PROJECT ENVIRONMENT, MACRO PLANNING PROCESS AND PERFORMANCE OF HOUSING CONSTRUCTION INDUSTRY: A CASE OF GATED COMMUNITY PROJECTS IN NAIROBI COUNTY, KENYA

BY

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A Thesis Submitted in Fulfilment of the Requirements for the Award of the Degree of Doctor of Philosophy in Project Planning and Management of the University of Nairobi

2017

DECLARATION

This doctoral thesis is my original work and has not been presented for any academic award in any other University.

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DEDICATION

I dedicate this work to my wife, Serah Ndinda Moses; my JM generation sons: James Muuo, John Mutunga, Joshua Mumo; and to Mummy Maria & late Papa Musyoka.

ACKNOWLEDGEMENTS

I express my appreciation to my supervisors, Prof. Christopher Gakuu and Dr. Dorothy Kyalo for their constant scholarly advice, guidance and encouragement. I also acknowledge the invaluable encouragement from Prof. H. Kidombo and Dr. Angeline Mulwa. The push from Prof. Charles Rambo will remain a driving force both now and beyond this study. Further, I appreciate all the lecturers who took me through this course and presentations for their rigorous training, constant guidance and dedication. I acknowledge the financial and moral support given to me by my employer, General Motors E.A Ltd – now Isuzu East Africa Ltd; I appreciate the support from the managing director, Rita Kavashe, Human resource director, Fred Wasike, and the General Manager Retail & Service workshop, Samuel Nyoro for their encouragement. I also thank my colleagues, Kennedy Njuguna, Jane Njagi and Felix Mbatha for enabling me balance work and study by taking up some of my office responsibilities from time to time during the study period. May God almighty bless you all in a special way.

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ABBREVIATION AND ACRONYMS

4D	Four dimensional
AAK	Architectural Association of Kenya
AEC	Architectural, Engineering and Construction
BS	British Standard
CAC	Cumulative Actual Cost
CBC	Cumulative Budgeted Cost
CEV	Cumulative Earned Value
PM	Project Manager
CPM	Critical path method
CSA	Country Social Analysis
DFID	Department for International Development
ECI	Early Contractor Involvement
EBK	Engineers Board of Kenya
ESI	Early Supplier Involvement
EVA	Earned Value Analysis
FTE	Full-Time Equivalent
GMA	General Mental Ability

GoK	Government of Kenya
HRM	Human resource management
ICT	Information Communication Technology
IQSK	Institute of Quantity Surveyors of Kenya
ISO	International Organization for Standardization
IT	Information Technology
JTC	Joint Contract Tribunal
KNBS	Kenya National Bureau of Statistics (KNBS)
LOB	Line of balance
MoPW	Ministry of Public Works
NCA	National Construction Authority
NCG	Nairobi County Government
NEMA	National Environmental Management Authority
NSC	National Safety Council
PM	Project Manager
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
PPI	Project Performance Criteria
QMS	Quality Management System
TBC	Total Budgeted Cost
ToP	Theory of Performance
WPMS	Web Based Project Management System
WWII	World War II

ABSTRACT

The study examined project environment, macro planning process and performance of housing construction industry: A case of gated community projects in Nairobi County, Kenya. The study was guided by six objectives which sought to establish the extent to which each of the independent variables namely; regulatory environment, technological environment, and project manager's personal attributes related to project performance. Further the environment factors combined were tested to establish their relationship with project performance. Macro planning process was tested to establish its influence on project performance, and further, was examined to determine its moderating influence on the relationship between project environment and performance. Six research hypotheses related to the objectives were tested to shed light on the direction of the study. Literature review was based on what other scholars, academicians, and practitioners in the field under study had said based on the study variables. Pragmatic paradigm to support mixed mode approach was adopted. Cross sectional descriptive survey and correlational research designs were used in this study. The study population comprised of 406 gated community housing projects initiated in 2009 – 2014. A total of 572 respondents were drawn from 143 sampled gated community housing projects from the seventeen sub-counties of Nairobi County (four members were drawn from each sampled gated community project – client, consultant, contractor, and the gated community facility manager). The sample was drawn from 208 gated community projects which were active. The sampling technique combined census, stratified, simple random, and purposive sampling techniques. A standardized open-ended interview guide and a Questionnaire with both open and closed-ended items with Likert-type interval scale anchored on a five-point scale were used to collect data. Descriptive statistics were computed for all variables using frequencies, percentages, arithmetic mean and standard deviation. Statistical tools used for inferential statistic were Pearson's Product Moment Correlation (r), simple regression, multiple regression and stepwise regression (R^2). T-tests were used to test hypotheses in the study. The results revealed that: r=0.532, t =4.314 at p=0.000<0.05, 1. H_1 was confirmed and concluded that regulatory environment had a statistically significant influence on the performance of gated community projects in Nairobi County, Kenya; with r=0.559, t =4.578 at p=0.000<0.05, 2. H_1 was confirmed and concluded that technological environment had a statistically significant influence on the performance of gated community projects in Nairobi County, Kenya; with r=0.539, t =5.074 at p=0.000<0.05, 3. H_1 was confirmed and concluded that project manager's personal attributes had a statistically significant influence on the performance of gated community projects in Nairobi County, Kenya; With r=0.655, t =10.962 at p=0.000<0.05, 4. H_1 was confirmed and concluded that macro planning process had a statistically significant influence on the performance of gated community projects in Nairobi County, Kenya; With r=0.655, t =39.273 at p=0.000<0.05, 5. H_1 was confirmed and concluded that combined environment variables (project environment) had a statistically significant influence on the performance of gated community projects in Nairobi County, Kenya; and with R^2=0.587, $R^2\Delta$=0.039, t = 15.15, p=0.000<0.05, 6. H_1 was confirmed and concluded that the relationship between project environment and performance of gated community projects in Nairobi County, Kenya is moderated by the project macro planning process. The study highlighted the need for project planners, managers and other stakeholder's training on new project technologies and provision of adequate ICT infrastructure for effective performance of the projects. The study deviated from other studies by empirically showing how individual project environment factors influenced the performance of gated community projects in Nairobi County, Kenya. The study recommended further research to be conducted with the project environment as the moderator to the relationship between macro planning process and project performance. Further, replication of this study may be done in all the counties in Kenya for further analysis and comparison.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Throughout history, it is evident that urban planning practice has always been shaped by powerful ideas controlled by class interests. “Gated communities”, which are becoming an increasingly distinctive feature in contemporary cities worldwide, is one such idea. It can influence existing urban rich and poor, social and economic policies and plans, urban governance and physical planning decision-making at both national and local levels (Zaatar 2008; Zahran 2003). While some scholars and practitioners defend the idea for being the core urban development engine without which cities worldwide, especially in Europe and the USA should have deteriorated dramatically after Second World War (WWII); others argue their destructive impact on the long-term sustainability of cities (Rahmaan et, al 2009; Zohny, 2009). According to Roitman, (2008), since the year 2000, worldwide case study research showed the existence of differences and similarities between countries in either promoting or restricting the spread of gated communities as far as their design and target population were concerned.

Gated communities are closed urban residential settlements voluntarily occupied by a homogeneous social group, where public space has been privatized by restricting access through the implementation of security devices, their houses are of high quality and have services and amenities that can be used only by their residents, they have a private body governing and enforcing internal rules concerning behavior and construction (Roitman 2008). With specific reference to the above definition, there has been an explosion of gated communities all over the world since the end of WWII. Examples from countries around the globe show the magnitude of such explosion. In the United States of America, for example, there were more than 20,000 gated communities, with 3,000,000 residential units in 1997 (Blakely et al., 1997) and more than 7,000,000 households living in walled communities in 2001 (Lentz, 2006).

In England, more than 1,000 gated communities housing 100,000 inhabitants were reported in 2003 (Atkinson et al, 2004). Additionally, since mid-1990s, an unprecedented increase of gated communities' development in Russia is well documented (Lentz, 2006). In the greater Buenos Aires region, Argentine, there were more than 11 million gated communities' inhabitants (Roitman, 2008). Gated communities were also a rapidly growing urban phenomenon in South Africa since mid-1990s. Landman, (2000) stressed the fact that there were more than 360 road closures related to gated communities' activities in one sub-structure of the greater Johannesburg Metropolitan Council. Moreover, although walls are not a new phenomenon in China, wealthy gated communities "were particularly novel in the Chinese context because income differences have only really been conspicuously revealed in spatial patterns since the housing market was created in the 1990s" (Webster et al, 2006).

Additionally, case study research in Portugal, Spain, Turkey, and Indonesia confirmed the magnitude of such urban phenomena growth during the past 20 years (Roitman, 2008). Furthermore, the number of gated communities has also been on the rise in countries all over the Middle East Region (Saudi Arabia, Egypt, Lebanon, Qatar, Kuwait, Bahrain, and Syria) since the early 1970s parallel to the influx of foreign manpower to the region and the oil boom. According to Zaatar, (2008) and Zohny, (2009), leading the pace in the region, Saudi Arabia has had the largest number of gated communities' inhabitants in the region with over one third of its population (more than 20 million inhabitants) living in gated communities.

In Kenya during the colonial period, estates in Nairobi were clearly demarcated along racial lines - European, Asian and African. Access to the European quarters was restricted to African domestic workers. Then, discrimination was in vogue and defined such arrangements. That was then. A new demarcation in housing estates is fast taking root in major towns albeit in a different way - through gated communities - mostly dictated by security and the need to cut costs by the home hunters (Low, 2001). While some saw it as a development that elevates Nairobi and the country to a status consistent with other cities, there are those who saw it as failure by city authorities to provide basic needs to the public. And the unintended result in the increasing number of gated communities was isolation, with housing estates defining social-economic class. The stand-alone home owners were giving way to estates that sought to provide security in numbers. Some have membership code of conduct and share certain social amenities. Ruthia. (2010) asserts that the phenomenon that started in Nairobi in 1980's is fast spreading to other towns in the country.

1.1.1 Project performance

These are defined as measures by which success or failure of the housing project will be judged (Cooke-Davies, 2002). Earlier Lim et al., (1999) defined performance indicators as set of principles or standards by which success of the housing construction can be judged. Toor et al., (2009) suggested the following indicators for measuring performance: project completion on time, within budget and to specified quality; safety, efficiency, effectiveness, free from defect, meets stakeholders' expectations, and minimal construction disputes and conflicts. Atkinson, (1999) classified housing construction performance indicators into two measures - success at the delivery stage and success at post-delivery stage. The performance indicators at the delivery stage include cost, time and quality and are referred to as iron triangle. These indicators measure the efficiency of project management or project management success. On the other hand, the project performance indicators at the post-delivery stage are divided into product performance indicators and organisational performance indicators. The product (Houses) performance indicators include end user satisfaction, environmental impact, contractors' profit, and team members' satisfaction, while the organisational performance indicators are the benefit to the organization, which includes improved efficiency, improved effectiveness, increased profits, reduced waste and promotion of organisational learning.

The study of Lim et al., (1999) divided the concept of project success into the macro and micro viewpoints. The macro viewpoint concerned the achievement of the original project goals, which could only be known after the project's completion at the operational stage. The indicators for measuring project success at the macro viewpoint are completion on time, client satisfaction, end user satisfaction and stakeholder satisfaction. Conversely, the micro viewpoint of project success concerned project management success, that is, achievement at the construction phase. The indicators for measuring project success at the micro point of view are completion on time, within budget, to the specified quality standard and safety. This means that the micro viewpoint concerns project success over a short period, while the macro viewpoint of project success concerns project success over a long period.

Furthermore Ahadzie, Proverbs et al., (2008) identified 15 project performance indicators for mass housing projects, which they classified into four components as follows: environmental impact, customer satisfaction, overall cost and time, and quality. Sanvido et al. (1992) proposed the following indicators for measuring project success, depending on a stakeholder's perspectives (client, end user, contractor or consultant). The indicators were project completed on budget, on schedule and to specified quality; client satisfaction; end user satisfaction; pleasing aesthetics; product marketability; safety; and minimal or no claims or conflicts.

Therefore, from this review, it was noted that performance indicators for housing construction projects' success was beyond the traditional measures of time, cost and quality, which mainly measures project management success; however, additional indicators emerge that include end user satisfaction, stakeholder satisfaction, safety, environmental impact and minimal disputes or the absence of any legal proceedings. Based on these studies, the current study adopted housing construction project performance indicators as: - Project completed within the budgeted cost, within the scheduled time, within the specified quality, delivered with described safety and health standards, and within clients' satisfaction levels.

1.1.2 Housing construction project environment

The housing construction project environment is the aggregate of surrounding things, conditions or influences on the construction process (Youker, 1992). Thus, the environment includes virtually everything outside the project; its technology, the nature of its products, customer and competitors, its geographical setting, and the economic, political and even metrological climate in which it must operate (Akinsola et al. 1997). Bennett, (1991) in a major review of project management theory established that the environment interfered with the planned progress of construction projects. The less predictable the environment and the greater its potential effects, the more it must be considered in managing the development of housing construction projects.

A review of the results of hundreds of World Bank projects by Youker, (1992) results showed that success or failure of housing construction projects often depends on factors in the general environment. The review pointed out that in the management of housing construction projects, a good understanding of the different features and factors within the environment that could influence the project was essential. This formed a basis for analysis for overcoming or mitigating their effects on the project performance. Project managers, in addition to their traditional functions, must set up a process to scan the environment, to identify potential problems, and to try to establish power relationships that help in the management of the key actors and factors on which successful implementation depends.

Some factors within the environment posed greater challenges to housing construction projects, management, and organizational structure than others. These factors formed the focus for the management of the projects' environment (Youker, 1992). While an analysis of the key elements of the environment may not necessarily solve all problems, some of which are truly structural, they provided a basis for establishing reasonable housing construction project objectives and also gave an early warning of potential problems. Clients who initiated housing construction projects must put in place appropriate management, organizational structures, systems, and procedures for overcoming the effects of the environment.

The factors identified as constituting environment of housing construction projects were political, legal, institutional, cultural, sociological, technological resources, economic, financial, and physical infrastructure (Walker, 1989, and Hughes, 1989). Walker, (1989) and Hughes, (1989) directed attention to some factors within the environment that posed greater challenges to housing construction projects, management and organizational structure than others and suggested that these factors formed the focus for the management of the housing projects' environment. For this study, we analysed the regulatory environment, technological environment, and project managers personal attributes as they were identified by Walker, (1989) and Hughes, (1989) as having the greatest impact on the performance of construction housing projects. Further, adopted project macro planning process was studied as a moderator to the relationship between project environment and performance. A brief overview of each element under study was given in the succeeding paragraphs.

The regulatory environment facing housing construction project organizations is becoming more complex and affecting housing construction project more directly. It has become increasingly difficult for housing construction project organizations to act without encountering laws and regulations. The housing construction projects operate within the covers of planning and environmental regulations, codes of practice, safety regulations, licensing, insurances and taxation laws. These laws, codes and regulations are generally well defined, making it possible to predict their impact on housing construction projects with reasonable accuracy. However, Martin et al., (2004) observed that changes to industrial, safety, taxation and environmental laws were not uncommon, and problems arose when the law changed during the life of a housing construction project. For instance, the collapse in buildings in Nairobi County (as well as other Counties) had led to revision of the building codes and abrupt change in how the County government implemented such housing construction projects in Kenya.

Legislation affects client's activities directly, through factors such as safety, planning law, and building regulations as it influences the contractual relationships within housing construction projects (Oladapo et al., 2007). The onus is on the managers of housing construction works to get acquainted with planning regulation and land use Act legislations which are parts of the legal environment. Regulatory environment therefore had an influence on the housing construction project performance, as was also confirmed by this study.

Technology is an aspect of the environment that should be considered in developing strategic plans for running housing construction projects. Oladapo et al., (2007) maintained that the appropriate housing construction technology could be measured by the availability of locally made plant and equipment, skilled manpower resources, extent of local material resources and the degree of utilization of such local construction resources as well as use of ICT in the design, communication and keeping and retrieving information. However, the housing construction industry in Kenya is characterized by the development projects which require the construction technology and resources of developed countries. The lack of technological know-how and the shortage of managerial manpower are one of the major problems and constraints facing the nation. The situation as at 1980's was described thus: ''lack of basic knowledge of production methods and design techniques for machinery constitute a serious constraint to rapid industrialization of the country. The situation was aggravated by acute shortage of managerial manpower''. As at today, the country remains a net importer of technical manpower, virtually most spare parts are imported and most investment in research and development are made abroad, except those sponsored by the government in public owned institutions (World Economic Forum, 2014). Computer aided designs (CAD), use of e-mails to share files and communications, teleconferencing using skype, WebEx, and building information modelling (BIM) are aspects of the technology applied in housing construction industry that greatly influenced performance of the housing projects. Technology environment was analysed and confirmed by this study to have a positive and significant relationship with housing construction project's performance.

The environment entailing the personal attributes of the project manager (PM) was perhaps the most important determinant of the housing construction project success or failure. The project manager plans, organizes and controls every detail of the housing project and must have knowledge of general management as well as specialized background in the particular nature of the housing construction project. The project manager is the ultimate authority on the development and completion of the housing construction project. Generally, a project manager spends his or her time overseeing the project and hiring and approving work completed by sub-contractors as well as negotiating contracts and developing a budget and a timeline for the completion of the housing construction project. If issues arise with contractors or permitting, the project manager is responsible for resolving those issues with either the sub-contractors or government officials. These professionals also work as a liaison between the housing construction team, architects, designers and the owners and stakeholders of the project to facilitate communication, decision-making and problem-solving. project managers typically require a broad background in both housing construction techniques as well as design, engineering and business administration skills (Jin et al., 1996). The environment surrounding the project manager personal attributes was examined in this study.

1.1.3 Project macro planning process

Planning is defined as a general term which is used in project management to encompass the ideas commonly referred to as programming, scheduling and organizing. Its aim is to make sure that all work required to complete the project is achieved in the correct order, in the right place, at the right time, by the right people and equipment, to the right quality, and in the most economical, safe and environmentally acceptable manner (Mawdesley et, al. 1996). There are different planning processes which can be adopted by the housing project managers depending on the nature of their construction project organization. One of such planning processes is the project macro planning process which takes into consideration the characteristics of complex project planning (Waly et al., 2002). This process takes place during the pre-construction stage of the project and involves the selection of major strategies, reviewing design constructability, the planning of major site operations and construction path, and arranging the primary means, methods and resources for the realization of the work packages. Waly et al., (2002) asserted that housing construction project's macro planning is of vital importance to its successful delivery and execution.

An important part of macro planning process in housing construction projects is the creation of the project schedule. The project schedule places all the tasks of the project in a logical and sequential order. The macro planning process of most housing construction projects depends on the market demands and available resources. This process sets the priorities and schedule for the tasks necessary to complete the operation's objectives. During the macro planning process, the project may be organized in a variety of ways: Sequential - in which the project is separated into stages completely in a consecutive sequence of tasks, Parallel - in which the project contains independent portions that happen simultaneously, and Staggered - in which the different tasks may overlap each other (Thamhain, 2004). According to PMI, (1996), there are nine specific areas that require a project manager's attention and should be incorporated into the macro planning process: Integration - to ensure that the various project elements are effectively coordinated, Scope - to ensure that all the work required (and only the required work) is included, Time - to provide an effective project schedule, Cost - to identify needed resources and maintain budget control, Quality - to ensure functional requirements are met, Human resources - to effectively employ project personnel, Communications - to ensure effective internal and external communications, Risk - to analyze and mitigate potential risks, and procurement - to obtain necessary resources from external sources.

The nine key areas integrated with the way the project had been organized (Sequential, parallel or staggered) will yield different results and the project manager should constitute the planning partners with the end result in mind if the project is to be delivered successfully (Thamhain, 2004). Depending on the type of tasks, variations in the sequence of tasks are possible. A basic housing construction project schedule contains the start and end dates of tasks, their duration, their dependency on other tasks and the types of dependency between tasks. More advanced project schedules may also include aspects such as float (slack). To create a housing construction schedule that is as efficient as possible, project managers use three tools and techniques commonly: the Gantt chart (with Critical Path Method), Line-of-Balance (LOB) scheduling, and, more recently, 4D models. However, to obtain efficiency in project scheduling, time is not the only important aspect. The resources required to complete the identified tasks are often considered in conjunction with the creation of the project schedule. The logic behind this is that the duration of the schedule and the structuring of its tasks have a direct relation with the amount and type of resources required. This study analyzed the project macro planning process (pre-construction planning) to establish its moderating influence on the relationship between project environment and performance in gated community projects.

1.2 Statement of the Problem

There has been massive growth in the Kenyan real estate sector with developers coming up with varied housing construction concepts to attract and accommodate the diverse needs of their clients. One concept that has been wholly embraced by various stakeholders in this industry is the idea of gated communities. Landman, (2012) states that a gated community is a type of housing estate that has strict entrances for its residents as well as their automobiles and is often characterized by a massive perimeter wall round the estate. Gated communities offer different types of buildings which include villas, bungalows, apartments as well as mansionnettes.

The Kenya National Bureau of Statistics, (KNBS) estimated the Kenyan growth population at 4.2% and was expected to reach 50 million by 2020. Based on these estimates there was an annual demand of 206,000 units of houses and the current supply was 50,000 units per year which created a shortfall of 156,000 units every year (KNBS, 2013). The government of Kenya sought to match the supply of houses to the existing demand by 2030 (GoK, 2005). Ministry of housing, Land and urban development, (2011) reported that, among all gated community developments initiated over the recent years, 48% of the housing construction projects in Nairobi County were still incomplete, and 10% of these projects had completely stalled. This lead to slow uptake of housing construction projects. According to GoK, (2003) report, failure of these housing construction projects resulted in reduced supply of quality houses as well as a less vibrant economy which consequently contributed to a lower standard of living for Kenyans as well as increased unemployment.

A review of the results of hundreds of World Bank projects by Joseph, (2009) indicated that success or failure of housing construction projects often depended on factors in the general environment. The review pointed out that in the management of projects, a good understanding of the different features and factors within the environment that influenced the project was essential. This formed a basis for analysis for overcoming or mitigating their effects on project performance. While an analysis of the key elements of the environment may not necessarily solve all problems, some of which were truly structural, they could provide a basis for establishing reasonable project objectives and give an early warning of potential problems. Clients who initiate gated community projects must put in place appropriate management, organizational structures, systems, and procedures for overcoming the effects of the project environment through planning.

To bridge the gap between the number of housing units demanded per annum and the actual units supplied, there was need to boost the completion rate of the housing construction industry (KNBS, 2013). It was against this background that this study focused on the moderating influence of macro planning process on the relationship between project environment and performance in housing construction industry, case of gated community projects in Nairobi county, Kenya.

1.3 Purpose of the Study

The purpose of this study was to examine the moderating influence of macro planning process on the relationship between project environment and performance in the housing construction industry; a case of gated communities in Nairobi County, Kenya.

1.4 Objectives of the Study

The objectives of the study were to:

i) Examine how regulatory environment influences performance of gated community projects in Nairobi County, Kenya.

ii) Determine the extent to which technological environment influences performance of gated community projects in Nairobi County, Kenya.

iii) Establish the extent to which project manager's personal attributes influences performance of gated community projects in Nairobi County, Kenya.

iv) Determine the extent to which project macro planning process influences performance of gated community projects in Nairobi County, Kenya.

v) Determine the combined influence of project environment factors on the performance of gated community projects in Nairobi County, Kenya.

vi) Examine the moderating influence of project macro planning process on the relationship between project environment and performance of gated community projects in Nairobi County, Kenya.

1.5 Research Questions

This study sought to answer the following research questions;

i) How does regulatory environment influence performance of gated community projects in Nairobi County, Kenya?

ii) To what extend does technological environment influence performance of gated community projects in Nairobi County, Kenya?

iii) To what extent does project manager's personal attributes influence performance of gated community projects in Nairobi County, Kenya?

iv) To what extend does project macro planning process influence the performance of gated community projects in Nairobi County, Kenya?

v) How does the project environment factors combined influence the performance of gated community projects in Nairobi County, Kenya?

vi) To what extent does macro planning process moderate the relationship between project environment and performance of gated community projects in Nairobi County, Kenya?

1.6 Research Hypotheses

The study was guided by the following research hypotheses;

i) $\mathbf{H_1 1}$ Regulatory environment has a significant influence on the performance of gated community projects in Nairobi County, Kenya.

ii) $\mathbf{H_1 2}$ Technological environment has a significant influence on the performance of gated community projects in Nairobi County, Kenya.

iii) $\mathbf{H_1 3}$ Project manager's personal attributes has a significant influence on the performance of gated community projects in Nairobi County, Kenya.

iv) $\mathbf{H_1 4}$ Project macro planning process has a significant influence on the performance of gated community projects in Nairobi County, Kenya.

v) $\mathbf{H_1 5}$ Project environment factors combined have a significant influence on the performance of gated community projects in Nairobi County, Kenya.

vi) $\mathbf{H_1 6}$ The strength of the relationship between project environment and performance of gated community projects in Nairobi County, Kenya is moderated by the macro planning process.

1.7 Significance of the Study

The findings from the study if accepted in the public domain, will be useful to project managers and clients by revealing the level of planning that will strengthen the relationship between project environment and performance in the housing construction industry. The findings will also inform project management teams on the influence of project environment factors on the performance. Policy makers and other stakeholders will be informed by the study findings when formulating related policies to govern the housing construction industry – Environmentalists, Government planners, Architects, Consultants, Investors, and Financial institutions among others. Academicians will also benefit from the study results once it gets to the public domain. Housing construction contractors and sub-contractors will benefit greatly from the study findings as in, if successfully applied they will deliver their housing projects in scope, schedule and budget, and at the best quality which will ensure customer satisfaction. The study findings also contribute in building knowledge in the project management discipline and especially on planning, design and implementation field, which is a key component of every project. This is because no successful project management can be achieved without a good planning, design and implementation system in place. The study findings further inform current and future project planners who have a sole objective of delivering their housing projects successfully in all aspects.

1.8 Limitations of the Study

The researcher encountered several limitations related to the research and especially in data collection. However, the limitations did not in any way have a significant interference in the outcome of this study. Some of the respondents involved in the study found it difficult to fill the research questionnaire fearing that, giving the information might jeopardize their jobs. This was solved by assurance that the information given would not be divulged and would only be used for academic purposes. Project managers were excluded from the study for the information needed was touching on their planning competence and other managerial qualities; it was therefore felt that their responses were likely to be biased so as to portray their planning prowess. It was inferred that the main contractors, consultant, gated community facility managers and the clients were able to provide adequate and vital information to cover what the project managers were required to cover.

Individual respondents differed in their perception based on the questionnaire items. The researcher assumed that the responses were factual based on the experience and qualifications of the targeted group of specialists. The researcher was also faced with the challenge of resource limitation. The resources referred to include time, financial and technical support especially during data analysis and thesis development. This barrier was mitigated by the researcher applying and winning a scholarship from High Educational Loans Board and taking a study leave.

Despite the limitations listed, the quality of the study was not compromised. The study was designed in a highly scientific manner following a thorough literature and theoretical reviews – it was rigorous in its approach, analysis, interpretation, discussions and reporting of its findings.

1.9 Delimitation of the study

This study was concerned with examining the moderating influence of macro planning process on the relationship between project environment and performance in the construction industry by studying the case of gated community projects in Nairobi County, Kenya. The study was restricted to gated community projects in Nairobi County, Kenya. The County has the largest population of the gated community housing project and it houses the capital city, hence well suited for the study. Gated community projects within the rest of the 46 Counties in Kenya were not considered. According to Kenya County Network, (2012), Nairobi County is in Nairobi Province bordering Counties of Kiambu to the North, North East and North West; Machakos to the East and South East; and Kajiado to the West, South and South West. The County covers an area of 695.1 square kilometers and has an approximate population of 3,138,369 with a population density of 4,515 people per square kilometer and 985,016 households. Four districts constitute the County, and these are Nairobi West, Nairobi East, Nairobi North and Westlands. Nairobi County has only one local authority called Nairobi County government. Westlands, Parklands, Karen/Langata, Makadara, Kibera, Roysambu, Ruaraka, Kariobangi, Kayole, Kamukunji, Starehe, Dagoretti, Mihang'o, Nairobi West, Mathare, Kasarani and Embakasi are the seventeen Sub-Counties that comprise Nairobi County.

The study focused on gated community housing projects in Nairobi County, which were constructed between 2009 and 2014, a period when environmental impact assessment (EIA) became mandatory before implementation of projects and hence documentation of such projects could be traced. Nairobi County was suitable to conduct this study because it has clear guidelines on the demand for housing units per annum and the actual provision of the same, clearly showing the downfall (KNBS, 2013). Further Nairobi County pioneered the gated community phenomena in the country, has many of such housing projects completed, a few stalled and many on-going. Respondents included clients, contractors, consultants, and gated community facility managers. The researcher was interested in the construction of the gated community projects which were active.

1.10 Assumption of the study

In this study it was assumed that different gated community projects were at different level of implementation; some complete, on-going, and others stalled. It was also assumed that the difference in the level of implementation was influenced by environment factors –regulatory environment, technological environment, and the project manager's personal attributes. It was further assumed that respondents were knowledgeable, honest and accurate in providing information upon which the study findings were based.

1.11 Definition of significant terms used in the study

For the purpose of this study, the following terms have the attached meaning.

Gated community	Refers to a type of a housing estate that has strict entrances for its residents as well as their automobiles and is often characterized by a massive perimeter wall round the estate. The houses will voluntarily be occupied by a homogeneous social group, with a private body governing and enforcing internal rules concerning behavior and housing construction.
Gated community project	A housing construction project that once completed will be sold out to a homogeneous social group. The houses are deemed to be of high quality, they are many under the one project and are developed by an entity (Corporate or individual) who will sell them out to home hunters once the project is complete
Project environment	Refers to all surrounding factors either external or internal to the project that may enhance or constrain project management options and may have a positive or negative influence on the project performance. These will be limited to regulatory environment, technology environment, and the environment surrounding Project manager's personal attributes.
Project Macro planning	A conscious determination of courses of action designed to accomplish purposes, taking into consideration the characteristics of complex project planning.
Project Macro	An act of putting project activities and tasks together that takes

planning process	place during the pre-construction stage of the project and involves the selection of major strategies, reviewing design constructability, the planning of major site operations and construction path, and arranging the primary means, methods and resources for the realization of the work packages.
Project manager's attributes	This refers to the environment entailing the personal attributes of the housing project manager – Leadership ability, communication skills, decision making skills, administrative skills, technical competence, and demographic attributes.
Project Performance	To perform is to produce valued results. Project performance will be defined as a measure, set of principles or standards by which success of the project can be judged. These will be limited to project completed within budgeted cost, scheduled time, quality, Safety and health, and client satisfaction.
Regulatory environment	This entails laws and policies that govern housing construction project. These will include but not limited to housing regulations, codes of practice, safety regulations, licensing, insurances and taxation laws.
Technology environment	This refers to external factors in the technology that impact on a project operation. The purposeful application of information and communication technology (ICT) in the design, production, and

utilization of goods and services, and in the organization and coordination of human activities throughout the construction phases.

1.12 Organization of the study

This study was organised into five chapters. Chapter one covered background of the study, statement of the problem, purpose of study, research objectives, research questions, research hypothesis, significance of the study, assumptions and delimitation of the study. Chapter two reviewed literature based on variables under study. The chapter opened with the dependent variable (project performance indicators), independent variables: -regulatory environment, technological environment, and project manager's personal attributes. The moderating variable – project macro planning process was also covered. The chapter further presented theoretical and conceptual framework of the study. Chapter three covered research methodology: -research philosophy, design, target population, sample and sampling procedures, research instruments, reliability and validity of instruments, data collection procedures, data analysis and methods to be used for presentation of data. Chapter four covered data analysis, presentation, interpretation, and discussions. Chapter five contained summary of findings, conclusions, and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter opened with analysing the dependent variable conclusively. It went further, and reviewed literature related to independent variables namely regulatory environment, technological environment, and project manager's personal attributes. The project macro planning process (project pre-construction planning) which formed the moderating variable to the relationship between project environment and performance in housing construction industry is also reviewed. The chapter further presented the theoretical and conceptual framework guiding the study. Finally, a summary of the research gap was presented.

2.2 Project performance indicators

Project performance indicators are defined as measures by which success or failure of a project will be judged (Cooke-Davies, 2002). Lim and Mohamed (1999) defined performance indicators as set of principles or standards by which success can be judged. Toor and Ogunlana (2009) suggest the following indicators for measuring project performance: project completion on time, within budget and to specified quality; safety, efficiency, effectiveness, free from defect, meets stakeholders' expectations, and minimal construction disputes and conflicts.

Project construction time and cost are fundamental considerations in project management and regarded as most important parameters for measuring success of any project. Poor performance of time and cost can lead to a significant amount of time and cost overrun which is global phenomenon. Time overrun can be defined as late completion of works as compared to the planned schedule or contract schedule. It occurs when the progress of a contract falls behind its scheduled program. It may be caused by any party to the contract and may be a direct result of one or more circumstances. A contract delay has adverse effects on both the owner and contractor (either in the form of lost revenues or extra expenses) and it often raises the contentious issue of delay responsibility, which may result in conflicts that frequently reach the courts (Abbas, 2006). Cost overrun can be considered as the difference between actual cost of a project and its Cost limit. It occurs when the resultant cost target of a project exceeds its cost limits where Cost limit of a project refers to the maximum expenditure that the client is prepared to incur on a completed housing project while cost target refers to the recommended expenditure for each element of a project (Jackson et al. 2001). Based on Ali et. al., (2010), construction cost which is out of control adds to investment pressure, increases construction cost, affects investment decision making and wastes the national finance might resulting in corruption or offence.

Quality is defined as ‘The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs’ (BS 5750, 1987). In the views of Jabnoun (2000), quality is defined as conformance to requirements. All the definitions given above define quality from the perspective of the customers. Quality can be understood as ‘meeting the customer’s expectation’. These definitions imply that the needs of the customer must be identified first because satisfaction of those needs is the ‘bottom line’ of achieving quality. For housing construction organizations, quality is defined as meeting the requirements of the owners’ need as to functional adequacy; completion of construction of the project on time and within budget, life-cycle costs and operation and maintenance (Arditi et al., 1997). According Abdul-Rahman, (1994), construction companies need to consider quality in the tendering process, contract review, project planning, financing control, sub-contractor and supplier selection, leadership and utilization, resource allocation and other management aspects.

Although many studies have recognized the importance of maintaining and doing quality projects these aspects are sacrificed in lieu of achieving short-term objectives, such as handing over of some critical structures, or only part of the structures falling in the critical path. Barnes, (1987) emphasizes that the control of the performance of the installation, building or engineering structure should be managed in the same way as the management of time and cost. In a recent survey conducted among Indian housing construction professionals, it has been found that, out of the five commonly used project performance criteria – compliances to schedule, cost, quality, no-dispute and safety – the quality compliance has come second next to schedule compliance (Jha, 2004). Delivering housing projects of poor quality have far reaching consequences. Collins (1996) quotes one that was recorded during the reign of a Babylonian king. ‘If a builder constructed a house but did not make his work strong with the result that the house which he built collapsed and so caused the death of the owner of the house, the builder shall be put to death.’

On safety and health, the construction industry continues to account for a disproportionate number of occupational fatal and nonfatal injuries. (Findley et al., 2004; Ho et al., 2000). In the last decade, despite continual safety efforts, the construction sector has decelerated in terms of improvement in injury rates. According to the Bureau of Labor statistics, (2012), the U.S. housing construction sector has been responsible for more than 1,000 fatal injuries every year between 1995 and 2008. In 2011, construction workers accounted for a fatality rate of 9.1 per 100,000 full-time equivalent (FTE) workers, as opposed to the all- worker fatality rate of 3.5 per 100,000 FTE workers (BLS, 2011). Similarly, nonfatal injuries rates were 3.9 per 100 full-time workers for construction, whereas the all industry nonfatal injury rates were 3.8 per 100 full-time workers (BLS, 2011). These injury statistics clearly show that construction workers are more likely to be killed or injured than workers in most other industries.

Traditionally, the construction industry has taken a reactive approach to safety. Accordingly, problems associated with an organization's safety program are only apparent when there is an increase in the number of injuries. With increased financial implications associated with occupational injuries and the emerging pursuit of zero incident projects, housing construction professionals are exploring the implementation of innovative safety strategies (Blake, 2012; Navon et al., 2007) that can be introduced early in the project development process (Goetsch, 1996; Holt, 2001). The fundamental goal of an effective safety program is to eliminate or reduce safety risk before work begins. To achieve this goal, it is important to identify as many hazards as possible prior to commencing work. Unrecognized hazards may have the potential to lead to unanticipated catastrophic accidents. Unfortunately, according to Carter et al., (2006), a large proportion of housing construction hazards are not recognized because of the dynamic nature of the industry and task unpredictability (Bobick, 2004). In their assessment of method statements of three projects, Carter et al., (2006) determined that the percentage of hazards recognized ranged between 66.5% and 89.9%. This often leads to the implementation of safety programs that are inadequate to manage actual safety risk. Based on studies done by Laurence, (2005) and Sneddon et al., (2004), workers who are not able to perceive safety hazards will be unable to respond or behave safely because they are unaware of the consequences that may result from their actions.

Customer satisfaction is an important factor in the development of the housing construction process and customer relationship. As housing construction companies' face-increasing competition, greater attention continues to be placed on customer relationships and satisfied customers. According to Barret, (2000), Torbica et al., (2001), Maloney, (2002), and Yasamis et al, (2002), customer satisfaction enables housing construction companies to differentiate themselves from their competitors and create sustainable advantage. Many authors propose the importance of customer satisfaction and its use for evaluating quality from the customers´ perspective.

Customer satisfaction is typically viewed as a predictor for such behavioural variables as loyalty and purchase intentions (Jones et al., 1995; Anderson et al., 1993). According to Jones et al., (1995), complete customer satisfaction is the key to securing customer loyalty and generating superior long-term financial performance. Customer satisfaction also appears to have a stronger and more consistent effect on purchase intentions than does service quality (Cronin et al., 1992). It is also widely noticed that high customer satisfaction leads to relationship strength and a deep state of collaboration has been found profitable (Storbacka et al, 1994). Anderson et al. (1994) examine briefly the links between customer-based measures (customer satisfaction) of firm performance and traditional accounting measures of economic returns. Their findings emphasised that project organizations which achieved high customer satisfaction also enjoyed superior economic returns. Housing construction projects use various forms of customer satisfaction approaches in developing and monitoring product/service (Houses) offerings to manage and improve customer relationships.

Therefore, from this review, it was noted that performance indicators for housing construction project success was beyond the traditional measures of time, cost and quality, which mainly measures project management success; however, additional indicators emerge that included end user satisfaction, stakeholder satisfaction, safety, environmental impact and minimal disputes or the absence of any legal proceedings. Based on the studies reviewed, this study adopted project performance indicators as: - Project completed within the budgeted cost, within the scheduled time, within the specified quality, delivered with described safety and health standards, and within clients' satisfaction levels.

2.3 The concept of gated community projects

There has been massive growth in the Kenyan real estate sector with developers coming up with varied construction concepts to attract and accommodate the diverse needs of their clients. One concept that has wholly been embraced by various stakeholders in this industry is the idea of gated communities. Landman, (2012) states that a gated community is a type of housing estate that has strict entrances for its residents as well as their automobiles and is often characterized by a massive perimeter wall round the estate. Gated communities offer different types of buildings which include villas, bungalows, apartments as well as maisonettes.

The Kenya National Bureau of Statistics, (KNBS) has estimated the Kenyan growth population at 4.2% and is expected to reach 50 million by 2020. Based on these estimates there is an annual demand of 206,000 units of houses and the current supply is 50,000 units per year which creates a shortfall of 156,000 units every year (KNBS, 2013). The government of Kenya seeks to march the supply of houses to the existing demand by 2030 (GoK, 2005). Ministry of housing, Land and urban development, (2011) reported that, among all gated community developments initiated over the recent years, 48% of the construction projects in Nairobi County were still incomplete and 10% of these projects had completely stalled. This lead to slow uptake of construction projects. Based on GoK, (2003) report, failure of these construction projects will result in reduced supply of quality houses as well as a less vibrant economy which consequently contributes to a lower standard of living for Kenyans as well as increased unemployment.

The Kenya Vision 2030 recognizes the importance of development infrastructure as critical for socio-economic transformation. The housing Sector aspires for a country with modern metropolitan cities, municipalities and towns with housing facilities that meet international standards to make Kenya a globally competitive and prosperous country. The strategies and measures to be pursued in the medium term include; supporting the development of housing initiatives around housing construction projects, strengthening the institutional framework for housing development, raising the efficiency and quality of housing as well as increasing the pace of housing projects so that they are completed as envisaged, protecting the environment as a national asset and conserving it for the benefit of the future generations and the wider international community. Other measures include encouraging Private Sector participation in the provision of housing services through the Public-Private-Partnerships framework (Ruitha, 2010). Because of all these initiatives, housing construction projects resulting to gated communities have been on the rise all over the country and particularly in Nairobi County.

2.4 Project environment and performance

The Kenyan housing construction industry is a wide range of loosely integrated organizations that collectively construct, alter and repair a wide range of different buildings and civil engineering projects. In a major review of project management theory, Bennett, (1991) established that the environment interferes with planned progress of construction projects. The less predictable the environment and the greater its potential effects, the more it must be considered in managing the development of housing construction projects. The project environment in many developing countries like Kenya present special challenges for project managers that almost presupposes extensive cost and time overruns even before a project commences. These challenges arise mainly from inherent risks such as political instability, excessive bureaucratic contract procedures, and lack of adequate infrastructure such as transportation networks, electricity supply, and telecommunications systems.

In recognition of these unique problems, previous research studies have suggested that there is a need to develop appropriate management tools and techniques specifically tailored to the project environment of developing countries (Faniran et al., (2000). The project environment factors that have been generally identified include; political, legal, institutional, cultural, sociological technological resource, economic, financial, and physical infrastructure (Walker, 1989). According to Ajayi et al., (2010), the four most important external environmental factors in decreasing order that have great influence on performance include community issues, external environment, economic situation (boom or meltdown) and government policy. Factors identified under external environment include; political, legal, institutional, cultural, sociological technological resource, economic, financial, and physical environment. This study will analyse regulatory environment, technology environment and project manager's personal attributes as factors of project environment that influence performance of housing construction projects.

2.5 Regulatory environment and project performance

The regulatory environment facing organizations is becoming more complex and affecting businesses more directly. It has become increasingly difficult for construction projects to act without encountering laws and regulations. The housing construction industry operates within the covers of planning and environment regulations, codes of practice, safety regulations, licensing, insurances and taxation laws. These laws, codes and regulations are generally well defined, making it possible to predict their impact on construction projects with reasonable accuracy. However, Martin et al., (2004) observed that changes to industrial, safety, taxation and environmental laws are not uncommon, and problems may arise when the law changes during the life of a project. Legislation affects client's activities directly, through factors such as safety, planning law, and building regulations as it influences the contractual relationships within the project. For instance, Oladapo et al., (2007) in their study focusing on factors affecting housing construction in Nigeria pointed to the attention of stakeholders that the legislation was based on the British model, an ex-colony and that the Standard form of Building Contract issued by the Joint Contract Tribunal (JTC) in Britain was modified for use in Nigeria. The onus is on the managers of housing construction works to get acquainted with planning regulation and Land use Acts legislation which are parts of the legal environment, institutionalise, adopt, and make it suitable for the country.

Building regulations are statutory instruments that seek to ensure that the building policies set out in the relevant legislation are carried out (Gelder, 2004). Building regulations approval is required for most building work in any given country. In building, regulation involves registration of contractors, projects, skilled construction workers, construction site supervisors, training institutions, and provisions relating to collection and payment of the construction levy (G.O.K, 2012). According to Nahinja, (2014), construction regulation authorities are established to harmonize construction laws found in statutes which may contradict each other, curb uncontrolled and unchecked physical planning of buildings and construction, control and enforce the mechanisms on the application of the Building Code in the housing construction industry, prevent easy entry and penetration of unqualified contractors, and improve on the bureaucratic requirements and procedures in approval of building plans. Further, construction regulation authorities eliminate corruption cases in the building industry, emphasize on both material quality and contractor performance, and revise the Building Codes to ensure relevance.

Construction regulations sets out the minimum legal requirements for construction works and relate primarily to the health, safety and welfare of the workforce which must be considered when planning construction operations and during the actual construction period (Chudley et al., 2006). According to Mohammed, (2010), construction regulations must incorporate a provision that the contractor who plans to perform any construction shall before carrying the work notify in writing the competent authority for construction planning. Traditionally, cost, quality and time have constituted the parameters within which projects have been managed. However, increasing awareness relative to the role of health and safety in overall project performance and the inclusion of health and safety as a project performance measure by, inter alia, building construction industry, has engendered focus on health and safety by a range of stakeholders. The number of large-scale housing construction accidents in Kenya in the recent past has further raised the level of awareness.

Regulation of building construction in Kenya is done through a statutory authority known as the National Construction Authority (NCA), whose function is to establish and oversee the construction industry and coordinate its development. Based on GOK, (2011) report Based on GOK, (2011) report, the NCA is mandated to encourage the standardization and improvement of construction techniques and materials, provide, promote, review and co-ordinate training programs for skilled construction workers and construction site supervisors, accredit and register contractors and regulate their professional undertakings, accredit and certify skilled construction workers and construction site supervisors, develop and publish a code of conduct for the construction industry.

From the preceding paragraphs, regulatory environment had an influence on the performance of housing construction project (s) in terms of compliance to the requirements - EIA permit processing, cost of compliance, taxation, insurance and permits processing fees, compliance with labour policies, lengthy conflict resolution mechanisms, and abrupt change in legislations. This environment was analysed to determine its influence and relationship with housing construction performance.

2.5.1 Regulatory framework practices and project performance

Regulation is treated as synonymous with law. Regulations are rules or norms adopted by government and backed up by some threat of consequences, usually negative ones in the form of penalties while a regulatory framework on the other hand, refers to a system of rules and the means used to enforce them. They are usually established by industry regulators to regulate the specific activities (Edinburgh, 2003). According to the Architectural Association of Kenya (AAK), regulatory framework is the due process of rules surrounding a single topic that entails all the relevant legislative documents (acts, regulations, annexes) and describes the agency or body responsible for administering the framework.

The housing regulation find it necessary to identify the factors that promote and determine the future regulation process of the housing construction and regulation process and associated standards and guidance in the next many years in relation to sustainable housing construction issues (Architect and Quantity Surveyors Act, 2010). The factors are based on emerging scenarios related to physical, social and economic changes that are taking place in the country and globally like international requirements, human needs and responsibilities and technological changes. Edinburgh (2003) indicated that the factors included climate changes, resource conservation, waste minimization, biodiversity and health and well-being of individuals and communities in and around the building. According to Christensen, (2009), the relationship between construction practices and regulations and a variety of economic growth, environmental quality and social prosperity factors is increasingly being recognized globally.

The current regulatory framework in developing countries like Kenya results in conflicts due to inadequacy at the boundaries of the responsibilities of its composite agencies and inevitably policy and development aspirations (Grimshaw, 2001). An ideal situation may be unachievable, but few would argue that no improvement is possible. The sustainable development agenda (GoK, 2003) has already brought many important issues and conflicts to the fore front, particularly in respect to planning, land use and housing construction activities (Warren & Wilkinson, 2008). It was concluded that the regulatory framework had an influence on the performance of the housing construction industry and should be given due consideration and adequate attention if the housing construction project (s) were to complete successfully.

2.5.2 Nairobi County Government regulatory practices on project performance

Nairobi County Government 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. On June 27, 2013 the Nairobi City County adopted the new Financial Act 2013 which became effective as of October 1, 2013. The Act modified the method of assessing the house building permit fees and consolidated several costs into one. The house building permit fee is now based on the size of the building. The Joint Building Council Rates provide the estimated cost per square meter which varies depending on the type of building (office block, and residential building). One will first approach the City Development Department of Nairobi City County Government to get their architectural plans approved. Before submitting the application, one must pay the relevant fees. Once the payment is made, you submit the receipt to the City Development Department to have the architectural plans approved. The application must contain the architectural drawings and plans, land title, copy of main architect's license (Nairobi City County Government, 2013). The application then gets forwarded to various departments: Physical Planning, Road Department, Public Health, Fire Department, Water Authority, and Electricity Authority. Each department takes at least one week to clear the respective section of the plans and grants separate permits for the plumbing, sewerage, and electrical activities (Nairobi City County Government, 2013). After the building permit is obtained, you must submit its structural project separately. The process takes many months to complete and sometimes due to lack of documents like the title deed, the process stalls and affects the projects' implementation.

Since 2006, Nairobi City Council, now Nairobi County Government had been reforming under Rapid Results Initiative (RRI), trying to reduce the number of days to process required permits and eliminate the bottlenecks. Since 2008 the architectural project approval was done by the Technical Committee that convened twice a week and issued the approvals. Previously, the approving body was the City Council itself. However, due to its busy schedule and backlog, it was decided to transfer the responsibility from the City Council to the Technical Committee. Because of various reforms it takes on average 30 days to obtain this part of the approval, as opposed to 50 days before. However, approval time can vary depending on the diligence of the architect (Daily Nation, 2014). Most city authorities experience various challenges in regulating housing construction. This is clearly a stylized depiction of the long gauntlet of regulatory approvals prior to initiation of major housing development projects. Further complicating the situation was the lack of a single approval process (Productivity Commission, 2005). Instead, developers must deal with multiple agencies and approval processes that relate to separate regulations governing land use, building safety, environmental considerations, and other regulations. Testa et al, (2011) asserts that in most instances, decision making for approvals is highly prescribed by relevant regulations with respect to the participation of different groups, locus of decision making, and appeal procedures.

2.5.3 NEMA regulatory practices on project performance

The National Environment Management Authority (NEMA) is a body established under the Environmental Management and Coordination Act (EMCA) 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 (EMCA, 1999). NEMA has the primary responsibility of implementing environmental safeguards, although many actors have responsibilities including civil society, private consulting firms, development banks which finance infrastructure and other government actors including local government and the court system. Currently, the system suffers from inadequate funding, corruption, a lack of engagement with important community stakeholders, gaps or duplications of regulations, and a misunderstanding by society at-large of the benefits of a sustainable project. These serious issues result in little oversight of development projects with potentially huge environmental impacts.

Kenya's Environmental Impact Assessment Law (EIA) requires the assessment of housing construction projects affecting the environment. The EMCA specifically lists the required elements for this assessment. According to NEMA, environmental assessments for housing construction sites exceeded 80% since 2009, and increased to 90% in 2012. If these statistics are accurate, and all environmental assessments have been conducted and approved by the appropriate departments, there would be substantially less environmental pollution and interference (houses build close to water bodies, rivers, over sewer lines, near or blocking roads, among others). While NEMA has addressed 82 serious violations, 20% of the 406-approved gated community construction projects have yet to comply with the EIA Law (these are part of the inactive projects). These statistics show that regulation of housing construction projects is superficial, reaching only as far as the environmental assessment. According to Canfa, (2013), those agencies responsible for drafting reports tend to falsify them to satisfy housing construction entities. For example, in one report, the real distance between a proposed building and a river was 5 meters, while the EIA report stated the distance at 40 meters. Consequently, the construction was approved.

2.5.4 National Construction Authority regulatory practices on project performance

Regulation of housing construction in Kenya is done through a statutory authority known as the National Construction Authority (NCA), whose function is to establish and oversee the construction industry and coordinate its development. The NCA is mandated to encourage the standardization and improvement of construction techniques and materials, provide, promote, review and co-ordinate training programs for skilled construction workers and construction site supervisors, accredit and register contractors and regulate their professional undertakings, accredit and certify skilled construction workers and construction site supervisors, develop and publish a code of conduct for the construction industry (GOK, 2011). Delays in permitting and housing construction are clearly noteworthy concerns. In a study by Ben-Joseph (2003), developers who participated reported waiting an average of 17 months for relevant permits. One-fifth of the respondents reported waiting more than 2 years. In a study of motivations for building-code compliance by home builders in western Washington, May, (2004) found that a primary motivation for compliance, cited by 76 percent of the respondents, is avoidance of delays in housing construction. Luger et al., (2000) provide insights about the sources of delay for residential development in their surveys of regulators in New Jersey and North Carolina, just like in the local scene.

Inconsistencies in regulatory requirements and inspections constitute another set of noteworthy concerns. More than three-quarters of the residential homebuilders surveyed by May (2004) cited these inconsistencies as a constraint on code compliance. Unnecessary delays and the impacts of local administrative discretion each were cited as the most burdensome aspect of regulation by approximately one-quarter of the respondents in both the 1976 and 2002 studies summarized by Ben-Joseph (2003). These are all different ways of communicating concerns about lack of coordination and inconsistencies in interpretation of rules. Inadequate inspectorate department has led to mushrooming of slums and informal dwelling places in the name of housing estates in Nairobi as well as in other counties (EMCA, 1999). From the reviews done, it is evident that the period required for acquisition of all the necessary permits for housing construction of a gated community project to break the ground, other things held constant is about one year - 224 days (appendix V). Doing Business (2016), asserts that this situation can create a lot of problems if the project planners do not take heed of all the requirements and in many occasions, it has caused projects' cost overrun and schedule delays.

2.6 Technology environment and project performance

Technology is an aspect of the environment that should be considered in developing strategic plans. Oladapo and Olotuah (2007) maintained that the appropriate housing construction technology can be measured by the availability of locally made plant and equipment, skilled manpower resources, extent of local material resources and the degree of utilization of such local construction resources. However, the housing construction industry in Kenya is characterized by the development projects which required the construction technology and resources of developed countries (Sun and Howard 2004). The lack of technological know-how and the shortage of managerial manpower are one of the major problems and constraints facing housing construction in developing countries. The situation is aggravated by acute shortage of managerial manpower (Oladapo et al., (2007). According to World Economic Forum, (2014), as at today, the country remains a net importer of technical manpower, virtually most spare parts are imported and most investment in research and development are made abroad, except those sponsored by the government in public owned institutions.

Due to environmental concerns and the need to reduce costs, the housing construction industry worldwide has experienced increased innovation and modernization in terms of technology (Moavenzadeh, 1978; Wells, 1984; Marques, et al., 2007). However, Kenya has not fully taken advantage of this international know-how (Sun et al., 2004). This was visible in the World Economic Forum technological performance indicator, where the country was ranked position 92 in the world, beneath South Africa, Rwanda, Tunisia and Egypt (Adriaanse et al., 2005, and World Economic Forum, 2014). Kenya's poor performance is a result of the following factors: reduced degree of absorption of new technology associated with the lack of skills; low levels of innovation, weakness in protecting intellectual property rights; and reduced private sector investment in research and development, due to its relatively small size and under capitalization (Elkhalifa, 2011, ANEMM, 2000, and AIMO, 2010). Indeed, the government industrial strategy for vision 2030 flagged this issue, pointing out the technology gap as one of the main factors behind the indigenous companies' inability to compete. The strategy called for urgent measures, but in a recent survey, World Economic Forum (2014), found that the situation has not changed even though the implementation period of the industrial policy and the strategy paper is approaching its end. Over 62% of the companies surveyed during the AIMO 2010 study (including producers of building materials, such as cement and heavy construction firms) had not made major acquisitions of new technologies since the 2000s, their machinery was over 20 years old and they were finding it hard to maintain and replace spare parts. This in turn impacted on the housing construction projects' prevailing environment hence it affected the performance.

In the present, information and communication technology (ICT) is responsible for the entire housing construction process from information being generated, transmitted and interpreted to enabling the project to be built, maintained, reused and eventually recycled (Chudley et al., 2006). The everyday life of individuals is increasingly relevant of ICT. This has totally transformed individuals and organisations to its wide spread use (Peansupap et al., 2005). The impact of ICT on modern society is profound, and its growing speed has enabled globalisation especially through the introduction of a global system of interconnected computer networks known as the 'internet', used for communication between individuals, companies and institutions for sharing and exchanging information and data (Sun et al., 2004).

The housing construction industry is faced with the ongoing challenge of changing and improving current work practices to become more client-orientated; more competitive as well as productive through adoption of ICT as an integral part of the construction process (Weippert *et al.,* 2003). Much effort has been directed toward improving housing construction productivity and the use of ICT in construction and this is an area worth concentrating upon because it can decrease the time for data processing, communicating information and increase overall productivity. Modern structural design software applications, such as 3D modelling and building information modelling (BIM), provide an example where designing complex structures and organising the electrical, mechanical, site, structural and quantifying of a project can be achieved in minimum time and increase the efficiency all in one data framework, whereas in the past this was almost impossible (Peansupap et al., 2005). ICT in construction industry can be broken down into different segments for its better understanding and its role in construction. The word Information, from different perspectives as well as towards an ICT view, has a whole new meaning of its own. Adriaanse et al., (2005) give explanation from the functionalist (positivistic, ‘scientific’) perspective that “ICT is a neutral provider of input for decision making”. In this point of view communication is no more than distribution of information. ICT may be adopted by specific groups of users within an organisation. For example, use of computer aided drafting (CAD) by architects or estimating software used by engineers or project managers. Emmitt et al., (2003) identifies the reality that, communication between housing construction industry participants and organisations are concerned with information exchange, dealings with drawings, specifications; cost data, programmes plus other design and management information. Conclusively, Day et al., (1986) asserts that ICT can be the interaction of meaning to reach a mutual understanding between a sender and a receiver via technology.

2.6.1 Influence of computer aided design (CAD) and building information modelling (BIM) on project performance

Different literatures have described and broken-down information and communication technology in relation to housing construction industry. The interaction touches on both the soft and hardware as used in modern ICT technology for purposes of communication and processing information at a speed formerly thought impossible. These include: Computers **-** Computer systems for building and architectural purposes are so much faster now than they were when they first came in the 1970s (Howard, 1998). Specially configured systems can even be purchased specifically for different purposes ranging from speed to its ability to higher graphics. These computers can also be connected to different hardware such as a projector for projecting images (used during presentations), printers, light pens, scanners, telephones and fax. Software and applications have been a very huge development in the history of ICT and has changed the conditions within building design and procurement. For construction industry, different applications have been built specifically for different purposes and some are compatible with others. For instance, drawings created in AutoCAD by an architect can be transferred to modelling software such as 3D studioMAX. There are also different applications such as those for contractors and surveyors which involve accounting and processing data for contracts and consolidating results for architects and engineers; Computer aided drafting (CAD) **-** The major output of any architectural and engineering team is drawings and these drawings are now mostly generated on computers. Like any other CAD software, construction oriented CAD are based on the same principles but may differ to some extent in their designing and application methods. CAD systems provide drawing entities with powerful construction, editing and database techniques to produce drawings and models of what buildings will look like when finished (Dace, 2007). They are based on the foundation of drawing primitives (2D/3D lines, arcs, curves, 3D surfaces, text). Its data can also be read and stored in by other applications software and hardware for analysing the output information.

Computer Aided Design system could be used to generate 2D drawing, and can be linked to another or same software as the case may be and generate the 3D model. It can be stored for future references, printed, projected, edited, modified, any number of times; Spread sheets and word processors - Spreadsheet, word programs and microcomputers have transformed information processing in construction organisations. They are used to solve problems and get around the long delays encountered in dealing with the traditional manual way of getting office works done (Sun et al., 2004). Spreadsheets like Microsoft excel, word and PowerPoint are very important office tools as they stand for the every day to day running of worksheets. They are frequently used for financial information and presentations as they can be used to create and edit charts, graphs and tables. They are a very important ICT tool in the construction industry as they are designed to perform general computation tasks using spatial relationships. Most documentation, letters, calculations and presentations are being done on spreadsheets and they are usually compatible to the CAD software and firms may independently operate small-group ICT innovation such as planning and scheduling applications using spread sheets and word processors; Building information modelling (BIM) - In the construction industry computers are used to automate and simulate hand-drafting methods, and 3D models have assisted in showing what building will look like by the time they are built. BIM software can directly and interactively present concepts of design in a form which represent physical and real images of the building to allow designers to identify clients' needs, and to promptly and effectively provide solutions to these needs (Dace, 2007). They involve more people from design, management, construction and operations during the design phase which helps a great deal in the lead to design improvement. They have the other personal computer- based construction planning packages such as spread sheets and CAD. They can build a project from the beginning to the end and be able to detect unclear flaws on the computer screen before actual field construction. According to Eastman et al., (2008) it is a tool to assist in improving communication and collaboration for a successful overall productivity by designer and contractors.

2.6.2 Influence of e-mails' use on project performance

E- Mail as is all known is simply the transfer of data from one person's computer files (or a mobile phone device) to another. It works via the internet. Nowadays, not only is text and pictures transferable via mails, but videos programs. In construction, electronic mails are very useful as they are very fast and convenient means of sending and receiving mails and files. Secured means and encryption are available too by third party software or hosts of the mailing site. Electronic mail does not simply speed up the exchange of information but leads to the exchange of new information as well (Sun and Howard (2004). In 1993, the introduction of the graphically-based World Wide Web led to an explosion in Internet usage among non-scientists and paved the way for commercial uses (Sun et al., 2004). The World Wide Web can provide the graphically-based tool for sharing information (text, full-colour graphics and photos, audio and video) through computers. Information on the Web can range from presentations to online publications to personal `home pages' and can from any computer or electronic gadget equip to connect to the internet. It is an interactive interface and provides a popular way to access information and networking. Between construction teams, physical distance generates communication barriers and the variety of communication media and modes in construction further augments its communication difficulties.

On site, simple radio signals can be used to communicate between participants, but messages sometimes get distorted or delayed. Further, using long distance calls or overseas reproduction is very costly and the cost of using the Internet services (WebEx, skype for video teleconferencing,) is much lower than that of express courier services. Messages can reach the recipients as soon as it is sent and can also be traceable. The Internet is a global network which is not restricted by locations, time or different computer operating systems (Tam, 1999). Networks in general and the Internet provide exceptional opportunities for communication and data exchange among and within construction firms. At a local scene, Safaricom's Mpesa transaction represent a technology which has affected every other sector of the economy. Walking distance has greatly reduced by use of internet and mobile phones e-commerce. Its easy today to source and purchase goods and services from your house by use of your handset/cell phone!

2.7 Project manager's personal attributes and project performance

The environment entailing the personal attributes of the housing project manager (PM) is perhaps the most important determinant of the project success or failure. The project manager plans, organizes and controls every detail of the project and must have knowledge of general management as well as specialized background in the nature of the project (Jugdev et al., 2005). Formal project management training is of great value to the project manager. The project manager is the ultimate authority on the development and completion of a construction project. Generally, a project manager spends his or her time overseeing the project and hiring and approving work completed by sub-contractors as well as negotiating contracts and developing a budget and a timeline for the completion of the project. If issues arise with contractors or permitting, the project manager is responsible for resolving those issues with either the sub-contractors or government officials (Munns et al., 1996). These professionals also work as a liaison between the construction team, architects, designers and the owners and stakeholders of the project to facilitate communication, decision-making and problem-solving. Jin et al., (1996) affirms that project managers typically require a broad background in both construction techniques as well as design, engineering and business administration skills.

One major factor that would impact on the success of a project would be the quality of management and leadership oversight provided by the project manager. Although project management by itself cannot guarantee success, research has indicated that project management is central in the planning, production, and handover phases of the project (Jugdev et al., 2005; Munns et al., 1996). During these phases, project management is the entity that takes a concept and set of objectives that resides with a client to reality; and the project manager is the central person responsible for facilitating these actions. It is a difficult endeavour to create a comprehensive list of all the actions that a project manager must engage in to fulfil these responsibilities because his or her responsibilities are so vast. In the broadest terms, the project manager is viewed as a direct representative of the firm's senior managers and is responsible for the overall success/failure of the project. From the project team perspective, the project manager is expected to possess some level of technical competence regarding the project work (Grant, et al., 1997) and at the same time possess the leadership skills needed to guide his or her diverse team of people (Turner et al., 2005). Study done by Bownekamp et al., (1987) revealed that other responsibilities of the project manager included building the project team, planning and evaluating the work, interfacing with the client, and proper allocation of the firm's project resources.

The project manager must also be able to forecast project needs, assess project risks, communicate plans and priorities, assess progress and trends, and get quality and value for the money invested in a project (Smith, 1995). From literature reviewed, the responsibilities of the project manager are incredibly comprehensive. However, a common thread among those that have tried to capture this list is the idea that these project managers are typically not given the same authority as that of traditional managerial positions (Keane, 1996; Bowenkamp et al., 1987) which creates a source of difficulty for the project manager. Project management is said to be more organic, more complex, and more varied than functional management (Pettersen, 1991) adding to the difficulty of the job. Seven key project manager attributes were identified from the literature and defined for the purposes of this study as below:

2.7.1 Leadership Ability, Communication, Decision making, Administrative skills and project performance

Leadership concept at its core is a process of influencing a group of individuals such that the group collectively agrees to and accomplishes a common goal. Leadership ability, then, is the ability for an individual to control that process (Northouse, 2004). Within a project management context, the project manager is charged with leading his project team through the successful completion of the lifecycle of a project which is in an increasingly complex and competitive project environment (Bowenkamp et al., 1987; Brugger et al., 2000; Hyväri, 2006; Zimmerer et al., 1998). The importance of leadership ability was highlighted by other authors throughout the project management literature. Odusami, (2002) found that construction professionals ranked leadership skill as one of the top four skills necessary for a project manager and Crawford, (2000) found that leadership was the most mentioned project manager’s attribute among sixteen studies reviewed.

Testing the contribution of leadership empirically, Thamhain, (2004) found a significant positive relationship between the existence of team leadership and high performance of construction project teams. Given the consensus among project management authors about the importance of leadership ability, it can be expected that a positive relationship exists between this project manager attribute and project success.

Communication was defined as the process of conveying any thought, idea, concept, feeling or opinion between two or more people (Samovar et al., 1995). With regards to project management, the project manager uses this skill in the conveying of construction project information to others and must be done so with efficiency given the highly technical, detailed nature of the work (Pettersen, 1991). Bowenkamp et al., (1987) and Einsiedel, (1987) suggest that project managers deal with complex ideas and vast amounts of information. In addition, project managers must engage in constant coordination among multiple organizations and stakeholders, and all while working within the restrictions created by the conflicting relationship of complete project responsibility and little formal authority. Communication skill is an important tool that the project manager must possess and master. Several studies emphasize the importance and contribution that communication ability makes within the context of construction project management success. Hauschildt et al., (2000) offered that effective communication was one of 24 factors related to project manager’s success, and Posner, (1987) found that communication skill was the most frequently cited skill in a survey of 287 project managers. Similar to the studies on leadership ability, Odusami, (2002) ranked communication skills as one of the top four skills perceived as necessary, and Crawford, (2000) revealed that communication was a frequently referenced skill in her review of 16 construction project management studies. Katz et al., (1979) reported that communication patterns varied distinctly between high performing project teams and low performing project teams. Given the importance placed on communication skill and the results of studies investigating this attribute, it was expected that a positive correlation existed between a project manager's communication ability and the level of success he or she achieved.

Decision making is defined as, how individuals use and combine information about a set of alternatives to decide (Radecki et al., 1996). Gushgari et al. (1997), applying decision making to construction project management defines it as the "ability to take appropriate action under the constraints of limited time, information, and resources". Posner, (1987), in discussing the role of the project manager as problem solver, states that the project manager must understand the critical problems he or she faces, such as inadequate resources, insufficient time, and unclear goals and direction, and be prepared to manage them. Because the project manager operates in a constrained resource environment, the management of these problems will always require decisions to be made among alternatives. Some work has been done in identifying decision making skill as an important attribute to possess (Gushgari et. al, 1997; Pettersen, 1991; Odusami, 2002; Crawford, 2000; Bownekamp et al., 1987), but no studies have been found that directly link this skill to performance, warranting further investigation, an initiative which was taken by this study. Decision making is a skill that everyone possesses and exercises in different ways (Kirton, 1976). The measurement of decision making style (as opposed to decision making frequency or decision-making quality) was deemed appropriate. Working in the field of applied psychology, Kirton established that everyone can be placed on a continuum of decision making style which ranges from adaptive to innovative. He postulates that those who view problems as having to be solved within existing paradigms and structures, the more adaptive a proposed solution was to be. Those that view existing paradigms and structures as part of the problem itself, and that changing the structure surrounding the problem where possible, were more likely to propose innovative solutions. Kirton terms adaptive decision makers as “doing things better” whereas innovative decision makers “do things differently”. He described the adaptor as in the following way: an organizational man who works in “reducing conflict, minimizing risks, and managing to solve problems by proceeding at a disciplined pace in a predictable direction”. As if he were describing a project manager, it was expected that a positive correlation existed between the extents to which a project manager possessed an adaptive decision-making style and his/her construction project management success.

Administrative skill comprises of two facets – planning and organizing (Kim et al., 1995). Administrative skill is described as the ability to plan and move forward in a systematic, organized fashion (Bartram, 2005). Kim et al., (1995) state that this skill is the determination of objectives and strategies (planning), the use of priorities in allocating resources (planning), and the attempt to improve the processes of coordination, production, and organizational effectiveness (organizing). Administrative ability is important to the project manager because he is charged with the initial planning, constant performance monitoring, and periodic re-planning should project conditions change. These three aspects of the project manager’s responsibilities are not limited to himself, but he must also ensure that the functional managers that contribute to his construction project manage their portion in the same coordinated way (Bowenkamp et al., 1987). The role that administrative skills play regarding project manager’s success is tested in at least three studies.

Hyavri, (2006) surveyed project stakeholders on project managers they recently conducted business with and found that planning and organizing ability were viewed by stakeholders as the best predictor of project manager effectiveness. Hauschildt et al.,

(2000) surveyed supervisors of project managers and found that administrative skill was a significant factor in the most successful project managers. Anderson et al., (1994) found a strong correlation between administrative skill and project manager success (but this relationship was mediated by the project managers use and knowledge of project management "best practices"). In sum, these three studies showed that administrative skill was a significant factor towards performance and it was expected that a positive correlation between this factor and construction project success exists.

2.7.2 Technical Competence and project performance

Technical competence can be defined as the competency to use project management tools and methods to carry out projects (Hyavari, 2006). In exploring the perceived importance of technical competence within defence acquisition, Grant et al. (1997) derived a similar definition of technical competence as the understanding of project management tools, techniques, and technologies. Hyavari, (2006) and Grant et al., (1997) reported that technical competence was perceived by their study's respondents as an important trait of the project manager, and Odusami, (2002) and Crawford, (2000) list technical competence within their rankings of important project manager attributes. Like several of the attributes described in the preceding paragraphs, the significance of technical competence as it relates to a project manager's success is unclear. Anderson et al., (1994), for example, advised that selecting a project manager with an appropriate technical background is essential, but caveat their statement saying that technical competence without managerial capabilities is not enough. Goodwin, (1993) offers that project managers who have too strong a focus on the technical aspects of a project may fail to recognize organizational, political, and other external realities to the detriment of their work.

Some other studies have reported that technical competence is related to success, or at least perceived to be related; Thamhain, (2004), for example, finds that the use of project management tools and techniques has a strong influence on team performance. Although it appears that technical competence is not as significant as other project manager's attributes in predicting success, its importance within the literature still drew the expectation that the level of technical competence a project manager possesses positively influenced the level of success he/she achieved. Therefore, the 7 key areas formed an additional project environment that operated around the project manager's personal attributes and that were deemed to have a relationship with the construction project's performance.

2.7.3 Demographic Attributes and project performance

The characteristics of the project manager include those such as gender, age, educational level and the institution. Kloppenborg, (2003) exposed that gender had only a small effect on transformational and transactional leadership behaviour, but the interaction of gender and education produced consistent differences in employees' assessments of leadership behaviours. Belout et al, (2004) exposed that women were increasingly praised for having excellent leadership skills. "Though, more people preferred male than female bosses and it is more difficult for women than men to become leaders and to succeed in male-dominated leadership environments". Geoghegan et al, (2008) reported that demographic variables such as gender and age had a significant effect on institutional employees' assessments of their institutions and on subordinates' perceptions of the leadership style. Curran, (2009) found that men were more likely to adopt an authoritarian style while women tend to adopt a transformational style, relying heavily on interpersonal skills. Furthermore, men tend to manage by punishment while women manage by rewards and usually care for the feelings of people. "Anantatmula, (2010) revealed that females were more likely than males to be transformational leaders. Nixon, (2012) asserts that females had a higher perceived effectiveness in coping ability and analytical thinking than men

Coping ability is defined as the ability to control thoughts and behaviours used in managing a situation or condition evaluated as stressful (Lazarus et al, 1984 and Folkman et al, 2004). This ability is necessary in several settings; Judge et.al, (1999) describe one such situation where individuals must deal with organizational change or workplace ambiguity. Similarly, Bartram (2005) offers that coping is the capability of an individual to adapt and respond well to change, which includes dealing with ambiguity, pressure, and setbacks. The occupation of project management is one in which the project manager must constantly deal with change, ambiguity, pressures, and setbacks (Einseidel, 1987; Posner, 1987). The environment of the project manager requires that he or she deals with changes in resources, shifting stakeholder expectations, problems resulting from ambiguous and unclear objectives, conflict among project team members, and conflict between organizational functions (Goodwin, 1993; Pitagorsky, 1998). Given this ever-changing and ambiguous environment, individual coping ability is regarded as a critical project manager's attribute (Einseidel, 1987; Goodwin, 1993; Pitagorsky, 1998; Posner, 1987). Analytical thinking on the other hand is defined as the ability to analyse and interpret information to solve complex problems and issues (Bartram, 2005). This skill is related closely to general mental ability (GMA) which refers to an individual's capacity to process information which guides behaviour, or, simply put is the capacity to learn (Le Pine et. al, 2000; Schmidt, 2002). Given these two definitions, and for the purpose of this study, analytical thinking was an individual skill that centres on information processing for solving complex problems and issues and is tied closely to GMA. The analysis of this skill and its link to construction project success was quite limited with only one study suggesting this link. Using the term "integrative thinking," Hauschildt et. al, (2000) proposed that this skill was one of seven factors which distinguished more successful project managers from the less successful.

2.8 Project Macro planning process and project performance

Planning is defined as a general term which is used in project management to encompass the ideas commonly referred to as programming, scheduling and organizing. Its aim is defined as: to make sure that all work required to complete the project is achieved in the correct order, in the right place, at the right time, by the right people and equipment, to the right quality, and in the most economical, safe and environmentally acceptable manner (Mawdesley et, al. 1996). There are different planning processes which can be adopted by the project manager(s) depending on the nature of their project organization. One of such planning processes is the macro planning process (Pre-construction planning) which takes into consideration the characteristics of complex project planning (Waly et al.,2002). This process takes place during the pre-construction stage of the project and involves the selection of major strategies, reviewing design constructability, the planning of major site operations and construction path, and arranging the primary means, methods and resources for the realization of the work packages. A project's macro planning is of vital importance to its successful delivery and execution (Waly et al.,2002). An important part of macro planning process in construction projects is the creation of the project schedule. The project schedule places all the tasks of the project in a logical and sequential order. The macro planning process of most construction projects depends on the market demands and available resources. This process sets the priorities and schedule for the tasks necessary to complete the operation's objectives. During the macro planning process, Thamhain, (2004)reveals that the project may be organized in a variety of ways: Sequential - in which the project is separated into stages completely in a consecutive sequence of tasks, Parallel - in which the project contains independent portions that happen simultaneously, and Staggered - in which the different tasks may overlap with each other.

There are nine specific areas that require a project manager’s attention and should be incorporated into the macro planning process: Integration - to ensure that the various project elements are effectively coordinated; Scope - to ensure that all the work required (and only the required work) is included; Time - to provide an effective project schedule; Cost - to identify needed resources and maintain budget control; Quality - to ensure functional requirements are met; Human resources - to effectively employ project personnel; Communications - to ensure effective internal and external communications; Risk - to analyze and mitigate potential risks; and Procurement - to obtain necessary resources from external sources (PMI, 1996). Each of the nine key areas integrated with the way the project has been organized (Sequential, parallel or staggered) will yield different results and the project manager should constitute the planning partners with the end result in mind if the project is to be delivered successfully (Thamhain, 2004). Depending on the type of tasks, variations in the sequence of tasks are possible.

The project manager therefore, during the pre-construction stage of the project (macro planning) needed to identify major strategies, review design constructability with the stakeholders, plan for major site operations and the construction path to be followed, and arrange the primary means, methods and resources for the realization of the work packages. These must be worked with reference to the initial project performance indicators, and considering the prevailing project external environment (Thamhain, 2004). For this purpose, the project manager must use various tools and techniques if the macro planning process will yield the desired results. Wilson, (2002) confirmed that the various tools and techniques necessary when undertaking the macro planning process in construction projects included: Gantt charts; Critical Path Method and Line-of-balance; and 4-Dimensional (4D) models, and are briefly discussed in the succeeding paragraphs.

2.8.1 Gantt Charts, Critical path method (CPM), and Line of balance (LOB), and project performance

Although it has a long history, project planning (and scheduling) first became formalized with the introduction of the Gantt chart by Henry L. Gantt in the early 1900s (Wilson, 2002). Initially, Gantt charts were a production planning tool that the production industry used to plan and manage batch production. Gantt charts use a time phased dependent demand approach to production planning (Wilson, 2002). By comparing the Gantt chart ‘as planned’ with the Gantt chart ‘as built’ project managers can analyse the performance of the overall project and isolate tasks and their allocated resources to analyse their performance individually. This makes the Gantt chart a useful tool for both project planning as well as project control. Computer-based tools such as MS Project and Primavera P3/P6 make use of Gantt Charts and have set an industry standard for the modern creation of project schedules linked to the resources of a project. These tools also can apply the Critical Path Method (Lu et al.,2008), and indicate the amount of float that non-critical tasks have.

CPM is a method that creates a sequence of tasks based on the (types of) dependencies and durations that add up to the longest total project duration. Float is defined as the additional time tasks can use without affecting the overall construction schedule. Galloway, (2006) gives an in-depth overview of how the construction industry views and applies CPM in the macro planning and realization of construction projects. She found that CPM scheduling has become a practical standard that is applied even when clients do not specifically request it and that it is also considered to be beneficial in risk management applications.

Another technique that, like CPM, has been used since the 1950s is the Line- of-Balance (LOB) technique (Suhail et al.,1994). LOB is a resource-oriented scheduling tool as opposed to CPM, which is characterized as an activity-based scheduling tool (Trimble, 1984). Although it is less widely used than CPM, LOB offers distinct advantages when applied to projects with repetitive tasks (Suhail et al., 1994; Tokdemir et al., 2006). With the LOB technique, planners can create a schedule that is optimized for the resources that the repetitive tasks require. Combining LOB and CPM gives the possibility to level resources and to utilize float times to streamline the scheduling process and achieve project goals related to productivity and reduced costs (Suhail et al., 1994). This ensures that the resources available to the project are spread evenly and that no tasks are scheduled when too little resources are available to complete these tasks. In macro planning for the realization of a construction project, this technique is also useful to examine different scenarios of resources availability and determine a resource strategy that can match the client's demands in terms of project costs and duration.

2.8.2 Four dimensional (4D) models and project performance

The most recent addition to planning and scheduling tools available to the construction industry is computer based 4D technology. Four-dimensional (4D) construction macro planning provides the ability to represent construction plans graphically (Heesom et al., 2002). A 4D model results from the linking of 3D graphic images to the fourth dimension of time (Koo et al., 2000). In the 4D model, the temporal and spatial aspects of the project are inextricably linked, as they are during the actual construction process (Fischer, 1997). In recent years, 3D and 4D models have been used in more and more construction projects to support management tasks (Hartmann et al., 2008). Because of the presence of a direct link between 3D design and the project schedule, a 4D model has more areas of application than traditional 2D drawings and a CPM. McKinney et. al, (1998) confirmed other advantages that 4D applications have over traditional 2D methods, and they included possibility to represent construction plans graphically (Heesom et al., 2002) and that the visualization of a construction project and its schedule helped planners in the process of identifying potential problems before actual construction started.

Examples from literature of the areas of application of 4D technology are the visualization of a project for marketing and communication purposes, design review (clash detection), cost estimating, bid preparation/procurement (Hartmann et al., 2008), constructability review (Hartmann et al., 2007), site management (Chau et. al, 2004), scheduling, and macro planning (location-based) work-flow (Jongeling et al., 2007). Heesom et al., (2004) remark that, in general, the utilization of 4D visualization allows a more intuitive comprehension of the construction process than traditional 2D drawings and schedule information. By visualizing the sequence of construction activities and the creation of various components of the construction project, project teams can determine whether the sequence is feasible and logical and whether there are clashes between the project components and activities before the project starts. This tool is very important at macro planning stage and gives the PM additional mileage in coming up with a sound workable and executable plan of the project beforehand.

2.8.3 Organizing project resources and project performance

Organizing technique relates to the micro planning of resources that the project requires to reach completion. According to Winch, (2002), determining and organizing the project resources is an important factor in 'riding the project life cycle' successfully. These resources can vary from the capital for financing the project to the materials, equipment, and human capital involved in realizing the construction project. In the wide spectrum of resources that are involved in realizing a construction project, the project team is perhaps one of the most important as one of its main tasks is to assure the gathering and proper utilization of the other project resources. Depending on the size and scope of a construction projects, project teams can consist of a few to several hundred persons, each with their own specialties and responsibilities (Winch, 2002). Hobday, (2000) states that a project-based organization can respond flexibly to changing client needs and that it is also effective in integrating different types of knowledge and skills.

In addition to poorly integrating the necessary types of knowledge and skills, an improperly formed project team can cause delays and budget overruns, which results in the inefficient realization of the project. Furthermore, during the macro planning process, the early involvement of project team members adds expertise and strengthens commitment to the project (PMI, 2004). The project team is by no means a static entity, but changes as the project moves through the consecutive stages of its life cycle. In the design and macro planning stages, the emphasis of the project team organization is more on specialties such as design, risk identification, and planning. In later stages, the emphasis is more on specialties that deal with realizing the project such as project management, construction crews, and project controllers. However, the persons involved in the earlier stage often still have an important role in later project stages, for instance to solve problems with constructability (Hobday, 2000). Furthermore, because of the complex environment that a construction project represents, authority within an organization becomes more decentralized (Shirazi et al., 1995), making it more difficult to maintain control over the organization. In addition, a construction project team is a temporary organization (Lundin et al., 1995), which means the smooth operation of the organization may require more effort than organizations that are not temporary. All these must be factored at the macro planning stage if the construction project has to complete successfully.

2.9 Theoretical Framework

This study was guided by three Theories – McGregor's Theory of X and Y, Critical Chain Project Management Theory, and the Theory of Performance (ToP). The theories were linked to the variables of the study and thus guided the relationship between the variables under study.

2.9.1 McGregor's Theory of X and Y

Douglas McGregor states that people inside an organization can be managed in two ways. The first is which falls under the category negative and the other one is positive. Under the assumptions of category negative, employees inherently do not like work and whenever possible, will attempt to avoid it. Because employees dislike work, they must be forced, coerced or threatened with punishment to achieve goals. Employees avoid responsibilities and do not work until formal directions are issued. Most workers place a greater importance on security over all other factors and display little ambition. Persons in this category are detrimental to project execution and performance.

Under the assumptions of category positive, physical and mental effort at work is as natural as rest or play. People do exercise self-control and self-direction and they are committed to those goals. Average human beings are willing to take responsibility and exercise imagination, ingenuity and creativity in solving the problems of the organization. An organization that is run on category negative lines tends to be authoritarian in nature. In contrast, category positive organizations can be described as participative, where the aims of the organization and of the individuals in it are integrated; individuals can achieve their own goals best by directing their efforts towards the success of the project organization, hence promotion of the project performance. This theory was best suited to guide the third objective, project manager's personal attributes for the success of the gated community housing construction projects.

2.9.2 Critical Chain Project Management Theory

Critical Chain Project Management is the Theory of Constraints logistical application for project operations. It is named after the essential element; the longest chain of dependent resourced tasks in the project. The aim of the solution is to protect the duration of the project, and therefore completion date, against the effects of individual task structural and resource dependency, variation, and uncertainty. The outcome is a robust and dependable approach that allows us to complete projects on-time, every time, and most importantly within at most 75% of the current duration for single projects and considerably less for individual projects within multi-project environments. The shorter duration provides a sterling opportunity in the marketplace to differentiate ourselves from our competitors who delivers poorer outcomes, and late at that, via other project management methods. It also offers the opportunity to deliver more projects over all, in the same amount of time, and at no increase in operating expense, thus significantly improving the bottom line (Ballard et al., 2002). Application of this theory was meant to improve and ensure project performance was enhanced in terms of completion on time. It was used to guide all the variables under study, but in particular the moderating variable (macro planning process) to capture all the critical tasks so as to deliver the project (s) within schedule.

2.9.3 The Theory of Performance (ToP)

The Theory of Performance (ToP) develops and relates six foundational concepts to form a framework that can be used to explain performance as well as performance improvements. To perform is to produce valued results. A performer can be an individual or a group of people engaging in a collaborative effort. Developing performance is a journey, and level of performance describes location in the journey. Current level of performance depends holistically on 6 components: context, level of knowledge, levels of skills, level of identity, personal factors, and fixed factors. Three axioms are proposed for effective performance improvements. These involve a performer's mind set, immersion in an enriching environment, and engagement in reflective practice.

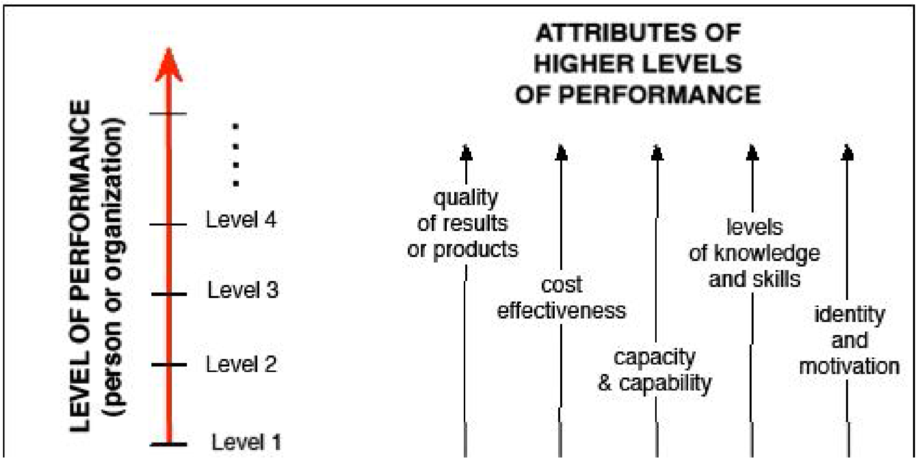


Figure 1: Performance advancing through levels (Hierarchy)

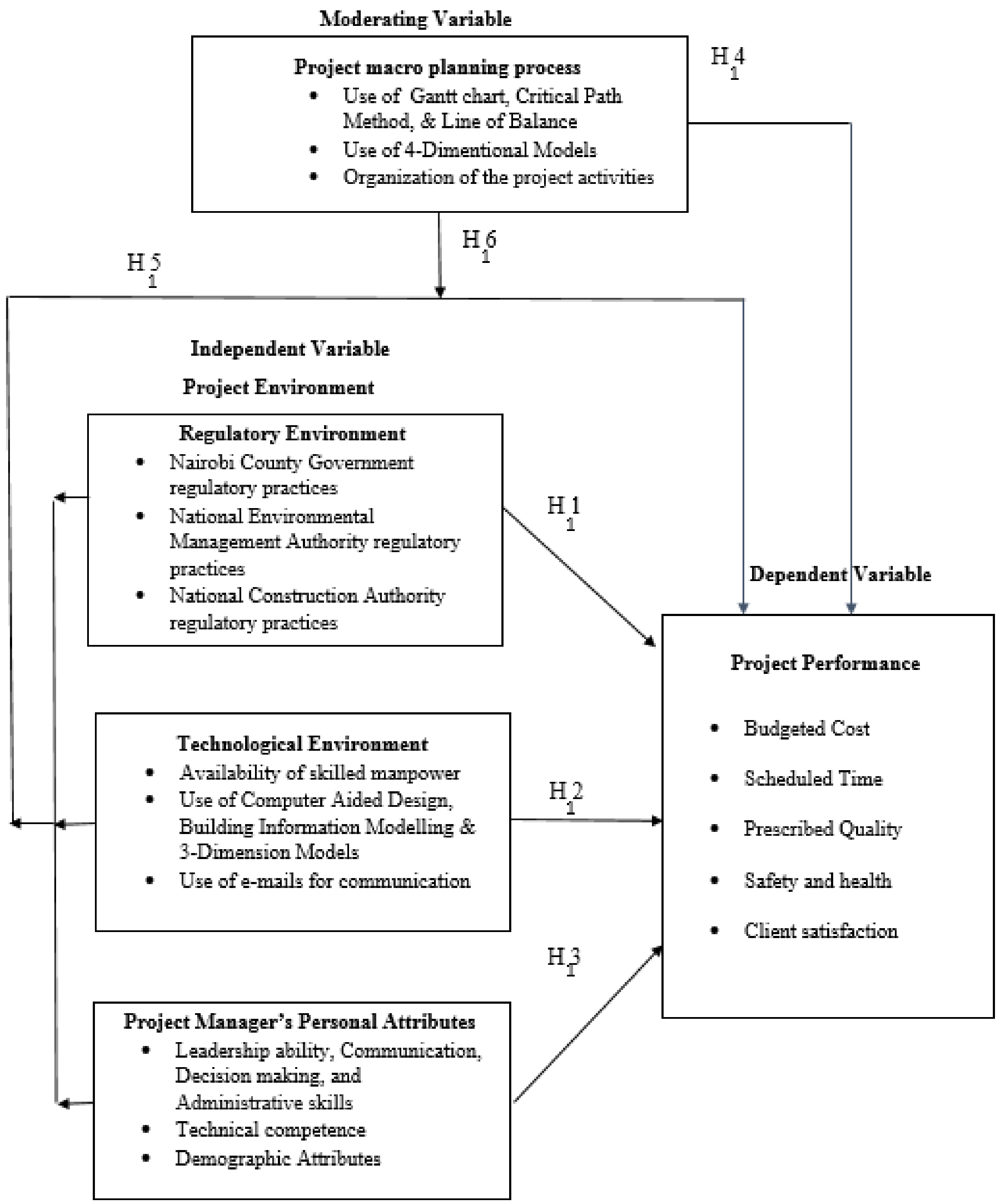
Source: Elger, 2008

Performance advancing through levels is shown in figure 1, where the labels "Level 1," "Level 2," are used to characterize effectiveness of performance. That is, a person or organization at Level 3 is performing better than a person or organization at Level 2. As shown on the right side of figure 1, performing at a higher level produces results that can be classified into categories: quality increases—results or products are more effective in meeting or exceeding the expectations of stakeholders; capability increases—ability to tackle more challenging performances or projects increases; capacity increases—ability to generate more throughput increases; knowledge increases—depth and breadth of knowledge increases; skills increase—abilities to set goals, persist, and maintain a positive outlook, increase in breadth of application and in effectiveness; and identity and motivation increases—individuals develop more sense of who they are as professionals, organizations develop their essence. This theory encourages teamwork and a sense of belonging which is a recipe for housing construction projects' performance. It was applied in all the variables and more to the dependent variable (Project performance). Performance levels can only be ascertained as the project progresses through scheduled and periodic reviews, hence this theory was best suited for this purpose.

2.10 Conceptual Framework for the study

The objective of this study was to examine the extent to which project macro planning process moderated the relationship between project environment and performance in the housing construction industry, by studying the case of gated community projects in Nairobi County, Kenya. It also sought to confirm that, there existed a relationship between project environment and performance in the housing construction industry. The basic assumption was that there existed a relationship between project environment and performance, and that, the relationship was moderated by the macro planning process adopted. Three key factors from the project environment had been identified as technological environment, regulatory environment, and the project manager's personal attributes. The project macro planning process was studied at two levels; as a factor that had an influence on project performance, and as a moderator to the relationship between project environment and performance. The inter-relationship between the study variables are shown in Figure 2.

Figure 2: Conceptual framework for the study



As shown in Figure 2, literature reviewed revealed that indicators of housing construction project performance were Cost, Time, quality, safety and health, and client satisfaction (Thomas et al., 2002, Kumaraswamy, 2002, and Cheung et al., 2004). On project environment, this study embarked on the regulatory environment, technological environment, and the environment surrounding project manager's personal attributes (Walker, 1989, and Hughes, 1989). Regarding the regulatory environment, Oladapo et al., (2004), and Martin, et al., (2004) concurred that managers of construction works needed to get acquainted with planning regulation and Land Use Act legislation, safety requirements, and taxation laws which were part of the legal environment, and this formed hypothesis number 1 in this study.

According to Akanni, et al., (2014), technology is the view of an environment which must be considered in developing housing construction strategic plans. The studies of Walker (2000), and Sommerville, et al., (2006) revealed that technology as an external environment factor significantly influenced effectiveness of housing construction risk management positively, hence improving performance; this formed hypothesis number 2 in this study. The project managers' personal attributes were another project environment which had not received much attention but very significant in the way the project plan would be implemented. The project manager is the ultimate authority on the development and completion of a housing construction project. Generally, a project manager spends his or her time overseeing the project and hiring and approving work completed by sub-contractors as well as negotiating contracts and developing budgets and a timeline for the completion of the project (Munns et al., 1996); this formed hypothesis number 3 in this study.

Project macro planning process according to Clough, (1991) asserted that thousands of tasks must be precisely controlled for a project to complete in time, scope and budget. This formed hypothesis number 4 in this study. According to Akinsola et al. (1997), and Bennett (1991), the project environment interfered with the planned progress of construction projects. The less predictable the environment and the greater its potential effects, the more it must be considered in managing the development of housing construction projects. This formed hypothesis number 5 in this study. During the macro planning process, the project tasks may be organised sequentially, in parallel or in a staggered manner; an arrangement that will moderate the relationship between project environment and performance (Griffin, 2010, Cleland, 1996, Costello, 2008, and Gray, et al., 2008). This formed hypothesis number 6.

2.11 Summary of the Research Gaps

To conclude the literature reviewed, a summary of research gaps was provided in Table 2.1.

Table 2.1: Summary of the research gaps

Author	Focus of the Study	Methodology used	Findings	Gap in Knowledge	Focus of current study
Kihoro & Waiganjo (2015)	Factors affecting performance of projects in the construction industry in Kenya; A survey of gated communities in Nairobi County	Cross-Sectional Survey	The study revealed that there is a positive relationship between planning and performance of projects in the construction industry. Also emphasized that stakeholder management as well as team competence strengthens the above relationship.	The study focused on planning in general, stakeholders' management and competence of project teams. It did not look at the project environmental factors and the role they play.	This study focused on the relationship between project environment and performance. Further it was interested in examining the role of macro planning process as a moderator of the relationship stated.
Akanni, Oke, and Akpomiemie (2015)	Impact of environmental factors affecting project performance in construction industry	Cross-Sectional Descriptive Survey	Political, legal, technological, economic and financial, and project manager's personal attributes had the greatest impact on project performance	The study focused on impacts of project environment factors on project performance and did not synchronize it with the aspect of planning process	This study addressed the influence of macro planning process on the relationship between project environment and performance

Kikwasi, (2012)	Causes and effects of delays and disruptions in construction projects in Tanzania	Descriptive Survey	There is a relationship between project environment and performance. The relationship is adversely affected by frequent design changes, delay in contractor payments, information delays, and inadequate planning.	The study did not address expressly how planning moderates the relationship between project environment and performance. The planning was general in nature	This study looked at the moderating role of macro planning process on the relationship between project environment and performance in construction industry in Kenya
Ikechukwu, Chinedu, and Onyegiri, (2011)	Impacts of ICT in construction industry	Descriptive survey (Ex-post facto design)	Use of ICT not effective because of inadequate ICT infrastructure, limited skill among teams, and lack of internet connectivity were cited as the main issues affecting project performance.	The study considered general success factors and did not focus on use of ICT on designs development, communication and sharing of information among all the stakeholders.	This study addressed ICT an indicator of an environment that had an influence in project Performance, and how it interacted with designs, communication and coordination of the projects team towards achievement of project success.
Juliet and Ruth (2014), and Thomas et, al., (2002)	Factors affecting performance of Construction projects in developed and developing countries	Cross-Sectional Descriptive Survey	Performance was affected by; experience and qualification of the planners, quality of equipment used, and environmental factors	The study revealed that there was a relationship between project environment and performance, but it did not bring out clearly the aspect of planning and how it affects the relationship	This study mainly focused on the role played by macro planning process and how it influences the relationship between project environment and performance.
Enshassi and Abushan (2009)	Factors affecting performance of construction projects in the Gaza strip	Cross-Sectional Descriptive Survey	Performance was affected by qualification of project manager, project teams, availability of raw materials, inadequate designs, and environmental factors surrounding the project.	This study did not break down the environmental factors affecting performance and also did not address the role of planning in enhancement of project performance	This study looked at three project environment factors that were deemed to have influence on the performance of the project; - Regulatory, Technological, and project manager’s personal attributes
Zhang (2005)	Factors critical to the success of Public Private Partnership projects	Descriptive survey (Ex-post facto design)	Stable political system, favourable economic system, adequate financial market, predictable currency exchange risk, long-term debt financing, a favourable legal framework and government support all influence project performance	Study did not expressly dwell on project environment, though silently it is addressing the same.	Current study dealt with relationship between project environment and performance. Macro planning was examined as a moderator of the relationship.

2.12 Summary of Literature Review

This chapter discussed both theoretical and empirical literature related to the variables under study. The concepts of housing construction project environment and its importance in project performance were discussed. Performance indicators were traced from other studies and linked with environment factors that influence the relationship between project environment and performance. The relationship between project environment and performance was traced and established in the literature review. Based on review of empirical studies, project environment was limited to three variable which were given the highest weight by many writers and the factors were conceptualized as regulatory environment, technological environment, and project manager’s personal attributes. Key indicators of each of the variables were identified and discussed on how they influenced project performance in the housing construction industry. The influence of project macro planning process on project performance as well as the moderating influence of macro planning process on the relationship between project environment and performance was also discussed. McGregor’s Theory of X and Y, Critical Chain Project Management Theory, and the Theory of Performance (ToP) and how they guided the study was also discussed. Conceptual framework for the study was developed and research gaps table drawn based on the studies which were reviewed. The review of literature was important in linking the study with other empirical studies.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter described how the study was carried out. The main sections consisted of philosophical underpinning of the study, research design, target population, sampling procedure, research instruments, validity and reliability of data collection instruments, data collection procedure and data analysis techniques.

3.2 Research Paradigm

A research paradigm sets the context for an investigator's study. Pragmatism which was the main philosophical underpinning of this study derives from the work of Peirce, James, Mead and Davey (Creswell, 2013). To pragmatists, knowledge claims arise out of actions, situations and consequences rather than antecedent conditions. There is a concern with application of what works and solutions to problems (Creswell, 2013). Instead of methods being important, the problem is most important, and researchers use all approaches to understand the problem.

The pragmatic rule states that the current meaning or instrumental or provisional truth value of an expression is to be determined by the experiences or practical consequences of belief in or use of the expression in the world (Johnson et al., 2004). Pragmatism helps to shed light on how research approaches can be mixed fruitfully. Research approaches should be mixed in ways that offer the best opportunities for answering important research questions (Johnson et al., 2004). As a philosophical underpinning for mixed mode studies, it conveys the importance for focusing attention on the research problem and then using pluralistic approaches to derive knowledge about the problem (Cresswell, 2013). This study therefore employed pragmatism paradigm to guide its mixed mode approach.

Pragmatism also allowed the researcher to interact with the research and especially with the respondents (Johnson et al., 2004). This is as opposed to the epistemological stand held by positivism and post-positivism paradigms. This allowed the researcher to collect both qualitative and quantitative data as was the case in this study. Pragmatism also allowed the researcher to conduct both deductive and inductive logic which is middle path between positivism and constructive paradigms. Considering that questionnaire with both closed and open-ended questions were used as instruments to collect both quantitative and qualitative data in this study, this paradigm was found to be the most suitable to be adopted.

Pragmatism holds to the following philosophical assumptions (Creswell, 2012) which were incorporated throughout the research build-up and thesis development in this study: - Ontology (nature of reality), researchers embrace the idea of multiple realities and report them by exploring multiple forms of evidence from different respondents' views and experience; Epistemology (Knowledge), researchers try to get as close as possible to the respondents of the study. Subjective evidence is build-up based on individual views from field research; Axiology (research values), researchers make their values known in the study and actively report their values and biases as well as the value-laden nature of information gathered from the field; and Methodology (methods used in the research process), inductive, emerging, and shaped by the researcher's experience in collecting and analyzing data.

3.2.1 Research design

The study combined a cross sectional descriptive survey and correlational research design. The use of the two designs were suitable because the study used both descriptive and inferential analysis of data. On one hand cross sectional descriptive survey design was concerned with describing, recording, analysing and interpreting conditions that existed. Application of cross-sectional survey meant information was collected from a predetermined population at just one point in time (Fraenkel et al., 2008). Kothari (2004) argued that surveys are only concerned with conditions or relationships that exist, opinions that are held, processes that are going on, effects that are evident or trends that are developing. This design was the most appropriate for this study because of its ability to elicit a diverse range of information. It also had the ability to minimize bias and maximize reliability.

Correlational research design on the other hand allowed the use of inferential statistics for measurement of two or more variables to determine the extent to which they were related or influenced each other (Fraenkel et al., 2008). Considering that in this study the influence of each independent variable and the combined influence of all the independent variables on the dependent were determined, correlational research design was the most suited. It also enabled testing of the moderating influence by use of multiple and stepwise regressions. Therefore, a combination of the two research designs enabled the researcher to conduct both descriptive and inferential analysis.

3.3 Target Population

Target population refers to the total number of subjects of interest to the research. The target population in this study comprised of all gated community housing projects in

Nairobi County which were initiated and completed between 2009 and 2014 (appendix IV). Gated community housing projects from 2009 were targeted because this was the year when Environmental Impact Assessment (EAI) became mandatory for all projects with significant impact on the environment. Going by Private Building Plans approved by Nairobi County Government (City Council by then), there were 95,926 residential buildings constructed from 2009 – 2014. Gated community housing plans were included in the 95,926 residential buildings but were not documented separately. As such, for the purpose of this study, the population of gated community housing projects was drawn from a Kenyan realtor in real estate, Knight Frank. According to listings by Knight Frank, 406 gated community housing projects were initiated between 2009 and 2014 in Nairobi County. Out of the 406, a record 228 projects were active (appendix IV). The population of the study therefore comprised of the 228 gated community housing projects which were active and running.

3.4 Sample Size and Sampling Procedure

This element of research methodology describes the sample size for the study and the sampling technique that was applied to obtain the required sample.

3.4.1 Sample Size

Kothari (2004) defines a sample as collection of units from the universe to represent it. To determine the sample size for this study considering the small population of 228 gated community housing projects (appendix IV), the study used the normal approximation to the hyper-geometric distribution. When dealing with large populations, the sample size is determined using the normal approximation to the binomial distribution. This approximation is very accurate when the population is large, and the sample size is small.

However, if you were to sample a population of less than 5000 elements, then for a given accuracy, you would require a far smaller sample than that calculated using the normal approximation to the binomial.

Therefore, to determine the sample size for small populations (less than 5000 units), the researcher used the normal approximation to the hyper-geometric distribution. Similar studies (Morris, 2014) have adopted the hyper-geometric distribution due to its ability to estimate sample sizes from small populations accurately. This is also in line with what was used by Kihoro et al., (2015) in a survey titled "Factors affecting performance of projects in construction industry in Kenya" The sample size formula for small populations is shown below:

$$`n= \frac{NZ^2pq}{[E^2(N-1)+ Z^2pq} \text{ .... Equation (1)}$$

Source: Morris, (2014)

Where;

`n = required sample size

N = population size (228 Gated community projects)

Z = level of confidence of the sample size (set at 95%) thus Z=1.96

p and q = population proportions (Each set to 0.5).

E = accuracy of the sample proportions (set to 0.05).

Therefore;

$$`n= \frac{228\ x\ 1.96^2\ x\ 0.5\ x\ 0.5}{\{0.05^2(228-1)+ 1.96^2\ x\ 0.5\ x\ 0.5\}}$$ ; and hence, `n = 143.3 ~ 143

Therefore, the sample size for the study was 143 gated community projects, each represented by 4 respondents; client (1), consultant (1), main contractor (1), and facility manager (1), and hence the sample consisted of 572 respondents - {143 x 4 = 572 respondents}

3.4.2 Sampling Techniques

The study employed a combination of census, stratified random sampling, and purposive sampling techniques. List of all gated community housing projects within Nairobi County (appendix IV) were obtained from the County planning department and Knight Frank. All the sub-Counties were included in the study (census) and this was the first stage. The gated community housing projects were clustered based on their sub-Counties. Each sub-County represented a stratum and a quota was established for the units to be picked from each stratum (stratified random sampling technique).

Random sampling is the probability whereby people, places or things are randomly selected (Kombo et al., 2006). In the second stage, one hundred forty-three (143) projects were randomly sampled from the 228 completed projects based on each stratum. The criteria to establish units to be included in the sample established by the researcher was as follows: “If number of active projects are less or equal to 5 in a sub-County, sample purposively the highest value project (1); and if the number of completed projects are higher than 5 in a sub-County, sample 66% of the total active projects by random sampling method (appendix IV).

In the third stage, client (owner), consultant, main contractor, and gated community facility managers, were selected using purposive sampling method from individual construction housing projects which were sampled above. According to Walliman (2005), purposive sampling is a useful sampling method which allows a researcher to get information from a sample of the population that one thinks knows most about the subject matter. The total number of respondents was therefore 572, that is, 143 projects x 4 people from each.

Table 3.1: Sample Frame

NAIROBI SUB - COUNTIES	TOTAL NO. OF PROJECTS	NO. OF ACTIVE PROJECTS	UNITS REQUIRED FOR STUDY (Random Sampling)	PROPORTION TAKEN FOR STUDY
DAGORETI NORTH	58	29	18	0.66
DAGORETI SOUTH	61	31	20	0.65
EMBAKASI CENTRAL	8	2	1	0.50
EMBAKASI EAST	28	13	9	0.69
EMBAKASI NORTH	0	0	0	0.00
EMBAKASI SOUTH	4	2	1	0.50
EMBAKASI WEST	8	3	1	0.33
KAMUKUNJI	4	2	1	0.50
KASARANI	69	40	25	0.63
KIBRA	7	3	1	0.33
LANGATA	47	34	22	0.65
MAKANDARA	2	2	1	0.50
MATHARE	11	7	4	0.57
ROYSAMBU	50	27	18	0.67
RUARAKA	4	2	1	0.50
STAREHE	3	2	1	0.50
WESTLANDS	42	29	19	0.66
Total	**406**	**228**	**143**	

Source: Knight Frank listing, 2014.

3.5 Research Instruments

Data collection instruments for this study included use of structured questionnaire and a standardized open-ended interview guide.

3.5.1 Questionnaire

Questionnaire was used to collect data because of its ability to collect a lot of information from respondents over a short period. Questionnaires are free from the bias of the researcher. The questionnaire had both closed-ended questions and a few open-ended questions. The questionnaire had four sections in order to cover the entire research variables.

Section A had five questions to collect information on the project at hand, personal information like gender, age, and level of education and the category of the respondent. The purpose of this section was to get the background information of the respondents. In section B, data was collected on performance status of gated community housing projects based on the four indicators namely; cost, time, quality, safety and health, and client satisfaction. There was an average of six questions (On each indicator) measured on a Likert scale. The section also had two open-ended questions touching on challenges encountered and how performance could be improved in gated community projects. Partially the questionnaire was adapted from the study of Enshassi et al. (2009) in their study entitled, “Factors affecting performance of construction projects in Gaza Strip” with a good reliability score, with a coefficient alpha of 0.78. This score suggested acceptable reliability of the measures.

In section C, data was collected on project environment in housing construction projects and how it influenced performance. Clusters of questions (average of 7 under each environment) were formulated under each environment, measured on a Likert scale from 1-5. Four open ended questions were given here touching on each environment and the relationship between the combined environment factors and performance. Section D, solicited for information on the aspect of macro planning process in housing construction projects and how the planning influenced/moderated the relationship between project environment and performance. Thirteen (13) questions measured on a Likert scale of 1 to 5 were used in this section. Three open ended questions were also formulated to touch on each of the areas under consideration. A survey questionnaire developed by Kikwasi (2012) was used in this section. The questionnaire had a coefficient alpha for structural variables of formalization, complexity and centralization of 0.90, 0.95 and 0.92 respectively. These scores suggested acceptable reliability of the items.

3.5.2 Standardized open-ended interview guide

A standardized open-ended interview guide was developed and used focusing on consultants (5) and main contractors (5). These two categories of the respondents were purposively selected from those who had been involved with the highest number of projects from the sampled 143 projects. The interviews were preceded by the return of the questionnaires so that the researcher could select the respondents to be interviewed based on their response to question number 5, (number of gated community projects involved in between 2009 – 2014 in Nairobi County). The main aim for the standardized open-ended interview guide was to triangulate on the responses given in the questionnaire by the respondents (appendix III). The standardized open-ended interview guide had 11 uptake questions which covered the variables under study. More probing questions were developed during the interview based on the respondents' responses. The standardized open-ended interview was extremely structured in terms of the wording of the questions. Participants were asked identical questions, but the questions were worded so that responses are open-ended (Turner, 2010). This open-endedness allowed the participants to contribute as much detailed information as they desired, and it also allowed the researcher to ask probing questions as a means of follow-up.

3.6 Validity and Reliability of Research Instruments

Validity is the degree to which results obtained from the analysis of the data represent the phenomenon under study (Kathuri et al., 1993). Reliability of the research instrument is its level of internal consistency over time. Reliability of measurement instruments concerns the degree to which a measuring procedure gives similar results over several repeated trials (Mugenda et al.,1999). The research instruments were tested for both validity and reliability.

3.6.1 Validity of Research Instruments

Validity refers to the appropriateness, meaningfulness, correctness and usefulness of the inferences a researcher makes (Fraenkel et al., 2008; Kathuri et al., 1993). Mugenda, (2008) argues that it is not possible to estimate validity from the instrument but from the data that is collected using the instrument. To ensure construct validity, the questionnaire was verified by a panel of experts made up of the researcher's supervisors. Also, peers were contacted to assist in establishment of the instrument validity. Internal validity which is concerned with the congruence of the research findings with the reality and the degree to which the researcher observes and measures what is supposed to be measured was tested by use of triangulation method advocated by Merriam, (1998), where the data collection instrument had the same question analyzed based on what the different categories of the respondents had answered.

3.6.2 Reliability of instruments

Reliability refers to the consistency of scores or answers from one administration of an instrument to another and from one set of items to another (Fraenkel et al., 2008). Mugenda (2008) observed that reliability in research is influenced by random error. As random error in the data increases, reliability of the data decreases. Random error is the deviation from a true measurement due to factors that have not effectively been addressed by the researcher. To test for reliability, a pilot study was conducted in four (4) selected housing projects, involving sixteen (16) respondents. The four housing projects were picked from the sub-Counties with the highest number of sampled project – Kasarani, Langata, Dangoreti south, and Westlands.

Internal consistencies were computed for the pilot study using Cronbach's Alpha co-efficient. This technique required only a single administration to provide a unique, quantitative estimate of the internal consistency of a scale. Kyalo (2007); Munyoki (2007); Mulwa (2012); Nganga (2014); and Ibua (2014) had used the same tool successfully to assess reliability of their research instruments. The housing projects selected for the pilot study were not used at the data collection stage.

3.6.3 Data Collection Procedure

Questionnaires were administered to the respondents by the researcher or research assistants. The researcher used e-mails to pass soft copies of the questionnaire to the respondents after an agreement with them to do so. For those who did not favor e-mails as a mode of delivering the questionnaire, hard copies were delivered by the researcher or the research assistants. Two weeks were given to the respondents to fill the questionnaire and return to the researcher. Hard copies were collected directly from the respondents by the researcher or the research assistants. Soft copies were re- emailed back to the researcher after the respondents were through with them. Prior to distributing the questionnaires, the researcher had to apply and get a research permit from the relevant authority (National Commission for Science, Technology and Innovation). Five research assistants were recruited and trained by the researcher before administration of the questionnaires to the respondents. Each research assistant was assigned twenty (20) gated community housing projects from which to collect data. Appointments were booked in advance by the researcher on behalf of the research assistants, through telephone calls and emails to the respondents. Respondents were assured of confidentiality before filling the questionnaires. Interviews with the consultants and main contractors were done after questionnaires were returned as the interview respondents were drawn after analysis of question number 5 in the questionnaire.

3.7 Data Analysis Techniques

Collected data was taken through data analysis phases which involved data clean-up, reduction, differentiation and explanation. Data clean-up involved editing, coding and tabulation to detect any anomalies in the responses and assign specific numerical values to the responses for further analysis. Data was then keyed in using Statistical Package for Social Sciences (SPSS) version 2.0 computer programme with appropriate codes and variable specification after which counter checking was done to ensure erroneous entries did not exist. Qualitative data generated through open ended questions in the questionnaire and interviews with the consultants and main contractors were analyzed using the Framework Based Approach proposed by Ritchie et al., (2003). This involved classifying and organizing data into a thematic framework based on key themes, concepts and categories.

Descriptive statistics was used for measures of central tendencies including mean, and standard deviation. This helped the researched in establishing the variability of the responses away from the mean (responses near the mean depict that the respondents were in agreement and of the same mind). The Pearson's coefficient of correlation was applied to measure the degree of influence of each independent variable (regulatory environment, technological environment, and project managers' personal attributes) on the dependent variable, project performance. Pearson coefficient of correlation, "**r"** was used in this study since data was measured in the interval scale and Pearson's correlation coefficient technique is recommended for such data as being the most appropriate for determining relationships (Kothari, 2004). The assumption associated with the application of Pearson's **"r"** is that the relationship between the variables being correlated was linear. This assumption was tested on the data by first plotting a scatter diagram to check on the linear relationship of the variables. The correlation was based on two-tailed tests to allow for the possibility that the relationship of the independent variables on the dependent variable could assume a positive or a negative condition. To test hypothesis, simple linear models were used to test significance between each independent and dependent variable. Multiple regression model was used to test the moderating variable. In this study the significance level for hypotheses testing was set at 0.05.

The moderating influence of project macro planning process on the relationship between project environment and performance was tested. A variable is said to function as a moderator to the extent that it accounts for the relationship between the independent and the dependent variable. The role of a moderating variable is to transmit the influence of an independent variable(s) to the dependent variable and hence it was important to test this influence. The models for testing hypotheses are presented in the Table 3.2.

Table 3.2: Models for Testing Hypothesis

Objective	Hypotheses	Model	Type of Analysis
To establish the extent to which regulatory environment influences performance in gated community projects in Nairobi County, Kenya.	$\boldsymbol{H_1}$**:** Regulatory environment has a significant influence on the performance of gated community projects in Nairobi County, Kenya.	$y = a + \beta_1 X_1 + e$ y= Project performance a=constant β_1= Beta coefficient X_1= Project regulatory environment e= error term	Linear Regression Analysis
To Examine how technological environment influences performance in gated community projects in Nairobi County, Kenya.	$\boldsymbol{H_1}$**:** Technological environment has a significant influence on the performance of gated community projects in Nairobi County, Kenya.	$y = a + \beta_2 X_2 + e$ y= Project performance a=constant β_2= Beta coefficient X_2= Project technological environment e= error term $y = a + \beta_3 X_3 + e$	Linear Regression Analysis
To determine the extent to which project manager's personal attributes influences performance in gated community projects in Nairobi County, Kenya.	$\boldsymbol{H_1}$**:** Project manager's personal attributes has a significant influence on the performance of gated community projects in Nairobi County, Kenya.	y= Project performance a=constant β_3= Beta coefficient X_3= Project manager's personal attributes e= error term	Linear Regression Analysis
To assess the relationship between project macro planning process and performance of gated community projects in Nairobi County, Kenya.	$\boldsymbol{H_1}$ **:**Project macro planning process has a significant influence on the performance of gated community projects in Nairobi County, Kenya.	$y = a + \beta_4 X_4 + e$ y= Project performance a=constant β_4= Beta coefficient X_4= Project macro planning process e= error term	Linear Regression Analysis
To determine the	$\boldsymbol{H_1}$**:** Project	$y = a + \beta_1 X_1 + \beta_2 X_2 +$	Linear Regression

combined influence of project environment factors on the performance of gated community projects in Nairobi County, Kenya.	environment factors (Regulatory, Technological, and Project manager's personal attributes) combined have a significant influence on the performance of gated community projects in Nairobi County, Kenya.	$\beta_3 X_3 + e$ y = Project performance $\beta_{1....}\ \beta_3$ = Beta coefficient X_1= Project regulatory environment $X_{2=}$ Project technological environment $X_{3=}$ Project manager's personal attributes e = error term	Analysis
To examine the moderating influence of planning on the relationship between project environment and performance of gated community projects in Nairobi County, Kenya.	$\boldsymbol{H_1}$**:** The strength of the relationship between project environment and performance of gated community projects in Nairobi County, Kenya is dependent on the Planning aspect put in place.	$y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_1 X_2 X_3 X_4 + e$ y = Project performance a = Constant $\beta_{1....}\ \beta_5$ = Beta coefficient $\mathbf{X_{1....}\ X_3}$ = Project environment factors X_4= Macro planning process adopted e = error term	Linear Regression Analysis

3.8 Ethical Considerations

The study ensured ethical considerations were observed by getting voluntary informed consent from all the respondents. The questionnaire did not require respondents to write their name to ensure no traceability to the respondents who filled them. The purpose of the study which was mainly academic was communicated to the respondents. The research findings were only being used for academic purpose.

3.9 Operationalization of study variables

The study objective, variables, indicators for each variable, measurement scale and type of analysis which were done for this study are shown in Table 3.4

Table 3.3: Operationalization of the study variables

Objective	Variable	Indicators	Measurements	Measurement scales	Research Approach	Type of analysis	Techniques for Analysis
To Examine how regulatory environment influences performance in gated community projects in Nairobi County, Kenya.	**Independent Variable:** Regulatory environment	* Nairobi County Government regulatory practices * National Environment Management Authority (NEMA) regulatory practices * National Construction Authority (NCA) regulatory practices	A composite index will be obtained by calculating the average of the total sum of the responses of each respondent to measure the variable	Interval	Quantitative	Parametric	Frequencies, Means and Standard deviation; Simple linear regression
To determine the extent to which technological environment influences performance in gated community projects in Nairobi County, Kenya.	**Independent Variable:** Technological environment	* Availability of skilled manpower * Use of ICT in construction projects * Use of CAD, BIM and 3D's in construction projects * Use of e-mails for communication	A composite index will be obtained by calculating the average of the total sum of the responses of each respondent to measure this variable.	Interval	Quantitative	Parametric	Frequencies, Means and Standard deviation; Simple linear regression
To establish the extent to which project manager's personal attributes influences performance in gated community projects in Nairobi County, Kenya.	**Independent Variable:** Project manager's personal attributes	* Leadership ability, Communication, Decision making, and Administrative skills * Coping ability, Analytical thinking, and Technical competence.	A composite index will be obtained by calculating the average of the total sum of the responses of each respondent to measure the variable	Interval	Quantitative	Parametric	Frequencies, Means and Standard deviation; Simple linear regression

Objective	Variable	Indicators	Measurements	Measurement scales	Research Approach	Type of analysis	Techniques for Analysis
To Assess the influence of project macro planning process and performance of gated community projects in Nairobi County, Kenya.	**Independent variable:** Macro planning process	* Tools and techniques used – Critical path method (CPM), Line of balance (LoB), and four-dimensional models (4D)	A composite index will be obtained by calculating the average of the total sum of the responses of each respondent to measure the variable	Interval	Quantitative	Parametric	Frequencies, Means and Standard deviation; Simple linear regression
To determine the combined influence of project environmental factors on the performance of gated community projects in Nairobi County, Kenya.	**Independent Variables combined:** Project environment	* Regulatory environment * Technological Environment * Project manager's personal attributes	A composite index will be obtained by calculating the average of the total sum of the responses of each respondent over the six levels in column three to measure this variable.	Interval Open-ended questions	Quantitative Qualitative	Parametric Non-Parametric	Frequencies, Means and Standard deviation; Multiple linear regression, and Descriptive analysis
To examine the moderating influence of macro planning process on the relationship between project environment and performance of gated community projects in Nairobi County, Kenya.	**Moderator Variable:** Project planning process	Project macro planning elements: * Use of Gantt chart, Critical Path Method, & Line of Balance * Use of 4-Dimentional Models * Organization of the project activities	A composite index will be obtained by calculating the average of the total sum of the responses of each respondent to measure this variable.	Interval	Quantitative	Parametric	Frequencies, Means and Standard deviation; Multiple linear regression
Dependent variable	**Dependent**	* Project Cost	A composite index				Frequencies,

Objective	Variable	Indicators	Measurements	Measurement scales	Research Approach	Type of analysis	Techniques for Analysis
	Variable: Project performance in housing construction industry.	* Project time/schedule * Project quality * Safety and health * Client satisfaction	will be obtained by calculating the average of the total sum of the responses of each respondent over the five scales in column three measuring this variable.	Interval interval	Quantitative Qualitative	Parametric Non-Parametric	Means and Standard deviation; Simple linear regression, and Descriptive analysis

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presented the findings of the study as was defined in the methodology chapter, give an interpretation and presentation of the findings. The study sought to establish the Project environment, macro planning process and performance of housing construction industry; a case of gated community projects in Nairobi County, Kenya.

The chapter was divided into sections as follows: Section 4.2 presented the questionnaire response rate of the study. Section 4.3 presented background of respondents based on gender, age, level of education and designation. Section 4.4 Tests of assumptions and analysis of Likert type of data. Section 4.5 presented analysis of the dependent variable which was project performance. Section 4.6 presented analysis of the influence of each of the independent variables as well as the moderator on the dependent variable as was stated in the objectives of the study.

For each of the six research objectives, descriptive analysis was first done by use of arithmetic mean and standard deviation followed by correlation analysis using Pearson's Product Moment Correlation. Research hypotheses were tested using t-test in regression analysis. Discussions were done for each objective based on the analysis and interpretation of descriptive and inferential data. The independent variables of the study were regulatory environment, technological environment, and project manager's personal attributes. Macro planning process (pre-construction planning) doubled as an independent variable and a moderator to the relationship between project environment and performance.

4.2 The questionnaire response rate

A sample of 143 gated community housing projects in Nairobi County were selected for this study following the procedures described in chapter three (appendix IV). Four gated community projects from the sample were used for pilot study and were exonerated from the final study sample. The final study sample therefore was 139 gated community projects. Four respondents were selected from each of the sampled gated community housing project consisting of the client, consultant, main contractor and the facility manager. Four questionnaires were therefore administered to each of the 139 gated community projects, totalling to 556, anticipating for responses from each of the four professionals chosen from each gated community housing project.

The questionnaires returned from the clients accounted to 66%. This was explained by the fact that some clients had several projects initiated over the period under consideration. The same tread applied to consultants who returned 62.6% and main contractors 63% respectively. Facility managers returned 86.3% of the questionnaires administered. On overall, out of the 556 questionnaires distributed, 387 were returned for analysis forming a response rate of 69.6%. Saunders et al. (2003) posed that above 50% response rate is reasonable for statistical generalization. The response rate for this study is higher than that of other studies conducted by Omari, (2012) who carried a study in public state corporations in Kenya and had a response rate of 48%, and Nganga, (2014) who carried a study in government ministries in Kenya and had a response rate of 61.3%. The response rate for this study is close to that of Ibua, (2014) who carried out a study in public universities in Kenya and had a response rate of 72%. Therefore, the response rate of 69%

was a representative sample for further analysis. The final study sample size is presented in Table 4.1

Table 4.1: Final study sample size.

	Number of projects	Number of respondents
Sample size from population (n’)	143	143 x 4 = 572
Pilot study units	4	4 x 4 = 16
Final study sample (n)	**139**	**139 x 4 = 556**

4.3 Background of the Respondents

This section gives the background of the respondents according to their gender, age, level of education, and their designation. Background of respondents was informed by the items in the research instruments used in the study. This was meant to confirm proportions of the respondents based on background information.

4.3.1 Distribution of respondents by gender

Respondents were requested to indicate their gender by selecting either male or female. The findings are presented in Table 4.2

Table 4.2: Distribution of the respondents by gender

Gender	Clients (Frequency) n	Consultants (Frequency) n	Main Contractors (Frequency) n	Facility Managers (Frequency) n	Total Percent %
Male	70	62	80	78	75
Female	22	25	08	42	25
Total	**92**	**87**	**88**	**120**	**100**

The research findings in Table 4.2 indicated that 75% of the respondents were male while 25% of the respondents were female. These findings showed that the housing construction industry in Kenya was dominated by male professionals. The highest number of women in this sector was observed from the facility managers' docket which had 42 number whereas men were 78 in number. Though not mandatory and neither a requirement across all sectors, the Kenya Constitution 2010 requires that there should be at least a third of either gender in all forums, especially in elective posts! This requirement is slowly creeping in and getting roots across all governmental and non-governmental institutions, and it was also represented in facility managers.

4.3.2 Distribution of the respondents by age

The researcher requested the respondents to indicate their age by selecting an age bracket ranging from 26 years and above 51 years. Seven categories were given to choose from with an interval of 5 years. The responses were as shown in Table 4.3

Table 4.3: Distribution of respondents by age

Age in years	Clients (frequency) n	Consultants (frequency) n	Main contractors (frequency) n	Facility managers (frequency) n	Total percentage (%)
< 26	0	0	0	0	0
26-30	0	5	7	30	10.85
31-35	03	25	10	42	20.67
36-40	06	32	27	22	22.48
41-45	15	11	29	15	18.09
46-50	25	09	13	11	14.99
> 51	43	05	02	0	12.92
Total	**92**	**87**	**88**	**120**	**100**

The research findings in Table 4.3 indicated that 10.85% of the respondents were between 26-30 years, 20.67% were between 31-35 years, 22.48% were between 36-40 years, 18.09% were between 41-45 years, 14.99% were between 46–50 years and 12.92% were 51 years and above. These findings showed that 68.5% of the professionals and project owners in the housing construction industry are above 36 years, hence experienced and knowledgeable in their respective fields. This trend implied that the older generation dominated this industry and not only affected building design and structure; but it also had a serious impact on the construction workforce, as a great deal of knowledge and skills would be lost in the next few decades with fewer professionals lined up for replenishing the market.

4.3.3 Distribution of the respondents by level of education

Respondents were required to indicate their level of education ranging from secondary school certificate, diploma, degree and post graduate degree (s). The findings are presented in Table 4.4

Table 4.4: Distribution of respondents by level of education

Level of Education	Clients (Frequency) n	Consultants (Frequency) n	Main Contractors (Frequency) n	Facility Managers (Frequency) n	Total Percentage %
PhD	03	02	0	0	1.29
Masters	19	37	13	0	17.84
Bachelor’s Degree	25	40	32	38	34.88
Diploma	15	08	37	62	31.52
Certificate	17	0	06	13	9.30
Secondary Certificate	13	0	0	07	5.17
Total	**92**	**87**	**88**	**120**	**100**

The research finding in Table 4.4 indicated that 1.29% of the respondents had a Ph.D. degree, 17.84% had master’s degree, 34.88% had bachelor’s degree, 31.52% had diploma, 9.30% had college certificate, whereas 5.17% had secondary school certificate. These findings showed that majority of the respondents (34.88% and 31.52%) who dominated this industry had a bachelor’s degree and college diploma, whereas those with Ph.D. and master’s degree combined were 19.13%. Those respondents with college certificate combined with secondary school certificate as their highest qualification were 14.47%.

The findings show that this industry is dominated by those with levels of education ranging from a bachelor's degree and a college diploma (66.4%). Those with education higher than the dominant group (master's and Ph.D. degree) were 19.13%, whereas, those below the dominant group (college diploma and secondary certificate) were 14.47%. From interviews with the selected respondents (consultants and main contractors), it was further revealed that the highest level of education (master's and Ph.D.) was solely by the consultants, whereas the dominant group (bachelor's degree and diploma) consisted mainly of the main contractor and the clients. The group with the least education consisted mainly of the facility managers/caretakers.

4.3.4 Distribution of the respondents by number of projects involved in between 2009 and 2014.

The respondents were requested to indicate the number of gated community projects they had been involved in between 2009 and 2014. The responses are shown in Table 4.5

Table 4.5: Distribution of respondents by by number of projects involved in-between 2009 and 2014.

Projects involved in 2009 - 2014	Clients (Frequency) n	Consultants (Frequency) n	Main Contractors (Frequency) n	Facility Managers (Frequency) n	Percentage (%)
< 5	11	13	18	120	41.86
5-8	29	29	34	0	23.77
9-11	28	33	22	0	21.45
12-14	11	06	11	0	7.24
15-17	9	3	03	0	3.88
18-20	4	2	0	0	1.55
> 21	0	1	0	0	0.25
Total	**92**	**87**	**88**	**120**	**100**

The research findings in Table 4.5 indicate that within the time under consideration, 41.86% of the respondents had been involved in less than 5 projects, 23.77 % involved in 5-8 projects, 21.45 % involved in 9-11 projects, 7.24 % involved in 12-14 projects, 3.88 % involved in 15-17 projects, 1.55 % involved in 18-20 projects, and 0.25 % involved in over 21 projects. These findings show that the respondents drawn from consultants and main contractors were involved in more than 9 projects at an average, as majority of clients (52/92) owned more than 9 projects. All facility managers were involved in less than 5 projects – to be specific, each facility manager represented only the gated community project in question. No facility manager who had more than one gated community project under their watch.

4.4 Tests for normality and multicollinearity

This section showed how tests of normality were carried out. Test of normality was conducted using Kolmogorov-Smirnov test statistics (KS-test) and Shapiro-Wilk test (SW-test). KS- test belongs to the Supremum class of EDF statistics and this class of statistics is based on the largest vertical difference between the hypothesized and empirical distribution (Rizali & Wah, 2011). This is meant to test if data follows or does not follow a specified distribution. While testing for normality, the null hypothesis was that the sample population was not normal. Shapiro-Wilk test was used to counter check the validity of the normality results from the KS-test statistics. This test can detect departure from normality due to either skewness or kurtosis or both (Rizali & Wah 2011). While testing whether a population is normal using SW-test, the null hypothesis is rejected if the value of W is too small. The value of W should lie between zero and one whereby small values of W lead to the rejection of normality whereas a value of one indicates normality of the data, Rizali & Wah (2011). The results of the KS- test and SW-test are shown in Table 4.6

Table 4.6: Results of Kolmogorov-Smirnov and Shapiro-Wilk tests

		Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
a)	Regulatory environment	0.145	387	0.03	0.899	387	0.086
b)	Technological environment	0.132	387	0.02	0.897	387	0.124
c)	Project manager's personal attribute	0.204	387	0.001	0.852	387	0.062
d)	Project macro planning process	0.080	387	0.003	0.984	387	0.121
e)	Performance in gated community projects	0.072	387	0.003	0.892	387	0.084

Results in Table 4.6 indicated that in all the variables under investigation, $p < 0.05$ and therefore the null hypothesis was rejected and concluded that the sample was picked from a normal population. The SW- test statistics for the study variables were between 0.852 and 0.984 hence the null hypothesis that the population was not normal was rejected. It was therefore concluded that the sample population was normally distributed.

4.4.1 Tests of multi collinearity and heteroscedasticity

The variables of the study were further subjected to multi-collinearity testing using Variance Inflation Factor (VIF) and Tolerance Tests in the regression analysis. The values of Variance Inflation Factor (VIF) ranged from 1.00 to 4.6 which are within the criteria set by Meyers, (1990), who suggest that VIF should be less than 10. The tolerance value was between 0.219 and 0.948 which was within Menard's, (1995) criteria, who suggested that tolerance value of less than 0.1 can infer multi-collinearity. Further, referring to the rule of thumb by Garson, (2008), none of the independent variables had a correlation of more than 0.8, which suggested that there was no multi-collinearity. Garson, (2008) posited that inter-correlation among variables of more than 0.8 indicates a possible problem of multi-collinearity.

Heteroscedasticity may occur when some variables are skewed, and others are not. Further, measurement error can cause heteroscedasticity. Some respondents might provide more accurate responses than others, or there may occur sub-population differences or other interaction effects which may cause heteroscedasticity. Based on the assumptions of the classical linear regression model, the researcher will hold that there will be no issues of heteroscedasticity as the data have been assumed to be linear, and also normality distribution of the population has been checked by Kolmogorov-Smirnov and Shapiro-Wilk tests.

4.4.2 Analysis of Likert- type data and accounting for the error term

The three main sections of the research questionnaire had five scales Likert-type of items. Researchers have assumed that Likert-type data have equidistant so that parametric methods of data analysis are used (Lantz, 2013). Carifio et al., (2007) indicated that when using a five-point Likert scale the following is the scoring; strongly agree (SA) 4.2<SA<5.0; agree (A) 3.4<A<4.2; neutral (N) 2.6<N<3.4; disagree (DA) 1.8<DA<2.6 and strongly disagree (SDA) 1.0<SDA<1.8. The scale gives equidistant of 0.8. This weighting criterion was followed in data analysis of Likert-type of data in this study and qualified the measurement scale to be interval. The same scale was used successfully by Nganga (2014).

The Likert scores were summed up, and the highest weight given to scale 4 to 5 - agree and strongly agree (3.4 to 5.0), meaning these responses were the most important based on the question (s) asked. The lower category of strongly dis-agree and dis-agree (1.0 to 2.6), also based on the question (s) asked was considered as having little influence on the overall performance. There fore a score of 1 was the lowest and 5 was the highest.

An error term in a statistical or mathematical model is a variable which is created when the model does not fully represent the actual relationship between the independent and the dependent variables. In other words, an error term is the amount at which the equation may differ during empirical analysis. It represents the margin of error within a statistical model, referring to the sum of the deviations within the regression line (used as a point of analysis when trying to determine the correlation between an independent and dependent variable).

In order to minimize the error, the researcher ensured a complete understanding of all statistical techniques in use before creation of the question list. In this way, the survey questions will complement the planned data analysis, hence minimizing the error. Further, formulation of open ended questions to supplement the closed ended questions will make it difficult to overlook options from respondents, which in turn will complement the value of the results and reduce the error. All these tactics had been given consideration by the researcher to mitigate for the error term.

4.5 Analysis of project performance indicators in gated community housing construction

Project performance in housing construction industry was identified in this study as the dependent variable. Budgeted cost, scheduled time, prescribed quality, safety and health, and clients' satisfaction were identified as indicators of project performance in housing construction industry. Respondents were given items rated on a five-point Likert scale ranging from: strongly agree (SA); agree (A); neutral (N); disagree (DA); strongly disagree (SDA) from which to choose relating to each indicator. The findings were presented in Table 4.7, 4.8, 4.9, 4.10, and 4.11.

Table 4.7: Frequencies and percentages for cost performance in housing construction industry

Statement	SDA F (%)	DA F (%)	N F (%)	A F (%)	SA F (%)	Total F (%) n
Budget/Cost Related.						
a) Cost of the project(s) was as per initial budget for the project	343 (88.6)	44 (11.4)	0 ()	0 (0)	0 (0)	387 (100)
b) No variation order (s) were raised for the project	303 (78.3)	84 (21.7)	0 (0)	0 (0)	0 (0)	387 (100)
c) No disagreements were raised on the valuation of work done	168 (43.4)	189 (48.8)	30 (7.8)	0 (0)	0 (0)	387 (100)
d) No funding issues were raised during the project time	0 (0)	0 (0)	27 (7)	287 (74.1)	73 (18.9)	387 (100)
e) Many provisional sums and prime costs were factored	0 (0)	0 (0)	42 (10.9)	334 (86.3)	11 (2.8)	387 (100)
f) Payments to the main contractor were released without delays.	20 (5.2)	329 (85.0)	38 (9.8)	0 (0)	0 (0)	387 (100)

The research findings in Table 4.7 showed that 88.6% of the respondents indicated that they strongly disagreed with the statement that projects completed as per initial budget, 78.3% strongly disagreed that there were no variation orders raised for their projects, 48.8% disagreed with the statement that there were no disagreements raised on the valuation of work done at their projects, 74.1% agreed that no funding issues were raised during their project time, 86.3% agreed there were many provisional sums and prime costs factored in their projects, and 85.0% disagreed with the statement that payments to the main contractor were released without delays.

The findings implied that majority (88.6%) of the projects did not complete as per the initial budget, hence there were budget overrun. 78.3% of the respondents also implied that there were variations raised in many of the projects. 48.8% of the respondents indicated that disagreements ensured emanating from work valuations based on the initial and final scope, implying that there were issues from scope clarity based on the design of the project(s). Majority of the respondents (74.1%) confirmed that project funding was not an issue as 86.3% of the respondents poised that many provisional sums and prime costs were factored in their project. This seems to be in agreement with the statement that there were issues with work valuation as provisional sums and prime costs are always not clearly defined and they normally give rise to conflicting financial stands for both the client and main contractor, each trying to get value from them. Finally, 85.0% of the respondents indicated that payments to the main contractor were not released in time. This statement agrees with the respondents who pointed out that there were issues based on work valuation, many provisional sums and prime costs as all these delay issuance of interim completion certificates for main contractor to make partial invoices.

Table 4.8: Means and standard deviations for cost performance in housing construction industry

Statement	n	Min	Max	Mean	SD
(a) Budget/Cost Related.					
a) Cost of the project(s) was as per initial budget for the project	387	1	2	1.11	0.32
b) No variation order (s) were raised for the project	387	1	2	1.22	0.41
c) No disagreements were raised on the valuation of work done	387	1	3	1.64	0.62
d) No funding issues were raised during the project time	387	3	5	4.12	0.49
e) Many provisional sums and prime costs were factored	387	3	5	3.92	0.36
f) Payments to the main contractor were released without delays.	387	1	3	1.68	0.64
Composite implementation mean	**387**	**1**	5	2.40	0.27

The research findings in Table 4.8 showed that the mean score for the budgeted cost used to measure project performance was 2.40 and standard deviation of 0.27. The mean score corresponded somewhere between 'strongly disagree' and 'disagree'. The study revealed a mild disagreement with the sediments in each question item (M=2.40)'. based on individual questionnaire's item responses, the results showed that to a very great extent actual cost of the project(s) was not as per initial budget as respondents strongly disagreed with the statement that cost of the project(s) was as per initial budget for the project (M=1.11, SD=0.32), No variation order (s) were raised for the projects (M=1.22, SD=0.41), disagreed that no disagreements were raised on the valuation of work done (M=1.64, SD=0.62), agreed that no funding issues were raised during the project time (M=4.12, SD=0.49), agreed many provisional sums and prime costs were factored in the projects (M=3.92, SD=0.36), and finally disagreed payments to the main contractor were released without delays (M=1.68, SD=0.64).

The results from the respondents implied that the responses were concentrated around the mean (composite implementation mean 2.40, SD 0.27) and that the respondents had responses which were not polarised as characterised by the small standard deviation. This can also be seen from the individual responses mean (s) and standard deviation (s) in Table 4.8. This meant that the responses were not having big variation and they concentrated around the notion that at an average the projects did not perform as per the initial budget.

Table 4.9: Frequencies and Percentages for Schedule performance in Housing Construction Industry

Statement	SDA F (%)	DA F (%)	N F (%)	A F (%)	SA F (%)	Total F (%) n
Time Related.						
a) Project was not executed within the planned time	0 (0)	0 (0)	3 (0.8)	20 (5.2)	364 (94)	387 (100)
b) Set project duration was not enough for the project	0 (0)	0 (0)	7 (1.8)	13 (3.4)	367 (94.8)	387 (100)
c) There were delay in mobilization by the main contractor	0 (0)	5 (1.3)	30 (7.8)	352 (90.9)	0 (0)	387 (100)
d) Many change requests were placed related to design	0 (0)	0 (0)	8 (2.1)	321 (82.9)	58 (15)	387 (100)
e) There was lengthy routine of government authorities	0 (0)	0 (0)	0 (0)	100 (25.8)	287 (74.2)	387 (100)
f) Irregular attending of project review meetings were recorded	0 (0)	0 (0)	0 (0)	75 (19.4)	312 (80.6)	387 (100)

The research findings on Table 4.9 showed that majority of the respondents strongly agreed that the projects were not executed within the planned time (94.0%), set project duration was not enough for the project (94.8%), there were lengthy routine of government authorities (74.2%), and irregular attending of project review meetings were recorded (80.6%); agreed there were delays in mobilization by the main contractor (90.9%), and many change requests were placed related to design (82.9%). These research findings implied that there were schedule delays and the initial schedule was not antiquate to complete the project. Government routine and permitting process was depicted as a bottleneck in meeting the initial project schedule due to lengthy and tedious procedures. Project review meetings with all stakeholders was implied to be an issue as absenteeism was noted and said to affect effective implementation of the project schedule. Finally, delays in mobilization from the main contractor and many change request schedules raised by the contractor due to design constructability were also cited as issues contributing to delay in meeting the project schedule as per the initial plan.

From the open-ended questions, the respondents agreed with the questionnaire respondents as they cited performance challenges among others as; lengthy government routine in permits processing, delay in main contractor mobilization, and many changes from the original design and scope through change requests. This reflected that both interviewed respondents and those from the questionnaires agreed that project performance in meeting the initial timeline was a real issue.

Table 4.10: Means and standard deviations for schedule performance in housing construction industry

Statement	n	Min	Max	Mean	SD
a) Project was executed within the planned time	387	1	5	4.93	0.29
b) Set project duration was not enough for the project	387	1	5	4.93	0.31
c) There were delay in mobilization by the main contractor	387	1	5	3.90	0.38
d) Many change requests were placed related to design	387	1	5	4.13	0.42
e) There was lengthy routine of government authorities	387	1	5	4.40	0.60
f) Irregular attending of project	387	1	5	2.04	0.38
Composite implementation mean	**387**	**1**	**5**	**4.01**	**0.19**

The research findings in Table 4.10 showed that project (s) were not executed within the planned time (M=4.93, SD=0.29), set project duration was not enough for the project (M= 4.93, SD=0.31), there were lengthy routine of government authorities (M=4.40, SD=0.60), and irregular attending of project review meetings were recorded (M=2.04, SD=0.38); and that there were delay in mobilization by the main contractor (M=3.90, SD=0.38), and many change requests were placed related to design (M=4.13, SD=0.42).

The results showed that the composite implementation mean score for the six statements used to measure scheduled time in project performance was 4.01 and standard deviation of 0.19, implying that the results from the respondents were concentrated around the mean (composite implementation SD 0.19) and that the respondents had responses which were not scattered away from the mean as characterised by the small standard deviation.

This can also be seen from the individual responses mean (s) and standard deviation (s) in Table 4.10. This meant the respondents were of the same mind and in agreement that the projects did not perform as per initial/planned schedule.

Table 4.11: Frequencies and percentages for quality performance in housing construction industry

Statement	SDA F (%)	DA F (%)	N F (%)	A F (%)	SA F (%)	Total n (%)
Quality Related.						
a) There were issues arising from quality of materials	0 (0)	55 (14.2)	33 (8.5)	299 (77.3)	0 (0)	387 (100)
b) Many re-work issues were raised	0 (0)	79 (20.4)	35 (9.1)	273 (70.5)	0 (0)	387 (100)
c) Inspection schedules were not followed	0 (0)	75 (19.4)	11 (2.8)	301 (77.8)	0 (0)	387 (100)
d) Changes in drawings and specifications were many	0 (0)	95 (24.5)	32 (8.3)	260 (67.2)	0 (0)	387 (100)
e) Inadequate skill of contractor's staff was noticed	0 (0)	99 (25.6)	42 (10.9)	246 (63.5)	0 (0)	387 (100)
f) There were frequent design changes	0 (0)	0 (0)	39 (10.1)	267 (69)	81 (20.9)	387 (100)

The research findings in Table 4.11 showed that 73.3% of the respondents agreed that there were issues arising from quality of materials, 70.5% agreed that many re-work issues were raised, 77.8% agreed that inspection schedules were not followed, 67.2% agreed that changes in drawings and specifications were many, 63.5% agreed that inadequate skill of contractor's staff were noticed, and 69.0% agreed that there were frequent design changes in their project (s). The findings indicate that the respondents were in agreement that quality related issues touching on materials, re-works, missed inspection schedules, changes in drawings and specifications, inadequate skills of the contractors' staff, and frequent design change. All these put together gave rise to the fact that the projects had quality issues.

Table 4.12: Means and standard deviations for quality performance in housing construction industry

Statement		n	Min	Max	Mean	SD
(b)	**Quality Related.**					
a)	There were issues arising from quality of materials	387	2	5	3.63	0.73
b)	Many re-work issues were raised	387	2	5	3.31	0.82
c)	Inspection schedules were not followed	387	2	5	3.26	0.74
d)	Changes in drawings and specifications were many	387	2	5	3.10	0.9
e)	Inadequate skill of contractor's staff was noticed	387	2	5	3.38	0.62
f)	There were frequent design changes	387	3	5	4.22	0.73
Composite implementation mean		**387**	2	5	3.48	0.55

The research findings in Table 4.12 showed that respondents agreed that; there were issues arising from quality of materials (M = 3.63, SD = 0.73), many re-work issues were raised (M = 3.31, SD = 0.82), changes in drawings and specifications were many (M = 3.10, SD = 0.9), inadequate skill of contractor's staff were noticed (M = 3.38, SD = 0.62), and there were frequent design changes (M = 4.22, SD = 0.73).

The results showed that the composite implementation mean score for the six statements used to measure quality in project performance was 3.48 and standard deviation of 0.55, implying that the results from the respondents were concentrated less than one standard deviation from the mean (composite implementation SD 0.55); this can also be seen from the individual responses' mean (s) and standard deviation (s) in Table 4.10. This implies that the respondents were of the same mind and in agreement that the projects did not perform as per initial/planned quality hence mitigation measures and necessary actions need to be put in place.

Table 4.13: Frequencies and Percentages for Safety and Health performance in Housing Construction Industry

Statement	SDA F (%)	DA F (%)	N F (%)	A F (%)	SA F (%)	Total F n (%)
Safety and Health Related.						
a) No fatalities were reported during the project time	0 (0)	0 (0)	0 ()	4 (1)	383 (99)	387 (100)
b) No injury compensation issues were raised	0 ()	87 (22.5)	40 (10.3)	260 (67.2)	0 (0)	387 (100)
c) No work-related injuries were reported	0 (0)	78 (20.2)	13 (3.4)	296 (76.4)	0 (0)	387 (100)
d) Safety orientation and talks were mandatory	0 (0)	0 (0)	18 (4.7)	67 (17.3)	302 (78)	387 (100)
e) Use of personal protective equipment (PPE's) was a must	0 (0)	0 (0)	0 (0)	97 (25.1)	290 (74.9)	387 (100)
f) Daily Pre-task planning before start of work with the team (s) was done	0 (0)	0 (0)	40 (10.3)	127 (32.8)	220 (56.9)	387 (100)
g) Permits were issued for working at heights	0 (0)	0 (0)	50 (12.9)	187 (48.3)	150 (38.8)	387 (100)
h) Scaffolding, personal fall arrest systems (PFAS), and Ladders had an inspection schedule	0 (0)	31 (8)	65 (16.8)	72 (18.6)	219 (56.6)	387 (100)
i) Permits were issued for working in confined space	0 (0)	14 (3.6)	33 (8.5)	193 (49.9)	147 (38)	387 (100)
j) Permits were issued for hot works	0 (0)	20 (5.2)	29 (7.5)	189 (48.8)	149 (38.5)	387 (100)
k) Safety officer was required full time at site	0 (0)	0 (0)	60 (15.5)	177 (45.7)	150 (38.8)	387 (100)

The research findings in Table 4.13 showed that majority of the respondents strongly agreed with the statement(s) that no fatalities were reported during the project time

(99%), safety orientation and talks were mandatory (78%), use of personal protective equipment (PPE's) was a must (74.9%), daily pre-task planning before start of work with the team (s) was done (56.9%), and scaffolding, personal fall arrest systems (PFAS), and Ladders had an inspection schedule (56.6%). The remaining portion of the respondents agreed with the statement(s) that, no injury compensation issues were raised (67.2%), no work-related injuries were reported (76.4%), permits were issued for working at heights (48.3%), permits were issued for working in confined space (49.9%), permits were issued for hot works (48.8%) and safety officer was required full time at site (47.5%).

The findings implied that the projects were delivered within specified safety and health parameters as respondents pointed out – no fatalities, safety orientation and safety talks were mandatory, use of PPE's was mandatory, daily pre-task plans were done before starting the work, scaffolding, personal fall arrest systems as well as ladders had an inspection schedules, no injury compensation issues were raised, no work related injuries were reported, permits were issued for working at heights, confined spaces and for hot works, and a full time safety and health officer was at site always. This further indicates that safety and health was highly regarded as an indicator of project performance, and measures and checks had been put in place at the construction sites to prevent injuries at the working sites.

Table 4.14: Means and standard deviations for safety and health performance in housing construction industry

Statement		n	Min	Max	Mean	SD
(c)	**Safety and Health Related.**					
a)	No fatalities were reported during the project time	387	4	5	4.75	0.59
b)	No injury compensation issues were raised	387	2	4	3.54	0.84
c)	No work-related injuries were reported	387	2	4	4.72	0.54
d)	Safety orientation and talks were mandatory	387	3	5	4.75	0.43
e)	Use of personal protective equipment (PPE's) was a must	387	4	5	4.47	0.68
f)	Daily Pre-task planning before start of work with the team (s) was done	387	3	5	4.26	0.67
g)	Permits were issued for working at heights	387	3	5	4.26	0.67
h)	Scaffolding, personal fall arrest systems (PFAS), and Ladders had an inspection schedule	387	2	5	4.23	1.00
i)	Permits were issued for working in confined space	387	2	5	4.22	0.25
j)	Permits were issued for hot works	387	2	5	4.20	0.79
k)	Safety officer was required full time at site	387	3	5	4.24	0.70
Composite implementation mean		**387**	2	5	4.33	0.45

Research findings in Table 4.14 based on individual questionnaire items showed that the mean score for the eleven statements used to measure safety and health indicator was 4.33 and standard deviation of 0.45. The individual items' means and standard deviation reflected that; to a very great extend no fatalities were reported during the project time (M = 4.75, SD = 0.59), safety orientation and talks were mandatory (M = 4.75, SD = 0.43), use of personal protective equipment (PPE's) was a must (M = 4.67, SD = 0.68), daily Pre-task planning before start of work with the team (s) was done (M = 4.26, SD = 0.67), and scaffolding, personal fall arrest systems (PFAS), and Ladders had an inspection schedule (M = 4.24, SD = 1.00). The remaining portion of the respondents to a great extent agreed with the statement(s) that, no injury compensation issues were raised (M = 3.54, SD = 0.84), no work related injuries were reported (M = 4.72, SD = 0.54), permits were issued for working at heights (M = 4.26, SD = 0.67), permits were issued for working in confined space (M = 4.22, SD = 0.25), permits were issued for hot works (M = 3.10, SD = 0.9) and Safety officer was required full time at site (M = 4.20, SD = 0.79).

The findings implied that safety and health was a major indicator of project performance and was highly regarded by the key players in the housing construction industry sites. The composite implementation mean and standard deviation showed that the responses were concentrated within one standard deviation away from the mean. The composite implementation mean score and standard deviation (M= 4.33; SD = 0.45) also followed the same trend as portrayed by the means and standard deviations of the individual items from which the respondents used to score. This implied that the responses were not scattered away from the mean hence the respondents had close views that tallied and agreed with the statements relating to safety and health. From the findings, safety and health was perceived to be of great importance in projects' execution and as an indicator for project performance in the construction industry.

Table 4.15: Frequencies and percentages for client satisfaction in performance of gated community housing construction

Statement	SDA F (%)	DA F (%)	N F (%)	A F (%)	SA F (%)	Total F n (%)
Client satisfaction related.						
a) No repeat jobs after completion	0 (0)	60 (15.5)	0 (0)	327 (84.5)	0 (0)	387 (100)
b) No legal issues raised by owner	0 (0)	314 (81.1)	0 (0)	73 (18.9)	0 (0)	387 (100)
c) Defects liability for workmanship was set for more than six months	0 (0)	0 (0)	0 (0)	69 (17.8)	318 (82.2)	387 (100)
d) Client was satisfied with final finishes of the facility (s)	0 (0)	54 (14)	0 (0)	333 (86)	0 (0)	387 (100)
e) There was smooth information coordination between owner and project parties	0 (0)	171 (44.2)	0 (0)	216 (55.8)	0 (0)	387 (100)
f) No Conflicts encountered among involved parties	0 (0)	91 (23.5)	33 (8.5)	263 (68)	0 (0)	162 (100)

The research findings in Table 4.15 showed that 84.5% of the respondents indicated that there were no repeat jobs after completion, 81.1% disagreed there were no legal issues raised by owner, 82.2% strongly agreed defects liability for workmanship was set for more than six months, 86% agreed client was satisfied with final finishes of the facility (s), 55.8% agreed there was smooth information coordination between owner and project parties, and 68% agreed no conflicts were encountered among involved parties. The respondents' results portrayed that the projects were delivered within above average quality based on how each item was scored; a small percentage (15.5%) indicated that there were repeat jobs after completion, 18.9% agreed there were legal issues raised by the owner, 17.8% agreed defects liability for workmanship was set for more than six months, 14% disagreed the client was satisfied with the final finishes of the facilities, 44.2% disagreed there was smooth information coordination between owner and project parties, and 23.5% disagreed with the statement that there were no conflicts among project parties. These findings implied that client satisfaction though highly rated was wanting and needed to be addressed for projects to deliver as per the clients' expectation.

Table 4.16: Means and Standard Deviations for client satisfaction performance in housing construction industry

Statement		n	Min	Max	Mean	SD
	Client Satisfaction Related.					
a)	No repeat jobs after completion	387	2	5	3.65	0.73
b)	No legal issues raised by owner	387	2	5	2.39	0.79
c)	Defects liability for workmanship was set for more than six months	387	4	5	4.82	0.38
d)	Client was satisfied with final finishes of the facility (s)	387	2	5	3.73	0.71
e)	There was smooth information coordination between owner and project parties	387	2	4	3.12	0.99
f)	No Conflicts encountered among involved parties	387	2	5	3.44	0.85
Composite implementation mean		**387**	2	5	3.53	0.54

The research findings in Table 4.16 showed that the mean score for the six statements used to measure client satisfaction indicator was 3.53 and standard deviation of 0.54. The results from individual items showed that respondents to a moderate extent agreed there were no repeat jobs after completion (M = 3.65, SD = 0.73), disagreed there were no legal issues raised by owner (M = 2.39, SD = 0.79), strongly agreed defects liability for workmanship was set for more than six months (M = 4.67, SD = 0.68), agreed client was satisfied with final finishes of the facility (s) (M = 4.82, SD = 0.38), agreed there was smooth information coordination between owner and project parties (M = 3.11, SD = 0.71), and agreed no conflicts were encountered among involved parties (M = 3.44, SD = 0.85).

The small standard deviations for the individual items showed that the responses were concentrated within less than one standard deviation away from the mean. The small standard deviations implied that there was no large amount of variations in the group that was being studied on client satisfaction. The composite implementation mean and standard deviation (M = 3.53, SD = 0.54) agreed on overall with the above findings that the responses were not scattered away from the mean and that the respondents rated the items at the middle of the scale, implying that the client satisfaction indicator was moderately rated based on the project(s) in question and was closely being monitored by the stakeholders in the housing construction industry.

4.5.1 Overall analysis on Project performance indicators

The overall findings on the project performance indicators in gated community housing construction industry was shown in table 4:17.

Table 4.17: Means and standard deviations for project performance indicators

Indicator	n	Min	Max	M	SD

a) Budgeted cost	387	1	5	2.40	0.27
b) Scheduled time	387	1	5	4.01	0.19
c) Prescribed quality	387	2	5	3.48	0.55
d) Safety & Health	387	2	5	4.33	0.45
e) Client satisfaction	387	2	5	3.53	0.54
Overall composite index	387	1	5	3.55	0.20

The research findings in Table 4.17 showed that the mean score for the five performance indicators was 3.55 and standard deviation of 0.20. Based on individual composite implementation mean and standard deviation for each indicator; to a very great extent (M=4.33, SD=0.45) projects did perform in health and safety issues; to a great extend projects did perform as per scheduled time, prescribed quality, and client satisfaction (M=4.01, SD=0.19), (M=3.48, SD=0.55), and (M=3.53, SD=0.54) respectively, and to a low extend projects did perform as per budgeted cost (M=2.40, SD=0.27).

From the observed small standard deviations, the implication is that the respondents were concentrated around the mean and didn’t have significant variations. The respondents scored the items at or close to the centre of the scoring scale. The overall composite index for the indicators combined took and followed the same trend, portraying a concentration of the responses around the mean. The group of respondents being studied emerged to have a similar scoring trend that did not have a wide variation from the mean, and the results generally implied that the project indicators combined were highly regarded by the respondents and needed to be taken into consideration to have projects in housing construction industry perform as per client and other stakeholders’ satisfaction.

From the open-ended questionnaire items, the researcher had required the respondents to list two performance challenges encountered in implementation of gated community housing projects, and suggest ways in which implementation of gated community housing projects could be made more effective. The responses were summarised in Table 4.18

Table 4.18: Summary of responses for open ended questions relating to project performance indicators

Item	Responses
List two performance challenges that you do encounter in implementing gated community housing projects	Schedule and budget overruns, Design constructability issues resulting to many changes from the initial plan, Unrealistic project schedule that does not take into account all the tasks required to deliver the project, Quality issues of the finished product resulting to client dissatisfaction, Compliance issues with the regulatory agencies, Delay in releasing interim payments to main contractor, and Breach of contractual terms – delayed deliveries, escalated material prices and poor quality of the supplied materials, and Disputes settlement process takes a long time to conclude on matters raised.
Suggest ways in which implementation of gated community housing projects can be made more effective	Development of a project schedule that takes care of all tasks required to deliver the project, Matching tasks with resources and required skill to execute them, Employing a sound pre-construction planning process to come up with a workable project schedule, Incorporating all the stakeholders – consultants, client and main contractor in all major project execution decisions, Development of a quality system and procedure to achieve the desired level of quality, Coming up with regular site project review meeting to evaluate progress with the concerned stakeholders, and Use of computer aided design tool (CAD) to makes the project designs accurate and easy to store for referencing purposes.

The summary of the research findings in Table 4.18 indicated that the respondents had similar answers to the closed ended questions in the questionnaire. The responses agreed with the closed ended questionnaire items. The respondents listed schedule and budget overruns, design constructability issues resulting to many changes from the initial plan, unrealistic project schedule that didn't consider all the tasks required to deliver the project, quality issues of the finished product resulting to client dissatisfaction, and compliance issues with the regulatory agencies. Suggesting ways in which implementation of gated community housing projects could be made more effective, the respondents listed the following; development of a project schedule that takes care of all tasks required to deliver the project, matching tasks with resources and required skill to execute them, employing a sound pre-construction planning process to come up with a workable project schedule, development of a quality system and procedure to achieve the desired level of quality, coming up with regular site project review meeting to evaluate progress with the concerned stakeholders, and use of computer aided design tool (CAD) to makes the project designs accurate and easy to store for referencing purposes. The responses were complimentary to the closed ended questionnaire items' responses.

For triangulation purposes, the researcher also had items related to the project performance indicators in the standardized interview guide (appendix III item 1, 6, 7 and 8) which were meant for consultants and main contractors. From each category (consultants and contractors), five respondents were chosen based on the procedures given at chapter three in this study. The five respondents were interviewed separately, and their responses summarized in Table 4.19

Table 4.19: Summary of responses for standardized interview guide relating to project performance

Item	Responses
What are the performance challenges encountered in housing construction industry projects?	Quality of materials, Inadequate contractor employees' skills, Communication issues, Lengthy conflict resolution process, Issues with design constructability, Issue with large provisional sums and prime costs factored in the bill of materials (BoM), Issues of scope changes and variations from the initial designs, Late release of interim payments, Unrealistic project schedule, and Many change requests during execution period.
In which way does quality management plan influence performance in housing construction industry projects	Specifying the desired materials' quality for contracting purposes, Communication to all stakeholders the level of quality anticipated for the project, Setting up a benchmark for resolution of material quality issues, Give a clear guideline for matching skill with tasks for attainment of the desired project quality, Scoping of the project can be done accurately to meet the client satisfaction, Setting a basis for establishment of a monitoring and evaluation as well as an inspection schedule for the project, and Assists in communication to all stakeholders about the quality of the project at hand.
How does project schedule influence performance in housing construction industry projects	It determines resource and time allocations, If it does not incorporate all the project tasks, there will be time and budget overruns, A sound project schedule is a recipe for good project performance in scope, schedule and budget, A poorly formulated project schedule will deliver the project late and with budget overrun and or / with quality issues, It will be a source of project conflicts among the teams if not well formulated, and May give rise to many conflicts in terms of funds, allocated time, and delivery of materials.

Why do gated community housing projects complete with over budget and time overrun?	Poor planning, Many provisional sums factored in the bills of materials, Poor scheduling, Wrong supply of materials, Reworks, Many change requests raised, Design constructability issues, Lack of execution planning, Inconsistent project review and inspection teams, and Lengthy and inconsistent compliance issues.

The summarized findings from Table 4.19 showed that the interview with the consultants and the main contractors produced results that agreed with those given for the open-ended questionnaire items and also complimented the results to the closed ended questionnaire items though in a different version. The standardized interview guide was meant for triangulation purposes and this requirement was achieved.

4.6 Project environment and performance in housing construction industry

In this section descriptive and inferential statistics of the influences of project environment (regulatory, technological, and project manager's personal attributes) on performance in housing construction industry was analysed. Project environment was measured using regulatory environment, technological environment and project manager's personal attributes.

4.6.1 Descriptive analysis of project environment on performance in housing construction industry

This section presented data analysis and findings on the indicators of project environment (regulatory, technological, and project manager's personal attributes) comprising of frequencies, percentages, means and standard deviations.

4.6.1.1 Regulatory environment

The respondents were requested to indicate the extent to which regulatory environment influenced performance in the housing construction industry. They were given eight items rated on a five-point Likert scale ranging from: To a very little extent (VLE); to a little extent (LE); to a moderate extent (ME); to a great extent (GE), and to a very great extent (VGE) from which to choose. The findings were presented in Table 4.20 and Table 4.21

Table 4.20: Frequencies and percentages for regulatory environment

Statement	VLE F (%)	LE F (%)	ME F (%)	GE F (%)	VGE F (%)	Total F n (%)
a) There was lengthy conflict resolution process	0 (0)	0 (0)	47 (12.1)	240 (62)	100 (25.9)	387 (100)
b) There were changes in the regulatory framework	0 (0)	98 (32.4)	289 (74.7)	0 (0)	0 (0)	387 (100)
c) Disputes settlement process was lengthy	0 (0)	184 (47.5)	203 (52.5)	0 (0)	0 (0)	387 (100)
d) Arbitration issues were raised	20 (5.1)	87 (22.5)	280 (72.4)	0 (0)	0 (0)	387 (100)
e) Litigation issues were raised	67 (17.3)	74 (19.1)	246 (63.6)	0 (0)	0 (0)	387 (100)
f) There were Management – Labor relationship issues	224 (57.9)	97 (25.1)	66 (17)	0 (0)	0 (0)	387 (100)
g) Cost of compliance to regulatory requirement was high	0 (0)	0 (0)	0 (0)	85 (22)	302 (78)	387 (100)
h) Long waiting time for compliance to regulatory requirements – EIA, and Approval of plans.	0 (0)	0 (0)	0 (0)	74 (19.1)	313 (80.9)	387 (100)

The research findings on Table 4.20 showed that 62% of the respondents indicated that to a great extent there were lengthy conflict resolution process; to a moderate extent there were changes in the regulatory framework (74.7%), to a moderate extent disputes settlement process was lengthy (52.5%), to a moderate extent arbitration issues were raised (72.4%), to a moderate extent litigation issues were raised (63.6%), to a very little extent there were Management – Labor relationship issues (57.9%), to a very great extent cost of compliance to regulatory requirement was high (78%), and to a very great extent there were long waiting time for compliance to regulatory requirements (80.9%).

The results implied that the respondents were in agreement that conflict resolution process was lengthy as the responses ranged from to a moderate extent agree (12.1%), to a great extent (62%), and to a very great extent (25.9%). Changes in regulatory framework during the project execution period was rated to a moderate extent (74.7%) and to a little extent (25.3), implying that changes in the regulatory framework were not frequent/many. Lengthy dispute resolution process was rated at a little extent (47.5%), and moderate extent (52.5%) implying that disputes resolution process was somewhat lengthy and needed realignment in housing construction industry. On litigation issues, respondents rated the item from to a very little extent 17.3%, to a little extend 19.1%, and to a moderate extent 63.3%. These results imply that the projects didn't perform without litigation issues, but the raised issues were not many as two ratings for the item had zero score (to a great extent, 0 %, and to a very great extent, 0 %.). Labour – management relationship issues had a similar tread with the litigation issue. The projects performed with a few labour - management relations issues and this implied that the housing construction industry called for restructuring of the labour laws and policies to make the projects perform smoothly. High cost of compliance to regulatory and long waiting period for compliance to regulatory requirement are two items which were scored on the higher side of the rating scale. This implied that a framework should be put in place to regulate the cost for compliance and the same time shorten the waiting time before compliance certificates/permits are issued (refer to appendix V)

Table 4.21: Means and standard deviations for regulatory environment

Statement	n	Min	Max	M	SD
a) There was lengthy conflict resolution process	387	3	5	4.14	0.61
b) There were changes in the regulatory framework	387	2	3	2.40	0.49
c) Disputes settlement process was lengthy	387	1	3	2.66	0.58
d) Arbitration issues were raised	387	3	5	4.12	0.50
e) Litigation issues were raised	387	1	3	2.46	0.77
f) There were Management – Labor relationship issues	387	1	3	1.59	0.76
g) Cost of compliance to regulatory requirement was high	387	4	5	4.78	0.42
h) Long waiting time for compliance to regulatory requirements – EIA, and Approval of plans.	387	4	5	4.81	0.39
Regulatory environments' influence and performance in housing construction industry	**387**	**1**	**5**	**3.37**	**0.46**

The research findings in Table 4.21 showed that the mean score for the eight statements for regulatory environment was 3.37 and standard deviation of 0.46. From the individual item mean and standard deviations, respondents agreed to great extent that there were lengthy conflict resolution process (M=4.14, SD=0.61), to a moderate extent there were changes in the regulatory framework (M=2.40, SD=0.49), to a moderate extent disputes settlement process was lengthy (M=2.66, SD=0.58), to a great extent arbitration issues were raised (M=4.12, SD=0.50), to a moderate extend litigation issues were raised (M=2.46, SD=0.77), to a very little extent there were management – labor relationship issues (M=1.59, SD=0.76), to a very great extent cost of compliance to regulatory requirement was high (M=4.78, SD=0.42), and to a very great extent there were long waiting time for compliance to regulatory requirements (M=4.81, SD=0.39).

The overall mean and standard deviation (M = 3.37, SD = 0.46) implied that the responses were not scattered but concentrated around the mean (less than one standard deviation from the mean). This further showed that the responses were similar, and respondents agreed with the items based on the statements in the questionnaire.

4.6.1.1.2 Correlational analysis of regulatory environment and project performance

Correlational analysis using Pearson's Product Moment technique was done to determine the relationship between regulatory environment and project performance. It was meant to identify the strength and direction of the association between the regulatory environment and project performance. Values of correlation coefficient range from -1 and +1. A correlation coefficient of +1 indicates that the two variables are perfectly and positively related in a linear sense, while -1 shows that the two variables are perfectly related but in a negative linear sense. Correlation coefficient (r) ranging from 0.81 to 1.0 is very strong; from 0.61 to 0.80 is strong; from 0.41 to 0.60 is moderate; from 0.21 to 0.40 is weak; and from 0.00 to 0.20 indicate no relationship (Hair et al., 2006). The results indicated a correlation of 0.499 and a significance of 0.000 (two tailed test), implying a positive and significant coefficient. The results further indicated a moderate and significant relationship (r=0.499, p-value<0.01) with project performance as summarised in Table 4.22

Table 4:22 Correlation table for regulatory environment and project performance

		Regulatory Environment
Project Performance	Pearson Correlation	0.499**
	Sig. (2-tailed	0.000
	N	387

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

The correlation results in Table 4:22 indicated a correlation of 0.499 and a significance of 0.000 (two tailed test), implying a positive and significant coefficient. The results further indicate a moderate and significant relationship between regulatory environment and project performance (r=0.499, p-value<0.01). Therefore, regulatory environment can be said to have a positive and significant relationship with project performance in housing construction industry.

4.6.1.1.3 Regulatory environment on performance of gated community projects

The first objective of the study was to examine how regulatory environment influences performance of gated community projects in Nairobi County, Kenya. The literature and empirical evidence had suggested that regulatory environment influences performance of housing construction industry projects. Performance of gated community housing projects was the dependent variable in the study and had five indicators namely: Cost; Time; Quality; Safety and Health; and Client satisfaction. A composite index for performance in gated community projects in Nairobi County was independently computed.

Regulatory environment in housing construction industry projects was the first independent variable in the study. Data was collected using 8 items, each item consisted of a statement that was measured on a five-point Likert-type scale. Composite index was computed and used in testing the hypothesis. To satisfy the first objective, the following hypothesis was tested using simple linear regression model.

Hypothesis one

$\mathbf{H_0}$: Regulatory environment has no significant influence on the performance of gated community projects in Nairobi County, Kenya.

$\mathbf{H_1}$: Regulatory environment has a significant influence on the performance of gated community projects in Nairobi County, Kenya.

The null hypothesis was tested using the following linear regression model:

$Y = a + \beta_1 X_1 + e$,

Where ;

Y= Project performance of gated Community projects

a=constant

β_1= Beta coefficient

X_1= Regulatory environment

e= error term

The results were presented in Table 4.23.

Table 4.23: Regression results of influence of regulatory environment on performance in gated community housing projects

Model	Unstandardized Coefficients		Standardized Coefficients	t	P-Value
	B	Std. Error	Beta		
Constant	1.683	0.129		13.379	0.000
Regulatory environment	0.275	0.63	0.399	4.314	0.000

Predictors: (Constant), Regulatory environment
Dependent Variable: **Performance in gated community housing projects**

R= 0.532
R square= 0.283
t= 4.314 at level of significance p = 0.0000 < 0.05

The study findings in Table 4.23 showed that r was equal to 0.532 indicating that regulatory environment had a moderately strong influence on performance in gated community housing projects. The value of r squared was 0.283, indicating that regulatory environment explained 28.3% of the variation in the performance in gated community housing projects in Nairobi County, Kenya. The β coefficient is 0.399, indicated that regulatory environment had statistically significant influence on the performance of gated community housing projects (β= 0.399, t=4.314, p= 0.000 < 0.05). The β value implied that one unit change in project performance was associated with 39.9% changes in regulatory environment.

The overall t =4.314 with p = 0.000<0.05 suggested that there was a statistically significant relationship between regulatory environment and performance in housing gated community projects. Based on the research findings we rejected the null hypothesis which stated that regulatory environment has no significant influence on the performance of gated community projects in Nairobi County, Kenya and conclude that regulatory environment had a significant influence on the performance of gated community projects in Nairobi County, Kenya.

Using the statistical findings, the regression model was substituted as follows;

$Y= 1.683+0.399X_1+e$,

Where;

Y= Project performance of gated Community projects

a=constant

β_1= Beta coefficient

X_1= Regulatory environment

e= error term

From literature reviewed, there were studies that related regulatory environment with performance in housing construction of gated communities (Ben-Joseph 2003, May 2004, and Luger et al., 2000). The study by Kikwasi (2012) found a positive and significant relationship between regulatory environment and project performance in Tanzania. Further, a study by Akanni et al. (2015) confirmed that regulatory environment is an important component in promoting project performance. The findings of this study also concur with Luger et al., (2000) who found that regulatory environment had a positive effect on the performance of housing construction projects. This study had results that concured with all the above studies and confirmed there existed a moderate positive and significant relationship between regulatory environment and performance in housing construction industry.

4.6.1.2 Technological environment

The respondents were requested to indicate the extent to which technological environment influenced performance in the housing construction industry. They were given seven items rated on a five-point Likert scale ranging from: to a very little extent (VLE); to a little extent (LE); to a moderate extent (ME); to a great extent (GE), and to a very great extent (VGE) from which to choose. The responses were presented in Table 4.24 and Table 4.25

Table 4.24: Frequencies and percentages for technological environment

Statement	VLE F (%)	LE F (%)	ME F (%)	GE F (%)	VGE F (%)	Total n (%)
a) Project used locally made plant and equipment (Not imported)	0 (0)	0 (0)	0 (0)	77 (19.9)	310 (80.1)	387 (100)
b) Skills were available for operation of the plant and equipment	0 (0)	0 (0)	35 (9)	302 (78.1)	50 (12.9)	387 (100)
c) Team members with necessary skills to operate and use the plant equipment were available	0 (0)	0 (0)	34 (8.8)	320 (82.7)	33 (8.5)	387 (100)
d) Use of Information and Communication technology (ICT) was satisfactory	0 (0)	0 (0)	49 (12.6)	99 (25.6)	239 (61.8)	387 (100)
e) Computer Aided Drafting (CAD) was used	0 (0)	0 (0)	25 (6.5)	25 (6.5)	337 (87)	387 (100)
f) 3D visual illustrations - Building Information Modelling, was used.	0 (0)	0 (0)	0 (0)	137 (35.4)	250 (64.6)	387 (100)
g) Electronic mails and communication was used	0 (0)	0 (0)	0 (0)	54 (14)	333 (86)	387 (100)

The research findings on Table 4.24 showed that majority of the respondents indicated that to a very great extent their projects used locally made plant and equipment (80.1%), to a great extent skills were available for operation of the plant and equipment (78.1%), to a great extent team members with necessary skills to operate and use the plant equipment were available (82.7%), to a very great extent use of information and communication technology (ICT) was satisfactory (61.8%), to a very great extent Computer Aided Drafting (CAD) was used (87%), to a very great extend 3D visual illustrations - Building Information Modelling, was used (64.6%), and to a very great extent electronic mails and communication was used (86%). However, a small part of the respondents had a slightly different opinion; availability of skills to operate plant and equipment (9%), use of ICT (12.6%), and use of computer aided drafting (6.5%) was rated ‘to a moderate extent’ when all the others had a rating above ‘to a great extent’. This implied that in some of the projects there were issues with these items and this should be addressed to have all the respondents operate at a common and level ground.

Table 4.25: Means and standard deviations for technological environment

Statement	n	Min	Max	M	SD
a) Project used locally made plant and equipment (Not imported)	387	4	5	4.81	0.40
b) Skills were available for operation of the plant and equipment	387	3	5	4.04	0.47
c) Team members with necessary skills to operate and use the plant equipment were available	387	3	5	4.00	0.43
d) Use of Information and Communication technology (ICT) was satisfactory	387	3	5	4.50	0.71
e) Computer Aided Drafting (CAD) was used	387	3	5	4.62	0.71
f) 3D visual illustrations - Building Information Modelling, was used.	387	4	5	4.65	0.48
g) Electronic mails and communication was used	387	4	5	4.86	0.35
Extent to which technology environment influence performance in housing construction industry	**387**	**3**	**5**	**4.50**	**0.31**

The research findings in Table 4.25 showed that the mean score for the seven statements for technological environment was 4.50 and standard deviation of 0.31. From individual items’ mean and standard deviation, it was clear that respondents agreed that to a very great extent their projects used locally made plant and equipment (M=4.80, SD=0.40), to a great extent skills were available for operation of the plant and equipment (M=4.04, SD=0.47), to a great extent team members with necessary skills to operate and use the plant equipment were available (M=4.0, SD=0.43), to a very great extent use of information and communication technology (ICT) was satisfactory (M=4.49, SD=0.71), to a very great extent Computer Aided Drafting (CAD) was used (M=4.62, SD=0.71), to a very great extend 3D visual illustrations - Building Information Modelling, was used (M=4.65, SD=0.48), and to a very great extent electronic mails and communication was used (M=4.86, SD=0.34).

The findings showed that the standard deviations were all lying approximately at one standard deviation away from the mean. The overall mean and standard deviation (M = 4.5, SD = 0.31) implied that the respondents had responses which were not scattered away from the mean. They agreed and of the same mind regarding the issues raised through the questionnaires, hence their responses concentrated around the mean. These research findings implied that technological environment is widely used in housing construction industry, and has an influence on project performance.

Table 4.26 Correlation table for technology environment and project performance

		Technology Environment
Performance of housing construction projects	Pearson Correlation	0.428**
	Sig. (2-tailed)	0.000
	N	387

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

The correlation results in Table 4.26 indicated a correlation of 0.428 and a significance of 0.000 (two tailed test), implying a positive and significant coefficient. The results indicated presence of a moderate positive and significant relationship between technological environment and performance of gated community housing projects in Nairobi County, Kenya ($r=0.499$, p-value<0.01). Therefore, technological environment was said to have a positive moderate and significant relationship with project performance in housing construction industry.

4.6.1.2.2 Inferential analysis of influence of technology environment on performance of gated community housing projects

The second objective of the study was to determine the extent to which technological environment influences performance of gated community projects in Nairobi County, Kenya. The literature and empirical evidence had suggested that technological environment influences performance of gated community projects. Performance of gated community projects was the dependent variable in the study and had five indicators namely: cost; time; quality; safety and health; and client satisfaction. A composite index for performance in gated community projects in Nairobi County, Kenya was computed.

Technological environment in housing construction industry projects was the second independent variable in the study. Data was collected using seven items, each item consisted of a statement that was measured on a five-point Likert-type scale. A composite index was computed and used in testing the hypothesis. To satisfy the second objective, the following hypothesis was tested using simple linear regression model.

Hypothesis two

$\mathbf{H_0}$: Technological environment has no significant influence on the performance of gated community projects in Nairobi County, Kenya.

$\mathbf{H_1}$: Technological environment has a significant influence on the performance of gated community projects in Nairobi County, Kenya.

The null hypothesis was tested using the following linear regression model:

$Y = a + \beta_2 X_2 + e$

Where ;

Y= Project performance in gated Community projects

a=constant

β_2= Beta coefficient

X_2= Technology environment

e= error term

The results were presented in Table 4.27.

Table 4.27: Regression results of influence of technological environment on performance of gated community housing projects

Model	Unstandardized Coefficients		Standardized Coefficients	t	P-Value
	B	**Std. Error**	**Beta**		
Constant	1.512	0.136		11.105	0.000
Technology environment	0.136	0.29	0.327	4.578	0.000
Predictors: (Constant), Technology environment					
Dependent Variable: **Performance in gated community housing projects**					
R = 0.559					
R square =0.312					
t = 4.758 at level of significance p = 0.000 < 0.05					

The study findings in Table 4.27 showed that r was equal to 0.559, indicating that Technological environment had a moderately strong influence on performance in gated community housing projects. The value of r squared was 0.312, indicating that technological environment explained 31.2% of the variation in the performance in gated community housing projects in Nairobi County, Kenya. The β coefficient was 0.327, indicating that technology environment had a statistically significant influence on the performance of gated community housing projects (β=0.327, t= 4.758, p=0.000<0.05). Considering the p value, it can be noted that the p value for technological environment (p=0.000) was statistically significant. The β value implied that one unit change in performance in gated community housing project was associated with 32.7% changes in technological environment.

The overall t= 4.578 with p = 0.000 <0.05 suggested that there was a statistically significant relationship between technological environment and performance in gated community housing projects in Nairobi County, Kenya. Based on the research findings we rejected the null hypothesis which stated that technological environment had no significant influence on the performance of gated community projects in Nairobi County, Kenya and concluded that technological environment had a statistically significant influence on the performance of gated community projects in Nairobi County, Kenya.

Using the statistical findings, the regression model was substituted as follows;

$$Y= 1.512+0.327\ X_2$$

Where; Y= Project performance in gated Community projects

X_2= Technological environment

Findings from this study agreed with Ikechukwu et al (2011) that technological environment had a relationship with project performance. The findings also supported Juliet et al., (2014), who argued that to a great extend technological environment has an influence on housing construction projects by giving out a clear picture of the completed houses in advance by use of 3D’s. The findings of this study further agreed with a study carried out by Thomas et al. (2002), which reaffirmed that technological environment had a positive and stable influence on the project performance and thereforce should be put into consideration whenever planners are working on a housing construction project.

4.6.1.3 Project Managers' Personal Attributes

The respondents were requested to indicate the extent to which project manager's personal attributes influenced performance in the housing construction industry. They were given eight items rated on a five-point Likert scale ranging from: to a very little extent (VLE); to a little extent (LE); to a moderate extent (ME); to a great extent (GE), and to a very great extent (VGE) from which to choose. The findings were presented in Table 4.28 and Table 4.29

Table 4.28: Frequencies and percentages for project manager's personal attributes

Statement	VLE F (%)	LE F (%)	ME F (%)	GE F (%)	VGE F (%)	Total n (%)
a) Educational qualifications are important	0 (0)	0 (0)	0 (0)	330 (85.3)	57 (14.7)	387 (100)
b) Overall Experience (specialised and other) is helpful	0 (0)	0 (0)	0 (0)	237 (61.2)	150 (38.8)	387 (100)
c) Management abilities (planning, organizing, directing, controlling) are required	0 (0)	0 (0)	27 (7)	240 (62)	120 (31)	387 (100)
d) Leadership abilities (focus on achievement of tasks & personal relations with the group) are vital	0 (0)	0 (0)	0 (0)	66 (17)	321 (83)	387 (100)
e) Relationship with top management, teams and client is important	0 (0)	0 (0)	90 (23.3)	213 (55)	84 (21.7)	387 (100)
f) Technical ability, knowledge in the use of tools and techniques very vital	0 (0)	0 (0)	113 (29.2)	215 (55.6)	59 (15.2)	387 (100)
g) Knowledge and understanding of estimating systems, cost control, scheduling control, quality and safety very	0 (0)	0 (0)	90 (23.3)	207 (53.4)	90 (23.3)	387 (100)

	important						
h)	Personality of the project manager - emotional stability, intelligence & maturity very important	0 (0)	0 (0)	37 (9.6)	297 (76.7)	53 (13.7)	387 (100)

The research findings on Table 4.28 show that most of the respondents indicated that to a great extent performance of housing projects was influenced by project manager's personal attributes citing that - educational qualifications are important (85.3%), overall experience (specialised and other) was helpful (61.2%), management abilities (planning, organizing, directing, controlling) were required (62%), leadership abilities (focus on achievement of tasks & personal relations with the group) was vital (83%), relationship with top management, teams and client important (55%), technical ability, knowledge in the use of tools and techniques was vital (55.6%), knowledge and understanding of estimating systems, cost control, scheduling control, quality and safety was very important (53.4%) and personality of the project manager - emotional stability, intelligence & maturity were very important (76.7%). However, from the same group we also find a different category of the respondents who rated personal attributes of the project manager 'to a moderate extend' for the following items; management abilities (planning, organizing, directing, controlling) are required (7%), relationship with top management, teams and client is important (23.3%), technical ability, knowledge in the use of tools and techniques very vital (29.2%), knowledge and understanding of estimating systems, cost control, scheduling control, quality and safety very important (23.3%), and personality of the project manager - emotional stability, intelligence & maturity very important (9.6%). All the other items were rated at 'to a great extent' and 'to a very great extent'. This implied that some of the respondents didn't look at all the listed items as being very important when evaluating the project manager's personal attributes. Generally, many respondents rated this environment very highly and rated the listed items as very important in determining the personal attributes of the project manager.

Table 4.29: Means and standard deviations for project manager's personal attributes

Statement	n	Min	Max	M	SD
a) Educational qualifications important	387	4	5	4.16	0.36
b) Overall experience (specialised and other) helpful	387	4	5	4.39	0.49
c) Management abilities (planning, organizing, directing, controlling) required	387	3	5	4.25	0.57
d) Leadership abilities (focus on achievement of tasks & personal relations with the group) vital	387	4	5	4.83	0.38
e) Relationship with top management, teams and client important	387	3	5	3.98	0.68
f) Technical ability, knowledge in the use of tools and techniques vital	387	3	5	3.88	0.67
g) Knowledge and understanding of estimating systems, cost control, scheduling control, quality and safety very important	387	3	5	4.12	0.50
h) Personality of the project manager - emotional stability, intelligence & maturity very important	387	3	5	4.02	0.7
Extent to which technology environment influence performance in housing construction industry	**387**	**3**	**5**	**4.20**	**0.34**

The research findings in Table 4.29 showed that the mean score for the eight statements for project manager's personal attributes was 4.20 and standard deviation of 0.34. Individual rating of each item showed that respondents indicated that to a great extent performance of their projects was influenced by project manager's personal attributes citing that - educational qualifications were important (M=4.12, SD=0.36), overall experience (specialised and other) was helpful (M=4.39, SD=0.49), management abilities (planning, organizing, directing, controlling) were required (M=4.25, SD=0.57), leadership abilities (focus on achievement of tasks & personal relations with the group) was vital (M=4.83, SD=0.38), relationship with top management, teams and client was important (M=3.98, SD=0.68), technical ability, knowledge in the use of tools and techniques was vital (M=3.88, SD=0.67), knowledge and understanding of estimating systems, cost control, scheduling control, quality and safety was very important (M=4.12, SD=0.50), and personality of the project manager - emotional stability, intelligence & maturity were very important (M=4.02, SD=0.70). From the findings, we notice that the items had a small standard deviation (< 1). This small standard deviation was a measure of how far the responses were distributed from the mean. This implied that the responses were concentrated around the mean. The overall mean and standard deviation (M = 4.2, SD = 0.34) also agreed with the general items' responses. The small standard deviation was an indication that the responses were not varied and were consistent from one respondent to another.

4.6.1.3.2 Correlational analysis of project manager's personal attributes and performance of housing construction projects

Correlational analysis using Pearson's Product Moment technique was done to determine the relationship between project manager's personal attributes and performance of housing construction projects. It was meant to identify the strength and direction of the association between the independent and the dependent variables. The results were summarized in Table 4.30.

Table 4.30 Correlation for project manager's personal attributes and project performance in housing construction industry in Kenya.

		Project manager's personal attributes
Performance in gated communities housing projects	Pearson Correlation	0.424**
	Sig. (2-tailed)	0.000
	N	387

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

The correlation results in Table 4.30 indicated a positive and significant coefficient between project manager's personal attributes and performance of housing construction projects, (r=0.424, p-value<0.01). These results implied a moderate and significant relationship between project manager's personal attributes and performance of housing construction projects.

4.6.1.3.3 Inferential analysis of influence of project manager's personal attributes on performance of gated community housing projects

The third objective of the study was to establish the extent to which project manager's personal attributes influences performance of gated community projects in Nairobi County, Kenya. The literature and empirical evidence had suggested that project manager's personal attributes influence performance of gated community projects. Performance of gated community projects was the dependent variable in the study and had five indicators namely: Cost; Time; Quality; Safety and Health; and Client satisfaction. A composite index for performance in gated community projects in Nairobi County was computed.

Project managers' personal attributes environment in housing construction industry projects was the third independent variable in the study. Data was collected using eight items, each item consisted of a statement that was measured on a five-point Likert-type scale. Composite index was computed and used in testing the hypothesis. To satisfy the second objective, the following hypothesis was tested using simple linear regression model.

Hypothesis three

$\mathbf{H_0}$: Project managers' personal attributes has no significant influence on the performance of gated community projects in Nairobi County, Kenya.

$\mathbf{H_1}$: Project managers' personal attributes has a significant influence on the performance of gated community projects in Nairobi County, Kenya.

The null hypothesis was tested using the following linear regression model:

$Y = a + \beta_3 X_3 + e$

Where ;

Y= Performance of gated Community housing projects

a=constant

β_3= Beta coefficient

X_3= Project managers' personal attributes

e= error term

The results are presented in Table 4.31.

Table 4.31: Regression results of influence of project manager's personal attributes on performance of gated community housing projects

Model	Unstandardized Coefficients		Standardized Coefficients	t	P-Value
	B	Std. Error	Beta		
Constant	1.573	0.130		12.144	0.000
Project manager's personal attributes	0.204	0.039	0.360	5.074	0.000
Predictors: (Constant), Project manager's personal attributes					
Dependent Variable: **Performance in gated community housing projects**					
R= 0.542					
R square=0.294					
t=5.074 at level of significance p = 0.000 <0.05					

The study findings in Table 4.29 showed that r was equal to 0.542, indicating that project managers' personal attributes environment had a moderately strong influence on performance in gated community housing projects. The value of r squared was 0.294, indicating that project managers' personal attributes environment explains 29.4% of the variation in the performance in gated community housing projects in Nairobi County, Kenya. The β coefficient is 0.360, indicating that project managers' personal attributes' environment had statistically significant influence on the performance of gated community housing projects ($\beta=0.360$, $t=5.074$, $p=0.000<0.05$). The β value implied that every unit change on the performance of gated community housing projects was associated with 36% changes in project manager's personal attributes environment.

The overall $t = 5.074$ with $p = 0.000 < 0.05$ suggested that there was a statistically significant relationship between project managers' personal attributes environment and performance in gated community projects in Nairobi County, Kenya. Based on the research findings we rejected the null hypothesis which stated that project managers' personal attributes environment had no significant influence on the performance of gated community projects in Nairobi County, Kenya and concluded that project managers' personal attributes had a statistically significant influence on the performance of gated community projects in Nairobi County, Kenya.

Using the statistical findings, the regression model was substituted as follows;

$$Y = 1.573 + 0.360\ X_3$$

Where;

Y= Performance of gated Community housing projects

X_3= Project manager's personal attributes

Although studies relating the influence of project managers personal attributes' environment on performance of gated community housing projects seemed to be limited, there were many studies based on influence of project manager's personal traits on project performance. A study by Jugdev et al. (2005) established that there was a positive relationship between project manager's personal traits and project performance. Further, a study by Jin et al. (1996) confirmed that project managers typically require a broad background in both construction techniques as well as design, engineering and business administration skills for their projects to perform as planned. The findings of this study also concur with Grant et al. (1997) who found that project manager's competence had a positive effect on the performance of their projects.

4.6.1.4 Project macro planning process

The respondents were requested to indicate the extent to which project macro planning process influenced performance in gated community housing projects. They were given thirteen items rated on a five-point Likert scale ranging from: never (NV); rarely (RL); occasionally (OC); frequently (FQ), and always (AW) from which to choose. The findings are presented in Table 4.30 and Table 4.32.

Table 4.32: Frequencies and percentages for project macro planning process

Statement	NV F (%)	RL F (%)	OC F (%)	FQ F (%)	AW F (%)	Total n (%)
a) Structural drawings level of adequacy impacts on project performance	0 (0)	0 (0)	0 (0)	67 (17.3)	320 (82.7)	387 (100)
b) Clear project specification details influence project performance	0 (0)	2 (0.52)	0 (0)	35 (9.08)	350 (90.4)	387 (100)
c) A clear and well-defined quality management plan impacts on project performance	0 (0)	0 (0)	0 (0)	33 (10.1)	354 (91.5)	387 (100)
d) Clear strategy on interaction & coordination of project tasks promotes performance	0 (0)	0 (0)	0 (0)	39 (10.1)	348 (89.9)	387 (100)
e) A project schedule which includes all required work influence performance.	0 (0)	0 (0)	0 (0)	24 (6.2)	363 (93.8)	387 (100)
f) A programme that shows all required resources and budget control initiatives promotes performance.	0 (0)	0 (0)	0 (0)	48 (12.4)	339 (87.60)	387 (100)
g) Matching project tasks with appropriate skilled personnel promotes project success.	0 (0)	0 (0)	0 (0)	82 (21.2)	305 (78.8)	387 (100)
h) Personnel training enhances project performance.	0 (0)	0 (0)	0 (0)	97 (25.1)	290 (74.9)	387 (100)
i) Involvement of project team(s) enhances project performance.	0 (0)	0 (0)	0 (0)	45 (11.6)	342 (88.4)	387 (100)
j) A sound communication strategy both internal and external enhances success of the project.	0 (0)	0 (0)	0 (0)	100 (25.8)	287 (74.2)	387 (100)
k) A well-defined risk mitigation strategy promotes project performance.	0 (0)	0 (0)	0 (0)	124 (32.0)	263 (68)	387 (100)
l) A strategy for balancing people, materials, equipment and time schedule promotes performance	0 (0)	0 (0)	0 (0)	86 (22.2)	301 (77.8)	387 (100)
m) A defined procurement strategy for necessary resources from external sources influence performance.	0 (0)	0 (0)	0 (0)	138 (35.7)	249 (64.3)	387 (100)

The research findings on Table 4.32 showed that most of the respondents concurred that always structural drawings level of adequacy impacts on project performance (82.7%), always clear project specification details influence project performance (90.4%), always a clear and well defined quality management plan impacts on project performance (91.5%), always clear strategy on interaction & coordination of project tasks promotes performance (89.9%), always a project schedule which includes all required work influence performance (93.8%), always a programme that shows all required resources and budget control initiatives promotes performance (87.6%), always matching project tasks with appropriate skilled personnel promotes project success (78.8%), always personnel training enhances project performance (74.9%), always involvement of project team(s) enhances project performance (88.4%), always a sound communication strategy both internal and external enhances success of the project (74.2%), always a well-defined risk mitigation strategy promotes project performance (68%), always a strategy for balancing people, materials, equipment and time schedule promotes performance (77.8%), and always a defined procurement strategy for necessary resources from external sources influence performance (64.3%). However, a small group had a slightly different opinion though still complimenting the responses of the majority, they rated the following item as shown: rarely does a clear project specification details influence project performance (0.52%). This was a deviation from the norm as all the other items were scored at frequently (FQ) and always (AW).

Table 4.33: Means and standard deviations for project macro planning process

Statement	n	Min	Max	M	SD
a) Structural drawings level of adequacy impacts on project performance	387	3	5	4.13	0.51
b) Clear project specification details influence project performance	387	3	5	4.04	0.50
c) A clear and well-defined quality management plan impacts on project performance	387	3	5	4.20	0.50
d) Clear strategy on interaction & coordination of project tasks promotes performance	387	4	5	4.63	0.38
e) A project schedule which includes all required work influence performance.	387	4	5	4.32	0.29
f) A programme that shows all required resources and budget control initiatives promotes performance.	387	3	5	4.52	0.29
g) Matching project tasks with appropriate skilled personnel promotes project success.	387	4	5	4.90	0.30
h) Personnel training enhances project performance.	387	4	5	4.62	0.24
i) Involvement of project team(s) enhances project performance.	387	4	5	4.52	0.33
j) A sound communication strategy both internal and external enhances success of the project.	387	4	5	4.32	0.41
k) A well-defined risk mitigation strategy promotes project performance.	387	4	5	4.02	0.43
l) A strategy for balancing people, materials, equipment and time schedule promotes performance	387	4	5	4.53	0.32
m) A defined procurement strategy for necessary resources from external sources influence performance.	387	4	5	4.37	0.43
Extent to which project macro planning process influence performance in gated community housing projects	**387**	**3**	**5**	**4.30**	**0.18**

The research findings in Table 4.33 indicated that the mean score for the thirteen statements for the project macro planning process was 4.30 and standard deviation of 0.18. From individual items' responses, respondents indicated that: always structural drawings' level of adequacy impacts on project performance (M=4.12, SD=0.51), clear project specification details influence project performance (M=4.04, SD=0.50), a clear and well defined quality management plan impacts on project performance (M=4.20, SD=0.50), clear strategy on interaction & coordination of project tasks promotes performance (M=4.63, SD=0.38), a project schedule which includes all required work influence performance (M=4.32, SD=0.29), a programme that shows all required resources and budget control initiatives promotes performance (M=4.52, SD=0.29), matching project tasks with appropriate skilled personnel promotes project success (M=4.90, SD=0.30), personnel training enhances project performance (M=4.62, SD=0.24), involvement of project team(s) enhances project performance (M=4.52, SD=0.33), a sound communication strategy both internal and external enhances success of the project (M=4.32, SD=0.41), a well-defined risk mitigation strategy promotes project performance (M=4.02, SD=0.43), a strategy for balancing people, materials, equipment and time schedule promotes performance (M=4.53, SD=0.32), and a defined procurement strategy for necessary resources from external sources influence performance (M=4.37, SD=0.43).

The results implied that the respondents regarded projects macro planning process very high in terms of its influence on performance of gated community housing construction projects. This can be seen by analysing the mean from each item and the small standard deviation which indicates how concentrated the responses were around the mean (less than one standard deviation around the mean. The overall mean and standard deviation also shows the same tread (M = 4.3, SD = 0.18) and is in agreement with the general trend of the responses populating close to the mean. From these findings it was inferred that the respondents were of the same opinion and in agreement that project macro planning process is very important in project execution and performance.

4.6.1.4.1 Correlational analysis of macro planning process and performance of housing construction projects

Correlational analysis using Pearson's Product Moment technique was done to determine the relationship between macro planning process and performance of housing construction projects. It was meant to identify the strength and direction of the association between the independent and the dependent variable. The results are summarized in Table 4.34.

Table 4.34 Correlation results for macro planning process and project performance in housing construction industry in Kenya.

		Macro planning process
Performance in gated community housing projects	Pearson Correlation	0.575**
	Sig. (2-tailed)	0.000
	N	387

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

The correlation results in Table 4.34 indicated a positive and significant coefficient between macro planning process and performance of housing construction projects, (r = 0.575, p-value<0.01). These results implied a high and significant relationship between project macro planning process and performance of housing construction projects.

4.6.1.4.2 Inferential analysis of influence of macro planning process on performance of gated community housing projects

The fourth objective of the study was to determine the extent to which project macro planning process influences performance of gated community projects in Nairobi County, Kenya. The literature and empirical evidence had suggested that project macro planning process influences performance of gated community housing projects. Project performance was the dependent variable in the study and had five indicators namely: cost; time; quality; safety and health; and client satisfaction. A composite index for performance in gated community projects in Nairobi County was computed.

Project macro planning process in housing construction industry doubled as the fourth independent variable as well as the moderator of the relationship between project environment and performance in the study. Data was collected using 13 items, each consisting of a statement that was measured on a five-point Likert-type scale. Composite index was computed and used in testing the hypothesis. To satisfy the fourth objective, the following hypothesis was tested using simple linear regression model.

Hypothesis Four

$\mathbf{H_0}$: Project macro planning process has no significant influence on the performance of gated community projects in Nairobi County, Kenya

$\mathbf{H_1}$: Project macro planning process has a significant influence on the performance of gated community projects in Nairobi County, Kenya

The null hypothesis was tested using the following linear regression model:

$Y = a + \beta_4 X_4 + e$

Where ;

Y= Project performance in gated Community projects

a=constant

β_4= Beta coefficient

X_4= Project Macro planning process

e= error term

The results were presented in table 4.35.

Table 4.35: Regression results of influence of project macro planning process on performance of gated community housing projects

Model	Unstandardized Coefficients		Standardized Coefficients	t	P-Value
	B	Std. Error	Beta		
Constant	1.140	0.136		8.356	0.000
Macro planning strategy	0.553	0.50	0.655	10.962	0.000
Predictors: (Constant), Macro planning process					
Dependent Variable: **Performance in gated community housing projects**					
R= 0.655					
R square=0.429					
t=10.962 at level of significance p = 0.000 <0.05					

The study findings in Table 4.35 showed that r was equal to 0.655, indicating that project macro planning process had a strong influence on performance in gated community housing projects. The value of r squared was 0.429, indicating that project macro planning process explained 42.9 % of the variation in the performance in gated community housing projects in Nairobi County, Kenya. The β coefficient was 0.655, indicating that project macro planning process had statistically significant influence on the performance of gated community housing projects (β=0.655, t=10.962, p=0.000<0.05). The β value implied that every unit change on the performance of gated community housing projects was associated with 65.5% changes in project macro planning process.

The overall t=10.962 with p = 0.000 <0.05 suggested that there was a statistically significant relationship between project macro planning process and performance in gated community projects in Nairobi County, Kenya. Based on the research findings, we rejected the null hypothesis which stated that project macro planning process had no significant influence on the performance of gated community projects in Nairobi County, Kenya and concluded that project macro planning process had a statistically significant influence on the performance of gated community projects in Nairobi County, Kenya.

Using the statistical findings, the regression model was substituted as follows;

$$Y= 1.140+0.655X_4$$

Where; Y= Project performance in gated Community projects

X_4= Project macro planning process

Past studies confirmed that project macro planning process (pre-construction planning) was of vital importance to the success of any project and its successful delivery and execution (Waly et al., 2002). According to Thabet et al. (2002), an important part of macro planning process in construction projects is the creation of the project schedule. The project schedule places all the tasks of the project in a logical and sequential order. The macro planning process of most construction projects depends on the market demand and available resources. This process sets the priorities and schedule for the tasks necessary to complete the operation's objectives. Thamhain, (2004) concurs that during the macro planning process, the project may be organized in a variety of ways: sequential - in which the project is separated into stages completely in a consecutive sequence of tasks, parallel - in which the project contains independent portions that happen simultaneously, and staggered - in which the different tasks may overlap with each other and all these have a positive influence on the project performance. The results of this study were therefore in agreement with the past studies and confirmed there existed a positive and significant relationship between project macro planning process and performance of housing construction projects.

The researcher had formulated three open ended items (appendix II, section C, item number 10, 11, and 12) relating to the project environment (regulatory, technological and project manager's personal attributes). The findings were summarized in Table 4.36

Table 4.36: Summary of responses for open ended questions relating to project environment

Item	Responses
Ways in which legal framework influence construction of gated community housing project activities	Permits issuance took a long waiting time, Duplication of regulatory requirements – NCA registration, County government permit, dumping permit, EIA requirements, City planning approvals, electricity connection approvals, and water connection approvals. All these created delays and escalated costs, Cost of compliance to regulatory requirement was high - EIA, Disputes settlement process took a long time to conclude on matters raised, and Changes in regulatory framework from time to time affected project execution - land ownership policies, county government by-laws and standing orders.
Ways in which technology affects construction of gated community housing projects	Use of 4D models enhanced visualization of the project better and enabled viable resource allocation, Computer aided designs (CAD) made the work easier with filling and retrieval of the designs very easy, Communication was enhanced and more effective regardless of geographical diversity - tele-conferencing, use of skype meetings, WebEx and e-mails, and 3D models allowed the client as well as the customers to see the final product beforehand and made desired changes early in advance. This had a favorable quality and cost implication
In which ways does the project manager's personal attributes influence performance in construction of gated community housing projects	Performance depended on the project manager's overall qualifications and experience, Performance also depended on the project manager's management abilities including planning, organizing, directing, and controlling. The project manager's relationship with the top management of the program office as well as the project team determined the level of performance, and The personality of the project manager including maturity, intelligence and emotional stability greatly determined the level of project performance.

The summary of the research findings in Table 4.36 indicated that the respondents had similar answers to the closed ended questions in the questionnaire. The responses also went out of the way to mention other key items that needed to be considered for improved performance of the gated community housing projects like duplication of regulatory requirements – NCA registration, County government permits, dumping permits, EIA requirements, City planning approvals, electricity connection approvals, and water connection approvals. The responses for the technological application were skewed on the positive side on how performance is enhanced by the technology. Respondents were also of the opinion that the project manager's personal attributes – academic qualifications, experience, management abilities, leadership abilities, relationship with the top management as well as with the project teams were very important recipe for project performance. The responses complimented the closed ended questions in the questionnaire.

For triangulation purposes, the researcher also had items related to the project environment in the standardized interview guide (appendix III item 2, 3, and 4) which were meant for consultants and main contractors. From each category (consultants and contractors), five respondents were chosen based on the procedures given at chapter three in this study. The five respondents were interviewed separately, and their responses summarized in Table 4.37

Table 4.37: Summary of responses for standardized interview guide relating to project environment

Item	Responses
How does legal framework practices influence projects in housing construction industry?	Lengthy and not clear court procedures for breach of contracts, Permits approval procedures lengthy and not centralized, Costs for compliance with building code very high and restrictive, So many permit requirements and approval certificates required before breaking the ground, Lengthy process to obtain environmental impact assessment, Rent seeking before approvals were granted – no actual site inspections, and Changes in regulatory framework from time to time – especially when a calamity occurred – falling structures at the construction stages.
In which ways does technology influence projects in housing construction industry?	Fast communication and transfer of information in soft copies, Use of e-libraries for consultations and reference when in doubt, Improved resource scheduling by use of 4D models, that is, linking 3D with the fourth dimension of cost to make 4D, Fast and accurate development of project design by use of computer aided design (CAD) tool, Video teleconferencing using system tools, pulling audience from a wide geographical area – use of skype, WebEx, and tele-conferencing tools, and Ability to view the final product at the design stage in 3D models allowing necessary adjustments to be made at early stage and also marketing the final product before execution of the project.
In which way does the project manager's personal attributes influence performance in housing construction projects?	Motivation to the project teams to deliver in time, scope and budget, Development of a viable project schedule that incorporated all the required task to deliver the project, Liaison with all the project stakeholders both internal and external to deliver in quality and customer satisfaction, Effective communication with the project teams, regulators and other stakeholders to smoothly execute the project, and Arbitrator among warrying parties to settle conflicting teams to avoid delays to the project work.

The summarized findings from Table 4.37 showed that the interview with the consultants and the main contractors produced results that agreed with those given for the open-ended questionnaire items and also complimented results to the closed ended questionnaire items. The standardized interview guide was meant for triangulation purposes and this requirement was achieved.

4.6.1.5 Analysis of combined influence of project environment on performance of gated Community housing projects

In this study a combination of regulatory environment, technological environment, and project manager's personal attributes was referred to as project environment. The combined influence of these factors on performance of gated community housing projects was tested using inferential statistics in this section.

4.6.1.5.2 Correlational analysis of project environment and performance of gated community housing projects

Correlational analysis using Pearson's Product Moment technique was done to determine the relationship between project environment and performance in gated community housing projects. This was meant to identify and establish whether there existed a relationship between project environment and performance in gated community housing projects. The results were presented in Table 4.38.

Table 4:38 Correlation matrix for project environment and performance in gated community housing projects.

		Regulatory environment	**Technology environment**	**Project manager's personal attributes**
Performance of gated community projects	Pearson Correlation	0.399**	0.327**	0.360**
	Sig. (2-tailed)	0.000	0.000	0.000
	N	387	387	387

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

The research findings on Table 4.38 on the correlation analysis indicated positive and significant coefficients between the variables (regulatory environment 0.399, technological environment 0.327, and project manager's personal attributes 0.360; all with a p value of 0.000). All the variables had a moderate significant and positive correlation on project performance in gated community housing projects – regulatory environment (r=0.532, p-value<0.01), technology environment (r=0.559, p-value<0.01), and project manager's personal attributes (r=0.542, p-value<0.01). This implied that project environment (regulatory, technological and project manager's personal attributes) had a positive influence on the performance of housing construction projects.

4.6.1.4.3 Regression analysis of project environment and performance in gated community housing projects.

The fifth objective of the study was to determine the combined influence of project environment on performance in gated community housing projects in Nairobi County, Kenya. The literature and empirical evidence had suggested that project environment has a positive relationship with project performance. Project environment was a combination of independent variables in the study (regulatory environment, technological environment and project manager's personal attributes' environment). Data was collected and measured on a five-point Likert-type scale. Composite index for each of the factors was computed and used in testing the hypothesis. To satisfy the fifth objective, the following hypothesis was tested using simple linear regression model.

Hypothesis five

H_0: Project environment factors combined have no significant influence on the performance of gated community projects in Nairobi County, Kenya.

H_1: Project environment factors combined have a significant influence on the performance of gated community projects in Nairobi County, Kenya.

The null hypothesis was tested using the following linear regression model:

$Y = a + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + e$

Where ;

Y = Performance of gated Community housing projects

$\beta_{1\ldots.}$ B_3 = Beta coefficient

X_1 = Regulatory environment

$X_{2=}$ Technology environment

$X_{3=}$ Project manager's personal attributes

e = error term

Table 4.39: Regression results of influence of project environment and performance of gated community housing projects in Nairobi County, Kenya.

Model	R	R Square	Std. Error	t	P-Value
	0.747	0.557	0.2506	39.273	0.000
	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**P-Value**
	B	**Std. Error**	**Beta**		
(Constant)	0.690	0.140		4.942	0.000
Regulatory Environment	0.275	0.630	0.399	4.314	0.000
Technology Environment	0.136	0.290	0.327	4.578	0.000
Project Manager's Personal Attributes	0.204	0.039	0.360	5.074	0.000

a. Predictors: (Constant), Regulatory environment, Technology Environment, and Project Manager's personal attributed.
b. Dependent Variable: Performance of gated community housing projects in Nairobi County, Kenya

The results in Table 4.39 indicated that project environment factors combined explained 55.7% of the variation in the performance of gated community projects in Nairobi County, Kenya (R-square = 0.557). The t values were statistically significant t=39.273, p= (0.000<0.05) suggesting that project environment has a statistically significant influence in performance of gated community projects in Nairobi County, Kenya. Beta coefficients indicated that regulatory environment had the strongest influence (0.399) followed by project manager's personal attributes (0.360), and lastly technology environment (0.327). Based on the research findings, this study rejected the null hypothesis that project environment factors combined had no significant influence on the performance of gated community projects in Nairobi County, Kenya and concluded that, project environment factors combined had a significant influence on the performance of gated community projects in Nairobi County, Kenya.

Using the statistical findings in Table 4.39 the regression model one was substituted as follows;

$$Y= 0.690 + 0.399X_1 + 0.327X_2 + 0.360X_3$$

Where;

Y = Project performance in gated community housing projects in Nairobi County

X_1= Regulatory environment

X_2=Technological environment

X_3=Project manager's personal attributes

The findings of this study were consistent with those of Bennett (1991) that indicated a positive and significant relationship between project environment and performance. Bennett (1991) in a major review of project management theory established that the environment interfered with the planned progress of construction projects, the less predictable the environment and the greater its potential effects, the more it must be taken into account in managing the development of housing construction projects. A review of the results of hundreds of World Bank projects by Youker (1992), results showed that success or failure of housing construction projects often depended on factors in the general environment. The review pointed out that in the management of housing construction projects, a good understanding of the different features and factors within the environment that could influence the project was essential. Factors mentioned included regulatory environment, technology environment, project managers personal attributes among others.

Studies done by Walker (1989) and Hughes (1989) directed attention to some factors within the environment that posed greater challenges to housing construction projects, management and organizational structure than others and suggested that these factors could form the focus for the management of the housing projects' environment. The factors included regulatory environment, technological environment, and project manager's personal attributes, and were posited to have the greatest impact on the performance of construction housing projects. The results from this study had statistically confirmed the past studies and established that project environment had a significant and positive relationship with performance in gated community housing projects

4.6.2 Analysis of the moderating influence of macro planning process on the relationship between project environment and performance of gated community housing projects

The study also investigated macro planning process as a moderating variable to the relationship between project environment and performance in gated community housing projects. Respondents were given thirteen items rated on a five-point Likert scale ranging from: never (NV); rarely (RL); occasionally (OC); frequently (FQ), and always (AW) from which to choose.

The findings were presented in Table 4.40 and Table 4.40.

Table 4.40: Frequencies and percentages for project macro planning process as a moderator to the relationship between project environment and performance

Statement	NV F (%)	RL F (%)	OC F (%)	FQ F (%)	AW F (%)	Total n (%)
n) Structural drawings level of adequacy impacts on project performance	0 (0)	0 (0)	0 (0)	67 (17.3)	320 (82.7)	387 (100)
o) Clear project specification details influence project performance	0 (0)	2 (0.52)	0 (0)	35 (9.08)	350 (90.4)	387 (100)
p) A clear and well-defined quality management plan impacts on project performance	0 (0)	0 (0)	0 (0)	33 (10.1)	354 (91.5)	387 (100)
q) Clear strategy on interaction & coordination of project tasks promotes performance	0 (0)	0 (0)	0 (0)	39 (10.1)	348 (89.9)	387 (100)
r) A project schedule which includes all required work influence performance.	0 (0)	0 (0)	0 (0)	24 (6.2)	363 (93.8)	387 (100)
s) A programme that shows all required resources and budget control initiatives promotes performance.	0 (0)	0 (0)	0 (0)	48 (12.4)	339 (87.60)	387 (100)
t) Matching project tasks with appropriate skilled personnel promotes project success.	0 (0)	0 (0)	0 (0)	82 (21.2)	305 (78.8)	387 (100)
u) Personnel training enhances project performance.	0 (0)	0 (0)	0 (0)	97 (25.1)	290 (74.9)	387 (100)
v) Involvement of project team(s) enhances project performance.	0 (0)	0 (0)	0 (0)	45 (11.6)	342 (88.4)	387 (100)
w) A sound communication strategy both internal and external enhances success of the project.	0 (0)	0 (0)	0 (0)	100 (25.8)	287 (74.2)	387 (100)
x) A well-defined risk mitigation strategy promotes project performance.	0 (0)	0 (0)	0 (0)	124 (32.0)	263 (68)	387 (100)
y) A strategy for balancing people, materials, equipment and time schedule promotes performance	0 (0)	0 (0)	0 (0)	86 (22.2)	301 (77.8)	387 (100)
z) A defined procurement strategy for necessary resources from external sources influence performance.	0 (0)	0 (0)	0 (0)	138 (35.7)	249 (64.3)	387 (100)

The research findings on Table 4.40 showed that most of the respondents concurred that always structural drawings level of adequacy impacts on project performance (82.7%), always clear project specification details influence project performance (90.4%), always a clear and well defined quality management plan impacts on project performance (91.5%), always clear strategy on interaction & coordination of project tasks promotes performance (89.9%), always a project schedule which includes all required work influence performance (93.8%), always a programme that shows all required resources and budget control initiatives promotes performance (87.6%), always matching project tasks with appropriate skilled personnel promotes project success (78.8%), always personnel training enhances project performance (74.9%), always involvement of project team(s) enhances project performance (88.4%), always a sound communication strategy both internal and external enhances success of the project (74.2%), always a well-defined risk mitigation strategy promotes project performance (68%), always a strategy for balancing people, materials, equipment and time schedule promotes performance (77.8%), and always a defined procurement strategy for necessary resources from external sources influence performance (64.3%). The findings implied that project macro planning process was very important if the project had to deliver as per the initial planning and to the clients' and other stakeholder's satisfaction. The results further showed that if this process was eliminated, project environment would deliver the project but with some limitations and challenges.

Table 4.41: Means and standard deviations for project macro planning process as a moderator to the relationship between project environment and performance

Statement	n	Min	Max	M	SD

n)	Structural drawings level of adequacy impacts on project performance	387	3	5	4.13	0.51
o)	Clear project specification details influence project performance	387	3	5	4.04	0.50
p)	A clear and well-defined quality management plan impacts on project performance	387	3	5	4.20	0.50
q)	Clear strategy on interaction & coordination of project tasks promotes performance	387	4	5	4.63	0.38
r)	A project schedule which includes all required work influence performance.	387	4	5	4.32	0.29
s)	A programme that shows all required resources and budget control initiatives promotes performance.	387	3	5	4.52	0.29
t)	Matching project tasks with appropriate skilled personnel promotes project success.	387	4	5	4.90	0.30
u)	Personnel training enhances project performance.	387	4	5	4.62	0.24
v)	Involvement of project team(s) enhances project performance.	387	4	5	4.52	0.33
w)	A sound communication strategy both internal and external enhances success of the project.	387	4	5	4.32	0.41
x)	A well-defined risk mitigation strategy promotes project performance.	387	4	5	4.02	0.43
y)	A strategy for balancing people, materials, equipment and time schedule promotes performance	387	4	5	4.53	0.32
z)	A defined procurement strategy for necessary resources from external sources influence performance.	387	4	5	4.37	0.43
Project macro planning process		**387**	**3**	**5**	**4.30**	**0.18**

The research findings in Table 4.41 indicated that the mean score for the thirteen statements for the project macro planning process as a moderator of the relationship between project environment and performance in gated community housing projects in Nairobi County Kenya was 4.30 and standard deviation of 0.18. From individual items' responses, respondents indicated that: always structural drawings' level of adequacy impacts on project performance (M=4.12, SD=0.51), clear project specification details influence project performance (M=4.04, SD=0.50), a clear and well defined quality management plan impacts on project performance (M=4.20, SD=0.50), clear strategy on interaction & coordination of project tasks promotes performance (M=4.63, SD=0.38), a project schedule which includes all required work influence performance (M=4.32, SD=0.29), a programme that shows all required resources and budget control initiatives promotes performance (M=4.52, SD=0.29), matching project tasks with appropriate skilled personnel promotes project success (M=4.90, SD=0.30), personnel training enhances project performance (M=4.62, SD=0.24), involvement of project team(s) enhances project performance (M=4.52, SD=0.33), a sound communication strategy both internal and external enhances success of the project (M=4.32, SD=0.41), a well-defined risk mitigation strategy promotes project performance (M=4.02, SD=0.43), a strategy for balancing people, materials, equipment and time schedule promotes performance (M=4.53, SD=0.32), and a defined procurement strategy for necessary resources from external sources influence performance (M=4.37, SD=0.43).

The results implied that the respondents regarded projects macro planning process very high in terms of its influence on performance of gated community housing construction projects. This can be seen by analysing the mean from each item and the small standard deviation which indicates how concentrated the responses were around the mean (less than one standard deviation around the mean. The overall mean and standard deviation also showed the same tread (M = 4.3, SD = 0.18) and agreed with the general trend of the responses populating around the mean. From these findings it was be inferred that the respondents were of the same opinion and in agreement that project macro planning process was very important in project execution and performance, and had an influence on the relationship between project environment and performance.

4.6.2.1 Correlational analysis of macro planning process and project environment

Correlational analysis using Pearson's Product Moment technique was done to determine the relationship between the project macro planning process and project environment (regulatory, technological and project manager's personal attributes' environment). It was meant to identify the strength and direction of the association between the moderating variable and the independent variables. Table 4.42 summarizes the results.

Table 4:42 Correlational results for macro planning process as a moderator of project environment.

		Regulatory environment	Technology environment	Project manager's personal attributes
Project macro planning process	Pearson Correlation	0.471**	0.387**	0.394**
	Sig. (2-tailed)	0.000	0.000	0.000
	N	387	387	387

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

The correlation results in Table 4.42 indicated positive and significant coefficients between macro planning process and project environment ($r = 0.575$, p-value<0.01). All the three factors forming the project environment had a positive and significant relationship with macro planning process; regulatory environment ($r=0.532$, p-value<0.01), technological environment ($r=0.559$, p-value<0.01), and project manager's personal attributes ($r=0.542$, p-value<0.01) respectively.

4.6.2.1 Inferential analysis of moderating influence of macro planning process on the relationship between project environment and performance

The sixth objective of the study was to examine the moderating influence of project macro planning process on the relationship between project environment and performance of gated community projects in Nairobi County, Kenya. Project macro planning process was identified as an independent variable as well as a moderating variable in the study. Data was collected using 13 items, each consisting of a statement that was measured on a five-point Likert-type scale. Composite index was computed and used in testing the hypothesis. To satisfy the sixth objective, the following hypothesis was tested using stepwise multiple regression model.

Hypothesis six

H_0: The strength of the relationship between project environment and performance of gated community projects in Nairobi County, Kenya is not moderated by the project macro planning process.

H_1: The strength of the relationship between project environment and performance of gated community projects in Nairobi County, Kenya is moderated by the project macro planning process.

The null hypothesis was tested using the following stepwise multiple regression model:

$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_1 X_2 X_3 X_5 + e$

Where;

Y = Project performance in gated Community housing projects

a = Constant

$\beta_{1....}\ \beta_5$ = Beta coefficient

$X_{1....}\ X_3$ = Project environment

X_5= Project macro planning process

e = error term

In testing the hypothesis, the moderating influence was computed using stepwise method advocated by Baron et al., (1986). This involved testing the influence of the independent variable (regulatory environment, technology environment, and project manager's personal attributes) on the dependent variable in step one, and introducing the moderator (macro planning process) in step two. Moderation was assumed to take place if the influence of interaction between the independent variable and moderator on dependent variable test was significant.

Step One: Influence of project environment on performance in gated community housing projects

In the first step, project environment was regressed on performance of gated community housing projects. The results were presented in Table 4.43.

Table 4.43: Regression results of influence of project environment on performance of gated community housing projects in Nairobi County, Kenya

Model	R	R Square		Std. Error	t	P-Value
	0.747	0.557		0.2506	39.273	0.000
	Unstandardized Coefficients			**Standardized Coefficients**	**t**	**P-Value**
	B	**Std. Error**		**Beta**		
(Constant)	0.690	0.140			4.942	0.000
Regulatory Environment	0.275	0.630		0.399	4.314	0.000
Technology Environment	0.136	0.290		0.327	4.578	0.000
Project Manager's Personal Attributes	0.204	0.039		0.360	5.074	0.000

c. **Predictors:** (Constant), regulatory environment, technological environment, and project manager's personal attributed.
d. **Dependent Variable:** Performance of gated community housing projects in Nairobi County, Kenya

The results in Table 4.43 indicated that project environment factors combined explained 55.7% of the variation in the performance of gated community projects in Nairobi County, Kenya (r-square = 0.557) in model one. The t-values were statistically significant t= 39.273, p= (0.000<0.05) suggesting that project environment had a statistically significant influence in performance of gated community projects in Nairobi County, Kenya.

Using the statistical findings in Table 4.43 the regression model one was substituted as follows;

$$Y= 0.690 + 0.399\ X_1 + 0.327\ X_1 + 0.360\ X_3 + e$$

Where;

Y=Project performance in gated community housing projects in Nairobi County

X_1= Regulatory environment

X_2=Technology environment

X_3=Project manager's personal attributes

Step Two: Influence of project macro planning process on the relationship between project environment and performance

In step two the influence of the moderator (project macro planning process) was introduced on the relationship between project environment and performance of gated community housing projects. The results were presented in Table 4.44.

Table 4.44: Regression results for influence of project macro planning process on the relationship between project environment and performance

Model	R	R Square	Std. Error	R Change	t Change	P-Value Change
1	0.747	0.557	0.2506	0.557	39.273	0.000
2	0.772	0.597	0.23998	0.039	15.152	0.000
	Unstandardized Coefficients B	**Unstandardized Coefficients Std. Error**		**Standardized Coefficients Beta**	**t**	**P-Value**
(Constant)	0.609	0.135			4.942	0.000
Regulatory environment	0.114	0.030		0.212	3.804	0.000
Technology environment	0.237	0.061		0.280	3.868	0.000
Project manager 's personal attributes	0.111	0.029		0.229	3.893	0.000

a) **Predictors:** (Constant), regulatory environment, technological environment, project manager's personal attributes, and project macro planning process
b) **Dependent Variable:** Performance of gated community housing projects

The results in Table 4.44 indicated that the introduction of a moderator (project macro planning process) in model two increased the value of R squared by 0.039. Thus, performance improves the goodness of fit by only 3.9%. This implied that macro planning process explains 3.9% performance variation of gated community housing projects. The t-values remained statistically significant at t=15.152, p=0.000<0.05). Thus, from the results it was concluded that project macro planning process had a statistically significant moderating influence on performance of gated community housing projects in Nairobi County, Kenya. These results suggested that project macro planning process acted as a moderator in the relationship between project environment and performance of gated community housing construction projects.

Based on the research findings, we rejected the null hypothesis that the strength of the relationship between project environment and performance of gated community projects in Nairobi County, Kenya was not moderated by the project macro planning process. We therefore conclude that the strength of the relationship between project environment and performance of gated community projects in Nairobi County, Kenya, was moderated by the project macro planning process.

Using the statistical findings in Table 4.44 the regression model two was substituted as follows;

$$Y = 0.690 + 0.399 X_1 + 0.327X_2 + 0.360X_3 + 0.229X_4 + 0.039X_1 X_2 X_3 X_4 + \varepsilon$$

Where;

Y=Performance of gated community housing projects

X_1= Regulatory environment

X_2=Technological environment

X_3=Project manager’s personal attributes

X_4= Project macro planning process

ε= Error term

The researcher had formulated three open ended items relating to project macro planning process and its influence on project performance in gated community housing projects. A summary of the responses was shown in Table 4.45

Table 4.45: Summary of open ended items' responses relating to macro planning process

Item	Responses
Ways in which structural drawings influence project performance in gated community housing projects in Nairobi County, Kenya	Execution planning made more effective and having a back-up information, minimized changes in design plans during execution, helped satisfy the conditions peculiar to a specific site, made owner/client take responsibility for providing adequate time and funding, Helped in development of an effective project schedule, and Minimized change request orders from main contractor
How does quality management plan influence project performance in gated community housing projects in Nairobi County, Kenya?	Give a clear picture of the final project quality, give a benchmark on material quality when sourcing, give a basis for material inspection at delivery to the site, helped set out a basis for workmanship and defects liability period, Informed material supplies contracts on the expected quality of materials, and Minimized poor quality work and repeat jobs, hence eliminating waste
How a project schedule that includes all the required tasks influence project performance in gated community housing projects in Nairobi County, Kenya.	Enables development of a workable project schedule, Budgeting and allocation of resources becomes easy, Resource allocation both capital and human easy and viable, and Avoids many change requests from the contractor during execution period

The summary of the research findings in Table 4.45 indicated that the respondents had similar concerns to the closed ended questions in the questionnaire. The responses also went out of the way to mention other key items that needed to be considered for improved performance of the gated community housing projects like; association of structural drawings with execution planning, satisfaction of a peculiar site condition, giving owner/client responsibility for schedule planning and funding, and development of an effective project schedule. Based on the quality management plan and how it influenced project performance, the respondents attached this item with; giving a clear picture of the final project quality, having a basis for benchmarking on material quality during sourcing process, and informing procurement on materials supplies contracts. Finally, the respondents when asked how a project schedule that considered all tasks required to complete the project and how it affected performance, they had the following to say; enabled development of a workable project schedule, avoided many change requests from the contractor during execution period, budgeting become easy and resource allocation both capital and human become easy and viable. The responses complimented the closed ended questions in the questionnaire.

The researcher also had items related to the project macro planning process in the standardized interview guide (appendix III item 9, 10, and 11) which were meant for consultants and main contractors. From each category (consultants and contractors), five respondents were chosen based on the procedures given at chapter three in this study. The five respondents were interview separately, and their responses summarized. The respondents' responses were summarized in Table 4.46

Table 4.46: Summary of responses for standardized interview guide relating to macro planning process (pre-construction planning)

Item	Responses
How does project macro planning process influence housing construction industry projects?	Makes execution planning practical and effective, enhances communication among project teams, Clarifies and gives a clear project schedule, Factors all the project tasks and allocates necessary means to execute them, gives mitigating strategies to uncertainties, and Arranges the project in the best economical way to meet the deliverables.
What are the effects of quality system implementation on performance of housing construction industry projects	Makes all the project parties read from the same script on the required quality, sets a benchmark for arbitration among warring parties, gives a basis for required material quality, Ensures the project is delivered at pro-predetermined quality, gives a basis to raise an early warning, and Gives a basis for preparation of monitoring and evaluation schedules to meet the desired quality
How can the completion rate of gated community housing projects be improved?	Employment of a sound pre-construction planning system, Elimination of change requests by either the contractor or client during execution, Development of sound inspection schedules and following them for delivery, setting up main stakeholders site review meeting to sort out conflicting issues, and Timely interim payments to the main contractor as per initial arrangement

The findings from Table 4.46 showed that the interview with the consultants and the main contractors yielded similar and complimentary results to the open ended as well as the closed ended questionnaire items. The standardized interview guide was meant for triangulation purposes and this requirement was fully fulfilled and satisfied. The respondents rated and confirmed overall performance of the project(s) were highly depended on all the independent moderating variables combined.

Although studies relating to the moderating influence of project macro planning process on the relationship between project environment and performance seem to be limited, there were many studies based on two main streams of research: the relationship between how planning is formulated and project performance, and the relationship between the project environment and performance (Kihoro et al. 2015), Juliet et al. (2014), and Thomas et al. (2002). Empirical studies in the field of project planning had mainly focussed on two main streams of research: the relationship between how planning is formulated and project performance, and the relationship between the project environment and performance (Juliet et al. 2014). A third area of interest carried by this study was planning as a moderator of the relationship between project environment and performance, but unlike the other two areas, planning as a moderator had not received much empirical interest.

According to Thomas et al. (2002), the results of the previous studies examining the relationship between planning formulation and performance, and relationship between project environment and performance had been inconclusive. A study by Waly et al. (2002) confirmed that a project macro planning process (pre-construction planning) was of vital importance to the success of any project and its successful delivery and execution. They further explained that an important part of project macro planning process in construction projects was the creation of the project schedule which placed all the tasks of the project in a logical and sequential order. In support of this, a study by Thamhain, (2004) postulated that lack of project macro planning was an important barrier to performance in housing construction industry, as it sets the priorities and schedule for the tasks necessary to complete the operation's objectives. A study by Kihoro et al. (2015) – "Factors affecting performance of projects in the construction industry in Kenya; a survey of gated communities in Nairobi County, Kenya", revealed that there was a positive and significant relationship between planning and performance of projects in the construction industry. Though not directly dwelling on project macro planning process, the findings of this study showed planning as a very important aspect in promoting project performance. The findings of the current study agreed with the past studies in this area of planning, and in particular at project macro planning level.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presented summary of findings, discussions, conclusions and recommendations for further studies. In the summary of findings, results and remarks for each of the hypothesis in the study were presented for the six research objectives. Discussions were based on each of the six objectives with reference to the literature reviewed. The conclusions presented in this section were guided by the research objectives and informed by the findings, analysis, interpretation and discussions in the study. Based on the conclusions made, the theoretical implication of the study and recommendations of the study to policy, practice and methodology were examined. It also presented the limitations of the study and outlined proposed areas for future research.

5.2 Summary of the Findings

The broad objective of this study was to examine the Project environment, macro planning process and performance of the housing construction industry; a case of gated community projects in Nairobi County, Kenya. Six specific objectives were developed and addressed through formulation and testing of six hypotheses. The population of the study comprised of all the active gated community housing projects in Nairobi County, initiated in 2009 – 2014 (Appendix IV). Data was collected from four key participants in each sampled project – client, consultant, main contractor and facility manager. The data collection instruments (Questionnaire and a standardized open-ended interview guide) had some items adapted from other studies and modified to fit this study.

Hypotheses were tested using simple, multiple and stepwise regressions. Simple linear regression was employed to determine the influence of each independent variable namely; regulatory environment, technological environment, and project manager's personal attributes and performance of gated community housing projects in Nairobi County, which was the dependent variable of the study. Multiple and stepwise regression were performed to determine whether macro planning process (pre-construction planning) had a moderating influence on the relationship between project environment and performance of gated community housing projects in Nairobi County, Kenya.

The first objective of the study was to examine how regulatory environment influenced performance of gated community projects in Nairobi County, Kenya. The null hypothesis tested was that regulatory environment had no significant influence on the performance of gated community projects in Nairobi County, Kenya. The results were $R^2 = 0.283$, t =4.314, P = 0.000<0.05. The null hypothesis was rejected and was concluded that regulatory environment had a statistically significant influence on the performance of gated community projects in Nairobi County, Kenya

The second objective of the study was to determine the extent to which technological environment influenced performance of gated community projects in Nairobi County, Kenya. The null hypothesis tested was that technological environment had no significant influence on the performance of gated community projects in Nairobi County, Kenya. The research findings were $R^2 = 0.312$, t =4.578, P = 0.000<0.05. The null hypothesis was rejected and was concluded that technological environment had a statistically significant influence on the performance of gated community projects in Nairobi County, Kenya

The third research objective was to establish the extent to which project manager's personal attributes influenced performance of gated community projects in Nairobi County, Kenya. The null hypothesis tested was that project managers' personal attributes had no significant influence on the performance of gated community projects in Nairobi County, Kenya. The findings were R^2 = 0.29, t = 5.074, P = 0.000<0.05. The null hypothesis was therefore rejected, and it was concluded that project manager's personal attributes had a statistically significant influence on the performance of gated community projects in Nairobi County, Kenya.

The fourth objective was to determine the extent to which project macro planning process influenced performance of gated community projects in Nairobi County, Kenya. The null hypothesis tested was project macro planning process had no significant influence on the performance of gated community projects in Nairobi County, Kenya. The research findings were R^2 = 0.429, t = 10.962, P = 0.000<0.05. The null hypothesis was rejected and was concluded that project macro planning process had a statistically significant influence on the performance of gated community projects in Nairobi County, Kenya.

The fifth objective was to determine the combined influence of project environment and performance of gated community housing projects in Nairobi County, Kenya. The null hypothesis tested was that project environment factors combined had no significant influence on the performance of gated community projects in Nairobi County, Kenya. The research findings were R^2 = 0.557, t = 39.273, P = 0.000<0.05. The null hypothesis was rejected and concluded that project environment had a statistically significant influence on the performance of gated community projects in Nairobi County, Kenya.

The sixth objective was to examine the moderating influence of project macro planning process on the relationship between project environment and performance of gated community projects in Nairobi County, Kenya. The null hypothesis tested was that the strength of the relationship between project environment and performance of gated community projects in Nairobi County, Kenya was not moderated by the macro planning process. The research findings were R^2 = 0.587, $R^2\Delta$ = 0.03, t = 15.152, P = 0.000<0.05. The null hypothesis was rejected and concluded that the strength of the relationship between project environment and performance of gated community projects in Nairobi County, Kenya was moderated by the macro planning process.

5.3 Discussion of research findings

In this section the findings of this study were discussed in relation to other studies which had been carried out in the area of Project environment, macro planning process and performance of housing construction industry.

5.3.1 Discussions on regulatory environment

The current study examined how regulatory environment influenced performance of gated community projects in Nairobi County, Kenya. Data was collected using 8 items, each item consisted of a statement that was measured on a five-point Likert-type scale. Composite index was computed and used in testing the hypothesis. The study established that regulatory environment had statistically significant influence on the performance of gated community housing projects (β= 0.399, p= 0.000 < 0.05). The β value implied that one unit change in project performance was associated with 39.9% changes in regulatory environment.

From literature reviewed, there were studies that related regulatory environment with performance in housing construction of gated communities (Ben-Joseph 2003, May 2004, and Luger et al., 2000). The study by Kikwasi, (2012) found a positive and significant relationship between regulatory environment and project performance in Tanzania. Further, a study by Akanni et al. (2015) confirmed that regulatory environment was an important component in promoting project performance. The findings of this study also concurred with Luger et al., (2000) who found that regulatory environment had a positive effect on the performance of housing construction projects. This study had results that concurred with all the above studies and confirmed that, there existed a moderate positive and significant relationship between regulatory environment and performance in housing construction industry.

5.3.2 Discussions on technological environment

The second objective of the study was to determine the extent to which technological environment influenced performance of gated community projects in Nairobi County, Kenya. The literature and empirical evidence had suggested that technological environment influences performance of gated community projects. Technological environment in housing construction industry projects was the second independent variable in the study. Data was collected using seven items, each item consisted of a statement that was measured on a five-point Likert-type scale. A composite index was computed and used in testing the hypothesis. The study established that technological environment had a moderately strong influence on performance in gated community housing projects ($\beta=0.327$, $p=0.000<0.05$). The β value implied that one-unit change in performance in gated community housing project was associated with 32.7% changes in technological environment.

Findings from this study agreed with Ikechukwu et al (2011) that technological environment had a relationship with project performance. The findings also supported Juliet et al., (2014), who argued that to a great extend technological environment had an influence on housing construction projects by giving out a clear picture of the completed houses in advance by use of 3D's. The findings of this study further agreed with a study carried out by Thomas et al. (2002), which reaffirmed that technological environment had a positive and stable influence on the project performance and thereforce should be put into consideration whenever planners were working on a housing construction project.

5.3.3 Discussions on project manager's personal attributes environment

The third objective of the study was to establish the extent to which project manager's personal attributes influences performance of gated community projects in Nairobi County, Kenya. Project managers' personal attributes environment in housing construction industry projects was the third independent variable in the study. Data was collected using eight items, each item consisted of a statement that was measured on a five-point Likert-type scale. Composite index was computed and used in testing the hypothesis.

The study findings indicated that project managers' personal attributes environment had a moderately strong influence on performance in gated community housing projects. The β coefficient was 0.360, indicating that project managers' personal attributes' environment had statistically significant influence on the performance of gated community housing projects ($\beta=0.360$, $p=0.000<0.05$). The β value implied that every unit change on the performance of gated community housing projects was associated with 36% changes in project manager's personal attributes environment.

Although studies relating the influence of project managers personal attributes' environment on performance of gated community housing projects seem to be limited, there were many studies based on influence of project manager's personal traits on project performance. A study by Jugdev et al. (2005) established that there was a positive relationship between project manager's personal traits and project performance. Further, a study by Jin et al. (1996) confirmed that project managers typically required a broad background in both construction techniques as well as design, engineering and business administration skills for their projects to perform as planned. The findings of this study also concurred with Grant et al. (1997) who found that project manager's competence had a positive effect on the performance of their projects.

5.3.4 Discussions on macro planning process as an independent variable

The fourth objective of the study was to determine the extent to which project macro planning process influenced performance of gated community projects in Nairobi County, Kenya. Project macro planning process in housing construction industry doubled as the fourth independent variable as well as the moderator of the relationship between project environment and performance in the study. Data was collected using 13 items, each consisting of a statement that was measured on a five-point Likert-type scale. Composite index was computed and used in testing the hypothesis.

The study findings indicated that project macro planning process had a strong influence on performance in gated community housing projects. The β coefficient was 0.655, indicating that project macro planning process had statistically significant influence on the performance of gated community housing projects (β=0.655, p=0.000<0.05). The β value implied that every unit change on the performance of gated community housing projects is associated with 65.5% changes in project macro planning process.

Past studies confirmed that project macro planning process (pre-construction planning) was of vital importance to the success of any project and its successful delivery and execution (Waly et al., 2002). According to Thabet et al. (2002), an important part of macro planning process in construction projects was the creation of the project schedule. The project schedule placed all the tasks of the project in a logical and sequential order. The macro planning process of most construction projects depended on the market demand and available resources. This process sets the priorities and schedule for the tasks necessary to complete the operation’s objectives. Thamhain, (2004) concurred that during the macro planning process, the project may be organized in a variety of ways: sequential - in which the project is separated into stages completely in a consecutive sequence of tasks, parallel - in which the project contains independent portions that happen simultaneously, and staggered - in which the different tasks may overlap with each other and all these have a positive influence on the project performance. The results of this study were therefore in agreement with the past studies and were confirming there existed a positive and significant relationship between project macro planning process and performance of housing construction projects

5.3.5 Discussions on project environment (combined project environments)

The fifth objective of the study was to determine the combined influence of project environment on performance in gated community housing projects in Nairobi County, Kenya. The literature and empirical evidence had suggested that project environment has a positive relationship with project performance. Project environment was a combination of independent variables in the study (regulatory environment, technological environment and project manager's personal attributes' environment). Data was collected and measured on a five-point Likert-type scale. Composite index for each of the factors was computed and used in testing the hypothesis.

The results of the findings indicated that project environment factors combined explained 55.7% of the variation in the performance of gated community projects in Nairobi County, Kenya (R-square = 0.557). The t-values were statistically significant t=39.273, p= (0.000<0.05) suggesting that project environment had a statistically significant influence in performance of gated community projects in Nairobi County, Kenya. Beta coefficients indicated that regulatory environment had the strongest influence (0.399) followed by project manager's personal attributes (0.360), and lastly technology environment (0.327). Based on the research findings, the researcher concluded that project environment factors combined have a significant influence on the performance of gated community projects in Nairobi County, Kenya.

The findings of this study were consistent with those of Bennett (1991) that indicated a positive and significant relationship between project environment and performance. Bennett (1991) in a major review of project management theory established that the environment interfered with the planned progress of construction housing projects, the less predictable the environment and the greater its potential effects, the more it must be taken into account in managing the development of housing construction projects. A review of the results of hundreds of World Bank projects by Youker, (1992), results showed that success or failure of housing construction projects often depended on factors in the general environment. The review pointed out that in the management of housing construction projects, a good understanding of the different features and factors within the environment that had influence the project was essential. Factors mentioned included regulatory environment, technological environment, project managers personal attributes among others.

Studies done by Walker, (1989) and Hughes, (1989) directed attention to some factors within the environment that posed greater challenges to housing construction projects, management and organizational structure than others and suggested that these factors should form the focus for the management of the housing projects' environment. The factors included regulatory environment, technological environment, and project manager's personal attributes, and were posited to have the greatest impact on the performance of construction housing projects. The results from this study statistically confirmed the past studies and established that project environment had a significant and positive relationship with performance in gated community housing projects

5.3.6 Discussions on macro planning process as a moderating variable

The sixth objective of the study was to examine the moderating influence of project macro planning process on the relationship between project environment and performance of gated community projects in Nairobi County, Kenya. Project macro planning process was identified as a moderating variable in the study. Data was collected using 13 items, each consisting of a statement that was measured on a five-point Likert-type scale. Composite index was computed and used in testing the hypothesis using stepwise multiple regression model advocated by Baron et al., (1986). This involved testing the influence of the independent variable (regulatory environment, technological environment, and project manager's personal attributes) on the dependent variable in step one, and introducing the moderator (macro planning process) in step two. Moderation was assumed to take place if the influence of interaction between the independent variable and moderator on dependent variable test was significant.

The findings indicated that project environment factors combined explained 55.7% of the variation in the performance of gated community projects in Nairobi County, Kenya. The t-values were also statistically significant t= 39.273, p = (0.000<0.05), suggesting that project environment had a statistically significant influence in performance of gated community projects in Nairobi County, Kenya.

In step two the influence of the moderator (project macro planning process) was introduced on the relationship between project environment and performance of gated community housing projects. The results indicated that the introduction of a moderator (project macro planning process) in model two increased the value of R squared by 0.039. Thus, performance improved the goodness of fit by only 3.9%. This implied that macro planning process explains 3.9% performance variation of gated community housing projects. The t-values remained statistically significant at t = 15.152, p=0.000<0.05). Thus, from the results it was concluded that project macro planning process had a statistically significant moderating influence on performance of gated community housing projects in Nairobi County, Kenya.

Although studies relating to the moderating influence of project macro planning process on the relationship between project environment and performance seemed to be limited, there were many studies based on two main streams of research: the relationship between how planning was formulated and project performance, and the relationship between the project environment and performance (Kihoro et al. 2015), Juliet et al. (2014), and

Thomas et al. (2002). Empirical studies in the field of project planning had mainly focussed on two main streams of research: the relationship between how planning was formulated and project performance, and the relationship between the project environment and performance (Juliet et al. 2014). A third area of interest was planning as a moderator of the relationship between project environment and performance, but unlike the other two areas, planning as a moderator had not received much empirical interest. According to Thomas et al. (2002), the results of the previous studies examining the relationship between planning formulation and performance, and relationship between project environment and performance had been inconclusive.

A study by Waly et al. (2002) confirmed that a project macro planning process (pre-construction planning) was of vital importance to the success of any project and its successful delivery and execution. They further explained that an important part of project macro planning process in housing construction projects was the creation of the project schedule which placed all the tasks of the project in a logical and sequential order. In support of this, a study by Thamhain, (2004) postulated that lack of project macro planning (pre-construction planning) was an important barrier to performance in housing construction industry, as it sets the priorities and schedule for the tasks necessary to complete the operation's objectives. A study by Kihoro et al. (2015) – "Factors affecting performance of projects in the construction industry in Kenya; a survey of gated communities in Nairobi County, Kenya", revealed that there was a positive and significant relationship between planning and performance of projects in the housing construction industry. Though not directly dwelling on project macro planning process, the findings of this study showed planning as a very important aspect in promoting project performance. The findings of this current study agreed with the past studies in this area of planning, and in particular at project macro planning level.

5.4 Conclusions

This section presented the conclusions made in the study in the context of the findings. The conclusions were made in line with the objectives and hypothesis testing.

The indicators for performance of gated community projects were budgeted cost, scheduled time, prescribed quality, safety and health, and client satisfaction. The results from descriptive analysis indicated that majority of the respondents disagreed with the statements that cost of the projects was as per initial budget, no variation orders were raised for the project, no disagreements were raised on the valuation of work done, and that payments were released without delay to the main contractor (s). However, the respondents strongly agreed with the statements that there were no funding issues raised during the project time, and many provisional sums were factored within the project(s) plan. The responses implied that project cost would be varied at completion with the initial budgeted cost.

On scheduled time, many respondents indicated that majority of the projects did not perform within the scheduled time simply due to the following issues: set project duration was not enough for the project, there were delays in mobilization by the main contractor(s), many change requests relating to the project designs were raised, there were lengthy routine of government authorities before project(s) started, and irregular attendance of project review meetings by the stakeholders.

Quality of the project(s) was also portrayed as a challenge for project performance by many respondents. This could be explained by the following challenges that respondents noted; issues arising from quality of materials supplied, many re-work issues raised, inspection schedules not followed, many challenges from the drawings and specifications regarding clarity and constructability, inadequate skills of the contractor staff, and frequent design changes.

Safety and health related issues were not a major challenge. Most of the respondents associated this with the following statements: that there were no fatalities reported; no injury compensation issues were raised; work related injuries were minimal; safety orientation and talks were mandatory; use of personal protective equipment (PPE's) was mandatory; daily pre-task planning before start of work was a requirement; permits were issued for working on heights, confined spaces and hot works; scaffolding, personal fall arrest systems and ladders had an inspection schedule; and a safety officer was always required at the construction site.

Client satisfaction was rated moderately by majority of the respondents. This was explained by the moderate rating of the following statements; no repeat jobs after project completion, no legal issues raised by the project owner, client was satisfied by the final finish of the facility(s), there was smooth information coordination between owner and project parties, and there were no conflicts encountered among project parties.

In summary, from the responses it was evident that the five indicators were all valid and determined the level at which projects performed. Each indicator does not work in isolation, but they reinforced each other. The research findings concurred with the literature reviewed as advanced by Jha (2004); in a survey which was conducted among Indian housing construction professionals, in which they concluded that, out of the five commonly used project performance criteria – compliances to schedule, cost, quality, no-dispute, and safety and health – the quality compliance was second next to schedule compliance.

The studies of Ogunlana et al. (1996) stated that the housing construction industry performance problems in developing economies were classified into three layers as; problems of shortages or inadequacies in industry infrastructure (mainly supply of resources), problems caused by clients and consultants and caused by contractor incompetence/inadequacies. According to Okuwoga, (1998), the performance problem was related to poor budgetary and time control. Samson et al., (2002) also remarked that performance issues arose in large housing construction projects due to many reasons such as: incompetent designers/contractors, poor estimation and change management, social and technological issues, site related issues and improper techniques and tools.

The findings of this study were also in concurrence with studies done by Navon, (2003) who stated that the main performance problem was divided into two groups: (a) unrealistic target settings (planning) or (b) causes originating from the actual housing construction (in many cases, the causes for deviation originating from both sources). The study of Ling et al., (2007) in China revealed that architectural, engineering and construction (AEC) firms faced difficulties managing housing construction projects performance because they were unfamiliar with this new operating environment. All these studies confirmed the project performance indicators as used in this study.

The Theories adopted for this study were analysed and how they contribute to the field of project management. McGregor's theory of X and Y is used mixed by most project managers. The managers may naturally favour one over another. Managers for instance, may tend to micromanage or, prefer to take hands-off approach. The success of each management style depends on the project team member's needs and wants, and project organization's objectives. Theory X can be applied for new starters requiring guidance, or in a situation that calls for the project manager's control such as crisis. For management of a team of experts, however, theory Y would be most appropriate.

Application of the Theory of Constraints in the field of project management ensures projects are delivered ahead of schedule, and at minimum at the initial planed time. The shorter duration provides a sterling opportunity to differentiate a project organization from the competitors who delivers poorer outcomes, and late at that, via other project management methods. Theory of Constraint also offers the opportunity to deliver more projects over all, in the same amount of time, and at no increase in operating expense, thus significantly improving the bottom line (Ballard et al., 2002). This theory was meant to improve and ensure project performance was enhanced in terms of completion on time. It was used to guide all the variables under study to capture all the critical tasks so as to deliver the project (s) within schedule.

Finally, the Theory of Performance's application on the field of project management was very critical for sustainability. For effective performance three axioms are proposed which involve a performer's mind set, immersion in an enriching environment, and engagement in reflective practice. This theory encouraged teamwork and a sense of belonging which was a recipe for housing construction projects' performance. It was applied in all the variables and more to the dependent variable (Project performance).

Research objective one was to examine how regulatory environment influenced performance of gated community projects in Nairobi County, Kenya. Descriptive analysis showed that majority of the respondents to a moderate extend, concurred that regulatory environment influences performance of gated community projects in Nairobi County. They cited that to a very great extent, cost of compliance to regulatory requirement was high, and there were long waiting time for compliance to regulatory requirement; to a great extend the respondents cited that there were lengthy conflict resolution process; and to a moderate extent, disputes settlement process was lengthy, arbitration issues were raised, and litigation issues were also raised; and to a very little extent a few respondents concurred that there were management-labour relationship issues. Inferential statistics indicated that regulatory environment had a strong influence on performance of gated community housing projects. From the results it was therefore concluded that regulatory environment had a statistically significant influence on the performance of gated community housing projects.

Research objective two in this study was to determine the extent to which technological environment influenced performance of gated community projects in Nairobi County, Kenya. Descriptive analysis indicated that majority of the respondents indicated that to a very great extent their project(s) used locally made plant and equipment, to a great extent skills were available for operation of the plant and equipment, to a great extent team members with necessary skills to operate and use the plant equipment were available, to a very great extent use of information and communication technology (ICT) was satisfactory, to a very great extent Computer Aided Drafting (CAD) was used, to a very great extend 3D visual illustrations - Building Information Modelling was used, and to a very great extent electronic mails and communication was used. The conclusion from the findings implied that in most gated community housing projects, technology had a positive and significant influence on the performance of the gated community housing construction projects.

Research objective three in this study was to establish the extent to which project manager's personal attributes influenced performance of gated community projects in Nairobi County, Kenya. The literature and empirical evidence from other studies had suggested that project manager's personal attributes influenced performance of gated community projects. The study findings indicated that project managers' personal attributes environment had a moderately strong influence on performance in gated community housing projects. The results from the analysed responses implied and lead us to conclude that there was a statistically significant relationship between project managers' personal attributes environment and performance in gated community projects in Nairobi County, Kenya.

The fourth research objective in this study was to determine the extent to which project macro planning process influenced performance of gated community projects in Nairobi County, Kenya. The literature and empirical evidence had suggested that project macro planning process influences performance of gated community housing projects. The study findings based on the study respondents indicated that project macro planning process had a strong influence on performance in gated community housing projects. Analysed data indicated that project macro planning process explained 42.9 % of the variation in the performance in gated community housing projects in Nairobi County, Kenya. The β coefficient indicated that project macro planning process had statistically significant influence on the performance of gated community housing projects. Based on the research findings we concluded that project macro planning process had a statistically significant influence on the performance of gated community projects in Nairobi County, Kenya.

The fifth research objective in this study was to determine the combined influence of project environment on performance in gated community housing projects in Nairobi County, Kenya. The literature and empirical evidence had suggested that project environment had a positive relationship with project performance. Project environment was a combination of independent variables in the study (regulatory environment, technological environment and project manager’s personal attributes’ environment). The results indicated that project environment factors combined explained 55.7% of the variation in the performance of gated community projects in Nairobi County, Kenya. From the analysis, regulatory environment had the strongest influence on the performance in gated community housing projects, followed by project manager’s personal attributes, and lastly technological environment. Based on the research findings, this study concluded that project environment factors combined had a significant influence on the performance of gated community projects in Nairobi County, Kenya

The sixth research objective was to examine the moderating influence of project macro planning process on the relationship between project environment and performance of gated community projects in Nairobi County, Kenya. Project macro planning process was identified as an independent variable as well as a moderating variable in this study. Data was collected using 13 items, each consisting of a statement that was measured on a five-point Likert-type scale. Stepwise method as was advocated by Baron et al., (1986) was used to test the hypothesis. In the first step, project environment was regressed on performance of gated community housing projects.

The results indicated that project environment factors combined has a statistically significant influence in performance of gated community projects in Nairobi County, Kenya. In step two the influence of the moderator (project macro planning process) was introduced on the relationship between project environment and performance of gated community housing projects. The results also indicated that, with the introduction of a moderator (project macro planning process) in model increased the value of r squared by 0.039. Thus, from the results it was concluded that macro planning process had a statistically significant moderating influence on performance of gated community housing projects in Nairobi County, Kenya. These results suggested that macro planning process acted as a moderator in the relationship between project environment and performance of gated community housing construction projects.

5.4 Contribution to Knowledge

Table 5.1 summarized the contribution of the study to knowledge.

Table 5.1: Contribution to Knowledge

Objective	Findings	Conclusion	Contribution to Knowledge
To examine how regulatory environment influences performance of gated community projects in Nairobi County, Kenya.	Regulatory environment had an influence on performance of gated community projects in Nairobi County, Kenya.	Regulatory environment had a statistically significant influence on performance of gated community projects in Nairobi County, Kenya.	The study empirically proved the influence of regulatory environment on performance of gated community projects in Nairobi County, Kenya. There was no documented study done in this field in Kenya before.
To determine the extent to which technological environment influences performance of gated community projects in Nairobi County, Kenya.	Technological environment had an influence on performance of gated community projects in Nairobi County, Kenya.	Technological environment had a statistically significant influence on performance of gated community projects in Nairobi County, Kenya.	The study empirically proved technological environment influenced performance of gated community projects in Nairobi County, Kenya. Among the study review, neither had expressly dwelled on technological environment
To establish the extent to which project manager's	Project manager's personal attributes had an	Project manager's personal attributes had a	The study proved the influence of project manager's personal

personal attributes influences performance of gated community projects in Nairobi County, Kenya.	influence on performance of gated community projects in Nairobi County, Kenya.	statistically significant influence on performance of gated community projects in Nairobi County, Kenya.	attributes on performance of gated community projects in Nairobi County, Kenya. No other study (reviewed) had empirically proved project managers personal attributes in this context
To determine the extent to which project macro planning process influences performance of gated community projects in Nairobi County, Kenya.	Project macro planning process had an influence on performance of gated community projects in Nairobi County, Kenya.	Project macro planning process had a statistically significant influence on performance of gated community projects in Nairobi County, Kenya.	The study has empirically proved that project macro planning had a positive influence on performance of gated community projects in Nairobi County, Kenya. This area had not been given attention in the previous studies reviewed.
To determine the combined influence of project environment factors on the performance of gated community projects in Nairobi County, Kenya.	Combined influence of project environment factors had an influence on performance of gated community projects in Nairobi County, Kenya.	Combined influence of project environment factors had a statistically significant influence on performance of gated community projects in Nairobi County, Kenya.	The study brought together project environment factors and empirically proved how they influenced performance of gated community projects in Nairobi County, Kenya. Other studies had solely dwelled on the natural environment, socio-political / cultural environments or economic environment.
To examine the moderating influence of project macro planning process on	Project macro planning process had a moderating influence on	Project macro planning process moderated the relationship	The study proved that project macro planning process had a moderating influence on

the relationship between project environment and performance of gated community projects in Nairobi County, Kenya.	performance of gated community projects in Nairobi County, Kenya.	between project environment and performance of gated community projects in Nairobi County, Kenya	performance of gated community projects in Nairobi County, Kenya. No other study reviewed had considered macro planning process as a moderating variable

5.5 Recommendations

This section presents recommendations made from the study based on findings. Recommendation on policy and practice were contained in this section.

5.5.1 Recommendations for Policy

Considering that the government of Kenya as well as many other developing countries were gearing towards implementation of systems that will ensure projects are delivered in budget, schedule, specifications, and client satisfaction, this study had implications to the government, implementing agencies and citizens. The study findings indicated that each of the project environment variables had an influence on performance of gated community housing projects in Nairobi County, Kenya. Further, the study showed that project macro planning process moderated the relationship between project environment and performance of gated community housing projects in Nairobi County, Kenya. The study revealed a statistically significant and positive relationship between regulatory environment, technological environment, project manager's personal attributes, and project macro planning process on performance of gated community projects in Nairobi County, Kenya. This implied that if project organisations (including the relevant stakeholders) would effectively manage the project environment (s) and integrate it with the macro planning process, performance of the projects would be enhanced.

Policy makers should ensure that project organizations will adopt the right strategies to manipulate the project environment (s) and use the macro planning process as a vehicle that will enhance the relationship between the project environment and performance. The project manager's personal attributes were very important as revealed from this study hence training and experience is also important as a recipe for project performance. Project performance would be difficult without the support of project macro planning process (pre-construction planning) as a moderator of the relationship between project environment and performance.

Findings from the study also indicated the need for policy makers to ensure adequate empowerment of the key practitioners – project owners, consultants, contractors and facility managers. This would ensure inputs from their processes would regulate the project environment(s) and promote performance. For instance, if the consultants would involve technology in their designs, the product would be a workable design that would not call for many change requests which in turn would assist in performing at the budgeted cost. On the same note, informed project owners would make use of the regulatory framework in place to arbitrate issues when conflicts arise among the contracted parties in terms of quality, contractual terms, provision of services, labour disputes among others. This implied that policy makers needed to design a training curriculum that would equip project managers, planners, designers and implementers with the necessary knowledge and skills to execute their project to the successful completion. Clear understanding of the regulatory environment, technological environment, project manager's personal attributes, and macro planning process was imperative for project performance to be effective and as originally designed.

The findings also showed a statistically significant moderating influence of the project macro planning process on the relationship between project environment and performance of gated community projects. Considering that macro planning process was perceived to be the duty of the project manager and his/her project team before execution commences, there was need to embark on training programmes to educate both the project managers and the project teams on the usefulness of the macro planning process and the effective levels at which it can be conducted. In addition, a close monitoring and evaluation system should be put in place to check on the level of performance and address the challenges that were negatively affecting the implementation process well in good time.

5.5.2 Recommendations for Practice

The findings from this study provided an indication that performance of gated community housing projects was influenced by the project macro planning process. This implied that public and private project organisations needed to align and embrace macro planning process for effective execution of the project designs. In this digital era, project organisations have to adopt strategies, structure, and a culture that is conducive for implementation of the new electronic systems that will produce quality drawings and presentations that reflect as built designs, that which will make communication very fast and easy among the stakeholders; that which will enable storage and retrieval of information as and when required, and that which will link the 3D's with the fourth dimension of cost to produce 4D - models. Project owners, managers, and other stakeholders needed to emphasize on capacity building that will equip implementers of projects and regulatory bodies with knowledge and skills on implementation of the technological systems to bridge the gap between the analogous and the digital era.

For project organisations to be effective and efficient in performance of their projects, they must analyse and understand their project environments to position themselves strategically and to enhance performance of their projects. Programme organizations could apply the findings of this study in areas of project planning, design and implementation, execution planning and development of a monitoring and evaluation systems. This study provided further insight into how project manager's personal attributes influenced performance in gated community housing projects. The study recommended attitudinal change trainings so that project managers were not expected to implement systems in their projects that did not add value, but those that would ensure effective performance of their project (s).

5.5.3 Recommendations of the Study on Methodology

This study used pragmatic paradigm to support its mixed mode approach. Cross-sectional survey was carried out using questionnaire as the data collection instrument. Data was analysed using descriptive statistics, correlation and hypotheses tested using simple linear regression, multiple and stepwise regression. A key departure from most other studies was to test hypotheses using data from the main variable rather - the composite of the main variable under study. This was done on regulatory environment, technological environment, project manager's personal attributes and project macroplanning process (as an independent variable). The advantage with this approach was that it was able to identify and isolate each individual project environment that was statistically significant instead of a general conclusion on the broad project environment. This was found to provide in-depth information on each of the project environment. Another implication of the findings from this study for the methodology was the need to use mixed mode research approach. This allowed the researcher to compare results obtained from both descriptive statistics and inferential statistics to provide a detailed interpretation.

5.6 Suggestions for Further Study

Arising from the implications and limitations of this study, recommendation for further study(s) were made. While this study successfully established the project Project environment, macro planning process and performance of housing construction industry: A case of gated community projects in Nairobi County, Kenya, it also presented rich prospects to examine in future research. The findings from this study revealed that macro planning process moderated the relationship between project environment and performance of gated community projects in Nairobi County, Kenya. Further research(s) could also investigate other variables that could moderate this relationship. Further to this, the project environment would be studied as the moderator of the relationship between macro planning process and project performance in gated community housing projects in Nairobi County, Kenya.

Given that this study focussed on gated community housing projects in Nairobi County, Kenya, it was recommended that similar studies be replicated covering other counties in the country and compare their results to the current study. This study could also be replicated in other developing countries to determine if the same results would be obtained.

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APPENDICES

Appendix I: Letter of Introduction

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1st August, 2016

Dear Sir/Madam

RE: ACADEMIC RESEARCH

I am a Ph.D. candidate in Project Planning and Management (Project Planning, Design and Implementation speciality) in the School of Education and External Studies of the University of Nairobi. I am collecting data for my research on: **"Macro planning process, project environment and performance in housing construction industry: A case of gated community projects in Nairobi County, Kenya".**

You have been randomly selected to be part of this study. I kindly request you to allow me/my research assistant to collect data from you by administering a questionnaire. You have one week and the questionnaire will be collected back from you either by me or my research assistant. Kindly feel free to give the true picture in response to each item based on your belief and experience. Thank you in advance for your time and the assistance accorded to me.

The information given will be treated with anonymity and will only be used for academic purpose in this study.

Kind regards and God bless.
Yours faithfully
Mr. Michael Musyoka Chris
Ph.D. Candidate.
L83/80503/2011

01/08/2016

Appendix II: Questionnaire for the study

I kindly appreciate in advance your time and cooperation in completing this questionnaire. This will take you just a few minutes to complete. The questionnaire is aimed at capturing data on: **"Project environment, macro planning process and performance of housing construction industry: A case of gated community projects in Nairobi County, Kenya"**. This is purely an academic research for my doctoral studies in Project planning and management (Project planning, design, and implementation) of the University of Nairobi. The results will hence not be traceable to you or any individual person. I therefore urge you to freely answer the questions as honestly as possible. The questionnaire is divided into four sections. Kindly follow the instructions given at the beginning of each section.

SECTION A: Personal Information

Please fill in the information below by ticking appropriately.

1. Please tick the appropriate category of your trade/designation

    a. Client (Owner) [ ]
    b. Consultant [ ]
    c. Contractor (Main Contractor) [ ]
    d. Estate Facility Manager (Gated Community) [ ]

2. Please indicate your gender.

    Male [ ]
    Female [ ]

3. What is your age bracket?

Below 26 years.	[ ]	26-30 years.	[ ]
31-35 years	[ ]	36-40 years	[ ]

41-45 years	[ ]	46-50 years	[ ]
51- Above	[ ]		

4. What is your highest level of education?

Secondary school	[ ]	Bachelor's degree	[ ]
Certificate	[ ]	Masters	[ ]
Diploma	[ ]	PhD	[ ]

Other (specify) ………………………………………………………………

5. How Many Gated Community housing projects have you been involved in between 2009 – 2014 in Nairobi County?

Below 5 projects.	[ ]	5-8 projects.	[ ]
9-11 projects.	[ ]	12-14 projects.	[ ]
15-17 projects.	[ ]	18-20 projects.	[ ]
21 projects - Above	[ ]		

SECTION B: Gated community project (s)' performance

6. The questions below refer to the level of performance of gated community housing projects. The responses range as follows with their weights as indicated: **strongly agree (5); agree (4); neutral (3); disagree (2); strongly disagree (1).** Please tick the most appropriate statement that best explains the status at which your project (s) performed.

Statement	Strongly agree (5)	Agree (4)	Neutral (3)	Disagree (4)	Strongly disagree (1)
Cost related					

a. Cost of the project(s) was as per initial budget for the project					
b. No variation order (s) were raised for the project					
c. No disagreements were raised on the valuation of work done					
d. No funding issues were raised during the project time					
e. Many provisional sums and prime costs were factored					
f. Payments to the main contractor were released without delays.					
Time related					
g. Project was executed within the planned time					
h. Set project duration was not enough for the project					
i. There were delay in mobilization by the main contractor					
j. Many change requests were placed related to design					
k. There were lengthy routine of government authorities					
l. Irregular attending of project review meetings were recorded					
Quality related					

m. There were issues arising from quality of materials					
n. Many re-work issues were raised					
o. Inspection schedules were not followed					
p. Changes in drawings and specifications were many					
q. Inadequate skill of contractor's staff were noticed					
r. There were frequent design changes					
Safety and Health related					
s. No fatalities were reported during the project time					
t. No injury compensation issues were raised					
u. No work-related injuries were reported					
v. Safety orientation and talks were mandatory					
w. Use of personal protective equipment (PPE's) was a must					
x. Daily Pre-task planning before start of work with the team (s)					

was done					
y. Permits were issued for working at heights					
z. Scaffolding, personal fall arrest systems (PFAS), and Ladders had an inspection schedule					
aa. Permits were issued for working in confined space					
bb. Permits were issued for hot works					
cc. Safety officer was required full time at site					
Client satisfaction related					
dd. No repeat jobs after completion					
ee. No legal issues raised by owner					
ff. Defects liability for workmanship was set for more than six months					
gg. Client was satisfied with final finishes of the facility (s)					
hh. There was smooth information coordination between owner and project parties					
ii. No Conflicts encountered among					

involved parties					

7. List two performance challenges that you do encounter in implementing gated community housing project (s) based on your experience?

   a. ……………………………………………………………………………………

   b. ……………………………………………………………………………………

8. Suggest ways in which implementation of gated community housing project (s) can be made more effective?

   a. …………………………………………………………………………………..

   b. ………………………………………………………………………………….

SECTION C: Project Environment and performance

9. The questions below refer to the project environment and the level at which it is related to the project performance in gated community housing construction. The questionnaire is rated on a five-point Likert scale ranging from 1 to 5: **to a very great extent (5); to a great extent (4); to a moderate extent (3); to a small extent (2); to a very small extent (1)**. Please tick **ONLY** the most appropriate response to the best of your knowledge and experience.

Statement	**To a very great extent (5)**	**To a great extent (4)**	**To a moderate extent (3)**	**To a small extent (4)**	**To a very small extent (1)**
Regulatory Environment related					
a. There was lengthy conflict					

resolution process					
b. There were changes in the regulatory framework					
c. Disputes settlement process was lengthy					
d. Arbitration issues were raised					
e. Litigation issues were raised					
f. There were Management – Labor relationship issues					
g. Cost of compliance to regulatory requirement was high					
h. Long waiting time for compliance to regulatory requirements – EIA, and Approval of plans.					
Technology Environment related					
i. Project used locally made plant and equipment (Not imported)					
j. Skills were available for operation of the plant and equipment					

k. Team members with necessary skills to operate and use the plant equipment were available					
l. Use of Information and Communication technology (ICT) was satisfactory					
m. Computer Aided Drafting (CAD) was used					
n. 3D visual illustrations - Building Information Modelling, was used.					
o. Electronic mails and communication was used					
Project Manager's personal Attributes' related					
p. Educational Qualifications important					
q. Overall Experience (Specialised and other) helpful					
r. Management Abilities (Planning, organizing, directing, controlling) required					
s. Leadership Abilities (Focus on achievement of tasks &					

personal relations with the group) vital					
t. Relationship with Top Management, teams and client important					
u. Technical Ability, knowledge in the use of tools and techniques vital					
v. Knowledge and understanding of estimating systems, cost control, scheduling control, quality and safety very important					
w. Personality of the Project Manager - Emotional Stability, intelligence & maturity very important					

10. State two ways in which Legal framework influences construction of gated community housing project activities

    a. ....

    b. ....

11. Suggest ways in which technology affects construction of gated community housing project (s)?

    a. ....

b. ……

12. In which way does the project manager's personal attributes influence performance in construction of gated community housing project (s) based on your experience?

a. ……

b. ……

SECTION D: Project macro planning process

The questions below provide various indicators of project macro planning process (pre-construction planning) deemed to influence both housing construction performance and the relationship between project environment and performance in construction of gated community projects. The response ranges as follows with their weights as indicated: **Never (1); rarely (2); occasionally (3); frequently (4); always (5).** Please tick the most appropriate response to the best of your knowledge and experience.

Statement	**Never (1)**	**Rarely (2)**	**Occasionally (3)**	**Frequently (4)**	**Always (5)**
I. Macro planning process and project performance related					
a. Structural drawings level of adequacy impacts on project performance					
b. Clear project specification details influence project performance					
c. A clear and well-defined quality management plan impacts on project					

performance					
d. Clear strategy on interaction & coordination of project tasks promotes performance					
e. A project schedule which includes all required work influence performance.					
f. A programme that shows all required resources and budget control initiatives promotes performance.					
g. Matching project tasks with appropriate skilled personnel promotes project success.					
h. Personnel training enhances project performance.					
i. Involvement of project team(s) enhances project performance.					
j. A sound communication strategy both internal and external enhances success of the project.					
k. A well-defined risk mitigation strategy promotes project performance.					
l. A strategy for balancing people, materials, equipment and time schedule promotes performance					

m. A defined procurement strategy for necessary resources from external sources influence performance.					

13. In which two ways does structural drawings influence performance in construction of gated community housing project (s)?

    a. ....

    b. ....

14. How does quality management plan influence performance in construction of gated community housing project (s) to the best of your knowledge and experience?

    a. ....

    b. ....

15. How does project schedule that includes all required work influence performance in construction of gated community housing project (s) based on your experience?

    a. ....

    b. ....

THANK YOU

Appendix III: Standardized interview guide for consultants and main contractors.

1. What are the performance challenges encountered in housing construction industry projects?
2. How does Legal framework practices influence project(s) in housing construction industry?
3. In which way(s) does technology influence project(s) in housing construction industry?
4. In which way(s) does the project manager's personal attributes influence performance in housing construction industry project(s)?
5. How does structural drawings influence performance in housing construction industry project(s)?
6. In which way(s) does quality management plan influence performance in housing construction industry project(s)?
7. How does project schedule influence performance in housing construction industry project(s)?
8. Why do gated community housing projects complete with over budget and time overrun?
9. How does project macro planning (Pre-construction planning) influence housing construction industry project(s)?
10. What are the effects of quality system implementation on performance of housing construction industry project(s)?

11. How can the completion rate of gated community housing project (s) be improved?

Thank you for your time and responses to the study questions. I will reach you back in case of need for clarifications.

Kind regards.

Appendix IV: Gated Community housing projects per Ward and Sub-County; 2009 - 2014

SUB - COUNTY	WARD	NO. OF PROJECTS INITIATED	NO. OF PROJECTS COMPLETED	UNITS REQUIRED FOR STUDY (Random Sampling)	PROPORTION TAKEN FOR STUDY
DAGORETI NORTH (58)	GATINA	12	29	18	0.66
	KABIRO	10			
	KAWANGWARE	10			
	KILELESHWA	14			
	KILIMANI	12			
DAGORETI SOUTH (61)	UTHIRU	15	31	20	0.65
	MUTUINI	10			
	NGANDO	10			
	RIRUTA	15			
	WAITHAKA	11			
EMBAKASI CENTRAL (8)	KAYOLE NORTH	2	2	1	0.50
	KOMAROCK SOUTH	5			
	KAYOLE SOUTH	0			
	MATOPENI	1			
	KAYOLE CENTRAL	0			
EMBAKASI EAST (28)	MIHANGO	6	13	9	0.69
	EMBAKASI AIRPORT	4			
	LOWER SAVANNAH	6			
	UPPER SAVANNAH	4			
	UTAWALA	8			
EMBAKASI NORTH (0)	DANDORA I	0	0	0	0.00
	DANDORA II	0			
	DANDORA III	0			
	DANDORA IV	0			

	KARIOBANGI NORTH	0			
EMBAKASI SOUTH (4)	KWA NJENGA	1	2	1	0.50
	PIPELINE	0			
	KWARE	1			
	KWA REUBEN	0			
	IMARA DAIMA	2			
EMBAKASI WEST (8)	KARIOBANGI SOUTH	1	3	1	0.33
	MOWLEM	3			
	UMOJA I	2			
	UMOJA II	2			
KAMUKUNJI (4)	CALIFONIA	2	2	1	0.50
	EASLEIGH AIRBASE	2			
	EASLEIGH NORTH	0			
	EASLEIGH SOUTH	0			
	PUMWANI	0			
KASARANI (69)	CLAY CITY	16	40	25	0.63
	KASARANI	12			
	MWIKI	12			
	NJIRU	15			
	RUAI	14			
KIBRA (7)	LAINI SABA	0	3	1	0.33
	LINDI	0			
	MAKINA	1			
	SARANG'OMBE	0			
	WOODLEY	6			
LANGATA (47)	MUGUMOINI	4	34	22	0.65
	KAREN	12			
	NAIROBI WEST	14			
	NYAYO HIGHRISE	8			
	SOUTH C	9			
MAKANDARA (2)	HARAMBEE	1	2	1	0.50
	MAKONGENI	0			
	MARINGO/HAMZA	0			
	VIWANDANI	1			
MATHARE (11)	HOSPITAL	2	7	4	0.57
	HURUMA	1			
	KIAMAIKO	0			
	MABATINI	0			
	MLANGO KUBWA	2			
	NGEI	6			
ROYSAMBU (50)	GITHURAI	11	27	18	0.67
	KAHAWA	6			
	KAHAWA WEST	10			
	ROYSAMBU	11			
	ZIMMERMAN	12			

RUARAKA (4)	BABADOGO	2	2	1	0.50
	KOROGOCHO	0			
	LUCKY SUMMER	2			
	MATHARE NORTH	0			
	UTALII	0			
STAREHE (3)	KARIOKOR	0	2	1	0.50
	NAIROBI CENTRAL	0			
	NAIROBI SOUTH	1			
	NGARA	1			
	LAND MAWE	0			
	PANGANI	1			
WESTLANDS (42)	KANGEMI	10	29	19	0.66
	KARURA	10			
	KITISURU	14			
	PARKLANDS				
		406	**228**	**143**	**1.00**

Source: Knight Frank, 2014

Criteria for getting study units: If number of completed projects are less or equal to 5 in a sub-County, pick the highest valued project (1); and if the number of completed projects are higher than 5 in a sub-County, pick 66% of the total projects completed.

Appendix V: Summary of code of practice for permits processing in Kenya

No.	Procedure	Time to Complete	Associated Costs
1	Obtain a survey plan from Survey Kenya *Agency:* Survey Kenya A survey plan from Survey of Kenya is a required document when applying for a building permit.	1 day	KES 500
2	Submit and obtain approval of the architectural plans *Agency:* Nairobi City County - Development Control Section The structural engineer submits all the structural and architectural drawings to be approved using an online platform https://ccn-ecp.or.ke/. The required documents to be submitted are the following: i. The proposed development; ii. A survey plan from Survey of Kenya; iii. Ownership documents iv. Up-to-date rates payment receipts. v. Structural plans The City Council will issue an invoice that must be paid, this can take up to 2—3 weeks to be obtained. The drawings are reviewed by all relevant departments simultaneously. Once the structural and architectural drawings are approved, they will be signed on by the governor of Nairobi. When all signatures have been obtained, the approved plans are scanned and uploaded in the system so that they can be retrieved by the architect. On June 27, 2013 the Nairobi City County adopted the new Financial Act 2013 which became effective as of October 1, 2013.	45 days	KES Percentage of the total cost

No.		Procedure	Time to Complete	Associated Costs
		The Act modified the method of assessing the building permit fees and consolidated several costs into one. The building permit fee is now based on the size of the building. The Joint Building Council Rates provide the estimated cost per square meter which varies depending on the type of building (office block, residential and industrial complex). The fees are as follows: (i) Building plan approval fee: 1.1% of the estimated cost of construction (ii) Construction sign board fee: (iii) Application fee: (iv) Inspection of building file: (v) Occupation certificate:		
	3	Submit and obtain approval of the structural plans *Agency:* Nairobi City County - Development Control Section When construction is about to commence, the Contractor will apply for a construction permit. However, with approved drawings construction may start while the application for a building permit is being processed. Building Company must have the following items approved: project plans, architectural drawings, location survey of property documents and others.	10 days	no charge
*	4	Obtain a project report from an environmental expert *Agency:* Private Expert A licensed environmental expert must be hired to prepare a project	5 days	

No.		Procedure	Time to Complete	Associated Costs
		report to be submitted to NEMA.		
	5	Obtain approval of the environmental impact study *Agency:* National Environment Management Authority (NEMA) Following the enactment of new Environmental Management and Co-ordination Act on February 27, 2009, companies now have to obtain approval of projects from the National Environment Management Authority. Projects of all risk categories are subject to approval and an environmental impact assessment (EIA), including the Building Company warehouse. It takes 90 days on average. The cost is set at 0.05% of warehouse value (0.05% * value for the project). Prior to February 11, 2009, the fee rate was 0.1% of warehouse value. The regulation regarding environmental impact assessment approval for Kenya has been in place since 1999. However, in recent years NEMA started enforcing the rules more vigorously. NEMA conducts periodic inspections during the construction. If new projects at the moment of inspection do not have an environmental impact assessment they may order the project be closed and erected objects demolished. Therefore, construction companies are now obtaining the environmental approval before the building work starts. However, the legislation is not clear on what categories of building this regulation applies to.	90 days	
*	6	Obtain stamps on architectural and structural plans from the Nairobi City County - Development Control Section *Agency:* Nairobi City County - Development Control Section	1 day	no charge

No.	Procedure	Time to Complete	Associated Costs
	Once the plans have been approved, the architect must submit hard copies of the plans to be stamped by the Nairobi City County, even after submitting the documents online. The engineer must also do the same after the architect's plans have been stamped. The engineer does not have to wait one month like the architect to bring in the hard copies.		
7	Notify the Nairobi City Council of commencement of work *Agency:* Nairobi City Council According to the Planning and Building Regulations 2009 - Volume I- Section A-101, AA 54, Building Company must complete a form to notify the Nairobi City Council of the commencement of work.	1 day	no charge
8	Request and receive set out inspection *Agency:* Nairobi City County - Development Control Section According to the Planning and Building Regulations 2009 - Volume I - A-102, AA 55, and Building Company must complete a form and request an inspection from the Building Control Section.	1 day	no charge
9	Request and receive foundation excavation inspection *Agency:* Nairobi City County - Development Control Section According to the Planning and Building Regulations 2009 - Volume I- Section A-103, AA 56, the Development Control Section of the Nairobi City Council must be informed that the foundation /excavation is complete and request an inspection by	1 day	no charge

No.	Procedure	Time to Complete	Associated Costs
	completing a form and submitted it.		
10	Apply for permit to connect to the city sewage system *Agency:* Nairobi City County - Development Control Section According to the Planning and Building Regulations 2009 - Volume 1, Section A-110, AA 63, a permit to connect to the City sewage system. It will take about a week to obtain the permission.	14 days	KES 7,500
11	Request and receive final inspection by the Municipal Authority after construction *Agency:* Nairobi City County - Development Control Section Once the construction is completed alongside statutory inspections, Building Company applies for an occupancy certificate. The Structural engineer will file a form AA65, according to the Planning and Building Regulations 2009, certifying "that the structural work of the building mentioned below has been carried out as per my structural design and details and that the said structure is safe and stable for the purpose for which it is intended". This certificate is issued to completed developments that have complied with all approval conditions and have undergone the regular inspections at the required stages. The application has to be accompanied by: Copy of approved building plans; Copy of approved structural plans; Structural Engineer’s indemnity form; Architect’s report; Plumbers certificate; and Kenya Bureau of Statistics form duly filled. The occupancy certificate is given when the City Council deems	5 days	no charge

No.		Procedure	Time to Complete	Associated Costs
		the building follows the approved architectural drawings. The application is then forwarded to the Assistant Director Enforcement so that an inspector is assigned for the final inspection of the construction. Normally it should be a combined visit from several other departments.		
	12	Obtain occupancy certificate *Agency:* Nairobi City County - Development Control Section	14 days	no charge
*	13	Apply for water connection *Agency:* Nairobi City Water and Sewerage Company (Nairobi Water) Building Company is required to submit an "application for water and sewerage supply form" obtained from the Nairobi City Water and Sewerage Company. Afterwards, Building Company is required to pay KES 5000 for a survey and estimate of fees and attach the receipt of payment to the application form. Building Company must also attach the company's certificate of registration and its PIN number. The Nairobi Water Company may approve the application after all these documents have been submitted. Two to three weeks after the application has been received Nairobi City Water and Sewerage Company will send a team to assess the connection cost. The final connection will be made once payment of the estimated connection cost has been paid and this will take about 2—3 weeks to be done.	5 day	KES 5,000

No.		Procedure	Time to Complete	Associated Costs
	14	Receive inspection for assessment of connection fees *Agency:* Nairobi City Water and Sewerage Company (Nairobi Water) Once an application has been submitted by Building Company, an inspector will visit the property to make a cost assessment for labor and materials for the connection. This inspection will happen in about 2--3 weeks.	1 day	no charge
	15	Obtain water connection *Agency:* Nairobi City Water and Sewerage Company (Nairobi Water)	30 days	no charge
		Total Number of days to complete the permits process	224 days	

* Takes place simultaneously with another procedure.

Source: Department of Planning – Nairobi County.

Appendix VI: Summary of research objectives, hypotheses and results

Objective	Null Hypotheses	Alternative Hypotheses	Results	Remarks
To examine how regulatory environment	$\mathbf{H_0}$: Regulatory environment has no significant	$\boldsymbol{H_1}$: Regulatory environment has a significant		

influences performance of gated community projects in Nairobi County, Kenya.	influence on the performance of gated community projects in Nairobi County, Kenya.	influence on the performance of gated community projects in Nairobi County, Kenya.	R^2=0.283 F= (3,158)18.840 P=0.000<0.05	H_0: Rejected
To determine the extent to which technological environment influences performance of gated community projects in Nairobi County, Kenya.	**H_0:** Technological environment has no significant influence on the performance of gated community projects in Nairobi County, Kenya.	**H_1:** Technological environment has a significant influence on the performance of gated community projects in Nairobi County, Kenya.	R^2=0.312 F= (3,147)23.761 P=0.000<0.05	H_0: Rejected
To establish the extent to which project manager's personal attributes influences performance of gated community projects in Nairobi County, Kenya.	**H_0:** Project managers' personal attributes has no significant influence on the performance of gated community projects in Nairobi County, Kenya.	**H_1:** Project managers' personal attributes has a significant influence on the performance of gated community projects in Nairobi County, Kenya.	R^2=0.290 F= (2,157)33.410 P=0.000<0.05	H_0: Rejected
To determine the extent to which project macro planning process influences performance of gated community projects in Nairobi County, Kenya.	**H_0:** Project macro planning process has no significant influence on the performance of gated community projects in Nairobi County, Kenya.	**H_1:** Project macro planning process has no significant influence on the performance of gated community projects in Nairobi County, Kenya.	R^2=0.429 F= (1,160)120.16 P=0.000<0.05	H_0: Rejected
To determine the combined influence of project environment factors on the performance of gated community projects in Nairobi County, Kenya.	**H_0:** Project environment factors combined have no significant influence on the performance of gated community projects in Nairobi County, Kenya.	**H_1:** Project environment factors combined have a significant influence on the performance of gated community projects in Nairobi County, Kenya.	R^2=0.557 F= (6,155)39.272 P=0.000<0.05	H_0: Rejected

To examine the moderating influence of project macro planning process on the relationship between project environment and performance of gated community projects in Nairobi County, Kenya	$\mathbf{H_0}$: The strength of the relationship between project environment and performance of gated community projects in Nairobi County, Kenya is not moderated by the macro planning process.	$\boldsymbol{H_1}$: The strength of the relationship between project environment and performance of gated community projects in Nairobi County, Kenya is not moderated by the macro planning process.	R^2=0.587 $R^2\Delta$=0.03 F= (1,344)15.15 P=0.000<0.05	H_0: Rejected

Appendix VII: Research Permit and Authorization

THIS IS TO CERTIFY THAT:
MR. MICHAEL CHRIS MUSYOKA
of UNIVERSITY OF NAIROBI, 30527-100
Nairobi,has been permitted to conduct
research in *Nairobi County*

on the topic: *MACRO PLANNING PROCESS, PROJECT ENVIRONMENT AND PERFORMANCE IN HOUSING CONSTRUCTION INDUSTRY: A CASE OF GATED COMMUNITY PROJECTS IN NAIROBI COUNTY, KENYA*

for the period ending:
22nd July,2017

Applicant's
Signature

Permit No : NACOSTI/P/16/86982/12726
Date Of Issue : 22nd July,2016
Fee Recieved :Ksh 2000

Director General
National Commission for Science, Technology & Innovation

CONDITIONS

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit
2. Government Officers will not be interviewed without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2) hard copies and one(1) soft copy of your final report.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

REPUBLIC OF KENYA

National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE PERMIT

Serial No. A 10234

CONDITIONS: see back page

NACOSTI

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

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NAIROBI-KENYA

Ref: No.

NACOSTI/P/16/86982/12726

Date:

22nd July, 2016

PRINCIPAL SECRETARY
RECEIVED
27 JUL 2016
POLICY REGISTRY
STATE DEPARTMENT OF LANDS

Michale Chris Musyoka
University of Nairobi
P.O. Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Macro planning process, project environment and performance in housing construction industry: A case of gated community projects in Nairobi County, Kenya,"*** I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **22nd July, 2017.**

You are advised to report to **the Principal Secretary, Ministry of Land, Housing and Urban Development, the County Commissioner and the County Director of Education, Nairobi County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The Principal Secretary
Ministry of Land, Housing and Urban Development.

The County Commissioner
Nairobi County.

COUNTY COMMISSIONER
NAIROBI COUNTY
P. O. Box 30124-00100, NBI
TEL: 341666

DIRECTOR OF EDUCATION
27 JUL 2016
MINISTRY OF EDUCATION
P. O. Box 74629, NAIROBI