the employees under these contractual agreements with much training investment and they may not be the preferred choice for the representation in the HSCs. Contractors are unwilling to invest in the employees who are on casual or temporary engagements as it seems uneconomical training employees with a high turnover (Agumba *et*

al., 2013). Such trainings will eventually culminate in reduction of profits and time losses due to continuous stoppages of work to provide trainings for employees' induction. This position points at the reluctancy of employers to avail trainings to the large group of employees with low literacy levels. In these circumstances, these cadre of employees who make the bulk of labour for most projects executed by contractors in the categories of NCA5-NCA8 continue to register unsafe and unhealthy incidences.

According to the data above, most of employees in the projects acquire knowledge through onsite training where their capacity is built through an experience-based approach at the work place. They stand to offer nothing and hence the contractor ends up being the senior partner in the HSCs and becomes a provider, initiator, and executor of everything with no active involvement of the employees. An external influence is called for then, to intervene towards enhanced employees' involvement in HSCs. This will require an approach that helps to build capacity to the employees involved in HSCs. A developer involvement may inject some influence towards the contractor by enhancing contractor commitment. This influence may result into a ripple effect that will trigger attitude change by the contractor towards the support of HSCs.

4.5.3 Extent of Developer Involvement in HSCs towards Compliance with OSHA 2007

The developers intervening roles is towards enhancing contractor commitment and employee involvement in HSCs require they work on the contractor attitude and building capacity for the employees to be able to participate effectively in HSCs. The questionnaire was tailored towards eliciting feedback on these aspects. To this end, the level of developer involvement towards compliance of OSHA 2007 regulations was measured using ten indicators. The results have been presented on *Table 4.8.*

The mean level of developer involvement towards HSCs stands at 2.802 (56%). This figure is very low and could be a pointer at why compliance levels towards OSHA 2007 are also very low. Many parameters like H&S financing with direct influence on the functioning of HSCs are not facilitated appropriately and hence a limitation on their functionality. Musonda *et al*. (2009) opine that in most developing countries, developers do not consider H&S to be extremely essential on construction projects, the majority of developers do not appropriately handle H&S in contract documents, and H&S is rarely a prominent issue on the agenda of progress meetings, and developers are also not entirely committed to H&S adoption.

Table 4.8: Extent of Developer Involvement in HSCs on construction sites

No.	Area of Involvement	N	Mean	Std. Dev.	Rank
1	Provision of insurance for the works	123	3.37	1.468	1
2	Compliance with other regulatory agencies	124	3.33	1.305	2
3	Registration of the workplace in compliance with OSHA 2007	123	3.17	1.906	3
4	Development of H&S policy	122	2.98	1.679	4
5	Provision of all information that have a bearing on the H&S management on the construction project	123	2.98	1.741	4
6	Engagement of H&S officers in the project	120	2.97	1.582	6
7	Participation in H&S trainings	124	2.90	1.458	7
8	Contractual provisions on H&S financing	124	2.87	1.744	8
9	Involvement in the establishment of HSCs	124	1.79	1.796	9
10	Participation in the HSCs meetings	124	1.66	1.771	10

Source: Author, 2023

Clearly developers tend to comply more with other regulatory mandates than the OSHA 2007 as seen in the high return on compliances with other agencies (Ogetii, 2019). The same position was earlier noted by the absence of DOSHS on construction projects relative to other Agencies like NCA and the County governments that registered the highest frequencies of visits in workplaces. This could be the reason why many developers are reluctant to comply with OSHA 2007 as they concentrated on parameters with direct bearing on their business environment at the expense of parameters that closely relate to the functioning of HSCs that in return affect the OSHA 2007 compliance.

Lack of contractual obligations by developers towards OSH accords them a lee way of keeping off on any matters that relate to the day-to-day functioning of HSCs and accompanying requirements (Kirombo, 2020). The weighty matters that relate to OSHA compliance like establishment of HSCs, participation in HSCs meetings and participation in safety training in workplaces are relegated and taken as a contractor and employee responsibility. Lack of a platform upon which the developer can be contractually obligated to directly participate in matters H&S is to blame for their hands-off approach towards H&S management on construction sites. The developer is not indebted to ensure that employees on the sites undergo relevant trainings that relate to H&S.

Accordingly, many developers do not formulate policies that govern H&S on construction projects a position that grants contractors' leeway to negligence on the H&S on projects so long as the project is delivered on time and at the accepted contract sum. The attitude of the contractor could change with more involvement of developer during the contract implementation phase to for example ensure training opportunities are accorded employees to cushion them against transient and ever-changing working conditions on construction projects.

Employees require capacity building to enable them to participate comprehensively and have some value additions in the HSCs by experience and expertise sharing in the meetings. Having a H&S policy in place that governs employees training could compel contractors to ensure that there is continuous training for all employees (Hervie & Oduro-Nyarko, 2018). Contractual provisions on H&S financing will trigger attitude change by contractor towards HSCs functionality on construction projects. The contractor will adequately price for the HSCs functioning rather than finding HSCs facilitation as unnecessary cost that does not have a direct benefit to the project and whose pricing makes their bid high and stand to lose the contract. The financing of the HSCs in this circumstance is put at bear minimum and on most occasions, nothing is provided towards this noble item. A provisional sum provided by the developer towards HSCs will help the contractor to ensure that the money is adequately expended towards the correct activity and at the same time build capacity towards the employees' ability to function well in the HSCs. Several scholars underscored the need for greater involvement of developers towards H&S management initiative. Raza *et al*. (2022) are of the opinion that developers should be the initiators and drivers of change efforts towards enhanced H&S compliances in workplaces. Further, Aasonaa (2023) opine that developers should play crucial roles towards H&S in the whole construction project cycle.

It is established here that the level of contractor commitment in HSCs stands at 3.309 on a scale of 1 to 5 where 1 is worst ranking and 5 is the excellent ranking. Looking at the results through the lenses of likelihood for unsafe and unhealthy occurrences these results are indicators of unacceptable construction workplace conditions in Nairobi. The conditions are expressed through the negative attitudes displayed by the contractors by failure to show commitment in supporting effective working of HSCs. Could there be a relationship between contractor commitment and the level of performance of HSCs on construction projects? How does the performance of HSCs affect the compliance levels towards OSHA 2007 relate?

4.6 Effect of Contractor Commitment, Employees' Involvement and Developer Involvement in HSCs on the Performance of HSCs

The research hypothesis is that there is a significant relationship between the Performance of HSCs and the three independent variables, namely; Contractor Commitment, Employee Involvement, and Developer Involvement. Two statistical analyses were used to test this hypothesis; bivariate correlations, and multiple regression.

4.6.1 Bivariate Correlations

The Pearson's correlation test was performed using SPSS. *Table 4.9* summarises the findings. Contractor commitment (0.662), employee involvement (0.708), and developer involvement (0.639) were discovered to have a statistically significant association with HSC performance. The three associations are strong and positive, implying that increasing the level of the three independent variables resulted in an increase in the level of HSC performance.

Table 4.9: Correlation between the Performance of HSCs against Developer Involvement, Contractor Commitment and Employees Involvement

		HSC performance	Contractor Commitment	Employee Involvement	Developer Involvement
HSC performance	Coefficient	1	.662**	.708**	.639**
	Sig. (2-tailed)		.000	.000	.000
	N	125	109	116	117
Contractor commitment	Coefficient	.662**	1	.769**	.840**
	Sig. (2-tailed)	.000		.000	.000
	N	109	109	104	103
Employee involvement	Coefficient	.708**	.769**	1	.806**
	Sig. (2-tailed)	.000	.000		.000
	N	116	104	116	110
Developer involvement	Coefficient	.639**	.840**	.806**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	117	103	110	117

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

Source: (Author, 2023)

The OSHA 2007 bestows a lot of responsibility upon the contractor when it comes to the functioning of the HSCs. As currently constituted, the contractor is almost entirely responsible for driving H&S management matters. This is because in the current bipartite arrangement where the HSCs are run by both the contractor and employees, it is the former's responsibility to establish the HSCs and bring on board the employees. Without the contractor taking the first initiative, then there can be no HSC business on a construction site. Further, the continued functioning of the HSCs relies on the goodwill and support of the contractor on matters such as provision of meeting venues, maintaining HSC records, participating in meetings,

appointment of new employees into HSCs in cases where existing members exit a construction project, maintaining display of OSHA (2007) abstract on notice boards, and implementing HSCs' recommendation on training of construction workers. This explains the significant positive relationship between contractor commitment and performance of HSCs. Further, Gbajobi *et al*. (2018) assert that enhanced contractor commitment on H&S matters results in reduced number of site accidents which is an indication of improved performance of HSCs.

Employees are the people involved in the hands-on activities on a construction sites. In almost all cases of accidents occurring on construction sites, the victims are usually employees. Therefore, there is need to recognize and involve them in H&S management. The OSHA 2007 captures this by making sure that employees are not only represented in the HSC but also participate in all its H&S management activities. Such involvement coupled with support from the contractor and perhaps the developer has the desired effect of reducing the number of fatalities, performance of HSCs and compliance of OSHA 2007 on construction sites. Agumba *et al*. (2013) state that the following actions by employees can help enhance the safety performance on sites; involvement in the production of H&S policy, assisting in developing H&S rules and safe work procedures, involvement in H&S inspections, and being consulted when the project's H&S plan is compiled. The authors further note that employees should have the power to refuse to work in unsafe and unhealth conditions without being victimized by their employers.

Though the OSHA 2007 fails to provide express responsibilities for the developers, OSH regulations and guidelines in other countries, especially the developed ones, are clear on the developer's role in H&S management. Even without the statutory responsibilities, it was observed that developers in most of the construction projects were involved to some extent in the running of the HSCs. Even though such level of involvement is not satisfactory, it was found to have a positive influence on the performance of HSCs. Haupt and Akinlolu (2021) indeed point out that if the developer is not actively involved in H&S implementation, improving H&S performance will remain elusive. According to Khoza (2020), developer involvement is a necessary criterion for the zero injuries goal.

4.6.2 Testing Statistical Assumptions

Prior to carrying out multiple regression analysis, four statistical tests were carried out on the four variables involved. These were linearity, normality, homogeneity, and multicollinearity. The results were presented graphically.

4.6.2.1 Linearity

As seen in Figures 4.10, 4.11 and 4.12, the relationship between the dependent variable and each of the predictor variable appeared to be linear. The established correlations in the section 4.6.1 were further evidence of linearity between the dependent and each of independent variables.

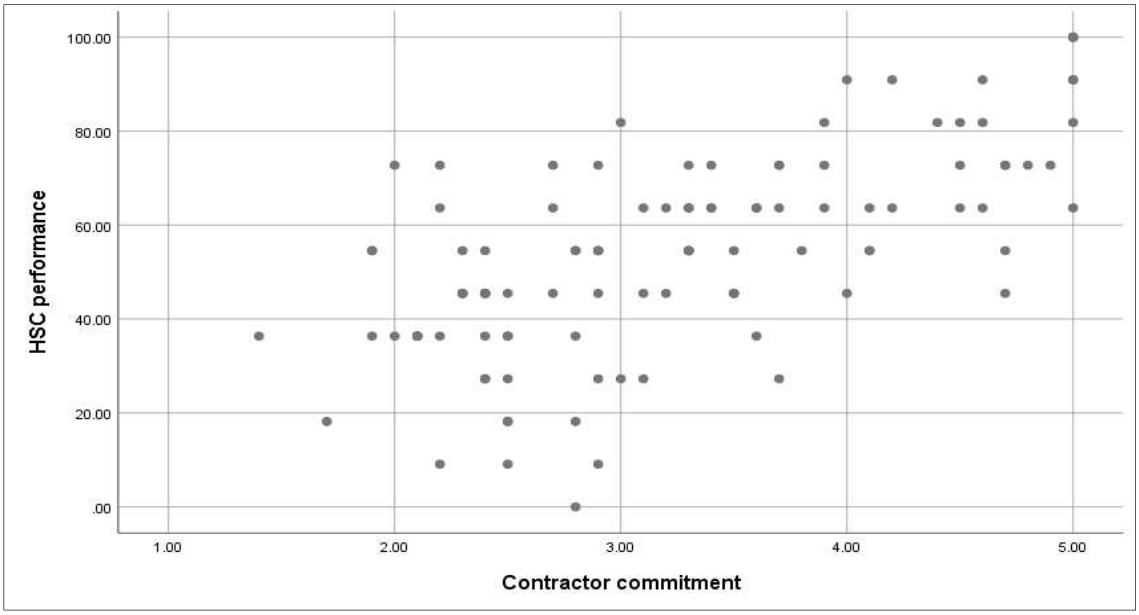

Figure 4.10: Level of HSCs Performance Versus Contractor Commitment
Source; (Author, 2023)

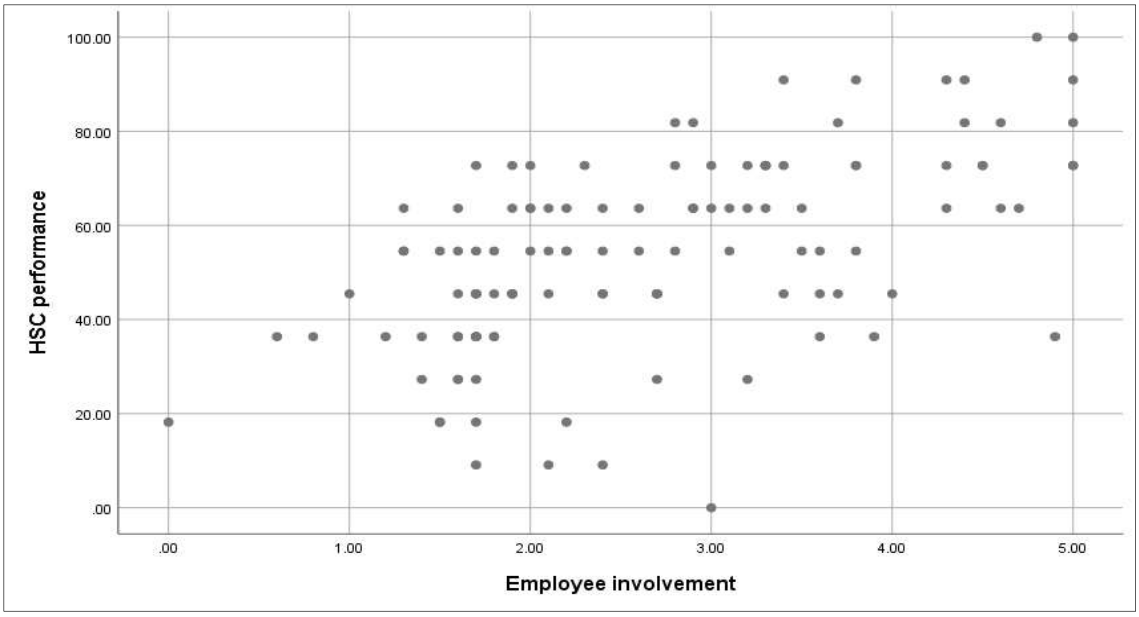

Figure 4.11: Level of HSCs Performance Versus Employee Involvement
Source; (Author, 2023)

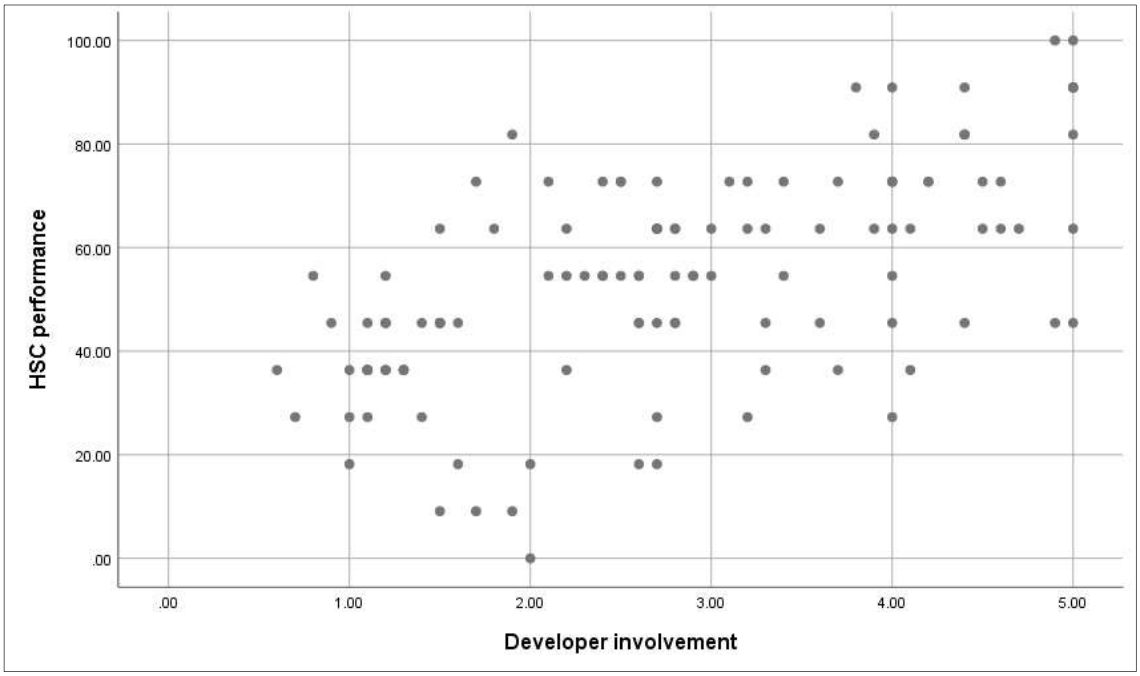

Figure 4.12: Level of HSCs Performance Versus Developer Involvement
Source; (Author, 2023)

4.6.2.2 Normality

As seen in *Figures 4.13, 4.14, 4.15* and *4.16*, the distribution of each of the four variables (dependent variable and the three predictor variables) appeared to be normal.

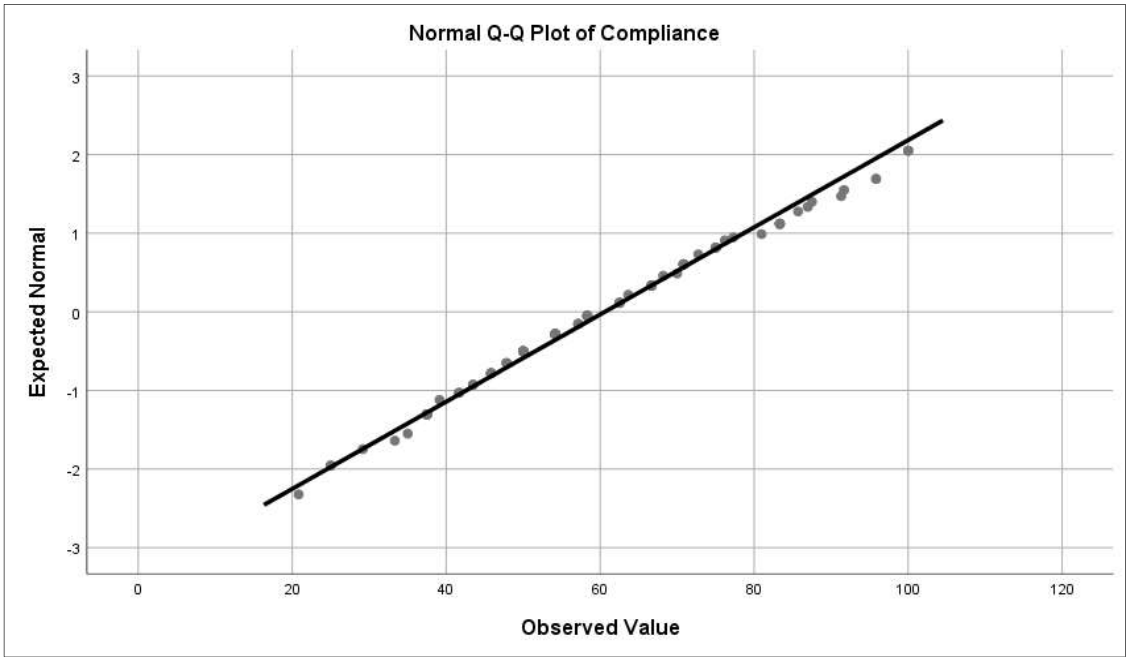

Figure 4.13: Normality Test for Level of HSCs Performance
Source; (Author, 2023)

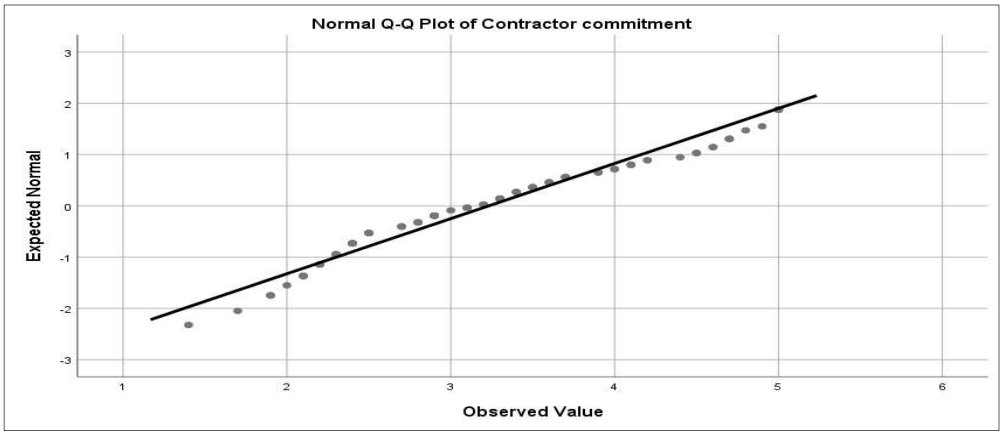

Figure 4.14: Normality Test for Level of Contractor Commitment
Source; (Author, 2023)

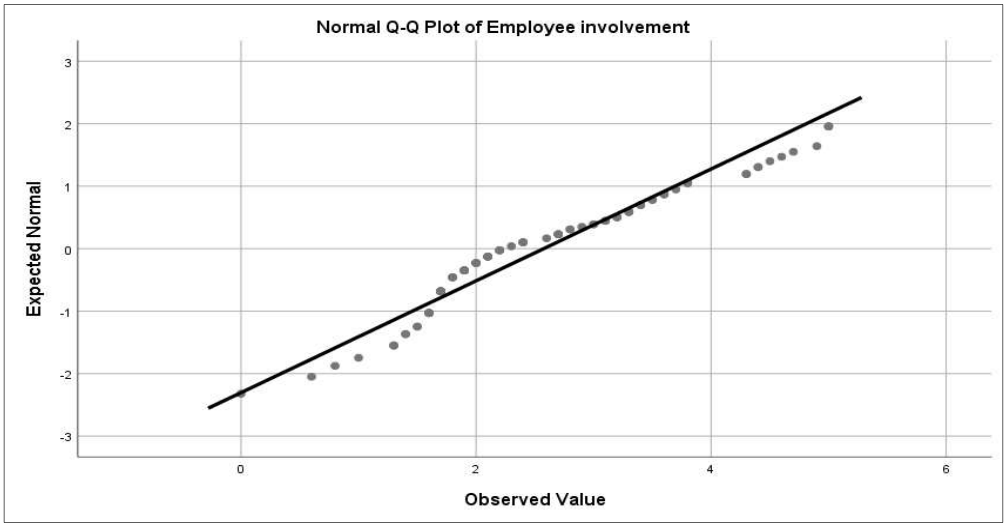

Figure 4.15: Normality Test for Level of Employee Involvement
Source; (Author, 2023)

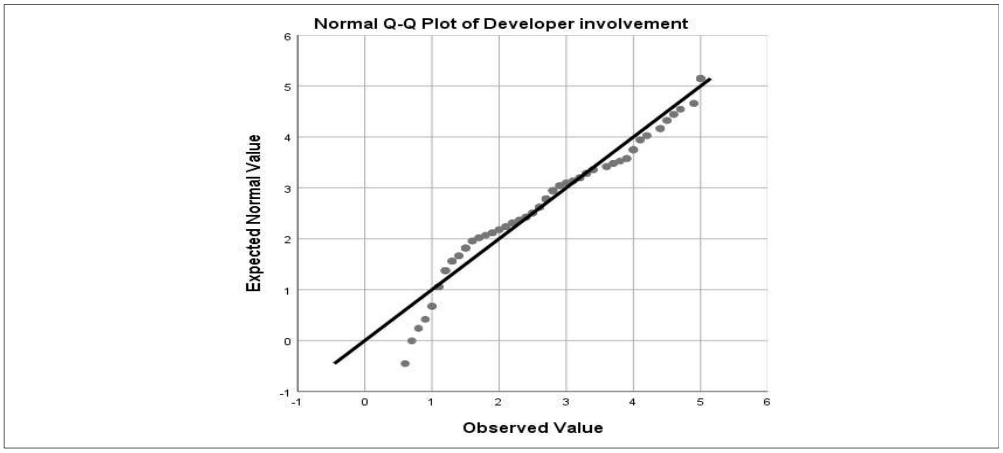

Figure 4.16: Normality Test for Level of Developer Involvement
Source; (Author, 2023)

4.6.2.3 Homogeneity

The homogeneity test was checked by plotting the residuals. The results have been presented in *Figure 4.17*. Since the scatter plot was evenly distributed above and below zero on both X and Y axis, the data passed the homogeneity test.

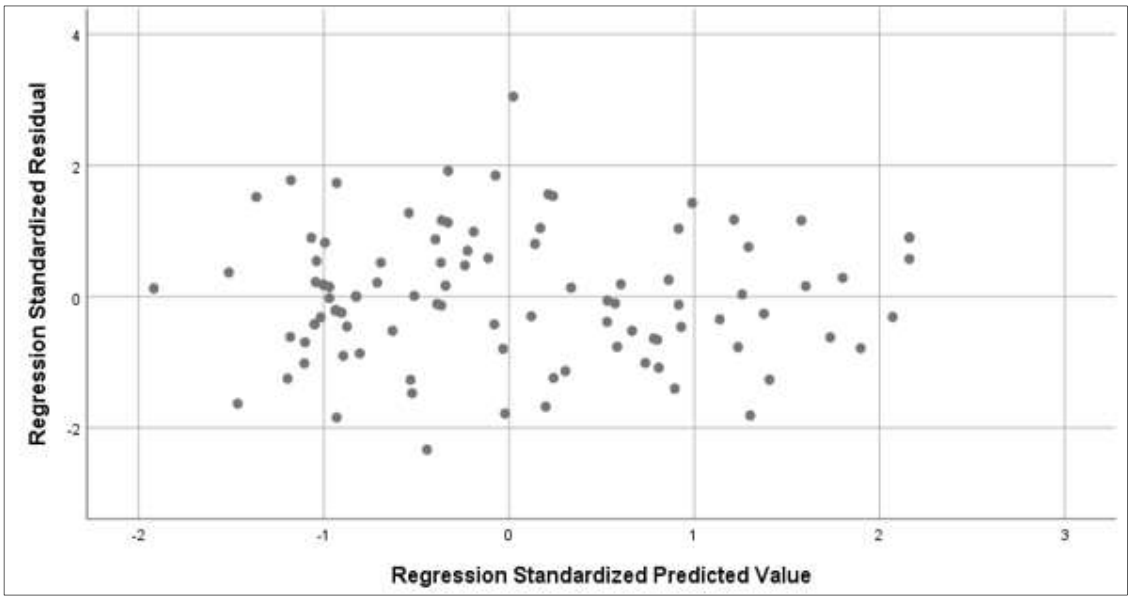

Figure 4.17: Homogeneity Test
Source; (Author, 2023)

4.6.2.4 Multicollinearity

Multicollinearity was checked using the Tolerance and VIF values. According to Hair Jr *et al*., (2010), VIF values should be between 1 and 10. Tolerance values on the hand should be above the 0.1 threshold suggested by Lewis-Beck (2015). As seen on *Table 4.10*, it is therefore evident that the data didn't have multicollinearity.

Table 4.10: Multicollinearity Test

Variable	Collinearity Statistics	
	Tolerance	VIF
Contractor Commitment	.244	4.092
Employee Involvement	.297	3.366
Developer Involvement	.264	3.790

Source: (Author, 2023)

4.6.3 Multiple Regression Results

The results for the multiple regression analysis have been presented on *Tables 4.11, 4.12* and *4.13.* As seen on *Table 4.11*, the adjusted value of R^2 for the generated model is 0.496 implying that 49.6% of the variation in the HSC performance is explained by the three predictors included in the model. Field (2009) notes that though there are no general criteria for R^2

threshold, studies that attempt to describe human behavior tend to be less than 50%. The balance 50.4% could be explained by presence of multiple and overlapping legislations coupled with weak enforcement in the Kenya construction sector that have an influence towards OHS on construction sites as highlighted in the literature review but are not part of this study. Therefore, the obtained R^2 was considered to be adequate in explaining and predicting the variability of HSC performance by the three observed independent variables namely; Developer involvement, Employee involvement, Contractor commitment.

Table 4.11: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.715[a]	.511	.496	12.808

a. Predictors: (Constant), Developer involvement, Employee involvement, Contractor commitment

Source: Author, 2023

The purpose of the ANOVA test was to establish whether the model was significant. Results on *Table 4.12*indicated that F=32.764 and p=0.000. This meant that the proposed model significantly improved the prediction of the level of compliance using the three predictors.

Table 4.12: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16124.831	3	5374.944	32.764	.000[b]
	Residual	15420.548	94	164.048		
	Total	31545.379	97			

a. Dependent Variable: Compliance

b. Predictors: (Constant), Developer involvement, Employee involvement, Contractor commitment

Source: Author, 2023

Table 4.13 below reveals that one out of the three predictor variables was statistically significant i.e., employee involvement. Since at least one of the independent variables has a statistically significant relationship with the dependent variable, the research hypothesis is proven to be true.

Table 4.13: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	24.856	5.070		4.902	.000
Contractor commitment (CC)	4.243	2.828	.219	1.500	.137
Employee involvement (EI)	6.633	2.135	.411	3.107	.003
Developer involvement (DI)	1.846	2.003	.129	.922	.359

Source: (Author, 2023)

The equation below was obtained from the above multiple regression results.

HSCs= 24.856 + 4.23CC +6.633EI + 1.846DI + e

Where:

- HSCs = Performance of HSC;
- CC= Level of Contractor Commitment;
- EI = Level of Employees Involvement;
- DI = Level of Developer Involvement and
- e = Error

The multiple regression analysis revealed that higher levels of OSHA compliance are associated with higher levels of contractor commitment, employee's involvement, and developer involvement. The same findings had been established in the bivariate correlations (section 4.6.1). It is conclusively realized that there is a relationship between the independent and dependent variables of the study as it has been proven statistically. To enhance the performance of HSCs on construction projects then efforts must be put in place towards enhancing contractor commitment and involving the employees and developer in those efforts.

4.7 Moderating Effect of Developer Involvement

In the conceptual framework, developer involvement had been treated both as an independent variable and a moderating variable. The aim of this was to statistically establish if the developer through their action or inaction can influence how contractor commitment and employee involvement affect the performance of HSCs. This was achieved through multiple regression analysis whereby an interaction variable (product of each of the independent variables and the moderating variable) was introduced to measure the variation brought about the addition of the interaction term (variable). This has further been discussed below.

4.7.1 HSC Performance Versus Contractor Commitment

The interaction variable created in this case was a product of the contractor commitment (the independent variable) and developer involvement (moderator variable) i.e., $X_1.Z$. As shown on *Table 4.14*, two models were then produced. In Model 1, the regressors included contractor commitment and developer involvement. In Model 2, a third regressor was included, i.e., the newly created interaction term.

Table 4.14: Moderating Effect of Developer Involvement on HSC Performance Versus Contractor Commitment

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.668[a]	.446	.435	15.72323	.446	40.309	2	100	.000
2	.677[b]	.458	.442	15.63592	.012	2.120	1	99	.149

a. Predictors: (Constant), Contractor commitment (X_1), Developer involvement (Z)
b. Predictors: (Constant), Contractor commitment (X_1), Developer involvement (Z), X_1.Z
c. Dependent Variable: HSC performance

Source: (Author, 2023)

The column indicated, "R Square Change", shows the increase in variation explained by the addition of the interaction term (i.e., the change in R^2). In this case, the change in R^2 is 1.2%. notably however, this change is not statistically significant ($p = 0.149 > 0.05$). This means that while both developer involvement and contractor commitment have a statistically significant effect on HSC performance, as demonstrated in Model 1 ($p < 0.05$), developer involvement does not have a statistically significant moderating effect on the influence of contractor commitment on HSC performance. Simply, when it comes to enhancing the performance of HSCs, just like contractors, developers play the same role of direct influence. This is as opposed to being an intermediary between contractors and HSCs.

4.7.2 Employee Involvement Versus HSC Performance

The interaction variable created in this case was a product of the employee involvement (the independent variable) and developer involvement (moderator variable) i.e., X_2.Z. Two models were then produced. In the first model, the regressors included employee involvement and developer involvement. In the second model, a third regressor was included, i.e., the newly created interaction term. The results have been presented on *Table 4.15*.

Table 4.15: Moderating Effect of Developer Involvement on HSC Performance Versus Employee Involvement

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.600[a]	.360	.348	16.47273	.360	30.129	2	107	.000
2	.601[b]	.361	.343	16.53497	.001	.196	1	106	.659

a. Predictors: (Constant), Employee involvement (X_2), Developer involvement (Z)
b. Predictors: (Constant), Employee involvement (X_2), Developer involvement (Z), X_2.Z
c. Dependent Variable: HSC performance

Source: (Author, 2023)

The column indicated, "R Square Change", shows the increase in variation explained by the addition of the interaction term (i.e., the change in R^2). In this case, the change in R^2 is 0.1%. notably however, this change is not statistically significant ($p = 0.659 > 0.05$). This means that while both developer involvement and employee involvement have a statistically significant effect on HSC performance, as demonstrated in Model 1 ($p < 0.05$), developer involvement does not have a statistically significant moderating effect on the influence of employee involvement on HSC performance. Simply, when it comes to enhancing the performance of HSCs, just like employees, developers play the same role of direct influence. This is as opposed to being an intermediary between contractors and HSCs.

4.8 Hypothesis Testing

The main hypothesis of this study had been presented in Chapter One. It was tested using multiple regression as discussed in Chapter Three. In the regression model presented on *Table 4.13*, at least one of the regression coefficients was significant ($p < 0.05$), and therefore the Alternate hypothesis was accepted as indicated on *Table 4.16*.

Table 4.16: Testing of Main Research Hypothesis

Type	Hypothesis	Action
Null	The level of performance of HSCs on the SME construction sites is not significantly influenced by the extent of developer involvement, contractor commitment and employees' involvement in the HSCs.	Reject
Alternate	The level of performance of HSCs on the SME construction sites is significantly influenced by the extent of developer involvement, contractor commitment and employees' involvement in the HSCs.	Accept

Source: (Author, 2023)

In the Chapter Two while presenting the conceptual framework, the relationship between HSC performance and the other three variables namely, contractor commitment, employees' involvement, and developer involvement was further broken down into individual relationships. These were presented as research sub-hypotheses H_1 to H_5 as shown on *Table 4.17*. All the three independent variables were found to have a statistically significant effect on the performance of HSCs both at individual level as demonstrated in the bivariate correlations and at a combined level as seen in the multiple regression analyses involving a moderation variable (*Section 4.7*). However, as further demonstrated in *Section 4.7*, developer involvement was found not to have a statistically significant moderating effect on the influence of contractor commitment and employee involvement on HSC performance.

Table 4.17: Testing of Null Sub-Hypothesis

Type	Hypothesis	Action
H_0^1:	Contractor commitment does not have a significant effect on the Performance of HSCs	Reject
H_0^2:	Employee Involvement does not have a significant effect on the Performance of HSCs	Reject
H_0^3	Developer Involvement does not have a significant moderating effect on the relationship between Contractor Commitment and Performance of HSCs	Accept
H_0^4	Developer Involvement does not have a significant moderating effect on the relationship between Employee Involvement and Performance of HSCs	Accept
H_0^5	Developer Involvement does not have a significant effect on the Performance of HSCs	Reject

Source: (Author, 2023)

Since the main objective of the study involved developing a tripartite framework for enhancing the performance of HSCs, additional questions were included in the questionnaire to gather additional useful data. This information together with that used in testing the research hypothesis(es) were integrated to formulate the framework later in this chapter. The additional data have been discussed as follows;

4.9 Factors that Limit Contractor Commitment and Employees' Involvement in HSCs towards OSHA 2007 Compliance

Respondents were provided with a list of 25 items which had previously been identified from the literature review as factors limiting contractors and employees in their attempt to comply with OSHA 2007 regulations. They were required to confirm if indeed these challenges affected their respective construction sites. The results are tabulated in *Table 4.18*.

Contractors are faced by a myriad of challenges in their efforts to comply with the OSHA 2007 especially on matters pertaining HSCs establishment and management. Kenya is a developing country and one among those challenges is inadequacy of resources. This is evident in the second ranked challenge, insufficient supervision from DOSHS towards HSCs activities with a score of 62%. The main reason for the inadequate supervision by DOSHS which is the regulatory authority responsible for implementing the OSHA 2007 is insufficient resources, both financially and personnel. This issue has been reiterated by Kirombo (2020). Inadequacy of resources can also be manifested through lack of a budget provision by both the developer and the contractor for H&S management. This is again seen in the third ranking challenge, lack of explicit contractual provisions on H&S financing.

Table 4.18: Limiting factors towards Contractor Commitment and Employees' Involvement in HSCs

No.	Limiting factors	Freq.	N	%	Rank
1	High number of unskilled and cheap labour market	78	125	62%	1
2	Insufficient supervision from DOSHS towards HSCs activities	77	125	62%	2
3	Lack of explicit contractual provisions on H&S financing	68	125	54%	3
4	Lack of clear roles and responsibilities among the stakeholders	68	125	54%	3
5	Lack of direct/explicit contractual obligations for developers towards H&S management	65	125	52%	5
6	Non-involvement of the developer in H&S management from the inception to handing over of the project	64	125	51%	6
7	Insufficient sensitizations and trainings for contractor employees	64	125	51%	6
8	Unmotivated employees towards H&S activities	63	125	50%	8
9	The culture of finger pointing and blames games amongst project partners in case of accidents/incidents	62	125	50%	9
10	Absence of top management (contractor management) support towards HSC activities	49	125	39%	10
11	Absence of mutual trust amongst stakeholders	61	125	49%	10
12	Lack of developer involvement in the establishment of health & safety committee (HSC)	60	125	48%	12
13	Engagement of incompetent employees in HSC matters	60	125	48%	12
14	Absence of continuous improvement strategies towards H&S management	60	125	48%	12
15	Absence of clear, faster and open lines of communication among stakeholders	58	125	46%	15
16	Lack of equity in the management of H&S among project stakeholders	55	125	44%	15
17	Absence of clear dispute resolution mechanisms	54	125	43%	17
18	Lack of perceived benefits among stakeholders towards H&S	54	125	43%	17
19	Lack of contractor top management support	53	125	42%	19
20	Lack of established resource sharing mechanisms towards H&S	48	125	38%	19
21	Lack of independent leadership in HSCs	47	125	38%	21
22	Absence of an over-sighting partner to the Bipartite HSC committee	47	125	38%	21
23	Lack of legal provisions for employees' significant roles in the HSCs	46	125	37%	23
24	Lack of established project stakeholder mutual goals towards H&S	45	125	36%	23
25	Lack of pain and gain sharing agreements among parties towards H&S management	45	125	36%	25

Source: (Author, 2023)

Without H&S budgeting from the planning phase of a project, it is very difficult to handle H&S management activities such as provision of PPEs and training of workers on H&S matters effectively when the project is ongoing.

The leading challenge established in this study was high number of unskilled and cheap labour market. This was not very surprising. As stated in the literature review, the Kenya construction sector does not specify the minimum qualification which an employee must possess before being engaged in construction activities as qualifications are only prescribed for highly skilled areas. This loophole has been exploited by contractors to bring on board persons who do not have prior training or experience (NCA, 2016). It is this cadre of employees who execute the bulk of manual tasks in an unhealthy and unsafe environment without statutory minimum entry qualification.

4.10 Developer Intervening actions towards Enhanced Contractor Commitment and Employees' Involvement in HSCs

Respondents were provided with a list of 23 items which had been identified during literature review as probable developer intervening measures in an attempt to enhance contractor commitment and employees' involvement in HSCs. The results are presented on *Table 4.19*. The five most popular intervening measures were found to be engaging contractors with good H&S record, providing sensitizations and trainings on H&S in the project, formulation of contractual provisions between contractor and employer on H&S financing, engagement of competent employees in HSC matters, and developer participation in H&S management from the inception to handing over of the built facility. The three least popular initiatives were having developer as the chair of the HSCs, contractor sole responsible for H&S during project implementation, and developer oversighting the HSC committee.

The study finds that contractors who have a good record towards H&S should be the choice of developers as they source executers of projects. This is also in agreement with best practices as seen in literature for the developed nations that take past performance as a criterion for selecting contractors for jobs (Bahn & Barratt-Pugh, 2013). In those countries, past performance is closely tied together with insurance premiums where contractors having bad records are compelled to pay high premiums and hefty penalties for unsafe and unhealthy incidences. This concept maybe worthy adopting in the Kenyan case; as only contractors with a good track record will be engaged in construction works. Much as this could be a good concept, this position could face some hiccups particularly for the SME contractors.

Table 4.19: Developer Intervening actions towards enhanced contractor commitment and employee's involvement in HSCs on construction projects

Description	Freq.	N	%	Rank
Engaging contractors with good H&S record	103	125	82%	1
Providing sensitizations and trainings on H & S in the project.	102	125	82%	2
Formulation of contractual provisions between contractor and employer on H&S financing	100	125	80%	3
Ensuring engagement of competent employees in HSC matters	98	125	78%	4
Participating of developer in H&S management from the inception to handing over of the built facility.	96	125	77%	5
Establishing continuous improvement strategies towards H&S management	89	125	71%	6
Establishment of clear roles and H & S responsibilities amongst the stakeholders	89	125	71%	6
Involvement of developer in the HSC	87	125	70%	8
Encourage employees' involvement and buy-in towards HSCs activities	82	125	66%	9
Providing incentives and motivations towards enhanced compliance to H&S regulations	82	125	66%	9
Continuous engagement with DOSHS towards HSCs activities	81	125	65%	11
Cultivating mutual trust amongst the project stakeholders	81	125	65%	11
Instituting clear, faster and open lines of communication among stakeholders	77	125	62%	13
Giving the pathway towards H&S management in the project	76	125	61%	14
According equal opportunities to all stakeholders in the management of H&S	75	125	60%	15
Have pivotal roles executed by employees in the HSC	74	125	59%	16
Encourage a culture change from finger pointing and blames to concerted responsibility towards H&S management	74	125	59%	16
Establishment of clear dispute avoidance and resolution mechanisms	74	125	59%	16
Establishment of resource sharing mechanisms among all stakeholders to foster H & S	72	125	58%	19
Formulating pain and gain sharing agreements amongst the parties, towards H&S management	71	125	57%	20
Provide oversighting role to the HSC committee	69	125	55%	21
Contractor sole responsibility for H&S in the project	68	125	54%	22
Having the developer as the chair of the HSCs	56	125	45%	23

Source: (Author, 2023)

The contractors in these categories are on most occasions on their maiden entrance to the industry and may not have a history to consider. Poor record keeping and the unwillingness or absence of such record as concerns contractor performance record could hinder taking such a step. The construction industry regulator NCA, has not developed a mechanism of evaluating contractor performance criterion and hence it might be a tall order enforcing that requirement.

H&S performance being a key aspect worth considering during contractor evaluation either for project selection or promotion to higher categories is worth considering. Contractor capacity building will involve having contractual provisions that expressly include H&S financing. This position as per findings greatly cushion contractors from failure to price on H&S in fear for being non-competitive and losing out on tenders. Those contractual provisions have been identified as priority areas for developer intervention. A contractor having financial provisions will have a positive attitude towards H&S on site.

Capacity building opportunities for employees in terms of provision of training opportunities has been identified as an area that calls for developer intervention. This is closely tied to contractual provisions on H&S by the developer as contractors will offer training opportunities to employees where resources are available contractually for such an activity. Capacity building through training to employees is essential for their effective performance in HSCs.

This position could be ailing the construction industry to a large extent as the developer desires that contractors engage full baked employees that will discharge their duties without much investment towards H&S. This is self-defeating as it is against the spirit and the letter of the OSHA 2007 dictating a different approach be taken that instead of enforcement route a collaborative approach be adopted to bring on board the developer, contractor and employees through a win all approach towards the support accorded to the HSCs.

The proposals on *Table 4.19* can conclusively be categorized into factors that enhance capacity building for the employees to enhance their involvement in HSCs and the ones that lead to change of attitude by contractors towards effective functioning of HSCs towards their commitment in the effective functioning of HSCs. These factors can also be identified as predictors/enablers of contractor commitment and employee's involvement in the HSCs as their absence or presence in the working environment is an indicator whether efforts are being made by the internal stakeholders towards OSHA 2007 compliances. A further *Table 4.20* as given below exemplifies this position.

Table 4.20: Attitude and Capacity Building factors towards HSCs Performance

Item	Factors that influence contractor attitude towards HSCs commitment	Factors that enhance employees' capacity building ability towards HSCs involvement
1	Engaging contractors with good H&S record	Providing sensitizations and trainings on H & S in the project.
2	Formulation of contractual provisions between contractor and employer on H&S financing	Ensuring engagement of competent employees in HSC matters
3	Establishing continuous improvement strategies towards H&S management	Establishment of clear roles and H & S responsibilities amongst the stakeholders
4	Participating of developer in H&S management from the inception to handing over of the built facility.	Involvement of developer in the HSC
5	Continuous engagement with DOSHS towards HSCs activities	Encourage employees' involvement and buy-in towards HSCs activities
6	Cultivating mutual trust amongst the project stakeholders	Providing incentives and motivations towards enhanced compliance to H&S regulations
7	According to equal opportunities to all stakeholders in the management of H&S	Instituting clear, faster, and open lines of communication among stakeholders
8	Encourage a culture change from finger pointing and blames to concerted responsibility towards H&S management	Giving the pathway towards H&S management in the project
9	Establishment of resource sharing mechanisms among all stakeholders to foster H & S	Establishment of clear dispute avoidance and resolution mechanisms
10	Formulating pain and gain sharing agreements amongst the parties, towards H&S management	Have pivotal roles executed by employees in the HSC
11		Provide oversighting role to the HSC committee

Source: (Author, 2023)

Having identified factors that limit contractor commitment and employee involvement in HSCs, with a follow up feedback on how the developers could intervene to enhance change of contractor attitude and foster employees' capacity in HSCs, a follow up question was formulated with an aim of soliciting views on the significance of the developer intervening roles towards enhanced performance of HSCs and OSHA 2007 compliance. The inquiry was made to find out:

1. Whether the contractor and employees could support the idea of stakeholder collaborations towards enhanced performance of HSCs and OSHA 2007 compliance

2. Which partner could yield the highest level of influence in a collaborative arrangement
3. Whether involvement of developer in a collaborative arrangement could upset the landscape towards enhanced performance of HSCs and OSHA 2007 compliance
4. Whether a tripartite approach could yield a positive return towards OSHA 2007 compliance.
5. Probable areas of collaboration between internal stakeholders towards enhanced OSHA 2007 compliance

These issues have been discussed in the following section together with its subsections.

4.11 Contractor, Developer and Employees' buy-in towards collaborations in enhancing performance of HSCs on construction sites

Respondents were asked whether they supported the idea of collaboration between contractor, developer, and employees in order to enhance compliance with OSHA 2007. All the responses were affirmative except for one missing value, meaning that they welcomed the idea of taking a collaborative approach in enhancing HSC performance and OSHA 2007 compliance on construction projects. The *Table 4.21* gives the findings from the respondents.

Table 4.21: Support for partnering

Response		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	124	99.2	100.0	100.0
Missing	System	1	.8		
Total		125	100.0		

Source: Author, 2023

Based on the synergistic concept presented in Chapter Two, it is obvious why all the respondents supported the idea of a collaboration among the contractor, developer, and employee. These three parties can be able to combine their efforts and resources towards ensuring maximum performance of HSCs and OSHA 2007 compliance which would cause a shift to a culture of zero tolerance towards accidents on construction sites.

4.11.1 Stakeholder with highest influence in HSCs

The research sought to establish which of the three main project stakeholders namely developer, contractor, and employees had the highest influence towards OSHA 2007 compliance. Results are found on *Table 4.22* and *Figure 4.18*. The developer influence was found to be statistically significant in Table 4.9.

Table 4.22: Level of Influence by parties towards HSCs performance

Project stakeholder	Frequency	Percent	Valid Percent	Cumulative Percent
Developer	47	37.6	37.9	37.9
Contractor	75	60.0	60.5	98.4
Employees	2	1.6	1.6	100.0
Total	124	99.2	100.0	
Missing	1	0.8		
Total	125	100.0		

Source (Author, 2023)

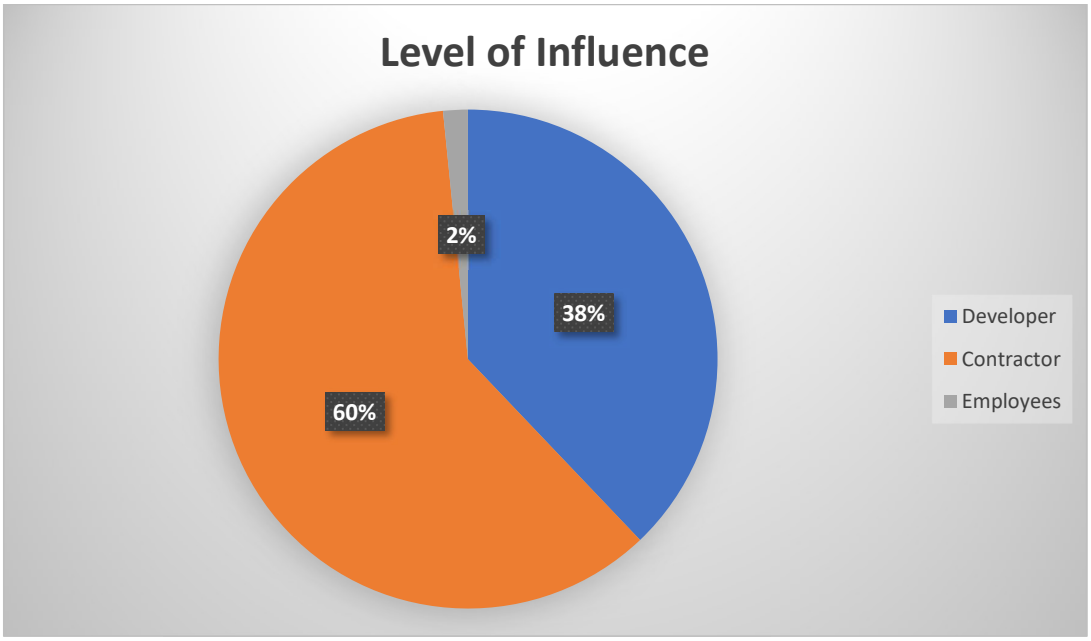

Figure 4.18: Level of Influence by parties towards HSCs performance
Source; (Author, 2023)

This finding resonates very well with earlier findings in this study that employees are on the receiving end. Whatever the employees undergo is a consequence of the decisions made by both the developer and contractor courtesy of resources and contractual obligations in the project. According to OSHA 2007, responsibility in the HSCs is on the shoulder of the occupier (contractor) who is obligated to provide a conducive environment to allow the committee to discharge its mandate making contractors wield more influence on the employees at the project implementation phase. On the flipside, the developer does wield substantial influence too at this phase from the point of being the financier of the project and has a direct contractual influence on the contractor who in this case is his employee (Atuahene *et al*., 2017).

This influence if directed to the efforts that result into enhancing compliance towards OSHA 2007 could result into formulation of contracts that provide for H&S direct financing and

engagement of contractors that have a good record towards H&S among other factors. These factors have direct influence on the change of attitude by contractors towards HSCs which will have a ripple effect towards capacity building of employees in the HSCs. Opportunities for employees training, provision of PPEs and involvement of employees in formulation of programs that help enhance compliances at workplaces are significant indicators of contractor commitment and employees' involvement in HSCs.

4.11.2 Effect of Involving Developer in HSCs Management

Respondents were asked if they thought incorporating the project developer in the H&S management would enhances compliance to the OSHA 2007 regulations. As presented on *Table 4.23* and *Figure 4.19*.

Table 4.23: Effect of incorporating the project developer in the HSC management

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	115	92.0	92.7	92.7
No	2	1.6	1.6	94.4
I Don't Know	7	5.6	5.6	100.0
Total	124	99.2	100.0	
Missing	1	.8		
Total	125	100.0		

Source (Author, 2023)

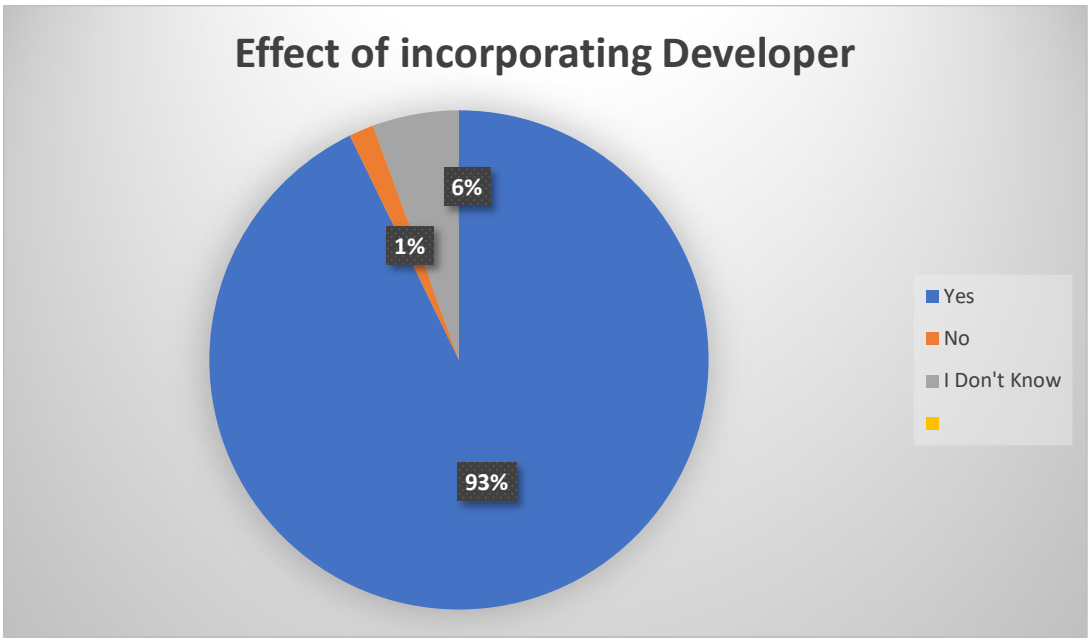

Figure 4.19: Effect of Involving Developer in HSCs Management
Source; (Author, 2023)

The above section has shown that indeed developer involvement in HSCs will have a positive influence towards enhanced OSHA 2007 compliance. The developer influence runs right from project design, procurement, implementation right to the handing over of the project. The developer influences H&S through drafting of contracts, engagement of contractors, financing of H&S programs, formulation of policies that have direct influence on H&S at workplaces (Haupt & Akinlolu, 2021). These are aspects that have a direct bearing on the contractor attitude and building of capacity of employees for effective performance of HSCs on construction projects.

With this understanding that indeed developer and contractor influence the performance of HSCs; it was prudent to find out whether bringing together the three stakeholders on a common platform could enhance the contractor commitment and employees' involvement in HSCs. The theory on synergy states that, "stakeholders working together give higher impact than when they work independently towards a common goal". This theory was put to test in this study by seeking out whether formulating tripartite approach could enhance HSCs performance towards OSHA 2007 compliance as discussed below.

4.11.3 Effect of Tripartite Collaborative approach framework in HSCs

Respondents were requested to rate the extent to which a tripartite collaboration framework between developer, contractor and employees could enhance performance of HSCs and compliance with OSHA 2007. The results are as shown on *Table 4.24*. An overall mean of 4.41 out of a possible 5 indicated that such a framework would be essential towards raising the levels of HSC performance. This demonstrated the understanding by the industry stakeholders on the benefits such a framework would have in the subject of H&S management. Maximum benefits from the establishment and management of HSCs can only be achieved through a collaborative effort from the three parties.

Table 4.24: Effect of Tripartite Collaboration Framework

	N	Mean	Std. Deviation
Effect of tripartite collaboration	124	4.41	.721

Source: (Author, 2023)

Further, respondents were requested to indicate probable areas of collaboration towards enhanced performance of HSCs. The results are tabulated in *Table 4.25* below.

Table 4.25: Areas of Stakeholder Collaboration in Enhancing HSC Performance

No.	Area of Participation	Freq.	N	%	Rank
1	Safety training for staff	99	125	79%	1
2	Involvement of developer in HSCs	98	125	78%	2
3	Selection of PPEs to staff	95	125	76%	3
4	Conducting of joint safety inspections	95	125	76%	3
5	Engagement of safety officer	92	125	74%	5
6	Conducting of safety inductions to staff	90	125	72%	6
7	Implementation of safe working systems	88	125	70%	7
8	Engagement of qualified contractor	87	125	70%	8
9	Conducting of safety inspections	86	125	69%	9
10	Engagement of professionals in the project	84	125	67%	10
11	Development of Emergency Plans and Procedures	83	125	66%	12
12	Culture change from finger pointing to collective responsibility	83	125	66%	12
13	Developer enhanced funding towards H&S management	81	125	65%	13
14	Contractually committed towards H&S management	81	125	65%	13
15	Expertise sharing	80	125	64%	15
16	Participation in toolbox talks	79	125	63%	16
17	Securing top contractor management commitment towards H&S	74	125	59%	17
18	Development of safety policy in the company	74	125	59%	17
19	Acquisition of compliance Safety Certificates to plant and equipment	68	125	54%	19
20	Developer taking leadership role in HSCs	53	125	42%	20

Source: (Author, 2023)

It is clear that there are many areas of collaboration among the three parties namely, contractor, developer, and employees. There is only one common goal, ensuring near-zero occurrence of accidents on construction sites by enhancing the performance of HSCs. In order to achieve this, the list of items which need participation of all the three stakeholders is long. This is because most of these responsibilities overlap.

4.12 A Tripartite Collaborative Approach Framework (TCAF)

This section outlines the route undertaken by the study towards formulation of the tripartite collaborative approach framework. The framework itself is a culmination of the piecing together of the key findings obtained by analysing the data from the field.

4.12.1 Rationale for the TCAF

Contractor commitment and developer involvement culminates in the provision of a conducive working environment for employees that is free from unsafe and unhealthy incidences. As has been proved in objective three, contractor commitment and employee involvement have a direct effect on the performance of HSCs. Further, this study has established that the current

bipartite approach, where compliance on construction projects is executed in its entirety in HSCs by two parties namely contractor and employees is not effective particularly for the SME construction projects in Nairobi, Kenya. This is of significance especially in the SME construction projects, which are not endowed with many resources to continuously build capacity for its employees and have workers on longer contracts.

The challenges of low capacity on the side of employees and negative attitude by contractors can only be alleviated through statutory onboarding of the developer who according to the OSHA 2007 bipartite approach has no platform upon which they can use to enhance performance of HSCs. This position changes with the formulation of a tripartite approach that grants the developer an opportunity to proactively and actively participate in all H&S aspects on construction projects in Nairobi, Kenya.

4.12.2 Formulation of the TCAF

The three theories namely; theory on synergy, the stakeholder theory and the systems theory, were the basis for the formulation of the TCAF towards enhanced HSC performance on the SME construction projects in Nairobi, Kenya. The formulation process consists of the coalescing of the compliance system components and the Key Developer Actions (KDAs) that need to be taken.

Findings in this study indicate that HSC performance on construction projects can be enhanced with the active participation of the developer in the management of HSCs. Inclusion of the developer in the HSCs require a platform that can adequately enhance synergy amongst the stakeholders through stakeholder collaboration. For this to be achieved, there should be a system that progressively considers the input, the process, and the output from each participant's contribution in a given controlled environment i.e., compliance is a system that requires controls for effective performance. The components making up the compliance system are derivatives or findings earlier established in objectives 1-3. These derivatives form the critical components of the compliance system. The OSHA 2007 compliance system functions primarily vide the use of HSCs which as currently constituted works on a bipartite platform that solely relies on the occupier (contractor) and employees in the execution of H&S in workplaces as per OSHA 2007.

Accordingly, systems theory is adopted to help formulate a platform that harnesses the efforts of the developer, the contractor, and employees towards enhanced compliance with OSHA 2007. The process followed towards enhanced HSC performance has inputs, transformation,

output, and feedback which are all the components in a system, i.e., findings from objectives 1-3 can adequately be superimposed as components in the OSHA 2007 compliance system.

Contractor and employees deposit inputs in the system as a way of involvement in the HSCs. The inputs are then processed as activities by the HSCs that leads to an output. In this case, the output expected is the performance of the HSCs in compliance with the OSHA 2007. The feedback in this case is the level of compliance with the OSHA 2007 as evidenced by the reduction in the number of accidents or incidences on the SME construction sites. It is this feedback, that has already been determined to be low, that triggers the level of developer influence towards enhancing the level of performance of the HSCs through the KDAs. The KDAs were earlier identified in *Section 4.10* and listed on *Table 4.19*. *Table 4.26* below gives the input, process, feedback, and output components as derived from the study objectives.

Table 4.26: System for Enhancing HSC Performance on Construction Sites

Input (Individual stakeholder roles)	Process (The functioning of the HSCs in compliance with OSHA 2007	Feedback (Level of compliance with OSHA 2007)	Output (Level of Performance of the HSCs)
Level of Contractor Commitment in the HSCs	Contractor roles in the HSCs according to OSHA 2007	Reduction in the number of unsafe/unhealthy incidences on the SME construction sites	Enhanced performance of the HSCs on the SME construction sites
Level of Employees Involvement in the HSCs	Employees roles in the HSCs according to OSHA 2007		
Level of Developer Involvement in the HSCs	Developer intervention (KDAs) as identified in the study		

Source (Author, 2023)

The OSHA 2007 compliance system identifies the various components of functioning HSCs on construction projects. HSCs function in environments that require controls and monitoring towards efficiency and continuous improvement via a framework that assigns duties and responsibilities to the various stakeholders in the HSCs. This system inculcates Key Performance Indicators (KPIs), based on HSC functions, and interventions towards improvement of the system. The KPIs and the KDAs are essential components of the framework. The efficiency of the HSCs is assessed by how well the two critical parameters are periodically executed. These two parameters are aligned alongside the requirements of the OSHA 2007.

Moreover, for any approach that touches on H&S to be successful, direct involvement of the developer is paramount as outlined in the literature review and established in the study's findings. The OSHA 2007 makes provisions for the establishment of HSCs that solely rely on the input from the contractor and employees in a bipartite arrangement. This study finds that the level of compliance with OSHA 2007 and subsequent performance of the HSCs on the SME construction sites in Kenya, to be significantly low compared to statistics elsewhere. This condition demands for an intervention to reverse the existing deplorable H&S conditions on construction sites in Kenya. It is upon this premise that, that the study suggests that the missing link in HSC bipartite arrangement is the developers. The incorporation of the KDAs reinforces the efforts by the HSCs in the bipartite approach to enhance its effectiveness towards compliance with OSHA 2007.

Incorporation of the KDAs in the OSHA 2007 compliance systems would make a stronger system based on a combination of the KDA (Developer) and the HSC (Contractor +Employees). This approach is what the study refers to the Tripartite Collaborative Approach Framework (TCAF). The strength of the TCAF heavily relies on the level of collaboration among the three stakeholders namely; the developer, contractor and the employees. Effectiveness of the collaboration among stakeholders is pegged on the level of communication between the stakeholders which is identified in the study as one of the prerequisites of effective performance of the HSCs. The framework constitutes the following components; the stakeholder input (contractor & employees), the HSCs functions, HSC key performance indicators (KPIs), the key developer actions (KDAs). The four components make up the TCAF. *Figure 4.20* below gives the TCAF as formulated in this study as per objective number four of this research.

Figure 4.21 presents an implementation system for the TCAF. The process starts on the left side which represents the current legal framework for H&S management on construction sites. The current OSHA regulation provides for a bipartite structure of the HSCs which includes contractors and employees. As reflected on the framework, this study established a low compliance rate for the existing OSHA guidelines. The performance of these HSCs was found to be inadequate at 40%. The study further established that statutory inclusion of the developer in H&S management and specifically in HSCs affairs has a desired effect of improving the performance of the restructured HSCs. The onboarding of the developer through the KDAs presented in the TCAF on *Figure 4.20* is the most crucial and missing piece in the jigsaw puzzle.

Stakeholders input as per the current OSHA 2007 regulations (Contractor and Employees)		HSCs functions in compliance with OSHA 2007	HSCs' Key Performance Indicators (KPIs)	Key Developer Action (KDAs)
Contractor - Appoint management representative in the HSC - Establish the HSC committee -Oversight the election of employees 'representatives in the HSCs -Provide suitable meeting facilities for the HSCs -Participate in the HSC meetings -Participate in the site inspections to confirm compliance -Review and act on the recommendations from the HSCs meetings -Facilitate periodical audits on OHS -Facilitate employees training on H&S -Submit reports to DOSHS as OSHA 2007 requirements	**Employees** -Election of suitable representatives to the HSCs - Participation in the trainings facilitated by the contractor -Use of PPEs as provided by the developer -Participation in the HSCs scheduled inspections -Observing all standard operating procedures -Proper use of personal protective gear	-Preparation of committee calendar for the year -Holding of periodic inspections to confirm compliance -Employees training sessions -Induction training for all new employees -Display of the OSHA abstract for all to read - Preparation of meeting minutes -Participation in OHS audit	-Established HSC (with membership from contractor, developer, and employees) -A schedule of HSC meetings for every calendar year -Committee minutes of HSC meetings held -Reports submitted to DOHSS periodically -Documented areas that require contractor attention -Proposals for improvements towards H&S in workplaces -Records of accidents and near misses at workplaces	Engaging contractors with good H&S record - Providing sensitizations and trainings on H & S in the project. - Formulation of contractual provisions between contractor and employer on H&S financing - Ensuring engagement of competent employees in HSC matters - Participating of developer in H&S management from the inception to handing over of the built facility - Establishment of clear H&S roles and responsibilities amongst the stakeholders - Involvement of developer in the HSC -Approve project OHS management plan -Review method statements, -Job safety analyses and other OHS plans -Review & analyze OHS data -Conduct OHS inspection /Audits

Figure 4.20: The Tripartite Collaborative Approach Framework (TCAF)
Source (Author, 2023)

The TCAF would have two effects. First is the revision of the existing OSHA to accommodate the developer. Second is the improvement in the performance of the restructured HSCs. Both effects would result in enhanced H&S management in construction sites. Some of the KPIs of this would be: enhanced safety of workers and public, reduced site accidents, reduced fatalities, improved employee involvement on H&S matters, increased productivity, time savings, financial savings, and project success. These are measurables which can be used to inform the necessary actions for further improvements. This is demonstrated in the feedback loop which would mean an endless cycle of continuous improvement towards zero tolerance for construction site accidents.

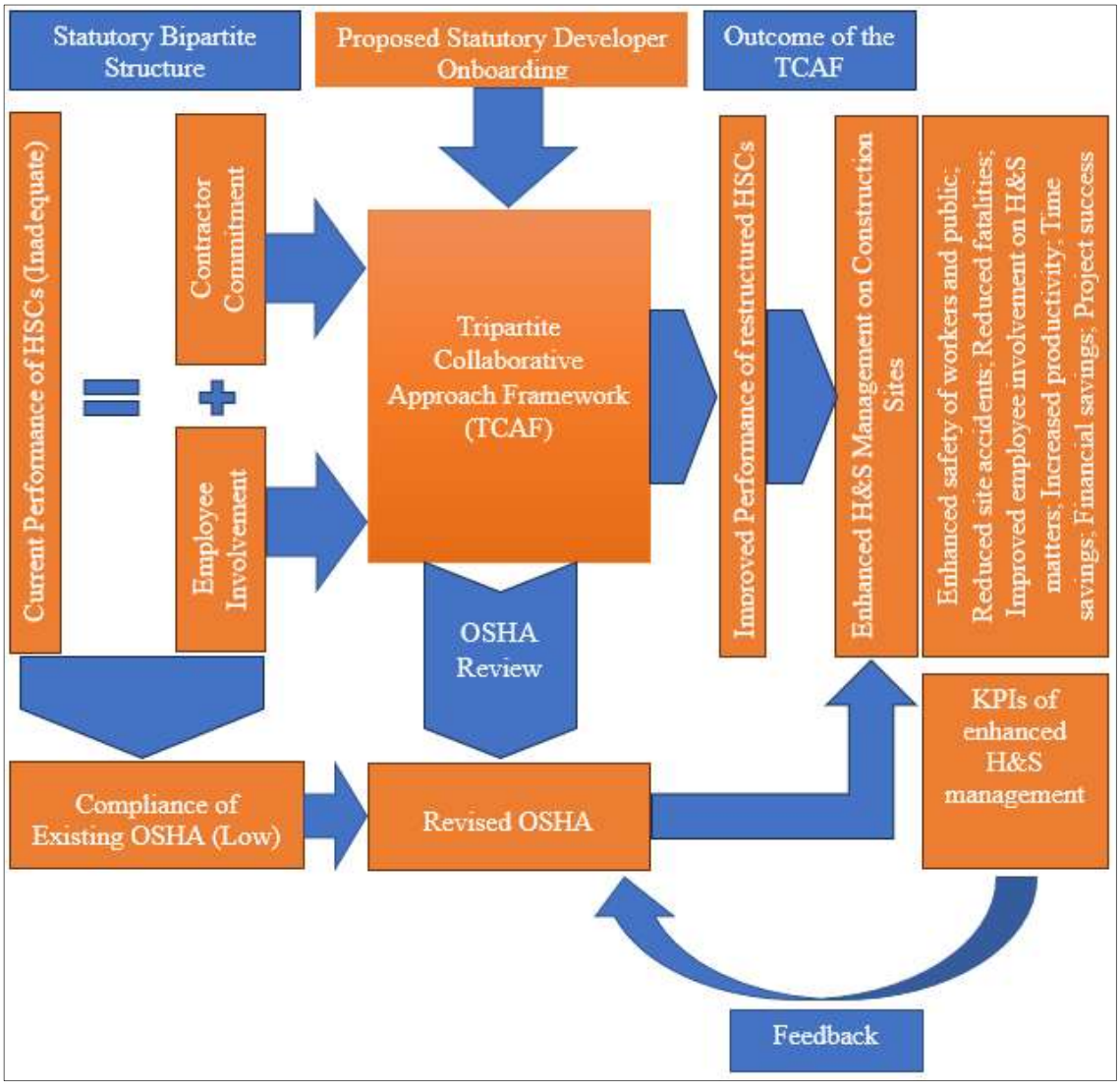

Figure 4.21: Implementation System for the TCAF System
Source; (Author, 2023)

From literature review, it can be concluded that any safety management framework has to comply with ILO (2005) requirements that encompass policy, organization structure, implementation plan, review and provision for continuous improvement. The framework must detail the probable areas of collaboration and the prerequisites for such collaboration. The implementation plan should detail key management action and assign responsibility for the given activity. A developer's involvement in all project decisions and proactive participation in H&S is critical for great project performance because they play a major coordination role in ensuring that H&S concerns are controlled and information is communicated across the construction supply chain.

Developers are in the best position to lead the cultural change required to improve H&S in the building and construction industry since they are the drivers of projects from inception to completion and as clients of the building and construction sector's services. Furthermore, developers make critical decisions regarding project budget, quality, performance objectives, and schedules, all of which have an impact on creating pressures and limits that can affect H&S during construction.

The formulated H&S management framework complies with the requirement as stipulated by ILO-OSH, 2001 on H&S management systems (ILO, 2009). The enhanced performance of HSCs and OSHA compliance is a function on input, control, output and a feedback mechanism. The role played by the contractor and employees are taken as inputs that require the HSC (2005) guidelines as a control mechanism to deliver on their mandate. However, this mandate has not been actualized due to internal weakness like low literacy levels by employees and low financing by the developer which in turn cripples the performance of the HSCs.

An intervening mechanism then has to be introduced to tilt the equation in favour of the effective functioning of the HSCs. The intervening role can only come in the form of the developer involvement. However, the developer in the bipartite approach has no platform upon which he can use to influence the function of the HSCs, except in cases of voluntary involvement as demonstrated in the study. A tripartite approach was formulated where the three stakeholders could synergistically work together through collaboration. This framework then is anchored on three key theories which are; the theory on synergy, the stakeholder’s theory and the systems theory. These three theories are the ones that give birth to the tripartite collaborative approach framework otherwise referred to as the TCAF. It is a platform upon

which the developer uses to exert his influence on the HSCs towards enhanced performance of the HSCs and compliance with the OSHA 2007.

4.13 Summary

In the OSHA 2007 compliance system, three stakeholders involved require a sound collaboration framework that assures synergy towards enhanced compliance with OSHA 2007. The framework developed relies on the findings from the three objectives, and the additional information obtained from the respondents, which were converted into components as captured in *Figure 4.20* under the OSHA 2007 compliance system. The OSHA 2007 compliance system is converted into a model process or an operational management framework that assigns tasks and responsibilities for stakeholders involved in it. The operational management framework having onboarded the developer as a third partner in the conventional bipartite HSCs is renamed the tripartite collaborative approach framework (TCAF). The framework is a platform upon which the attributes of contractor commitment, developer and employees' involvement in the HSCs could be continually enhanced.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter draws conclusions and makes recommendations for actions to be taken by industry stakeholders. Contributions to the body of knowledge and areas of further research are also highlighted. This study sought to establish the underlying causes that could be contributors to the continued reports of unsafe incidences among the SME construction projects. The aim of the study was to formulate a framework towards enhanced performance of HSCs on the SME construction sites in Nairobi.

5.2 Conclusions

The study found the level of compliance with the OSHA 2007 on construction sites stood at 62%. OSHA 2007 being a regulatory requirement is expected that sites exhibit 100% compliance with the law. Statistically it means that 38% of the construction projects in Nairobi, are totally non-compliant with this legal requirement. Further, HSC was found to be the worst performing among the evaluated indicators of OSHA compliance. Since HSC is the main driver of OSHA compliance, then there is high urgency for stakeholders to do everything possible to enhance HSC performance and therefore reduce the level of unsafe and unhealthy incidences.

The findings established that the level of contractor commitment, employee's and developer involvement in the HSCs was averagely low at 64%, 54%, and 56%. It was established that a paltry 20% of the contractors had established HSCs and only 72% of these had meetings representing an overall trivial figure of 15%. It was noted that some of the HSC functions were being performed even in the absence of the HSCs. The study further established the level of performance of the HSC functions stood at a mere 40%. Establishing HSCs that do not serve their purposes defeats their very existence as the crucial instrument for ensuring compliance with OSHA 2007.

The study established existence of a positive significant relationship between the level of contractor commitment (0.662), employees' involvement (0.708) and developer involvement (0.639) in the HSCs against the level of performance of HSCs on construction sites in Nairobi. The higher the degree of contractor commitment, employee's and developer involvement, the higher the degree of performance of HSCs on construction sites in Nairobi. Multiple regression analysis established that the level of HSC performance could be predicted using the following statistical model;

HSCs= 24.856 + 4.23CC +6.633EI + 1.846DI + e

Where: HSCs = Performance of HSC; CC= Level of Contractor Commitment; EI = Level of Employees Involvement; DI = Level of Developer Involvement and e = Error

The model which was found to be statistically significant supported the earlier findings from the bivariate relationships that all the three predictors had a positive influence on the performance of HSCs. Based on this equation, the study hypothesis holds: the low performance of HSCs is as a result of low contractor commitment, inadequate employees' and developer involvement in HSCs on construction projects. To enhance OSHA 2007 compliance on construction projects, then efforts must be put in place towards enhancing contractor commitment and encouraging more involvement of employees and developer in those efforts.

The bipartite approach as adopted towards OSHA 2007 compliance on the SME construction sites has failed to actualize its intended purpose, which was to eradicate cases of unhealthy and unsafe incidences at work places. This is evidenced by reports of rampant accidents and incidents on construction sites. Contractors have minimum commitment towards the performance of the HSCs and consequently accords the employees minimum involvement in the management of the HSCs on construction sites. The low level of contractor commitment and low employees' involvement have a direct influence on the performance of the HSCs which in turn has an influence on the level of OSHA 2007 compliance on the construction sites in Kenya. The absence of contractual provisions on H&S financing was found to be one of the impediments towards success in safety management. Contractors channel their resources towards project implementation with no consideration for H&S of employees at work places. A great gap exists in the functioning of the HSCs that demands introduction of the developer to inject new impetus on the performance of the HSCs. The developer influence requires a platform upon which that influence can be injected from. Currently, no such platform exists.

The study establishes an overwhelming 92% support for statutory onboarding of developer in the functioning of HSCs on construction sites in Nairobi. Onboarding of the developer will be attained through a collaborative approach by use of the TCAF. The TCAF encourages collaboration and building of synergy amongst project stakeholders. Any initiative that encourages prudent utilization of meagre resources is a most welcome approach. Further, the TCAF identifies KDAs and KPIs as tools for monitoring the performance of the HSCs on sites.

5.3 Recommendations

1. TCAF to be adopted towards enhanced performance of HSCs in compliance with the OSHA 2007 on construction sites in Nairobi. As noted in the positive correlation

coefficients, there is need for increased contractor commitment and employee involvement in the management of HSCs. The developer involvement should not only be enhanced but should also be made statutory. Due to the crucial role that the developer plays, such involvement will also trigger improved contractor commitment and increased employee involvement.

2. Review of the OSHA 2007 to accommodate the requirements of the TCAF which calls for the onboarding of the developer. The statutory involvement of the developer in the management of the HSCs is the missing link in the culture shift towards zero tolerance of construction site accidents.
3. There is need to ensure increased level of contractor commitment towards H&S management on construction sites. This could be achieved through engagement of competent employees, continuous improvement strategies towards H&S management, sensitization and trainings for contractor employees, motivation of employees towards H&S activities and ensuring independent leadership in HSCs.
4. Further, employee involvement in OSH matters should also be enhanced in the following ways; participation in safety trainings, possession of technical qualification, and participation in HSCs meetings.
5. There should be explicit contractual provisions on H&S financing. This will ensure no conflicts arise during construction project execution with regard to dealing with any arising H&S matters.

5.4 Contributions to Knowledge

Despite the large number of studies having addressed the concept of H&S management, only a limited amount of research has focused on stakeholder collaborations towards compliance enhancement on SME construction projects with particular reference to developing countries. In the majority of existing studies, researchers have replicated already tested models in order to improve their adequacies.

1. This research has been able to apply the principles of the systems theory to formulate a framework that enhances compliance with regulatory requirements on the SME construction sites with reference to developing countries.
2. The study empirically established the relationships amongst the stakeholders namely; the developer, contractor, employees and the compliance on construction sites with occupational health and safety regulations.

3. It has been able to identify key developer actions that can enhance the level of contractor commitment and employees' involvement in HSCs towards enhanced compliance with OSHA 2007 on SME construction sites.
4. The study has been able to formulate the tripartite collaborative approach framework (TCAF) as a platform that stakeholders could adopt towards enhanced compliance with regulations on SME contractors in developing nations.
5. The study explored the extent to which stakeholders' collaboration enhances level of compliance to H&S regulations for the SME construction projects.
6. The study advances the stakeholder theory through a workplace collaborative approach in a bid to raise compliance with OSHA 2007 on the SME construction projects.
7. This study identifies weakness exhibited on SME construction projects in the bipartite approach in the enforcement of OSHA 2007 and provides guidance on the development of policy direction to guide capacity building for SMEs.

5.5 Areas for Further Research

This study has focused on H&S compliance on SME construction projects who have engaged twenty or more employees and are by law required to establish HSCs. Further research should focus on H&S compliance for projects, which have engaged less than twenty employees (micro construction sites) and are not obligated to establish HSCs. Further, the TCAF should be tested out in real world to check the performance and reliability of the framework as no trials were conducted.

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APPENDICES

Appendix I- Introductory Letter to Respondents

CHRISPUS NDINYO,
P.O BOX 10065-00200,
NAIROBI, Kenya.

Tel: +254 (0) 724715059,
Email: ndinyochrispus@students.uonbi.ac.ke
Date: 3rd March 2022

……..

Dear Sir/Madam,

RE: INVITATION TO PARTICIPATE IN A RESEARCH PROJECT

A Framework for Enhancing the Performance of Health and Safety Committees on Small and Medium Size Construction Sites in Kenya.

I am a PhD student at the University of Nairobi in the Faculty of Built Environment and Design, who is currently conducting a study on the way construction project stakeholders - developer, contractor and site employees - have complied with the OSHA 2007; in partial fulfillment of the requirements for the award of Degree of Doctoral of Philosophy (PhD) in Construction Management. The study aims to formulate a framework that encourages collaboration amongst the stakeholders in a bid to foster efficiency in the management of health and safety on construction sites in Nairobi. Specific objectives of the study are:

- To establish the level of performance of HSCs in compliance with OSHA 2007 on the small and medium size construction sites in Nairobi.
- To determine the extent of developer involvement, contractor commitment, and employees' involvement in HSCs on the small and medium size construction sites in Nairobi.
- To explore the effect of developer involvement, contractor commitment and employees' involvement on performance of HSCs.
- To formulate a framework towards enhanced performance of HSCs on the small and medium size construction sites in Nairobi.

Being a key player in the construction sector, you have been identified by the researcher through a random sampling procedure to help provide the information required to address the study objectives, as outlined in the attached questionnaire on compliance with OSHA 2007 Health and Safety regulations on construction sites in Kenya. The data collected is limited to academic use and will be treated as confidential. This exercise has been sanctioned by the National Council of Science Technology & Innovation (NACOSTI) and the University of Nairobi.

Thank you very much for your valued time.

Yours faithfully,
CHRISPUS SIFUMA NDINYO
PhD Candidate; Reg. No. B80/50812/2016

Appendix II - Questionnaire

SECTION A: BACKGROUND INFORMATION

1. Background of the Respondents: kindly tick (√)

	Role on Site	***Profession***	√	***Education level***	√	***Experience***	√
a	Clerk of Works **(Answer Sections C & H)**	Civil engineering		Masters		1-5 years	
		Architecture		Degree		6-10 years	
		Quantity Surveying		Diploma		11-15 years	
		Construction Management		Certificate		16-20 years	
		Others……		Others……		Above 20	
b	Site Agent **(Answer Sections B, D, E, F & G)**	Civil engineering		Masters		1-5 years	
		Architecture		Degree		6-10 years	
		Quantity Surveying		Diploma		11-15 years	
		Construction Management		Certificate		16-20 years	
		Others……		Others……		Above 20	
c	NCA Accredited Site supervisor ***(*Answer Section C)**	Civil engineering		Masters		1-5 years	
		Architecture		Degree		6-10 years	
		Quantity Surveying		Diploma		11-15 years	
		Construction Management		Certificate		16-20 years	
		Others……		Others……		Above 20	
d	Other (Specify)						

2. Particulars of the Project:

Item	***Description***	***Amount in Kenya shillings***	**Kindly tick (√)**
a)	Contract sum	Less or equal to 20 million	
		21–40 million	
		41–60 million	
		61–80 million	
		81–100 million	
b)	Contract period	1-3 months	
		4–6 months	
		7–9 months	
		10–12 months	
		Above 12 months	
c)	Percentage complete	0–20 %	
		21–40 %	
		41–60 %	
		61–80 %	
		81–100 %	
d)	Others		

3. Which one of the government agencies below has visited this site most times to check on health and safety? Kindly tick

[ ] NEMA [ ] NCA [ ] County Government [ ] DOSHs

4. Has this project been ever suspended or any legal action taken against the contractor for non-compliance with OSHA 2007?

[ ] Yes [ ] No

5. If the answer to question 4 above is 'Yes,' what was the highlighted non-compliance? Briefly explain in the section below:

---

6. Which of the following OSHA 2007 H&S regulations have been complied with in this construction project? Please tick (√) either a "Yes" or "No" response, appropriately.

Item	Question	Response	
		Yes	No
1	Is this workplace registered with DOSHS		
2	Posted a copy of abstract OSHA 2007 on notice board accessible to the public?		
3	Have you placed any warnings about the dangers or illnesses that may befall anyone who are exposed to harmful or objectionable substances?		
4	Do you have a Health and Safety Policy?		
5	Engaged H&S officers in compliance with OSHA 2007?		
6	Established Health and Safety Committee (HSC)?		
7	Scheduled H&S inspection of the workplace for the current calendar year?		
8	H&S meetings minutes for the past 4 months?		
9	Do you have safety inspection certificates for all equipment and machines from KEBS?		
10	Do you have evidence of issuance of PPEs to all employees?		
11	Do you have evidence of safety training to all employees?		
12	Do you have a record of accidents, risky incidents, near misses, or illnesses?		
13	Reward/Recognition system for employees' exemplary Performance		
14	Conduct of induction training for all workers on health and safety before commencing work?		
15	Do you have documented evidence of daily work safety inspections?		
16	Do you have evidence of regular safety audits of the project?		
17	Have you provided this work place with means of escape, in case emergency?		
18	Have you provided adequate sanitary conveniences for both sexes as guided by OSHA 2007?		
19	Have you provided adequate supply of wholesome drinking water as guided by OSHA 2007?		

Item	Question	Response	
		Yes	No
20	Have you provided washing facilities as guided by OSHA 2007?		
21	Have you provided facilities for employees' attire that is not worn during working hours?		
22	Have you provided resting facilities for workers as guided by OSHA 2007?		
23	Have you provided a first-aid box or cupboard as guided in OSHA 2007?		
24	Do you have evidence on first aid training for all staff on this project?		

SECTION B: LEVEL OF HSC PERFORMANCE ON CONSTRUCTION SITES IN NAIROBI

This question will be answered by the ***Clerk of Works*** *in the absence of which an* ***NCA accredited site supervisor*** *will answer*

Item	Question	Response	
		Yes	No
1	Investigate complaints relating to workers' health, safety		
2	Maintained accidents register		
3	Advise on the adequacy of any health and safety measures		
4	Identify work-related risks and instances of illness		
5	Conducts safety inspections		
6	Investigate accidents		
7	Has a schedule of inspections		
8	Facilitates trainings on H&S in workplaces		
9	Organize promotional activities necessary for enhanced H&S management		
10	Maintained a record of minutes for the past HSC meetings		
11	Held HSC meetings as per schedule		

SECTION C: CONTRACTOR COMMITMENT IN HSC TOWARDS COMPLIANCE WITH OSHA 2007

This question will be answered by an ***NCA accredited site supervisor*** *in the absence of which the* ***Clerk of works*** *will answer*

Please rate the level of the contractor's commitment towards OSHA 2007 compliance in this construction project, on a scale of 1-5, where: 5 = to a **very high** level; 4 = to a **high** level; 3 = to a **medium** level; 2 = to a **low** level; 1 = to a **very low** level

Item	Area of Commitment	Level of Contractor Commitment				
		5	4	3	2	1
1	Provision of meeting places for HSCs					
2	Appointment of employees for the HSCs					
3	No reprimands for attending HSCs meetings					
4	Records for the HSCs meetings					
5	Training for membership of the HSCs					
6	Appointment of management representative for HSCs					

7	Display of OSHA 2007 on notice boards					
8	Provision of stationary for the HSCs					
9	Participation in HSCs meetings					
10	Establishment of HSCs					

SECTION D: EMPLOYEE INVOLVEMENT IN HSCs TOWARDS COMPLIANCE WITH OSHA 2007

This question will be answered by the ***Site Agent***

Please rate the level of employees' involvement towards OSHA 2007 compliance in this construction project, on a scale of 1-5, where: 5 = to a **very high** level; 4 = to a **high** level; 3 = to a **medium** level; 2 = to a **low** level; 1 = to a **very low** level

Item	Area of Involvement	Level of Employee Involvement				
		5	**4**	**3**	**2**	**1**
1	Participation in safety trainings.					
2	Development of H&S policy.					
3	Conduct of induction trainings to new employees.					
4	Conduct of safety inspections.					
5	Health and safety committees (HSCs)?					
6	Health and safety meetings?					
7	Implementation of safe working systems.					
8	Establishment of emergency procedures and plans.					
9	Obtaining compliance and safety certificates for plant and equipment.					
10	Sharing of expertise in H&S issues					

SECTION E: DEVELOPER INVOLVEMENT IN HSCs TOWARDS COMPLIANCE WITH OSHA 2007

This question will be answered by the ***Site Agent***

Please rate the level of the developer's involvement towards compliance with OSHA 2007 in this construction site, on a scale of 1-5, where: 5 = to a **very high** level; 4 = to a **high** level; 3 = to a **medium** level; 2 = to a **low** level; 1 = to a **very low** level

Item	Area of Involvement	Level of Developer Involvement				
		5	**4**	**3**	**2**	**1**
1	Contractual provisions on H&S financing					
2	Involvement in the establishment of health and safety committee (HSC)					
3	Participation in H&S trainings					
4	Engagement of H&S officers in the project					
5	Development of Health and safety policy					
6	Participation in the HSCs meetings					
7	Participation in safety inspections					
8	Workplace registration in accordance with OSHA 2007					
9	Provision of workplace insurance and worker compensation schemes					

10	Provision of all information relevant to the construction project's H&S management					

SECTION F: HURDLES FACED BY CONTRACTORS TOWARDS COMPLIANCE WITH OSHA 2007

This question will be answered by the ***Site Agent****.*

Which of the following factors tend to suppress the contractor's commitment and/or employees' involvement towards compliance with OSHA 2007 in this construction project? Please tick (√).

Item	Hurdles faced by contractor towards compliance with OSHA 2007	(√)
1	Lack of explicit contractual provisions on H&S financing	
2	Lack of developer involvement in the establishment of health & safety committee (HSC)	
3	Lack of independent leadership in HSCs	
4	Lack of legal provisions for employees' significant roles in the HSCs	
5	Absence of top management (contractor management) support towards HSC activities	
6	Unmotivated employees towards HSCs activities	
7	Insufficient supervision from DOSHS towards HSCs activities	
8	Absence of an over-sighting partner to the Bipartite HSC committee	
9	Engagement of incompetent employees in HSC matters	
10	Non-involvement of the developer in H&S management from the project inception to completion	
11	Absence of continuous improvement strategies towards H&S management	
12	The culture of finger pointing and blames games amongst project partners in case of accidents/incidents	
13	Absence of clear, faster and open lines of communication among stakeholders	
14	Lack of pain and gain sharing agreements among parties towards H&S management	
15	Absence of mutual trust amongst stakeholders	
16	Lack of clear roles and responsibilities among the stakeholders	
17	Absence of clear dispute resolution mechanisms	
18	Lack of established resource sharing mechanisms towards H&S	
19	Lack of perceived benefits among stakeholders towards H&S	
20	Lack of equity in the management of H&S among project stakeholders	
21	Lack of established project stakeholder mutual goals towards H&S	
22	Lack of contractor top management support	
23	Insufficient sensitizations and trainings for contractor employees	
24	Lack of direct/explicit contractual obligations for developers towards H&S management	
25	High number of unskilled and cheap labor market	

SECTION G: SUGGESTIONS ON PROBABLE DEVELOPER INTERVENTIONS TOWARDS ENHANCEMENT OF COMPLIANCE WITH OSHA 2007

This question will be answered by the ***Site Agent***

Please respond to the question to the best of your understanding.

(a) Do you support partnering between contractor, developer and employees towards enhanced compliance with OSHA 2007? Please tick (√), either a "Yes" or "No" response appropriately.

- o Yes
- o No

(b) Of the stakeholders listed below, in your opinion, who can have the highest influence in a partnership (of developer, contractor and employees) towards OSHA 2007 compliance in this construction project? Please tick (√).

- o Developer
- o Contractor
- o Employees

(c) Do you think incorporating the project developer in the H&S management would have enhanced compliance to the OSHA 2007 regulations on this construction site? Please tick (√).

- o Yes
- o No
- o I Don't Know

(d) Please rate the extent to which, in your opinion, a tripartite (i.e. developer, contractor & employees) collaboration framework can enhance compliance with OSHA 2007, on a scale of 1-5, where:

[ ] 5 = to a very high level
[ ] 4 = to a high level
[ ] 3 = to a medium level
[ ] 2 = to a low level
[ ] 1 = to a very low level

(e) In your opinion, which of the probable developer intervention actions listed on the table below can enhance compliance with OSHA 2007 H&S regulations on this construction site. Please tick (√).

Item	**Probable developer intervention actions**	**(√)**
1	Formulation of contractual provisions between contractor and employer on H&S financing	
2	Involvement of developer in the HSCs	
3	Having the developer as the chair of the HSCs	
4	Have pivotal roles executed by employees in the HSC	
6	Engaging contractors with good H&S record	

7	Encourage employees' involvement and buy-in towards HSCs activities	
8	Continuous engagement with DOSHS towards HSCs activities	
9	Provide oversighting role to the Bipartite HSC committee	
10	Ensuring competent employees are engaged in HSC matters	
11	Participating of developer in H&S management from the project inception to completion	
12	Establishing continuous improvement strategies towards H&S management	
13	Encourage a culture change from finger pointing and blames to concerted responsibility towards H&S management	
14	Instituting clear, faster and open lines of communication among stakeholders	
16	Formulating pain and gain sharing agreements amongst the parties, towards H&S management	
17	Cultivating mutual trust amongst the project stakeholders	
18	Establishment of clear roles and H & S responsibilities amongst the stakeholders	
19	Establishment of clear dispute avoidance and resolution mechanisms	
20	Establishment of resource sharing mechanisms to foster H&S performance in the project	
21	Providing incentives and motivations towards enhanced compliance to H&S regulations	
22	According equal opportunities to all stakeholders in the management of H&S	
23	Giving the pathway towards H&S management in the project	
24	Giving top management support to the H&S function in the project implementation	
25	Providing sensitizations and trainings on H&S in the project.	

SECTION H: PROBABLE AREAS OF STAKEHOLDER COLLABORATION IN THE ENHANCEMENT OF COMPLIANCE WITH OSHA 2007

This question will be answered by the ***Clerk of Works****.*

(a) In your opinion, which of the probable areas of stakeholder (contractor, site workers, developer, etc.) collaboration listed on the table below can enhance compliance with OSHA 2007 H&S regulations on this construction site? Please tick (√).

Item	**Probable areas of stakeholder collaboration**	**Tick √**
1	Involvement of developer in HSCs	
2	Developer assuming leadership role in HSCs	
3	Developer increased funding towards H&S management	
4	Securing top contractor management commitment towards H&S	
5	Developer involvement towards project's H&S management	
6	Development of company's safety policy	
7	Staff safety training	
8	PPEs selection to staff	

9	Hiring of safety officer	
10	Attendance of tool box talk sessions	
11	Carrying out safety inspections	
12	Carrying out safety inductions to staff	
13	Adoption of safe working systems	
14	Formulation of emergency procedures and plans	
15	Obtaining compliance safety certificates for plants and equipment	
16	Engagement of competent professionals in the project	
17	Engagement of competent contractor	
18	Carrying out safety inspections	
19	Sharing of expertise	
20	Culture shift from blaming to collective responsibility	

(b) Please give any other suggestions you might have on ways of enhancing of OSHA 2007 compliance on this construction site.

……
……
……

Thank you very much.

Appendix III: Sampling Frame

S/N	Sub County	Project Number	Project Value (Kshs)
1	Starehe	53128914710142	500,000.00
2	Dagoretti North	53127565710225	895,000.00
3	Kibra	53127865710029	1,200,000.00
4	Dagoretti North	53127515710210	2,158,656.00
5	Langata	53127715710392	2,247,523.20
6	Langata	53127715710368	3,000,000.00
7	Westlands	53127415710443	4,000,000.00
8	Langata	53127714710403	4,472,620.00
9	Kamukunji	53128815710169	4,693,545.60
10	Westlands	53127415710458	4,793,017.65
11	Dagoretti South	53127615710109	4,950,000.00
12	Langata	53127715710429	5,078,664.50
13	Westlands	53127415710414	5,986,418.00
14	Kasarani	53128015710183	6,794,100.00
15	Kasarani	53128015710158	7,300,000.00
16	Langata	53127725710381	7,500,000.00
17	Langata	53127725710388	7,500,000.00
18	Embakasi South	53128215710111	7,590,122.00
19	Langata	53127715710387	7,648,450.00
20	Westlands	53127415710508	7,762,600.00
21	Dagoretti South	53127615710123	7,845,338.85
22	Roysambu	53127915710153	8,000,000.00
23	Langata	53127715710421	8,483,000.00
24	Langata	53127765710427	8,678,825.22
25	Langata	53127715710383	8,780,992.74
26	Langata	53127715710397	8,817,246.00
27	Langata	53127714710430	8,924,250.00
28	Westlands	53127415710421	8,945,000.00
29	Langata	53127715710370	9,022,700.00
30	Embakasi Central	53128415710048	9,958,593.00
31	Langata	53127715710351	10,447,412.40
32	Kasarani	53128015710174	11,392,387.00
33	Langata	53127715710425	11,685,252.00
34	Kasarani	53128015710175	11,783,025.00
35	Westlands	53127415710454	11,838,064.90
36	Roysambu	53127915710163	11,966,207.45
37	Dagoretti North	53127515710198	12,250,000.00
38	Westlands	53127415710473	12,928,225.00
39	Embakasi East	53128515710141	13,000,000.00
40	Langata	53127715710410	13,442,565.00
41	Westlands	53127425710505	14,681,100.00
42	Makadara	53128715710076	14,722,043.58
43	Westlands	53127415710495	14,735,555.00
44	Westlands	53127415710425	14,802,742.00

S/N	Sub County	Project Number	Project Value (Kshs)
45	Langata	53127715710411	14,997,391.76
46	Langata	53127715710377	15,000,000.00
47	Langata	53127715710378	15,000,000.00
48	Starehe	53128915710154	15,001,010.00
49	Westlands	53127415710493	15,197,050.00
50	Mathare	53129015710015	15,262,380.00
51	Embakasi East	53128515710137	16,225,000.00
52	Langata	53127715710423	16,246,747.00
53	Westlands	53127415710507	16,294,695.00
54	Dagoretti North	53127515710196	16,500,000.00
55	Langata	53127715710367	17,200,486.00
56	Kasarani	53128015710178	17,381,436.93
57	Langata	53127715710359	17,464,835.62
58	Langata	53127715710380	18,000,000.00
59	Langata	53127715710433	18,114,207.45
60	Langata	53127715710404	18,750,872.50
61	Langata	53127765710366	19,421,880.00
62	Westlands	53127415710498	19,717,954.70
63	Langata	53127715710362	19,987,462.02
64	Westlands	53127415710426	20,000,000.00
65	Westlands	53127411710419	20,531,876.00
66	Dagoretti North	53127511710187	20,531,876.00
67	Roysambu	53127911710147	20,531,876.00
68	Ruaraka	53128111710041	20,531,876.00
69	Ruaraka	53128111710042	20,531,876.00
70	Embakasi South	53128211710107	20,531,876.00
71	Embakasi North	53128311710034	20,531,876.00
72	Embakasi Central	53128411710046	20,531,876.00
73	Mathare	53129011710012	20,531,876.00
74	Mathare	53129011710013	20,531,876.00
75	Ruaraka	53128115710043	20,765,294.40
76	Westlands	53127415710437	21,041,085.42
77	Westlands	53127415710485	21,163,190.00
78	Embakasi West	53128615710053	21,190,070.00
79	Dagoretti North	53127515710193	21,238,584.85
80	Makadara	53128715710074	21,374,720.00
81	Embakasi East	53128515710136	21,500,000.00
82	Westlands	53127415710491	21,533,403.41
83	Langata	53127715710432	21,765,491.20
84	Kasarani	53128015710159	21,771,181.00
85	Kasarani	53128015710173	21,850,900.00
86	Langata	53127715710391	23,490,159.00
87	Embakasi East	53128515710143	23,566,207.45
88	Embakasi East	53128515710139	23,613,366.00
89	Dagoretti South	53127615710119	23,775,290.00
90	Dagoretti North	53127515710214	24,242,666.00

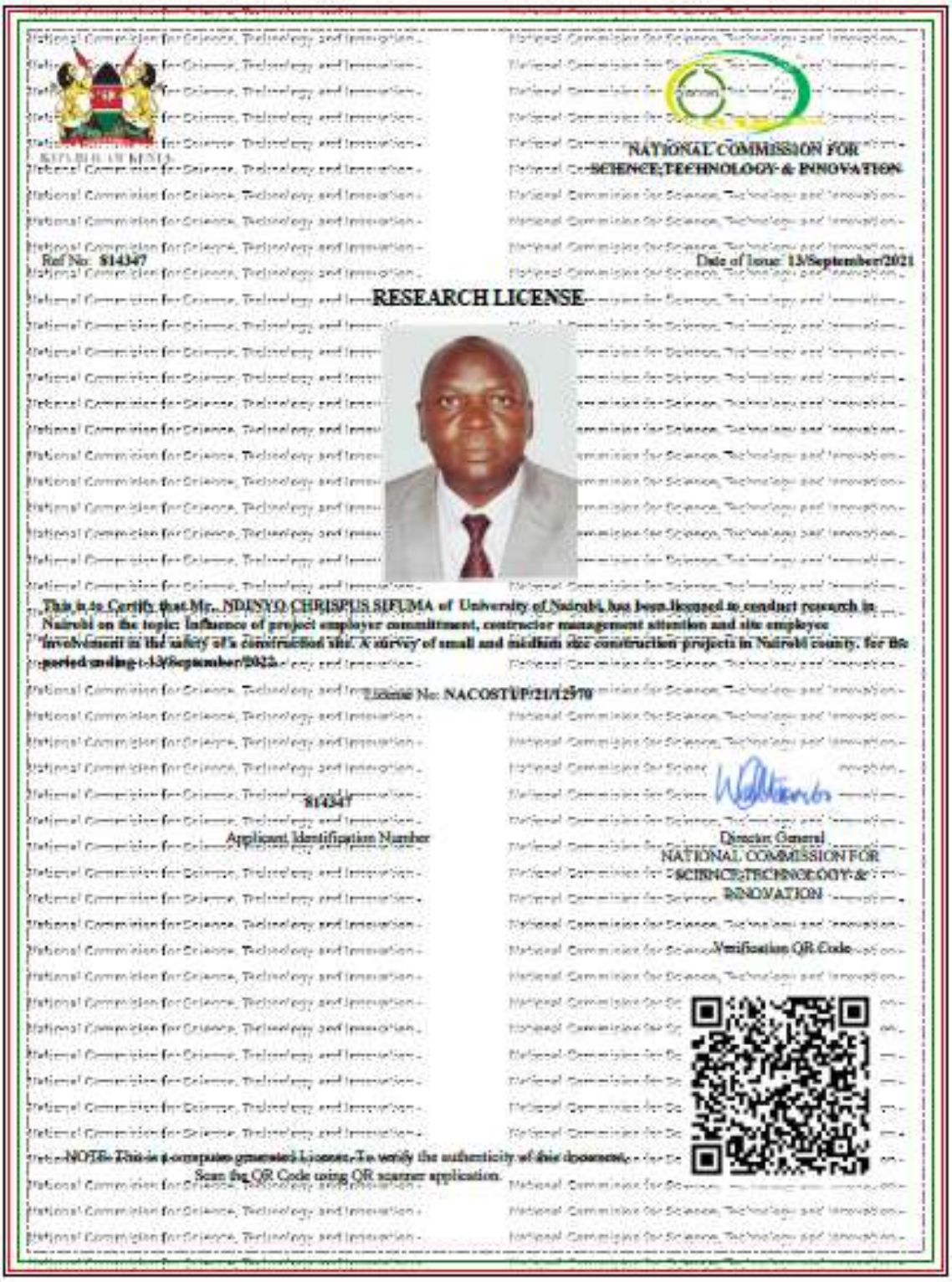
S/N	Sub County	Project Number	Project Value (Kshs)
91	Roysambu	53127915710171	24,405,642.00
92	Kasarani	53128015710168	24,567,641.00
93	Westlands	53127415710433	24,885,903.35
94	Roysambu	53127915710156	24,951,961.00
95	Langata	53127715710358	25,282,360.00
96	Roysambu	53127915710154	25,359,754.00
97	Roysambu	53127915710166	25,417,785.00
98	Dagoretti South	53127615710114	25,500,000.00
99	Westlands	53127415710488	26,050,000.00
100	Embakasi East	53128515710132	26,395,241.02
101	Dagoretti North	53127565710219	26,411,888.83
102	Dagoretti North	53127515710205	26,978,086.80
103	Starehe	53128915710159	27,120,000.00
104	Dagoretti South	53127615710113	27,783,000.00
105	Kibra	53127815710031	27,790,669.00
106	Westlands	53127415710476	28,337,415.00
107	Roysambu	53127915710150	28,423,250.00
108	Dagoretti South	53127615710120	28,657,820.00
109	Langata	53127713710422	28,713,965.11
110	Langata	53127715710352	28,910,150.00
111	Langata	53127715710355	28,959,400.00
112	Langata	53127715710372	29,000,000.00
113	Dagoretti North	53127513710215	29,799,850.00
114	Westlands	53127415710465	29,930,175.00
115	Westlands	53127415710472	30,000,000.00
116	Langata	53127715710369	30,000,000.00
117	Roysambu	53127915710151	30,000,000.00
118	Kasarani	53128015710171	30,000,000.00
119	Kasarani	53128015710186	30,000,000.00
120	Langata	53127715710431	30,292,772.00
121	Langata	53127715710408	30,500,000.00
122	Roysambu	53127915710157	30,785,708.69
123	Kasarani	53128015710162	30,882,506.00
124	Kasarani	53128015710180	31,011,210.00
125	Westlands	53127415710428	31,521,814.00
126	Dagoretti South	53127615710124	31,564,254.00
127	Ruaraka	53128115710044	31,650,130.20
128	Starehe	53128915710158	32,275,613.00
129	Makadara	53128715710073	32,323,135.00
130	Embakasi North	53128315710035	32,500,000.00
131	Roysambu	53127915710161	32,501,174.00
132	Embakasi West	53128615710050	32,505,116.00
133	Langata	53127715710415	32,836,395.00
134	Kasarani	53128015710185	32,992,175.00
135	Langata	53127714710365	33,005,800.00
136	Roysambu	53127915710149	33,193,920.00

S/N	Sub County	Project Number	Project Value (Kshs)
137	Westlands	53127415710484	33,372,000.00
138	Westlands	53127415710492	34,000,000.00
139	Langata	53127715710414	35,000,000.00
140	Embakasi West	53128614710052	35,896,000.00
141	Embakasi East	53128515710138	35,898,324.00
142	Mathare	53129015710017	35,898,324.00
143	Embakasi South	53128215710108	36,750,179.88
144	Dagoretti North	53127515710207	36,758,020.00
145	Kibra	53127811710030	37,969,475.00
146	Kasarani	53128011710163	37,969,475.00
147	Kasarani	53128011710164	37,969,475.00
148	Kasarani	53128011710165	37,969,475.00
149	Embakasi South	53128211710105	37,969,475.00
150	Embakasi South	53128211710106	37,969,475.00
151	Embakasi East	53128511710130	37,969,475.00
152	Kamukunji	53128811710163	37,969,475.00
153	Langata	53127714710384	38,000,000.00
154	Langata	53127715710390	38,000,000.00
155	Embakasi Central	53128415710047	38,292,270.00
156	Embakasi East	53128515710131	38,951,650.00
157	Embakasi East	53128515710131	38,951,650.00
158	Makadara	53128715710075	39,427,989.00
159	Kasarani	53128015710169	39,590,537.00
160	Westlands	53127415710501	40,046,000.00
161	Roysambu	53127915710146	40,059,855.00
162	Dagoretti South	53127615710121	40,139,256.00
163	Dagoretti South	53127615710103	40,304,405.00
164	Dagoretti South	53127615710118	40,360,000.00
165	Roysambu	53127915710148	40,759,361.80
166	Embakasi South	53128215710104	40,845,072.00
167	Dagoretti North	53127514710221	40,920,338.50
168	Westlands	53127415710423	42,233,626.00
169	Langata	53127715710426	42,486,250.00
170	Starehe	53128911710148	43,000,000.00
171	Langata	53127715710402	43,040,438.50
172	Kasarani	53128015710160	43,193,920.00
173	Dagoretti South	53127615710111	43,700,000.00
174	Roysambu	53127915710169	43,769,350.00
175	Westlands	53127414710503	44,070,040.14
176	Westlands	53127415710477	44,217,726.96
177	Westlands	53127415710479	44,937,190.00
178	Dagoretti South	53127615710115	45,082,680.00
179	Dagoretti South	53127615710116	45,500,000.00
180	Kasarani	53128015710176	45,500,000.00
181	Langata	53127715710406	45,600,000.00
182	Langata	53127715710424	46,053,405.65

S/N	Sub County	Project Number	Project Value (Kshs)
183	Roysambu	53127915710168	46,615,034.54
184	Dagoretti North	53127515710224	47,727,008.00
185	Westlands	53127415710463	47,944,636.00
186	Starehe	53128965710134	48,082,552.00
187	Westlands	53127415710489	49,875,000.00
188	Starehe	53128915710151	50,000,000.00
189	Westlands	53127415710496	50,743,916.00
190	Roysambu	53127915710155	51,519,503.30
191	Kamukunji	53128815710167	51,561,871.20
192	Westlands	53127415710464	51,887,546.84
193	Roysambu	53127915710170	53,500,000.00
194	Westlands	53127415710416	53,666,640.00
195	Westlands	53127415710471	54,000,000.00
196	Westlands	53127411710499	54,118,964.00
197	Kasarani	53128015710187	55,000,000.00
198	Westlands	53127415710457	58,000,000.00
199	Westlands	53127415710490	58,329,108.50
200	Kasarani	53128015710182	58,684,513.00
201	Kamukunji	53128815710181	58,755,623.00
202	Langata	53127715710360	59,859,815.00
203	Kamukunji	53128815710196	59,860,300.00
204	Starehe	53128915710139	60,000,000.00
205	Dagoretti North	53127515710220	60,107,500.00
206	Dagoretti South	53127615710104	60,240,840.00
207	Kamukunji	53128815710194	61,680,770.00
208	Roysambu	53127915710152	62,000,000.00
209	Langata	53127715710357	62,092,162.00
210	Embakasi East	53128515710135	62,791,414.00
211	Dagoretti South	53127615710112	64,000,000.00
212	Kasarani	53128015710188	65,000,000.00
213	Embakasi South	53128215710109	65,415,098.00
214	Kamukunji	53128815710189	66,000,000.00
215	Embakasi East	53128515710142	66,363,825.00
216	Embakasi Central	53128415710050	66,640,000.00
217	Langata	53127715710417	67,542,106.84
218	Ruaraka	53128115710045	69,600,000.00
219	Embakasi Central	53128415710049	69,669,905.00
220	Dagoretti South	53127615710108	70,000,000.00
221	Dagoretti South	53127615710108	70,000,000.00
222	Starehe	53128915710140	70,036,673.00
223	Westlands	53127415710451	71,004,590.00
224	Westlands	53127415710500	74,165,321.00
225	Dagoretti North	53127515710216	75,000,000.00
226	Kamukunji	53128815710173	75,000,000.00
227	Kasarani	53128015710170	76,939,600.00
228	Langata	53127765710371	77,701,092.00

S/N	Sub County	Project Number	Project Value (Kshs)
229	Dagoretti North	53127515710226	78,316,520.00
230	Kamukunji	53128815710192	78,620,957.00
231	Westlands	53127415710444	79,700,675.69
232	Westlands	53127415710411	80,000,000.00
233	Westlands	53127415710487	80,000,000.00
234	Dagoretti South	53127615710117	80,125,396.00
235	Langata	53127715710412	80,410,817.00
236	Dagoretti South	53127615710110	80,456,871.66
237	Kamukunji	53128815710172	83,000,000.00
238	Westlands	53127415710494	84,286,042.08
239	Westlands	53127415710420	86,191,227.00
240	Westlands	53127415710480	87,915,655.50
241	Makadara	53128715710072	88,045,009.00
242	Kamukunji	53128815710195	88,045,009.00
243	Starehe	53128915710141	91,052,325.20
244	Embakasi East	53128515710133	91,423,216.00
245	Kamukunji	53128815710159	92,194,080.00
246	Kamukunji	53128815710180	92,194,080.00
247	Westlands	53127415710441	94,415,584.00
248	Roysambu	53127915710164	96,175,406.00
249	Dagoretti North	53127515710217	98,000,000.00
250	Westlands	53127415710469	99,760,000.00

Appendix IV- NACOSTI Permit



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Ref No: 814347

Date of Issue: 13/September/2021

RESEARCH LICENSE

This is to Certify that Mr., NDENYO CHRISPUS SIFUMA of University of Nairobi, has been licensed to conduct research in Nairobi on the topic: Influence of project employer commitment, contractor management attention and site employee involvement in the safety of a construction site: A survey of small and middle size construction projects in Nairobi county, for the period ending: 13/September/2022.

License No: NACOSTI/P/21/12570

814347

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

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Appendix V- University Introduction Letter

UNIVERSITY OF NAIROBI
P.O. Box 30197, 00100 Nairobi, KENYA, ***Tel: No. +254-020-491 3532***
E-mail:*dept-cmqs@uonbi.ac.ke*

DEPARTMENT OF CONSTRUCTION MANAGEMENT & QUANTITY SURVEYING

Ref: B80/5081/2016 **Date:** 12th April, 2021

To Whom It May Concern

Dear Sir/Madam,

SUBJECT: NDINYO CHRISPUS SIFUMA

This is to certify that the above named is a student in the Department of Construction Management & Quantity Surveying, pursuing a course leading to the Doctor of Philosophy in Construction Management.

He is carrying out a research entitled ***"Influence of Project Employer Commitment, Contractor Management Attention and Site Employee Involvement in The Enhancement of Safety on A Construction Site. A Survey of Small and Medium Size Construction Projects in Nairobi, Kenya"*** in partial fulfillment of the requirements for the degree programme.

The purpose of this letter is to request you to allow him access to any kind of material he may require to complete his research. The information will be used for research purposes only.

CHAIRMAN
DEPARTMENT OF CONSTRUCTION
MANAGEMENT AND QUANTITY SURVEYING
UNIVERSITY OF NAIROBI

Isabella N. Wachira-Towey, (PhD)
Chair & Senior Lecturer,
Dept. of Construction Management & Quantity Surveying

Appendix VI: NCA Categorization

NCA CATEGORIZATION AND PROJECT VALUES

1.BUILDING WORKS CONTRACTORS

NCA1	Unlimited
NCA 2	Upto Kshs.500,000,000
NCA 3	Upto Kshs.300,000,000
NCA 4	Upto Kshs.200,000,000
NCA 5	Upto Kshs.100,000,000
NCA 6	Upto Kshs.50,000,000
NCA 7	Upto Kshs.20,000,000
NCA 8	Upto Kshs.10,000,000

2.SPECIALIST CONTRACTORS

NCA1	Unlimited
NCA 2	Upto Kshs.250,000,000
NCA 3	Upto Kshs.150,000,000
NCA 4	Upto Kshs.100,000,000
NCA 5	Upto Kshs.50,000,000
NCA 6	Upto Kshs.20,000,000
NCA 7	Upto Kshs.10,000,000
NCA 8	Upto Kshs.5,000,000

1.ROAD AND OTHER CIVIL CONTRACTORS

NCA1	Unlimited
NCA 2	Upto Kshs.750,000,000
NCA 3	Upto Kshs.500,000,000
NCA 4	Upto Kshs.300,000,000
NCA 5	Upto Kshs.200,000,000
NCA 6	Upto Kshs.100,000,000
NCA 7	Upto Kshs.50,000,000
NCA 8	Upto Kshs.20,000,000

Appendix VII: SPSS Code Book

A Framework for Enhancing the Performance of Health and Safety Committees on Small and Medium Size Construction Sites in Kenya

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
SECTION A: BACKGROUND INFORMATION							
1	A01	CoWProf	Numeric	CoW Profession	Clerk of Works Profession	1 = Civil engineering 2 = Architecture 3 = Quantity Surveying 4 = Construction Management	Nominal
2	A02	CoWEdu	Numeric	CoW Education Level	Clerk of Works Level of Education	1 = Masters 2 = Degree 3 = Diploma 4 = Certificate	Ordinal
3	A03	CoWExp	Numeric	CoW Experience	Clerk of Works Experience	1 = 1-5 years 2 = 6-10 years 3 = 11-15 years 4 = 16-20 years 5 = Above 20	Ordinal
4	A04	SAProf	Numeric	SA Profession	Site Agent Profession	1 = Civil engineering 2 = Architecture 3 = Quantity Surveying 4 = Construction	Nominal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
						Management	
5	A05	SAEdu	Numeric	SA Education Level	Site Agent Level of Education	1 = Masters 2 = Degree 3 = Diploma 4 = Certificate	Ordinal
6	A06	SAExp	Numeric	SA Experience	Site Agent Experience	1 = 1-5 years 2 = 6-10 years 3 = 11-15 years 4 = 16-20 years 5 = Above 20	Ordinal
7	A07	EmpProf	Numeric	Employee Profession	Employee Profession	1 = Civil engineering 2 = Architecture 3 = Quantity Surveying 4 = Construction Management	Nominal
8	A08	EmpEdu	Numeric	Employee Education Level	Employee Level of Education	1 = Masters 2 = Degree 3 = Diploma 4 = Certificate	Ordinal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
9	A09	EmpExp	Numeric	Employee Experience	Employee Experience	1 = 1-5 years 2 = 6-10 years 3 = 11-15 years 4 = 16-20 years 5 = Above 20	Ordinal
10	A10	ContractSum	Numeric	Contract Sum	Project Contract Sum	1 = 0 – 20 million 2 = 21 – 40 million 3 = 41 – 60 million 4 = 61 – 80 million 5 = 81 – 100 million	Ordinal
11	A11	ContractPeriod	Numeric	Contract Period	Project Contract Period	1 = 1 - 3 months 2 = 4 – 6 months 3 = 7 – 9 months 4 = 10 – 12 months 5 = Above 12 months	Ordinal
12	A12	PercentComp	Numeric	Percentage Complete	Percentage Complete	1 = 0 – 20 % 2 = 21 – 40 % 3 = 41 – 60 % 4 = 61 – 80 % 5 = 81 – 100 %	Ordinal
13	A13	Agency	Numeric	Visiting Agency	Which one of the government agencies below has visited this site most times to check on health and safety?	1 = NEMA 2 = NCA 3 = County Government 4 = DOSHs	Nominal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
14	A14	Suspension	Numeric	Suspension	Has this project been ever suspended or any legal action taken against the contractor for non-compliance with OSHA 2007?	1 = Yes 2 = No	Nominal
15	A15	Registered	Numeric	DOSH Registration	Is this workplace registered with DOSHs as per OSHA 2007?	1=Yes 2=No	Nominal
16	A16	NoticeBoard	Numeric	OSHA Notice board	Have you posted a copy of abstract OSHA 2007 on notice board accessible to the public?	1=Yes 2=No	Nominal
17	A17	Warnings	Numeric	Warning on Dangers	Have you posted notices stating the danger or ill heath that may be posed to persons exposed to injurious or offensive substances?	1=Yes 2=No	Nominal
18	A18	HSPolicy	Numeric	H&S Policy	Do you have a Health and Safety Policy?	1=Yes 2=No	Nominal
19	A19	HSOfficers	Numeric	H&S Officers	Have you engaged H&S officers in compliance with OSHA 2007?	1=Yes 2=No	Nominal
20	A20	HSC	Numeric	H&S Committee	Have you established Health and Safety Committee (HSC) in compliance with OSHA 2007?	1=Yes 2=No	Nominal
21	A21	HSInspection	Numeric	H&S Inspections	Is there a schedule for H&S inspection of this workplace for the current calendar year?	1=Yes 2=No	Nominal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
22	A22	HSCMeetings	Numeric	HSC Meetings	Do you have copies of HSC meetings minutes for the past 4 months?	1=Yes 2=No	Nominal
23	A23	KEBS	Numeric	KEBS Certificates	Do you have safety inspection certificates for all equipment and machines from KEBS?	1=Yes 2=No	Nominal
24	A24	PPEs	Numeric	Use of PPEs	Do you have evidence of issuance of PPEs to all employees?	1=Yes 2=No	Nominal
25	A25	SafetyTraining	Numeric	Safety Training	Do you have evidence of safety training to all employees?	1=Yes 2=No	Nominal
26	A26	RecordAccidents	Numeric	Accidents Register	Do you have a history of accidents, risky incidents, near misses, or illnesses?	1=Yes 2=No	Nominal
27	A27	Reward	Numeric	Reward for H&S	Do you have a reward system for employees who give exemplary performance towards H&S?	1=Yes 2=No	Nominal
28	A28	InductionTrain	Numeric	Induction Training	Do you have evidence of conducting induction training for all workers on health and safety before commencing work?	1=Yes 2=No	Nominal
29	A29	DailyInspec	Numeric	Daily Safety Inspections	Do you have documented evidence of daily work safety inspections?	1=Yes 2=No	Nominal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
30	A30	SafetyAudit	Numeric	Safety Audits	Do you have evidence of regular safety audits of the project?	1=Yes 2=No	Nominal
31	A31	EscapeMeans	Numeric	Means of Escape	Have you provided this work place with means of escape, in case emergency?	1=Yes 2=No	Nominal
32	A32	Sanitary	Numeric	Sanitary Conviniencies	Have you provided adequate sanitary conveniences for both sexes as guided by OSHA 2007?	1=Yes 2=No	Nominal
33	A33	DrinkingWater	Numeric	Drinking Water	Have you provided adequate supply of wholesome drinking water as guided by OSHA 2007?	1=Yes 2=No	Nominal
34	A34	WashingFac	Numeric	Washing Facilities	Have you provided washing facilities as guided by OSHA 2007?	1=Yes 2=No	Nominal
35	A35	Accomodation	Numeric	Accommodation facilities	Have you provided accommodation for employees clothing not worn during working hours?	1=Yes 2=No	Nominal
36	A36	RestingFac	Numeric	Resting Facilities	Have you provided resting facilities for workers as guided by OSHA 2007?	1=Yes 2=No	Nominal
37	A37	FirstAid	Numeric	First Aid Box	Have you provided a first-aid box or cupboard as guided in OSHA 2007?	1=Yes 2=No	Nominal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
38	A38	FirstAidTrain	Numeric	First Aid Training	Do you have evidence on first aid training for all staff on this project?	1=Yes 2=No	Nominal
	SECTION B: HSC PERFORMANCE						
39	B01	InvestigateComplaints	Numeric	Investigate complaints	Investigate complaints relating to workers' health, safety	1=Yes 2=No	Nominal
40	B02	MaintainedRegister	Numeric	Maintained accidents register	Maintained accidents register	1=Yes 2=No	Nominal
41	B03	AdviseAdequacy	Numeric	Advise on the adequacy	Advise on the adequacy of any health and safety measures	1=Yes 2=No	Nominal
42	B04	IdentifyRisks	Numeric	Identify work-related risks	Identify work-related risks and instances of illness	1=Yes 2=No	Nominal
43	B05	ConductsInspections	Numeric	Conducts safety inspections	Conducts safety inspections	1=Yes 2=No	Nominal
44	B06	InvestigateAccidents	Numeric	Investigate accidents	Investigate accidents	1=Yes 2=No	Nominal
45	B07	ScheduleInspections	Numeric	schedule of inspections	Has a schedule of inspections	1=Yes 2=No	Nominal
46	B08	FacilitatesTrainings	Numeric	Facilitates trainings	Facilitates trainings on H&S in workplaces	1=Yes 2=No	Nominal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
47	B09	OrganizePromotional	Numeric	Organize promotional activities	Organize promotional activities necessary for enhanced H&S management	1=Yes 2=No	Nominal
48	B10	RecordMinutes	Numeric	record of minutes	Maintained a record of minutes for the past HSC meetings	1=Yes 2=No	Nominal
49	B11	HeldHSCMeetings	Numeric	Held HSC meetings	Held HSC meetings as per schedule	1=Yes 2=No	Nominal
SECTION C: CONTRACTOR COMMITMENT IN HSCs							
50	C01	AbideHS	Numeric	Abide by HS Policy	Abiding by the company health and safety policy.	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
51	C02	ProvSafTrain	Numeric	Provide Safety Training	Provision of safety training for staff.	1 = very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
52	C03	ProvPPEs	Numeric	Provide PPEs	Provision of PPEs to staff.	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
53	C04	EngageSOs	Numeric	Engage Safety Officers	Engagement of safety officers.	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
54	C05	ConductSIs	Numeric	Conduct Safety Inspections	Conducting of safety inspections.	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
55	C06	ConductSIsS	Numeric	Conduct Site Inductions	Conducting of safety inductions to staff.	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
56	C07	ImplementSWSs	Numeric	Implement SWSs	Implementation of safe working systems.	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
57	C08	EmergencyPlans	Numeric	Establish Emergency Plans	Establishment of emergency plans and procedures.	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
58	C09	CompSafetyCerts	Numeric	Acquire Compliance Certificates	Acquisition of compliance safety certificates for plant and equipment.	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
59	C10	ProvFirstAid	Numeric	Provide FirstAid Train & KIts	Provision of first aid training and kits	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
SECTION D: EMPLOYEE INVOLVEMENT IN HSCs							

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
49	D01	PartSafTrain	Numeric	Participate Safety Training	Participation in safety trainings.	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
50	D02	DevelopHSP	Numeric	Developing H&S policy	Development of H&S policy.	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
51	D03	ConductInd	Numeric	Conducting Induction	Conduct of induction trainings to new employees.	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
52	D04	ConductSI	Numeric	Conducting Safety Inspections	Conduct of safety inspections.	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
53	D05	HSCs	Numeric	H&S Committees	Health and safety committees (HSCs)?	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
54	D06	HSMeetings	Numeric	H&S Meetings	Health and safety meetings?	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
55	D07	ImplementSWS	Numeric	Implementing SWSs	Implementation of safe working systems.	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
56	D08	EstablishEmerg	Numeric	Establishing Emergency Plans	Establishment of emergency plans and procedures.	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
57	D09	AcquireCompl	Numeric	Acquiring Compliance Certs	Acquisition of compliance safety certificates for plant and equipment.	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
58	D10	ShareExpertise	Numeric	Sharing H&S Expertise	Sharing of expertise in H&S issues	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
SECTION E: DEVELOPER INVOLVEMENT IN HSCs							
59	E01	ContractualProv	Numeric	Contractual Provisions	Contractual provisions on H&S financing	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
60	E02	InvolvementHSC	Numeric	Involvement in HSC	Involvement in the establishment of health and safety committee (HSC)	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
61	E03	ParticHSTrain	Numeric	Participation in HS training	Participation in healthy and safety trainings	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
62	E04	EngagHSOs	Numeric	Engagement of HS officers	Engagement of H&S officers in the project	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
63	E05	DevHSPolicy	Numeric	Development of HS policy	Development of Health and safety policy	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
64	E06	PartHSCMeets	Numeric	Participation in HSC meetings	Participation in the health and safety committee (HSC) meetings	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
65	E07	ParticipateSIs	Numeric	Participation in safety inspections	Participation in safety inspections	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
66	E08	RegisterOSHA	Numeric	Registration with OSHA	Registration of the work place in compliance with OSHA 2007	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
67	E09	ProvInsurance	Numeric	Provision of Insurance	Provision of insurance for the works and compensation schemes for workers	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
68	E10	ProvInformation	Numeric	Provision of Information	Provision of all information that have a bearing on the H&S management on the construction project	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
SECTION F: FACTORS THAT LIMIT CONTRACTOR COMMITMENT AND EMPLOYEES' INVOLVEMENT IN HSCS							
69	F01	LackContrProv	Numeric	No contractual provisions	Lack of explicit contractual provisions on H&S financing	1=Yes 2=No	Nominal
70	F02	LackDeveloperInvol	Numeric	No developer involvement in HSC	Lack of developer involvement in the establishment of health & safety committee (HSC)	1=Yes 2=No	Nominal
71	F03	LackIndLead	Numeric	No independent leadership	Lack of independent leadership in HSCs	1=Yes 2=No	Nominal
72	F04	LackLegalProv	Numeric	No legal provisions	Lack of legal provisions for employees' significant roles in the HSCs	1=Yes 2=No	Nominal
73	F05	AbsenceTopMgt	Numeric	No management support	Absence of top management (contractor management) support towards HSC activities	1=Yes 2=No	Nominal
74	F06	UnmotivEmp	Numeric	Unmotivated employees	Unmotivated employees towards HSCs activities	1=Yes 2=No	Nominal
75	F07	InsuffSupDOSH	Numeric	Insufficient supervision	Insufficient supervision from DOSHS towards HSCs activities	1=Yes 2=No	Nominal
76	F08	AbsenceOvers	Numeric	No oversight	Absence of an over-sighting partner to the Bipartite HSC committee	1=Yes 2=No	Nominal
77	F09	IncompetentEmp	Numeric	Incompetent employees	Engagement of incompetent employees in HSC matters	1=Yes 2=No	Nominal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
78	F10	NonInvolDeveloper	Numeric	No developer involvement in H&S mangt	Non-involvement of the developer in H&S management from the inception to handing over of the project	1=Yes 2=No	Nominal
79	F11	NoContImprov	Numeric	No continuous improvement	Absence of continuous improvement strategies towards H&S management	1=Yes 2=No	Nominal
80	F12	FingerPointing	Numeric	Culture of finger pointing	The culture of finger pointing and blames games amongst project partners in case of accidents/incidents	1=Yes 2=No	Nominal
81	F13	NoComms	Numeric	Poor communication	Absence of clear, faster and open lines of communication among stakeholders	1=Yes 2=No	Nominal
82	F14	PainGain	Numeric	No pain and gain sharing	Lack of pain and gain sharing agreements among parties towards H&S management	1=Yes 2=No	Nominal
83	F15	NoMutualTrust	Numeric	No mutual trust	Absence of mutual trust amongst stakeholders	1=Yes 2=No	Nominal
84	F16	NoClearRoles	Numeric	No clear roles and responsibilities	Lack of clear roles and responsibilities among the stakeholders	1=Yes 2=No	Nominal
85	F17	NoClearDisRes	Numeric	Poor dispute resolution	Absence of clear dispute resolution mechanisms	1=Yes 2=No	Nominal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
86	F18	NoResSharing	Numeric	No resource sharing	Lack of established resource sharing mechanisms towards H&S	1=Yes 2=No	Nominal
87	F19	NoPercBenefits	Numeric	No perceived benefits	Lack of perceived benefits among stakeholders towards H&S	1=Yes 2=No	Nominal
88	F20	NoEquity	Numeric	Lack of equity in mangt	Lack of equity in the management of H&S among project stakeholders	1=Yes 2=No	Nominal
89	F21	NoMutualGoals	Numeric	Lack of mutual goals	Lack of established project stakeholder mutual goals towards H&S	1=Yes 2=No	Nominal
90	F22	NoTopMgtSupp	Numeric	No contractor mangt support	Lack of contractor top management support	1=Yes 2=No	Nominal
91	F23	InsuffTraining	Numeric	Insufficient training	Insufficient sensitizations and trainings for contractor employees	1=Yes 2=No	Nominal
92	F24	NoContrOblig	Numeric	No direct contractual obligation	Lack of direct/explicit contractual obligations for developers towards H&S management	1=Yes 2=No	Nominal
93	F25	UnskillledLab	Numeric	Many unskilled labour	High number of unskilled and cheap labor market	1=Yes 2=No	Nominal
SECTION G: CONTRACTOR, DEVELOPER AND EMPLOYEES' BUY-IN TOWARDS COLLABORATIONS IN ENHANCING PERFORMANCE OF HSCS ON CONSTRUCTION SITES							

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
94	G01	SupportPartnerin g	Numeric	Support partnering?	Do you support partnering between contractor, developer and employees towards enhanced compliance with OSHA 2007?	1=Yes 2=No	Nominal
95	G02	HighInfluence	Numeric	Who has highest influence?	Of the stakeholders listed below, in your opinion, who can have the highest influence in a partnership (of developer, contractor and employees) towards OSHA 2007 compliance in this construction project?	1=Developer 2=Contractor 3=Employees	Nominal
96	G03	EnhanceCompl	Numeric	Effect of incorporating developer	Do you think incorporating the project developer in the H&S management would have enhanced compliance to the OSHA 2007 regulations on this construction site?	1=Yes 2=No 3=I Don't Know	Nominal
97	G04	Tripartite Collaborative Approach	Numeric	Effect of tripartite collaboration	Please rate the extent to which, in your opinion, a tripartite (i.e. developer, contractor & employees) collaboration framework can enhance compliance with OSHA 2007	1=very low level 2 = low level 3 = medium level 4 = high level 5 = very high level	Ordinal
98	G05	Form Contractual Provisions	Numeric	Form contractual provisions	Formulation of contractual provisions between contractor and employer on H&S financing	1=Yes 2=No	Nominal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
99	G06	Involve Developer HSC	Numeric	Involve developer in HSC	Involvement of developer in the health and safety committee (HSC)	1=Yes 2=No	Nominal
100	G07	Developer Chair HSC	Numeric	Developer as chair of HSC	Having the developer as the chair of the HSCs	1=Yes 2=No	Nominal
101	G08	Involve Emp HSC	Numeric	Pivotal role by employees	Have pivotal roles executed by employees in the HSC	1=Yes 2=No	Nominal
102	G09	Competent Contractor	Numeric	Engage contractors good in HS	Engaging contractors with good H&S record	1=Yes 2=No	Nominal
103	G10	Involve Employees	Numeric	Encourage employee's involvement	Encourage employees' involvement and buy-in towards HSCs activities	1=Yes 2=No	Nominal
104	G11	Engage DOSHs	Numeric	Engagement with DOSHs	Continuous engagement with DOSHS towards HSCs activities	1=Yes 2=No	Nominal
105	G12	Oversight Role	Numeric	Oversight role to HSC	Provide oversighting role to the Bipartite HSC committee	1=Yes 2=No	Nominal
106	G13	Competent Emps	Numeric	Engage competent employees	Ensuring engagement of competent employees in HSC matters	1=Yes 2=No	Nominal
107	G14	Participate Developer	Numeric	Participation of developer in HS management	Participating of developer in H&S management from the inception to handing over of the built facility.	1=Yes 2=No	Nominal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
108	G15	Improve Strategies	Numeric	Continuous improvement of HS	Establishing continuous improvement strategies towards H&S management	1=Yes 2=No	Nominal
109	G16	No Finger Pointing	Numeric	Avoid finger pointing	Encourage a culture change from finger pointing and blames to concerted responsibility towards H&S management	1=Yes 2=No	Nominal
110	G17	Efficient Comm	Numeric	Efficient communication	Instituting clear, faster and open lines of communication among stakeholders	1=Yes 2=No	Nominal
111	G18	PainGainSharing	Numeric	Pain & gain sharing agreements	Formulating pain and gain sharing agreements amongst the parties, towards H&S management	1=Yes 2=No	Nominal
112	G19	Mutual Trust	Numeric	Cultivating mutual trust	Cultivating mutual trust amongst the project stakeholders	1=Yes 2=No	Nominal
113	G20	Clear Roles	Numeric	Clear HS roles & responsibilities	Establishment of clear roles and H & S responsibilities amongst the stakeholders	1=Yes 2=No	Nominal
114	G21	Proper DispRes	Numeric	Proper dispute resolution	Establishment of clear dispute avoidance and resolution mechanisms	1=Yes 2=No	Nominal
115	G22	Resource Sharing	Numeric	Resource sharing mechanisms	Establishment of resource sharing mechanisms to foster H & S performance in the project	1=Yes 2=No	Nominal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
116	G23	Incentives	Numeric	Incentives in HS matters	Providing incentives and motivations towards enhanced compliance to H&S regulations	1=Yes 2=No	Nominal
117	G24	Equal Opportunities	Numeric	Equal opportunities to all parties	According equal opportunities to all stakeholders in the management of H&S	1=Yes 2=No	Nominal
118	G25	PathwayHSMangt	Numeric	Pathway towards HS mangt	Giving the pathway towards H&S management in the project	1=Yes 2=No	Nominal
119	G26	TopMangtSupport	Numeric	Top management support	Giving top management support to the H & S function in the project implementation	1=Yes 2=No	Nominal
120	G27	Provide Training	Numeric	Provide training & sensitization	Providing sensitizations and trainings on H & S in the project.	1=Yes 2=No	Nominal
SECTION H: PROBABLE AREAS OF STAKEHOLDER COLLABORATION IN THE ENHANCEMENT OF OSHA 2007 COMPLIANCE							
121	H01	Involve Developer HSC	Numeric	Involve developer in HSC	Involvement of developer in HSCs	1=Yes 2=No	Nominal
122	H02	Developer Leader	Numeric	Developer taking leadership	Developer taking leadership role in HSCs	1=Yes 2=No	Nominal
123	H03	More Funding HS	Numeric	Enhanced funding	Developer enhanced funding towards H&S management	1=Yes 2=No	Nominal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
124	H04	Contractor Support	Numeric	Contractor top mangt support	Securing top contractor management commitment towards H&S	1=Yes 2=No	Nominal
125	H05	Developer Commitment	Numeric	Developer commitment towards HS	Developer commitment towards H&S management on the project	1=Yes 2=No	Nominal
126	H06	Develop HS policy y	Numeric	Develop HS policy	Development of safety policy in the company	1=Yes 2=No	Nominal
127	H07	Staff Trainning Safety	Numeric	Safety training for staff	Safety training for staff	1=Yes 2=No	Nominal
128	H08	PPEs Selection	Numeric	Selection of PPEs	Selection of PPEs to staff	1=Yes 2=No	Nominal
129	H09	EngageSO	Numeric	Engagement of safety officer	Engagement of safety officer	1=Yes 2=No	Nominal
130	H10	ToolBox Talks	Numeric	Participation in toolbox talks	Participation in tool box talks	1=Yes 2=No	Nominal
131	H11	Safety Inspection s	Numeric	Conducting safety inspections	Conducting of safety inspections	1=Yes 2=No	Nominal
132	H12	Safety Inductions	Numeric	Conducting safety inductions	Conducting of safety inductions to staff	1=Yes 2=No	Nominal
133	H13	ImplemenSWSs	Numeric	Implement safe working systems	Implementation of safe working systems	1=Yes 2=No	Nominal

No	Code	Name	Type	Label	Variable Name (Exact Wording)	Values	Measure
134	H14	Dev Emergency Plans	Numeric	Develop emergency plans	Development of Emergency Plans and Procedures	1=Yes 2=No	Nominal
135	H15	Compliance Certs	Numeric	Acquire safety compliance certificates	Acquisition of compliance Safety Certificates to plant and equipment	1=Yes 2=No	Nominal
136	H16	Engage Profession	Numeric	Engage professionals	Engagement of professionals in the project	1=Yes 2=No	Nominal
137	H17	Qualified Contractor	Numeric	Engage qualified contractor	Engagement of qualified contractor	1=Yes 2=No	Nominal
138	H18	ConductSafInspecs	Numeric	Conduct safety inspections	Conducting of safety inspections	1=Yes 2=No	Nominal
139	H19	Expertise Sharing	Numeric	Expertise sharing	Expertise sharing	1=Yes 2=No	Nominal
140	H20	Collect Response	Numeric	Collective responsibility	Culture change from finger pointing to collective responsibility	1=Yes 2=No	Nominal