

**EFFECTS OF SKILLED LABOUR ON QUALITY OF WORKMANSHIP WITHIN
THE CONSTRUCTION SECTOR IN NAIROBI COUNTY**

BY

SAMUEL KIPNG'ENO ARAP LANGAT

UNITED STATES INTERNATIONAL UNIVERSITY – AFRICA

SUMMER 2018

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SAMUEL KIPNG'ENO ARAP LANGAT

**A Project Report Submitted to the Chandaria School of Business in Partial Fulfilment
of the Requirement for the Degree of Masters in Business Administration (MBA)**

UNITED STATES INTERNATIONAL UNIVERSITY-AFRICA

SUMMER 2018

STUDENT'S DECLARATION

I, the undersigned, declare that this was my original work and has not been submitted to any other college, institution or university other than the United States International University in Nairobi for academic credit.

Signed: _____ **Date:** _____

Samuel Kipng'eno Arap Langat (ID: 655378)

This project has been presented for examination with my approval as the appointed supervisor.

Signed: _____ **Date:** _____

Peter N. Kiriri

Signed: _____ **Date:** _____

Dean, Chandaria School of Business

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ABSTRACT

The general objective of the study was to investigate the effects of skilled labour on quality of workmanship within the construction sector in Nairobi. The specific objectives of the study were to investigate the extent on-site skills training and certification influences the quality of workmanship within the construction sector, to investigate to what extent managerial skills affects the quality of workmanship within the construction sector and to investigate the impact of using effective strategies for improving the quality of workmanship within the construction sector in Nairobi.

This study employed the use of primary data. The target population of this study consisted of the building contractors in Nairobi County totalling 1,938. However, to ensure the sample was a true representative of a broad target population the researcher applied the sampling formula by Miller and Brewer (2003) giving a sample size of 332 construction sites of whom 302 responded. A stratified random sampling technique was used in the selection of the active construction sites within NCA 1 to NCA 4 categories. For purposes of this study, the data collection was carried out through structured questionnaires. Research assistants were engaged to help in distributing the questionnaires to the respondents. To ensure objective results the researcher focused on all levels of workers on site. Data collection was completed in person as much as possible. The collected data was analysed using descriptive statistics. Inferential statistics was applied to show the association between study variables and multiple regression analysis showed the strength, direction and significance of the relationships. Data was presented in the form of tables. Standard Package for Social Sciences (SPSS) was the tool used to analyse the data.

An analysis of the first objective revealed that the respondents strongly agreed that there was a notable improvement in quality of workmanship in the construction industry over the last two years. Subsequently, there has been an increase in the Certification of construction workers in Nairobi County and required to prove their competence. The respondents believed many construction workers in Nairobi are informally trained through the social flat forms like family businesses or mentored by a relative. A majority are employed and learn on the

job and despite this, the worker was still expected to deliver correct results on the first attempt.

An analysis of the second objective revealed inadequate funding resulted in inadequate professional staffing. When a project was on a very tight budget, the developer or contractor cuts out supervisory and managerial functions to save on cost. This resulted in poor work going unnoticed. Having managers; foremen, subcontractors, or supervisors in a project affected the quality of results because they bring to the site proper construction management and effective manpower management. The combination of some or all these elements helped managers to undertake quality projects.

An analysis of the third objective revealed with emphasis the importance of stakeholder's engagement with the Government expected to take a leading role in the sector as a catalyst to the development of training institutions. There was marked progress addressing training needs by both public and private institutions; however, because of the nature of the trade, there was still the gap of scaling this program. In this regard, it was notable that all quality enhancement strategies should be specific in trade/ skills and worker oriented. There was a strong positive association between the lack of good training providers to poor quality of workmanship.

It was concluded that there in regards quality of workmanship there was a need for industry unity amongst stakeholders spearheaded by Government not just for policy formulation and implementation but was being the catalyst for the creating right atmosphere for promoting onsite skills training by really converting these construction sites into viable organised training centres. This was because of the challenge that majority of the workers are informally trained, but that this approach has borne results as reported by similar studies in other international markets facing a similar challenge.

For further studies, there was need to establish effective models for implementing the proposed effective strategies. Especially on how to convert these construction sites into training centres; what challenges in doing so. Additionally, further research ought to be carried out in consideration of a national scale since this case was particularly focused on Nairobi Country hence need for consideration of the other 46 Counties.

ACKNOWLEDGEMENT

I convey my gratitude to my project supervisor Dr. Peter N. Kiriri for his valuable guidance to make this research a success. Special thanks to the Dean, Chandaria School of Business who provided ample space and environment for completion of my research project.

DEDICATION

I wish to dedicate this project to my loving wife Mrs. Betty Tuto Langat and my little princess Ms Anissa Chemalel Langat who make this strive to success all that worthwhile. To my beloved parents Mr Raymond Ronoh and my late mom Mrs Anne Ronoh; My Parents in Law; Mr and Mrs Gideon and Aida Mwai; and The Langat's family for their love, endless support, encouragement and sacrifices.

Above everything else, all glory to the Lord God Almighty, without whom life is futile.

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LIST OF ACRONYMS AND ABBREVIATIONS

ADF	Africa Development Bank
NCA	National Construction Authority
OHS	Occupational Health and Safety
TVETA	Technical Vocational Education and Training Authority
GOK	Government of Kenya
KNBS	Kenya National Bureau of Statistics
GDP	Gross Domestic Produce

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

There are growing concerns over shortage of skilled workmanship in the construction industry. Craftsmen play an integral role in all construction works and their availability dictates the overall growth rate of the sector. Skills shortage of workmanship negatively impacts the quality of construction project through the development of defects that are costly to repair, and some mistakes lead to the collapse of buildings. The type of workmanship influences project quality, which refers to the total features of a service or work that fully meet the stated needs. Factors causing workmanship defects include the lack of knowledge, carelessness, forgetfulness, but at times mistakes are intentional. Poor management was another contributing factor to poor workmanship (Bilau, Ajagbe, Kigbu, & Sholanke, 2015). Consequences of poor workmanship include poor finishing, construction of unsafe structures, mould in buildings, and breach of contractual agreement. Therefore, every country was angling at improving workmanship to make artisans the backbone of the construction industry.

Poor workmanship has been reported in developed countries like Australia raising concern over the future of the thriving global construction sector (Watson, 2012). In Malaysia poor workmanship has been witnessed with numerous housing projects witnessed in the nation since the launch of government construction projects for low cost and affordable housing (Ali & Wen, 2011). Arguably, Africa has the largest workmanship problem because a significant portion of employees in the construction industry are unskilled. For example, Nigeria reports high levels of resource wastage and inefficiency in the sector due to employers' unwillingness to impact employees with the right skills to improve their performance (Shittu et al., 2013). Poor workmanship in Africa has led to project and budget overruns, and construction of low quality roads and building in different countries.

The Construction Sector in Kenya was considered as a sector full of promise. Currently 11 of the 43 major infrastructure projects in East Africa are in Kenya. Some of these key Government mega-projects totalling a consolidated US\$7.8bn split up as follows: US\$3.8bn Mombasa - Nairobi Railway Project, the US\$2.1bn Tatu City Project, the

US\$1bn Lamu Port Berths Project and the US\$900m Lake Turkana Wind Power Project. Demand for housing continues to grow with role players estimating that more than 210,000 new residential units need to be built annually to keep pace with Kenya's expanding population. With crude oil production in the Great Rift Valley set to commence in the first half of 2018, many analysts predict that the country was on the cusp of an unprecedented construction boom.

The Construction Industry in Kenya and specifically in infrastructure development continues to see robust growth and remains a central component of the country's immediate and longer-term economic growth agenda and a central pillar of Kenya's Vision 2030 (Government of the Republic of Kenya [GOK], 2007). The industry's GDP contribution in 2014 totalled KSh259.6bn (\$2.86bn), up 13.1% on 2013. This growth pushed the construction sector's share of the economy up by a third of a percentage point to reach 4.8% of GDP. The construction industry's substantial jump in 2014 made it the best-performing sector that year, owing primarily to an injection of funds for major roadworks, railway projects, and road rehabilitation. Commercial credit extended to the construction sector rose from KSh70.8bn (\$778.8m) in 2013 to KSh80.4bn (\$884.4m) in 2014, an increase of 13.6%. Similarly, the value of approved building plans in the private sector rose by 7.8%, from KSh190.6bn (\$2.1bn) in 2013 to KSh205bn (\$2.26bn) (Robert Tashima, 2016). In 2015 the construction sector contributed US\$3bn (4.8%) to the Kenyan economy (Vision 2030 Infrastructural Goals, 2017).

The multi-billion booming construction industries has seen universities and colleges churn out large numbers of professionals in the past five years to 2017. These professionals supply the industry with greater numbers of architects, quantity surveyors, and engineers among other professionals. They are charged with the mandate to oversee the design and construction of projects while acting as intermediaries between clients and builders. However, there was a mutation of roles and functions and these professionals evolve to become contractors, sub-contractors or consultants for major construction because little attention was being paid to match up the demand and supply of builders creating the gap in roles and function governing this workforce in construction projects.

Notably, little attention used to be paid to growing the labor force, which ideally comprises of informal labor made up of unskilled and or semi-skilled lower cadre workers commonly known as *fundi's* and as a result creating an industry predicament a

huge skills gap. With the ever-increasing demand for both residential and commercial buildings, the skilled and unskilled worker plays a critical role in the construction chain of workers. In many developed countries, the construction sector was well structured with working mechanisms and policies but sadly, this was not completely the case in Kenya (Standard Media Group, 2011). Fundi's make up the backbone of the construction workers. Even with the imminent shortage of trained fundi's, many contractors are still hell-bent on cutting down their costs, opting for hiring quacks and non-professionals to widen their profit margins. The fundi workforce was a vital part of the broader construction community, and therefore individual skills upgrading at all levels needs to take place simultaneously to match the demand for this type of workers.

The profile of these fundi's according to Stephen Okari, the Secretary General of Mafundi Wa Kenya Association; a registered professional body representing individual artisans, artisans and technicians nationally range from a high school graduates, school dropouts, or completely unschooled casual worker's. This begs the question, are they trained for these jobs they seek? What criteria do contractors and sub-contractors use in hiring these fundi's? What are the qualification requirements? Which institutions train the Kenyan fundi's? (Standard Media Group, 2011)

It was estimated about 60 percent of buildings in Kenya are built by workers with little if not basic technical training with workers who claim to have learned on the job from similar previous construction site jobs. This beckons to compromise on the quality of workmanship. According to a report on informal labor in the construction industry in Kenya by Mitullah & Wachira, (2003) terms and conditions of their engagement are poorly defined lacking proper contracts. Contractors generally avoid issuing the workers with written contracts and registering them with relevant authorities in order to avoid additional costs associated with legal and labor laws. Indeed, the evasion of these additional costs was often a motivation for outsourcing untrained and unskilled labor. Without contracts, these artisans are exposed to exploitation contravening the occupation health and safety standards and have no medical covers against sickness and accidents that may occur at a construction site. Other benefits like workman's compensation, insurance schemes are hardly taken by contractors to cushion these informal laborers in case of injury, and the same contractors have no contractual obligations holding them liable to do so (Standard Media Group, 2011).

These workers generally included plumbers, masonry/ builders, electricians, roof constructors, interior fixtures and fittings installers, painters and landscapers. With the current conversion of many technical institutions and polytechnics into satellite universities by Ministry of Education in line with Kenya's Vision 2030, less of these hands-on-workers are being trained and in Nairobi, it was only Kenya Polytechnic now a University, was still offering technical training for fundi's. Other polytechnics that used to train masons and painters among other such skills are either run down or have been upgraded to colleges offering different curricular altogether (Standard Media Group, 2011).

The resultant dilemma and change in technology has created an opportunity for a new wave of training. Corporate companies and other stakeholders collaborate within the construction and building sector and are now coming in to train workers on how to use their products either as part of their corporate social responsibility strategy or commercial drives to increase brand visibility. Companies such as Basco Paints, Bamburi Cement, and East Africa Portland Cement are among the few companies that are training construction workers on the usage of their products. Basco Paints, for instance, started their Dura Coat Expert Training Centre in 2012 to train painters on how to achieve the best paint job with their paints and pastes. According to the Managing Director Mital Shah, the certificate offered after completion of training has validated skills and in return opened doors for many previously unemployed painters who go ahead and land that previously elusive contract. (Standard Media Group, 2011). It was this training dilemma that has presented the construction industry as an elitist sector where many universities train the higher cadre of individuals leaving the lower cadre to survive on referrals from previous jobs.

According to Kenya National Bureau of Statistics (KNBS), through its annual research publication - Economic Survey 2016 reported that approximately 148,000 people are formally employed in the domestic building and construction industry. Players operating in the sector range from indigenous micro-enterprises to foreign multinational civil engineering and construction giants. Although building and construction contractors are required to be registered with the National Construction Authority (NCA), a significant number of unregistered contractors operate in the informal sector.

This was a clear indicator of the marked shortage of skilled labor in the construction sector and heavily impacting the performance of the sector, which was central to Kenya becoming a middle-income economy by 2030. The Engineers Registration Board of Kenya records that there are only 6,353 registered engineers in the country (Engineers Board of Kenya, 2017). Yet this figure needs to be doubled as a bare minimum requirement for Kenya to attain the infrastructural development necessary for an industrialized nation. The present number translates to about 150 engineers for every one million people versus a similar global industry benchmark of 500 and 3,500 for every one million South Africans and South Koreans, respectively. This undersupply of skilled labour has led to an over-dependence on foreign contractors which are not sustainable. If as a nation we are geared towards attaining Vision 2030 milestones and with the continued growth of construction, emerging needs has increased demand on materials, technology, and skills resulting in gaps in their use. Therefore, a number of failures not limited to the quality of documentation of materials, inadequate capacity of contractors and their workers, unprofessional practices and enforcement challenges.

1.2 Statement of the Problem

As was customary in many countries to employ a proportion of the construction workforce on a casual and temporary basis to cope with the variations in contractors' workloads. However according to Jill and Arthur (2010) there was evidence to show that the number employed in this way has grown substantially in recent years in a great variety of contexts. The results of a survey by NCA indicated that the construction sector in Kenya currently has a total of 511,676 workers employed as skilled, semi-skilled and unskilled artisans (NCA, 2014). The sector depends mainly on unskilled laborers, who account for 42% of the employed labor force within the sector. Skilled workers account for 25% whilst Semi-skilled workers are 33%. One identified the reason for this apparent shortage was considered to be as a result of a shortage of policy, the ripple effect of which was that of an imbalanced demand to supply ratio; the few contractors have in turn lead to impunity and operate without any regulation, giving rise to the so-called rogue contractors.

There was a clear lack of a proper regulatory mechanism to govern industry topics effectively, The Engineers Registration Board Act 1969, in force 48 years since independence, was considered insufficient to address the current gaps in the sector despite

sporadic efforts to help the situation. The government was led to establish the National Construction Authority (NCA) through the NCA Act mandated to develop new and relevant policies and through a multi-stakeholder approach and was aligned to conduct research via the National Construction Research Agenda (NaCRA) to identify solutions facing the country's construction industry (MyGov, 2016).

A construction industry capacity survey found that the strategic and sustained capacity development of the construction industry requires credible and comprehensive industry data and information and that recently, there was inadequate data and information on skills gaps, and other key elements (NCA, 2014). Hence, the importance of this research was to address the pertinent gaps in policy, management and knowledge relating to the effects of skilled labour on quality of workmanship within the construction sector focusing on Nairobi County. The results can be used a viable blueprint in replicating the same key findings and recommendations to other counties across Kenya.

1.3 General Objective

The general objective of this study was to investigate the effects of skilled labor on quality of workmanship within the construction sector in Nairobi.

1.4 Specific Objectives

1.4.1 To investigate the extent on-site skills training and certification influences the quality of workmanship within the construction sector in Nairobi.

1.4.2 To investigate to what extent managerial skills affects the quality of workmanship within the construction sector in Nairobi.

1.4.3 To investigate the impact of using effective strategies for improving the quality of workmanship within the construction sector in Nairobi.

1.5 Importance of the Study

1.5.1 Bridging the Skills Gap Between Construction Sites

Focusing on skills upgrade training for construction site workers, versus the emerging themes in addressing skills upgrade for example using Mobile technology as a learning tool as well as benchmarking with other successful societies to improve on our standards.

The resulting skilled labor shortage in the construction industry has led to a decline in the quality of work and projects (Kiganda, 2016). Building local capacity, bridging between the demand for contractors and demand in the sector.

1.5.2 Policy Makers and Regulators

Technical Vocational Education and Training Authority (TVETA) - Established by GOK according to The TVET Act, 2013, it aims to strengthen the relevance and quality of TVET to respond to the needs of the labor market. to mainly regulate and coordinate training; accreditation, registration and licensing of TVET institutions and trainers; and promote quality, access and relevance of training programs.

National Construction Authority (NCA) - which was constituted under Act No. 41 of 2011 (Government of Kenya, 2011) to accredit and register contractors and regulate their professional undertakings, to accredit skilled construction workers and site supervisors, and to advice the government on policy issues aimed at developing the sector, regulate the industry and build the capacity of local contractors.

1.5.3 Other Stakeholders in the Construction Sector

Scholarly progression in the study of the improving the building and construction sector in Kenya. These industry Stakeholders, include employers, employees (site workers) and regulatory authorities, Technical Training colleges and Institutions, Contractors, Government of Kenya, Property Developers and owners and ICT (Data Base / Software, digital stakeholders). This research will contribute towards addressing keys subjects by these stakeholders on how to enhance employability, formalizing and transforming the workforce within the construction sector.

1.5.4 Government of Kenya (GOK)

The GOK has laid emphasis on the development of a reliable pool of human capital with the necessary skills and competencies to act as the key drivers of the goals of Vision 2030 (Government of Kenya, 2007). In line with this, the Kenya Vision 2030 Second Medium Term Plan (MTP) 2013 to 2017 intends to equip the youth with necessary skills, capital, and opportunities to create wealth (Government of the Republic of Kenya, 2013). This research contributes towards the development of the right strategies addressing workmanship in the construction sector.

1.5.5 Research and Academic Institutions

Skills shortage has been a persistent problem and a critical factor facing the construction industry in Kenya. The research sought to enrich the existing knowledge on the subject of skilled labor and quality of workmanship in the construction sector. As it was there was an ongoing concern and need develop effective strategies in the address of these two concerns regarding skilled labor and quality of workmanship across all verticals in the construction sector (Government of the Republic of Kenya, 2013).

1.6 Scope of the Study

The scope of this research had some delimitation. The geographical scope of the research was limited to the construction sector within Nairobi County Kenya. The research considered randomly selected construction sites. In addition, the populations considered for this research were limited to the following key stakeholders, contractors, construction site workers, and management of National Construction Authority. Also, the study used the descriptive research design because the research intended to collect detailed information through descriptions in cross-sectional study methods and observations making it useful to identify variables and unbiased information under the study. and a questionnaire was administered to collect primary data. The research sought to investigate the influences of on-site skills training and certification, managerial skills, and strategies for improving the quality of workmanship. The research was carried out for four months between January and April 2018.

Some possible limitations to this research included; unwillingness of the respondents to participate in the study and/ or giving factual and accurate information, however the researcher mitigated this through a cocktail of options: either by explaining to the respondents the importance of the study relative to each stakeholder, by giving reassurance, and guarantee confidentiality and anonymity of responses. Another possible limitation may be the lack of proper technical understanding of the subject matter by respondents, however, in the research, a simplified survey tool was designed to allow for good understanding by the respondents in their answering.

1.7 Definition of Terms

1.7.1 Construction Worker

In the context of this study, a construction work shall be classified into three according to as follows: “Unskilled construction worker” commonly known as a *‘fundi or unskilled draughtsman’* means any employee or class of employee who was not skilled and who was engaged in manual work. “Semi-skilled construction worker” means any employee possessing the accepted level of skill, knowledge, qualification, and experience of one or more of the trades as determined by different authorities within the construction industry. “Skilled construction worker” means a person possessing the accepted level of skill, knowledge, qualification, and experience of one or more of the trades as determined by different authorities within the construction industry (NCA, 2014). It was key to note that unskilled labor doesn’t necessarily mean lack of a skill set, but that the skill set required was acquired, for example, learned with minimal training.

1.7.2 Classification of Construction Workers in Kenya

According to the results of the construction industry capacity survey by indicated that the construction sector in Kenya currently has a total of 511, (NCA, 2014) 676 workers employed as Skilled, Semi-skilled and Unskilled Artisans. The construction workers are classified into three categories: **Site Supervisor**, who was a tradesman with relevant formal technical training, and was currently working as a site supervisor; **Skilled Construction worker**, who was a tradesman with relevant formal technical training, or has gone through formal training but has more than 10 years of working experience in his trade of specialization and **Semi-Skilled Construction worker**, who was a tradesman with no formal technical training in his/ her field of specialization and has experience of less than 10 years.

The sector depends mainly on unskilled laborers, who account for 42% of the employed labor the force within the sector. Skilled workers account for 25% whilst Semi-skilled workers are 33%. Women are underrepresented in all the categories with a proportion of 19%. The demographics are split as follows: most predominant age group of construction workers was between 25-30 years at 48% followed by 30-35 years at 29%. Proportions of other age groups are: below 25 years at 7%, 35-40 years 9%, 40-45 years 3% and above 45 years 4%. The number of construction workers employed per category was NCA1,

skilled 37, semi-skilled 96 and unskilled 112. NCA2 skilled workers 28, semi-skilled 8 and unskilled 13. Skilled workers for NCA3 and NCA4 are less than 15, whilst for NCA5 to NCA8, less than 10 skilled workers are employed. NCA was the classification of contractors to their capacity, by the Contractors registration establishment in Kenya has 8 distinct categories ranging from NCA1 (Highest) to NCA8 (Lowest) with most of the contractors doing more than one class of work. See appendix C.

1.7.3 Classification of Construction Work

The main classes of work include Roads, Water, Building, Electrical, and Mechanical. There are a total of over 13,700 contractors registered by NCA with over 22,400 licenses in the above classes of work. Building works have the highest proportion of licensed contractors at 43% followed by Roads at 34%. Water and Electrical works have proportions of 10% and 9% respectively. Mechanical has a paltry 3%. The sector was dominated by small and medium enterprise contractors which account for a total of 79% with NCA5 11%, NCA6 22%, NCA7 31% and NCA8 15%. Large establishment contractors account for 21% with NCA4 13%, NCA3 4%, NCA2 2% and NCA1 3%. 71% of the construction firms are owned by men whilst 21% have joint ownership of both men and women. Women-owned companies account for only 7%.

1.7.4 Informal Construction Sector

The informal construction sector has been defined as comprising “unregistered and unprotected individuals and small enterprises that supply labor and contribute in other ways to the output of the construction sector”. These small enterprises and individuals are mainly engaged in housing and building construction activity and are now recognized as suppliers of labor to contractors engaged in larger projects in other sections of the industry (Mlinga & Wells, 2002).

1.7.5 Informal Labor

It includes all construction workers who are employed on a casual or temporary basis without any proper form of contract, as well as those who work for themselves either alone or in small groups (Mitullah & Wachira, 2003). The terms and conditions of employment are not regulated in any way and hence the workers have no protection from the law against dismissal and no social protection against sickness, old age or incapacity to work.

1.7.6 Skills Shortage

Skills shortage can be described as an insufficient supply of suitably qualified workers willing to work under existing market conditions, particularly at prevailing wages (AOSIS, 2016).

1.7.7 Occupational Health and Safety (OHS)

The construction industry business in Kenya, as in other countries, cannot be tackled effectively without harnessing Occupational Health and Safety (OHS), to safeguard the health of the workers and the entire community. OHS was an area concerned with protecting the safety, health, and welfare of people engaged in work or employment. The goals of occupational safety and health programs include fostering a safe and healthy work environment (Ministry of Health, 2014).

1.7.8 Informal Construction Sector

According to (Mlinga & Wells, 2002) the informal construction sector has been defined as comprising “unregistered and unprotected individuals and small enterprises that supply labor and contribute in other ways to the output of the construction sector”. These small enterprises and individuals are mainly engaged in housing and building construction activity, but it was now recognized that they also supply labor to contractors engaged in large projects in other sections of the industry.

1.7.9 Construction Management Skills

Sears & Clogh (2005) suggests that there are three essential attributes for effective construction management skills, first was a practical experience so that they are thoroughly familiar with the workings and intricacies of the industry. Second, be familiar with various tools and techniques for planning, scheduling and controlling construction operations. Thirdly, was personality and insight that enabled them work harmoniously with other people and especially peers, subordinates and staff.

1.8.0 Construction Management

Construction management process was where the detail designed was transformed into a construction/fabrication plan and into day-to-day coordination and control of processes on site or in a factory (Koskela, 2010).

1.8.1 Technical Skills

Technical skills comprise the knowledge and capabilities to perform specialized tasks related to a specific field.

1.8 Chapter Summary

Chapter one furnishes the general introduction and background information to the effects of skilled labor on quality of workmanship within the construction sector. It highlights the statement of the problem, the purpose of the study and general objective as well as specific objectives that investigate the extent on-site skills training and certification influences the quality of workmanship, to what extent managerial skills affects the quality of workmanship and determine strategies for improving the quality of workmanship within the construction sector in Nairobi.

This chapter also addressed the importance of the study to various stakeholders, the scope of the study and definition of terms. In the chapters to follow, the research looks at the literature review in chapter 2, research methodology in chapter 3, results and findings of the research in chapter 4 and finally chapter 5 provides a discussion, conclusion, and recommendation to the study.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter discusses various literature related quality of workmanship in the construction sector. It specifically focuses, analyzes, and critiques the concept and impact of on-site skills training and managerial skills to the quality of workmanship in the construction sector as discussed by various past scholars and researchers by addressing the theoretical review, empirical review and a summary of each.

2.2 Influence of On-site Skills Training and Certification on Quality of Workmanship

As economies grow and expand, the construction industry must meet the demand for skilled local workforces. To ensure relevant professional and vocational competencies, site skills training was necessary but in a manner that delivers recognized and international best-practice training solutions with programs aimed at building and improving skills and expertise to guarantee success in the workforce. Upon reviewing the extent to which on-site skills training and certification influences the quality of workmanship was key. To do this it was one must understand the genesis and journey in the development of training up to being offered onsite.

2.2.1 Construction Industry and Developments

There was no common definition to what construction industry is, however, there are proposed arguments about whether it was an industry or a sector that comprises many industries (Turin, 1980; Han & Ofori, 2001). The literature further shows the importance of construction industry as a large bona fide sector of an economy playing a key role in not only national but also social and economic development (Hillebrandt, 2000). Construction takes place in all parts of the country and can be used to develop entrepreneurship, and transfer technologies to all the citizens of the country (Turin, 2007). It was because of its great importance that it was critical to appreciate that the construction industry has peculiar features that need to be understood if the sector was to be able to perform effectively and efficiently.

Hillebrandt (2000) defines the construction industry as the sector concerned with an erection, repair, and demolition of constructed physical facilities which provide space where other activities may take place. Furthermore, the building section of the construction industry was mainly concerned with the assembly of building materials which are supplied by the manufacturing sector and delivered to the site by the transportation sectors. In Kenya, to a large extent, manual labor was used in the execution of construction works and this contributes to job creation (Mbiti, 2008) and to a greater extent in Kenya many of the construction of the building works still rely heavily on manual labor in their assembly. The research pointed out that the construction industry employs more than 800,000 people who are required to deliver the constructed facilities to the clients on time, within budget and meeting specified standards of quality.

2.2.2 Inputs of Construction

Construction in most countries was more labor intensive so it generates employment directly in an economy (Hillebrandt, 2000). In Kenya, it was a sector that can assist the government to develop the economy as well as generating employment opportunities for its rapidly growing population. In practice, the building may be constructed using a steel frame, a precast reinforced concrete frame, in-situ reinforced monolithic concrete or load-bearing brickwork. According to Enshassi, Mohamed, Abu Mustafa and Mayer (2007), the major inputs in the construction process are cited as materials, labor, capital, plant and equipment, entrepreneurship and technology. These factors are critical to productivity outputs and represent the broad areas in which project managers can take action to obtain better productivity (Heizer & Render, 1990). Increased productivity in the construction industry can be viewed from two perspectives, the client and the contractor. From the client's perspective, increased productivity lowers costs, shortens construction schedules, offers more value for the money, and achieves better returns on investments. From the contractor's perspective, increased productivity leads to a more satisfied client, while also providing a competitive advantage and in return leading to a faster turnover and increased profits (Horner R. & Duff R., 2001).

2.2.3 Outputs of Construction

According to (Bon, 2010) the major outputs in the construction process on site are the facilitation of growth in the economy, an increase in capital formation, the creation of wealth and employment. For developing countries, the positive growth trend was

anticipated because the production capacity of the construction industry was expected to grow proportionate to the national demand for physical infrastructure, which generally increases as the developing country progresses.

2.2.4 Workmanship in the Construction Industry

The definition of workmanship was not a settled concept and exists different views. Pye (2002), defines workmanship as 'the quality of the execution of a project'. He argues that workmanship was any part of a final product that cannot be abstracted, the chair you are sitting on can be drawn, diagrammed into parts, and described on paper, but the actual chair itself was the result of the workmanship that made it more than any of those things. In conclusion, therefore, the closer to the design the final product was in terms of look, quality of material, and quality of construction, the better its workmanship (Pye, 2002).

Howard Risatti, an art critic, and writer describes workmanship as the skill and ability that was displayed by the engineer, sculptor, or worker to build the home, chair, or sculpture. (Risatti, 2007). The argument between Risatti and Pye shows that workmanship was sometimes defined by the process of how a thing was built (skill) versus the outcome of the construction process (quality), this was subjective to the consumer of the final product.

2.2.5 Skills Gap in the Construction industry

According to the Construction Industry Development Board of Malaysia (CIDB), a skilled worker was defined as some personnel who carries out his work according to the set specification based on the national industrial requirements and passed the fixed accreditation test. After successfully accredited (passing the practical skills test), then only CIDB will officially recognize him as skilled personnel by issuing 'CIDB Skill Competency Certificate' based on the line of work (CIDB, 2010). The skilled labor shortage in the construction industry can be attributed not only to the economic boom but also to many other factors. They include lack of proper academic type qualifications, continuous development training such as new or existing technology gap knowledge, process or recruitment of these laborers being formal or informal and lacking in criteria and lack of benchmarking to standards and best practices locally or globally.

Moreover, lack of proper laws and regulations or poor implementation where they exist by not only government bodies but industry regulators (CIDB South Africa, 2004). As a

result, many companies are now left with insufficient skilled labor to meet their quality needs and its effects become visible in the quality of workmanship. This sort of shortage of skilled labor should result from an increase in the demand for labor and this can be interpreted in a twisted way as demand exceeding supply however so never to the benefit of the laborers.

The common agenda of providing a social and economic advantage to the population has placed the construction industry has been under pressure to embrace labor-intensive construction as one way of creating job opportunities for operatives in the labor market. Since labor-intensive construction process was an important means to an end in the application of labor output constants' and standards are key to ensure efficiency (KNBS, 2012).

The NCA (2014) report categorizes the construction workers totaling 511,676 in 2014. The skills gap was split as follows: out of the employed in the sector was dominated by plumbers accounting for 24%, electricians 23%, welders 13%, masons 12%, carpenters and painters 10% each, machine/plant operators 2%, interior specialist artisans 2%, aluminium fabricators 1% and site supervisors 1%. This highlights to a perspective which skills are in highest contributors to the unskilled population and possibly poor workmanship. Also, in prioritizing efforts as well in the alleviation of the skills gap altogether.

Table 2.1: Classification of Skilled and Semi-Skilled Workers in Kenya

Trade	Kenya		Nairobi	
	No. Of Workers	%	No. Of Workers	%
Masons	75,612	55.1%	19,442	51.2%
Carpenters	16,841	12.3%	5,958	15.7%
Steel Fixers	6,939	5.1%	3,087	8.1%
Supervisors	6,115	4.5%	1,869	4.9%
Electricians	5,892	4.3%	1,769	4.7%
Painters	4,889	3.6%	1,737	4.6%
Welders	4,195	3.1%	1,308	3.4%
Plumbers	4,038	2.9%	1,193	3.1%
Machine Operators	2,010	1.5%	501	1.3%
Tile Fixers	1,577	1.1%	394	1.0%
Drivers	442	0.3%	89	0.2%
Surveyors	425	0.3%	80	0.2%
Glaziers	134	0.1%	53	0.1%
Scaffolders	100	0.1%	53	0.1%
Interior Decorators	93	0.1%	37	0.1%
Aluminium Technicians	90	0.1%	34	0.1%
Asphalt Specialists	85	0.1%	24	0.0%
Terrazo Fitters	75	0.1%	8	0.0%
Others	802	0.1%	2	0.3%
Totals	130,354	94.8%	37,638	99.1%

Source: NCA (2015)

2.2.6 On-site Skills Training and Certification

In developing countries like Kenya, there was an abundant supply of semi-skilled and unskilled labor with inadequate formal training in the construction industry (Moremati, 2011). The Government considers this a key pillar in its development goal and appreciates the need to be engaged in their development in its drive to promote the creation of employment (KNBS, 2012). This challenge was further complicated by high employee turnover rates which in turn deters investments by stakeholders of the Industry

in employee training. Lack of training causes delays due to rework and overall low labor productivity and ultimately compromising the quality of workmanship. Inadequate training as well causes the workers to get employment in markets that differ from the skills they have acquired and the increase in maintenance works that are increasingly demanding multi-skilled artisans (CSSC, 1989).

In addition, construction workers increasingly require an underpinning general knowledge to cope with changing work responsibilities and to comprehend the interfaces between the various site production tasks. For example, applied mathematics, setting out, reading drawings, environmental studies, power tools, organization and structure of the sector (Construction Industry Board, 2011; Clarke & Christopher, 2004; Fowler, 2011; Gann & Senker, 2011). These writers have argued that traditional craft skills can no longer meet the demands of contemporary construction which palpably has a need for continuous formal training.

2.2.7 Need for On-Site Skills Training

With the imminent challenges facing skills gaps in the construction industry, many construction firms embrace the unsystematic method of learning on the job commonly referred to as “informal skilling” (Middleton, Ziderman, & Arvil Van Ad, 2005). This mainly involves learning via observing and doing and was largely confined to initial employment training with the limited continuation of training and skills upgrading commonly referred to as continuous improvement training. Kinyanjui and Mitullah (2009) found that in Kenya a considerably large percentage of workers operating within the informal construction sector are trained through apprenticeship. In the construction industry, the split between those trained via formal and informal institutions sits at 50 percent each, the latter being mainly through apprenticeship. The apprenticeship was a systematic process that begins with the recruitment of new unskilled workers as apprentices and attached to understudy the experienced tradesmen in different competency areas. The apprentices work closely with the skilled workmen learn the craft and acquire the requisite skills and the cycle begins again with new recruits and them as coaches. Otherwise once relevant skills are acquired, experience and reputation allow workers to proceed to take up specific work on their own.

Another challenge in informal skilling was that it was geared towards the transmission of existing practices without or with minimal external input. Ziderman (2002) states the

implication of this was that the master's ability to train was limited to his current skill and knowledge and this often results in low productivity and the ultimate quality or workmanship. He further pointed out that informal skilling was the most prevalent mode of training in the informal sector. Mitullah and Wachira (2003), informal skill training was further encouraged by the low level of formal artisans training because it was 'self-financing' in that it takes place without any funding from the government, however, artisans informally trained lack competency skills as they are not adequately trained.

2.2.8 Development of On-Site Skills Training and Certification

The early developments of artisan training and transfer of skills and still present in the modern society began with an apprenticeship. This was one of the oldest methods of training artisans in skills across the board. In earlier centuries, the practice would run for a five to eight years' period of learning under a 'master craftsman'; through an indenture or agreement. However, with the industrial revolution and the economic burden on poor families, there was reduced the popularity of this long period of apprenticeship (Schwartz, 2009). Across time the old tradition of apprenticeship developed to the now common practice in the twenty-first century and especially, in the informal sector was the abridged form of 'on-site' training. With onsite skills training, the mode of operation, duration and intensity vary from place to place.

According to NCA (2014), there are only 460,000 registered skilled workforce in the construction industry. This against a demand of more than 2 million required for the government agenda on the housing to become a reality. The African Development Bank reported that there was a 75 percent skills gap and a looming crisis that has pushed manufacturers and bodies like NCA into the training arena as of 2016. A debate as to whether a firm trains its artisans solely on the use of their products would be doing so for short-term selfish reasons or to have properly 'trained' them. In response to this need, the NCA began a formal artisan on-site training and accreditation in 2016 themed '*Be sure, Jenga smart*' which means build smart and targeted artisans and site supervisors.

The program was conducted and implemented by NCA officers from headquarters and its respective regional and liaison offices. The free training was based on the importance of; getting accredited, always using Personal Protective Equipment (PPE) while working and upholding professionalism at all times including sensitization on their industrial rights. The venue for the training sessions was on construction sites and compliant with NCA'S

quality standards and requirements. The Authority aims to train and accredit at least 300 hundred people per venue as part of efforts to accredit 1.5 million artisans by the year 2020. The requirements for an artisan to qualify for accreditation are a copy of the national identity card, passport size photo, technical certificates or a reference letter and an accreditation fee of Ksh. 1000 for artisans and Ksh. 2000 for site supervisors (Mjenzi, 2017).

Several firms in the construction value chain have taken to training artisans in various disciplines to address the deficiency of skilled workers in the industry. The training was an indictment of the education system since artisans like masons, carpenters and painters were supposed to be trained by technical training institutions. NCA in partnership with Technical and Vocational Education and Training (TVET) as well as Industry Stakeholders have successfully trained over 19,000 contractors and 15,000 skilled workers as of December 2017. Amongst the private companies includes cement companies like Athi River based Savannah Cement, Housing Finance Corporation, Sadolin Paints, Alibhai Shariff, Stanley Black and Decker (Tool Company) and Kenya Master Federation of Builders. Also, among those in the intensified training was Arc Skills, an organization that has also beefed up its efforts to boost the industry's professionalism. They have targeted and trained masons, electricians, plumbers, tiling specialist, plasters and painters, their blended learning model 'TVET ON SITE' and this has seen more than 1,000 skilled workforces injected into the industry. Also notable was an "Actis programme (Phase 1) that saw 300 youth from the Garden City environs being equipped with employable skills under this initiative. In the next five years, Arc Skills plans to have trained more than 10,000 skilled professionals, including tile fixers, masons, and joinery experts while equipping them with international and local accreditation (David Mwitari, 2018).

2.2.9 Benefits of On-Site Skills Training and Certification

Mugo (2017), noted that when you train people and certify them, the certified artisans are provided with a means of benchmarking and assessment as to what level of quality of workmanship and output to expect before awarding contracts and jobs. On the Job Training (OJT) can also be referred to as job instruction training or on-site skills training. It was the most commonly used method of training employees. Awe (2006) posits that OJT involves training of employees for job tasks by allowing them to perform such tasks

under the guidance of an experienced worker. This can be in the form of the formal or informal method of imparting knowledge and skills. Certification was considered a double-edged sword leveling the playing field for both employer and employee, besides enabling the employer to assess a worker's output, the certification gives the employee the right to demand a certain and possible better wage. Training also acts as a stepping stone for such underprivileged people to go up the social ladder to attain better socio-economic welfare. Not only these but also with the health and safety of workers and environs if a construction site. Qualified staff need minimal supervision and enable a company to do a good job, and within the stipulated time. So, it gives you a pool of people for your site who have more skills and are more qualified, which means you can build better quality buildings in good time and save money (Mugo, 2017).

2.3 Influence of Managerial Skills on the Quality of Workmanship

The success or failure of a construction project was pretty much dependant on effective leadership and the presence of management (Murphy, David, Bruce, & Dalmar, 1974). The success of a project was generally defined on the basis of time, cost, or quality performance which was a direct result of the impact of key individuals on the project. This, therefore, means that the identification of key personal characteristics and attributes serving to deliver on the project can either enhance or detract the likely outcome of the construction projects success or failure.

2.3.1 Management in the Construction Industry

What was management and why was it important and what value was adequately addressing and identifying attributes associated with successful management? Management has significant influence over the quality of workmanship in the construction industry. It refers to the process of planning, organizing, directing, and controlling available organizational resources including employees and other materials for the attainment of specific objective. Project management relates to the application of specific knowledge, skills, and techniques for the purposes of meeting stakeholders' expectations within the constraints of time, scope, and quality. Generally, project management extends to the workmanship as one of the key requirement for the construction of sound building roads, and entertainment outlets among other types of public and private works. Effective management was essential in reducing the number of defects occurring during workmanship through prompt identification of challenges at

early stages and ensuring the employment of efficient correction strategies to minimize or eliminate completely the negative side effects of a project.

Fundamentally, there was universal consensus that management, be it good or bad has a significant impact on the overall success or failure of an endeavour. Despite this, however, there was a level of disagreement over just how significant that impact may be. The significance of management to an endeavour's success or failure was an ongoing argument. Some researchers posit that management was a key determinant in success or failure, and arguments exist that managerial skills are minor of many major factors that determine success or failure. This because managers have the power to motivate employees and use minimal available resources optimally for realization of project goals. However, some researchers have different perspectives they state that economic, environmental, social and industrial conditions have a much greater impact on the organization's success or failure (Nahavandi, 2003). Since managers are responsible for the coordination of these forces in the company, there was no doubt about the importance and influence of management on quality of workmanship in the construction sector.

A construction project requires management and the effective manager exhibits good leadership McManus and Koorosh (2003). At a managerial level, individuals are engaged in influencing various project entities to perform specified project tasks. The manager's ability to influence the speed, quality, and cost of these items places the project's success or failure squarely on their leadership skills. Construction managers must have the ability to lead the team within a relatively unstructured environment by integrating individual demands, requirements, and limitations into decisions that will affect overall project performance towards the desired output (Odusami, 2000). Odusami further breaks down the skills of a manager on a construction project and many times the terms leader and manager are used interchangeably, however, in the relationship between management and leadership there are many different skills that go into managing a project that was distinct from leadership. There are key skill sets of managers which are fundamental to administration; technical skill, human skill, and conceptual skill.

2.3.2 Administrative Skills

In a construction project, the foreman or superintendent's ability to clearly see the broad picture of what was to be accomplished and then optimizing the manner in which it was

done demonstrated both his human (leadership) and conceptual skill. The composition and configuration of the teams that are put together relate to his ability to effectively lead and motivate the individuals involved in the process. Within these broad managerial categories, it was the human and conceptual skills to which leadership applies. Management can be broadly applied to the nature of a construction project manager or superintendent's position, but leadership was a skill requisite to successful management (Chan & Chan, 2005).

Rahman et al., (2000), workmanship was classified as one of the most frequent in non-conformance to standards in a construction site and therefore through literature, variables that are related to the causes of poor quality of workmanship in construction projects have been identified. An incompetent manager was generally recognized as a major factor to poor construction productivity. Poor supervision on site contributes to poor workmanship during construction and the ability of a management team on construction site was important to ensure the employee's daily productivity (Rahman et al. 2000). The role of sub-contractor was one of the factors contributing to construction deficiency because most of the site work was completed by subcontractors. A large percentage of the site work was done by a variety of subcontractors whereas the main contractor focuses on management and coordination. Due to the involvement of various types of subcontractors in the same construction project, quality control becomes a complex and challenging task by the main contractor to the subcontractors to inspect, supervise and control the works that have been done. (Kasun, & Janaka, 2006).

Abbas (2006) refers to communication as a key element and concern by the supervisor and a key skill important to conveying right instructions to the workers in a construction site. Due to the nature of most construction sites, it was possible to find different languages between different laborers and local supervisors causing communication failure on a site. This was because many foreign workers are not able to speak in local languages fluently, and consequently ends up in misunderstanding and quality or workmanship becomes compromised. This was true for many foreign-owned construction companies and their projects.

A research case of the artisan's in the construction industry in South Africa investigating the causes of skills shortage found that skills shortage has led to increased project delays and low productivity. Artisan skills shortage continues to hamper the infrastructure and

developmental plans. This causes an ever-increasing challenge for authorities to regulate the level of skills and training of the country's construction force due to increasing emerging contractors (Tshele & Agumba). The lack of skills at management level has impacted the efforts towards the training of artisans due to poor administration of skills transfer. Other stakeholders suffer the effects of poor skills, for example, contractors experienced time delays, increased costs on projects, and poor quality of workmanship, low productivity, re-work and ultimately affect the competitiveness of that industry. Studies in the Kenyan construction industry show that labor costs vary widely within the industry and that worker's management was the most significant factor affecting labor productivity and consequently a firm output and profitability. Sound management aims at increasing both the efficiency and effectiveness well as good quality workmanship. Sound skills management that includes the management techniques, such as construction methods and, resource management, project administration factors and social factors which will lead to an increase in efficiency and effectiveness of personnel. It was considered a significant factor in determining the future survival of any firm in the construction industry particularly as competition increases (Lim & Alum, 1995).

A report by PWC (2014) categorizes the loss of skills and expertise as high risk because of its impact on the ability of companies to successfully complete contracts and undermines expansion. Growth strategies place a high demand on companies maintaining and retaining the appropriate leadership capacity. Recommended that a remuneration policy focusing on performance and retention of key talent was essential to the sustainability of a business. Regular succession reviews to identify potential talent retention risks and application of career planning strategies should be undertaken. It was essential that cash flow requirements over the life of a contract be considered at the tendering stage. In Kenya, it was notable for the need to train the higher-level employees as well. They include supervisors, managers, and subcontractors, all the way to the contractor, to equip them with work.

2.3.3 Technical Skills

Additionally, construction managers should possess adequate technical skills critical for overseeing the quality of workmanship in the construction industry. Technical skills refer to the knowledge and proficiency acquired in a particular area of specialization that assists in understanding the requirements of a profession (Ghalandari, 2012).

Construction managers should possess several technical skills including the comprehension of various types of construction methodologies, types of construction tools, and reading construction blueprints. Technical skills are particularly essential for middle and lower level managers because they work closely with artisans during the construction process (Javadin, Amin, Tehrani, & Ramezani, 2010). These technical skills enable the managers to guide craftspeople how to perform their jobs and facilitate effective project monitoring. The managers can identify building defects and identify workers contributing to the biggest percentage of these errors early before they can make irreparable damage to projects.

2.3.4 Human Skills

Also, construction managers should have people management skills also referred to as human skills. This refers to the capability to communicate with subordinates and influence them to pursue common goals for organizational benefits. Leaders with management skills should prioritize the needs of their employees and develop a suitable environment to make them feel secure and part of the organization (Namvaran, Rabavi, & Avarsin, 2008). Consequently, they get more involved in organizational functions and work as they are motivated to see the fruits of their labour.

2.4 Strategies for Improving the Quality of Workmanship in the Construction Sector

Accelerating skills acquisition and upgrading of courses in the construction sector and the million-dollar question has been how to essentially turn construction sites into training centers. There was a need for a paradigm shift in the construction sector in terms of stakeholder management and engagement to address industry concerns and GAPS. Enhancing employability, formalizing and transforming the workforce in the construction sector through vertical specific certifications, for example, competency-based certification.

Despite the output of the country's construction industry has risen on average by 13 percent annually since 2014. There was an estimated gap of about 30,000 engineers, 90,000 technicians, and 400,000 artisans, with the shortage of mid-level technician and artisans hampering the prospects for economic growth. It was critical at an industry level to develop sustainable documented solutions to address this gap on a continuous basis

and some of the solutions developed with a successful track record both globally and some locally as follows:

2.4.1 Skills Transfer

The increasingly diverse selection of materials and components used in the contemporary construction sector was altering the skills required from each craft. For example, in plumbing, the traditional plumber worked mainly with copper and lead but currently, plumbing works also encompass items made of copper, steel, and plastic DPP using different non-traditional jointing methods, hence demanding skills transfer so as be able to work with the new changes and with time older skills becoming irrelevant (Clarke, 2010)

2.4.2 Changing Work Methods

Changing work methods, processes, standard operating procedures (SOP's) due to the above two factors such as mechanization as well as the changing environment, employment relationships have an impact on work practices and artisan skills by modifying their responsibilities as well (Gann & Senker, 2011; Construction Industry Board, 2011). The increasing degree of mechanization in site production works requires artisans with more technical and knowledge-based skills, for instance, the demand for soft skills by customers (Dainty, Ison, & Briscoe, 2005).

2.4.3 Technology

Firstly, the construction sector introduces changes in the technology used in site production in pursuit of better methods of construction and greater efficiency, for example, in prefabrication. Changes in technology impact artisan skills by changing the nature of their work, for example, the increased use of concrete frames requires artisans with steel fixing skills to work with steel reinforcement (Clarke, 2010; Gann & Senker, 2011; Construction Industry Board, 2011).

2.4.4 Poor Industry Image

Like most construction industries developing nations, the industry was usually related to a 3D concept which means dirty, dangerous and difficult (CIDB Malaysia, 2015). Local people are not willing to participate in the construction industry where in Kenya most of

the construction workers whether skilled or unskilled are from lower education caliber. The irresponsible or unethical employer or contractor who desire to make savings will ignore the safety of workers by either providing minimum if no insurance was an all too common story on the ground. This dilemma was further aggravated by that of a poor paymaster, which was a grave concern globally because of the insecurity of income that comes with temporary status. Acknowledging that there was a lot of stigmas associated with working as an artisan, in Kenya, since the education system and parents have prejudiced us to believe that only mainstream careers such as law or medicine can take us places. The industry needs to show that we value this level of training by paying artisans a decent salary and was the sure way we will motivate more young people to seek the training.

2.4.5 Stakeholder Participation

Generally, in both developed and developing countries, the large companies have off-loaded their commitment to skill development to an uncoordinated sector of the subcontractors. It was imperative therefore to harness the potential in this sector along with the medium size construction outfits for the development of skilled artisans (Ogbeifun, 2011).

However, as part of their stakeholder contributions taking place in Kenya was the involvement of industry players in jointly participating in programs that seek to improve on the working conditions as well as the skills of workers in construction sites stands. The training programmes companies offer vary, with no standard template on what to be imparted and some are also specific to the companies' products. One of the companies in Savannah Cement, which was one of the country's large cement producers, in 2015 was the latest to announce such a training programme, and in 2017 trained more than 10,000 artisans. Bamburi, on the other hand, was teaching the artisans on-site planning, drawing, setting out and foundations, mix designs, causes of building defects, as well as on-site safety procedures.

In 2013, Housing Finance launched a program dubbed 'one million artisans' in various courses, by offering them loans to take the courses in conjunction with other industry stakeholders like Alibhai Sharif Centre of Excellence, who carried out the training and certification. The artisans were trained by local instructors, alumni of the Global Tool Trainer Certification (GTTC) at the Stanley Black and Decker University in Dubai. The

supervision was offered by Mafundi Wa Kenya Association. The initiative was one of the ambitious plans laid out in the Vision 2030 flagship project, which aims to train 1 million artisans by 2022. Over 250,000 artisans need to be trained each year in order to reach this target. In 2015 graduated and certified more than 500 artisans have graduated Alibhai Shariff was a decade old retailer of construction material in Kenya. The 558 graduates, male and female drawn from Nairobi and its environs, took courses in carpentry, metal fabrication, painting and electrical works. The programme was approved by the Ministry of Science, Education, and Technology and was set up to address the gaps in skills in the construction industry (Daily Nation, 2015).

2.4.6 Government Policy

The government of South Africa, in April 2000, the Construction Education and Training Authority (CETA) was established to influence the course of training and skills development in the construction industry (CETA, 2008). The unique component of the role of CETA to the informal sector was the implementation of the “Recognition of Prior Learning” (RPL) process (SAQA, 2002). The process recognizes artisans who acquired skills outside the traditional learning context, they are enrolled into a form of induction course to orient them and be certified in the appropriate grades, thus enabling them to function adequately in the construction industry (Fitchett, 2009). Further to this, the fund for training was integrated into the contract value and the supervising authorities or consultant could double as facilitators, not merely performing their statutory duties. This principle was being used in the development of infrastructures in the tourism industry of South Africa.

The construction industry in Kenya was regulated by the County Governments and the NCA (Building and construction, 2018). The link between TVET and industry in Kenya was very weak resulting in a mismatch between the supply of skills and the market. Furthermore, there are weak academia and industry linkage leading to skills mismatch for the labor market (KNBS, 2011). In addition, the Labour Market Information System (LMIS) was inadequate. This was because the provisions of the Act only recognize and accredits graduates and tradespersons of formal training institutions and that informal construction workers have generally not had any formal training and have therefore not benefited from the training provisions under the Act (The Industrial Training Act, 1983). The majority of informal construction workers are trained on-the-job, through informal

means of apprenticeship, leading the government not to grade and register them, even where demonstrated competence. Despite this myopic view, research has shown that the performance of workers trained through informal apprenticeship was an effective way of learning, with some workers excelling in their respective fields.

The Kenya government, in an effort to encourage the training for skills in various trades, enacted the The Industrial Training Act (1983) requiring all construction projects worth more than Ksh. 50,000.00 (US\$ 641) to pay 0.25 percent of the contract sum as a training levy. Money generated from this source was supposed to be used in the training of various workers in the construction industry. However, informal construction enterprises or workers do not pay such monies mainly because their projects are not registered, and they do not have formal contract agreements. Consequently, workers in the informal sector are not able to take advantage of this fund to develop their skills and their lack of access to these funds has resulted in the funds hardly being utilized. By 2011, the account had credit in excess of US\$ 853,544 (Shah, 2011).

World Bank report on improving skills development in the informal sector recommends that all stakeholders including governments, public and private providers of training, and international development and financing agencies have roles to play in the improvement of the strategies addressing the construction industry and in particular the subject matter skills and quality of workmanship (Adams, Silva, & Razmara, 2013). Governments can play an important role in building a market for skills for the informal sector and in supporting basic education. They can also promote efficiency and equity in training markets that serve the informal sector by changing the incentive system to serve market needs for both formal and informal sectors. Governments can use different tools to address both supply and demand constraints through financing, information, quality assurance, and the like. They can lead efforts to strengthen statistical sources and improve program monitoring and evaluation.

Public providers of skills including the technical and vocational education offered by ministries of education and the non-formal training offered by other ministries such as labour, youth and sports, industry, and agriculture can play a larger role in providing skills for the informal sector. They can introduce reforms such as the use of modular curricula for training that offer greater flexibility in delivery and reduce the time needed away from work for those in the informal sector. Although the private sector was more

responsive to the informal sector, public providers can offer other services that contribute to the skills needed by those in the informal sector, such as introducing adult literacy. Second-chance education and entrepreneurship courses. Private providers of skills that already play an important role in serving informal sector enterprises should be encouraged and their efficiency improved. Evidence shows that private training providers are responsive to increased demand in the informal sector, and better regulation and market information can improve their efficiency. On the supply side, governments and donors can play an important role in strengthening the capacity of informal sector associations for organizing and delivering training. On the demand side, financing through targeted vouchers and training funds can improve equity and access to skills for the informal sector.

International development and financing agencies can also play an important role in the financing of skills for small and household enterprises and ensure that their assistance focuses on interventions that help improve productivity and incomes for the nonfarm informal sector. Among possible investments are improving the skills and pedagogy of master craftspersons; building the capacity of industry associations to serve the skill needs of the informal sector; offering targeted demand-side financing to promote equity in access to skills, competition, and innovation for the informal sector; supporting public sector reforms in technical and vocational education that expand services to the informal sector; strengthening market institutions that provide information about quality; and supporting rigorous evaluations of programs for skills development serving the small and household enterprises of the informal sector.

2.4.7 Integrated Training with Construction Processes

According to research findings by Ogbeifun (2011), on the propagation of the use of progressive implementation of the construction process in any particular project, found that commencing construction works from the simple to more complex areas of the project was an effective tool for skill development. In the study of two projects that adopted this principle, some of the key findings include: The skills of the artisans improved progressively as the construction progressed from simple to complex stages; Successful completion of a prototype created the necessary encouragement in the workforce, reinforcing their confidence and ability to apply their knowledge appropriately in the later more complex stages of the project; Though the new trainees

may not be proficient in their respective trades, yet they possess a skill for improved employment; The success recorded in these training experiments were possible because of the active participation of the project personnel- client, consultants, and contractors; The collaboration with the academia gave vent to the application of relevant research findings.

2.5 Chapter Summary

This chapter provided a review of literature of the subject of the quality of workmanship in the construction sector, and specifically identifying current interventions around onsite skills training, managerial skills, and strategies addressing this subject matter globally and locally. It also looked at the benefits accrued to organizations that employ or invest for skilled workers in construction, as well as the challenges construction companies are facing in addressing these shortages are discussed. The next chapter three looks into the research methodology that discusses the tools and skills employed in the gathering of data in the validation of the hypothesis.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter entails the research methodology used in collecting, analysing and presenting data for the dissertation. According to Yin (2008) the main use of documentation in literature review was to corroborate and dispute evidence from other sources. Additionally, effective design of the research instrument requires a good understanding of the theories underpinning the research area.

The study adopted a sequential mixed method research approach involving personal interviews and a questionnaire survey to collect empirical data. It was acknowledged that research surveys could attract identifiable disadvantages (Lim, Oo, & Proust, 2012). They include low response rates and the potential to incorporate bias such as sampling skews, researcher bias, and prior knowledge among others. With this in mind, contingency measures were employed to address these shortcomings by using research triangulation (Fellows, R. & Liu, A., 2008). The purpose of triangulation was not to replicate results but obtain complementary findings that strengthen the deductions made (Morse, 2005). Questionnaires were distributed to a sample of contracting companies within the County of Nairobi that are listed in Grades NCA 1 – 4 grading system by National Construction authority. The research was supported by interviews to validate the findings made from the responses received from the questionnaires.

Nairobi has a thriving construction industry composed of both formal and informal firms and was the area of the study. Nairobi was the capital city of Kenya with a population of approximately 4 million inhabitants living within 695 km². Nairobi was found within the Greater Nairobi Metropolitan region, which consists of 5 out of 47 counties in Kenya, which generates about 60% of the entire nation's GDP that was registered at 4.4% 2017 (Kenya National Bureau of Statistics, 2009). See Appendix C.

3.2 Research Design

According to Kothari (2004) a research design was the blueprint for the collection, measurement, and analysis of data in a manner that aims to combine relevance to the research purpose facilitating the smooth sailing of the various research operations.

Thereby making research as efficient as possible yielding maximal information with minimal expenditure of effort, time and money. It was the conceptual structure within which research was conducted.

This study followed a general plan of how the researcher answered the research questions. The research strategy provided the overall direction of the research including the process by which the research was conducted, through a mixed approach of the following mixed methods of surveys, action research and archival research (Saunders, Lewis, & Thornhill, 2009).

The research design selected for this study was descriptive research, which tends to identify and explain association between variables (Kothari, 2004). According to Orodho (2009), descriptive research design was used in preliminary and exploratory studies to allow researchers to gather information and summarize, present and interpret data for purposes of clarification. According to Mugenda and Mugenda, (2008) the purpose of descriptive research was to determine and report the way things are and it helps in establishing the present status of the population under study. They are useful for describing, explaining or exploring the existing status of two or more variables. For this study, the researcher sought to assess if there was a relationship between the effects of skilled labour on the quality of workmanship. The dependent variable quality of workmanship and the independent variable was onsite skills training and certification, managerial skills and effective strategies.

3.3 Population and Sample Design

3.3.1 Population

The population refers to a complete set of elements (individuals, events or objects) that possess some common observable characteristics defined by the sampling criteria established by the researcher. was composed of two groups; target population and accessible population.

Target population was the entire group of people or objects to which the researcher wishes to generalize the study findings and meets set of criteria of interest to the researcher. Accessible population was the portion of the population to which the researcher has reasonable access; may be a subset of the target population and may be limited to region, state, city, county, or institution (Mugenda & Mugenda, 2003). In

Kenya, building contractors are graded by the NCA according to the money value of work they can undertake and are grouped into categories ranging from NCA1 to NCA8. The population for this study was captured from NCA 1 to NCA 4 as per table 3.2 below:

Table 3.1: Total Population Distribution

S/No.	NCA Category	NCA Selection Criteria	Building Contractors Population (N)
1	NCA 1	Unlimited	341
2	NCA 2	500M	264
3	NCA 3	300M	310
4	NCA 4	200M	1,023
TOTAL			1,938

Source: NCA (2018).

3.3.2 Sampling Design

Sampling was a method of selecting experimental units from a population so that we can make decision about the population. Sampling design was a definite plan for obtaining a sample from a given population that specifies the population frame, sample size, sample selection, and estimation method in detail. The objective of the sampling design was to know the characteristic of the population (Mugenda & Mugenda, 2003).

3.3.2.1 Sampling Frame

A sampling frame was a comprehensive list of persons or objects where the sample was to be drawn, also known as the working population which should generically possess certain characteristics representative of the entire population (Saunders, Lewis, & Thornhill, 2016). In this study, the sampling frame was the list provided of NCA 1 to NCA 4.

3.3.2.2 Sampling Technique

According to Saunders, Lewis, and Thornhill (2016), sampling technique was a scientific or statistical method of selecting the sampling units which would offer the requisite estimates with their associated margins of uncertainty; this might emerge from the probe

of only part (sample) and not the whole population. For this study employed stratified random sampling technique. This was defined as a probability sampling technique in which the representative sample was obtained from a stratified frame which was divided into over-lapping groups like geographical areas and was commonly used in survey research because it offers the advantage over completely random sampling of ensuring all groups of interest to the researcher are adequately represented. At the same time, it maintains a high degree of external validity and minimizes subjectivity in the sample selection. (Maina, 2012). For this reason, simple stratified within the strata, random sampling technique were used for the selection of the active construction sites within NCA categories: NCA1, NCA2, NCA 3 and NCA 4.

3.3.3.3 Sample Size

Sample refers to a subset in a population which represents the characteristics of the population. A researcher should be able to make inferences regarding the population parameters from the sample statistics (Saunders, Lewis, & Thornhill, 2016).

The criteria used to determine the sample size are the level of precision, the level of confidence, the degree of variability in the attributes under study and the mathematical sampling approach was based on Miller and Brewer (2003) formula that was stated as follows:

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

Where:

n = Sample size

N = Sample frame

α = Level of precision

Using a confidence level of 95% and a total population of 1938 Building Contractors in Nairobi and the sample size was calculated as follows:

$$n = \frac{1938}{1 + 1938 (0.05)^2} = \mathbf{332 \text{ Building Contractors}}$$

Table 3.2: Sample Size Distribution for Contractors

S/No.	NCA Category	Criteria	Population (N)	Sample Size
1	NCA 1	Unlimited	341	58
2	NCA 2	500M	264	45
3	NCA 3	300M	310	53
4	NCA 4	200M	1,023	176
TOTAL			1,938	332

3.4 Data Collection Method

The study employed both primary and secondary data of relevant literature from both academic and non-academic sources. Primary data refers to data that was collected afresh and for the first time, unique to the specific research (Saunders, Lewis, & Thornhill, 2009). The primary data was collected in the capital city of Nairobi, between April 2018 and July 2018. The primary data were collected in three phases: a scoping exercise aimed at gathering basic information on issues of the investigation. The main survey of construction workers researching issues relating to the worker within the construction sector, and a survey to probe the quality of workmanship construction sites. Due to the nature of the study, use of a questionnaire was adopted.

A questionnaire was a data collection instrument consisting of a series of questions and other stimuli used to gather information from respondents for primary data. It was preferred because of its relatively low cost associated with this data collection method, minimized interviewer bias, give respondents time to respond to questions and ideal for difficult, unapproachable respondents. It comprises of both structured and open-ended questions in which Likert scale rating questions was also be used. This was administered to contractors, project and site managers, and workers on live construction sites. This enabled collection of detailed, sufficient, complete, accurate and holistic data for the analysis of the variables under consideration. A cross-sectional survey analysis technique was equally employed seeking to capture data at a particular point in time and allowed for the reliability of data, detailed, all-round data, and sufficient, complete and accurate information without bias.

Due to the nature of conducting surveys with large samples would be expensive. Worker intensive, secondary data was, therefore, incorporated in the research to supplement information obtained from the field survey. Secondary data was gathered from published documents which were already available. Sources of secondary construction- related data in Kenya included: Kenya Demographic Housing Survey; the Kenya informal settlements Improvement Programme (2010), Kenya Bureau of Statistics; United Nations Development Programme's Annual Housing Report; Internet, Journals articles, periodicals, conference papers, unpublished theses, research reports from reputable tertiary institutions, academic institutions and documentation centres of organisations focusing on the construction sector, such as UN-HABITAT, Ministry of Roads, NCA, Public Works and Housing, Kenya Building Research Centre. The information gathered provided a good base for raising research questions and finalizing the research instrument.

3.5 Research Procedure

According to Kothari (2004), research procedure describes the detailed steps taken to permit another researcher repeat the same research for further advancement. Conducting a pilot study before the start of actual data collection exercise was important to test the research instruments suitability and clarity. This was done by randomly selecting subjects to be involved in testing the wording of questions, identifying ambiguous questions and testing the techniques that were to be used to collect data from the four categories NCA1 to NCA4 classifications and administering a few questionnaires to a pilot sample of eight interviewees comprising two contractors. The purpose of the pre-test was to validate the data collection tool.

The questionnaire was checked for ambiguity, grammar and clarity of questions, then fine-tuned and administered to sample of respondents identified earlier in the sample size. The research was conducted with the aid of a research assistant whose role was to distribute and collect the questionnaires through a drop and pick process.

3.6 Data Analysis Method

Data analysis was the process of systematically examining data that has been collected with the purpose of making deductions and inferences. It involves uncovering underlying structures extracting important variables detecting any anomalies and testing any underlying assumptions. According to Saunders, Lewis, and Thornhill (2016), since data

obtained from the field in the raw form was difficult to interpret there was a need for editing, coding, classification, and tabulation at this stage to enable the researcher to enter data quickly with minimally acceptable errors. Data was analyzed using the SPSS software where a regression analysis was undertaken to determine the type of relationship between the independent and dependent variables. This was followed by an ANOVA test to determine whether there was significant relationship between the independent variables. Finally, data presentation was presented using tables and figures to simplify the analysis, showcase the responses and ease of comparison.

3.7 Chapter Summary

In summary, the research design, data collection and analysis procedures in the study were elaborated as descriptive design. The methodological procedures were followed in the study of population, sample size and techniques of sampling among others provided a strong foundation for valid and reliable data.

The next chapter presented the results of data analysis obtained from the field and quantitatively analyzed using Statistical Packages and be presented as diagrams, graphs, tables and pie charts and for percentages of response frequencies for ease of interpretation and understanding.

CHAPTER FOUR

4.0 RESULTS AND FINDINGS

4.1 Introduction

This chapter presents the results of the study of the investigation of the effects of skilled labour on the quality of workmanship within Nairobi County. It analyses all the data obtained from the 332 questionnaires administered to various construction workers and managers of selected construction sites. The analysis was done by using the research questions as the guideline to fulfil the main objective of this study. The first part of the analysis looks into the demographics of the respondents. The second section presents the findings on the extent on-site skills training and certification influences the quality of workmanship within the construction sector in Nairobi. The third section presents the findings on the extent managerial skills affects the quality of workmanship within the construction sector in Nairobi. The fourth section presents the finding on the impact of using effective strategies for improving the quality of workmanship within the construction sector in Nairobi. The chapter will conclude with a chapter summary.

4.1.1 Response Rate Variable

Out of total of 332 questionnaires issued, 302 responses were received from the respondents accounting for 91% response rate as indicated in table 4.1. According to Sekaran (2003), this the study response was sufficient for the study. The high response rate was attributed to the emphasis of confidentiality, the structure of the questionnaire for ease of response as well as the relevance of topics to industry specific concerns.

Table 4.1: Response Rate

Gender	Distribution	
	Frequency	Percentage
Response	302	90.96
Non-response	30	09.04
Total	302	100.00

4.2 Demography

Demographic characteristics of the respondents was tested by the researcher based on the age of the respondents, the level of education of respondents, the number of years the respondents have worked in the construction industry and of key importance the NCA grade. The researcher used frequency APA tables in discussing and representing the results collected from the respondents.

4.2.1 Gender Distribution of the Respondents

The researcher started by enquiring the gender of the respondents where the study revealed that majority of the respondents interviewed were males than females in the construction industry of whom revealed to have lighter duties. Results from the study revealed that there are more males in the construction industry than females. Table 4.2 shows that males recorded the highest percentage of about 76.16% while the females recorded a percentage of 23.94%. One of the respondents replied when asked inform of interview that “.....we have more males than females in the construction industry because most females interpret construction as a black collar job that do not fit women but men. At the same time the few women that were in the construction industry were in the departments that demanded more of their knowledge than labour”. This implies that construction industry was a male dominated sector due to the perception that the physical nature of work was better delivered by the male gender.

Table 4.2: Gender of the Respondents

Gender	Distribution	
	Frequency	Percentage
Male	230.00	76.16
Female	72.00	23.94
Total	302	100.00

4.2.2 Age of the Respondents

The researcher sought to establish the distribution of age within the construction sites relative to the study topic and results as per table 4.3 revealed that out of the respondents interviewed 28.48% were between the ages 18-25 years, followed by age bracket 26-35 years recording a percentage of 25.83%, followed by 46-55 years recording a percentage

of 19.21%, followed by 10.93% were aged between 36-45 years while below 20 years recorded 9.93 and lastly over 56 years gave out a mean of 2.32%. The results implied that the labour was driven by youth possibly due to the physical demands of the trade.

Table 4.3: Age of the Respondents:

Age	Distribution	
	Frequency	Percentage
Below 20 years	30	9.93
18-25 years	86	28.48
26-35 years	78	25.83
36-45 years	33	10.93
46-55 years	58	19.21
Over 56 years	7	2.32
Total	302	100.00

4.2.3 Educational Level

From the survey findings on the level of education relative to skills and experience required for construction work revealed that majority of the respondents had a bachelor's degree scoring a percentage of 31.13% while doctorate degree which was the last one in the list scored 7.28%. The researcher again noted that out of the respondents who recorded the list of others were either owning certificate level of education, division II or an equivalent to Kenyan certificate qualification as shown in the table 4.4 below:

Table 4.4: Educational Level

Educational level	Distribution	
	Frequency	Percentage
Doctoral degree	22	7.28
Master's degree	56	18.54
Bachelor's degree	94	31.13
Diploma	88	29.14
Other	42	13.90
TOTAL	302	100.00

4.2.4 Number of Years Working in the Construction Industry

The study findings per figure 4.5 revealed the length of service by different employees are predominantly between 6 and 9 years at 29%, followed by 10 to 13 years at 25%, then 2 to 5 years at 21%, over 14 years at 17% and below 2 years at 8%.

Table 4.5: Working Years in the Construction Industry

Number of years working in the construction industry	Distribution	
	Frequency	Percentage
Below 2 years	24	7.95
2-5 years	62	20.53
6-9 years	88	29.14
10-13 years	76	25.17
Over 14 years	52	17.22
TOTAL	302	100.00

4.2.5 NCA Grade

The construction industry in Kenya was regulated by NCA grading system as per NCA Act (2011). The distribution of the respondents by NCA grade was shown in table 4.5 below. Out of the interviewed contractors, the distribution was considerably well represented across the NCA levels, however notable that the highest NCA 1 grade had the lowest registered at 20% because the regulations required to be registered are very steep for most contractors. Some contractors were not aware of all the regulations and with this notably in many cases contractors got registered because they had got into trouble for not being registered or the lack of registration would lock them out of some bids. NCA3 had the most registered, implying most construction budgets are in this range hence demand for more contractors.

Table 4.6: NCA Grade

NCA grade	Distribution	
	Frequency	Percentage
NCA 1	61	20.20
NCA 2	72	23.84
NCA 3	81	26.82
NCA 4	64	21.19
Other	24	7.95
TOTAL	302	100.00

4.3 Effects of On-Site Skills Training and Certification on Quality of Workmanship

4.3.1 Effects of On-site Skills Training and Certification and Quality of Workmanship

The researcher employed the Likert scale to assess various parameters ranging from Strongly Disagree to Strongly Agree across 5 levels of the Likert Scale 1 to 5. The first part of the analysis sought to investigate the influence of on-site skills training and certification influences the quality of workmanship in construction. The respondents strongly agreed that there was notable improvement on quality of workmanship in the construction industry over the last two years (4.46). Subsequently there has been an increase in the Certification of construction workers Nairobi County and required to prove their competence (4.12) which during the interview when one of the respondents was asked if construction workers in Nairobi County have certifications to prove their competence said “.....in Nairobi being the capital city of Kenya and being the only town with almost all main campuses of all university situated within town with several colleges both private and public has helped construction workers within the city to gain knowledge on how to remain relevant in the field by making sure that they have enough documents to prove their certification on their level of competence....”.

Regarding getting work gets done correctly on first attempt (2.22), this was an indication of the high expectation to deliver correct results on first attempt. From the findings, the

contractors who were interviewed held the opinion that many construction workers in Nairobi are not trained formally. They explained that majority are employed and learn on the job where they begin as easy-going labourers who do manual work on locales. These workers would carry out works for various trades and after some time build up an enthusiasm for a specific skill and put more hours to better the skills through experience. Despite this informal approach to skills acquisition, the worker was still expected to deliver on the job. In numerous destinations, designers or sub-contractors do not verify if the specialists by trade have authentication and usually discovered that the labourers carrying out a certain task that was mismatched to their level of understanding of the craft. The outcome was that workmanship needs be matched in class with experience and respondents were not satisfied with artisans' workmanship in the construction industry (2.22). Equally felt that there was a huge skills gap in the construction sector within Nairobi County (3.07) as presented on table 4.6.

Table 4.7: On-site Skills Training and Certification and Quality of Workmanship

Statement	1	2	3	4	5	Mean	Std
	SA	A	N	D	SD		
B1 There a shortage of skilled labour in the construction industry.	88	62	76	52	24	2.18	0.41
B2 The quality of construction labour in the industry was competitive to international standards.	80	70	72	57	23	3.11	0.78
B3 Construction workers get work done correctly on first attempt	70	81	71	22	59	2.22	0.12
B4 Construction workers in Nairobi County have certifications to prove their competence	57	23	70	76	76	4.12	0.38
B5 There was notable improvement of quality of workmanship in the construction industry over the last two years.	24	52	76	62	88	4.46	0.18
B6 Construction workers can work with minimal supervision and produce expected results	81	70	22	71	56	3.46	0.88
B7 I feel satisfied with artisans' workmanship in the construction industry	70	53	56	71	54	2.88	0.24
B8 There was a huge skills gap in the construction sector, Nairobi County	56	67	73	62	54	3.07	0.34

4.3.2 Correlation between On-site Skills Training and Certification and Quality of Workmanship

A Pearson correlation was carried out between (dependent variable) quality of workmanship and (independent variables) on-site skills training and certification revealed that there was a positive correlation; on-site skills training and certification and quality of workmanship ($r=0.656$, $P>0.05$), as indicated in table 4.7.

The findings revealed that the confirmed literature according to research findings by Ogbeifun (2011), on the propagation of the use of progressive implementation of the construction process in any project. Found that commencing construction works from the simple to more complex areas of the project was an effective tool for skill development. This implies not only the influence of skill development through training but with certification influence on the quality of workmanship in construction sites.

Table 4.8: Correlation Analysis

Variable 1 (V ₁)	Correlation	The quality of workmanship (D ₁)
Extent on-site skills training and certification influencing the quality of workmanship within the construction sector in Nairobi	*Analysis with Pearson correlation*	.656**
	Sig. (2-tailed)	.018
	n	302

Note: *Correlation was (2-tailed) at a significant level of 0.05

4.3.3 Regression Analysis

The researcher used regression analysis to predict the value of one variable (quality of workmanship) from assumed values of other variables related to it (on-site skills training and certification). As recorded on table 4.8, a regression analysis done between quality of workmanship, on-site skills training and certification indicated that the R square was 0.488 and therefore 48.8% of the variations in quality of workmanship were because of the variations in on-site skills training and certification.

Table 4.9: Goodness of Fit

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.654 ^a	.488	.412	.15456

a. Predictors: (Constant), V₁: On-site skills training and certification

b. Dependent Variable: D₁: Quality of workmanship

4.4 Influence of Managerial Skills on Quality of Workmanship

4.4.1 Effects of Managerial Skills on Quality of Workmanship in Construction Sector

The researcher employed the Likert scale to assess various parameters ranging from Strongly Disagree to Strongly Agree across 5 levels of the Likert Scale 1 to 5. The first part of the analysis sought to extent managerial skills affects the quality of workmanship within the construction sector in Nairobi. The respondents agreed that effective communication skills help managers to undertake quality projects (3.48), followed by effective decision-making skills improve on the quality of output (3.44) and lastly there was a lack of professional and technical skills, which has led to poor project quality (2.10).

From the discoveries, deficient subsidizing brought about insufficient staffing. At the point when a venture was on a tight spending plan, the designer or temporary worker removes supervisory and administrative capacities to save money on cost. These outcomes in poor work going unnoticed. A considerable number of the contractual workers and subcontractors wind up in development for the most part since they can profit by beginning such a business. Maybe a couple had preparing identified with the administrations they gave. So, except if the temporary worker was sufficiently enormous to bear the cost of prepared labourers, numerous managed with the little involvement in administration that they had. Greater part of the temporary workers expressed that "*.....much development equips in Nairobi are made of the standard that has for the most part had essential preparing in say plumbing....*". He at that point considers and procures a couple aides and does the activity himself with their assistance. In the event that the activity was too vast for him, the nature of work endures as he was extended too thin. He may employ another handyman to help, however whose work may not be as great.

Table 4.10: Managerial Skills and the Quality of Workmanship

	Statement	1	2	3	4	5	Mean	Std
		SA	A	N	D	SD		
D1.	Effective leadership skills and motivation skills affect the quality of workmanship.	80	70	72	57	23	2.20	0.86
D2.	There was a lack of professional and technical skills, which has led to poor project quality.	70	81	71	22	59	2.10	0.76
D3.	Effective decision-making skills improve on the quality of output	57	23	70	76	76	3.44	0.66
D4.	Poor project skills create problems in the monitoring and control as the result in misdirection for project management	24	52	76	62	88	3.33	0.88
D5.	Listening skills and time management skills increase the efficiency and quality of project output	81	70	22	71	56	2.80	0.18
D6.	Having managers; foremen, subcontractors, or supervisors in a project affect workmanship.	70	53	56	71	54	2.60	0.24
D7.	Lack of experience and level of competency of the managers affect the quality of workmanship.	80	70	72	57	23	3.56	0.82
D8.	Project planning affects performance.	57	23	70	76	76	2.60	0.74
D9.	Effective communication skills help managers to undertake quality projects.	24	52	76	62	88	3.48	0.72
D10.	Proper construction management would enhance the workmanship in construction	81	70	22	71	56	3.26	0.61
D11.	Regular employee's performance review by project managers help to retain the best talent in construction	57	23	70	76	76	3.28	0.70
D12.	Manpower management in construction helps to create functional teams and quality of workmanship	24	52	76	62	88	3.32	0.28

4.4.2 Correlation Between Managerial Skills and Certification on Quality of Workmanship Within the Construction Sector

A Pearson correlation was carried out between (dependent variable) quality of workmanship and (independent variables) Managerial Skills revealed that there was a positive correlation between managerial skills and quality of workmanship ($r=0.578$, $P>0.05$), as indicated in table 4.10 below.

Table 4.11: Correlation Between Managerial Skills and Quality of Workmanship

Variable 2	Correlation	The quality of workmanship
Extent managerial skills affect the quality of workmanship within the construction sector in Nairobi.	*Analysis with Pearson correlation*	.578**
	Sig. (2-tailed)	.014
	N	302

Note: *Correlation was (2-tailed) at a significant level of 0.05

4.4.3 Regression Analysis

The researcher used regression analysis to predict the value of one variable (quality of workmanship) from assumed values of other variables related to it (Managerial skills). As recorded on table 4.11, a regression analysis done between quality of workmanship, and managerial skills indicated that the R square was 0.444 and therefore 44.4% of the variations in quality of workmanship were because of the variations in on-site skills training and certification and there for a positive correlation.

Table 4.12: Goodness of Fit

Model	R	R	Adjusted R	Std. Error of
		Square	Square	the Estimate
1	.578 ^a	.444	.412	.166234

a. Predictors: (Constant), V₂: Managerial skills

b. Dependent Variable: D₁: Quality of Workmanship

4.5 Effective Strategies for Improving the Quality of Workmanship

4.5.1 Impact of Effective Strategies on the Quality of Workmanship

The researcher again investigated on the impact of using effective strategies for improving the quality of workmanship within the construction sector in Nairobi. The researcher used a 5-likert scale that represented opinions of the respondents ranging from *Scale: 1- Strongly Agree, 2- Agree, 3- Neutral, 4- Disagree, 5- Strongly Disagree.*

The study findings revealed that majority of the respondents strongly agreed that it was the role of management to ensure that adequate plans and resources exist to recruit, motivate, train and develop employees (3.88); followed by there was need for policies that motivate and reward for the inclusion training programs on construction sites (3.86) and lastly time was a major constraint to effectively run training programs across construction sites recording the lowest (2.78) as indicated in table 4.12.

This study confirmed to the findings from the literature review that success or failure of a construction project was pretty much dependant on effective leadership and the presence of management (Murphy, David, Bruce, & Dalmar, 1974). The success of a project was generally defined based on time, cost, or quality performance which was a direct result of the impact of key individuals on the project. This, therefore, means that the identification of key personal characteristics and attributes serving to deliver on the project can either enhance or detract the likely outcome of the construction projects success or failure.

Table 4.13: Impact of Effective Strategies on the Quality of Workmanship

Statement	1	2	3	4	5	Mean	Std
	SA	A	N	D	SD		
E1. Time was a major constraint to effectively run training programs across construction sites.	74	70	72	57	29	2.78	0.26
E2. Continuous training and development of construction workers increases the quality of workmanship	64	81	71	22	68	2.76	0.28
E3. Incorporation of innovative technology in the construction industry will improve quality of workmanship in the industry	51	23	70	76	82	3.78	0.24
E4. Government support by setting up learning institutions will improve the quality of workmanship	32	52	76	62	80	3.76	0.22
E5. All quality enhancement strategies should be worker oriented	71	70	22	71	66	2.82	0.28
E6. Lack of good training providers negatively affects quality of workmanship in Nairobi County	65	53	56	71	59	3.11	0.25
E7. Stakeholders collaboration will fast track the improvement in quality of workmanship in Nairobi County	60	70	72	57	43	3.00	0.27
E8. New trainees should focus on acquiring local experience to increase their proficiency	57	23	70	76	76	3.08	0.27
E9. There was a need to develop an up to date curriculum for better training of construction workers.	24	52	76	62	88	3.74	0.12
E10. Training on current construction technology will improve competitiveness in the quality of workmanship versus	81	70	22	71	56	2.80	0.24

	global standards.							
E11.	It's the role of management to ensure that adequate plans and resources exist to recruit, motivate, train and develop employees.	57	23	70	76	76	3.88	0.14
E12.	There was need for policies that motivate and reward for the inclusion training programs on construction sites	44	52	76	62	68	3.86	0.18
E13.	Policies that guide and match grade to pay will motivate the attendance rate of trainees.	70	80	72	57	23	3.06	0.23

4.5.2 Correlation Analysis

A Pearson correlation was carried out between (dependent variable) quality of workmanship and (independent variables) effective strategies revealed that there was a positive correlation between managerial skills and quality of workmanship ($r=0.614$, $P>0.05$), as indicated in table 4.13 below.

Table 4.14: Correlation Between Effective Strategies and Quality of Workmanship

Variable 3	Correlation	The quality of workmanship
The impact of using effective strategies for improving the quality of workmanship within the construction sector in Nairobi	*Analysis with Pearson correlation*	.614**
	Sig. (2-tailed)	.018
	N	302

*Correlation was (2-tailed) at a significant level of 0.05

5.3.3 Regression Analysis

The researcher used regression analysis to predict the value of one variable (quality of workmanship) from assumed values of other variables related to it (effective strategies). As recorded on table 4.14, a regression analysis done between quality of workmanship,

and effective strategies revealed that the R square was 0.512 and therefore 51.2% of the variations in quality of workmanship was because of the variations in effective strategies and therefore a strong positive correlation.

Table 4.15: Goodness of Fit

Model	R	R	Adjusted R	Std. Error of
		Square	Square	the Estimate
1	.478 ^a	.512	.612	.146784

a. Predictors: (Constant), V₃: Effective strategies

b. Dependent Variable: D₁: Quality of Workmanship

4.6 Construct Reliability

Cronbach's alpha was carried out on the objectives under correlation and regression analysis to measure reliability and consistency of the multiple-question Likert scale surveys. The Cronbach's Alpha for the constructs are shown in table 4.15 below for the instrument used in the final analysis. After correlation analysis and regression in every objective the researcher again calculated on the Cronbach's Alpha reliability coefficients on item analysis. Wherever an item was found not fit was dropped and latter reliability was determined for all the objectives or alternatively three factor analyses. Results from the analysis indicated very good levels of reliability and convergent validity, and therefore from the findings it's with clear evidence that a strong correlation exists between variables V₁ (On-site skills training and certification), V₂ (Managerial Skills) and V₃ (effective strategies) with the Dependent variable – D₁(Quality of workmanship) within the construction sector in Nairobi County.

Table 4.16: Cronbach's Alpha

Variables	Cronbach's	Comment
	Alpha	
V1	0.767	Strongly Agree
V2	0.675	Strongly Agree
V3	0.543	Strongly Agree

4.7 Testing on Analysis of Variance (ANOVA)

The ANOVA analysis revealed an F critical value of 0.302 and the level of significance was 0.000 and therefore insignificant ($P > 0.05$) as indicated in table 4.16. Therefore, the significance Q1, Q2 and Q3 are < 0.05 each. This indicates that we can reject the null hypotheses that Q1, Q2 and Q3 perceive ease of use of the construction sector in Nairobi County.

Table 4.17: ANOVAa

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	3.4321		1.4567	302	.000 ^b
1	Residual	2.324		.068		
	Total	5.7561				

a. Dependent Variable: ANOVAa (Quality of Workmanship)

b. Predictors: (Constant): Q1, Q2 and Q3 (On-site skills training and Certification, Managerial Skills and Effective Strategies)

4.8 Chapter Summary

This chapter presented the findings established from the data analysis done which were presented in four sections; the first part detailing the findings from the demography results and the other three sections presenting the findings against each of the three specific objectives of this study. Chapter five presents the discussion of results from chapter four, recommendations and conclusion established from the study.

CHAPTER FIVE

5.0 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the discussions in line with results presented in chapter four and conclusions drawn from the presentation. This was done through comparison of the research findings achieved to previous studies done relative to this topic. The chapter will also make conclusions by presenting a set of recommendations on both current and areas for further research.

5.2 Summary

The general objective of the study was to investigate the effects of skilled labor on quality of workmanship within the construction sector in Nairobi. The specific objectives of the study were to investigate the extent on-site skills training and certification influences the quality of workmanship within the construction sector, to investigate to what extent managerial skills affects the quality of workmanship within the construction sector and to investigate the impact of using effective strategies for improving the quality of workmanship within the construction sector in Nairobi.

In this study descriptive research design was applied. Descriptive design seeks to identify and explain associations between variables and was useful for describing, explaining or exploring the existing status of two or more variables. The target population of this study consisted of the building contractors of within Nairobi County totalling 1,938. However, to ensure the sample was a true representative of a broad target population the researcher applied the mathematical sampling approach based on Miller and Brewer (2003).

A stratified random sampling technique was used for the selection of the active construction sites within NCA categories: NCA1, NCA2, NCA 3 and NCA 4 within Nairobi County. The researcher purposively targeted 332 construction sites of the population across the strata resulting into sample of 302 respondents. This study employed the use of primary data. For purposes of this study, the data collection was carried out through structured questionnaires. Research assistants were engaged to help in distributing the questionnaires to the respondents. To ensure objective results the researcher focused on access to individual workers, managers and contactors as the

desired choice versus having one person represent the site. Data collection was completed in person as much as possible.

An analysis of the first objective revealed that the respondents strongly agreed that there was a notable improvement in quality of workmanship in the construction industry over the last two years. Subsequently, there has been an increase in the Certification of construction workers in Nairobi County and required to prove their competence. The respondents believed many construction workers in Nairobi are informally trained through the social flat forms like family businesses or mentored by a relative. A majority are employed and learn on the job and despite this, the worker was still expected to deliver correct results on the first attempt. The outcome was that workmanship needs be matched in class with experience. Respondents were not satisfied with the quality of workmanship attributing it to a huge skills gap in the construction sector within Nairobi County.

An analysis of the second objective revealed inadequate funding resulted in inadequate professional staffing. When a project was on a very tight budget, the developer or contractor cuts out supervisory and managerial functions to save on cost. This resulted in poor work going unnoticed. Having managers; foremen, subcontractors, or supervisors in a project affected the quality of results because they bring to the site proper construction management and effective manpower management. Equally on the workers front it was notable that effective manpower management was key creating functional teams. Tools such as regular employee's performance review by project managers would help to retain the best talent in construction. The combination of some or all these helped managers to undertake quality projects.

An analysis of the third objective revealed with emphasis the importance of stakeholder's engagement with the Government expected to take a leading role in the sector as a catalyst to the development of training institutions. There was marked progress addressing training needs by both public and private institutions; however, because of the nature of the trade, there was still the gap of scaling this program. In this regard, it was notable that all quality enhancement strategies should be specific in trade/ skills and worker oriented. There was a strong positive association between the lack of good training providers to poor quality of workmanship.

An analysis of the third objective revealed that time was a major constraint to effectively run training programs across construction sites. Continuous training and development of construction workers increases the quality of workmanship as well as incorporation of innovative technology in the construction industry will equally improve quality of workmanship and raise the skill sets to match international standard. Emphasis on the importance of stakeholders. There was marked progress addressing training needs by both public inform of technical and vocational colleges and private Funding for trainings and availability of budgets needed to be raised either from Government budgets and industry stake holders were a critical ingredient towards the skills development construction workers. The respondents believed that it was the role of management to ensure that adequate plans and resources exist to recruit, motivate, train and develop employees. In this regard it was notable that all quality enhancement strategies should be specific in trade/ skills and worker oriented. There was a strong positive association between lack of good training providers poor quality of workmanship. Equally the respondents felt that the current curriculum was out of date and needs updating to match global standards which serves as a competitive advantage and creation of job opportunities go beyond boarders.

5.3 Discussion

5.3.1 The Extent On-Site Skills Training and Certification Influences the Quality of Workmanship within the Construction Sector in Nairobi County

An analysis of the first objective revealed that the respondents believed many construction workers in Nairobi are informally trained through the social plat forms like family businesses or mentored by a relative. They explained that a majority are employed and learn on the job where they begin as easy-going labourers who do manual work for various trades. After some time build up an enthusiasm for a specific skill and put more hours to better the skills through experience. Despite this informal approach to skills acquisition, the worker was still expected to deliver correct results on first attempt.

The respondents strongly agreed that there was a notable improvement in quality of workmanship in the construction industry over the last two years. They strongly agreed that there was notable improvement on quality of workmanship in the construction industry over the last two years. Subsequently there has been an increase in the

Certification of construction workers Nairobi County and required to prove their competence which during the interview when one of the respondents was asked if construction workers in Nairobi County have certifications to prove their competence said “.....*in Nairobi being the capital city of Kenya and being the only town with almost all main campuses of all university situated within town with several colleges both private and public has helped construction workers within the city to gain knowledge on how to remain relevant in the field by making sure that they have enough documents to prove their certification on their level of competence....*”. The outcome was that workmanship needs be matched in class with experience. Respondents were not satisfied with the quality of workmanship attributing it to a huge skills gap in the construction sector within Nairobi County.

Regarding getting work gets done correctly on first attempt. This was an indication of the high expectation to deliver correct results on first attempt. From the findings, the contractors who were interviewed believed many construction workers in Nairobi are not trained formally. They explained that majority are employed and learn on the job where they begin as easy-going labourers who do manual work on locales. These workers would carry out works for various trades and after some time build up an enthusiasm for a specific skill and put more hours to better the skills through experience. Despite this informal approach to skills acquisition, the worker was still expected to deliver on the job. In numerous destinations, designers or sub-contractors do not verify if the specialists by trade have authentication and usually discovered that the labourers carrying out a specific task mismatched to their level of understanding of the craft.

Individuals who are knowledgeable about specific construction skills gained from training or from practical experience in construction can be defined as skilled manpower (Medugu et al, 2011). Rafee in the same journal noted that skilled manpower in the construction industry play a very critical function to the survival and growth of the sector as they are directly involved in construction process. In Kenya there was an acute shortage of skilled manpower despite the many construction projects that the government was undertaking. Elevation of middle level colleges to universities has further eroded the development of skilled manpower creating a major shortage of skilled manpower. Wang (2010) indicated in his report that labour shortage was a problem faced by many countries all over the world. In the construction industry framework, the purchasing power of the end user

results quality work production. Hence, additional skilled workforce was needed. Medugu et al (2011) observed that where highly capable workforce was utilized, the effect of skilled manpower in the construction sector was very visible in its end products. This was because they are directly involved in early realization of construction projects completion since they handle the technical phase of such contract. Reduction in poor quality, low productivity, late project completion, cost and time overruns in projects was notable where trained skilled manpower was involved. Abiola (2004) believed that rework of defective or unsatisfactory work was mostly attributed to poor level of workmanship which normally results from involvement of unskilled manpower.

The effect of availability of skilled manpower has been adequately reported in the literature with the ever-rising pressure on construction contractors to execute projects of high quality, cost and on time (Medugu, 2011). The significance of more skilled manpower in the industry cannot be ignored as they have the possibility of reducing inefficiencies owing to poorly constructed projects. Bustani (2000) concluded that quality and availability of skilled labour force was considered a vital factor in the effectiveness of the construction sector. The problem of shortage of skilled manpower was a serious threat to the economic wellbeing of many nations around the world. Medugu et al (2011) mentioned that shortage of skilled manpower has effect on many areas of construction activities and affect time, cost and quality of work.

5.3.2 The Extent Managerial Skills Affects the Quality of Workmanship Within the Construction Sector in Nairobi County

An analysis of the second objective revealed, inadequate funding resulted in inadequate staffing. When a project was on a very tight budget, the developer or contractor cuts out supervisory and managerial functions to save on cost. This results in poor work going unnoticed. Many of the contractors and subcontractors end up in construction because they can make money by starting such a business. Few had professional training related to the services they provided. So, unless the contractor was big enough to afford trained workmen and especially in managerial roles, they made due with the little experience in management that they had. There was consensus that because of the lack of effective leadership skills and motivation skills resulting in a transactional management and a demotivated team. Majority of the contractors started out as the principle with basic training in one field for example welding. He then hires one or two assistants to support.

The more senior respondents such as the project managers and supervisors felt that effective decision-making skills leads to the improvement of the quality of output, through good project skills especially in the monitoring and control. However, in many sites this was found lacking and as the result misdirection for project managements resulting in poor quality of work. Usually if the job was too large, then the contractor was stretched out too thin and ultimately the quality of workmanship suffers.

Having managers; foremen, subcontractors, or supervisors in a project affect the quality of results because they bring to the site such skills as project planning, effective communication skills resulting in proper construction management and enhancement the workmanship in construction. Equally on the workers front it was notable that effective manpower management was key creating functional teams. Tools such as regular employee's performance review by project managers would help to retain the best talent in construction. The combination of some or all these helped managers to undertake quality projects.

On linking to the literature review fundamentally, there was universal consensus that management, be it good or bad has a significant impact on the overall success or failure of an endeavour. Despite this however, there was a level of disagreement over just how significant that impact may be. The significant of management to an endeavour's success or failure was an ongoing argument. Some researchers posit that management was a key determinant in success or failure, and arguments exist that managerial skills are minor of many major factors that determine success or failure. This because managers have the power to motivate employees and use minimal available resources optimally for realization of project goals. However, some researchers have different perspectives they state that economic, environmental, social and industrial conditions have a much greater impact on the organization's success or failure (Nahavandi, 2003). Since managers are responsible for the coordination of these resources in the company, there was no doubt about the importance and influence of management on quality of workmanship in the construction sector.

A construction project requires management and the effective manager exhibits good leadership McManus and Koorosh (2003). At a managerial level, individuals are engaged in influencing various project entities to perform specified project tasks. The manager's ability to influence the speed, quality, and cost of these items places the project's success

or failure squarely on their leadership skills. Construction managers must have the ability to lead the team within a relatively unstructured environment by integrating individual demands, requirements, and limitations into decisions that will affect overall project performance towards the desired output (Odusami, 2000).

5.3.3 The Impact of Using Effective Strategies for Improving the Quality of Workmanship Within the Construction Sector in Nairobi County

An analysis of the third objective revealed that time was a major constraint to effectively run training programs across construction sites. Continuous training and development of construction workers increases the quality of workmanship as well as incorporation of innovative technology in the construction industry will improve quality of workmanship and raise the skill sets to match international standard. Emphasis on the importance of stakeholders with the Government expected to take a leading role in the sector as a catalyst to development of training institutions. There was marked progress addressing training needs by both public in form of technical and vocational colleges and private (NGO's and For-Profit Organisations); but because of the nature of the trade, there was still the challenge on how to integrate time to the workers schedule considering the earn hourly and every penny earned counts.

The second critical concern was funding the trainings, budgets need to be raised either from Government and industry stake holders was critical as they stand to benefit directly from the development workers and the quality of workmanship and ultimately the industry or sector.

The third concern regards policy and enforcement of the law to the industry to ensure training was done and accounted for that it's the role of management to ensure that adequate plans and resources exist to recruit, motivate, train and develop employees. Even the more, for policies that motivate and reward construction companies for the inclusion training programs on construction sites, such as tax breaks, concessions, awarding of tenders and projects. In this regards it was notable that all quality enhancement strategies should be specific in trade/ skills and worker oriented. There was a strong positive association between lack of good training providers poor quality of workmanship. Equally the respondents felt that the current curriculum was out of date and needs updating to match global trends in technology, materials used, architecture like green construction and buildings, methodology as well as management of human capital.

This becomes a competitive advantage and job opportunities go beyond borders. This may be developed in line with policies that guide and match grade to pay will motivate the attendance rate of trainees.

Strategies may not necessarily involve theories but planning and coordination of programmes in construction industry. The study findings revealed that majority of the respondents strongly agreed that it was the role of management to ensure that adequate plans and resources exist to recruit, motivate, train and develop employees; followed by there was need for policies that motivate and reward for the inclusion training programs on construction sites and lastly time was a major constraint to effectively run training programs across construction sites.

This study confirmed to the findings from the literature review according to Armstrong (2006, p.259), strategic management involves introducing, eliminating, modifying, directing and guiding processes. This was done in such a way that all individuals and teams are equipped with the skills, knowledge and competences they require to undertake current and future tasks required by the organization". Management strategies in the construction industry are geared towards increasing labour productivity by raising awareness of the need for a learning culture that leads to continuous improvement.

The strategies addressing the construction industry and in particular the subject matter skills and quality of workmanship (Adams, Silva, & Razmara, 2013). Governments can play an important role in building a market for skills for the informal sector and in supporting basic education. They can also promote efficiency and equity in training markets that serve the informal sector by changing the incentive system to serve market needs for both formal and informal sectors. Governments can use different tools to address both supply and demand constraints through financing, information, quality assurance, and the like. They can lead efforts to strengthen statistical sources and improve program monitoring and evaluation.

This can be achieved by developing competent managers through training that would lead to knowledge creation and expansion of learning capacity throughout the organization. In a construction project, there are many parties involved such as contractors, subcontractors, consultants, and client. Often, it may be difficult for these various separate parties to work in harmony without effective coordination. In the words of Assaf

et al. (2006), difficulties in coordination between the parties was one of the factors that contributes to decline in labour productivity, for example in the situation that newly revised construction drawings of a project may be issued later by the contractors to the subcontractors. This leads to construction mistakes and the work requiring to be redone. Rework takes additional time, therefore impacting upon labour output of the project.

5.4 Conclusion

5.4.1 The Extent On-Site Skills Training and Certification Influences the Quality of Workmanship within the Construction Sector in Nairobi County

On-site skills training and certification was discussed to be of major influence on the quality of workmanship within the construction sector in Nairobi County. However, there were key barriers towards the proper implementation of on-site skills training and certification of construction workers that were identified based on the literature reviews and questionnaire survey. Based on the literature review, most of the construction labourers are informally trained and join the sector for manual work in various trades. After lengthy experience will gain a specific skill and hopefully raise the ranks to a supervisor level. The challenge here was how to change the status quo and create a learning and training environment that will be supported with certification as evidence of newly acquired skills. The benefit was better pay and ultimately improved livelihoods. The barriers to this change were; lack of resources to drive the agenda; lack of ownership of agenda between stakeholders as to who will drive; time to train the workers considering they are paid per hourly basis, the debate is on the structure of the training vis a vis compensating those who attend the training; as well as resources mainly in funding the training and scaling of these programs.

5.4.2 The Extent Managerial Skills Affects the Quality of Workmanship within the Construction Sector in Nairobi County

The significance of management towards the endeavours of success versus failure is an ongoing argument. Some researchers have argued that managerial skills are an ingredient to many major factors that determine success or failure of a construction site work. This was because managers have the power to motivate employees and optimal use of available resources towards realization of project goals. Equally believed is that the role

of management to ensure that adequate plans and resources exist to recruit, motivate, train and develop employees.

However, regarding quality of workmanship, it's is arguably a consensus that having managers; foremen, subcontractors, or supervisors in a project has had notable impact on the quality of results because of the benefits of good leadership and great management practise in construction sites. In summary included; project planning, effective communication skills resulting in better relations on site; creating functional teams. Tools such as regular employee's performance review helped in talent retention. 3The preferred approach was the cocktail these good management practises gave managers the confidence to undertake quality projects.

5.4.3 Impact of Using Effective Strategies for Improving the Quality of Workmanship within the Construction Sector in Nairobi County

In conclusion it was important to implement right strategies so as to have impactful changes to the quality levels to construction works. Some of the major areas to consider developing effective strategies included; continuous training and development of construction workers increases the quality of workmanship; incorporation of innovative technology in the construction industry will improve quality of workmanship and raise the skill sets to match international standards; emphasis on the importance of stakeholders with the Government expected to take a leading role in the sector as a catalyst to development of training institutions and structuring the remuneration of construction workers in line with their skill sets would motivate for pursuit of certification by the informal labour in Construction as an Industry.

There was marked progress addressing training needs by both public in form of technical and vocational colleges and private by NGO's and For-Profit Organisations for example Tools and Paint companies as part of CSR programs; but because of the nature of the trade, there was still the challenge on how to integrate time to the workers schedule considering the earn hourly and every penny earned counts. Equally of importance was the funding for the trainings, budgets need to be raised from all quarters by all stake holders to better the sector. This was because better quality of workmanship meant growth for industry and sectors. Policy makes the solutions enforceable by law. This brought the elements of accountability. The positive side of policy was to motivate and

reward construction companies for the inclusion training programs on construction sites, such as tax breaks, concessions, awarding of tenders and projects. In this regard it was notable that all quality enhancement strategies should be specific in trade/ skills and worker oriented. There was a strong positive association between lack of good training providers. Equally the respondents felt that the current curriculum was out of date and needs updating to match global trends in technology, materials used, architecture like green construction and buildings, methodology as well as management of human capital. This becomes a competitive advantage and job opportunities go beyond borders. This may be developed in line with policies that guide and match grade to pay will motivate the attendance rate of trainees.

5.5 Recommendations

5.5.1 On-Site Skills Training and Certification Influences the Quality of Workmanship within the Construction Sector in Nairobi County

From the study findings and conclusions, the researcher can comfortably recommend the importance of on-site skills training and certification and a strategic move to tactfully address the impending issue of poor quality in workmanship within the construction sector. The task at hand remains on how to incentivise all stake holders and especially the workers and equally the construction companies. Notably and with near immediate effects was expanding the compensation of prepared skilled workers will likewise guarantee development exchanges that are beneficial to both with the outcome of better controlled quality outputs in the long term. Since the population of workers are still informally trained, this method of training on-site offers the quickest gains and most impactful training platform and opportunity to upgrade skills and certification serving as organisation for recognition of progress achieved. Certificates will then allow for data base management and a whole lot more can then take place from this point. Such as Job matching to skills sets, better pay to skills and capabilities and development of localised training curriculums.

5.5.2 The Extent Managerial Skills Affects the Quality of Workmanship within the Construction Sector in Nairobi County

As revealed in the study that many contractors and subcontractors end up in construction usually because they can make money by starting such a business. Few had professional

training related to the services they provided. However, the benefits of having good managers far out ways the lack of, for example speed, quality, and cost. Construction project requires good management which go hand in hand with good leadership qualities. It was therefore important for construction companies to consider employing good managers of significant importance.

5.5.3 The Impact of Using Effective Strategies for Improving the Quality of Workmanship within the Construction Sector in Nairobi County

All strategies in nature are visionary and in the case of quality of workmanship requires the Government to play its role as the overseer of the Construction sector. By this it means that with the good will and engagement of Government to create an environment for other stake holders to invest in the sector will catalyse the change sort with regard to quality of workmanship. Both Public (NCA, TVET and others) together with Private stakeholders need to come together to address this agenda. There needs to be a win-win formula of there was to be a sustainable progress.

5.5.4 Recommendations for Further Studies

The general objective of the study was to investigate the effects of skilled labour on quality of workmanship within the construction sector in Nairobi with the main areas of concentrations being to investigate the extent on-site skills training and certification influences the quality of workmanship, establish to what extent managerial skills affects the quality of workmanship and to investigate the impact of using effective strategies for improving the quality of workmanship.

For further studies, to establish effective models for implementing successfully the proposed effective strategies on especially how to convert these construction sites into training centres and equally the challenges in doing so. Additionally, further research ought to be carried out in consideration a national scale since this case was particularly focused on airobi Country hence need for consideration of the other 46 Counties.

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APPENDICES

Appendix A: Cover Letter



QUESTIONNAIRE FOR CONSTRUCTION WORKERS

Dear Respondent,

BRIEF: The construction sector in Kenya was a key employer and investment segment in the economy. The industry was characterized by extensive subcontracting, temporary and insecure employment. This research aims at gaining better understanding the factors affecting skilled labour in order to understand how this was affecting the quality of workmanship within the construction sector in Nairobi County and how this can be changed.

Participation in their exercise was voluntary and your response to issues raised in this questionnaire was highly appreciated and will go a long way in assisting find a solution to this ongoing concern. There are 4 sections and should take you about 20 minutes to complete. You are encouraged to answer all questions. Please complete every item as honestly as possible and make comments where necessary. Any information provided will remain strictly confidential and will strictly be used for academic purposes only by the researcher.

Appendix B: Questionnaire

SECTION 1:

General information

Do not write your name in anywhere in this questionnaire.

Please tick one box to indicate your response to the questions.

1. Gender

1.	Male	
2.	Female	

2. Age

1.	Age	
2.	18-25 year	
3.	26-35 years	
4.	36-45 years	
5.	46-55 years	
6.	Over 56 years	

3. Educational level

1.	Doctoral degree	
2.	Master's degree	
3.	Bachelor's degree	
4.	Diploma	
5.	Other	

4. Number of years working in the construction industry

1.	Below 2 years	
2.	2-5 years	
3.	6-9 years	
4.	10-13 years	
5.	Over 14 years	

5. NCA grade

1.	NCA 1	
2.	NCA 2	
3.	NCA 3	
4.	NCA 4	
5.	Other	

SECTION 2:

Investigate the Quality of workmanship within the construction industry

Please tick the appropriate box to indicate your response to the following statements.

Use Scale: 1- Strongly Agree, 2- Agree, 3- Neutral, 4- Disagree, 5- Strongly Disagree

	Statement	1	2	3	4	5
B1	There a shortage of skilled labour in the construction industry.					
B2	The quality of construction labour in the industry was competitive to international standards.					
B3	Construction workers get work done correctly on first attempt					
B4	Construction workers in Nairobi County have certifications to prove their competence					
B5	There was notable improvement of quality of workmanship in the construction industry over the last two years.					
B6	Construction workers can work with minimal supervision and produce expected results					
B7	I feel satisfied with artisans' workmanship in the construction industry					
B8	There was a huge skills gap in the construction sector, Nairobi County					

SECTION 3:

Investigating the extent on-site skills training and certification influences the quality of workmanship

Please tick the appropriate box to indicate your response to the following statements.

Use Scale: 1- Strongly Agree, 2- Agree, 3- Neutral, 4- Disagree, 5- Strongly Disagree

	Statement	1	2	3	4	5
C1	On-site skills training helps construction workers to improve their skills level					
C2	Training helps to make sure construction workers keep up to date with industry standards					
C3	Employees that enrol into on-site training have a higher opportunity for promotion					
C4	Certification improves construction workers confidence in their work					
C5	On-site training and certification improves the quality of workmanship in the construction industry					
C6	On-site training and certification reduces wastages and errors on job					
C7	Workers are able to understand and complete jobs faster after on-site training					
C8	Benefits of on-site training outweigh the costs					

SECTION 4:

Investigating the extent managerial skills affects the quality of workmanship

Please tick the appropriate box to indicate your response to the following statements.

Use Scale: 1- Strongly Agree, 2- Agree, 3- Neutral, 4- Disagree, 5- Strongly Disagree

	Statement	1	2	3	4	5
D1.	Effective leadership skills and motivation skills affect the quality of workmanship.					
D2.	There was a lack of professional and technical skills, which has led to poor project quality.					
D3.	Effective decision-making skills improve on the quality of output					
D4.	Poor project skills create problems in the monitoring and control as the result in misdirection for project management					
D5.	Listening skills and time management skills increase the efficiency and quality of project output					
D6.	Having managers; foremen, subcontractors, or supervisors in a project affect workmanship.					
D7.	Lack of experience and level of competency of the managers affect the quality of workmanship.					
D8.	Project planning affects project performance.					
D9.	Effective communication skills help managers to undertake quality projects.					
D10.	Proper construction management would enhance the workmanship in construction					
D11.	Regular employee's performance review by project managers help to retain the best talent in construction					
D12.	Manpower management in construction helps to create functional teams and quality of workmanship					

SECTION 5:

Investigating the impact of using effective strategies for improving the quality of workmanship

Please tick the appropriate box to indicate your response to the following statements.

Use Scale: 1-Strongly Agree, 2-Agree, 3-Neutral, 4-Disagree, 5-Strongly Disagree

	Statement	1	2	3	4	5
E1.	Time was a major constraint to effectively run training programs across construction sites.					
E2.	Continuous training and development of construction workers increases the quality of workmanship					
E3.	Incorporation of innovative technology in the construction industry will improve quality of workmanship in the industry					
E4.	Government support by setting up learning institutions will improve the quality of workmanship					
E5.	All quality enhancement strategies should be worker oriented					
E6.	Lack of good training providers negatively affects quality of workmanship in Nairobi County					
E7.	Stakeholders collaboration will fast track the improvement in quality of workmanship in Nairobi County					
E8.	New trainees should focus on acquiring local experience to increase their proficiency					
E9.	There was a need to develop an up to date curriculum for better training of construction workers.					
E10.	Training on current construction technology will improve competitiveness in the quality of workmanship versus global standards.					
E11.	It's the role of management to ensure that adequate plans and resources exist to recruit, motivate, train and develop employees.					
E12.	There was need for policies that motivate and reward for the inclusion training programs on construction sites					
E13.	Policies that guide and match grade to pay will motivate the attendance rate of trainees.					

Appendix C: Classification of Construction Workers in Nairobi and Kenya

Category	Kenya		Nairobi	
	No. Of Workers	Percentage	No. Of Workers	Percentage
Site Supervisors	2,965	2.1%	602	1.6%
Skilled	41,776	30.3%	9,474	24.9%
Semi-Skilled	93,265	67.6%	27,904	73.5%
Total	138,006	100.0%	37,980	100.0%

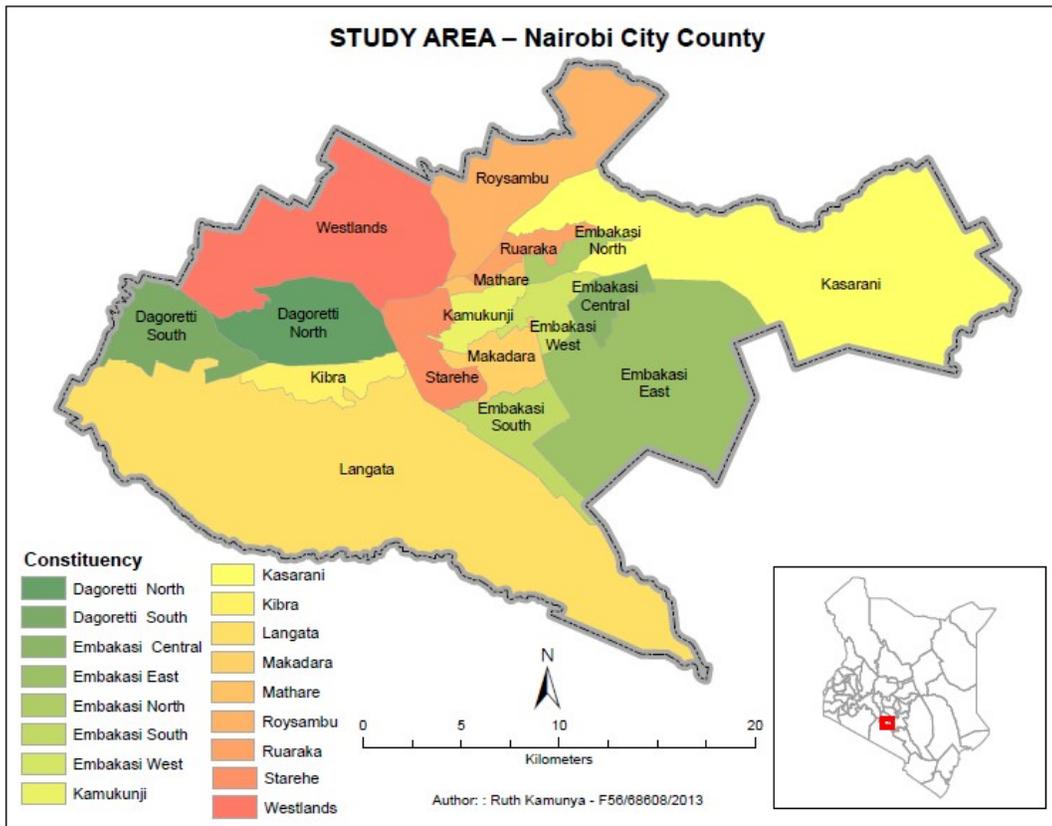
Source: NCA (2015)

Appendix D: Area Size of Nairobi County

Area	County	Area (km²)	Population Census 2017
Core Nairobi	Nairobi County	694.9	4,000,000
Northern Metro	Kiambu County	2,449.20	1,623,282
North Eastern Metro	Murang'a County	2,325.80	942,581
Southern Metro	Kajiado County	21,292.70	687,312
Eastern Metro	Machakos County	5,952.90	1,098,584
Totals	Nairobi Metro	32,715.50	7,490,128

Source: Kenya National Bureau of Statistics (2009).

Appendix E: Map of the Study Location – Nairobi



Source Kamunya (2015).