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SCHOOL OF BUILT ENVIRONMENT

**DEPARTMENT OF REAL ESTATE AND CONSTRUCTION
MANAGEMENT**

**A STUDY OF EFFECTIVENESS OF REGULATORY FRAMEWORK IN
CONSTRUCTION INDUSTRY IN PROMOTING SUSTAINABILITY**

(A CASE STUDY OF NAIROBI COUNTY)

BY

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(CONSTRUCTION MANAGEMENT)**

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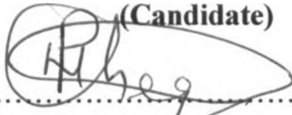
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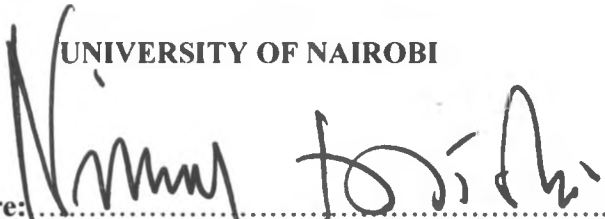
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DEDICATION

This thesis paper is dedicated to my mum, Magdaline Wangui, for the sacrifice she has made for my education until now. Thank you for helping me realize my purpose in life. May God continue to bless you abundantly and give your more strength in the spirit and in your heart.

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TABLE OF CONTENT

PROJECT TITLE.....	I
DECLARATION.....	II
ACKNOWLEDGEMENT.....	III
DEDICATION.....	IV
TABLE OF CONTENT.....	V
LIST OF TABLES.....	X
LIST OF FIGURES.....	XI
LIST OF PHOTOS.....	XII
LIST OF MAPS.....	XIII
APPENDICES.....	XIV
ABBREVIATIONS AND ACRONYMS.....	XV
ABSTRACT.....	XVI
CHAPTER ONE: INTRODUCTION AND LITERATURE REVIEW.....	1
Background of the Study.....	1
REVIEW OF RELATED LITERATURE.....	4
Introduction.....	4
Nature and Role of the Construction Industry.....	5
Regulatory Framework in the Construction Industry.....	8
An Overview of the Regulatory Framework in Kenya Construction Industry.....	10

Effectiveness of Regulatory Framework.....	17
Measure of Effectiveness of Regulatory Framework.....	17
Construction Industry and Economic Sustainability.....	19
Construction Industry and Environmental Sustainability.....	21
The Kenyan Situation on Environmental Sustainability.....	23
Construction Industry and Social Sustainability.....	24
Social Responsibility and Social Sustainable Development.....	25
Problem Statement.....	26
Research Questions.....	27
Research Objectives.....	27
Research Hypothesis.....	28
Research Methodology.....	28
Scope of the Study.....	30
CHAPTER TWO: CASE STUDY OF NAIROBI COUNTY.....	31
History of Nairobi County.....	31
Geography of Nairobi County.....	32
Nairobi County Social-Economic and Environmental Parameters.....	32
Informal Settlement.....	33
Land Resources.....	33
Water Resources.....	33
Approach to Development.....	33

CHAPTER THREE: CONCEPT OF SUSTAINABILITY IN THE CONSTRUCTION INDUSTRY.....	38
Introduction	38
Concept of Sustainability in the Construction Industry.....	38
Sustainability through Value Management.....	39
Integrating Sustainability with Value Management.....	40
The Strength of Value Management for Sustainability	41
CHAPTER FOUR: RESEARCH METHODOLOGY.....	43
Introduction.....	43
Research Design.....	43
Target Population.....	44
Sampling Procedures.....	44
Data Collection Methods and Instruments.....	46
Sources of Research Data.....	47
Validity of the Study and Research Instruments.....	47
Assumption of the Study.....	48
Reliability of the Research findings.....	48
Data Analysis Techniques.....	48
Chapter Summary.....	49

CHAPTER FIVE: DATA ANALYSIS AND PRESENTATION.....50

Introduction.....50

 Results and Discussions..... 50

Response rate.....50

Economic Sustainability.....51

 Training on Economic Sustainability..... 51

Environmental Sustainability.....52

 Training on Environmental Sustainability..... 52

Social Cultural Sustainability.....53

 Training on Social Cultural Sustainability..... 53

 Local Sustainability Programs Relating to Community Service
 within the Institution..... 54

**Capacity of Regulatory Framework in Promoting Economic, Environmental,
and Social Sustainability.....55**

 Courses Offered on Sustainability Related Topics..... 55

 Extent to Which Sustainability is Woven into Organizational Policies.....56

 Involvement in Sustainability Related Research..... 57

 Extent to Which Sustainability Practices are Infused in Prime Project Areas 58

 Institutional Commitment to Sustainability..... 59

 Extent of Considering Sustainability Literacy in Recruitment of Staff..... 61

 Extent to Which the Institution is involved in Sustainable Programs
 Development through Partnerships..... 62

 Key Factors Influencing Pursuit of Sustainability Issues 63

 Factors Leading to Resistance or Lack of Responsiveness to Economic,
 Environmental and Social Sustainability Issues..... 64

Extent to Which Regulatory Framework Is Effective in promoting sustainability.....	65
Regression on Effectiveness of Regulatory Framework on Sustainability.....	66
CHAPTER SIX: FINDINGS, DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS.....	68
Introduction.....	68
Report on Major Findings.....	68
Discussions.....	70
Sustainability and the Construction Industry in Kenya	70
Pursuing Economic Sustainability	71
Pursuing Environmental Sustainability.....	72
Pursuing Socio- Cultural Sustainability.....	73
Strategies to Improve Regulatory Capacity to Promote Sustainability.....	74
Scientific Theory of the Study.....	75
Significance of the Study.....	75
Limitation of the Study.....	76
Conclusion.....	76
Recommendations.....	77
Areas for Further Research.....	78
REFERENCES	79
APPENDICES.....	86

APPENDIX A – QUESTIONNAIRE TO OFFICERS OF
REGULATORY FRAMEWORK..... 86

APPENDIX B – DEFINIFION OF SIGNIFICANT TERMS..... 92

LIST OF TABLES

Table 4.1: Sampling frame.....	47
Table 5.1: Overall response rate.....	50
Table 5.2: Response rate on Economic Sustainability.....	51
Table 5.3: Response rate on Environmental Sustainability.....	52
Table 5.4: Response rate on Social Cultural Sustainability.....	53
Table 5.5: Response rate on local sustainability programs relating to community service.....	54
Table 5.6: Courses offered on Sustainability Related Topics.....	55
Table 5.7: Extent to which sustainability is woven into organization policy.....	56
Table 5.8: Involvement in Sustainability Related Research.....	58
Table 5.9: Infusion of Sustainability Practices in Prime Project Areas.....	59
Table 5.10: Institution Commitment to Sustainability.....	60
Table 5.11: Extent of Considering Sustainability Literacy in Recruitment of Staff.....	61
Table 5.12: Involvement of institution in sustainability programs through partnership.....	62
Table 5.13: Response Rate on Factors Influencing Pursuit of Sustainability Issues.....	63
Table 5.14: Response Rate on Factors Leading to Resistance to Sustainability Issues.....	64
Table 5.15: Effectiveness of Regulatory Framework in Promoting Sustainability	66
Table 5.16: Regression Results.....	67

LIST OF FIGURES

Figure 1.1: Conceptual framework.....	41
Figure 5.1 Training on Economic Sustainability.....	51
Figure 5.2: Training on Environmental Sustainability.....	52
Figure 5.3: Training on Socio Cultural Sustainability.....	53
Figure 5.4: Sustainability Programs Relating to Community Service.....	54
Figure 5.5: Courses on Sustainability.....	56
Figure 5.6: Sustainability Woven into Organizational Policies.....	57
Figure 5.7: Involvement in Sustainability Research.....	58
Figure 5.8: Infusing Sustainability Practices into Prime Project Areas.....	59
Figure 5.9: Institutional Commitment to Sustainability.....	60
Figure 5.10: Considering Sustainability Literacy in Staff Recruitment.....	61
Figure 5.11: Involvement in Sustainable Development Programs through Partnerships.....	62
Figure 5.12: Factors Influencing Pursuit of Sustainability Issues.....	63
Figure 5.13: Factors Causing Resistance to Sustainability Issues.....	65

LIST OF PHOTOS

Photos 2.1: Nairobi Central Business District.....	35
Photos 2.2: Nairobi Informal Sector & Settlement.....	36

LIST OF MAPS

Map 2.1: Location Map of Nairobi.....	37
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APPENDICES

APPENDIX A – Questionnaire to Officers of Regulatory Framework	86
APPENDIX B – Definition of Significant Terms	92

ABBREVIATIONS AND ACRONYMS

AAK	-	Architectural Association of Kenya
BORAQS	-	Board of Registration of Architect and Quantity Surveyors (Kenya)
CRE	-	Corporate Real Estate
CRE & C	-	Corporate Real Estate and Construction
CSR	-	Corporate Social Responsibility
EMCA	-	Environmental Management and Coordination Act, 1999, of the Laws of Kenya
ERB	-	Engineers Registration Board (Kenya)
GDP	-	Gross Domestic Product
GNP	-	Gross National Product
H ₁	-	Hypothesis 1
H ₂	-	Hypothesis 2
H ₃	-	Hypothesis 3
IQSK	-	Institute of Quantity Surveyors of Kenya
ISK	-	Institute of Surveyors of Kenya
MoPW	-	Ministry of Public Works (Kenya)
NCC	-	Nairobi City Council
NEMA	-	National Environmental Management Authority (Kenya)
ROI	-	Return on Investment
SCPI	-	Sustainable Commercial Property Investment
SRI	-	Social Responsible Investment
SSA	-	Sub- Saharan Africa
SSSI	-	Sites of Special Scientific Importance
UK	-	United Kingdom
UN	-	United Nations
VM	-	Value Management

ABSTRACT

Construction is a key sector of the national economy. Its social-economic significance also become obvious when examined for a global context. Sustainability concerns protecting environmental quality, enhancing social prosperity and improving economic performance (Addis and Talbot, 2001). The pursuit of sustainable development thereby throws the built environment in sharp focus as it constitutes are on the one hand the main supports of economic development, and, on the other, its contribution has significant impacts on resources, the living and working environment.

These contributions and constituents of construction have lately' been put under the microscope in the Kenya Construction Industry as its activities have constantly failed to safeguard the fundamentals of society's resource base. This is despite Kenya regulatory framework and legislation governing the construction industry having well articulated Acts, safety standards and code of ethics that spell sustainability in social-economic and environmental fronts. It was found necessary therefore to establish the effectiveness of regulatory framework in construction industry in promoting sustainability. The research sought to establish the extent to which the existing regulatory framework of the Kenya construction industry promotes sustainability and explores strategies to be used to improve its capacity in Kenya. The research concentrated on regulatory framework in the private and public sector in Nairobi County. Data was analyzed using quantitative and qualitative methods of data analysis, in particular, using statistical package for social science software program.

The findings that emerged showed that the regulatory framework in the Kenyan construction industry is not optimally and holistically promoting sustainability. Specifically, promotion of economic sustainability was found to target profits at the compromise of quality. The research revealed that there was greater commitment towards promoting sustainability on the environmental front than on both economic and socio-cultural fronts. On the socio-cultural front, the research showed that the regulatory framework has failed to promote sustainability to a meaningful or no extent. The study also revealed that the key hindrance causing lack of responsiveness and resistance to sustainability issues is the lack of an accepted industry model to evaluate sustainability program.

In view of this, it is recommended that specialized bodies mandated to champion for social sustainability be included in the composition of the regulatory framework that governs the Kenya construction industry. The study also recommends with paramount importance the need for regulatory bodies to weave sustainability into organizational policies. There is need for a clear model to be developed in the industry to guide the achievement of holistic sustainability. Awareness and outreach campaigns should also be conducted to increase literacy and knowledge on sustainability. It is hoped that this research will be a step forward in the quest for sustainable development with particular regards to the built environment.

CHAPTER ONE

INTRODUCTION AND LITERATURE REVIEW

Background of the Study

When the construction industry is examined from a global context, its socio-economic significance becomes obvious. The industry is the world's largest industrial employer (111 million employees) and in most countries it accounts for more than half of capital investment and as much as 10 per cent of GNP (Du Plessis, 2001). Any industry of this magnitude inevitably has significant social and economic influences, yet these are generally harder to document than an industry's environmental impacts. Bearing in mind that the construction industry is commonly seen as a barometer of the economy, construction output may then be set to rise at the same rate. Construction is likely, therefore, to impose increasing adverse impacts on the environment and well being of people around the world (Ofori, 1998). This underpins the need for building professionals to develop a better understanding, not only of the environmental effects of construction, but its social and economic effects too.

The pursuit of sustainable development throws the built environment and the construction industry into sharp focus. This sector of society is of such vital innate importance that most other industrial areas of the world society simply fade in comparison. Bourdeau (1999) reiterates this claim, asserting that the built environment constitutes on the one hand of the main supports (infrastructure, buildings) of economic development, and, on the other, its construction has significant impacts on resources (land, materials, energy, water, human/social capital) and on the living and working environment. Hence the construction industry has significant direct and indirect links with the various aspects of sustainable development.

Sustainability promotes a balanced approach by taking account of the need to continue in business, but does not seek profitability at the expense of the environment or society's needs (MaSC, 2002). Sustainability concerns protecting environmental quality, enhancing social prosperity and improving economic performance (Addis and Talbot, 2001). Sustainability as a term is often associated with issues around "keeping alive", "continuing", and "enduring". In 1987 the UN Commission on Environment and Development (The Brundtland Commission) used the term "Sustainable Development" to relate the concept of sustainability to human endeavor. The Brundland Report further defined sustainable development as development which meets the needs of the present without compromising the ability of future generations to meet their own needs (WCDED, 1987). This, the most commonly quoted definition of

sustainable development, is entirely appropriate in the context of construction works, as outlined by Prasad and Hall: The built environment provides a synthesis of environmental, economic and social issues. It provides shelter for the individual, physical infrastructure for communities and is a significant part of the economy. Its design sets the pattern for resource consumption over its relatively long lifetime (Prasad and Hall, 2004). Accepting that there can be no sustainable development without a synthesis of economic, environmental and social aspects to base it upon recognizes the need for a fundamental change in attitude towards prioritizing the preservation of an environment capable of sustaining an acceptable quality of life for everyone (Lovins and Lovins, 2001). Agenda 21, the EC's Sixth Environmental Action Programme: Environment 2010: Our future, our choice, (EU, 2001) and the UK National Strategy for Sustainable Development: Securing the future (DEFRA, 2005) also rightly emphasize the need to review development processes in a holistic way moving towards a more balanced relationship between social, economic and environmental factors.

The construction industry in Kenya is witnessing a boom in view of the significant economic activity in all sectors of the economy. The sector plays a very major role in the country's economic development through its contribution to gross domestic product (GDP), gross domestic capital formation (GDCF), creation of employment and production of capital facilities and assets required for production in other sectors, as creating demand for their products (UNCHS, 1996). This contribution by the construction industry is prime in cities and town, as urban areas are known to have prospered or declined depending on their environment effects, economic activities, social prosperity, and natural resources around them (Olima, 2001). The principle decision makers of the state, politicians, technocrats, entrepreneurs and landowners live and derive their political and economic support from these urban centers (Obudho, 1988). They ensure that the allocation of goods, services, income and other resources are carried out disproportionately to these urban centers at the expense of other parts of the country mainly due to economic reason. This coupled with rapid urban growth due to both natural population growth and rural urban migration has resulted to accelerated growth in urban centre in Kenya exerting too much pressure on natural resources (Olima, 2001). The major urban centres in Kenya; namely the city of Nairobi, Mombasa, Kisumu, Nakuru, Nyeri and Eldoret play a major role in nearly all aspects of the nation's development. Nairobi, the capital of Kenya, is one of the fastest growing cities in the world. The city is one of the most economic hubs in the continent and contributes 60 percent of the GDP to the Kenyan economy, which had an annual growth rate of six percent in 2007. The Headquarters of UNEP, the

United Nation Environmental Programme, which is the United Nation's body mandated to promote Environmental and Social Sustainability, are based in Nairobi (Dafe, 2009).

The contribution by the Construction Industry to the robust national economic and urban growth in the country has however been put under the microscope as its activities have constantly and lately failed to safeguard the fundamentals of society's resource base, which include the people, natural environment, industrial and production base of goods and services, and the expansive built environment. This has been through rising cases of fatalities as a result of collapsed buildings, depletion of the natural environment through development and encroachment of public land and water catchments areas and unprofessional practices in production, manufacturing and delivery of the final product in the real estate and construction industry. The intergenerational and interdependence aspect of sustainability demand that the built environment safeguards the needs and requirements of the society's resource base, which includes the people. However, safety and safeguard of life has been lacking in the Kenya real estate and construction industry. On Thursday, 22nd October, 2009, a building collapsed in Nairobi Outcast town of Kiambu. 32 people were pulled out of the building; 16 dead and 16 still alive, (Ndirangu, 2009). Another building collapsed the same month in Huruma Estate of Nairobi killing a man in a shack next to it. On 5th June, 2009, another building collapsed in Kisii when the top floors of the building came tumbling down, trapping the workers who were on the ground floor, beneath the rubble. At least one man died and three others were feared dead after the three-storey building under construction collapsed, setting off a desperate rescue operation, (Ndirangu, 2009).

The development process in the country is at the stage at which land use practices such as environmental management, water conservation, forestry, tourism, mining, manufacturing, human settlements, and infrastructure development are always conflicting. This is exacerbated by the mismatch between population and economic growth together with inadequate policy governing land use. Additionally, existing policies and programmes are either poorly implemented or lack harmonization and coordination. These inadequacies especially those governing management of the resource base have resulted to widespread environmental degradation (Ministry Environmental Conservation, 1999).

The production system of products and services in the real estate industry is also in jeopardy. An alarm has been sounded in Kenya's major urban centres over a growing number of un-trained persons engaged in various professional works in the Kenya real estate industry.

The Architectural Association of Kenya (AAK) says the number of quacks in the building industry is more than three times that of registered professionals. In Nairobi, six out of 10 buildings have not been approved by the City Council of Nairobi, which is ill-equipped to handle the large amount of unplanned development taking place. According to the AAK, which keeps a record of all registered professionals in the building and construction sector, the number of collapsed buildings could increase if the trend goes unchecked. (Ndirangu, 2009).

These rising cases of fatalities as a result of collapsed buildings, depletion of the natural environment, encroachment of public land and water catchments areas and unprofessional practices in the real estate and construction industry raise the concern of the society to question the effectiveness of the Kenya regulatory framework and its implementers in providing enabling structures and environment that promote sustainability. There are a number of literature that have attempted to define the concept of regulatory framework and their importance as tools for introducing an enabling and exclusive built environment for sustainable development (Wegelin & Baorgman, 1995). While the business dictionary (2011) defines effectiveness as the degree to which objectives are achieved and the extent to which target problems are solved, the Strategy for Sustainable Construction represents a commitment from the industry to work towards this vision by reducing its carbon footprint and its consumption of natural resources, while creating a safer and stronger industry by training and retaining a skilled and committed workforce. It lays out specific actions by which industry and Government contributes to the achievement of overarching targets within each of the main areas covered by the sustainability agenda (HM Government, 2008). Being the provider and life cycle custodian of the built environment, the construction industry therefore has a role in developing and harmonizing the interrelationship and interdependence within multiple levels of perspectives on and complexity of different variables within society's resource base through sound professional practices for positive influence on sustainability.

REVIEW OF RELATED LITERATURE

Introduction

This chapter gives a brief review of some studies focusing on sustainability, regulatory framework in the construction industry and in the area under study. The chapter also gives relevant literature concerning the different facets of sustainability affected by the construction industry. The chapter also presents a conceptual framework that shows the interrelationship between the dependent and interdependent variables in achieving sustainability.

Nature and Role of the Construction Industry

Rahim, (2007) defines construction as fitting parts or materials together to make something – such as a structure to provide shelter, a bridge or foundation to carry loads, an embankment to support raised way or a dam wall to impound water. In its broadest sense construction is responsible for the 'built environment'. The construction industry participates in every phase of the development, from investment and financing to site planning engineering, and architecture; through project execution; and even into facilities management. It is clear then, that the construction industry plays a central role in the economic development.

The Jones, Comfort and Hillier, (2006) identifies a number of sectors of construction activity namely public housing; private housing; infrastructure; other public non-housing; private industrial; and private commercial and makes the distinction between "new work" and repair and maintenance. Rahim, (2007) noted that the construction industry, together with the materials industries which support it, is one of the major global exploiters of natural resources, both physical and biological. The industry thus contributes very significantly to the current unsustainable development path of the global economy.

The construction industry is a large and diverse component of developed countries such as the UK economy and embraces a wide range of businesses including building contractors, quarrying firms, products producers, builder's merchants and professional services. Estimates suggest that the industry broadly defined includes some 350,000 firms and that it employs almost three million people (Construction News, 2005). Building contractors are in many ways at the visible heart of the construction industry and in 2005 some 170,000 firms generated some £80,000 million (at 2000 prices) in annual output and employed approximately 1.81 million people (Department of Trade and Industry, 2005).

The role of the construction industry, especially in developing countries, has already been articulated (Ofori, 1990; World Bank, 1984.). Lopes (1998) observed that according to the UN system of national accounts convention, construction is the only sector of the economy that appears twice in national accounts statistics: first as one of the sectors that compounds GDP by industrial origin; and secondly as a component of a country's gross capital formation. He also presented evidence for Sub-Saharan Africa (SSA) that demonstrated that a long-term decline in GDP *per capita* between 1980 and 1992 for the region corresponded directly to a relative decrease in construction volume, and also noted that the converse appeared to be true.

In developing countries, the construction industry may account for anywhere between 1.8 and 11 per cent of GDP (Wells, 2001) depending on the performance of the economy. The industry's contribution to GDP in Kenya, in the period 1980-1992 averaged 4.1 per cent (Lopes, 1998). This contribution could be much higher if the hidden economy, of which construction usually boasts a substantial proportion through its backward and forward linkages, is taken into account (Chen, 1998). The industry also provides the infrastructure that supports other sectors of the economy. Thus, construction plays an important role that goes beyond its share of national output in the development strategy of any country or region. Its capacity for employment creation and contribution to other economic activities has been mentioned on many occasions. Lopes (1998) observed that the flexibility of the industry in responding to structural economic adjustments makes it a major contributor to the process of socio-economic development – the primary agenda of SSA. Therefore, the organization, efficiency, capacity and cost effectiveness of construction is important to the future prosperity of SSA countries.

While each sector of construction activity has its own internal business and technical characteristics, agendas and challenges, it is possible to identify a number of common general issues which bring construction into the wider social realm. These include the nature and status of construction employment, health and safety, environmental concerns, relationships with communities, supply chain relationships, partnering, international ventures and public relations. The majority of building firms rely on a nominally self-employed labour force and the past two decades have witnessed a substantial increase in subcontracting in construction. Such subcontracting, although seen by many firms as an efficient use of labour, creates significant problems for innovation and training (Jones et al., 2006).

The vast majority of self-employed workers are not in a position to be able to invest in their own training, site-based training is becoming increasingly rare and the numbers of apprentices and trainees are declining. In August 2005, the Chartered Institute of Building (2005), for example, reported that over 90 per cent of its members were anticipating a skills shortage beyond 2005 and the prime cause of this shortage within the construction industry was seen to be the industry's poor image and greater competition from more attractive sectors of the economy. At the same time, there are gender equality issues in that females comprise just below 10 per cent of those working in the construction industry.

In the construction industry, perhaps more than in any other, the reputation of businesses and the quality of their work is constantly under scrutiny from environmental

pressure groups, the media and the public, not to mention potential clients and investors (Dulaimi et al. 2002). Changing markets, new technology and rising client expectations are also stimulating radical reviews of how the industry can be re-engineered to enhance its environmental and social performance. Construction has a poor image mainly as a result of the industry's failure to change the attitudes, technologies, processes and culture (Yitmen 2007). Health and safety are major causes of concern within the construction industry. While the statistics vary from year to year, fatal accidents to workers are generally much higher than in any other industry and falls from height and the management of site transport and equipment are the main causes of fatalities. Occupational ill health is also a major problem and here the main risks are from manual handling, Hand-Arm Vibration Syndrome, high levels of allergic dermatitis and the legacy of past work with asbestos. Building projects can cause considerable disruption to local communities during construction and concerns are regularly expressed within communities about site cleanliness, noise, traffic management and the standards of dress and behaviour of the workers on site (Lin & Mills, 2001).

The construction industry has a significant impact on both the natural and the built environment through energy and resource use, the production of waste materials, pollution and quarrying and sand and gravel extraction, and the associated impact on the landscape, and the creation of new buildings and roads. English Nature (2004), for example, argues that the construction industry has a number of adverse impacts on nature conservation including both the direct loss of sites of special scientific importance (SSSI) as well as indirect effects on SSSI's from adjacent developments. These indirect effects include disturbance, increased risk of vandalism, air and water pollution, fires and fly tipping and the displacement of individuals and populations of species leading to increased pressure elsewhere. English Nature suggests that these effects are often poorly addressed in environmental impact assessments and their significance is often simply not recognized by decision makers. More generally the government has stressed that as the construction industry makes an important contribution not only in the use and management of resources but also in shaping their use in everyday life it also has a major role to play in working towards more sustainable consumption and production.

Managing the supply chain has long been a cause of economic and operational concern within the construction industry but many companies are coming under increasing pressure to ensure that their suppliers are meeting their social, environmental responsibilities. The construction as an industry, also, often faces many difficulties ranging from internal

weaknesses to external threats that affect and influence its performance (Ofori, 2000). In both developing and developed countries, these weaknesses and difficulties are usually compounded by the shortage of skilled and qualified people (Mackenzie *et al.*, 2000; Dainty *et al.*, 2004) which often results in cost and time overruns, as well as quality shortfalls. Other symptoms of the challenges besetting the industry that could stem from shortage of quality craft skills include avoidable rework, waste, idle resources, accidents, claims, disputes and bankruptcies (Kumaraswamy, 1997). Rowings *et al.* (1996) argued that many of the problems faced by the industry arise from a need to maintain a skilled and competitive workforce. Kumaraswamy (1997) also noted that productivity and quality levels are dependent on the performance of construction workers at all levels. Improvements in productivity and quality require upgrading the knowledge and skills of all the workers in the industry, including craftspeople.

Regulatory Framework in the Construction Industry

Regulatory framework is laws and regulations that outline the legal requirements to be met. They may also be complemented by policies, standards directives and guidelines. Regulatory framework is also the due process of regulation surrounding a single topic that entails all of the relevant legislative documents (acts, regulations, annexes) and describes the agency or body responsible for administering the framework. In the context of the construction industry, the fundamental purposed of building control was originally the protection of the public interest with regard to health and safety. The scope has however been extended over the years to include the welfare of people in and around building and furthering the conservation of environment, fuel and power (Edinburgh, 2003).

A significance issue in relation to sustainable development is the inertia that has been apparent in dealing with potential and presumed threats. To facilitate future proofing and appropriate response provision within the Building Regulation it has been necessary to identify those “pull” factors that are determining the future direction of the building regulation process and associated standards and guidance in the next 20 years in relation to sustainable construction issues. The factors are predicated on emerging scenarios related to physical, social and economic changes that are taking place in the country and globally. The issues are diverse and encompass international requirements, human needs and responsibilities, and technological changes. These include climate changes, resource conservation, waste minimization, biodiversity and health and well-being of individuals and communities in and around building (Edinburgh, 2003). The connection between construction practices and regulations and a range

of environmental quality, economic growth and social prosperity issues is increasingly being recognized globally. New trends in environmental accounting lean heavily towards life-cycle assessment that accounts not only for the use (energy consumption) phase of a building but also for the impacts of the pre-construction (design and siting) and construction phases. The increasingly common position that buildings, like other infrastructure modes, should be subjected to a cradle-to-grave analyses that address the impacts of their many uses is backed by emergent data that reveals the relative environmental, economic and social impacts of the various phases of the built environment (Christensen, 2009).

There are potentially major drivers in the built environment globally for sustainable construction. Policy on sustainable construction in Kenya is relatively underdeveloped despite a number of independent initiatives by some government's agencies bodies and local authorities. An extensive literature review has considered Building Regulations and best practice in a number of countries worldwide to compare and contrast how building regulations in these countries are supporting sustainable development. The form, scope and nature of the regulations are identified, and how these have been amended in recent years to respond to the requirements of sustainable building. The review highlighted that there are examples throughout the world of credible and specific measures for achieving sustainable development objectives through the Building Regulatory Framework, supplemented by other incentives, and significant opportunity to pro-actively set objectives and to develop the appropriate mechanisms for achieving them. Incentives, disincentives and sources of best practice guidance by way of publications and web sites have been identified and might contribute to policy development. The review identified a number of useful and replicable mechanisms for promoting sustainable construction at the design stage and throughout the lifetime of the building construction works (Edinburgh, 2003).

It has been long apparent that the Current Regulatory Framework in developing countries like Kenya suffers from inadequacies at the boundaries of the responsibilities of its composite agencies and inevitably policy and development aspirations lead to conflicts overlap. An ideal situation may be unachievable, but few would argue that no improvement is possible. The sustainable development agenda in particular has already brought many important issues and conflicts to the fore particular in respect of planning, land use and construction activities (Edinburgh, 2003). The effectiveness of the current regulatory frameworks in Kenya are therefore explored in this study and identify areas for expansion and

integration that can result in closing those gaps that adversely affecting the ability to deliver sustainable construction.

An Overview of the Regulatory Framework in Kenyan Construction Industry

Historically the professionals representing the land and built environment have depended upon and trusted their professional and regulatory bodies both to uphold educational and professional standards among its members and also to regulate the profession for the benefit of members and broader society. Professions and regulatory organizations discharge a vital responsibility in society and much has been already published about these benefits (Grimshaw 2001; Friedson 1994; Barker 1968). Professional and regulatory bodies are also charged with the responsibility of protecting the general public against being exploited by untrained and unqualified persons in these fields. The regulation of ethical standards by professional bodies is well documented as a basis of professional practice. In many global jurisdictions it is the professional bodies with their time-honoured codes of practice and ethical guidelines that provide a regulatory safeguard between the professional practitioner and the role of the state in protecting citizens. According to Jamal & Bowie (1995) the role of professional codes is to 'prevent professionals from exploiting the asymmetrical information that is a part of the professional-client relationship'. It is primarily for these reasons that professional and regulatory bodies have grown in national and international contexts and the importance of the quality of membership and the ethical standards which they maintain is essential to their continued success (Warren & Wilkinson 2008; Grimshaw 2001; Jamal & Bowie 1995).

In Kenya, the construction process is executed by various professionals of diverse training and skills, namely: Land Surveyors, Project Managers, Architects and designers, Quantity Surveyors, Engineers, Contractors, Builders, Estate and marketing agents and Facility Managers (Buildafrique Consulting Limited, 2011). The professional and regulatory bodies that govern the works of these professionals in the Kenya construction industry include:

- 1) Board of Registration of Architects and Quantity Surveyors (BORAQS)
- 2) Architectural Association of Kenya (AAK)
- 3) Institute of Quantity Surveyors of Kenya (IQSK)
- 4) National Environmental Management Authority (NEMA)
- 5) Nairobi City Council (NCC)

- 6) Ministry of Public Works (MoPW)
- 7) Engineers Registration Board (ERB).

BORAQS is a Kenya government professional regulatory body established to regulate professionals in the fields of Architecture and Quantity Surveying towards a Sustainable Built and Natural Environment. The body executes its mandate through training, registration and enhancement of ethical practice. According to Architects and Quantity Surveyors Act of the laws of Kenya, no person should practice under any name, title or style containing any of the words or phrases "architect", "architecture", "architectural", "quantity surveyor" or "quantity surveying" unless he is registered under the Act as an Architect or a Quantity Surveyor (Architect and Quantity Surveyors Act, 2010). An Architect is a person trained and licensed in the planning and designing of buildings, and participates in supervising the construction of a building (The Wikipedia Encyclopedia, 2010). The work of an architect is to advise his clients, study their needs, to prepare, direct and co-ordinate design and to supervise works executed under a building contract (Architect and Quantity Surveyors Act, 2010). Architects and Quantity Surveyors Act stipulates that a person registered to practice as an Architect in Kenya must have a minimum of five years of approved training followed by at least one year of practical experience in the work of an architect to the satisfaction of the registration Board, and has passed a prescribed examination. He must also have a minimum of one year of professional experience in Kenya to the satisfaction of the Registration Board or has satisfied the Board that he has otherwise acquired an adequate knowledge of Kenya building contract procedures (Architect and Quantity Surveyors Act, 2010).

Architectural Association of Kenya (AAK) on the other hand was established in 1967 to be Kenya's leading Association for professionals in the built and natural environment in Kenya incorporating Architects, Quantity Surveyors, Town Planners, Engineers, Landscape Architects and Environmental Design Consultants and Construction Project Managers. The Association is registered under the Societies Act and brings together professionals from the Private Sector, Public Sector and Academia. The Association also acts as a link between professionals and stakeholders in the construction industry: Including policy makers, manufacturers, real estate developers, financial institutions, and so on. The stated objectives of AAK are:

1. To co-ordinate the activities of professionals concerned with built and natural environment in Kenya and promote professionals integrity and to direct the members of Association in all matters of professional practice;
2. To advance the science and art of planning and building by developing the standards of professional education, training and practice, and facilitate matters of mutual interest of the member professions;
3. To create public awareness by marketing the services of member professions and provide professional opinions on the matters pertaining to violation of the statutes provided for good maintenance of the built and natural environment;
4. To establish and accredit Continuing Professional Development programmes for the members of the Association and encourage collaboration of professionals and societies engaged in the built and natural environment;
5. To offer community services by participation in the enhancement of built and natural environment, maintain building information services, and monitor quality assurance on materials;
6. To liaise with the Government and regulatory agencies on the matters affecting Registration and licensing of the professionals engaged in the built and natural environment;
7. To foster National, Regional and International co-operation in matters dealing with the professions related to built and natural environment;
8. To maintain and protect heritage of the built and natural environment;
9. To facilitate research and dissemination of information for advancement of professional education, training, and practice;
10. To publish documents and publications for the benefit of the members of the Association and the general public in matters of the built and natural environment.
11. To create revenue generating activities for the Association.

Still on professional and regulatory bodies that govern the works of professionals in the Kenya construction industry, the Institute of Quantity Surveyors of Kenya (IQSK) is an

organization specifically charged with promoting and safeguarding the interests of the Kenyan Quantity Surveyor. The primary objective of IQSK is to promote the advancement of the practice of Quantity Surveying and its application in Kenya. The Institute of Quantity Surveyors of Kenya (IQSK) was founded in 1994 as a non-political and non-profit making organization whose primary objective is to promote the general advancement of the practice of Quantity Surveying and its application in Kenya including facilitating the exchange of information of the institute and otherwise. The Institute cooperates with universities, other educational institutions and public education authorities for furtherance of education and training in Quantity Surveying and practice. The Institute also works closely with the Board of Registration of Architects and Quantity Surveyors, and other relevant societies on matters concerning Quantity Surveying education, training, examinations and practice (IQSK, 2012)

Engineers also play significant role in real estate and construction industry in Kenya. An Engineer is a person who works to develop economic and safe solutions to practical problems, by applying mathematics, scientific knowledge and ingenuity while considering technical constraints (The Wikipedia Encyclopedia, 2010). He or she is also a person skilled in the principles and practice of any branch of engineering including carrying through an enterprise by skillful or artful contrivance (Brainyquote, 2011). The Engineers in Kenya are governed by the Engineers Registration Board (ERB) through Engineers Registration Act of the laws of Kenya. The Act requires that for a person to be registered as an Engineer, he must be a holder of a degree, diploma or licence of a university or school of engineering which may be recognized for the time being by the Board as furnishing sufficient evidence of an adequate academic training in engineering. The person must also have three years' practical experience of such a nature as to satisfy the Board as to his competence to practice as a registered engineer (Engineers Registration Act, 2009). The act also provides for temporary registration for persons with intends to be present in Kenya in the capacity of an engineer for the express purpose of carrying out specific work for which he has been engaged. The person must however immediately before entering Kenya be in practice as an engineer in such a capacity as to satisfy the Board of his fitness to serve the public as a registered engineer (Engineers Registration Act, 2009).

Nairobi City Council (NCC) is the local authority governing the city of Nairobi, Kenya. It is the largest of the 175 local Authorities in the country and is under direction of the Ministry of Local Government. NCC is mandated to provide and manage basic social and physical infrastructure services to the residents of Nairobi. These services include basic education,

housing, health, water and sewerage, refuse and garbage collection, planning and development control, urban public transport and fire services among others (City Council of Nairobi, 2011).

The Ministry of Public Works (MoPW) is a Kenya government ministry that facilitate provision, construction and maintenance of quality government buildings and other public works for sustainable socio-economic development. The ministry is further mandated to formulate public work policy for public works, spearhead public works planning, develop and maintain public buildings, maintain inventory of government property, provide mechanical and electrical (building services), coordinate procurement of common user items by government ministries, and register and regulate the work of contractors, consultants for buildings and civil works and materials suppliers. (MoPW, 2012)

Environmental health professionals have always played a critical role in the built environment through design of healthy friendly structures and enforcing public health standards. Traditionally, this role has been taken by the Architects who are the lead consultants and designers in a construction project. The design of the built environment affects physical activity and obesity, air pollution and respiratory diseases, injuries, mental health, social capital, and environmental justice (Frumkin, Frank, & Jackson, 2004). As the country strives to accelerate the pace of development, environmental concerns have become more evident. The enactment of the Environmental Management and Coordination Act of Kenya (EMCA) of 1999 has served as the main framework of environment law (Kenya Environmental and Political News Weblog, 2010). The National Environment Management Authority (NEMA) is a body established under the Environmental Management and Coordination Act of the laws of Kenya to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment (Environmental Management and Coordination Act, 1999). Other roles of this body include:

- 1) Co-ordinate the various environmental management activities;
- 2) Establish and review in consultation with the relevant lead agencies, land use guidelines;
- 3) Examine land use patterns to determine their impact on the quality and quantity of natural resources;

- 4) Identify projects and programs or types of projects and programs, plans and policies for which environmental audit or environmental monitoring must be conducted under this Act, including all construction projects;
- 5) Publish and disseminate manuals, codes or guidelines relating to environmental management and prevention or abatement of environmental degradation.

NEMA in consultation with the relevant lead agencies has a role of promoting the use of renewable sources of energy by, and in particular promoting research in appropriate renewable sources of energy, creating incentives for the promotion of renewable sources of energy and promoting measures for the conservation of non-renewable sources of energy (Environmental Management and Coordination Act, 1999). The National Environment Management Authority (NEMA) also requires that any person, being a proponent of a project, including all construction projects, to execute and submit a project report to the Authority, giving the prescribed information regarding the nature of the project. An environmental impact assessment study and report is then executed after studying the project report submitted to the authority to assess the impact that the intended project may or is likely to have or will have on the environment (Environmental Management and Coordination Act, 1999). Environmental Impact Assessment (EIA) is defined as the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made (IAIA, 1998). The Authority is further required to carrying out environmental audit of all activities that are likely to have significant effect on the environment during the course of executing the project (Environmental Management and Coordination Act, 1999). This includes monitoring during the operation of the project or building with a view of determining its immediate and long-term effects on the environment project (Environmental Management and Coordination Act, 1999).

The management of real estate assets is also regulated by a number of statutes. These laws regulate the leasing, transfer and maintenance of real estate. This includes the following: The Public Health Act, which relates to maintenance of property in a good habitable condition. The workings of this Act spell out the minimum standards to keep the property in and the consequences likely due in default. Secondly, the Landlord and Tenant Act which aims to make provisions with respect to certain premises for the protection of tenants of such premises from evictions or exploitation and other incidentals. It works as a counterpart of the Rent Restriction Act Cap 296 in commercial properties. It spells out the lease terms under the Acts

control, maintenance and repair roles, payment of certain charges etc. The Distress for Rent Act is used for the recovery of rent arrears. Other notable statutes include, The Registered Land Act, The Local Government Act, Factories Act, the Building Code, Occupiers Liability, Sectional Properties Act and the Estate Agents Act which governs the property management profession in Kenya (Kariuki and Nzioki, 2010). In terms of urban development, there are two (2) institutions: one is the Ministry of Land and the other is Ministry of Local Government. These institutions are guided by two key statutes: the Physical Planning Act (Cap 286) and the Local Government Act (Cap 265). There are other laws that govern the physical planning and are found mostly related to land. Some of these legislations are:

- 1) Physical Planners Registration Act, 1996
- 2) Environmental Management and Co-ordination Act, 1999
- 3) Public Health Act (Cap 242)
- 4) Agriculture Act (Cap 318), Rev.1986
- 5) Land Control Act (Cap 302)
- 6) Land Acquisition Act (Cap 295), 1968
- 7) Registered Lands Act (Cap 300)
- 8) Survey Act (Cap 299)
- 9) The Building By-Laws (Grade I &II), 1968
- 10) Housing Act (Cap 117)
- 11) Water Act, 2002

Even though the importance of professional and regulatory institutions has not changed, an ostensible change in their effectiveness and efficiency has changed and deteriorated in recent past in property and construction industry in Kenya. Most of the laws in the Acts mentioned in this study are outdated by time and no longer effective in guarding professionalism in Kenya. The penalties and fines proposed in these laws are too lenient for today's social and economic setting in Kenya. For instance, section 3 of the Architects and Quantity Surveyors Act recommend a fine not exceeding five thousand Kenya shillings for any person who contravenes the provisions of subsection 1 of this section, which include the

unlawful use of protected names under this act by un-registered persons (Architect and Quantity Surveyors Act, 2011), For Engineers, any person who pretends to be a registered engineer shall be guilty of an offence and liable to a fine not exceeding twenty thousand Kenya shillings (Engineers Registration Act of Kenya, 2009). These penalties in the acts have not been reviewed in a long time to reflect on the rising inflation and lose of currency value of the Kenya shilling despite the extent of contravention of the same laws by un-trained and un-qualified persons.

Effectiveness of Regulatory Framework

The term effectiveness refers to the degree to which objectives are achieved and the extent to which targeted problems are solved (Business Dictionary, 2011). It is also the capability of producing a desired or desirable result. When something is deemed effective, it means it has an intended or expected outcome, or produces a deep, vivid impression (Longman and Pearson, 2011). Use of the term “desirable” in the definition captures those effects that may be desired by an individual or an institution but also open the possibility that the individual may discover other effects produced by an activity that are desirable but not originally desirable (Simon, 1976). Regulatory effectiveness as measured by market outcomes varies considerably between developing and developed countries. There are clear differences between less developed economies and more developed economies. Developed economies rank highly on indices of stakeholders protection and effective regulatory systems and they deliver good market outcomes. Elements of value are implicit or explicit imperative about a preferred state of a framework or systems when measuring effectiveness. The process of evaluating effectiveness can be reduced into three conditions necessary for attribution to effectiveness: (1) an effect is desirable if it has an element of value, (2) the effect is observed or reliably predicted if it has an element of fact; and (3) the desirable effect is perceived as having been produced by the activity being evaluated if it has an element of fact (Walker, 1919)

Measure of Effectiveness of Regulatory Framework

Regulatory authorities and frameworks have a critical role in providing a context which ensures the soundness and proper functioning of particular markets like the construction industry. There are a range of factors within the regulatory sphere which impact on the construction industry including: legal and institutional frameworks; regulatory supervision; and regulatory enforcement. A significant amount of academic literature has emerged over the past decade on regulatory effectiveness (CRA, 2009). Regulatory effectiveness as measured by

economic, environmental and social outcomes varies considerably between developing and developed countries. There are clear differences between less developed economies and more developed economies. Developed economies rank highly on indices of public protection and effective legal systems and they deliver good sustainability outcomes (Ayres and Braithwaite, 2002).

Regulators have a range of tools at their disposal including appropriate legal and institutional frameworks, regulatory supervision and enforcement for ensuring their regulatory mandate. In practice it is not possible to easily separate these regulatory tools into clearly distinguishable categories. Regulators encourage compliance using activities that might be considered to be of a supervisory nature, linked to enforcement, or elements of both. Similarly, regulators typically have rulemaking abilities and are therefore able to extend or alter the legal frameworks through which regulation arises including through requiring additional disclosure, certain governance standards or bringing some forms of activity or products under their remit or tightening standards as an activity already covered by their remit (Coffee, 2009). It is the combination of regulatory tools rather than one particular ongoing supervisory activity that are of immense importance in gaining effectiveness. There is some consensus that a strategy based on punishment and deterrence alone is inferior to one based on persuasion, education, and co-operation in ensuring effectiveness. A regulatory framework in which regulators challenge firms to improve based on constructive and active engagement can be effective in ensuring compliance before a serious problem emerges. This is especially the case with respect to risk management and the need for regulators to have sufficient skills to oversee firms in the context of rapid economic disparities, environmental changes and growing social demands in the society. Ensuring adequacy of supervisory resources and the embedding of skills in regulatory staffs in the key prudential areas where failures have occurred in the recent past need to be an important focus for the future of effectiveness of regulatory framework (CRA, 2009).

A comprehensive and effective regulatory framework in the construction industry should be able to protect the citizens or the general public for social prosperity, ensure that markets are fair, efficient and transparent for economic growth; and reduce the systemic environmental risk associated with the construction activities. Additionally, the regulatory framework should be set on the following basic principle to ensure effectiveness in economic, environmental and social fronts (CRA, 2009):

- 1.) Regulators should be suitably empowered, independent, and accountable;

- 2.) Self regulatory organizations, for example BORAQS and NEMA, should observe standards of fairness and confidentiality and be overseen by regulators;
- 3.) Regulators should have comprehensive inspection, investigation, surveillance, and enforcement powers;
- 4.) Regulators should set minimum entry standards for professional practitioners as well as other prudential requirements for intermediaries and establish procedures for dealing with their failure;
- 5.) Market system should be subject to effective regulation and oversight, and procurement activities should be transparent.

Construction Industry and Economic Sustainability

In most corporate settings, construction costs are the second highest recurring cost after staffing. Over a comparatively short period of time there has been a change in the way that construction related assets are perceived. While historically real estate was considered to be a cost centre that was, at best, managed passively, it has moved to become a vital resource that demands specific and effective management. A consequence of this shift has been the evolution of the Corporate Real Estate and Construction (CRE&C) management discipline, which has moved from having a rather narrow approach to property matters to one that has a more holistic, wider business focus (Gibson & Lizieri, 2001).

While the more tangible, “hard” measures of business performance, including, for example, return on investment, positive management of the external cost of capital, worker productivity, reduction in energy costs and levels of maintenance expenditure, are fairly easy to identify, quantify and benchmark, a range of “soft” considerations, such as, for example, employee work environment, company culture and developing a product's brand, have assumed greater importance (Morton, 2003 cited in Roper and Beard, 2006). The “softer” aspects are issues that firms are considering more closely as there are links being identified between a corporate's real estate, its corporate identity and corporate values to its ability to attract skilled labour (Breslau, 2007) and to grow the corporate brand. Additionally, the early findings of ongoing research investigating the impact of sustainable space on employee health, productivity, and job satisfaction are compelling (Breslau, 2007). It is not only employee issues that may be of increasing importance. The public perceives that companies associated with sustainable real estate and construction are modern, altruistic and dynamic (Canada Green

Building Council, 2005) which in turn may be powerful incentives to construction and real estate executives to occupy them. Alignment with current sentiment will be more than a marketing ploy, as it can be perceived as a demonstrable and integrated component of quality management (Frej, 2003).

It can be argued that the business case for sustainable construction is solely and exclusively economic and regardless of the various environmental and occupational benefits claimed, hard economic imperatives prevail. However, strategic and tactical CRE&C decisions are being taken within a broader context that is influenced by diverse external factors. For example, in the UK Government advice and guidance acknowledges the evolution of the international agenda towards sustainability. The UK Government's overarching theme – economic growth – is formally articulated through a range of documents linking the economic, social and environmentally sustainable in cohesive ways. Primary and secondary legislation, Building Regulations and the explicit requirements for energy conservation via the Energy Performance in Buildings Directive (EU 2001) are devised to encourage degrees of flexibility in many aspects of the CRE&C portfolio. It can be argued that all businesses, regardless of size, sector or location, tend to be in a constant state of flux – they will be growing or contracting; acquiring or disposing; innovating and developing; or static and deteriorating (Cooke and Woodhead, 2007). These characteristics underpin the need for flexibility and this is likely to have implications on the CRE&C decision-making process.

The sustainable construction debate typically concentrates on new-build facilities that are more frequently sourced through the speculative development market. This may be problematic in itself, as developers may not wish to provide units with the higher levels of specification that could be demanded by possible investors and/or corporate occupiers. In fact, there seems to have been little incentive for the developer to provide anything that exceeded the *de minimis* compliance for mandatory building codes, such as the Building Regulations. From the developer's perspective a major barrier to providing units with sustainable specifications is the perceived lack of impact on the capital value of the completed unit. Zhou and Lowe (2003) argue that developers are encouraged to think of short-term profits rather than evaluate the long-term consequences of their design and construction decisions. This is because the current financial system actually discourages long-term investment through the practice of discounting, a technique used to calculate the most effective use of capital. Reliance

on this approach often leads to short-term policies as the cost metrics used actually discourage current expenditure at the expense of greater saving later.

The literature argues that sustainable buildings provide financial benefits that conventional buildings do not. These include, for example, energy and water savings, reduced waste, improved indoor environmental quality, greater employee comfort and productivity and reduced absenteeism or sickness. One of the principal and historic barriers to the wider adoption of more sustainable design and construction solutions is the perception that they are disproportionate in terms of initial cost. Recent international cost-value studies have refuted this view. Significant work has been provided by Bartlett and Howard (2000), Frej (2003), Zhou and Lowe (2003), Canada Green Building Council (2005), and Davis Langdon (2007). Many of these studies are empirical and reinforce the point that there is no significant difference in average costs of sustainable buildings as compared with more traditional buildings. Indeed, many project teams are building sustainable buildings with little or no added cost, with budgets well within the cost range of more traditionally constructed buildings with similar programmes (Davis Langdon, 2007). Some of the major economic benefits of sustainable real estate are in the improvement in building performance and durability due to a reduction from the maintenance and operational costs during the buildings life. However, a potential disadvantage of sustainable real estate is that the environmental attributes are often invisible and only appreciated once the building is occupied and in use (Bartlett and Howard, 2000). It is argued that the range of environmental and economical considerations should be considered together in order to allow CRE&C decision-makers to make informed value judgements rather than rely on over-simplified budget estimates about the costs of building in a sustainable way (Bartlett and Howard, 2000).

Construction Industry and Environmental Sustainability

The world has changed over the past couple of decades with an ever-increasing recognition that we can no longer continue to use natural resources without facing environmental consequences. Business and the property industry have been slow to react to this changing view of the world, even though there has been awareness of the growing environmental consequences of our actions since the Industrial Revolution. While sustainability is usually interpreted today as the overarching goal or target of having a durable balance between the economy, environment and society, sustainable development means an ongoing process directed towards achieving this goal. In this context, taking responsibility

towards the environment can be seen as a precondition and measure for implementing the principles of sustainable development, The urgency of undertaking action in order to achieve more sustainable development can be highlighted by referring, for example, to two recent publications:

Millennium Ecosystem Assessment Report – a study involving the work of more than 1,360 experts worldwide – which revealed that “human activity is putting such strain on the natural functions of Earth that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted” (Millennium Assessment, 2005) and secondly;

Stern Review on the Economics of Climate Change, - which argued that climate change is the greatest and widest-ranging market failure ever seen and that its overall costs will be equivalent to losing between 5 per cent and 20 per cent or more of global gross domestic product each year (now and in the future) if prompt and strong action is not undertaken (Stern, 2006).

The extent and consequences of these trends require us to look for options that allow for both a stronger commitment to the principles of sustainable development and an improved uptake of environmental responsibility within all branches, companies and asset classes. One key justification for seeking to encourage action in the property and construction sector is that no other sector has such a great potential role in contributing to sustainable development. For this reason, buildings and the property and construction sector have been termed the “cornerstone of sustainability” (Organization for Economic Co-operation and Development, 2003). Sustainable development is unattainable without sustainable buildings. Interestingly, although many descriptions on what is a “sustainable building” have been offered (John *et al.*, 2005), there has been no agreement on a single definition (Burnett, 2005; Shafii, 2005). As to “sustainable construction”, UNEP has defined it as “the use and/or promotion of environmentally friendly materials, energy efficiency in buildings, and management of construction and demolition waste” (UNEP, 2003). Although many aspects of buildings can impact on sustainable development, those that are generally perceived as critical include: the consumption of resources, including energy, materials and water; waste and recycling; and indoor environmental (including air) quality (OECD, 2002, 2003).

The Kenyan Situation on Environmental Sustainability

On environment in the building industry, available evidence suggests that environmental policy in developing countries remains largely incoherent. These are lacking mainly because poverty and socioeconomic needs are often seen as more pressing than the need for environmental controls. How to balance these is a major challenge. Kenya, in particular, is faced with diverse and complex environmental challenges and has been struggling to resolve these, mainly because it operated in many years without a national environmental policy (Kenya Environmental and Political News Weblog, January 27, 2010)

The continuing deterioration of Kenya's environment has precipitated a number of hazards that have long-term irreversible damage. The adverse impacts of deforestation, particularly where natural ecosystems are involved, are widely recognized. The planned forest clearance, which has gotten underway in several areas of the Mount Kenya, the Nandi forests and the Mau Forest, is to benefit mainly local loggers, squatters and tea growers. Similarly, out of the justifiable need to create more jobs and enhance economic development, policy makers, professional institutions, designers and planners in the construction industry often ignore the potential negative effects that various developments cause to the environment – a situation exacerbated by the rapidly growing population (Kenya Environmental and Political News Weblog, 2010). Moreover, strategies to achieve the provisions of Environmental Coordination and Management Act have not been fully developed or implemented in the construction industry and beyond. Different factors that have contributed to these situations including: lack of institutional capacity and resources to mobilize and link activities effectively within and between sectors; specific environmental sectoral laws that do not adequately articulate the links between development, population and environmental concerns; more often, conflict with the Environment Management and Coordination Act (EMCA); and, limited budgetary provisions to finance the effective implementation of environmental programs set out in national development plans (Kenya Environmental and Political News Weblog, 2010). There have also not been enough resources to review and investigate the many complaints on environmental degradation in construction projects as required by section 32 of the Environmental Management and Coordination Act of the Laws of Kenya. The National Environment Management Authority (NEMA) has also not been at the forefront in promoting the use of renewable sources of energy in the construction industry. Level of use of external and renewable sources of energy has been low and thus putting pressure on the available natural resources, a situation also attributed by increase pollution. Other construction development

regulation challenges today include environmental management in the context of rapid population growth and urbanization. As the urbanization trend continues, urban environments are deteriorating. One of the biggest policy challenges today is the inclusion of environmental policy into urban policy. There are a lot of cases of construction project without environmental impact assessment study or report as required by the law. Some of the projects have engaged professionals who are ignorant of the law requirements (Government of Kenya, 2006).

Construction Industry and Social Sustainability

The benefits of sustainable commercial property investment (SCPI), in both existing and new products, get measured in micro (energy efficiency, recycling,) and macro terms (greenhouse gas reducing, carbon foot printing, less resource depleting.), but are nearly always environmentally based. The social aspects of sustainability (productivity, well-being,) have proven harder to measure, and are clearly less visible. However studies of Kinder, Lydenberg, Domini Research & Analytics social responsibility metrics have found that transparency is significantly increased (Chatterji *et al.*, 2009). Nevertheless, the measuring, valuing and reporting of social sustainability, or what is sometimes lumped into the notion of social responsibility, is significantly less developed, at least in the context of the built environment. This makes it vitally important to demonstrate that social sustainability is identifiable, desirable and value adding, if it is going to really matter to real estate investment profiles any time soon. Successfully arguing that Socially Responsible investment (SRI) not only fully envelopes sustainable investment, but also actually seeks to further advance and expand upon a sustainability agenda weighed down by the baggage of loosely applied jargon, may well be an important catalyst in the evolution of a greener built environment. As Hopwood *et al.* (2005, p. 38) argue a greener urban environment “requires a strong basis in principles that link the social and environmental to human equity”.

Social sustainability tends to be viewed as the “softer – politically correct” component of sustainable development (Kimmet, 2007). This is a poor, yet widely held misconception of the very tangible benefits social sustainability can bring to construction investment (Boyle, 2005). Much greater clarity of the influence of social sustainability, in what is all too often a short-term focus on quick returns, is urgently required. More precise measurement and reporting of social sustainability will greatly advance this understanding of its importance and will help to progress the arguably marginalized second component of the Brundtland definition

of sustainability – the rights of future generations to enjoy equal opportunities to those of the current global citizens.

Social Responsibility and Social Sustainable Development

Social responsibility emerges from ideas about good corporate citizenship and ethical practice, particularly with respect to economic equity. However, it is more commonly associated with investment and corporate strategies and practices than the built environment. Social Responsible Investment (SRI) on the other hand implies that investment decisions line up with an individual's personal values regarding society and the environment. (Watmore and Bradley, 2001) takes this thinking further by positioning accountability as central to the notion, and not just the corporate adoption of privately held values, stating that “genuine social responsibility upholds the principles of social justice predicated on a progressive understanding of egalitarianism and equal worth, and the idea that those who have suffered most from power concentrations of the past should benefit most from its redistribution”. Edgerton (2007) and his colleagues see no difference between sustainability and corporate social responsibility (CSR). This reflects the language used in documents discussing the Sustainable Responsible Investment Certification program run by the Ethical Investment Association of United Kingdom (UK), which consciously merges the two concepts by using each term interchangeably

According to the social investment forum web site, socially responsible property investment refers to the consideration of “the social and environmental consequences of investments, both positive and negative, within the context of rigorous financial analysis”. Pivo (2005) adds that “it focuses on the ‘triple bottom line’ by which investments are evaluated in terms of their financial profitability, social equity, and ecological integrity”, and may refer to real estate investment trusts, companies that make conservation, urban revitalization and sustainability a key part of their corporate strategy, and a range of private funds with similar objectives. Distilling these ideas into a single notion, we can confidently point to SRI being broadly concerned with equity, durability and function at three levels: the broad scale of social networks, the more intimate level of relationships and the individual quantum of well-being (Kimmet, 2008). All three of these levels feed into the productivity mix and effectively incorporate all of the SRI specific issues identified in the literature. And when sought to be maximized in terms of public good outcomes, resulting sustainability outcomes not only include, but can also reach far beyond environmental concerns.

Statement of the Problem

The Kenyan strategic development plan, dubbed Vision 2030 that advocates for an equitable, safe and healthy future for Kenyans highlights the role that professionally qualified individuals can play in delivering sustainable development. However, few professionals in the Kenyan construction industry fully comprehend sustainability issues or are equipped with the attributes that would enable them take decisions that sustain, rather than degrade the environment around them. This is evinced by the fact that the Kenyan regulatory framework and legislation governing the construction industry has well articulated Acts, safety standards and code of ethics that spell sustainability but the situation on the ground is in stark contrast to the laid down laws. This prompts questions like how effective is the implementation of building regulations when building canopies collapse on unsuspecting pedestrians? How sustainable is the construction process when whole buildings cave in a few months after completion?

With regard to the environment, available evidence suggests that environmental and social policies in the construction remain largely incoherent. Public land and water catchments areas have been encroached for development purposes in many areas of the country despite the existence of the National Environment Management Authority (NEMA). There are also no clear boundaries between residential, industrial and entertainment areas thus posing a wide range of pollution to the environment including the use of non renewable sources of energy that result to depletion of natural resources. The continuing deterioration of Kenya's environment has precipitated a number of hazards that have long-term irreversible damage. The adverse impacts of deforestation, particularly where natural ecosystems are involved, are widely recognized. The planned forest clearance, which got underway in several areas of the Mount Kenya, the Nandi forests and the Mau Forest, was to benefit mainly local loggers, squatters and tea growers. Similarly, out of the justifiable need to create more jobs and enhance economic development, policy makers, professional institutions, designers and planners in the construction industry often ignore the potential negative effects that various developments cause to the environment – a situation exacerbated by the rapidly growing population. These factors are likely to raise poverty levels in the society due to depletion of natural resources, loss of employment due to corrupt and unprofessional practices in delivery of services and loss of lives that are providers of socioeconomic needs to many families in our society.

The question therefore begs; are the construction activities sufficiently managed to ensure future generations can benefit from the environment as well? Are the authorities aware that environmental and natural resources are being depleted at an alarming rate? Are our construction activities in the built environment socially sustainable to ensure safeguard of lives to occupants, workers and users of these facilities? All these questions point to the need to conduct this study with a view to exposing sustainability-relevant knowledge, skills and values that can enhance “sustainability literacy”, in the Kenyan construction industry.

Research Questions

The study will be geared towards answering the following questions:

1. To what extent does the existing regulatory framework of the Kenyan construction industry promote economic sustainability in Nairobi County?
2. To what extent does the existing regulatory framework of the Kenyan construction industry promote environmental sustainability in Nairobi County?
3. To what extent does the existing regulatory framework of the Kenyan construction industry promote social sustainability in Nairobi County?
4. What strategies can be employed to improve capacity of the construction regulatory framework in Kenya in promoting sustainability?

Research Objectives

The objectives of this study are:

1. To establish the extent to which the existing regulatory framework of the Kenyan construction industry promotes economic sustainability in Nairobi County.
2. To establish the extent to which the existing regulatory framework of the Kenyan construction industry promotes environmental sustainability in Nairobi County.
3. To establish the extent to which the existing regulatory framework of the Kenyan construction industry promotes social sustainability in Nairobi County.
4. To explore strategies to be used to improve the capacity of the construction industry's regulatory frameworks in Kenya in promoting sustainability.

Research Hypothesis

The study will test the following hypotheses;

H₁: The existing regulatory framework governing the Kenyan construction industry has achieved significant effectiveness in promoting economic sustainability.

H₂: The existing regulatory framework governing the Kenyan construction industry has achieved significant effectiveness in promoting environmental sustainability.

H₃: The existing regulatory framework governing the Kenyan construction industry has achieved significant effectiveness in promoting social sustainability.

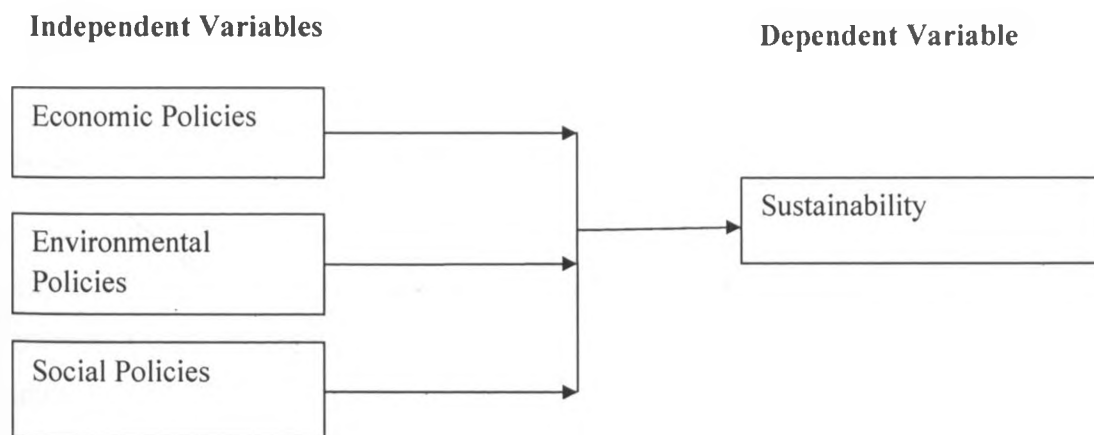
Research Methodology

Chapter Three (3) of this research paper presents the research design and methodology. It discusses research design, population, sampling, research tools and instrument, and data analysis techniques. The variables under investigation in the study include both Independent variable and dependent variables as shown in the conceptual framework below:

Conceptual Framework of variables

The conceptual framework shows the relationship of the variables to be measured. The independent variables become the parameters that will be measured and their effect on the dependent variable determined.

Figure 1.1: Conceptual framework



Economic Policies

Economic policies dictate how businesses are conducted. Economic policies are also the actions taken by a government to influence its economy. Types of economic policy actions can include setting interest rates through a federal reserve, regulating the level of government expenditures, creating private property rights, and setting tax rates. Taxation policies affect the nature of technology and materials to be used in construction and this has an overbearing effect on the overall quality and design of buildings. Policies on energy also dictate the type of materials to be used in construction and this affects the longevity of buildings and hence its ability to serve future generations. Financial policies affect access to capital for the construction process and determine the type of buildings erected. The more tangible effects of economic policies are seen through measures like return on investment, worker productivity, external cost of capital and energy costs and levels of maintenance expenditure. On the other hand, the softer effects of economic policies are seen through considerations such as employee work environment and company culture.

Environmental Policies

Environmental policy refers to the commitment of an organization to the laws, regulations, and other policy mechanisms concerning environmental issues and sustainability. These issues generally include air and water pollution, solid waste management, biodiversity, ecosystem management, maintenance of biodiversity, the protection of natural resources, wildlife and endangered species. Environmental policies are put in place to regulate the use of natural resources. For the construction process to be seen as sustainable it has to be seen as conserving the environment and preserving the natural resources. Environmental policies are thus put in place to protect the ability of the planet's eco-system to sustain future generations. These policies ensure the use of environmentally friendly materials, that buildings are energy efficient and that construction and demolition wastes are properly managed. These materials include all energy sources, water and air.

Social Policies

Social policy primarily refers to guidelines, principles, legislation and activities that affect the living conditions conducive to human welfare. Social policies are nearly always environmentally related and are measured in micro (energy efficiency, recycling) and macro terms (greenhouse gas reducing, carbon foot printing, less resource depleting). Social policies

such as worker safety productivity and well being are properly enshrined in labour laws. Others social issues that ensure social sustainability are facilities such as parking space, facilities for handicapped people, social justice, demographic statistics and urbanization.

Scope of the Study

The study intends to establish the effectiveness of the regulatory framework in the construction industry in promoting sustainability in Nairobi County. The study focuses on regulatory framework other than other aspects of the construction that affect sustainability because the regulatory framework is the custodian of other variables through its legislations, leadership and goodwill that guide the other aspects in adhering to set standards, rules and legislative framework governing sustainability. One key justification for seeking to encourage regulation in the construction sector is that no other sector has such a great potential role in contributing to sustainable development. For this reason, buildings and the property regulatory framework in construction sector has been termed the “cornerstone of sustainability” (Organization for Economic Co-operation and Development, 2003).

CHAPTER TWO

CASE STUDY OF NAIROBI COUNTY

History of Nairobi

Urbanization in Kenya has a long history with urban agglomeration in the form of trading centers being found along the Kenyan coast as early as the 9th Century AD (Obudho 1988). However, the growth of many urban centers can be traced to the pre-independence period when they were used as centers of administrative and political control by the colonial authorities (UNCHS, 1985). Nairobi takes its name from the Maasai phrase “enkare Nairobi” which means a “a place of cold waters”. The area was originally grazing land and a livestock watering point and there were no permanent African settlement. After World War I Nairobi became increasingly a base for business for government. The plain lands where Nairobi lies were know as a ‘no-man’s land’ here were no inhabitants except the nomads who from time to time built their manyattas on the higher ground, better known to them as ‘the place of cool waters’. The city of Nairobi owes its birth and growth to the Kenya Uganda Railway (KUR). The railhead reached Nairobi in May 1899 “enroute” to the present day Kisumu which was then part of what is Uganda. The moving of the railway headquarters from Mombasa to Nairobi by its chief engineer, Sir George Whitehouse resulted in the subsequent growth of Nairobi as a commercial and business hub of the then British East Africa protectorate (Situma, 1992:167). By 1900, Nairobi had become a large and flourishing place with the settlement consisting mainly of the railway buildings and separate areas for Europeans and Indians, the latter mainly comprising the labourers engaged in building the railway. Nairobi as an urban centre was officially defined in 1900 under the Nairobi Municipal Community regulations and it became the capital of Kenya in 1907 (Mitulla 2003, Rakodi, 1997).

Following its founding in 1902, Nairobi took roughly 40 years to exceed a population of 100 000 people. By independence, 20 years later it had reached around 350 000 people (Olima 2001). Rapidly increasing population has been ongoing since, surpassing one million in the 1980s, two million in the 1990s and now approaching three million residents. Of the total population 29% lives below poverty line and of the total population more than 40% are categorized as informal settlements, mainly residing in slums. While the annual rate of growth has at times exceeded ten per cent, it has more recently decreased to below four per cent per year — still very high by global standards. Nairobi is projected to top 3.8 million by 2015.

Geography of Nairobi

Nairobi was previously known as “the city in the sun” because of its appealing environment. Nairobi, the capital of Kenya, is one of the fastest growing urban cities in the world. It is an equatorial city, located at the south-eastern end of Kenya’s agricultural heartland and lies at an altitude of 1,670 metres, latitude 36 degrees 50’ east and longitude 1 degree 17’ south about 140 kilometres south of the equator. The city is one of the most economic hubs in the continent and contributes 60 percent of the GDP to the Kenyan economy, which had an annual growth rate of six percent in 2007. Nairobi occupies an area of about 700 kilometer square meters at the south-eastern end of Kenya’s agricultural heartland. At 1600 to 1850 m above sea level, it enjoys tolerable temperatures year round. (CBS 2001, Mitullah 2003). Key physical features include the Nairobi, Ngong and Mathare rivers and the indigenous Karura forest in northern Nairobi. The Ngong hills stand towards the west, Mount Kenya towards the north and Mount Kilimanjaro towards the south-east. As Nairobi is adjacent to the Rift Valley, minor earthquakes and tremor occasionally occur.

Nairobi County Social-Economic and Environmental Parameter

Nairobi as the capital city of Kenya, is the centre of industry, education and culture. It is also the world headquarters of the two United Nations agencies, the United Nations Environment Programme (UNEP) and United Nations Centre for Human Settlement (UN-Habitat) and houses regional offices of other United Nations agencies such as the United Nations Children’s Fund (UNICEF). However, much of Nairobi’s urban footprint is unplanned settlement driven by rapid population growth and urban poverty, among other things. Sprawling informal settlements handicap the city’s delivery of social services and negatively impact the quality of life and environment (Tabainjuki, 2007). The livelihood of most inhabitants of Nairobi comes from informal economic activities especially from the expansive construction activities and production and manufacturing base in the City. Formal wage employment has been decreasing, as the public sector continues to retrench its employees. The informal sector where most of the poor belong has therefore been noted to generate more employment than the formal sector. Estimates of the size of the informal sector vary. The growth of the urban population in Nairobi, which has resulted from both natural population growth and rural urban migration, has consequently led to an increased demand for resources required to meet the consequent demand for infrastructure services (Olima 2001). As consequence of such increase in population and economic development, now the city has been

facing to various issues/problems such as stress on land and, natural environment, inadequate public services and overburden on infrastructure as well as various social matters which include:

Informal settlements

Influx from the rural areas to the Nairobi city is now spilling into various environs of the city and the main cause of creating slums and squatters. People in such slums and squatters are hardly possible to access to adequate public services including water supply and sewerage, health and education facilities, etc. and there are a lot of issues of gender. Such slums and squatters are one of the reasons resulting in degrading urban environment (UNCHS, 1985).

Land resources

The city of Nairobi is not much favored with natural resources especially land and water. Keeping pace with the increasing population and expansion of economic activities, a large number of housing estates/residential estates, high rise buildings, industrial establishments have been developed within the city area. Actual land use pattern has been greatly changed compared to the ones in 40 years ago. There is reduction of vegetation and open land which have been playing important role in the natural environment, scenery, retardation of storm rainfall, recharging water resources, etc (UNCHS, 1985).

Water resources

In view of the geographical location, the city of Nairobi is presumed to be not favored with rich surface and ground water resources. It has been identified the most promising source in future is the surface runoffs to be tapped in the small rivers in the eastern slopes of the Aberdare Ranges only, and this resources could meet the demand only up to 2014. Accordingly it is no exaggeration to say that such resources development would be the one which governs development of Nairobi in future. Water supply will be one of the priority sectors that are required to be addressed urgently as possible (UNCHS, 1985).

Approach to development

A number of studies have been conducted since 1990s, each of which had objective to address its specific problems. There is no integration among the studies, and no comprehensive urban development plan/strategy has been conducted since 1973. The 1973 urban development

strategy established is now outdated and no longer adaptable even to the present situation of the city and its environs. It is now hardly possible to Nairobi City Council and other stakeholders how to control, adjust and limit development activities keeping harmony with the natural environment and exploitable resources, since there is no adequate and proper master plan to guide (UNCHS, 1985).

As Nairobi's settlements and rural urban migration sprawl outwards, they take over forested and agricultural land, fragmenting and degrading remaining natural areas. In addition, rapid population growth has outstripped the city's ability to deliver adequate services such as education, health care, sanitation, and waste removal. It has also led to an explosion in industrial parks and manufacturing plants, leading to high levels of air pollution. As it continues to grow, Nairobi faces the challenge of planning for sustainable urban development that provides adequate housing and services at the same time as it protects air and water quality and the natural environment within and around the city. This has partly been initiated by recent government policy papers, like the Nairobi Metro 2030. Nairobi Metro 2030 is part of the overall national development agenda for Kenya which is encapsulated in Kenya Vision 2030 and the Grand Coalition Government Policy Agenda (Government of Kenya, 2008). These two documents are the country's response to dealing with five key development issues, namely rapid economic growth, employment and balanced wealth creation, poverty alleviation, meaningful youth engagement, and a vigorous pursuit of regional equity in all its manifestations. Nairobi Metro 2030 is the Nairobi Metropolitan Region's (NMRs) statement that aims to grow and develop the city of Nairobi into a world class African region that is able to create sustainable wealth and offer a high quality of life for its residents, the people of Kenya, investors and offer an unmatched experience for its esteemed visitors (Government of Kenya, 2008). It is premised on the recognition that there is a close nexus between economic, social, cultural and environmental well being. The mission for the Nairobi Metropolitan Region shall be to build a robust, internationally competitive, dynamic and inclusive economy; develop world class infrastructure to support development; enhance linkages and accessibility to national, regional and global contexts. It will also build a skilled and responsive labour force; integrate metropolitan local authorities to be responsive to resident, visitor and investor needs; create a sustainable world class living and working environment; build a unique place in the region and the world; and enhance implementation capacity in the metropolitan region. Thus, in 2030 the NMR will be a world-class business setting, recognized nationally, regionally and globally as a centre of business excellence. It will provide an economy built

around its strengths of finance, trade and business services; the knowledge economy; tourism; human resource development as well as sports and leisure (Government of Kenya, 2008).

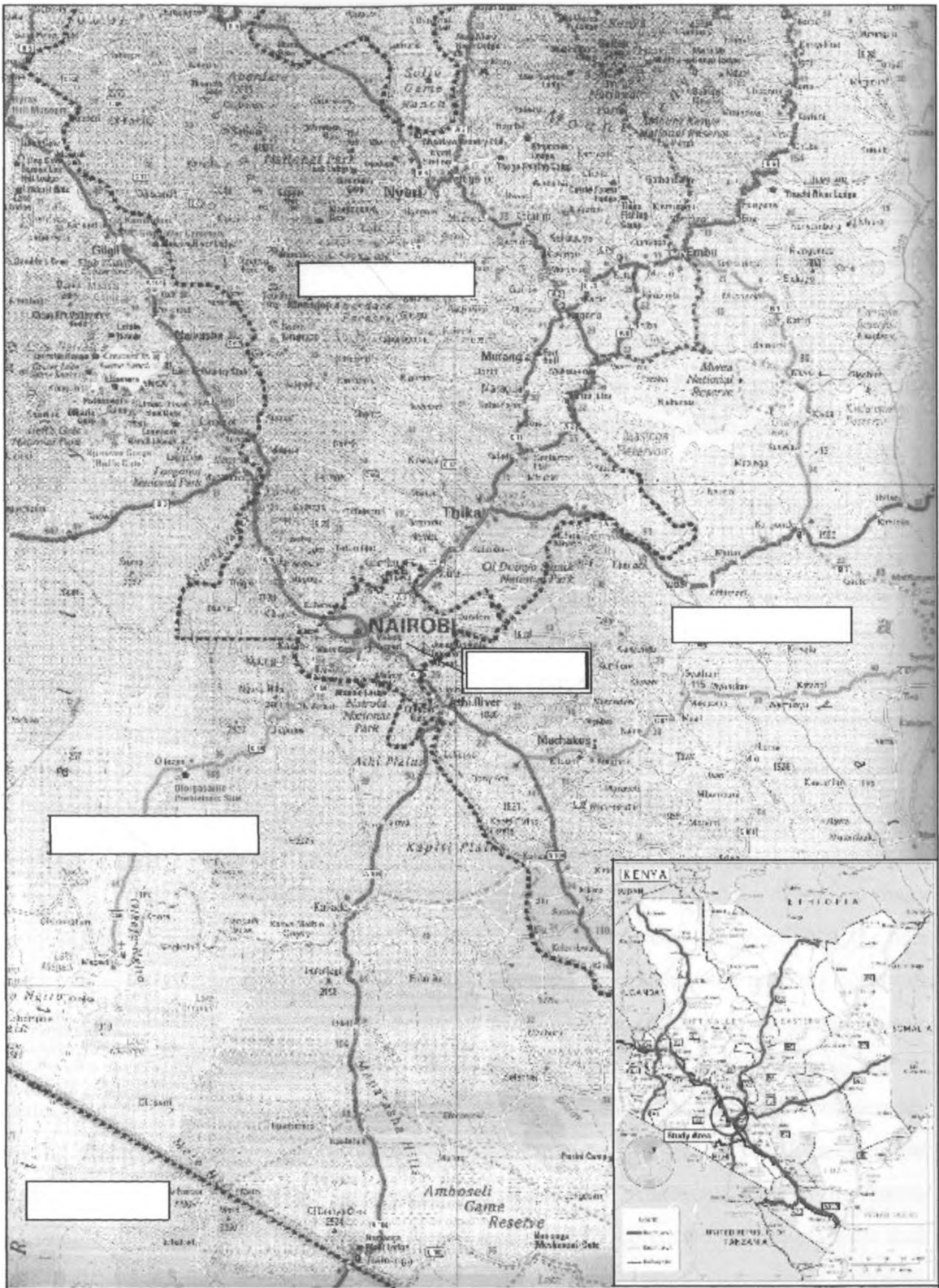


Photo 2.1: Nairobi Central Business District

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Photo 2.2: Nairobi Informal Sector and Settlement



Map 2.1: Location Map of Nairobi

CHAPTER THREE

CONCEPT OF SUSTAINABILITY IN THE CONSTRUCTION INDUSTRY

Introduction

In this chapter, the researcher attempts to present the expected outcomes in a manner suitable for empirical investigations. Essentially, the method is to bring out, what one is led to expect from a robust application of sustainable management principles in the construction industry, with particular emphasis to application of Value Management concept throughout the initiation, briefing, design, and implementation of construction process. The chapter opens with an outline of the researcher's conceptual process of sustainability in the construction industry, as the researcher undertakes a more in-depth, step-by-step breakdown of the study.

Concept of Sustainability in the Construction Industry

The meaning of sustainability and sustainable development is evolving over time and commonly the terms are interchanged to broadly describe an approach that addresses the social, economic and environmental challenges mankind faces. Under evolving macro-economic and regulatory conditions, the CRE executive's task is becoming increasingly difficult. Contemporary global problems – significantly higher energy costs, an increased threat of climate change, and depletion of key natural resources, increasing air and water pollution and growing levels of solid waste (Kibert and Grosskopf, 2006) - are shaping aspects of value in construction and these issues are likely to impact further upon the strategic decision-making process. It is widely acknowledged that sustainability has become a key driver of many business decisions, in part being guided by “carrot and stick” forces –, respectively, the halo effect that rewards alignment with popular environmental actions, and the growing corporate accountability movement that compels greater disclosure of environmental impacts (Nelson, 2007). As a consequence, sustainability is no longer a technical or moral issue, but an economic and financial imperative. There is increasing evidence that corporate occupiers are seeking premises with enhanced environmental performance and greater social amenity and prepared to pay a premium for such space (Breslau, 2007). Additionally there are further sustainable dimensions that can be beneficially exploited by corporate entities through their CSR and SRI profiles, issues that external stakeholders are taking increasingly seriously. Accordingly, Construction Industry executives and stakeholders need to be fully aware of the possible impact to the business of their strategic and tactical construction decisions.

There is compelling evidence linking current planning, design, construction and property management practices to the over-exploitation of the natural environment economic and social mal-practices (Zainul & Pasquire, 2003). An obvious environmental case in point is the on-going depletion of non-renewable resources worldwide. As the world faces larger environmental crises, it is no longer merely politically pragmatic but absolutely essential to address these problems in the built environment. Many governments have become signatories to international treaties and protocols regarding issues such as carbon emission, greenhouse gas and natural resource depletion. A new management concept taking shape, of involving stakeholders to increase the value of the end product of the construction process, is that of value management. Value management, VM, ensures that all stakeholders' opinions and concerns are factored in at all stages of the construction process; during planning, designing and management of the process. As such through value management, optimal, value adding decisions that capture sustainable concerns are subtly made.

Sustainability through Value Management

The focus on sustainability in UK construction projects is increasing and its contribution towards improving value is becoming visible. The industry and its customers are broadening their interpretation of value, and beginning to appreciate the subjective nature of it by adding concerns surrounding environment and society (Thomson *et al.*, 2003). The Institute of Value Management (2002) states that the concept of value relies on the relationship between the satisfaction of many differing needs and the resources used in doing so. The differing needs are likely to include aspects such as high quality, good indoor environment, durability, cheaper to maintain, user friendly etc. These needs are all part of sustainability objectives. Sustainability promotes a balanced approach by taking account of the need to continue in business, but does not seek profitability at the expense of the environment or society's needs (MaSC, 2002). Sustainability concerns protecting environmental quality, enhancing social prosperity and improving economic performance (Addis and Talbot, 2001). There is an important distinction between sustainability and sustainable construction. Sustainable construction is a process whereby, over time, sustainability is achieved (Parkin, 2000). As a value enhancement technique, VM should integrate the issues of sustainability as they affect the quality of the over time outcome.

Integrating Sustainability with Value Management

VM is a structured approach to establishing what value means to a client in meeting a perceived need by clearly defining and agreeing the project objectives and establishing how they can best be achieved (Construction Industry Board, 1997). In VM, although clients tend to put pressure on cost reduction, their vision would still be the same, i.e. value for money, better quality, profitability and positive business image. In rendering a service designed to improve the value of a project, VM considers various issues before proposing the best solution to clients. Sustainability issues should be included as they affect the quality of the outcome. This opinion, however, has not been widely expressed in the literature.

VM practitioners have opportunities to minimize environmental and social damage through recommending suitable site location, selecting sustainable materials, determining elements or theme of design and choice of construction. Committing to sustainability during VM could lead to the vision of generating good economic return whilst delivering accountability and excellence in our social and environmental performance. The basic premise of this concept is to absorb sustainability elements, blending in the issues throughout the VM process to help reduce the conflicting terms of cost and sustainability when designing. Solutions would be proposed to best match the client's economic needs without neglecting environmental and social needs. The idea behind integrating VM with sustainability is to put this concern at the forefront of VM thinking and along its activities. Sustainability should not be seen as an “add on” to VM requirements but truly integrated into all facets of planning and design. The emphasis that participants in Value Management Workshops place on sustainability issues would determine the sustainability “content” within the workshops.

Theoretically, consideration of sustainability within VM should not change the generic process of VM as it only affects the scope and focus of study. VM practitioners need to widen and apply their sustainability knowledge when defining functions, generating ideas and developing proposals. At pre-workshops of Value Management practitioners, the facilitators should present the importance of sustainability consideration to the clients to secure commitment for it. Having identified sustainability as part of the project's objectives, they would be made explicit to all team members and included during function analysis stage. Ideas generated during creativity phases are evaluated against the defined functions and objectives. The proposals are then developed and presented to the decision makers, highlighting the estimated cost savings and the features that protect the environmental and social interest and

provide long-term economic return. It is important to acknowledge the existence of certain boundaries, which limit the influence that VM can have on the vision of sustainability such as time constraints and a preset scope and interest of study, which vary according to the project and the different timing of VM practices. The strategy and action taken to uphold this idea of integration must account for these boundaries

The Strengths of Value Management for Sustainability

Sustainability concern should be effectively managed as early as possible in the project process to secure commitment for it. In the United Kingdom, VM workshops are conducted at pre-brief, briefing, outline and final sketch design and pre-construction stage (Connaughton and Green, 1996). Hence, the strategic timing of VM creates an opportunity to include sustainability early in the project where its impact will be greatest (Zainul Abidin and Pasquire, 2003). The series of workshops ensures the sustainability agenda does not dissipate as the project becomes more complex. The VM process is systematic as it uses a structured job plan that guides the team through problem seeking and solving in a co-ordinated manner (Woodhead and Downs, 2001). This effective job plan could ensure that sustainability issues are thoroughly considered and appropriately included before forwarding any VM proposals. Phillips (1999) stated that VM process can be adapted and applied to align stakeholder views and to develop jointly acceptable strategies for moving towards agreed, long term, sustainable solutions. Through its tools and techniques, VM offers a means for the client to contribute to a better built environment and the opportunity to stimulate improvements in the construction process (Hayles, 2004). The view that sustainability adds cost hinders acceptance of this concept. The acceptance would be accelerated by demonstrating that it can be economically viable. VM has an abundance of techniques that are used to achieve the best solution to satisfy the client's needs at the lowest cost possible. With the VM capability for eliminating unnecessary cost, it is possible that sustainability could be upheld without unnecessary cost increase, thus demonstrating that sustainability can be economically viable.

There are three types of participants in VM workshops namely decision makers (clients or clients' representatives), facilitators and team members (Pasquire and Maruo, 2001). Each role can contribute positively towards the integration of sustainability. Leung and Liu (1998) confirmed that project goals affect the VM participants' behaviour and the final outcome. Thus, if clients include sustainability as part of their objectives, the whole process of VM would be directed towards it. The interaction between clients and VM facilitators at the pre-

workshop stage raises the opportunity to encourage client's commitment for sustainability. Dallas (1999) stated that the facilitators should take lead on advising sustainability to the clients. The facilitator can relay clients' needs, which should include the need for sustainability, to all team members and ensure that the demand is upheld throughout the decision-making. The skill-mixed will work in unity to achieve what has been targeted. Fong (2003) highlighted the strength of VM as an effective knowledge creation and transfer tool. By gathering the participants in one place and at the same time, the process of giving and absorbing information is faster and more effective. The knowledge and importance of sustainability can be planted in the participants' mind, which can later be diffused further in future projects or workshops.

CHAPTER FOUR

RESEARCH METHODOLOGY

Introduction

This section discusses the methodology that will be used in acquiring and synthesizing the study data. The elements discussed are; research design, target population, sample and sampling technique, research instruments, sources of data, validity, reliability, data collection procedures and techniques.

Research Design

The study will use the descriptive survey research design. Descriptive research shall seek to collecting data in order to answer questions concerning the current status of the subject in the study. A survey on the other hand shall attempt to collect data from members of a population in order to determine the current status of that population with respect to one or more variables (Mugenda, 2003).

According to Mugenda (2003), descriptive research determines and report the way things are including answering the question of what is going on which is an important aspect to consider in answering the questions concerning the current status of the subject of the study, and identify the role and purpose of the research. The researcher explores the real issue affecting the dependent variable in the background of the research study; these being economic, environmental and social factors affecting the construction industry towards achieving holistic sustainability in the county of Nairobi. The survey research on the other hand shall explore characteristics of both independent and dependent variable, mainly construction industry and economic sustainability, construction industry and environmental sustainability, and construction industry and social sustainability, in order to gain a greater and deeper understanding of the variables under study. The survey research shall also seeks to collect data from members of a population in order to determine the current status of that population with respect to one or more variables, since the research is concerned with identifying the effectiveness of regulatory framework in the real estate and construction industry in promoting sustainability. The researcher shall uses information gathered from the survey to generalize findings from a drawn sample back to a population, within the limits of random error.

Target Population

The population of this study shall be all the regulatory bodies and professional associations that govern the work of Land Surveyors, Project Managers, Architects and designers, Quantity Surveyors, Engineers, Contractors / Builders, Estate and marketing agents and Facility Managers in Nairobi County. These are Board of Registration of Architects and Quantity Surveyors (BORAQS), Architectural Association of Kenya (AAK), Institute of Quantity Surveyor of Kenya (IQSK), The Ministry of Public Works (MoPW), National Environmental Management Authority (NEMA) and Nairobi City Council (NCC). The study will target 10 members of each of these bodies and associations. The total number of group members thus is 60; this will form the target population of the study. Other statutes including the Factory Acts, The Local Government Act, the Building Code, Occupiers Liability, Sectional Properties Act, Estate Agents Act, Landlord and Tenant Act and other acts of parliaments governing real estate and construction industry are assumed to be administered and falling under the six major regulatory bodies mentioned above and as mentioned in Chapter 1 of this research study.

Sampling Procedures

Sampling is a procedure, where in a fraction of the data is taken from a large set of data, and the inference drawn from the sample is extended to whole group. The study will use the probability sampling technique; this is because probability samples are the only type of samples where the results can be generalized from the sample to the population. In addition probability samples allow the researcher to calculate the precision of the estimates obtained from the sample and to specify the sampling error. A properly designed probability sample, also, provides a reliable means of inferring information about a population without examining every member or element. A probability sample frequently is more accurate than a census of the entire population. The smaller sampling operation lends itself to the application of more rigorous controls, thus ensuring better accuracy. These rigorous controls allow the researcher to reduce non-sampling errors such as interviewer bias and mistakes, non-response problems, questionnaire design flaws, and data processing and analysis errors.

(Miaoulis and Michener, 1976) acknowledge in addition to determining the purpose of the study and population size, three criteria usually will need to be specified to determine the appropriate sample size: the level of precision, the level of confidence or risk, and the degree of variability in the attributes being measured. The degree of variability in the attributes being

measured refers to the distribution of attributes in the population. The more heterogeneous a population, the larger the sample size required to obtain a given level of precision. The less variable (more homogeneous) a population, the smaller the sample size because a proportion of .50 indicates the maximum variability in a population, it is often used and will be used in determining a more conservative sample size of this study, that is:

$$no = \frac{(t)^2 * (p) (q)}{(d)^2}$$

$$no = \frac{(1.96)^2 (.5) (.5)}{(.05)^2} = 384$$

The above formulae is adopted from Cochran (1977). However, since this sample size is less than the size of the population, Cochran's (1977) correction formula should be used to calculate the final sample size. These calculations are as follows;

$$n1 = \frac{no}{(1 + no / Population)}$$

$$n1 = \frac{(384)}{(1 + 384/60)} = 52$$

Table 4.1: Sampling Frame

Sampling Unit	Population	Percent (%)	Sample
Members of regulatory bodies and Associations	60	100	60
Total	60		

Data Collection Methods and Instruments

There will be two types of data that the researcher will use in the study. These are the primary data and the secondary data. The data will be both qualitative and quantitative. Qualitative data will seek to describe the qualities and characteristics of the subjects of the study. Quantitative data in form of figures will be used to show trends of the subjects of the study. For primary data, the researcher intends to collect first hand information from the members of the regulatory and professional bodies. The researcher shall use the questionnaire as data collection instrument to collect the primary data from the respondents. The primary data shall be efficient to the research because it is reliable and accurate. The secondary data shall also be very important in the study. The researcher shall collect important and relevant information from the library books, performance reports from the relevant Ministries governing construction, journals and publications from research institutions.

The researcher will personally administer the questionnaires to the respondents with the help of research assistants. This method is preferred as it shall allow for the researcher to seek clarification on various issues. The main research instrument to be used in the study will be the questionnaire. The questionnaires will be addressed to the respondents who in this study are members of professional associations and regulatory bodies governing the real estate and construction industries. Interviews will consist of oral questions by the interviewer and oral responses by the members of these bodies. The interviews will be conducted with the help of an interview guide.

Sources of Research Data

In order to achieve the research objective and answer the research questions, the research shall focus on the following sources of data to generate the findings of the study:

- 1.) **Secondary Data:** The researcher shall gather and analyzed in detail the large body of academic research on both independent and dependent variables of the research study; mainly the construction industry and economic sustainability, construction industry and environmental sustainability, construction industry and social sustainability and the general concept of sustainability.

The researcher shall also analyze the literature on social-economics and environmental parameters of the County of Nairobi, including literature on what constitutes “effective” regulatory framework as a measurement variable. The researcher shall also review, to the extent possible given the time constraints, the various regulatory framework governing construction activities in the County of Nairobi.

- 2.) **Primary Data:** The researcher shall use questionnaires to collect first hand information from the respondents who are representatives of the members of various regulatory bodies as data collection instrument to collect the primary data from the respondents. The researcher shall administer the questionnaire to the respondents with the help of a research assistant.

Validity of the Study and Research Instruments

Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are. It is also the degree to which results obtained from the analysis of the data actually represent the phenomenon under study. Prior to the using of the questionnaires to collect data, the questionnaire will be tested by conducting a pilot survey on 10 construction and real estate professionals who are not part of our sample to ascertain its content validity. The pilot study will be carried out to check the appropriateness of the language used in the questionnaire as well as determining the difficulty of the items in the instruments. The researcher will then make the necessary modifications of the tools thus improving the level of the instruments’ validity.

Assumptions of the Study

Assumptions are things that are somewhat out of the researcher's control. They are also statements by the researcher that certain elements of the research are understood to be true. A few assumptions have been made in the study research about the theory under investigation, the research instrument, the research methodology, the participants in the study, and the results of the study. First, the study is guided by the assumptions that all ethical considerations have been adhered and the findings of the study will not be harmful. An assumption has also been made that the sample is representative of the population and that the data collection instrument has validity and is measuring the desired constructs. The researcher also assumes that the respondents will answer the questions correctly and truthfully.

On the theory under investigation, the minor regulatory bodies and statutes in the Kenya construction industry which including the Factory Acts, The Local Government Act, the Building Code, Occupiers Liability, Sectional Properties Act, Estate Agents Act, Landlord and Tenant Act and other acts of parliaments governing real estate and construction industry are assumed to be administered and falling under the six major regulatory bodies that form the target population of the research study.

Reliability of the Research findings

Reliability is the extent to which results are consistent over time and an accurate representation of the total population under study. The data is to be collected using well tested and accepted procedures which have and can yield consistent data if used on similar studies. The test retest method will be used to ascertain the reliability. Test-retest measures consistency from one time to the next through administering the same instrument twice to the same group of subjects. In the piloting, the research instrument was given twice to the same group of people. The results were consistent as the scores should be similar thus the questionnaire was found to be reliable.

Data Analysis Techniques

This study will use the quantitative and qualitative method of data analysis. To ensure easy analysis, the questionnaire will be coded according to each variable of the study to ensure the margin of error is minimized to assure accuracy during analysis. Data will be analyzed using univariate analysis. Univariate analysis involves the examination across cases of one variable at a time. In Univariate analysis there are three major characteristics of a single

variable that are looked at. These are the distribution, the central tendency and the dispersion. The measures of distribution will be largely utilized in the study. This will include frequency and percentages. The analysis will be done with the help of Statistical Package for Social Sciences (SPSS) software program. Data will be coded in and this will be used to generate frequencies such as mean scores and percentages. These will be presented using tables and pie charts to give a clear picture of the research findings at a glance. This will be enhanced by offering a narrative explanation.

Chapter Summary

The chapter started by outlining the research design, the survey method was selected because the study focuses more than one case in the population. The target population was defined as all professionals working under professional and regulatory bodies that govern the construction and real estate industry in Nairobi County and government agencies regulating the industry. The population was divided into strata from which a sample size was selected. The chapter then proceeded to outline the procedure for data collection and outlined the method for data analysis.

The next chapter present the results and findings of the survey in order of the specific problem as stated in the problem statement in chapter one. Data collected is also analyzed quantitatively and qualitatively as per the level of measurements and number of dimensions and variables of the study. Data is also interpreted to establish interconnection between and among variables, checking for indicators whether objectives have been met or not, research questions answered or not by the findings, including establishing the link between the present findings and the previous literature.

CHAPTER FIVE

DATA ANALYSIS AND PRESENTATION

Introduction

This chapter presents the analysis of the data collected from officers of regulatory authorities governing the built environment in Kenya. The data was interpreted according to the research questions and the results presented. The analysis and findings are summarized into tables using percentages and frequencies.

Results and Discussions

The findings and data analysis of the study are outlined in this section. The discussions capture the outcomes based on the questions of the study and research objectives that were focused on by the study.

Response rate

The researcher administered questionnaires to the respondents. The questionnaires were both served in person and electronically. Secondary data was also obtained from various publications of the targeted agencies. The overall response rate from the officers of the various regulatory authorities was as tabulated below in table 4.1.

Table 5.1: Overall response rate

INSTITUTION	Total From Sample Size	Responses	% of responses from Sample Size
BORAQS	10	4	40
AAK	10	9	90
IQSK	10	8	80
MoPW	10	7	70
NEMA	10	7	70
NCC	10	8	80
Total	60	43	70

Table 4.1 (Questionnaire Code 001 – 060, administered between, 2nd February and 11th March, 2012)

Economic Sustainability

Training on Economic Sustainability

The researcher wanted to find out what courses on economic sustainability members of the regulatory institutions were required to take. Courses on worker productivity and energy cost management were listed as most required by 82% and 78% of the respondents respectively. Courses on cost of capital and return on investment were listed as the least required by 42% and 35% of the respondents respectively.

Table 5.2: Response rate on Economic Sustainability

Training on Economic Sustainability	Frequency	Percentage %
Return on Investment	21	35%
Cost of Capital	25	42%
Worker Productivity	50	82%
Energy Cost Management	47	78%
Average Response Rate		60%

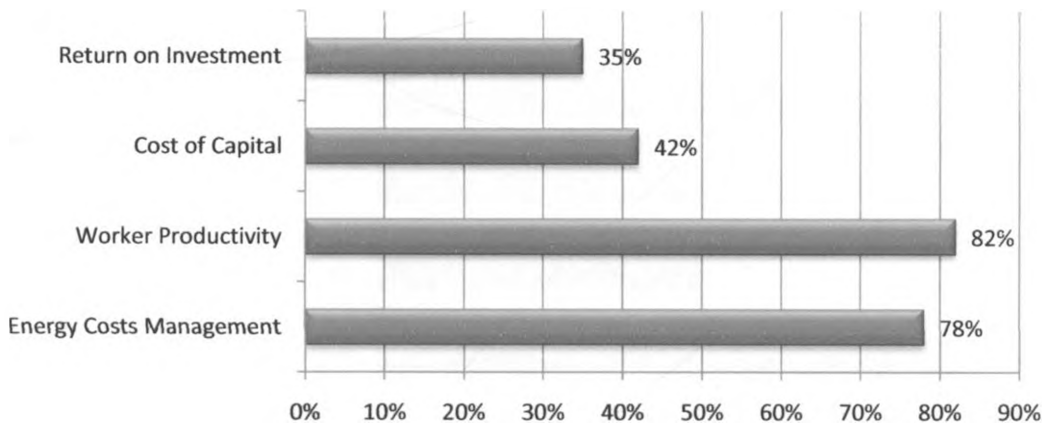


Figure 5.1 Training on Economic Sustainability

Environmental Sustainability

Training on Environmental Sustainability

The researcher wanted to find out what trainings on environmental sustainability are more common in the institutions regulating the Built Environment. Eighty two per cent of the respondents asserted that they were required to take trainings on waste management while 75% of the respondents offered they were required to attend trainings on environmental law. Sixty three per cent of the respondents attested they were required to take courses on environmental impact assessment while only 45% were required to take trainings on urban ecology.

Table 5.3: Response rate on Environmental Sustainability

Training on Environmental Sustainability	Frequency	Percentage %
Environmental Law	45	75%
Environmental Impact Assessment	38	63%
Urban Ecology	27	45%
Waste Management	49	82%
Average Response Rate		66%

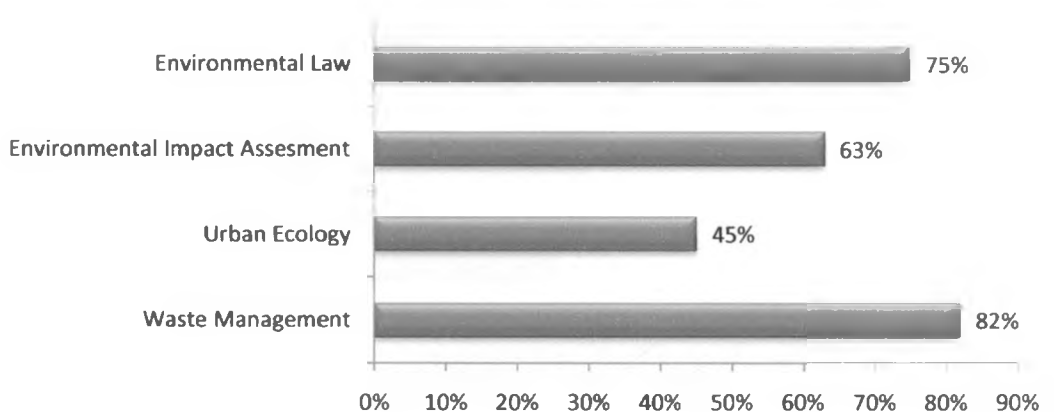


Figure 5.2: Training on Environmental Sustainability

Social Cultural Sustainability

Training on Socio Cultural Sustainability

The researcher wanted to find out what courses on socio-cultural sustainability the respondents are required to take. It was revealed that 62% of the respondents were required to be apt on labour laws while 53% on urbanization. Surprisingly only 30% of the respondents said they were required to take courses on demographic statistics. Social justice was revealed to be the least required course with only 20% listing it as a course they were required to take.

Table 5.4: Response rate on Social Cultural Sustainability

Training on Social Cultural Sustainability	Frequency	Percentage %
Social Justice	12	75%
Labour Laws	37	62%
Demographic Statistics	18	30%
Conflict Resolution	16	27%
Urbanizations	32	53%
Average Response Rate		53%

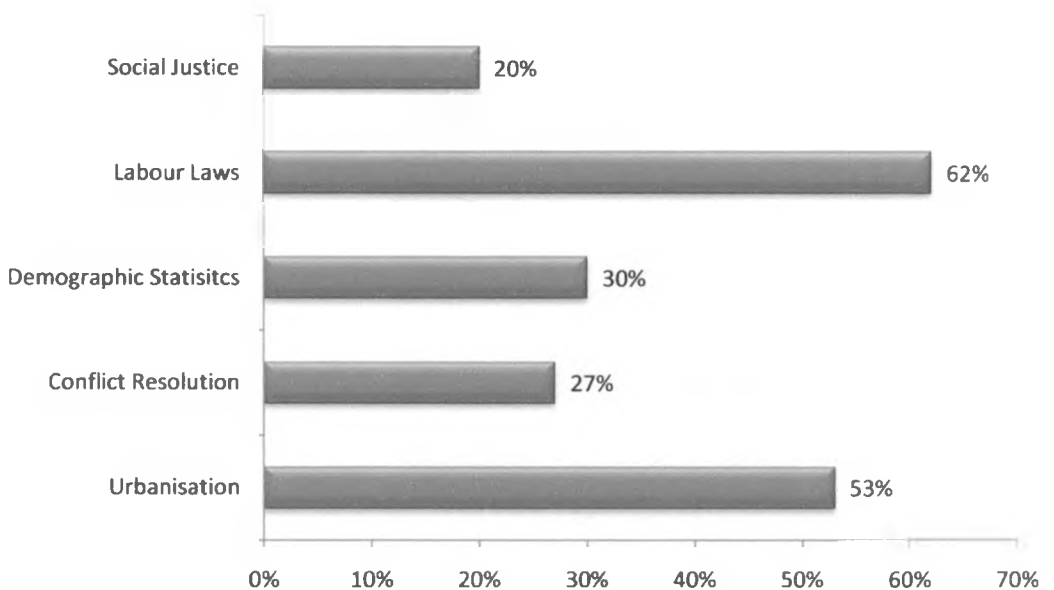


Figure 5.3: Training on Socio Cultural Sustainability

Local Sustainability Programs Relating to Community Service within the Institution

The researcher wanted to find out what local sustainability programs relating to community service existed within the regulatory institutions. Organizing seminars for stakeholders was found to be the most common community project conducted by these institutions with 84% of the respondents holding this position. Offering job internships to students and doing social work for the needy, were the second and third most common community projects conducted by these institutions, this position was held by 66% and 52% of the respondents. The least common community project by the regulatory bodies is the construction of workshops for local labourers.

Table 5.5: Response rate on local sustainability programs relating to community service

Local Sustainability Programs to Community.	Frequency	Percentage %
Tree Planting	28	46%
Social Work for the Needy	60	52%
Construction Workshop for Local Labourers	25	42%
Organization seminars for stakeholders	50	84%
Job Internship for Students	40	66%
Average Response Rate		58%

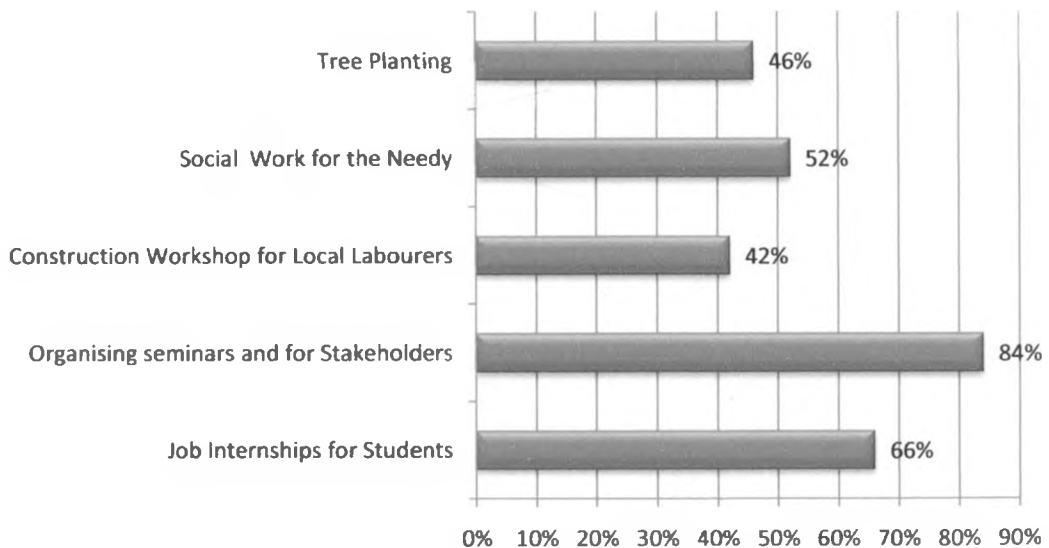


Figure 5.4: Sustainability Programs Relating to Community Service

Capacity of Regulatory Framework in Promoting Economic, Environmental and Social Sustainability

Courses Offered on Sustainability Related Topics

The researcher wanted to find out what topics relating to sustainability were offered by the various institutions to their staff. The study revealed that topics on environmental policy and management were the most commonly offered across the various institutions. This could be attributed to the fact that the activities of the built environment are mostly kept in check by environmental laws. Topics relating to women and development and social justice were found to be least common across the various regulatory bodies.

Table 5.6: Courses offered on Sustainability Related Topics

	NCC		NEMA		MoPW		IQSK		AAK		BORAQS	
	FQS	%	FQS	%	FQS	%	FQS	%	FQS	%	FQS	%
Environmental Policy	60	100%	60	100%	48	80%	48	80%	54	90%	60	100%
Environmental Philosophy	54	90%	60	100%	45	75%	18	30%	41	68%	45	75%
Urban Ecology	45	75%	60	100%	54	90%	39	65%	45	75%	45	75%
Social Justice	27	45%	35	58%	36	60%	15	25%	15	65%	12	20%
Women & development	30	50%	20	33%	33	55%	21	35%	18	30%	18	30%
Sustainable Production	15	25%	45	75%	41	68%	39	64%	42	70%	39	65%

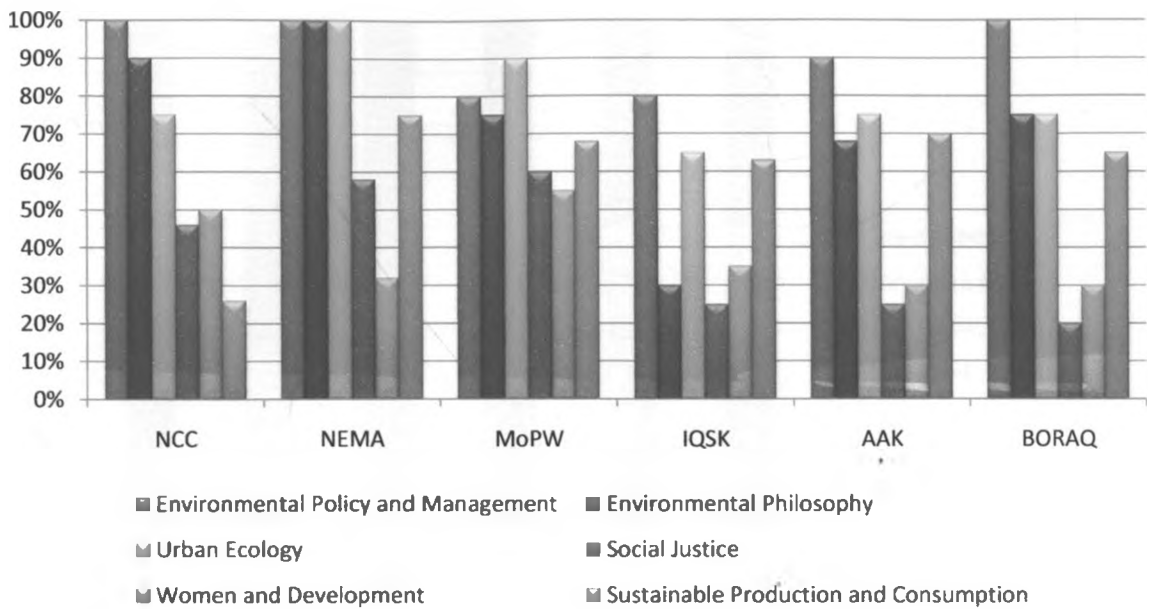


Figure 5.5: Courses on Sustainability

Extent to Which Sustainability is Woven into Organizational Policies

The researcher wanted to find out to what extent sustainability is woven into the institutions' organizational policies. It was revealed that 65% of the respondents from NEMA feel sustainability is woven into their organizational policies to a great extent while only 30% of the respondents from NCC feel this way. Half of the respondents from the MoPW also feel that their organizational policies address sustainability to a great extent while 10% of the MoPW respondents totally disagree, asserting this is not the case at all. On average 70% all the institutions agree at least to a moderate extent that their organizational policies address sustainability.

Table 5.7: Extent to which sustainability is woven into organization policy

	NCC		NEMA		MoPW		IQSK		AAK		BORAQS	
	FQS	%	FQS	%	FQS	%	FQS	%	FQS	%	FQS	%
Great Extent	18	30%	39	65%	30	50%	18	30%	24	40%	24	40%
Moderate Extent	24	40%	15	25%	18	30%	24	40%	24	40%	24	40%
Less Extent	12	20%	6	10%	6	10%	12	20%	6	10%	12	20%
No Extent	6	10%	–	–	6	10%	6	10%	6	10%	–	–

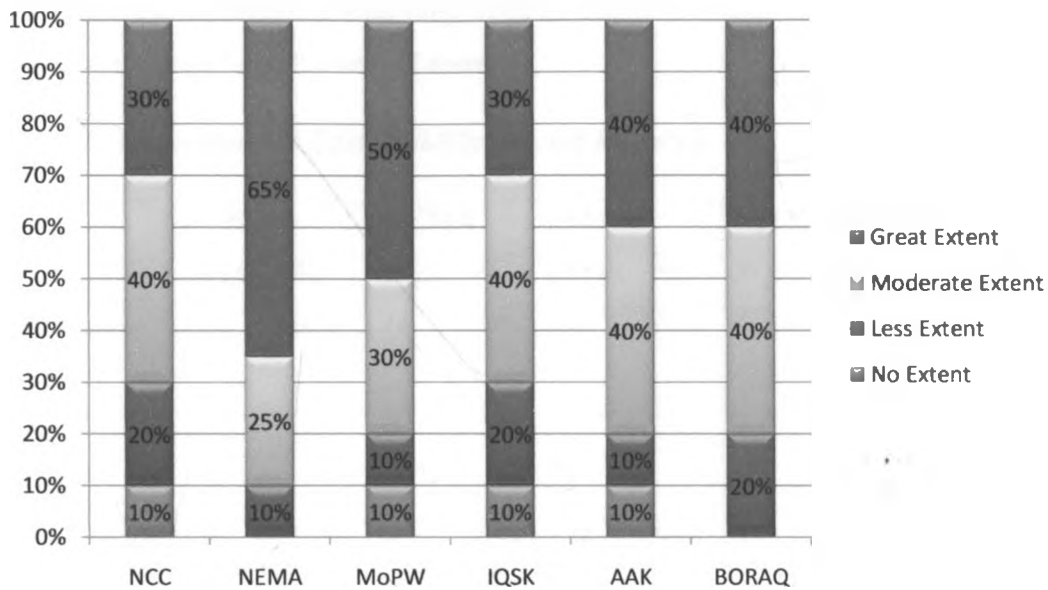


Figure 5.6: Sustainability Woven into Organizational Policies

Involvement in Sustainability Related Research

The researcher wanted to find out in what areas of sustainability the regulatory authorities are involved in research. The NCC was found to be involved in research on sustainability with 75% of the respondents offering it was involved in research concerning sustainable building design. Half of the NCC respondents in the sample offered the institution is involved in research on renewable energy while only 20% offered this was true for research on socially sensitive building technology. All of the respondents from NEMA on the sample said their employer was involved in research on renewable energy while 80% of them offered it was involved in research on socially sensitive building technology. Ninety per cent of the respondents from the MoPW and 80% of the same respondents offered the institution was involved in research on sustainable building design and socially sensitive building technology respectively. Only 40% of the respondents from MoPW said the institution is involved in renewable energy research. Sustainable building design was found to be the most common area of research amongst the professional and regulatory institutions with more than half of the respondents attesting to this. Socially sensitive building technology was also seen to be a common area of research with 60% of the respondents in both the AAK and BORAQ attesting to this. Across the regulatory institutions, ecological economics was seen to be the most

neglected areas of research with only 10% of the respondents from NEMA asserting their institution is involved in this area of research.

Table 5.8: Involvement in Sustainability Related Research

	NCC		NEMA		MoPW		IQSK		AAK		BORAQS	
	FQS	%	FQS	%	FQS	%	FQS	%	FQS	%	FQS	%
Socially Sensitive Building Tech.	12	20%	48	80%	48	80%	12	20%	36	60%	36	60%
Ecological Economics	-	-	6	10%	-	-	-	-	-	-	-	-
Sustainable Design	45	75%	6	10%	54	90%	39	65%	45	75%	45	75%
Renewable energy	30	50%	60	100%	24	40%	15	25%	6	10%	6	10%

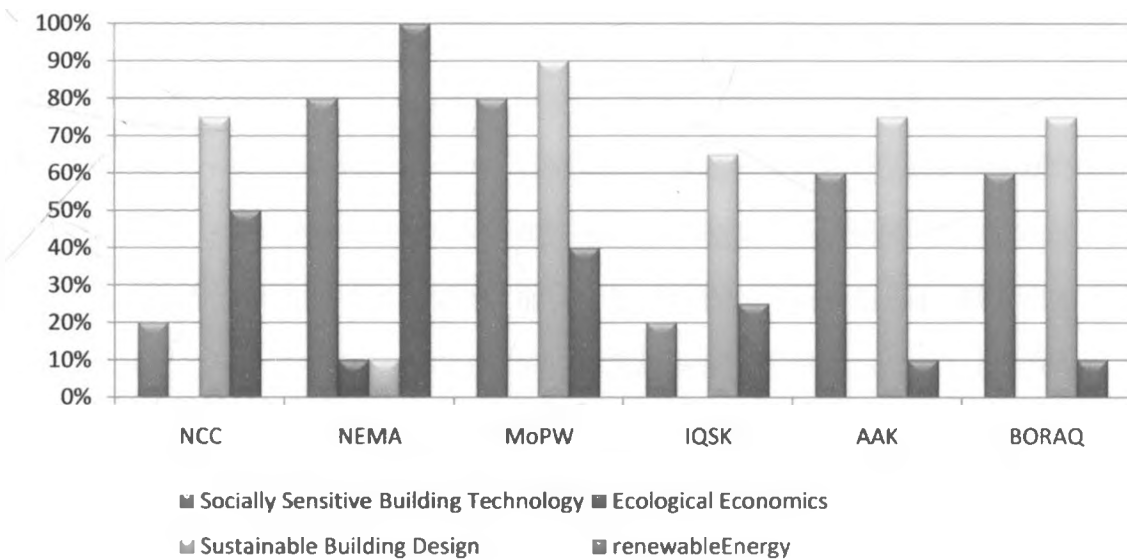


Figure 5.7: Involvement in Sustainability Research

Extent to Which Sustainability Practices are Infused in Prime Project Areas.

The researcher wanted to find out the extent to which sustainability practices are infused in prime project areas conducted by the regulatory institutions in the Kenyan built environment. Water and energy conservation practices were found to be the sustainability practices greatly infused in prime project areas. Waste reduction practices and environmental sustainability assessments were also found to be greatly infused into prime project areas.

Sustainable landscaping and sustainable transportation program were found to be the practices that are sometimes not infused in the execution of prime projects

Table 5.9: Infusion of Sustainability Practices in Prime Project Areas

	Construction based on green principles		Energy Conservation practices		Waste reduction practices		Water conservation Practices		Sustainable Landscape		Environment Sustainable assessment		Sustainable transportation program	
	FQS	%	FQS	%	FQS	%	FQS	%	FQS	%	FQS	%	FQS	%
Great Extent	9	15%	39	65%	34	56%	41	68%	6	10%	33	55%	10	16%
To Some Extent	15	25%	20	33%	13	22%	15	25%	8	13%	20	32%	10	33%
To a Less Extent	45	60%	2	2%	13	22%	5	7%	45	60%	8	13%	23	38%
To No Extent	–	–	–	–	–	–	–	–	6	17%	–	–	8	13%

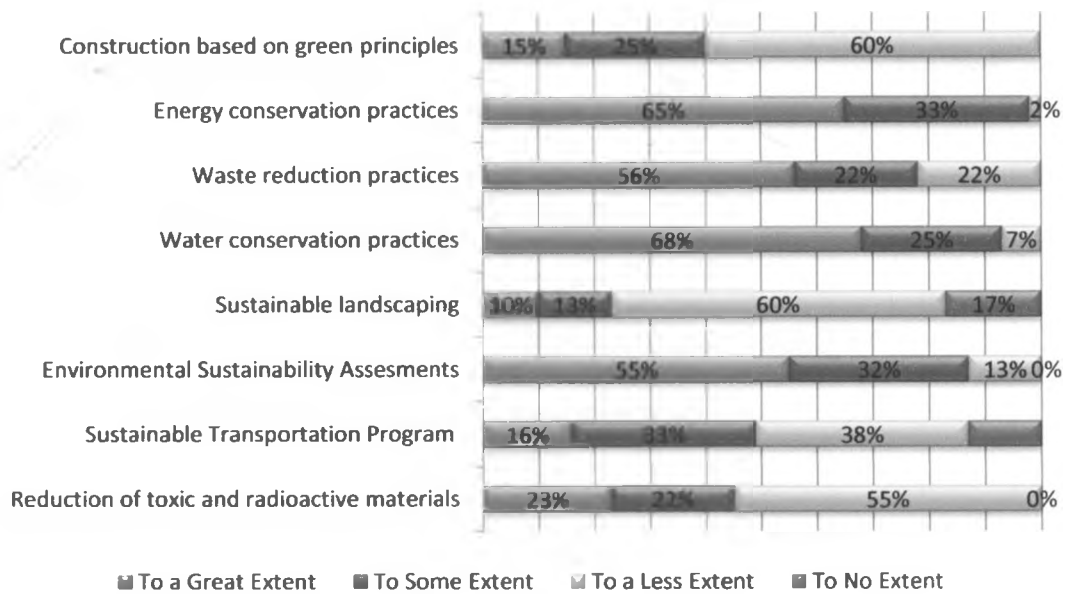


Figure 5.8: Infusing Sustainability Practices into Prime Project Areas

Institutional Commitment to Sustainability

The researcher wanted to find out the commitment of the regulatory institutions towards sustainability across social, economic and environmental fronts. BORAQS was found to be more committed to environmental sustainability than economic and social sustainability, with commitment being least on the social front. The AAK was also found to be more

committed to environmental sustainability than economic and social sustainability, with the commitment being least on the social front. The IQSK was however found to be more committed to economic stability with 65% of the respondents from the institution taking this position. Commitment to sustainability was also least on the social front for the IQSK as well. The MoPW, NEMA and NCC were also found to be more committed to sustainability in the environmental front than on the economic and social fronts. The researcher also noted that commitment to social sustainability was greatest in NEMA and least in BORAQS. The IQSK and AAK were also noted to have the strongest commitment to economic sustainability than any other regulatory body.

Table 5.10: Institution Commitment to Sustainability

	NCC		NEMA		MoPW		IQSK		AAK		BORAQS	
	FQS	%	FQS	%	FQS	%	FQS	%	FQS	%	FQS	%
Socially	15	25%	27	45%	21	35%	24	40%	48	80%	24	40%
Economically	33	55%	39	65%	39	65%	24	40%	24	40%	30	50%
Environmentally	42	70%	48	80%	30	50%	39	65%	60	100%	45	75%

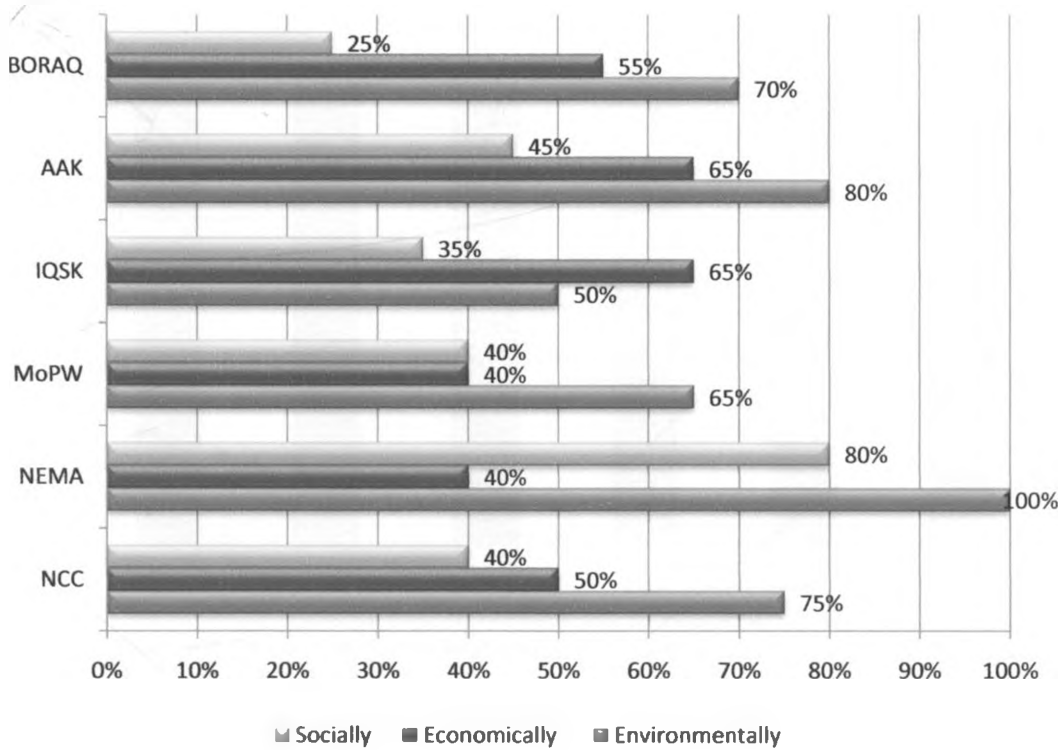


Figure 5.9: Institutional Commitment to Sustainability

Extent of Considering Sustainability Literacy in Recruitment of Staff.

The researcher wanted to find out the extent to which the regulatory institutions consider sustainability literacy in recruitment of their staff. A quarter of the respondents at NEMA and BORAQS offered that they consider literacy on sustainability to a great extent at the recruitment stage. Apart from the MoPW, at least 40% of the respondents in all the other institutions in the study consider literacy on sustainability to a moderate extent when recruiting their staff. On the other hand 30%, 20%, 25% and 20% of respondents from the NCC, NEMA, MoPW and AAK said they do not consider sustainability literacy when recruiting their staff at all.

Table 5.11: Extent of Considering Sustainability Literacy in Recruitment of Staff

	NCC		NEMA		MoPW		IQSK		AAK		BORAQS	
	FQS	%	FQS	%	FQS	%	FQS	%	FQS	%	FQS	%
Great Extent	18	30%	12	20%	15	25%	–	–	12	20%	–	–
Moderate Extent	6	10%	6	10%	24	40%	24	40%	12	20%	15	25%
Less Extent	24	40%	27	45%	15	25%	30	50%	30	50%	30	50%
No Extent	12	20%	15	25%	6	10%	6	10%	6	10%	15	25%

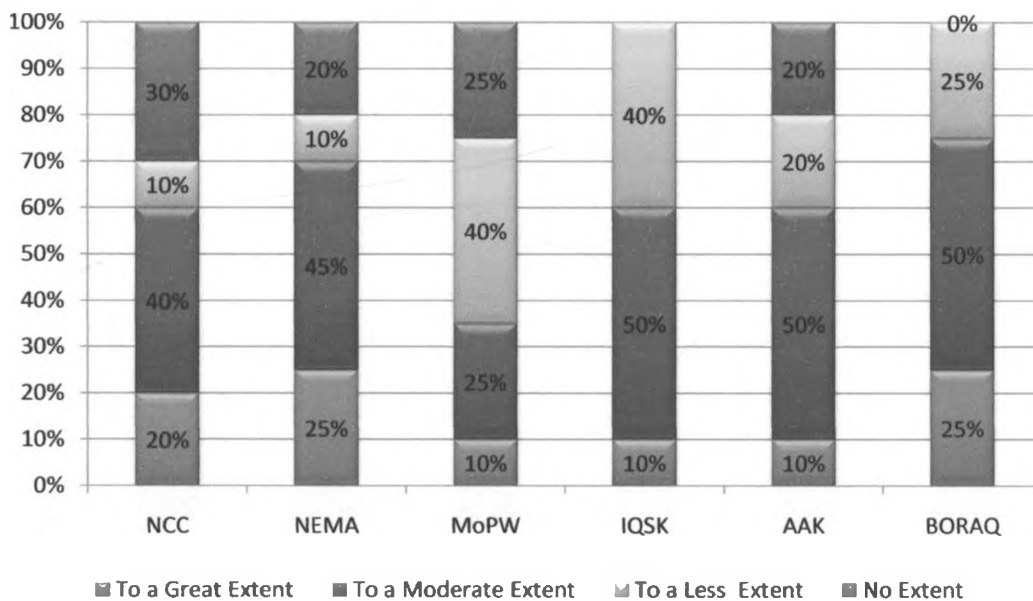


Figure 5.10: Considering Sustainability Literacy in Staff Recruitment

Extent to Which the Institution is involved in Sustainable Development Programs through Partnerships.

The researcher wanted to find out the extent to which the regulatory institutions are involved in sustainable development programs through partnerships. NEMA was found out to be more involved in sustainable development partnerships to a greater extent followed by the MoPW and AAK at 60%, 40% and 30% respectively. On the whole 80% of the respondents across all the institutions seem to be involved in some kind of sustainable development program partnership at least to a less extent. On average 13% of the respondents across all the institutions were of the opinion that no partnerships exist at all on sustainable development programs.

Table 5.12: Involvement of institution in sustainability programs through partnership

	NCC		NEMA		MoPW		IQSK		AAK		BORAQS	
	FQS	%	FQS	%	FQS	%	FQS	%	FQS	%	FQS	%
Great Extent	6	10%	6	10%	6	10%	12	20%	12	20%	6	10%
Moderate Extent	15	25%	6	10%	6	10%	6	10%	6	10%	12	20%
Less Extent	24	40%	12	20%	24	40%	24	40%	24	40%	30	50%
No Extent	12	20%	36	60%	24	40%	12	20%	18	30%	12	20%

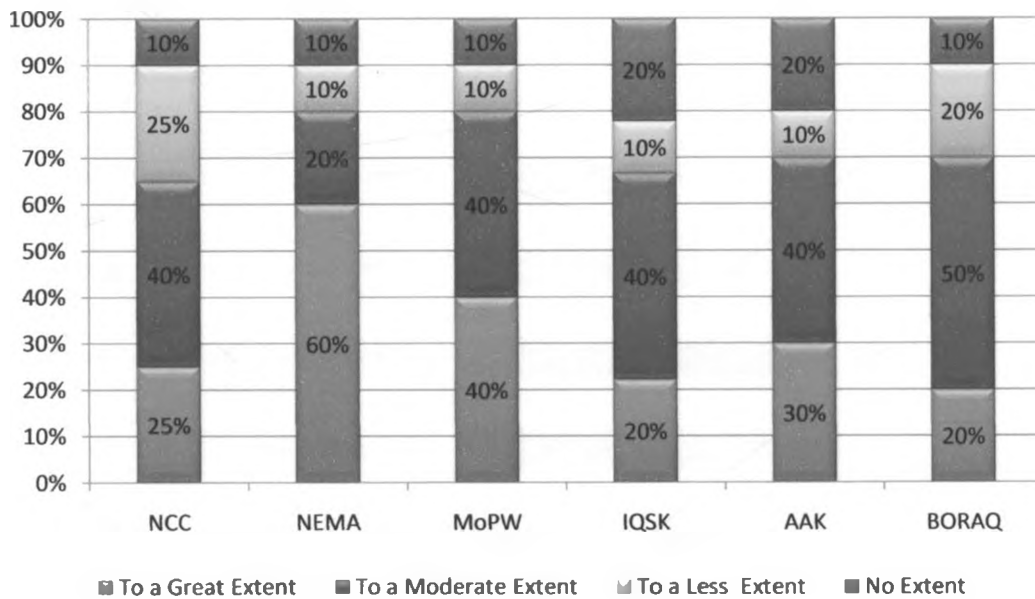


Figure 5.11: Involvement in Sustainable Development Programs through Partnerships

Key Factors Influencing Pursuit of Sustainability Issues.

The researcher was interested in establishing the key factors influencing pursuit of sustainability issues. The study revealed that 72% of the respondents were of the opinion that industry regulations was the key reason most regulatory institutions pursue sustainability issues. Government regulations was listed as the second most common influencer for regulatory bodies to pursue sustainability issues, with 63% of the respondents holding this position. Corporate social responsibility campaigns were given as another reason to this end by 42% of the respondents. Wealth and profit maximization goal and awareness for the need for sustainability were found to be the least common reasons for influencing the pursuit of sustainability issues.

Table 5.13: Response Rate on Factors Influencing Pursuit of Sustainability Issues

Training on Economic Sustainability	Frequency	Percentage %
Awareness on Need for Sustainability	16	26%
Wealth and Profit Maximization Goal	20	33%
Corporate Social Responsibility	31	51%
Company Policy	26	42%
Industrial Regulations	44	72%
Government Regulations	68	63%
Average Response Rate		48%

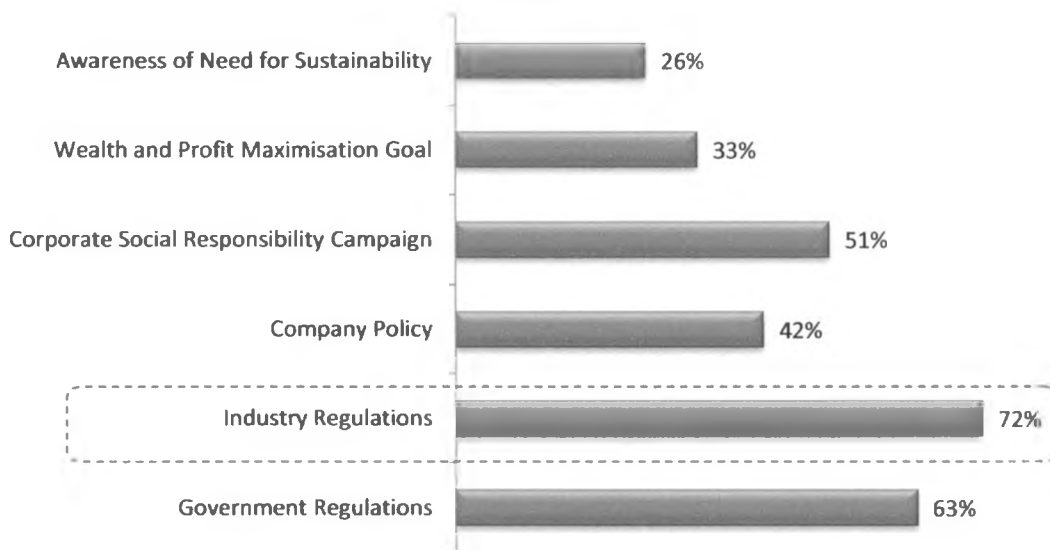


Figure 5.12: Factors Influencing Pursuit of Sustainability Issues

Factors Leading to Resistance or Lack of Responsiveness to Economic, Environmental and Social Sustainability Issues.

The researcher wanted to identify the leading factors causing resistance and lack of responsiveness to sustainability issues. The lack of an accepted industry model for evaluation of sustainability programs was cited as the main factor by 68% of the respondents for resistance to sustainability issues. Sixty one per cent of the respondents cited difficulty in seeing the benefits of pursuing sustainability as a factor causing lack of responsiveness to sustainability issues. Lack of dedicated resources was cited by 56% of the respondents while lack of follow up and lack of time were cited as the lesser significant factors in causing resistance in the pursuit of sustainability programs by 34% and 22% of the respondents respectively.

Table 5.14: Response Rate on Factors Leading to Resistance to Sustainability Issues

Training on Economic Sustainability	Frequency	Percentage %
Lack of follow up	21	34%
Lack of time	14	22%
Difficulty in seeing benefits of Sustainability	37	61%
Human / Organization Resistance	30	49%
Lack of Accepted Industrial Model for evaluation	41	68%
Lack of dedicated resources	34	56%
Lack of familiarity with techniques	26	42%
Average Response Rate		48%

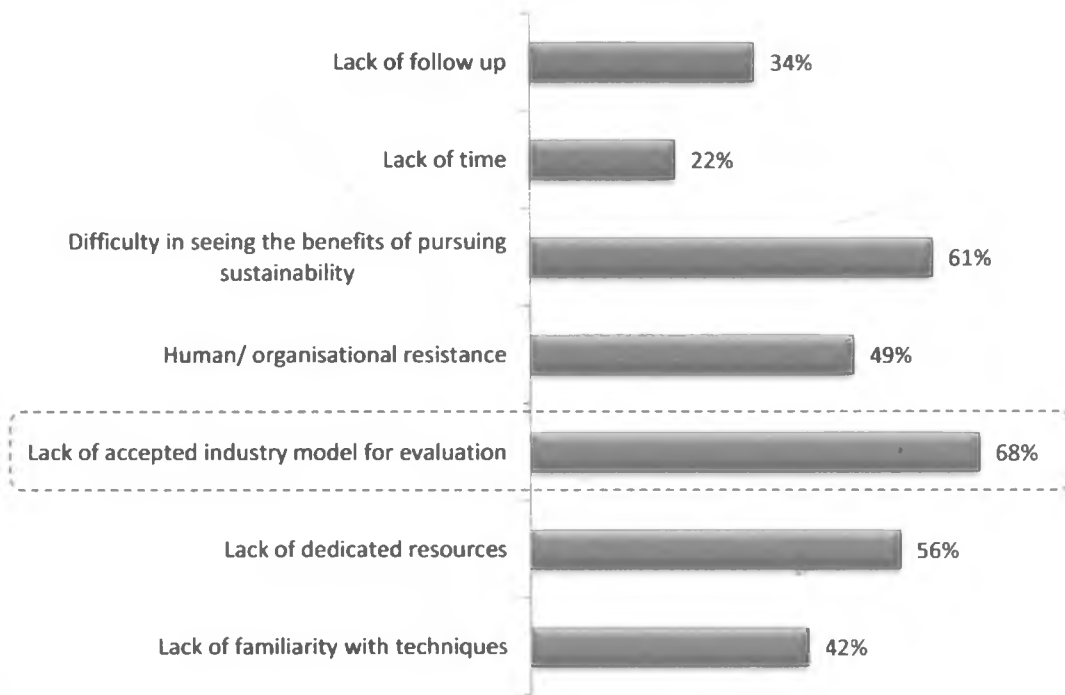


Figure 5.13: Factors Causing Resistance to Sustainability Issues.

Extent to Which Regulatory Framework Is Effective in promoting sustainability

The study also sought to find out the extent to which existing regulatory framework is effective in promoting the three forms of sustainability. A five point likert scale was used. A rating of “Very Effective” had a score of 5 assigned to it; “Slightly Effective” was assigned a score of 4; “Neutral” was assigned a score of 3; “Slightly Ineffective” had a score of 2 assigned to it; “Very Ineffective” was assigned a score of 1. A weighted mean score was used to interpret the results. A mean score of 5-3.5 was taken to mean that the regulatory framework was effective in promoting stated sustainability. A mean score of 3.4 to 2.6 was taken to mean mixed reactions from the respondents and lack of clarity on effectiveness of regulatory framework in promoting sustainability. A mean score of 2.5 to 1 was taken to mean the regulatory framework was not effective in promoting stated sustainability. The results are presented in table 4.13.

Table 5.15: Effectiveness of Regulatory Framework in Promoting Sustainability

Nature of sustainability	Very Ineffective	Slightly Ineffective	Neutral	Slightly Effective	Very Effective	Mean Score
	1	2	3	4	5	
Economic	2	4	2	33	19	4.05
Environment	1	4	3	39	13	3.98
Social	9	14	3	23	11	3.22

The results show that regulatory framework were effective in promoting economic and environmental sustainability as shown by a mean score of 4.05 and 3.98 respectively. The results however do not give a clear picture on the effectiveness of regulatory framework in promoting social sustainability as a mean score of 3.22 was obtained.

Regression on Effectiveness of Regulatory Framework on Sustainability

Table 4.13 shows the results for the regression analysis to determine the effectiveness of regulatory framework in promoting the three forms of sustainability; namely: environmental, economic and social sustainability. The results show that the existing regulatory framework promotes sustainability on the environmental and economic front. As shown, the effectiveness of regulatory framework in promoting environmental and economic sustainability was positive and significant. On the other hand the results show that regulatory framework had an insignificant role in promoting social sustainability. The model explained 46% of the variance in sustainability as shown by the R-squared below.

Table 5.16: Regression Results

Variables	Coef	SE
Social sustainability	0.161	(0.138)
Environmental sustainability	1.153**	(0.452)
Economic sustainability	0.952***	(0.217)
Constant	18.64**	(8.347)
Observations	35	
R-squared	0.460	

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

From the regression results the study thus accepts the hypothesis that “The existing regulatory framework governing the Kenyan construction industry has achieved significant effectiveness in promoting economic sustainability”.

The study also accepts the hypothesis that “The existing regulatory framework governing the Kenyan construction industry has achieved significant effectiveness in promoting environmental sustainability”.

The study however rejects the hypothesis that “The existing regulatory framework governing the Kenyan construction industry has achieved significant effectiveness in promoting social sustainability”

CHAPTER SIX

FINDINGS, DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

Introduction

This chapter presents the summary of the findings, conclusions and recommendations based on the responses from the respondents.

Report on Major Findings

The findings of the research were in accordance to the objectives of the study and are summarized as below:

The first objective of the research was to establish the extent to which existing regulatory framework of the Kenyan construction industry promotes economic sustainability. The findings of the research are that the regulatory framework promotes worker productivity to a very great extent. The regulatory framework is also seen to promote management of energy costs to a great extent. The findings further show that the regulatory framework promotes knowledge of cost of capital to a moderate extent. The regulatory framework also appears keen to promote sustainability through the hard measures of business performance like worker productivity and energy costs reduction. This could be the case because the soft considerations like company culture, comfort and brands are harder to quantify. However for the regulatory framework to fully achieve economic sustainability both soft and hard measures of business performance should be accorded equal importance. Based on the regression results the study thus accepts the hypothesis that “The existing regulatory framework governing the Kenyan construction industry has achieved significant effectiveness in promoting economic sustainability”.

The second objective of the research was to establish the extent to which existing regulatory framework of the Kenyan construction industry promotes environmental sustainability. The findings of the research are that the regulatory framework promotes proper waste management to a great extent. The regulatory framework has only promoted knowledge of environmental law and environmental impact assessment to a moderate extent. The findings further show that the regulatory framework promotes knowledge of cost of capital to a moderate extent. Finally, it has also come out that regulatory framework has not actively promoted inclusion of environmental policy into urban policy. The regulatory frameworks directly concerned with

environmental issues have greater commitment to achieve environmental sustainability than other professional bodies in the framework. Knowledge on environmental policy and management appears to have been greatly disseminated but has not been sufficiently tied to sustainable production and consumption. For environmental sustainability to be achieved environmental laws also need to be effectively implemented. Based on the regression results the study accepts the hypothesis that “The existing regulatory framework governing the Kenyan construction industry has achieved significant effectiveness in promoting environmental sustainability”.

The third objective of the research was to establish the extent to which existing regulatory framework of the Kenyan construction industry promotes social sustainability. The findings of the research are that the regulatory framework pursues and observes labour laws to a moderate extent. The findings further show that regulatory framework champions for social justice to a very small extent. It has also been seen from the findings that the regulatory framework is involved in matters of women and development to a very small extent. The regulatory framework in Kenya’s construction is least involved in sustainability issues on the social front vis-a-vis economic and environmental. This could be attributed to the fact that the social aspects of sustainability have proven harder to measure and are less visible. Be that as it may, even those that are easily visible like socially responsible investments and green building concepts are not earnestly pursued or are ignored altogether. We therefore find that the study rejects the hypothesis that “The existing regulatory framework governing the Kenyan construction industry has achieved significant effectiveness in promoting social sustainability”

The fourth objective of the research was to explore strategies to be used to improve capacity of construction industry’s regulatory frameworks in Kenya in promoting sustainability. The findings give the following as the main strategies to be used to improve capacity of construction industry’s regulatory frameworks in Kenya in promoting sustainability:

- 1.) Increase awareness on need for sustainability within the regulatory frameworks then to stakeholders.
- 2.) Legislative backing through formal articulation of economic, environmental and social sustainability into Kenyan Laws
- 3.) Channeling of more resources towards sustainability

- 4.) Creation of a body to review economic, environmental and social degradation in construction industry.

The regulatory frameworks lack the institutional capacity to properly implement issues relating to sustainability. It is in fact a vague concept to the very people charged with the responsibility of its implementation. Literacy on the concept of sustainability is low and the regulatory frameworks lack the capacity and the resources to pursue most of the goals to this end.

Discussions

The discussions in this research work were done in line with the study objectives. The relationships between the independent variables and the dependent variable were discussed.

Sustainability and the Construction Industry in Kenya

The construction industry is without a doubt a very important sector of the Kenyan economy not only because of its contribution towards GDP but also because it provides the infrastructure that supports other sectors. In the literature review it was noted that the industry has a huge capacity for employment creation and its flexibility in responding to economic adjustments makes it a major contributor to the process of socio economic development. However, as was noted earlier its contribution has been put under scrutiny because its activities have more often than not failed to protect the rudiments of society's resource base. Being the provider and life cycle custodian of the built environment, through its regulatory framework, the industry needs to earnestly pursue sustainability. The research revealed that the regulatory bodies that make up the framework that governs the construction industry offer few courses on sustainability. To compound the problem the courses do not properly link all aspects of sustainability. As indicated in Figure 4.1, courses covering the environment are more commonly offered than those covering social aspects. The construction industry in Kenya has in the past come into conflict with the public through its activities. There have been numerous instances where development has been done on public utilities like playgrounds and parks or waste material disposed in these areas. Additionally, the rampant cases of buildings collapsing killing and maiming workers and members of the public all point to the need for the regulatory framework to pursue a balanced approach to the issue of sustainability.

To achieve this holistically, it is of paramount importance that the regulatory bodies weave sustainability into their organizational policies. This will ensure that issues relating to

sustainability are proactively pursued as opposed to being a consequence of conforming to industry and government regulations. The research however revealed this is not the case with the Kenyan construction regulatory bodies. As indicated in Figure 4.2 only NEMA has sustainability woven into its organizational policies to a great extent. This could be because their core activity is to safeguard the environment and their very existence was necessitated by the need to pursue environmental sustainability. Eighty percent of the respondents in the MoPW were of the opinion that sustainability was weaved into organizational policies at least to a moderate extent. There was no absolute consensus by any regulatory body that indeed sustainability was woven into organizational policy. This could be because, while they may be actually be weaved into policy they are not actively pursued giving the impression of partial or non-existence. As was noted earlier in the literature review, in many global jurisdictions it is the professional bodies with their time-honoured codes of practice and ethical guidelines that provide a regulatory safeguard between the professional practitioner and the role of the state in protecting citizens.

Pursuing Economic Sustainability

As seen earlier from the literature review, companies and institutions that pursue economic sustainability have to offer powerful incentives to clients in terms of quality and are thus perceived to be modern altruistic and dynamic. The pursuit of profit has led most developers to pursue short term profits rather than evaluate the long term consequence of their design and construction decisions. As a result the regulatory framework on the economic front has been seen to focus on cost reduction measures and worker productivity, and direct processes of the construction activity. Consequentially, economic sustainability which aims at creating the highest value from a given set of resources may be compromised. As indicated in Figure 4.5, respondents cited worker productivity and energy costs management as the biggest concerns in terms of training on the economic front. Training on more complex financial issues like ROI and cost of capital are cited as least offered by the regulatory bodies. This is indeed ironical as the construction industry is indeed profit oriented and most construction activity is done with a commercial eye. This could be as a result of the fact that there are very few economists in the composition of these professional bodies and financial consultants appear to be consulted on a need basis to execute the more specialized and complex financial issues.

From the literature review it was noted that value management should be incorporated into the construction process to lock in the value throughout the construction activity. VM

workshops should be conducted at pre-brief, briefing, outline and final sketch design and pre-construction stage. The strategic timing of VM creates an opportunity to include sustainability early in the project where its impact will be greatest. Economically sustainable buildings offer greater value through aspects like energy and water savings, reduced waste, improved indoor environmental quality, greater employee comfort and productivity and reduced absenteeism or sickness. Regulatory bodies in the construction industry in Kenya need to realize that sustainable buildings provide financial benefits that conventional buildings do not. Cost reduction in construction has been misconstrued to mean the avoidance of incorporating sustainable features altogether. However as has been seen in the literature review, sustainable buildings can be built within the cost range of more traditionally constructed buildings. The blind pursuit of profit without wholesome consideration of other aspects of economic sustainability has resulted in low quality, unsafe buildings. The regulatory framework needs to increase their knowledge base on concepts such as value management as they are seen to be critical in the enhancement of economic sustainability. As indicated in Figure 4.8 professional bodies and in particular the IQSK has the greatest institutional commitment in pursuing sustainability on the economic front than any other front. The AAK is equally committed to promoting economic sustainability but seems to promote environmental sustainability more. NEMA and the MoPW were revealed to be least concerned with promoting economic sustainability.

Pursuing Environmental Sustainability

From the literature review it was noted that human activity is putting a lot of strain on the natural functions of Earth that the ability of the planet's ecosystems to sustain future generations is in question. The research revealed that there was greater commitment towards promoting sustainability on the environmental front than on both economic and socio-cultural fronts. As indicated in Figure 4.8 all the regulatory bodies in the framework apart from the IQSK show greater institutional commitment towards environmental sustainability than economic and socio-cultural sustainability. This could be because the enforcing agents of environmental laws with regard to the construction industry, namely NEMA and NCC, have judicial powers to prosecute errant developers. On that coin, NEMA was found out to have absolute institutional commitment to sustainability; this is palpably because its exact mandate is to ensure environmental sustainability. The AAK and the NCC were also found to have very strong commitment towards environmental sustainability. Environmental discourse is high on the global agenda with the UNEP and other international agencies championing this course. So

even though environmental policy in Kenya is largely incoherent, with the UNEP being headquartered in Nairobi a lot of environmental sustainability advocacy is being carried out. This could explain the reason why environmental sustainability is pursued more by the regulatory bodies in Kenya.

The research also revealed that the regulatory bodies offer more courses on environmental sustainability to their staff than on any other area of sustainability. Courses on environmental policy and management, environmental policy and urban ecology were cited by at least 60% of the respondents across all the regulatory bodies as being offered to them. All of the respondents from NEMA and the NCC offered that they had indeed done courses related to the three topics above. NEMA and the NCC being the chief custodians of the environment seem to be taking great effort to educate their employees on environmental sustainability issues. In sharp contrast to this finding it was noted in the literature review that NEMA has not been at the forefront in promoting the use of renewable sources of energy in the construction industry. It was also noted that the level of use of external and renewable energy sources has been low and thus putting pressure on the available natural resources including increase pollution. It would appear therefore that while education and literacy on environmental sustainability is being disseminated, absorption of this knowledge into active policy actual implementation is minimal.

Pursuing Socio- Cultural Sustainability

From the literature review it was noted that the social aspects of sustainability have proven harder to measure and are clearly less visible. The findings of this study as indicated by Figure 4.1 consolidate this assertion. The study showed that courses offered on social issues such as social justice and women and development were not common especially in the professional bodies that make up the regulatory framework. NEMA and NCC were cited by the respondents as offering courses on social issues to a moderate extent. However, as indicated by Figure 4.4 62% of all the respondents in the study cited receiving training on labour laws, while 53% cited receiving training on urbanization. Social issues have been closely associated with environmental issues and from the literature review socially responsible investment are said to be those that line up with an individual's personal values regarding society and the environment. The view tends to support that there is no difference between social sustainability and corporate social responsibility. In that light, the regulatory framework can be said to be quite ineffective in promoting social sustainability, with buildings collapsing on unsuspecting

pedestrians and labourers. Additionally, and as was noted in the literature, the continuing deterioration of Kenya's environment has precipitated a number of hazards that have long-term irreversible damage. Damaged ecosystems and water catchment areas due to deforestation caused by loggers have negatively impacted on the climate causing havoc to many livelihoods. The findings of the study as indicated in Figure 4.8 are a further testament that social sustainability issues fall on the wayside with pursuit of profit and conformance to environmental laws taking centre stage. The study revealed that professional bodies in the regulatory framework have the least institutional commitment towards social sustainability. The study revealed that the environmental watchdog NEMA had the greatest commitment towards social sustainability. This could be because environmental issues are heavily intertwined with social issues. In addition to that, as indicated by Figure 4.10, the study revealed that 60% of the respondents from NEMA are involved in social sustainable programs to a great extent through partnerships as compared to only 30%, 20% and 20% from AAK the IQSK and BORAQS respectively. The study also revealed that on the whole most community social sustainability programs are passive in nature. As indicated in Figure 4.11 84% of the total respondents cited organizing seminars for stakeholders as the most common community service program; organizing job internships for students was cited by 66% of the respondents. Active forms of community service like doing social work for the needy and tree planting were cited by 52% and 46% of the respondents respectively.

Strategies to Improve Regulatory Framework's Capacity to Promote Sustainability

The Kenyan construction industry has been found to lack institutional capacity and resources to effectively implement sustainability programs. The study revealed that there was little regard given to sustainability literacy during staff recruitment. As indicated in Figure 4.9, less than a quarter of all the respondents offered that they were quizzed on knowledge of sustainability during their recruitment. A lack of knowledge on sustainability by its promoters without a doubt adversely affects its pursuit. The research also revealed the main project areas in which sustainability is infused. Energy and water conservation practices and waste reduction practices were found to be the main ways in which sustainability is infused into construction activities. Sustainable landscaping and transportation programs are not keenly pursued in construction projects. The Kenyan Construction Industry regulatory framework should be encouraged to pursue sustainability wholesomely, as indicated in figure 4.7; even sensitive issues like reduction of toxic wastes are only pursued to a less extent. The study revealed industry regulations as the single most common factor influencing pursuit of sustainability.

Government regulations and CSR campaigns also greatly influence the pursuit of sustainability. On the other hand, awareness of the need for sustainability was cited as the least common reason influencing pursuit of sustainability. This goes to show that regulatory bodies promote sustainability due to pressure by industry regulations and that there is a degree of duress when they actually pursue them. A key strategy to improving institutional capacity of regulatory bodies is to understand the level of sustainability literacy during staff recruitment exercises in order that relevant training programs are developed. Additionally, sensitizing staff on the need for sustainability will not only improve their capacity to promote and implement sustainability programs but will also in the longer term make promotional campaigns cost effective. The study also revealed that the key hindrance causing lack of responsiveness and resistance to sustainability issues is the lack of an accepted industry model to evaluate sustainability programs. In the same vein, difficulty in seeing the benefits of pursuing sustainability has also caused resistance by regulatory bodies to actively promote sustainability. Lack of sufficient resources and a lack of familiarity with sustainability promotional techniques have also led to the passive approach of regulatory bodies in handling all matters sustainability. A key strategy therefore in enhancing institutional capacity is the development of a legally accepted industry model of evaluating sustainability. This coupled by training of staff and the general public on sustainability and the channeling of more resources to this end will greatly bolster sustainability programs.

Scientific Theory of the Study

The researcher formulated a hypothesis in the study and was also guided by research objectives. According to Mugenda (2003), researchers find it difficult sometimes to formulate hypothesis in certain types of research, for example where the research is exploratory survey, thereby being guided by set objectives in specific research work. In additions to having hypothesis in this study, the objectives were also set and further guided the formulation of research questions after which data was analyzed and finding formulated based on the set objectives.

Significance of the Study

It is hoped that an analysis of the regulatory framework will help policy makers in the construction industry in Kenya to formulate successful programs to disseminate information to improve awareness and literacy on sustainability. The study will also pinpoint a policy issue

that the government may need to design better or improve mechanisms to enhance effectiveness of the regulatory authorities in the construction industry in promoting sustainability. The public procurement regulatory authorities, professionals' registration boards, National Environmental Management Authority and local authorities could also use the findings of the study to review their guidelines in approving construction projects that are custodian of life cycle and ones that promote sustainability. To academicians and professionals in the construction industry, the research will help them understand the need for sustainable professional practices that safeguard people's lives and their future. To the general public, the research will enlighten them on the need and importance of procuring sound professional practice and services in any construction project or works to safeguard people's lives and future, prevent environmental degradation and promote the use of renewable sources of energy for sustainable development.

Limitations of the Study

Since most of the respondents are members of the regulatory bodies charged with responsibility of implementing the regulatory framework, the respondents we seen to be biased in giving the correct information. Additionally the time allowed for the study did not allow for a proper investigation into all the regulatory bodies in the regulatory framework.

Conclusion

The conclusion derived from the research is that the regulatory framework in the Kenyan construction industry is not optimally and holistically promoting sustainability. Knowledge of the concept of sustainability among staff of the regulatory bodies and its inclusion in their operational policies is minimal. This has rendered achievement of sustainability objectives difficult.

Specifically, promotion of economic sustainability has been found to target profits at the compromise of quality. Developers have increasingly focused on higher worker productivity and cost reduction purposes with an eye to making quick profits but with disastrous results. The literature review offered that economically sustainable buildings offer higher returns in the long run because they offer greater value. It was also noted that there is negligible additional costs in building a sustainable building as compared to a traditional building. Regulatory frameworks should aggressively campaign for the mandatory incorporation of value management into the construction process. Value management has been

seen to add value and quality to buildings making them more economically sustainable. Professionalism in the issue of documentation to allow for construction of sustainable buildings should be positioned at the fore as opposed to greed. The Kenyan media has been abound with news of collapsing buildings due to lack of professionalism and lack of awareness on the need for sustainability and its benefits.

The Kenyan construction industry's regulatory framework was found to pursue environmental sustainability more than economic and social sustainability. This was largely attributed to the fact that the regulatory frameworks directly concerned with environmental issues have greater commitment to achieve environmental sustainability than professional bodies who mainly eye profits. Additionally, NEMA the environmental watchdog in the regulatory framework and the NCC have legal ability to arrest errant practitioners. This has bolstered efforts in promoting sustainability on the environmental front. However, it appears stakeholders in the industry achieve this end through duress as opposed to awareness of the need to pursue it.

On the socio-cultural front, the regulatory framework has failed to promote sustainability to a meaningful or no extent. Most social sustainability programs are passive and take the form of seminars and workshops. Aside from the labour laws and industry regulations that guide payment of consultants, the inculcation of social policy into construction activity and process is generally lacking. Lastly, there is need for a clear model to be developed in the industry to guide the achievement of holistic sustainability.

Recommendations

Based on the research findings, the researcher hereby makes the following recommendations:

1. The composition of the regulatory framework that governs the Kenyan construction industry should include a specialized body mandated to champion for social sustainability; in much the same way NEMA champions for environmental sustainability.
2. The construction industry professionals should create a model to guide the holistic achievement of sustainability.

3. The regulatory framework governing the Kenyan construction industry should conduct awareness and outreach campaigns to increase literacy and knowledge of the concept of sustainable construction, which is largely lacking
4. The regulatory framework governing the construction industry should seek legal capacity to prosecute errant developers who through unsustainable construction practices cause loss of life, depletion of non-renewable resources and tear the moral and social fabric

Areas for Further Research

Following the study herein, the researcher recommends further research to be done on ways to pursue social sustainability as it is still not clear and should be substantiated with social responsibility. Further research is also recommended on the possible models used in other countries to achieve sustainability. This will help in the adaptation of a suitable hybrid model that is congruent with the social and economic aspirations of Kenyan society, as stipulated in the Kenyan strategic development plan, dubbed Vision 2030.

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APPENDICES

APPENDIX A – QUESTIONNAIRE TO OFFICERS OF REGULATORY FRAMEWORK

Questionnaire No.....

Date:.....

5. Are personnel working in your organization required to have or take a course on issues related to economical sustainability? _____

1. Are personnel working in your organization required to have or take a course on issues related to environmental sustainability? _____

4. Are personnel working in your organization required to have or take a course on issues related to socio-cultural sustainability? _____

1. Indicate the extent to which your organization offers courses which address topics related to sustainability;

0 (don't know) 1 (none) 2 (a little) 3 (quite a bit) 4 (a great deal)

TOPICS	
Environmental policy and management	
Environmental philosophy	
Urban ecology	
Social justice	
Women and development	
Sustainable production and consumption	

2. Indicate the extent to which sustainability is a focus woven into your organizations policies and disciplinary education. _____

0 (don't know) 1 (none) 2 (a little) 3 (quite a bit) 4 (a great deal)

Please comment how this is done _____

6. Is your organization involved in research in any of these areas relating to sustainability?

AREA	
Renewable energy	
Sustainable building design	
Ecological economics	
Socially sensitive building technology	

7. The chart below lists some of the operational practices emphasized by institutions moving toward sustainability. Please complete the chart, for prime project areas and for more information needed, and indicating the extent to which your institution has implemented these practices using the following scale;

0 (don't know) 1 (none) 2 (a little) 3 (quite a bit) 4(a great deal)

PRACTICE	
Building construction and renovation based on green design principles	
Energy conservation practices (including lightning, heating, cooling, ventilation)	
Waste reduction practices	
Water conservation practices	
Sustainable landscaping (biodiversity, minimizing lawn, pest management)	
Environmental sustainability assessments	
Sustainable transportation program (pedestrian friendly systems, safe car parks)	
Reduction of toxic materials and radioactive materials	

8. Is your institution committed to sustainability? _____

9. To what extent does the criterion for hiring recognize organization staff's sustainability literacy? _____

10. To what extent is your organization involved in sustainable development work through formal partnerships at regional, national or international levels? _____

11. What local sustainability related community service, service learning and or internship programs exist in your institution? _____

12. Describe the key factors that support the advancement of environmental and sustainability issues in your organization? _____

13. What factors do you think account for resistance or lack of responsiveness to these concerns?

14. How do you rate the effectiveness of regulatory framework with regard to economic, environmental and social sustainability using a scale of (Very Ineffective, Slightly Ineffective, Neutral, Slightly Effective and Very Effective)? _____

15. What strategies, in your opinion can your organization employ to better promote sustainability? _____

APPENDICES

APPENDIX B – DEFINITIONS OF SIGNIFIVANT TERMS

Definition of Significant terms

Built Environment:

The term built environment refers to the human-made surroundings that provide the setting for human activity, ranging in scale from personal shelter and buildings to neighborhoods and cities, and can often include the supporting infrastructure such as water supply or energy works (Longman and Pearson, 2011).

Regulatory Framework:

These are laws and regulations that outline the legal requirements to be met. They may also be complemented by policies, standards directives and guidelines. Regulatory framework is also the due process of regulation surrounding a single topic that entails all of the relevant legislative documents (acts, regulations, annexes) and describes the agency or body responsible for administering the framework (Longman and Pearson, 2011)..

Effectiveness:

The term effectiveness refers to the degree to which objectives are achieved and the extent to which targeted problems are solved (Business Dictionary, 2011). It is also the capability of producing a desired result. When something is deemed effective, it means it has an intended or expected outcome, or produces a deep, vivid impression (Longman and Pearson, 2011).

Sustainability:

Sustainability is the capacity to endure through renewal, maintenance, and sustenance, or nourishment, in contrast to durability; the capacity to endure through resistance to change. Sustainability creates and maintains the conditions under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic and other requirements of present and future generations (Brundtland, 1987).

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Sustainable Development:

The Brundtland Report defined sustainable development as development which meets the needs of the present without compromising the ability of future generations to meet their own needs (WCDED, 1987). This definition contains within it two key concepts; one being the concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs."