UNIVERSITY OF NAIROBI

A SYSTEMS APPROACH TO HOUSING DELIVERY FOR THE LOW AND MIDDLE LEVEL PUBLIC SECTOR EMPLOYEES IN KENYA

Submitted By: -

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DECLARATION

This Research Thesis is my original work and it has not been presented for a degree award in any University.

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DEDICATION

This research thesis is dedicated to my wife, Phoebe as well as my children; Denis, Nelson, Caroline, William and Tracy for their moral support and encouragement throughout the entire doctoral study period.

ACKNOWLEDGEMENT

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LIST OF ABBREVIATIONS/ACRONYMS

AHURI	Australian Housing and Urban Research Institute
CAHF	Centre for Affordable Housing Finance Africa
CBK	Central Bank of Kenya
CBO	Community Based Organizations
CSHSF	Civil Servants Housing Scheme Fund
EPS	Expanded Polystyrene Styrofoam
GOK	Government of Kenya
HFK	Housing Finance – Kenya
ICLEI	International Council of Local Environmental Initiatives.
IEC	International Economic Council
IPPR	Institute for Public Policy Research
KNBS	Kenya National Bureau of Statistics
MLH & UD	Ministry of Land, Housing & Urban Development
NACHU	National Cooperative Housing Union
NCA	National Construction Authority
NEMA	National Environmental Management Authority
NGO	Non – Governmental Organization
NHC	National Housing Corporation
PPP	Public Private Partnership
SACCOS	Savings and Credit Co-operative Society
SEA	Sustainable Energy Africa
UK	United Kingdom
UN	United Nations
UNEP	United Nations Environment Programme
UNGA	United Nations General Assembly
USA	United States of America
USAID	United States Agency for International Development
WCED	World Commission on Environment and Development
WHO	World Health Organization

ABSTRACT

Accessibility to adequate and quality housing by low and middle-income public sector earners remains a major challenge world over particularly in developing countries. Kenya, for instance, has encountered hurdles in provision of adequate and quality housing for the low and middle-income public sector employees who form over 90% of the total workforce. The housing crisis may be partly traced to the in-adequacy of housing delivery system components and failure of the systems components to operate in synergistic manner. This study therefore applied systems approach to evaluate the provision of quality housing for the low and middle level public sector employees. A system in the context of this study is a coherent entity as a whole but with parts that are interdependent and interactive amongst themselves and the immediate environment for a common objective and purpose.

The study was conducted in the City of Nairobi and focussed on 5 Public Housing Schemes with a total of 1016 households. 259 public sector housing experts, 52 key housing informants and 5 previous lead consultants were also part of the target population. Stratified random and systematic random sampling techniques were applied to identify housing units, households and public housing experts. Structured questionnaires were administered to 235 households and 60 public servants while 12 key informants and 5 previous lead consultants who were purposively selected were interviewed. Further data were obtained from observation by the researcher and records maintained by purposively selected public and private institutions. The study employed both qualitative and quantitative approaches. Quantitative data were analysed using descriptive and inferential statistics while qualitative data were analysed through the grounded theory technique. Charles Spearman's rank correlation analysis was adopted in correlating independent and dependent variables while Chi-square test was applied to test null hypotheses.

The findings have shown that the existing housing delivery approach is not a fully operational system since it lacks basic configuration and characteristics of a system. The null hypotheses were rejected implying that there are relationships between both housing cost and household income with affordability and customer satisfaction. The most significant challenges of the existing housing delivery approach included lack of / high cost of land / infrastructure, high cost of construction, in-adequate financing, lack of focus in research into cheap alternative materials / technology, lack of integrated planning, low household income and lack of political good will.

The study recommended policy initiatives that include lowering taxation on construction inputs, enhancing research into cheap alternative materials / technology, streamlining land administration / management, reviewing of planning / approval process, subsidizing rent / mortgage rate, controlling of macro-economic environment and reforming of the existing housing policy.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

Globally, housing is a major concern for all people living in every corner of the world given that every citizen of any nation has a right to basic shelter. In 1948, the General Assembly of the United Nations recognized this right by adopting and proclaiming the Universal Declaration of Human Rights *(United Nations Human Rights, 1948)*. The right to housing was further reinforced by the 1966 Committee on the Economic, Social and Cultural Rights convention. A subsequent convention in 1991 for which the General Comment No. 4 outlined that adequate or quality housing is not just having a roof over one's head but should explicitly be defined to incorporate security of tenure, availability of services, affordability, location and cultural adequacy (*United Nations Habitat, 1996).*

World nations have accordingly defined quality housing in line with this universal interpretation. The Habitat Agenda adopted in the United Nations conference held between 3rd-14th June, 1996 in Istanbul, Turkey also recognizes housing as a fundamental human right *(United Nations Habitat, 1996)*. To fulfil the Habitat Agenda, member states recognize the need to develop appropriate housing policies to facilitate provision of decent, adequate and affordable housing for all. The developed and developing states have employed differing strategies in trying to overcome the housing dilemma for the low and middle level income earners inclusive of the plight of the low and middle level public sector employees responsible for running day to day affairs of any government.

The housing delivery approach adopted by the developed world is anchored on policies that encourage heavy subsidy and tax reforms. The United States of America (US) housing policy introduced the national home ownership strategy. The US policy targeted the lower income group including vulnerable federal state workers to access decent and affordable houses developed through federal governments (*Millennial Housing Commission, 2002*) while Britain's Policy is hinged more on home ownership rather than ensuring sufficient supply of housing to meet the rising demographic needs resulting in sharp rise in rents and asset price (Hull A, 2012). The strategy adopted by these nations seeks to tackle housing provision challenge by offering subsidies both at supply and demand levels to increase production of housing units and reduce construction costs respectively. It remains to be seen whether the

developing countries have capacity to implement this model. The Australian policy targets those households that pay more than 30% of gross income on housing cost so that their numbers are reduced by half by 2025 (Disney, 2007). Australia has formulated a national affordable housing strategy that not only grants cash and non-cash subsidies but also involves all stakeholders including non-profit housing development organizations.

On the other hand, the developing nations with weak economies cannot shoulder the heavy subsidy provided by the developed nations and therefore have to resort to the strategies. The Malaysian housing policy seeks to facilitate all income groups particularly, the disadvantaged section of the society access to adequate, affordable and quality shelter (*Idrus N and Siong HOC, 2008*). Malaysia has been able to reduce the numbers of the homeless through increased supply of public housing and incorporating a rule that every private housing development must set aside 30% of housing units in any development for the low-income earners. Shuid (2004) however believes that to enable the low medium income Malaysian citizens who form the majority population access quality housing, the Federal Government needs to provide incentives to the private housing developers such as tax relief, lower land premium and faster approval.

Similarly, Kenya as one of the United Nations member states enacted the National Housing Policy to address the same sentiments (*Republic of Kenya, 2004).* Further, Article 43 (1b) of the Kenyan Constitution on economic and social rights enforces the right to accessible and adequate housing in line with the Universal Declaration of Human Rights *(Republic of Kenya, 2010).* Despite the pronouncement of this right, Kenya has not been able to satisfy the housing needs of her low and middle level public sector employees. *Centre for Affordable in Africa (2012)* decries that over 90% of the Kenyan low and middle level income earners in urban centres including public servants are un-able to access quality housing from the formal market.

On the other hand, only 2083 out of 32,099 civil servants in Nairobi representing 6.5% have benefitted from the scheme fund since its inception in 2004 indicating low supply of public housing as a constraint *(Republic of Kenya, 2015).* On the demand side, rents or mortgages as compared to income levels of this category of public sector employees are un-affordable. For instance, the average rent for a 1-3 bed room house in formal market in Nairobi is Kshs 70, 182 *(Hassconsult, 2014*) while the low and middle level civil servants earn Kshs 12,840 – 97,000 *(Republic of Kenya, 2013a)* showing how dire the situation is. The majority of this

income group either finds themselves in shelters that do not meet acceptable standards or have to forego certain basic amenities to secure a modest shelter. Accordingly, the UN Habitat (2013) indicates that 60% of urban dwellers in Kenya live in slums and other squatter settlements, a portion of which could be the public sector employees who have failed to secure accommodation from public and private sector formal housing schemes. This scenario continues despite the government have put in place a number of policy initiatives including the recently enacted Housing Policy of 2017. This indeed is justifying the need for an alternative delivery system that would a guarantee accessibility to quality housing by the low and middle level public sector employees.

1.2 Problem Statement

While the high-end income earners in Kenya are able to access quality housing from the formal market, the same is not true for the low and middle level formal sector employees. The low and middle level public sector employees are the formal sector employees affected by this dilemma. Over 90% of this income group cannot access quality housing from the formal market. A review of various previous studies and policy documents of the government of Kenya, indicate that the annual supply of housing units in Kenya is only between 30,000 − 35,000 units against a corresponding demand of 200,000 units.

This scenario exposes a serious shortfall complicated further by the rural urban migration and high rate of population growth estimated at 4.2% (Nabutola, 2013; Republic of Kenya, 2008 and Republic of Kenya, 2004). Okonkwo (1996), Noppen (2012), Centre for Affordable Housing Finance in Africa (2012) and Republic of Kenya (2013b) cite inadequate supply, unaffordable house mortgage / rent, undeveloped housing finance sector, high housing development cost, in-adequate serviced land and lack of appropriate housing policy as some of the drawbacks that have hindered access to quality housing by the low and middle level public sector employees in Kenya. The foregoing situation has prompted the majority of the lower end income group to live in slums under squalid unsanitary conditions.

Various studies undertaken in the developed world have pointed out a number of ways of achieving the universally agreed principle for shelter. Each nation has developed its destiny. The *World Bank (2012)* however clarifies that to enable access to quality housing for every citizen, the existing housing delivery approaches have to be reviewed. The mortgage, rental, tenant purchase, site and service, cooperative and self-built housing programmes across the country have failed to address housing supply and affordability crisis limiting accessibility by

these households. Various policy interventions including Sessional Paper No. 5 of 1966 / 67, Sessional Paper No. 4 of 2004, Legal Notice No. 98 of 2004 and the National Slum Upgrading / Prevention Policy of 2004 have not yielded any meaningful results.

The *World Bank (1989)* argues that incentives and disincentives through various government interventions affect the demand and supply of housing and could positively or negatively influence access to quality housing by the low and middle level income earners. Pioneer theorists in economics believe that demand and supply theory is underpinned in the works of Adam Smith and may be partly responsible for the plight of the low and middle level public sector employees in Kenya *(Aspromourgo, 2013).* Positive interventions would encourage increase in output while negative interventions would retard development in the sector. Appropriate interventions on the components of the existing delivery approach may therefore provide a framework for a housing delivery approach that will enhance accessibility to quality housing by the low and middle level public sector employees in Kenya.

Housing experts contend that housing delivery is a system that comprises several components. *Theorieenoverzicht (2014) and Saleemi (2009)* argue that systems comprise several components that include objects, external environment, input, output, processing and feedback. The housing delivery approaches have components that can be broadly classified under similar groupings. Systems theory provides that a working system is a whole with several partners that cooperate to realize a common purpose or objective *(Hjorland and Nicolaisen 2005).* Further, open systems have to interact with their external environment to continue existing *(Banathy, 1991)*. In line with the systems thought, housing delivery in Kenya could therefore be an open system whose components have failed to interact synergistically within themselves and external environment through a feedback mechanism. Feedback mechanisms are responsible for policy interventions required to initiate reforms in the housing delivery system to address the housing needs of the various income groups.

It is for the foregoing that this study proposes to examine why Kenya cannot provide housing to the low and middle-income level public sector employees and what model therefore can be adopted to arrest the situation. This study therefore examined to what extent public sector housing delivery approach in Kenya has adopted the systems approach, the challenges encountered and how best to address the challenges in order to provide a framework for a housing delivery system that guarantees accessibility to quality housing by the low and middle level public sector employees.

1.3 Hypothesis Setting

The background section of this chapter confirmed that the failure of the existing housing delivery system is manifested mainly in high rents or mortgage rates limiting access to quality housing attributed mainly to comparatively low household income from the low and middle level public sector employees and low supply. The access to quality housing in the context of this study is measured by household affordability and satisfaction levels of the output delivered to the market. The implication of this is that the alternative housing delivery system must focus in delivery housing units that meets satisfaction and affordability of the households within their income levels. This may be achieved among other strategies by reducing housing development cost as a key component of the housing delivery system.

The review of related literature confirms that development cost and household income are major determinants to accessibility to quality housing by the low / middle level public sector employees measured in terms of affordability and customer satisfaction. The implication of this fact is that theoretically, there exists relationships between housing development cost and household income and; access to quality housing (measured in terms of affordability and customer satisfaction) generating a need for empirical proof.

Based on the above arguments, four critical hypotheses arise in this study.

1.3.1 Hypothesis No. 1
    (a) Null Hypothesis

There is no relationship between housing development cost and affordability by the low and middle level public sector employees

    (b) Alternative Hypothesis

There is a relationship between housing development cost and affordability by the low and middle level public sector employees.

1.3.2 Hypothesis No. 2
    a) Null Hypothesis

There is no relationship between household income and affordability by the low and middle level public sector employees

b) Alternative Hypothesis

There is a relationship between household income and affordability by the low and middle level public sector employees.

1.3.3 Hypothesis No. 3

a) Null Hypothesis

There is no relationship between housing development cost and customer satisfaction by the low and middle level public sector employees.

b) Alternative Hypothesis

There is a relationship between housing development cost and customer satisfaction by the low and middle level public sector employees.

1.3.4 Hypothesis No.4

a) Null Hypothesis

There is no relationship between household income and customer satisfaction by the low and middle level public sector employees.

b) Alternative Hypothesis

There is no relationship between household income and customer satisfaction by the low and middle level public sector employees.

1.4 Objectives of the Study

The aim of this study was to evaluate the challenges faced by the current housing delivery approaches in Kenya and how best to address these challenges in the context of systems approach to improve accessibility to quality housing by the low / middle level public sector employees. Specifically, the study sought:

1. To examine the existing public sector housing delivery approaches for the low and middle level income earners including identification of their components.

2. To evaluate the extent to which public sector housing delivery approaches are embodied in a systems model.

3. To assess the challenges of the existing public sector housing delivery approaches and how best to address them in the context of systems model.

4. To assess the appropriateness of the housing delivery approaches in improving access to quality housing by the low and middle level income public sector employees.

5. To formulate a systems frame work for improving accessibility to quality housing by the low and middle level public sector employees.

1.5 Research Questions

1. What are the housing delivery approaches for the low and middle level public sector employees and what are their components?

2. How are the public sector housing delivery approach embodied in a systems approach model?

3. What are the challenges of the existing public sector housing delivery approach and how can they be addressed in the systems context?

4. How appropriate are the housing delivery approaches in improving access to quality housing by the low and middle level income public sector employees?

5. How can systems approach improve housing delivery for the low and middle level public sector employees?

1.6 Justification/Significance of the Study

In attempting to address the challenges of the existing housing delivery approach, it is hoped that this study will contribute to the process of developing an appropriate delivery approach that will reflect the realities of the low and middle level employees in order that they have access to quality housing. This is indeed intended to aid policy makers plan for long term accessibility to quality housing for the low and middle level income employees whose proportion is over 90% and yet the majority cannot access quality housing (*Republic of Kenya, 2013e*). Furthermore, this study attempts to contribute to the growing debate on defining policy direction for housing the low and middle level earners in a sustainable manner not only in Kenya but to the larger context of the developing world. Lastly, although the majority of the low and middle level employees and in particular public servants have consistently not been able to access quality housing, no known study has been undertaken in this area with a view to improving accessibility.

The study therefore constitutes pioneering work and this contributes to filling the existing gap of knowledge in employer provided housing in Kenya as well as other similar developing countries. The findings from this study will be applied by housing development experts to improve the lives of millions of Kenyans through provision of quality housing as outlined in the social pillar of the Vision 2030 Development Blue Print and Article No 43 (1b) of the Kenyan Constitution.

1.7 Scope of the Study

The study focuses on the low and middle level employees who constitute over 90%, the majority of whom cannot afford mortgage or rent and therefore the most vulnerable group. The study area covered major public housing in Nairobi and included Ngara, Shauri Moyo, Jogoo Road and Ruai Public Housing Schemes which were purposively selected. The housing schemes accommodate a total of 1016 housing units categorized as one, two and three bed roomed justifying the selection. Households, consultants who were previously engaged in these housing schemes, public housing experts and key housing policy informants were targeted in this study.

1.8 Limitation of Study

Ideally, this study would have been more accurate if it had been conducted in all the forty-seven counties in Kenya. This posed some logistical, financial and time constraints. The justification for choice of Nairobi as study area was that no major public housing that accommodates the low and middle-income earners has been implemented anywhere other than Nairobi City in the recent past since the introduction of the Civil Servants Housing Scheme Fund in 2004. In addition, almost all of the housing policy informants / experts and consultants targeted in this study operate from Nairobi City. Finally, this being an academic research constraint with strict timelines and budget, it would be impractical to focus on the entire country.

1.9 Definition of Operational Terms

Household
One person or group of people who live together and either share at least one meal a day or share accommodation (living/sitting room).

House Tenure

Refers to house owner occupier or renter occupier options.

Private Housing

Housing developed through private sector initiative.

Public Housing

Housing developed through public financing.

Social Housing

Housing provided for the vulnerable groups whose needs cannot be met within the open market and where housing cost is subsidized.

Affordable Housing

Housing for an income group whose rent or mortgage does not exceed 30% of the gross household income as a rule of thumb.

System

A system is a complex whole comprised of component parts that work together in an orderly way, over an extended period of time, towards the achievement of a common goal.

Delivery System

A means or procedure for providing a product or service to the public.

Systems Theory

Systems theory is a set of rules for analysing how systems and its components operate and relate to one another and can be applied to various fields.

Accessible Housing

Housing for which a specific income group can afford.

Adequate or Quality Housing

Housing which is more than a roof over one's head provided with adequate space, privacy, safety, lighting, ventilation and security of tenure, basic and social infrastructural services and free from environmental hazards.

Market Rented Housing

Housing whose rent is determined by market forces

Low Grade Housing

Housing unit comprising a minimum of two habitable rooms, cooking area and sanitary facilities and covering between $30 - 65 \text{ m}^2$ which for this study should house income groups earning Kshs. 12,840 – 22,580 per month.

Middle Grade Housing

Housing unit comprising a minimum of three habitable rooms, cooking area and sanitary facilities and covering between $65 - 85\text{m}^2$ which for this study should house income groups earning Kshs. 22,580 – 97,290 per month.

Housing Survey

Identification of housing needs on annual basis and includes population and household information.

Slums

Poor quality housing or settlement in squalid and unsanitary conditions lacking basic services

1.10 Structure of the Research Thesis

The Research thesis is divided into eight chapters as detailed here under.

Chapter One – Background to the study

Chapter One discusses introduction, statement of the problem, aims and objectives, research questions and hypothesis. It further highlights the justification and significance of the study. Finally, it sets out the scope and limitations of the study including definitions of operational terms as well as an outline of the research thesis.

Chapter Two – Systems Theory and its Application in Housing Delivery

Chapter two is a consolidation of related literature on past research findings systems theory and global housing approaches to identify existing body of knowledge and research gaps. It further focuses on theories and concepts that are related to the field of study and ends up with a conceptual model that was employed as a framework for investigation.

Chapter Three – Housing Delivery Approaches for the Low and Middle Level Public Sector Employees in Kenya

Chapter three has employed secondary data to examine the housing delivery approaches for the low and middle level formal sector employees. The chapter focuses on the housing accessibility challenges by this income group and the reforms so far undertaken by the

Government of Kenya to address them. It further identifies components of the existing housing delivery approach. This chapter addresses objective one.

Chapter Four – Research Methodology

Chapter four is broadly concerned with the methodological approach or strategy that was applied in the investigation. It sets out research approach, design, target population, sample / sampling techniques, methods of data collection, measures of improving reliability / validity as well as the means by which to analyse data.

Chapter Five – Housing Delivery and its Challenges

Chapter five displays, interprets and discusses primary data on housing delivery obtained from the sampled public housing experts. It seeks to establish to what extent the housing delivery components are embodied in a systems approach and it intends to address objective number two. It further seeks to identify the critical housing accessibility challenges and how best to address them in the context of systems model so as to address objective number three.

Chapter Six – Households' and Previous Consultants' Assessment of Housing Delivery

Chapter six displays, interprets and discusses primary data on housing delivery obtained from the sampled households and previous lead consultants who managed the selected housing schemes. It further assesses the appropriateness of a section of housing delivery components that include household income, rent / mortgage, customer satisfaction, land / infrastructure, planning process, materials adopted during construction, research into cheap alternative materials / technology and construction process which partly addresses objective number four.

Chapter Seven – Key Experts' and Informants' Assessment of Housing Delivery

Chapter seven displays, interprets and discusses primary data with reference to the assessment of the housing delivery through perceptions of the key experts and informants. It assesses the appropriateness of a section of housing delivery components that include housing actors, delivery methods, financing strategies, mortgage systems and policy which partly addresses objective number. It also evaluates the association of housing delivery components (independent variables) with access to quality housing (dependent variable) as well as the null hypotheses tests. Chapter seven partly addresses objective four.

Chapter Eight – Conclusion and Recommendations

Chapter eight consists of a summary of main findings, conclusion and recommendations. It discusses the main findings with a view of drawing appropriate conclusion and recommendations on the enquiry. It also seeks to state the contribution of the study to the existing body of knowledge as well as identify research gaps that are outstanding to be undertaken in the future.

References and Appendices

References and appendices appear at the end of the text.

CHAPTER TWO

2.0 SYSTEMS THEORY AND ITS APPLICATION IN HOUSING DELIVERY

2.1 Introduction

Shelter or housing alongside food and clothing stands out as one of the basic human needs since time immemorial. In recognition of this basic need, the United Nations (*United Nations, 1948)* through the Universal Declaration of Human Rights guaranteed the right to adequate housing further reinforced in a later report by World Bank (*World Bank, 1980). Other subsequent United Nations fora have gone a step further to strategize on how to deliver quality housing for all that is affordable and sustainable (*United Nations Habitat, 1996; United Nations Habitat, 1997; United Nations Habitat, 1998; United Nations Habitat, 2001). The right to quality affordable housing is therefore universally recognized and has to be advocated by the respective governments of the United Nations member states.

Indeed, most governments all over the world have made significant strides to address this right which cut across all citizens including civil servants through the adoption of various housing delivery systems. Despite this, the shelter for all concept however still faces numerous setbacks. The year 2008 statistical information indicates that 3.3 billion people equivalent to more than half of the world's population live in cities out of which one billion lack decent quality housing and therefore live in slums and squatter settlements *(United Nations Habitat, 2013).* The future of the homeless in developing countries is therefore hinged on how to reform the existing housing delivery systems to enable them access quality housing.

This study considers system approach as a model framework within, which to provide solutions to the housing accessibility challenges being experienced by the low and middle level formal sector earners. This is informed by the fact that the research inquiry is underpinned by the systems theory *(Bertalanffy, 1968 and Boulding, 1956).* Accordingly, the inability to deliver quality housing for the low and middle level formal sector employees may be due to failure of the housing system components to work in a synergic manner. It is therefore important that the systems theory be well understood as it is the foundation of the research enquiry.

2.2 Systems Theory

Several definitions of systems abound and differ from person to person. *Bertalanffy (1956)*, a pioneer systems theorist defines a system as a complex of interacting elements and introduces system as a new scientific paradigm. *Hjorland and Nicolaisen (2005)* refer to a system as a set of social, technological or material partners cooperating on a common purpose. *Laszlo and Kripper (1998)* however view a system as a set of related and interacting sub systems performing functions directed at reaching a common goal, a meaning that is also propagated by *Amagoh (2008), Meles et al (2010)* and *Baldwin and Sauser (2009).*

Although the general aspects of the definitions are common, the divergence arising is more on what the individuals are focusing on. These definitions therefore converge on the general meaning of systems theory. Having critically looked at the various definitions, a comprehensive definition is thus 'a system is a coherent entity as a whole but with parts that are interdependent and interactive amongst themselves and the immediate environment for a common objective and purpose'.

2.2.1 Types of Systems

PENN (2014) and *Heylighen (1998)* view systems as mechanistic, animate, social and ecological as represented in figure 2.1.
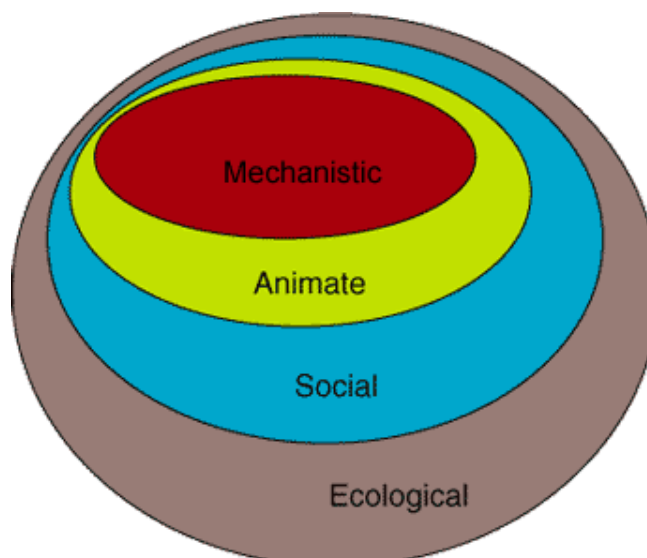
Figure 2. 1: Hierarchical Classification of Systems

Source: *PENN (2014)*

The significance of this classification is that all but mechanistic systems can be incorporated as parts of other systems of the same or lower class but not of a higher class. Ecological systems can therefore encompass systems of all the other classes. *Thakur (2015) and theorieenoverzicht (2014)* however classifies systems as abstract / physical, deterministic / probabilistic, open / closed and user machines. The above authors however fail to portray the hierarchical status of systems classification. The hierarchical concept of classification is one that follows the thoughts of *Boulding (1956)* whose approach classifies systems in nine levels in order of increasing complexity that include statistic structure, simple dynamic, self – regulation, openness, genetic societal, animal, human, social and transcendal. The four level classifications by *PENN (2014)* is therefore a broad and summarized model from the works of *Boulding (1956).*

Recent trends in systems thinking provide a much broader classification. *Laszlo and Kripper (1998)* believe that systems should broadly be classified as hard or soft or both. The hard system approaches can be applicable in systems engineering, soft approaches in humanistic psychology and mixed approach in operations research. Accordingly, while hard systems are typically the subject matter of engineers concerned with real world problem – solving (mechanisms, machines, aircraft and power plants) the extreme end of soft systems is characterized by human beings as their principal components, a phenomenon that is difficult to define. Although the literature review confirms varying modes of classifications, there is however unanimity in scope of context from various authors. It can be argued that the broad classification of systems includes; abstract / physical, deterministic / probabilistic, open / closed, artificial / natural and cybernetic.

2.2.2 Characteristics of systems

Various studies have described systems in different ways depending on focus. The manner in which these descriptions have been framed highlight the major characteristics of a system. *Hjorland and Nicolaisen (2005)* argue that a system is a whole with several partners that cooperate to realize a common purpose or objective. *Laszlo and Knipper* refers to relationship and interconnectivity of the systems to achieve a common goal, characteristics also embraced by *Amagoh (2008). Baldwin and Sauser (2009)* however pick interactivity of complex parts or components to achieve a common goal or purpose as major characteristics of systems. *Stave and Hopper (2007)* focus more on interconnectivity/ identity of parts / the wholeness and the cause – effect relationships between parts as unique characteristics of a system.

Saleemi (2009) identifies systems components' regulated interaction, organized whole, communication within the parts through systems boundary and wholeness as key characteristic. *Kast and Rosenzweig (1972)* recognize interrelationship of parts, ability to maintain an equilibrium, hierarchical nature, feedback mechanism for its survival, holism, synergism and systems boundary as traits that define the identity of a system. *Banathy (1991)* however gives more attachment to the openness, closedness, holistic nature, goal directedness including existence of both the whole and parts as major identities of a system. The holistic nature is derived from the thoughts of Aristotles which states that the whole is bigger than the parts (Boulding, 1956).

The arguments from the above writers however converge with respect to certain characteristics, for instance, there is general commonality that systems characteristics include holistic nature, goal directedness, openness / closedness, possession of boundary, ability to communicate with its parts and external environment, feedback mechanism for its survival, ability to achieve equilibrium status after disturbance and a hierarchical nature. These characteristics provide a new paradigm shift towards addressing the emerging complex societal problems being witnessed in our day to day activities. *Banathy (1991), Amogoh (2008) and; Hojarland and Nicolansen (2005)* argue that these characteristics present an opportunity in the systems approach to address massive technological and social changes that continue being witnessed. In view of the above arguments it can be explicitly stated that the characteristics of systems has offered us an opportunity to carry out research with a view of providing alternative solutions to the emerging complex problems.

2.2.3 Components of a System:

Components of a system can be well understood from a conceptual framework point of view. This view point is fronted by *Ansari (2004)* and *Bertalanffy (1956)* who point out the major factors of the systems theory as the relationship and interaction amongst the different parts and also to the whole. According *Freetutes (2014)* and *Heylighen (1998),* the systems concept integrates both analytic and synthetic methods, encompassing holism and reductionism in line with the thoughts of *Bertalanffy (1956). Theorieenoverzicht (2014)* and *Saleemi (2009)* conceive a system as consisting of objects, environment, boundary, throughput (processing), input, output and a feedback mechanism.

Heylighen (1998) and Freetutes (2014) contend that a system has inputs in the form of raw materials for processing via the throughput component for release as an output to external

environment through a boundary. The above authors argue further that a system has a control component also known as feedback mechanism for communication with the external environment so as to continue existing. The objects in a system include parts, elements or variables within the system which are both interdependent and interactive. At the lowest level, we have sub systems and supra system at the upper level all existing in a hierarchical manner.

The components of a system exist in conceptual relationship with one another in interactive and synergic manner. According to *Theorieenoverzicht (2014), Freetutes (2014)* and *Hylighen (1998),* a system must add value to the input in producing the desired output relevant for the existence of the system. This essentially reveals the functional and performance attributes of the system. The conceptual model for the interactive / interdependent arrangement of the components of a system can be graphically represented in two ways (simple / elaborate perspective). Figures 2.2 and 2.3 show conceptual representation of the components of a system in simple and elaborate forms respectively.
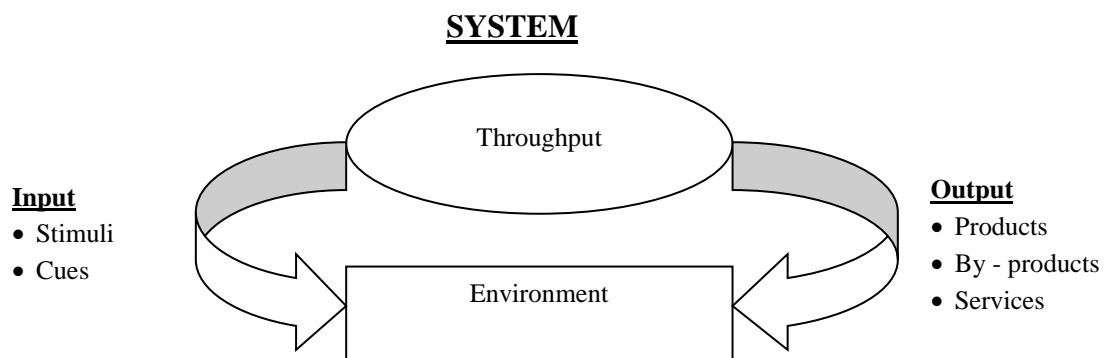
SYSTEM

Figure 2. 2: Simple System Model

Source: *Adapted from Heylighen (1998)*

Figure 2.2 above shows the basic components of a simple system model which can be found in all systems. The model is however more abstract than practical because of all the missing links on how the system operates and interacts with its environment which is a critical omission. *Freetutes (2014)* has however included most of these missing links as observed in Figure 2.3.

17
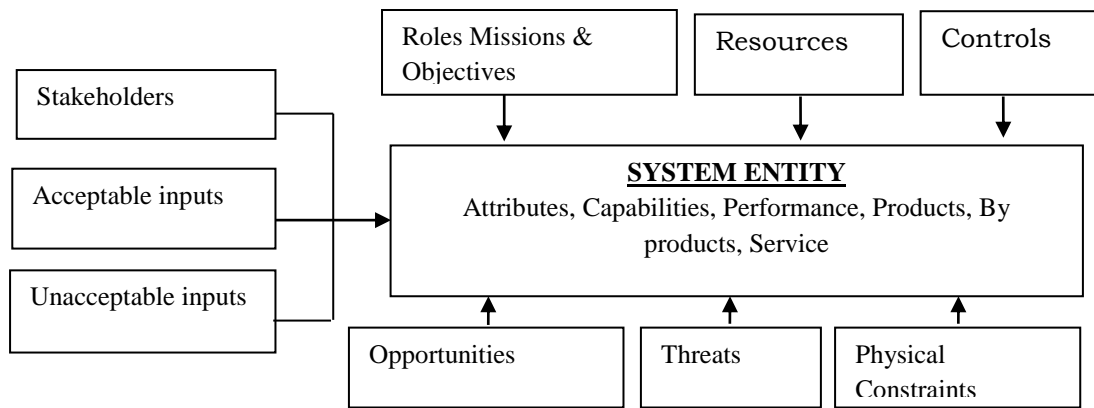
Figure 2. 3: Analytical (Elaborate) System Model

Source**:** *Freetutes (2014)*

The components of a system therefore include input, throughput, output, feedback and external environment existing as a conceptual model which can be employed to investigate societal problems as shown in Figures 2.2 and 2.3.

2.2.4 Benefits and Critique of the Systems Theory

That the systems theory has become significant in resolving societal problems cannot be understated. *Whyte et al (2015)* identify the critical benefits from systems theory as the broadening of the theoretical aspects of inquiries, ability to deal with complex situations and a focus on the environment to initiate feedback for survival. *Kast and Rosenzweig (1972)* on the other hand see systems theory as vital to the study of social organizations and providing the major paradigm in research, a view point also promoted by *Allison et al (2004)* and; *Steve and Hopper (2007).* The multi-disciplinary nature of system are attributes that *Banathy (1991) and Kalyanamitra et al (2015)* view as significant benefits to research fraternity.

Despite the global benefits systems theory can deliver to assist mankind formulate solutions to the ever-emerging challenges; the theory has also exhibited some shortfalls. Critics have pointed out some flaws associated with systems theory which include the fact that it does not provide a means of addressing the environment. *Kast and Rosenzweig (1972)* identify four major weakness of the system theory that include difficulties in comparison of artificial objects with living organism, difficulties in applying strict polarization between closed and open systems, delineating specific systems understudy and; specific of the systems boundary and assumptions that some organizations are continued systems. *Whyte et al (2015)* argue that a system lack focus on specific task functions; does not provide detailed focus and doesn't explore impact of interpersonal relationships and loyalty on productivity.

Going by the weightings of the benefits and challenges of the system theory it is evident that the theory has provided a platform within which to provide solutions for complex problems that have continued to bedevil mankind, housing delivery challenges notwithstanding.

2.3 Housing Delivery

International conventions and treaties recognize housing both as human right and a basic need. Across the globe a number of nations have put in place measures through different housing delivery approaches to address the shelter for all initiative. Despite these efforts, one billion people are still living in the slums and other informal settlements in major cities of the world indicating how desperate the situation is *(UN Habitat, 2013c and Noppen, 2012)*. In addition, the majority of households live in settlements that do not meet healthy housing standards set by the World Health Organization (Ranson, 1988). The worst affected are the low and middle level public sector employees who comprise over 90% and whose plight this study has attempted to address.

It is believed that the housing accessibility challenge by this income group is linked to the demand and supply forces in different market economies as well as the affordability power of households. The market dynamics theory as reflected in the works of 'Adam Smith' becomes significant in this study *(Aspromourgo, 2013)*. Further, *Karuppanan (2011)* and *Choguil (2007)* decry that provision of affordable housing in particular to the low and middle level citizens remains a global challenge. The following sections therefore looks at the existing global housing delivery approaches and their challenges. The sections also try to establish the role of affordability and various market economies in housing delivery.

2.3.1 Global Housing Delivery Approaches

Reforms in housing Policy targeting the vulnerable groups are necessary to enable the achievement of the shelter for all objectives. While the developed world realized this challenge much earlier and are now a step ahead, things have not been well with the developing counterpart. Global urbanism triggered through mass exodus of citizens to cities and urban centres in pursuit of livelihoods has presented housing delivery challenges calling for concerted housing policy reforms across the world *(United Nations, 2013)*.

In the United States, the question of lack of affordable housing was recognized in 1948 during the reign of President Harry Truman, a situation that necessitated enacted of a housing policy which has been reviewed severally by successive regimes with the aim of tackling the

problem of insufficient quality affordable housing for the vulnerable groups (*Weiss, 2002).* The approach takes a middle ground scenario between socialist and open market situations. *White House (2013);* and *Quigley and O'Regan (2000)* project a raft of US government's incentives, for example selective tax exemptions / abatements, land subdivisions and zoning bonuses would encourage the private sector to deliver more housing units to the low and middle-income class while increased allocation of funds for public housing, rent subsidy and rent control would increase affordability *(Schwartze, 2006).* Financing public housing for all vulnerable citizens require enormous resources and can pose a huge burden to the developing nations with lower per capita income.

In about 1913, the vast majority of the United Kingdom citizens lived in the privately rented accommodation developed by Philanthropic Associations and limited number owning homes, with the concept of social housing coming in the wake of World War II, a situation that ended with the enacting of the Housing Act, 1980 which provides for an enhanced regulatory framework (*Hull, 2012).* The Act advocated for exceptional protection for public sector employees including civil servants (tenants' / home owners) with provisions for life long security of tenure, the right to tenure, 50% discounted house price, incremental purchase schemes and increased allocations to social housing. Currently, the new United Kingdom Policy on housing is focused on cuts to capital expenditure, restrictions on house benefits awards, changes to social housing and increased localism jeopardizing the previous gains achieved as access to decent affordable housing by the low-income earners become elusive once again. This shift in policy contradicts the right to adequate housing for all as provided for in the European Convention on Human Rights *(Kenna, 2013).*

 Housing delivery in the UK has faced a number of challenges restricting access to quality housing by the low and middle level income earners. *Alakeson (2011)* views costly land, restrictive planning regulations, low profitability, prohibitive taxation system, low supply of mortgage funds as major barriers to housing the low to middle level income earners in the United Kingdom. On the other hand, *Commission for Architecture and Built Environment (2006)* cites cost of poor design as another equally significant constraint in addressing the housing needs of the low and middle level citizens in the UK. Notwithstanding the above constraints, *Cunningham (2013)* argues that design parameters such as functionality, geometric specifications, whole life costs and legislative constraints can positively or negatively impact on housing cost thereby limit access to quality housing. Most of these

challenges were addressed through better economic scale and conducive political atmosphere prevailing in the UK.

Globally, housing delivery approaches have been either market or social welfare based. *Zhang and Hashim (2011)* argue that welfare system is derived from state ownership and control of house rents while the market systems involves individual ownership with house pricing and rents being determined by market forces. It means that the success of any housing approach is dependent on whether it is anchored on social welfare, market or hybrid systems. The housing delivery for the urban low and middle level in China has been riddled with a number of challenges. The unfair distribution of affordable housing as well as constraints associated with formal market demand and supply forces have limited access to quality housing by the low and middle level income earners *(Chow, 2014 and; Zhang and Hashim, 2011).* Lack of adequate access to quality housing due to the above constraints prompted appropriate reforms in the housing sector.

From 1949 to the present, China's urban housing policy has undergone tremendous transformation from welfare system. *Mostafa, Wong and Chui (2002)* contend that the reforms involve a shift from the welfare-based housing with maximum government involvement to socialist market economy where housing provision is a shared responsibility to a freer market policy where housing provision is left to market forces. The hither to applied welfare system led to higher demand of housing units by households through state control on house rents but was un-able to deliver a commensurate supply to satisfy demand. *Wong and Hui (1998) and Boelhouwerm (2010)* believe that the market system has come up with active involvement by private sector in housing supply to address the level of demand but still maintain some level of social housing to cater for the socially disadvantaged citizens. Despite these major reforms including the introduction of the housing provident fund, a number of the majority of the low and middle-income group citizens are still unable to access quality housing *(UN Habitat, 2013a).* The shift from the welfare-based systems to an open based market system though has increased supply but has come up with affordability challenges.

Malaysia just as many other developing countries has faced many hurdles in trying to address the housing needs of her low and middle level income earners. *Shuid (2004)* argues that provision of adequate shelter for all in line with the Istanbul Declaration on Human Settlement is a tall order for the developing nations. Malaysia has severally reformed her

housing policy to be able to address the constraints within the housing delivery approach. According to *Abdullahi and Azziz (2011),* the Malaysian government has created positive incentives that include faster development approvals, relaxed planning standards, faster licensing procedures and conducive regulation which have considerably facilitated more delivery of decent and affordable housing to the vulnerable income groups as a strategy that should be emulated by other developing nations. *Shuid (2010)* on the other hand believes that reforming the existing housing allocation system in Malaysia currently riddled with corrupt practices will go a long way in ensuring that housing units are allocated to the deserving cases. The effects of corrupt vices on housing allocation systems are felt far and wide globally even includes developed nations such as Albania and Slovenia thus requiring concerted efforts to eradicate *(Shutina, 2010 and Nick, 2015).*

Addressing the housing accessibility challenges in Malaysia lies on formulating strategies that are hinged on a policy framework and institutional mechanisms that provide for collaborative efforts between the government and other players including private developers to provide housing that is supply and demand driven *(Isa and Jusan, 2012).* Enlisting the support of the private sector could be achieved through Public Private Partnership (PPP) model that would generate financing from the private sector hence saving public finances for other services *(Ibem, 2010).* The housing delivery approach in Malaysia is therefore hinged on a middle level market system to promote more input of housing units to satisfy demand as well as affordability by the low and middle citizens, a strategy that is proving successful. Despite all these efforts a substantial number of Malaysian citizens cannot access quality housing.

Nigeria with its huge urban population is also facing tremendous shortfall in housing provision, in particular to the low and middle level income earners who experience affordability challenges. *Makinde (2013)* believes that the housing challenge for the low and middle-income earners is attributed to land allocation cost, high mortgage finance, high cost of construction contributing to unaffordable rents, high mortgage rates and in − adequate supply of housing units. Notwithstanding the above challenges, *Makinde (2015)* views the negative impacts of socio-cultural practices on residents' satisfaction key to implementing housing programmes for the lower end income groups as this may lead to failure of housing the targeted households. *Makinde (2013) and Ibem (2010)* argue that the government of Nigeria has tried to overcome some of these challenges through appropriate policy reforms in order to romp in the private sector as a major stake holder to increase output for the

vulnerable groups. This is in addition to infrastructure provision, favourable mortgage regime, improved access to land, faster registration of land and speedier development approval. The above means of addressing housing accessibility challenges notwithstanding, the role of cheap locally available materials and technology in enhancing access to quality housing is a strategy that researchers in the field of housing believe can revolutionize housing delivery for the low and middle level income earners. *Ugochukwu and Chioma (2015)* decries the phenomenal increase of urban population in Nigeria over the recent past culminating to a serious housing accessibility dilemma which they believe could be resolved better through sustainable exploitation of cheap locally available materials and technologies capable of minimizing construction costs by approximately 60%. The substantial cost minimization could be translated into cheaper rent / mortgage rates to enhance access to quality housing by the low and middle level income earners.

Nigeria just as other developing nations has relied on varied financing strategies to implement housing for her low and middle level citizens. *Wapwera, Parsa and Egbu (2011)* argue that 75% of households in low / informal housing sector utilize traditional financing systems that include Age Trade Associations, Men's Revolving Loan Association and Social Club Contributions while 25% have considered modern financing methods such as housing and commercial bank financing. As other more viable financing options surface, Nigeria is not being left behind but to consider moving side by side with globalization trends. *Makinde (2013) and Ibem (2010)* contend that the Nigerian government is now shifting to a public private partnership (PPP) approach necessitated by the dwindling exchequer allocations for public housing. This approach is partly socialist and capitalistic in nature in that the developers in the informal market would get incentives to increase production while some level of subsidy would be provided to increase affordability by the vulnerable groups.

Kenya has also suffered similar challenges as a developing country in addressing the needs of her low and middle level income earners. High urbanization rate, poverty level and continued escalation of housing prices have caused housing provision to the low and middle level earners a daunting task *(Republic of Kenya, 1999a and Economic Survey, 2016). Republic of Kenya (2004b)* cites a number of housing delivery reform initiatives formulated to address the situation that include Sessional Paper No. 5 on Housing Policy, the National Strategy for Shelter to the Year 2000, Sessional Paper No. 3 on Housing policy (2004) and Legal Notice No. 98 on the Establishment of the Civil Servants Scheme Fund (2004). Despite these efforts

over 90% of the low and middle level Kenyan citizens cannot access quality housing *(CAHF, 2012; Noppen, 2012; Arvantis, 2013 and Mbaka, 2013).*

This is partly blamed on housing affordability challenges, corrupt housing allocation system as well as cost / time overruns of housing projects. In addition, *Moko and Olima (2014); Ndungu (2014), UNEP (2012) and Njathi (2011)* contend that high cost of land / infrastructure, expensive building materials / technology, low household income and high rent / mortgage rates are among the significant challenges to access to quality housing. Although, it is believed that cheap alternative materials and technology can enhance affordability of the low and middle level income earners in Kenya, this strategy has not achieved much. *Magutu (2015)* argues that although cheap alternative materials / technologies are economical, durable and safe, their applicability is limited majorly due to lack of standards and sensitization of the general populace. The implication of this constraint is that housing policy makers need to review the existing standards to accommodate the emerging alternative materials / technologies and also build capacity for elaborate sensitization of consumers. Further, housing allocation system as applied in Kenya has been blamed for unfairly leaving out deserving cases at the expense of well-connected elites who are economically endowed *(Mitullah,, 1993). Martini (2012)* and; *Kangethe and Manomano (2014)* cite nepotism, bribery and political influence as some of corrupt vices that facilitate unfair allocation of housing units in completed housing schemes. To address the practice, it is necessary that the housing allocation criteria and committees be reformed to eliminate corrupt practices.

On the other hand, *Mbatha (1986), Njogu (2015) and Rugenyi (2015)* cite changes of project scope, contractors' cash flow problems, delays in decision making, inappropriate planning, inaccurate documentation, use of unqualified or inexperienced consultants / contractors, inadequate funding, delayed payments, contractual disputes, ineffective quality control and lack of effective monitoring tools as the significant causes of failure of the construction processes to be completed within time, budget and quality specifications. It is therefore imperative that these constrains are investigated with a view of instituting appropriate strategies for overcoming them. The next section looks at housing affordability, its concept and measures.

2.3.2 The Concept of Housing Affordability in Housing Delivery

The explicit importance of exploring housing affordability levels in making policy decisions is paramount and cannot be understated where accessibility is critical. It follows that the term

"housing affordability" is accurately defined to clarify its concept to housing development experts. In simple terms, housing affordability implies the ability to afford housing beyond which housing becomes a burden *(Oxford English Dictionary, 2001)*. A survey of literature reveals a lack of a consensus among scholars and housing development experts on the definition of affordability. For instance, *Linneman and Megboluge (1992*) expressed, "talk of housing affordability is at best ambiguous".

The Republic of the *United Kingdom (2012)* refers to affordable housing as the social rented, affordable rented and intermediate housing provided to eligible households whose needs are not met by the market while the *National Association of Realtors (2013)* have adopted an affordability index of 100 above which housing is affordable. According to *Johnson (2006),* affordable housing refers to owner or renter occupied housing that is targeted for low, moderate and middle-income earners whereby income levels are at or below 120% of the area median income. *The US Department of Housing and Urban Development (2012), Family and Community Services (2013), Shwartze and Wilsine (2006) and Disney (2007),* are all in consensus that the generally acceptable definition should be based on 30% of gross household income. Housing is therefore affordable to a household if the gross housing rent or mortgage cost is less than 30% of the gross household income. *Republic of USA (2012)* identifies other costs that go with rent or mortgage as basic utilities, taxation, insurance and legal costs but cautions that rent or mortgage costing more than 30% of the household income is a burden that destabilizes household budgets.

When the rent and mortgage become a burden, household faces consequences that include reducing or foregoing basic needs for instance food, clothing, transport and medical care *(Republic of USA, 2012)*. Knowledge and understanding of the concept of affordability is therefore critical in formulating policies for accessibility to quality housing by the low and middle-income households. Affordability level influences demand for housing by specific income groups which in the long run determine the number of housing units to be delivered or supplied in the market.

Affordable housing model is not only based on income, rent and mortgage levels but should also encompass other parameters linked to quality and construction cost (Noppen, 2012 and Kvarstrom, 2014). Construction cost influences the rent or chargeable while a house whose mortgage or rent is affordable would not necessarily satisfy public health and safety requirement if not constructed within the internationally accepted minimum quality

standards. According to Gichunge (2001) planning and development control is necessary to ensure among other roles that buildings constructed meet basic quality standards. On the other hand, Kabo (2006) and Rapoport (2000) argue that social standing and cultural background should also be considered in affordable housing model given that these norms influence house size and household income which are key determinants of affordable housing.

Based on these arguments, housing policy makers could consider the concept of affordability in a way that incorporates quality, social, cultural and economic norms to deliver housing is affordable. Figure 2.4 is a typical theoretical framework for delivering quality affordable housing that considers affordability, construction cost, social, cultural and quality norms.
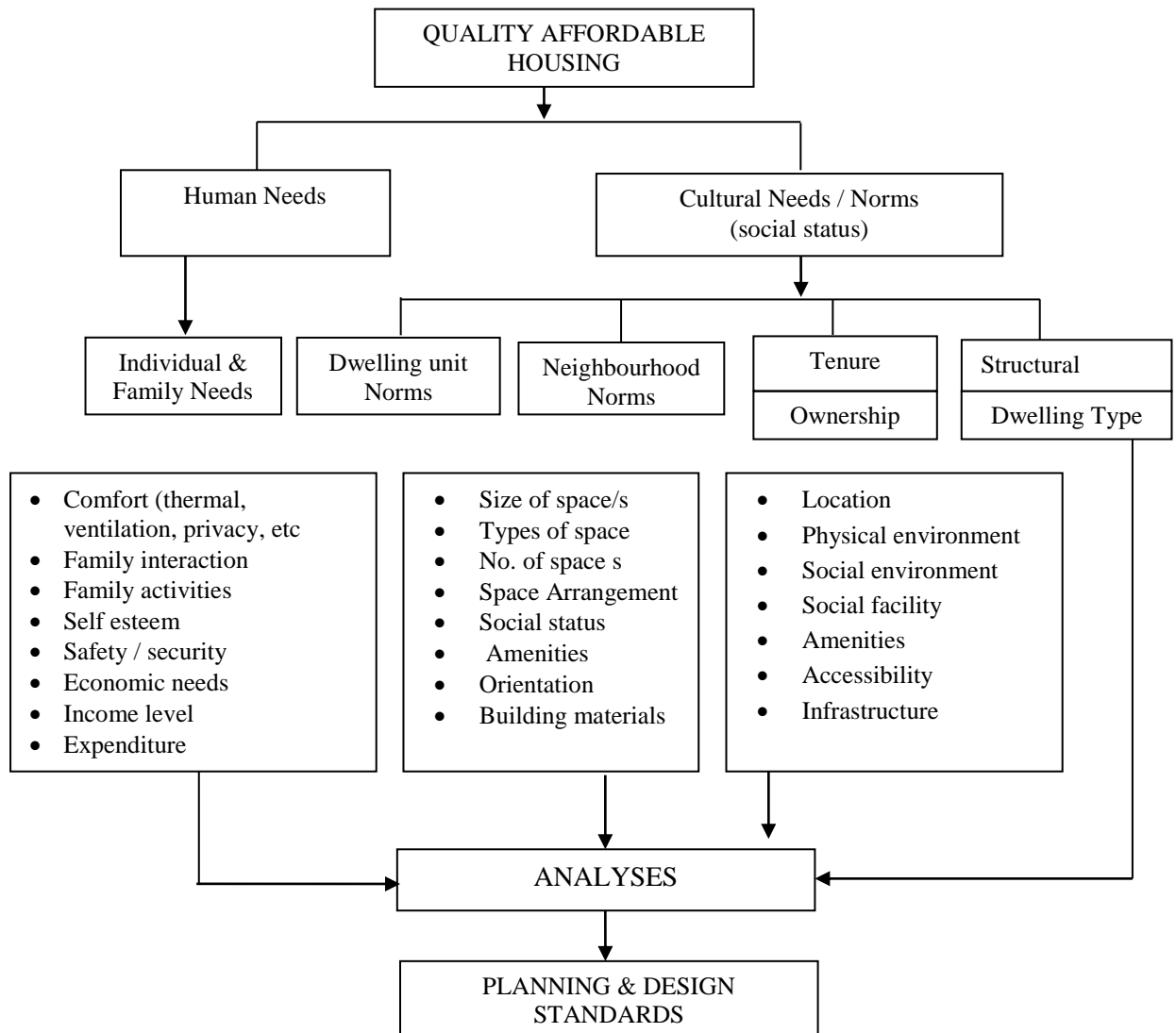
Figure 2. 4: Quality Affordable Housing: Theoretical Framework

Source: *Adapted from Sidi (2011)*

The above model is modified from that formulated by *Sidi (2011).* The model fronted by Sidi has incorporated individual / family needs, tenure norms and structural norms as quality affordable housing parameters determining planning and design standards leaving out other important parameters i.e. dwelling unit norms and neighbourhood norms. The Figure 2.4 shows that quality affordable housing is a function of individual / family needs, dwelling unit norms, neighbourhood norms, tenure norms and structural norms. *McCarrill and Griffin (2012)* identifies cost and affordability of housing as critical factors for owning quality affordable homes implying the significant role affordability plays in house ownership.

In light of the foregoing, it follows that accurate methods of measuring housing affordability are adopted by housing experts and developers. *Ndumbueze (2009)* argues that there is no convergence on a single method of measuring housing affordability agreed by scholars and housing experts. He explains that the methods for measuring affordability are varied and include housing cost, non-housing cost, quality adjusted and affordability mismatch / gap approaches. Depending on the comparative advantages and disadvantages, the most appropriate in specific circumstances would be adopted to guide policy decisions for the implementation of housing programmes for given socio- economic groups including the low and middle level formal sector employees.

The most common measure of housing affordability is however the housing cost approach also known as expenditure - to -income ratio approach. It is simply a measure of the ratio of what a household pays as rent or mortgage against the gross income. Republic of USA *(2012), Family and Community Services (2013), Shwartze and Wilsire (2006); and Disney (2007)* explain that the above measuring model which originated from North America relies on a rule of thumb of no more than 30% of gross household monthly income being committed on housing costs should be considered as appropriate and affordable.

An appropriate measure for housing affordability is necessary to identify income groups who qualify for specific housing type and location or alternatively the measures could be applied in design to generate housing options for various income groups (*Ndumbweze, 2009).* Housing affordability measure is significant in that it influences demand and supply which in turn determines the grade of housing suitable for a particular level of income group.

2.3.3 Capitalist versus Socialist Economies in Housing Delivery

World economies are broadly classified as capitalist or socialist. Capitalistic economy is anchored in a theory that promotes private ownership and competition in a free market economy where prices are influenced by demand and supply forces (*Centre on Capitalism and Society, 2014*). Capitalistic economy provides property rights that are central where there is need to offer collateral on financing arrangements with lending institutions exposing the key role it can play in housing provision market dynamics. *Jaffle (1989)* therefore projects the usefulness of property rights paradigm in the analysis of various arrangements between two or more individuals' systems. Accordingly, any system that confer ownership to state agencies retards economic growth, a view projected by the capitalist theorists *(Centre of Capitalism and Society, 2014).*

The Socialist Marxist leaning proponents on the other hand argue that in a capitalist set up, the gap between the poor and the rich will continue to widen as the poor will continue to remain poor while the rich will continue to grow rich. *Mostafa, Wong and Hui (2002)* explain the origins of the above major challenge as being attributed to the open market system where production and distribution is determined by demand and supply, a situation that is responsible for the inequalities in accessing quality housing by different socio-economic groups. In response to this state of affairs, a number of researchers; *Oxfam America (2013), Makendel (2014), Cohen (1983) and Affordable Housing Institute (2013)*, who are non-proponents of the open market system agree that appropriate subsidies and other building cost minimization measures can address the acute housing accessibility problems faced by the lower end income groups. The capitalist economy ideals are drawn from the works of Adam Smith two centuries ago. This theory partly explains why the majority of the low and middle level employees cannot access quality housing from the open formal market *(Aspromourgo, 2013).*

 The socialistic economy on the other hand confers ownership in a production system by all citizens through state control and therefore does not facilitate competition and open market economy *(Trainer, 2010).* The theory promotes socialism depicted as a centralized state-controlled economy as opposed to the elitist competitive open market system practiced by the proponents of the capitalistic theory. *Kemeny (2013)* argues that the theoretical and conceptual awareness of this thought has gradually permeated research and has since been given considerable impact by the growth of Marxist theory in particular Althusserian

structuralism of the 1970s and Weberian reaction of the 1980s. The theoretical concepts underlying the early works of the socialist theorists have been widely accepted and employed in various fields including affordable housing sector. Increased state intervention through heavy subsidies has now made it possible to deliver affordable quality housing to the vulnerable groups *(Hull, 2012 and Schwartze, 2006).*

Against this background, *Cohen (1983)* laments that the conventional housing delivery approaches have failed to address the plight of millions of citizens in the lower income level prompting the need for a paradigm shift, more in particular in the developing nations including Kenya. Although this theory has within it some inherent challenges, majorly in the adoption by the developing nations with weaker economies that cannot sustain heavy subsidy, it is believed that it will go a long way in solving the challenges arising from the open market systems. This according to *Sivam et al (2001)* will advance a delivery system that will not only provide adequate housing to meet the current housing provision short fall but to also counter the pressure from the rapidly rising global population growth and urbanization witnessed recently in the developing world. This theory draws inspiration from the historical concepts of Karl Marx which underpins the concept of social housing provision that is getting popular in Europe, Australia and United States of America and has been applied to some success in housing the lower middle and low-income groups.

Kenya is among the nations practicing capitalistic economy making it difficult for the vulnerable income groups to access quality housing. This is confirmed by *Chepsiror (2010)* who argues that the private sector driven by profitability will always tend to invest in high income housing development with guaranteed better returns. Having examined the cons and the pros of both theories, it is safe to conclude that a middle ground approach would be more appropriate for the study. Extreme capitalistic ideals will work against affordability by the lower end income group while extreme socialist approach will adopt the level of subsidy that cannot be adequately shouldered by the weak economies of the developing countries. The extreme socialist and capitalistic systems are dying slowly with time towards a hybrid system. Figure 2.5 shows the metamorphosis of the socialist housing provision system *(Wong and Hui, 1998).*

STAGE 1

- Welfare based housing
- Housing sector partially nationalized & managed collectively
- Maximum govt. intervention

REFORM

- Work units allowed to invest in housing
- Sale of public housing

STAGE 2

Sharing housing provision responsibilities among the state, local govt & work units

STAGE 3

- Market oriented housing provision
- Some social housing for socially disadvantaged
- Involvement of private sector

REFORM

- Market oriented housing measures under local govt.
- Some social housing

Figure 2. 5: State Intervention for Housing Provision in Relation to Different Stages in Economic Development in Shanghai, China

Source: Adopted from Wong and Hui (1998)

As shown in Figure 2.5, the socialist system practiced in China for a very long time is metamorphosing towards to a hybrid system which is more open. It remains to seen whether the hybrid approach could address the current housing accessibility challenges by the low and middle-income earners occasioned by the capitalistic economy ideals. The following section reviews the extent to which the global housing delivery approaches have incorporated systems approach ideals to address the housing accessibility challenges by the low and middle level earners.

2.4 Extent of Application of Systems Theory to Housing Delivery

The review of the global housing delivery approaches brings into focus various models based on the prevailing political, social and economic factors. The *World Bank (1989)* confirms that

variables that influence global housing models are political, social and economic in nature. Politics determine the housing policies and legal framework that is most responsible for providing a conducive environment that is associated with incentives, subsidies and regulation. Social status is indicative of household income and determines whether a citizen has the requisite level of affordability to own or rent housing from the formal market. Appropriate economic policies control demand / supply factors, taxation levels, inflation and construction cost. The review of global housing provision systems indicates that both welfare and open market systems are practiced depending on which market economy is prevailing in a particular nation. Figure 2.6 shows a global conceptual framework for the supply of housing through welfare and open market systems.
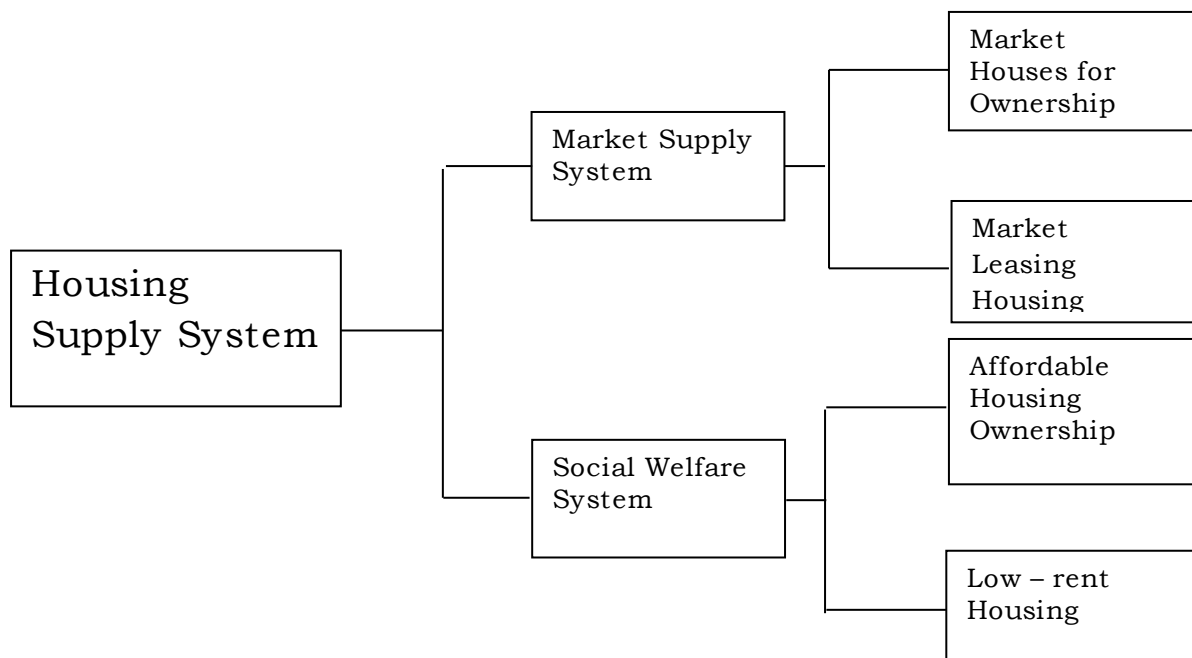
Figure 2. 6: Housing Supply in China

Source: Adopted from Zhang and Hashim (2011)

In order to address housing accessibility challenges by the low and middle level citizens posed by globalization, each individual world nation has come up of ways and means of charting her destiny. The developed nations have formulated approaches that are meant to address housing challenges peculiar to their social, economic and political set ups. The United States of America has focused more on mortgage market reforms, strong legislative framework, faster development approval, development of common infrastructure and various forms of incentives / subsidies to expand the housing accessibility for her low and middle

level income groups (*White House, 2013; Weiss, 2002 and; Quigley and O' Regan, 2000).* The United Kingdom has equally reformed its housing policy severally to focus in social housing where housing is treated as a basic right for all citizens in a bid targeting the low and middle level citizens. *The Republic of the United Kingdom (2009)* and *Alakeson (2011)* argue that the reviewed United Kingdom Policy has targeted the costly land, restrictive planning regulations, prohibitive taxation, dis-incentives to the developers and prohibitive taxation regime to enhance the accessibility by these vulnerable income groups. According to *Mustafa, Wuong and Chui (2002),* China, a socialist nation has been reviewing its housing welfare approach towards a socialist market economy in a bid to increase housing production. While the welfare approach addresses affordability, it depends on huge state funding just like the social housing approach. Figure 2.7 highlights a conceptual framework for delivery of housing in a socialist market situation.
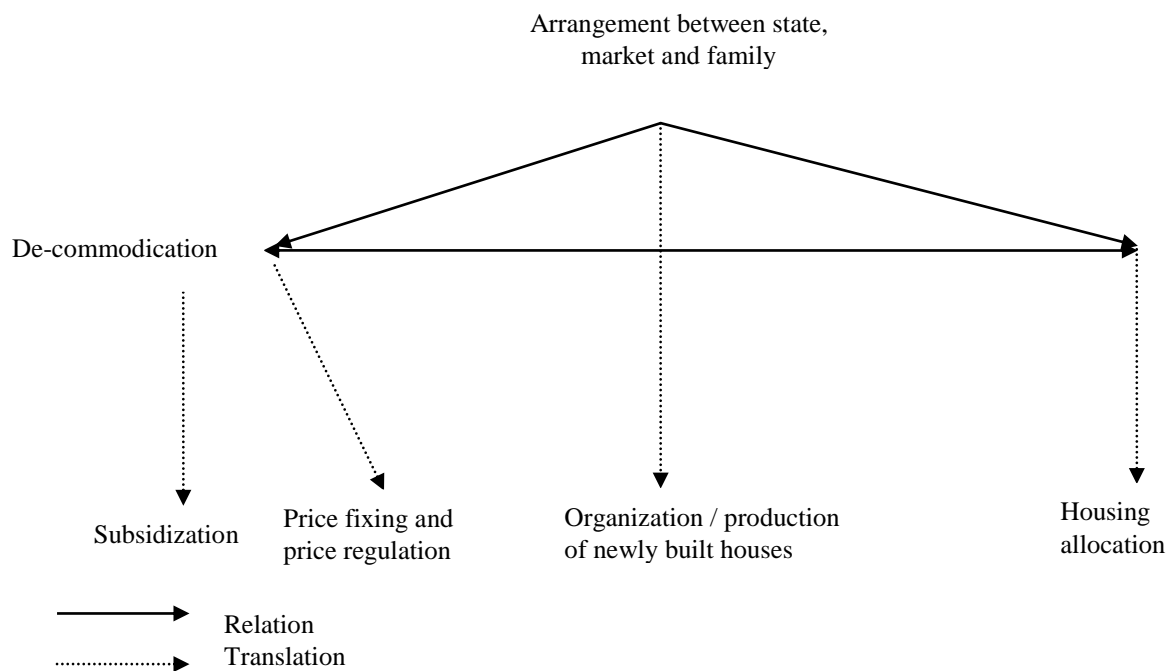
Figure 2. 7: Conceptual Framework for Welfare Housing Delivery Model

Source**:** *Boelhouwer (2010)*

The huge level of state funding required could be part of the reasons why China is reforming its system to a more open market system (*Mustafa, Wuong and Chui,2002).* The US and the UK have also experienced challenges with capitalist system opting to take a middle level ground between capitalist and socialist economy to bring in some level of state control to be able to cater for housing needs of the vulnerable groups *(Wong and Hui, 1998).* As the

extreme socialist and capitalistic systems continue to die, the middle ground approach is getting more and more embraced. The middle ground market approach is depicted as a conceptual model framework in Figure 2.8.
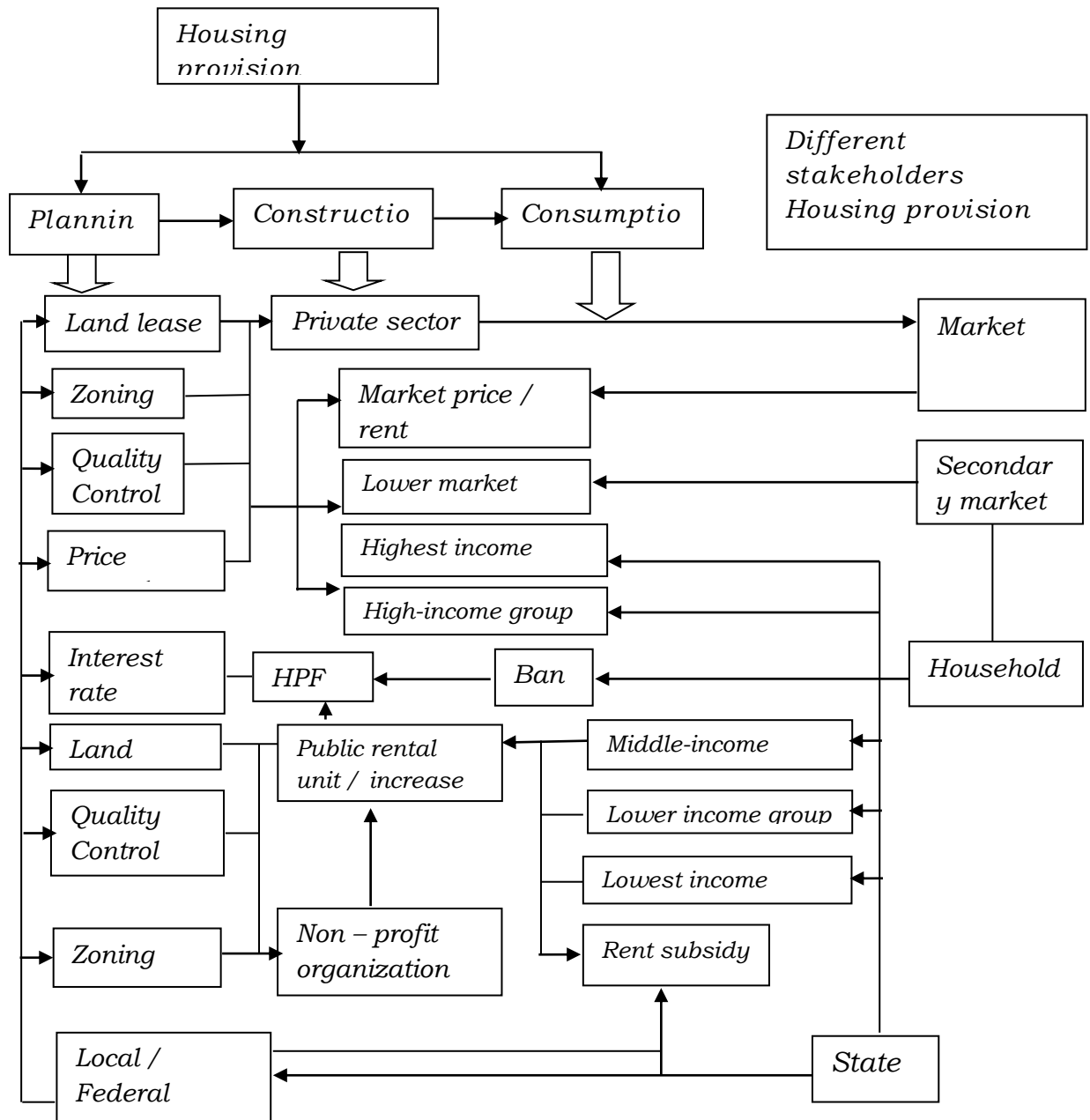
Figure 2. 8: Conceptual Housing Model for Middle Ground Market Approach

Source: *Adapted from Wong and Hui (1998)*

Housing delivery reforms in the developed world therefore focuses on some level of state involvement to enhance accessibility by the vulnerable groups and provision of conducive market environment to the private developers to increase housing production. *(Alakeson, 2011 and Weiss, 2002).* Despite all these efforts, the developed world has not been able to

provide quality housing for all citizen. America, despite being a super power still has a number its citizens living in the ghettos in squalid conditions *(White House, 2013).*

In the developing world, the situation is slightly different due to low state of economy which is not able to support huge subsidies and incentives associated with social or welfare housing. *Shuid (2004), Ibem (2010) and Makinde (2004)* argue that provision of adequate quality housing in the developing world is a tall order if left to market forces to decide and therefore cite more direct government intervention to broaden the level of accessibility to quality housing by the low and middle-income groups. Some schools of thought believe that the accessibility challenges for the low and middle level populace in developing countries could be partly addressed through measures that include infrastructure provision, favourable mortgage regime, improved access to land, faster registration of land, and speedier development approval in addition to use of a public private partnership model *(Makinde, 2013 and Ibem, 2010).* This strategy is believed to increase housing production through private sector financing and also lower construction costs to enhance demand. This view point may not be true since the super powers in the developed world have tried the strategy with little success meaning that the approaches employed have not met the needs of all citizens. For instance, the United States although being a super power is currently facing a cute housing crisis for the lower end income group.

Kenya with a capitalist background has also experienced similar challenges leading to low accessibility from the formal market despite the right to housing having been recognized in the constitution *(Chepsiror, 2010; Noppen, 2012; CAHF, (2012), Republic of Kenya, 2013b; Mbaka, 2013 and Arvantis, 2013).* The challenges, according to *Noppen (2012) CAHF, (2013), AAP Architects (2014) and Hass consult (2012*) include high cost of the conventional building materials / technology, land value, cost of infrastructure provision, restrictive planning conditions, high interest rate, low mortgage market and expensive mortgage rates. House ownership in a capitalistic state will continue being a pipe dream unless access to cheap finance is eventually addressed. The housing finance market framework in a capitalist economy is based on supply and demand factors. On the supply side, the finance market cannot guarantee sufficient finance base to satisfy demand while at the demand side, the mortgage lending rates are too expensive to be afforded by the low and middle level earners *(Baharogin and Lindfield, 2000).* Figure 2.9 shows a typical finance market framework in the capitalist developing countries.

Supply Side		Demand Side		• Non-profit organizations • Co-operatives • Private level • State parastatals

Micro – finance Institutions Commercial Banks SACCOS

Savings

Repayment of Loan Principal + Interest → Housing Provider e.g. Housing association

Housing Finance Institutions ← Households Buying Houses

Purchase

Investment in Financial Instit. Intermediary Bonds Saving Deposits Shares

Mortgage of Loan Term Interest

Asset

Other Saving institutions Other financial institutions Government (Taxpayers)

Collateral

House with Title e.g. Freehold or Condominium

Figure 2. 9: Finance Market in Developing Capitalistic States

Source**:** *Baharogln and Lindfield (2000)*

Despite a number of measurers put in place, we still have some of the citizens in the developing nations living in unsanitary conditions in slums *(Noppen, 2012).* Kenya, one of the developing nations has not been able to implement social housing although it is anchored in the Housing Act partly due to the huge funding required and has recently adopted the Public Private Partnership (PPP) approach to attract private sector financing *(Republic of Kenya, 2013g and Rono, 2015).* The weak economies have necessitated the developing nations to shift from the existing housing approaches to Public Private Partnership model to attract private sector funding as opposed to the developed nations who are well endowed economically *(Ibem, 2010).* We therefore have three broad approaches currently being used globally; the conventional approaches in the developed world and developing world as well as the emerging Public Private Partnership model in developing countries.

Each of the three approaches have been analysed separately to establish whether they represent systems or not and the gaps that need to be filled to upgrade them to systems. *Bertallanfy (1956), Hjorland and Nicolaisen (2005), Amagoh (2008), Baldwin and Saucer (2009), Meles et al (2010)* argue that a system has unique characteristics and components; and is a coherent whole but with parts that are interdependent and interactive amongst themselves and with the immediate environment. *PENN (2014), Heylighen (1998), Thakur (2015), Theoreenoverzicht (2014), Boulding (1956), Salemi (2009) and Kripper (1998)* contend that systems fall in different classifications. The question that needs to be answered is whether these housing delivery approaches have attributes that are aligned to systems characteristics, components and classification. The analysis of the components by the researcher shows that the three approaches are broadly political, social and economic in nature. These approaches have been evaluated under systems attributes that include classification, characteristics and components as summarized in Table 2.1.

Table 2. 1: Evaluation of Housing Approaches in the Systems Theory Context

No.	Systems Attributes	Developed world Approach	Developing world Approach	Public Private Partnership
1.	**Classification**	Physical, deterministic, open, cybernetic	Physical, deterministic, open, cybernetic	Physical, deterministic, open, cybernetic
2.	**Characteristics**	Holistic, goal–directedness, interactive, interdependent, open, has boundary with environment, equilibrium status, feedback mechanism, communication, hierarchical nature	Holistic, goal–directedness, interactive, interdependent, open, has boundary with environment, equilibrium status, feedback mechanism, communication, hierarchical nature	Holistic, goal–directedness, interactive, interdependent, open, has boundary with environment, equilibrium status, feedback mechanism, communication, hierarchical nature
3.	**Components**	**Objects: -** Development cost, national government, contractors, sub-contractors, financial institutions, county / federal governments, mortgage, rent, delivery strategies,	**Objects: -** Development cost, national government, contractors, sub-contractors, financial institutions, county / federal governments, mortgage, rent, delivery strategies,	**Objects: -** Development cost, national government contractors, sub-contractors, financial institutions county / federal government, mortgage, rent delivery strategies,

No.	Systems Attributes	Developed world Approach	Developing world Approach	Public Private Partnership
		subsidies, designs, building code, planning regulations, size of household, floor area of housing units, income of household, national environmental management authority, national construction authority	subsidies, designs, building code, planning regulations, size of household, floor area of housing units, income of household, national environmental management authority, national construction authority	subsidies, designs, building code, planning regulations, size of household, floor area of housing units, income of household, national environmental management authority, national constitution Authority, PPP node, PPP unit, PPP Committee
		External Environment Economy, politics, housing market, manufacturers, social issues	**External Environment** Economy, politics, housing market, manufacturers, social issues	**External Environment** Economy, politics, housing market, manufacturers, social issues
		Input Project funds, land, infrastructure, building materials, technology, labour, equipment, transport, housing delivery methods	**Input** Project funds, land, infrastructure, building materials, technology, labour, equipment, transport, housing delivery methods	**Input** Project funds, land, infrastructure, building materials, technology, labour, equipment, transport, housing delivery methods
		Output (High, middle, low), Apartments, flats, bungalows, maisonettes, condominiums, incremental units	**Output** (High, middle, low), Apartments, flats, bungalows, maisonettes, condominiums, incremental units	**Output** (High, middle, low), Apartments, flats, bungalows, maisonettes, condominiums, incremental units
		Processing Planning, approvals, financing, construction	**Processing** Planning, approvals, financing, construction	**Processing** Planning, approvals, financing, construction
		Feedback • Customer satisfaction,	**Feedback** • Customer satisfaction,	**Feedback** Customer satisfaction, (quality, size, no. of

No.	Systems Attributes	Developed world Approach	Developing world Approach	Public Private Partnership
		(quality, size, no. of units) • Policy intervention • housing policy, statutory regulation	(quality, size, no. of units) • Policy intervention • housing policy, statutory regulation	units) • Policy intervention • Policy intervention. • housing policy, statutory regulation

Source: *Author (2016)*

2.4.1 Housing Systems Classification

The three approaches appear individually in three distinct classifications. Housing approaches can be physical systems since these are concrete operational systems that comprise people, materials, machines, energy and so on *(Meles et al, 2010; Saleemi, 2009 and, Kast and Rosenzweig, 1972)*. The approaches can also be all classified both as deterministic and cybernetic. The deterministic nature of the housing delivery approaches arises out of the fact that the occurrence of housing delivery events can be planned to take place through predetermined procedures while the cybernetic context is due to the fact that housing policy can be reformed to adapt to the constant changing demand and supply factors *(Kast and Rosenbweig, 1972)*. It is therefore explicit to state from the classification context that the three housing delivery approaches can be classified as physical, deterministic and cybernetic in nature.

2.4.2 Housing Systems Characteristics

Housing delivery approaches have characteristic that mirror those of systems. *Hjorland and Nicolaisen (2005), Laszle and Kripper (1998), Amagoh (2008), Baldwin and Sauser (2009); and Banathy (1991)* believe that systems are holistic, goal – directness, interactive, interdependent, open / closed, have a boundary with the environment, communicate within itself and the environment, have feedback mechanisms, return to equilibrium after disturbance and hierarchical in nature, attributes that housing delivery approaches also have. The housing delivery approaches are holistic in nature but have parts which are meant to be

interactive and interdependent to be able to achieve the objective of providing shelter to citizens of different categories of income.

The openness of the housing delivery approaches is an attribute that enables it to interact with its external environment that comprise political, social and economic forces. Housing policy and statutory regulations are control or feedback mechanisms needed to realize number, size and quality of housing units that are delivered to the market. System theorists argue that whenever any political, social or economic challenges occur, the delivery approaches must adjust accordingly either to increase or reduce the number of units delivered to the market. Last but not least the housing delivery approaches can hierarchically appear at district level, county level and national level and is also part of the global level which is supra. Despite these similarities in characteristics with a system, the housing delivery approach is unable to achieve its broad objective of providing housing to all systems due to low synergistic relationships between its parts and in – ability of the feedback mechanism to relay appropriate signals.

2.4.3 Housing Systems Components

Housing delivery approaches comprises several components. *Theorieenoverzicht (2014) and Saleemi (2009)* contend that systems comprise several components that include objects, external environment, input, output, processing and feedback. The housing delivery approaches have components that can be broadly classified under similar groupings. The objects grouping of components consists of national government, county / federal governments, contractors, subcontractors, suppliers, mortgage, rent, delivery strategies, subsidies, designs, building code, planning regulations, size of household, floor area of housing units, income of households, development cost, National Environmental Management Authority and National Construction Authority. Figure 2.11 shows the major components of housing delivery from Mugambe (2009)'s view point. The listing of components by the above author is however incomplete as it leaves out some significant components of the input, output, throughput, external environment and feedback rendering it an incomplete system.

COMPONENTS OF A HOUSING DELIVERY SYSTEM

AUTHORISA-TIONS	LAND	INFRA-STRUCTURE MUNICIPAL SERVICES	PUBLIC FACILITIES COMMUNITY SERVICES	LABOUR FORCE	BUILDING MATERIALS	FINANCING
• Land sub-division permit • Residency/ Occupancy permit • Building permit • Planning / Zoning permission • Concession • etc...	• PUBLIC • PRIVATE • Freehold • Leasehold • Waqf • Cooperative • Customary • etc...	• Roads • Water supply • Sewerage • Electricity • Drainage • Gas • Garbage collection • etc...	• Schools • Clinics • Mosque / church • Police • Post office • Playgrounds • Open spaces • Civic center • Cultural center • etc...	Intellectual (architect) Manual (builders)	• Wood • Concrete • Cement • Sand • Steel • Corrugated iron • Adobe • etc...	• DEBT • EQUITY • Land acquisition loan • Construction loan • Enterprise loan • Mortgage loan • Public subsidy • etc...

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Figure 2. 10: The Housing Delivery System Components

Source: *Mugambe (2009)*

Based on the above arguments, the global housing approaches may be systems from the view point of classifications, characteristics and components. The inadequate supply of adequate and quality housing units to the low and middle level income earners may be attributed to either or / both failure to the housing delivery components to interact synergistically or / and the level of components are not inadequate *(Meles et al., 2010).* For instance, there might be no strong political will, effective housing policy and adequate financing. It is noted that while the right to adequate and quality housing is recognized both locally and globally, low and middle level earners in Kenya and other developing countries continue to face quality housing accessibility challenges partly due to financial constraints and the political goodwill *(United Nations Human Rights, 1948 and Republic of Kenya, 2010).* Public exchequer allocations to the housing sector have continued to dwindle while the Draft Revised Building Code has remained unlegislated due to lack of political goodwill. In addition, the Draft National Housing Bill (2011) was legislated 6 years later in 2017 for the same reason.

The approach in the developed world seems to be more successful than those from the developing counter parts because of high level of affordability by their citizens and political goodwill responsible for reforming policies to provide for conducive climate, better economic performance necessary for financing high subsidy and social housing programmes for vulnerable groups *(Weiss, 2002 and Alakeson, 2011).* The developing world facing financial constraints could therefore reform their political systems to provide a conducive atmosphere

to promote incentives to the private sector housing developers but financing capacity remains a tall order. A proactive arrangement could however involve a shift from direct financing of public housing to a Public Private Partnership (PPP) model to attract private sector financing. Figure 2.7 shows a typical PPP model framework for delivery of housing in developing nations.
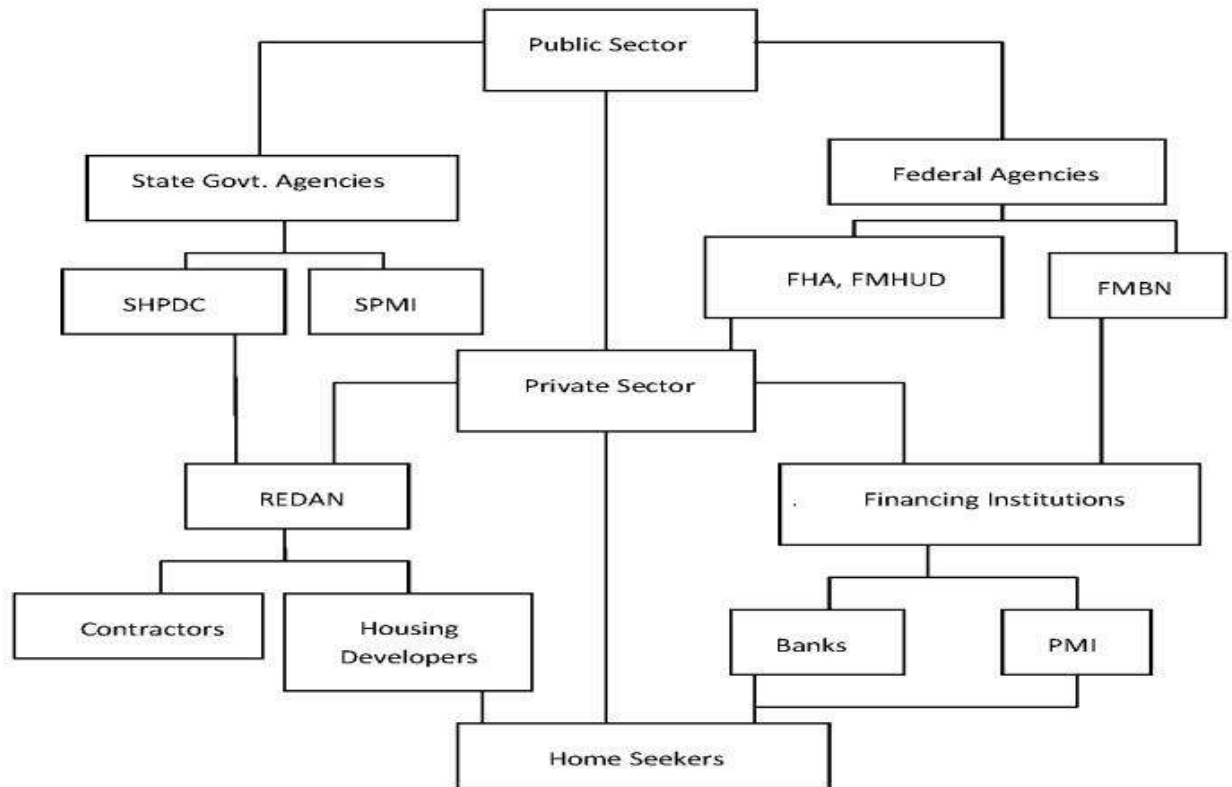
Figure 2. 11: Typical Institutional Framework for PPP Housing Delivery Approach in the Developing Countries

Source**:** *Ibem (2010)*

2.5 Theoretical Systems Framework for the Improvement of Accessibility to Quality

Housing for the Low and Middle Level Income Earners

The literature reveals that there is no single housing delivery approach that has been able to fully address the needs of the low and middle level income earners raising a research gap to exploit. It classifies broadly the various global housing delivery approaches as those from the developed world and developing world in addition to the emerging Public Private Partnership model which is slowly being adopted by the developing world to implement public housing programmes *(Ibem, 2010; Shuid, 2004 and Republic of Kenya, 2013b).*

The developed world housing delivery models have proved more successful than those from the developing world due to better economic performance necessary for the financing of heavy subsidy and numerous incentives. The USA and UK have relied on heavy subsidies to facilitate affordability while at the same time provide various incentives to the private developers to boost housing production *(White House, 2013 and Shwartze, 2006).* This is a way of controlling the formal market to enable vulnerable groups access quality housing. The capitalistic and socialist economic blocks have tried to reach a middle ground so as to be able to encourage both production and affordability *(Wuong and Hui, 1998).* China, UK and USA have reformed their approaches in line with the hybrid market model system *(Boelhouwer, 2010; Hull, 2012 and Schwartze, 2006).*

The levels of subsidy and incentives provided by the developed world cannot be accommodated by the weak economies from the developing world like Malaysia, Nigeria and Kenya who have instead opted to adopt the emerging Public Private Partnership for public housing in order to attract financing from the private sector *(Ibem, 2010 and Makinde, 2013).* The housing formal markets in the developing nations are also capitalistic in nature where private developers most concerned with profitability have got no interest in developing housing for the lower end income earners *(Chepsiror, 2010).*

The review further identified various variables that influence accessibility to quality housing by the low and middle level earners *(World Bank, 1989, 2003; UN Habitat, 2013b, 2013c, 2013d; Cohen, 1983; Hui et al, 1998 and Ibem, 2010).* The variables include development control, design standards, household income, development cost, cost of infrastructure, size of dwelling units, rent, mortgage rate, delivery strategy, housing policy, availability of mortgage and security of tenure. It classifies these variables as political, economic and social in nature and conclude further that they have interactive and interdependency qualities close to systems components. Similarly, from the researcher's evaluation of the housing delivery approaches, the variables also have attributes which almost march systems characteristics.

The literature review has confirmed that the housing delivery approaches in Kenya and other developing nations are systems which have broken down due to the inadequacy of the various components and the failure of them to interact in a synergistical manner as well as the in-effective feedback mechanism *(Rapoport, 2001).* The literature confirmed that the housing delivery components are political, social and economic in nature and are broadly classified as inputs, processing, outputs, external environment and feedback in line with systems theory dynamics (PENN, 2014; Heylighen, 1998; Thakur, 2015; Theoreenoverzicht, 2014; Boulding

1956; Saleemi, 2009 and Kripper (1998). Chepsiror (2010), Noppen (2012), CAHF (2012), Republic of Kenya (2013b), Mbaka (2013) and Arvantis (2013) point out various variables linked to housing delivery approaches in Kenya that influence housing accessibility that can further be grouped in a system's architecture as highlighted in Table 2.2. Table 2.2 shows how the housing delivery components, sub-components and variables are embodied in a systems framework.

Table 2. 2: Summary of Major Components

Input	Throughput	Output	External Environ	Feedback
• Housing actors • Consumables • Delivery methods	• Planning • Construction process • Financing	• Market Housing • Social Housing • Customer Satisfaction	• Economic • Political • Social • Globalis	• Monitoring/ Control • Policy interv • Policy reform

Source: Author (2016)

In line with open system characteristics, the components of a system are interdependent and interact within themselves and the external environment in order to function and continue existing. According to Aristotle, a renown Greek philosopher, the interaction of the components makes the whole bigger than the components, and any disorder in the interactive processes implies that the whole ceases to exist *(Bertalanffy, 1968).* This explains the failure of the existing housing delivery components.

The systems components are meant to interact synergistically within themselves and the external environment to deliver adequate house types for the relevant income groups within acceptable quality standards. Inadequate and low-quality housing in the housing market would trigger a feedback mechanism to facilitate appropriate policy intervention to make the necessary adjustments to the housing inputs and processes for the achievement of the new targets or objectives. The above arguments indicate that housing is a system that is partially functional. It was therefore necessary to make enquiries on shortfalls on the current housing delivery systems with a view of making it a working system that can deliver adequate and quality housing to the low and middle level public sector employees. Figure 2.8 shows a theoretical conceptual framework indicating how the various components interact and relate to one another in a perfect systems mechanism.
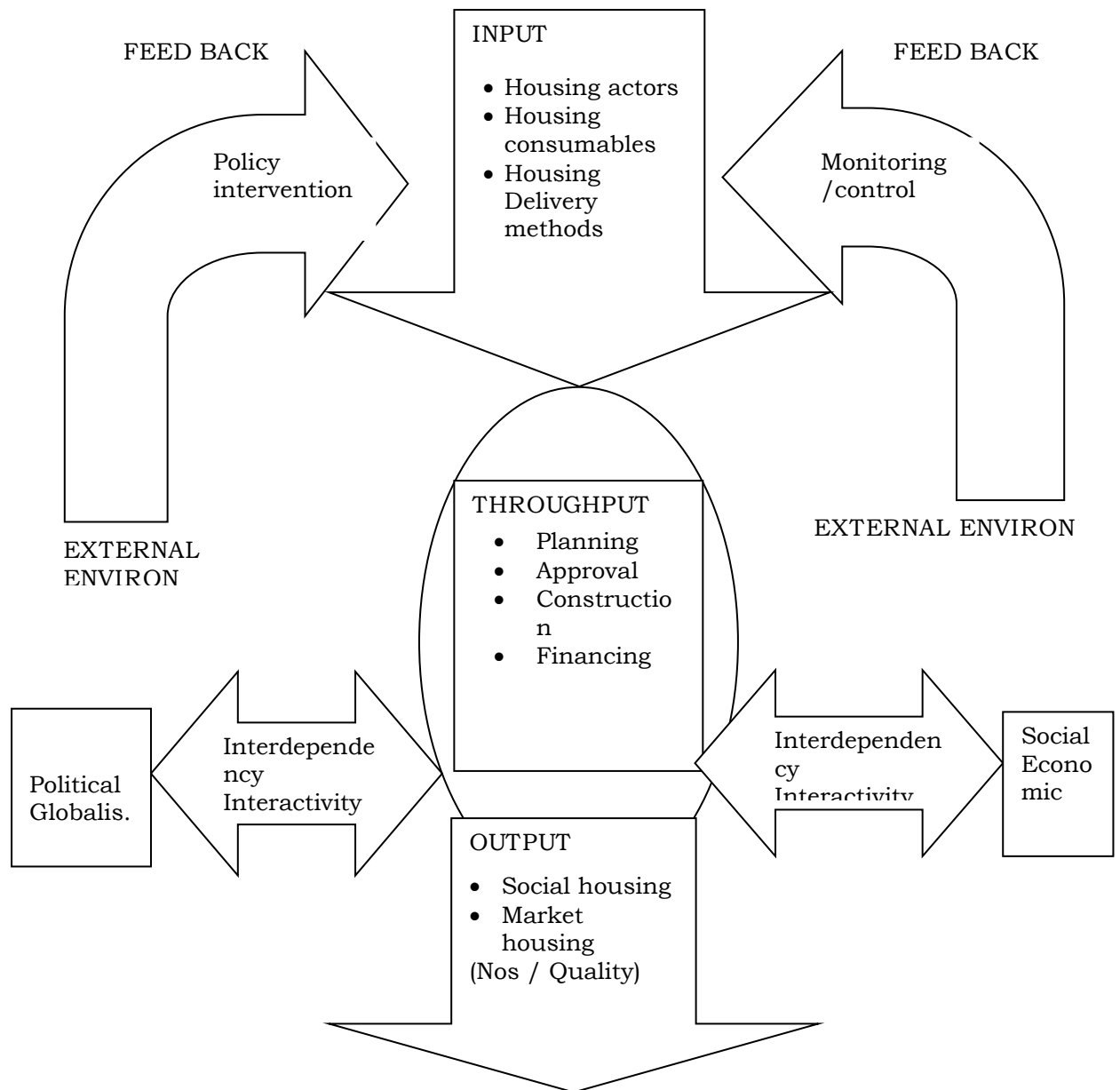
Figure 2. 12: Systems Conceptual Framework for the Delivery of Housing for the Low and Middle Level Formal Sector Employees

Source**:** *Author (2015*)

The study therefore adopted a fully operational systems model where components exist as input, throughput, external environment, feedback and output as well as provided in adequate quantities, are interdependent and able to interact synergistically *(Saleemi, 2009 and Theorieenoverzicht, 2014).* The variables included in the above the systems frame work were operationalized, details of which are captured in Appendix 4. Appendix 4 formed the basis of interrogations of issues underlying housing accessibility dilemma for the low and middle level public sector employees with a view of improving access to quality housing by this

income group in the context of sytems. This was necessary to address the purpose and objectives of the enquiry. The literature review confirms that the majority of the low and middle level cannot access quality housing in the formal market in Kenya. It has also established that there is a research gap to be exploited as no known study has employed a systems approach to address the housing needs of the low and middle level. The next chapter discusses the analysis of secondary data obtained from purposively selected organizations that are involved in housing provision for the low and middle level income earners. It assesses the existing housing delivery approach, its successes and failures including identification of its components.

CHAPTER THREE

3.0 HOUSING DELIVERY APPROACHES FOR THE LOW AND MIDDLE LEVEL PUBLIC SECTOR EMPLOYEES IN KENYA

3.1 Introduction

This chapter is based on secondary data obtained from records of various public and private organizations which were purposively selected for their relevance in the enquiry and willingness to allow data collection. The public institutions visited included Directorate of Housing, Central Bank of Kenya, Nairobi County Government, Kenya National Bureau of Statistics and National Housing Corporation while the private institutions were Hassconsult, Cytonn Real Estate and Shelter Afrique. Housing Finance, World Bank and UN Habitat did not respond even though having been notified. Some data were obtained from various internet sources. This chapter has examined the existing housing delivery approaches in the provision of quality housing for the low and middle-income level public sector employees. It has further identified the constraints the housing delivery approach has faced including the delivery components from which the constraints have arisen. The identified housing delivery components have been grouped and structured in a systems architecture.

3.2 Historical Context of Housing Delivery Approaches in Kenya

In Kenya, the housing accessibility dilemma for the low and middle level income earners can be traced to the colonial era administration. Further, *NACHU (2017) and National Housing Corporation (2012)* argue that the colonialists enacted laws that prohibited native Africans from housing located in urban centres which were specifically meant for the white settlers and it was only after 1940 that the native Africans were accepted to occupy housing in urban centres in secluded areas without basic social and infrastructural services. Accordingly, at independence, there was already housing accessibility crisis with 70% of the African urban households occupying single rooms out of which 53% were inhabited by three or more individuals thereby leading to overcrowding *(Obudho and Ojwang, 2000)*. The African population accepted in urban centres were intended to provide cheap labour for the white settlers. This seclusion is responsible for the current zoning of residential areas in the City of Nairobi (*National Housing Corporation, 2012 and; Obudho and Aduwo, 1989).*

Later the government encouraged the private sector to build houses and founded the National Housing Corporation (NHC) in 1967 taking over from the Central Housing Board formed in 1953 by the colonial government *(National Housing Corporation, 2018)*. Prior to the establishment of the NHC, the Central Housing Board had delivered 10,910 single roomed rental housing in major urban areas such as Nairobi and Mombasa, a portion of which targeted public sector employees but efforts could not adequately satisfy demand *(Choka, 1987)*. The establishment of the NHC through the National Housing Act was meant to supplement the efforts of the private developers who in this period were less active. The population by then was just 9million against a housing demand of 45,000 in the entire country (*National Housing Corporation, 2012)*.

In the 1970's large scale site and service housing schemes financed through various donor agencies such as International Monetary Fund (IMF), World Bank and United States of Aid for International Development (USAID) were implemented by the government (Mitullah, 1993 and; Obudho and Ojwang, 2000). During this period, the NHC in collaboration with the local authorities also initiated a number of housing schemes through delivery methods such as site and service, tenant purchase, rental and mortgage housing schemes (*(National Housing Corporation, 2012)*. These initiatives were partly supported by Housing Finance Company of Kenya (HFCK), a premier mortgage institution that came into being in 1965 through the conversion of the First Permanent East African Limited and was mandated to provide funding for the development of middle and high-income housing *(Housing Company Kenya, 2018)*.

 On the other hand, Housing Research Development Unit (HRDU) was founded around the same time to investigate cheap local materials that would spur the growth of low income housing but faced challenges of low scale, low dissemination and lack of financial / political support *(Obudho and Ojwang, 2000, Syyaga, 1993 and Noppen, 2012)*. The number of housing units delivered through these initiatives were disappointingly low compared to the demand and thus accelerating the growth of slums and other informal settlements. *Republic of Kenya (2013a) and; Obudho and Ojwang (2000)* cite a number of slums upgrading programmes put in place by the government but slums and other informal settlements continued to grow.

Upon attaining self-rule, Kenyan Government initially focussed more on institutional and pool rental housing for public servants while private sector employers and local authorities followed suite at a later stage *(Ogutu, 1978)*. Public servants consist of Civil Servants,

employees of Commissions and Independent Offices and; employees of State Corporations and Parastatals formed through Acts of Parliament *(Republic of Kenya, 2010)*. The housing units delivered during this period were meant to motivate employees for enhanced productivity setting stage for employer assisted housing. *Henderson (1987)* contends that there is a direct relationship between individual physical environment and psychological perspective implying the central role housing can play in motivating employees such public servants in the delivery of government programmes. This view point is also held by *United Nations (1948)* that recognized housing as a basic right alongside food, clothing and healthcare. Employers in Kenya including public service have a legal duty of providing appropriate housing for their employees. Accordingly, section 31 of the Employment Act in Kenya stipulates that an employer should provide housing to its employees in lieu of which they should prioritize housing allowance or a consolidated salary *(Corporate Staffing Services, 2018)*.

In 1963, only 44% of public sector employees lived in public housing forcing the government to devise other strategies of increasing housing stock through setting up review organs at various dates that included Ndegwa, Waruhiu and Ramtu Commissions whose mandate was to review remuneration and strategy for provision of housing for public servants *(Chako, 1987)*. Chako (1987) observes that these reviews similarly undertaken by the Kenya Railways did not achieve much as the public housing delivered remained inadequate, rental housing from the formal market were too expensive and owner occupier package could not service high mortgage rates.

Kenya enacted the Legal Notice No.98 of 2004 on Civil Servants Housing Fund to empower more civil servants to acquire quality housing but the dilemma of housing accessibility challenges continued *(Republic of Kenya, 2004)*. This initiative was however discriminative as it did not consider state employees from other public sector organizations such as state corporations and parastatals. The existing housing accessibility crisis is evidenced by the fact that only 2083 out of 32,099 civil servants in Nairobi representing 6.5% have benefitted from the scheme fund since its inception in 2004 *(Republic of Kenya, 2015 and Republic of Kenya, 2013a)*. This is despite the enactment of National Housing Policy of 2004 and the newly legislated Housing Policy of 2017. Given that the various strategies employed by the government have failed to address the plight of the low and middle level public sector employees in Kenya, it was therefore imperative that a new appropriate housing provision approach be investigated.

3.3 Housing Delivery Status for the Low and Middle Level Income Earners

One of the major challenges that has impaired access to quality housing by all is the high population growth rate which is not in tandem with the growth of housing sector, with the low and medium grade housing stock worst affected. For instance, at independence in the 1963, the Kenyan population was 7 million which over the years has grown to 33 million, while dwelling units have not been constructed at the same pace *(Joint Centre for Housing, 2005).*

3.3.1 Population Growth, Urbanization and Housing Accessibility

According to the last Population and housing census conducted in 1999, the population of Kenya had grown to 38.6 million compared to the total national housing stock which was 10.4 million out of which, 19.5% translating to 2.03 million were in urban centres while the rest constituted rural housing *(Republic of Kenya, 1999a).* According to Kenya National Housing Survey 2012/2013, urbanization increased from19% in 1999 to 32% in 2009 and is projected to reach 50% mark by 2030. This level of urbanization certainly poses a dilemma to the government as it struggles to provide adequate housing for the low and middle-income employees who majorly reside in urban set ups. The population growth rate is faster than the rate of construction of dwellings. The Economic Survey 2016 indicates an increase of rate of construction of dwellings from 3.5% in 2011 to 14.7% in 2012. From 2012, there has however been consistent decline of construction of dwellings over the years to a low level of 9.7% in 2015 causing worries to policy makers. Figure 3.1 shows the growth rate of dwellings between 2011 and 2015.
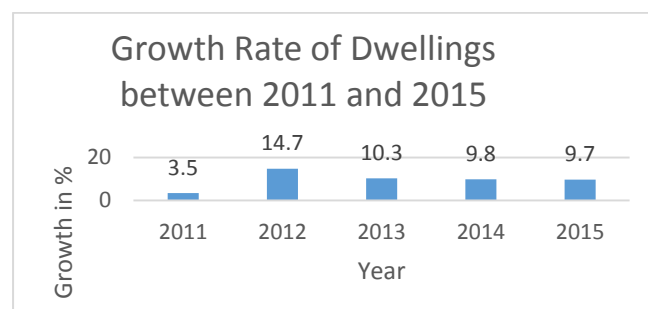
Figure 3. 1: Growth Rate of Dwellings between 2011 and 2015

Source: *Economic Survey (2016)*

This scenario is also globally reflected meaning that negative effect of population growth and urbanization access on growth rate of dwellings is a worldwide phenomenon. For instance,

the review of literature reveals that in 2008, 3.3 billion representing over half of the world population lived in cities out of which 1 billion lacked quality housing and were therefore living in slums and other squatter settlements in squalid un-sanitary conditions *(United Nations habitat, 2013).* The import of this state of affairs is that there is a huge proportion of global population that cannot access quality housing calling for the review of the existing housing policies. While the developed world including the US and UK have successively reviewed their housing policies severally and are better off, the situation is not the same in the developing world and in particular Kenya where access to quality is extremely low *(Arvantis, 2013).*

3.3.2 Extent of Accessibility to Quality Housing

Despite the recognition of the right to adequate housing by the Kenyan government through various statutes in pursuit of achieving the globally accepted standards, access to quality housing has since remained elusive *(Republic of Kenya, 2014).* Article 1b of the Kenyan constitution recognize housing as a social right while the Kenyan's development blue print, Vision 2030 emphasizes on the need for adequately and decently housed nation *(Republic of Kenya, 2008).* Various policy instruments have been enacted since Kenya attained her independence but these efforts have not achieved much in addressing the plight of the low and middle-income earners due to a number of challenges. For instance, the annual need in urban housing stands at 200,000 while the supply is only a paltry 30,000 with the implication of a serious housing deficit *(Republic of Kenya, 2017).*

In Kenya, housing provision is both undertaken through government and private sector initiatives. The private sector motivated by profitability has shied away in investing in lower end housing ventures associated with low returns and high risk; and thus, concentrating on higher end housing *(Chepsiror, 2010).* The housing provision crisis for the lower end income group will continue unless serious incentives to romp in the private sector are put in place. According to the Economic Survey for the year 1999, there were 5.5 million employees working in both formal and informal sectors based in various urban centres in Kenya indicating a serious housing shortfall *(Republic of Kenya, 1999b).* The low and middle level employees, the majority of whom cannot access quality housing comprise over 90% of the total workforce in Kenya *(Economic Survey, 2013e). Okonkwo (1996), Noppen (2012), Centre for Affordable Finance in Africa (2012) and Republic of Kenya (2013b)* cite inadequate supply, unaffordable house mortgage / rent, undeveloped housing finance sector,

high housing development cost, in-adequate serviced land, and lack of appropriate housing policy as some of the drawbacks that have hindered access to quality housing by the low and middle level employees in Kenya. All these factors have made the cost of the existing housing stock beyond the reach of many necessitating the need to review the existing low and middle grade housing delivery system.

The government of Kenya is the largest employer justifying the need to target public sector employees for this study. Every employer in Kenya is encouraged to facilitate employees to acquire housing *(Corporate Staffing Services, 2018)*. Until this requirement is made mandatory, adequate housing provision for the low / middle level employees will continue to remain a pipe dream for quite a while. The Sessional Paper No. 3 of 2004 on National Housing Policy advocates for decent and affordable housing for all including public servants *(Republic of Kenya, 2004a)*.

The public service in Kenya consists of civil servants and other public servants who provide the workforce necessary for implementation of programmes and policies formulated by the government *(Republic of Kenya, 2010)*. In fulfilling the above objective, it is imperative that the civil service is well motivated to be able to deliver services effectively. One of the earlier strategies the government adopted to motivate its workforce was provision of public housing *(Republic of Kenya, 2013a)*. With the ever-increasing workforce, the government has not been able to satisfy the housing demand calling for a change in the delivery system *(Muturi, 2013)*. The *Draft National Housing Policy (2011)* puts the current national housing deficit at 2,250,000 consisting of 750,000 units in urban areas and 1,500,000 in rural areas. Vision 2030, the Kenya government's development blue print paints a gloomy picture by indicating that only 23% of this demand is being met *(Republic of Kenya, 2008)*.

To date, the government through the National Housing Corporation (NHC) and Civil Servants Housing Department has delivered only 93,000 units since the colonial era. The NHC replaced the colonial era Central Housing Board in 1967 through the enactment of Housing Act Cap 117 that conferred it the principal mandate of implementing housing policies and programmes in the provision of affordable housing for the low and middle level Kenyans and has to date financed housing schemes through various delivery methods at Kshs 5.6 billion *(Barnes, 2016)*. The NHC has partnered with the defunct local authorities, now counties and other stakeholders to deliver approximately 50,000 housing units in various parts of the country since its establishment in 1967 through the following delivery methods

shown in Figure 3.2. The delivery methods have however not been able to deliver adequate housing stock in the market to satisfy demand due to certain constraints *(National Housing Corporation, 2012).*
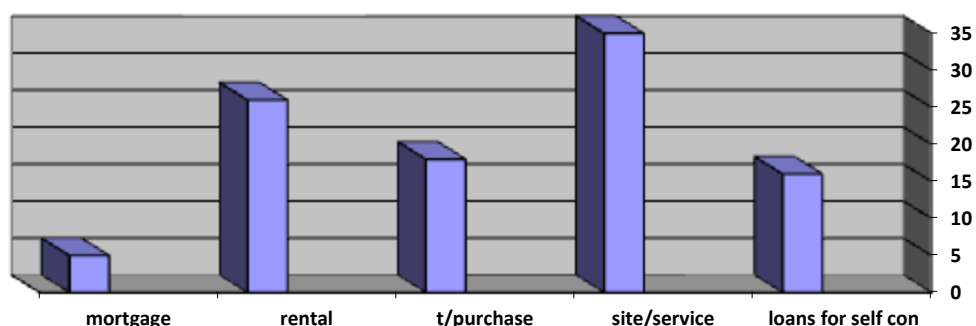
Figure 3. 2: Housing Delivery Methods by Proportion

Source: *Adapted from NHC (2012)*

The number of projects implemented on annual basis has been declining majorly due to financial constraints from the public exchequer. For instance, 45 projects were implemented in 2015 compared to 243 in 2014 *(National Housing Corporation, 2015).* In addition, the corporation which is the government's implementing agency for housing delivery programmes had advanced loans to the counties in 2014/15 financial year totalling Kshs 14.9 billion as reflected in Table 3.1.

Table 3. 1: Loan Disbursements to Various Counties in 2014/15 Financial Year

Item No.	Name of County	Loan in Kshs Billion
1	Nyeri	2.3
2	Kiambu	4.8
3	Embu	1.5
4	Elgeyo Marakwet	1.25
5	Muranga	0.48
6	Kakamega	0.91
7	Trans Nzoia	0.47
8	Machakos	2.5
Total		14.91

Source: *National Housing Corporation (2015)*

Other than National Housing Corporation, there are number of Non-Governmental Organizations (NGOs) that have also participated in the implementation of the low and middle level housing programmes. The list of the NGOs as highlighted by *Noppen (2012)* and corroborated by senior officials of the Directorate of Housing include; Jamii Bora, Makao Mashinani Trust, Shelter Afrique, International Housing Solutions, UN-Habitat, World Bank, Hydro-forms South Africa, Habitat for Humanity, Centre for Affordable Housing in Africa, Housing Finance-Kenya, Innovations housing, National Housing Co-operative Union (NACHU) and Karibu Homes. These organizations have either contributed housing finance or/and technical expertise in the implementation of low and middle level housing schemes but the impact has not been felt much since 90% of the low and middle level have not been able to access quality housing due to low supply and affordability challenges *(Republic of Kenya, 2013a).* For instance, according to *Kimanthi (2018) and Shelter Afrique (2013),* Shelter Afrique, a partnership of 44 African governments, African Development Bank and African Reinsurance company has operated in Kenya for 35 years and has only contributed slightly above 300 housing units. On the other hand, Habitat for Humanity, a global non-profit housing organization in over 70 countries commenced operations in Kenya in 1982 but have only partnered with about 20,000 low income families to provide affordable housing (*Habitat for Humanity, 2016).*

Civil service is major employer in Kenya as well as in the public sector with 90% of the work force designated as low and middle for which this study has focused on *(Economic Survey, 2013e).* According to government records, the civil service workforce stands at 217,069 while public housing in the entire country is only 43,000 indicating approximately 80% shortfall in housing provision *(Republic of Kenya, 2013a).* The net effect of the delivered housing units in comparison to the huge demand is insignificant prompting a desire to review the existing housing delivery strategy. The huge shortfall necessitated the government to establish a civil servants housing scheme fund through a Gazette Supplement No. 58 of 2004 from which only 2,830 civil servants have benefitted as shown in Table 3.2.

Table 3. 2: Summary of Total Number of Beneficiaries

Item No.	Category	No. of Benef.
1.	Non-Strategic Government Houses	1,082
2.	Mortgage loans through Kenya Commercial Bank (KCB)	558
3.	Newly constructed houses in Nairobi sold to civil servants	747
4.	Acquisition of NHC/NSSF houses	32
5.	Leasing of rental housing units in Ngara, Shauri Moyo and Jogoo Road	411
	TOTAL	**2,830**

Source: Directorate of Housing (2013)

Out of this number, 1026 are low and middle level income earners *(Republic of Kenya, 2013a)*. There is now more focus on constructing new housing units as a new strategy in meeting the existing supply demand gap. Table 3.3 shows housing units in various schemes constructed since the Civil Scheme Fund came into place in 2004.

Table 3. 3: Completed Housing Projects as at March, 2013

Item No.	Project Name	Project Description	Grade of Units	No. of Units	Completion Date	Contract Sum (Kshs)
1.	Jogoo Road Phase II Infill	2 bed roomed units in 3 blocks	Low Grade	50	22/01/2008	56,800,000
2.	Gichugu Road Plot No. 2950	4 & 3 bed roomed units in 2 blocks	High Grade	16	19/02/2008	43,382,200
3.	Gichugu Road Plot No. 3545	4 bed roomed units in 2 blocks	High Grade	10	15/10/2008	28,942,200
4.	Kilimani Phase I	4 bed roomed units in 2 blocks	High Grade	30	02/12/2008	111,909,101
5.	Kilimani Phase II	4 bed roomed Units in 2 blocks	High Grade	20	22/04/2010	132,909,101
6.	Nyeri Road Kileleshwa	Four bed roomed units in 4 blocks	High Grade	40	01/04/2011	260,405.101
7.	Shauri Moyo	1 bed roomed	Low	320	08/10/2012	470,925,000

Item No.	Project Name	Project Description	Grade of Units	No. of Units	Completion Date	Contract Sum (Kshs)
		units in 5 blocks	Grade			
8.	Ngara Phase I	2 & 3 bed roomed units in 5 blocks	Low/ Middle Grade	130	08/10/2012	412,062,101
9.	Ngara Phase II	2 & 3 bed roomed units in 16 blocks	Low/ Middle Grade	526	08/10/2012	1,619,909,101
		TOTAL		**1142**		**3,137,243,905**

Source: Adapted from Housing Directorate (2013)

From Table 3.3, it can be deduced that 1142 new housing units have been constructed since 2004 out of which 1016 are low/middle grade houses representing 90%. This is in line with the Directorate of Housing categorization which classifies public housing into low grade (LG), medium grade (MG) and high grade (HG) depending on house size, quality and neighbourhood status. The government has currently proposed 3000 housing units in Nairobi, Kisumu, Nyeri and Mombasa for low/middle level civil servants ranging from one bed room to three bed rooms which are in various implementation stages *(Republic Kenya, 2013a).* Particular emphasis has also been focused in housing the uniformed forces who hither to faced acute housing shortage. Accordingly, the government has embarked on a mission of constructing through alternative technology 1050 units categorized as bed sitters, one bed roomed, two bed rooms and 3 bed rooms for the uniformed forces in Kisumu, Nairobi, Kiambu and Machakos at a cost of Kshs 1,460,212,347 *(Republic of Kenya, 2016).* The overall output for completed and proposed housing schemes is however inadequate but the shift in policy is not only an effort towards production of 200,000 housing units in line with the social pillar of the Kenya Vision 2030 development blue print but also to satisfy the strategy for the National Housing Policy towards facilitating an annual output of 150,000 housing units in urban areas and 300,000 units in rural areas in the next five years *(Republic of Kenya, 2008 and Republic of Kenya, 2004a). Nabutola (2013)* puts the annual production of new housing at 30,000 in the urban centres giving a significant shortfall of 120,000 per annum. According to *Republic of Kenya (2013a),* the implementation of the civil servants

housing schemes has also faced time and cost overruns. The time overruns are majorly attributed to the delay of release of treasury exchequer financing and poor performance by project contractors some of whom were involved in substandard works resulting to considerable delays in occupation by the beneficiaries *(Rugenyi, 2015)*. On the other hand, cost overruns are as a result of in accurate project documentation by project consultants and critical additional works which prompted revision of rents / mortgage rates working against the affordability of the targeted groups *(Njogu, 2015)*.

The foregoing confirms that the existing housing delivery approach has not delivered adequate quality housing to the low and middle level income earners. The review of global housing delivery approach in chapter two however indicates that the developed world has to some extent addressed the housing needs of the low and middle level population segment due to their better economic performance enabling them to offer reasonable subsidies at supply and demand levels *(Quigley and O'Regan, 2000 and Schwartz, 2006)*. The drifting of the housing markets from extreme socialist and capitalist economies may be a scenario also favouring the developed world through balancing demand and supply *(Wong and Hui, 1998)*. The extreme socialist ideals promote affordability through state control but limits production while extreme capitalist economy promotes production by enlisting the private sector support but lowers affordability especially for the lower end income group *(Mustafa, Wuong and Chui, 2002)*. It therefore becomes necessary that the constraints that have widened the gap between the supply and demand of housing for the low and middle level formal sector income earners in Kenya be identified and mitigated against.

3.4 Constraints of the Existing Housing Delivery Approach

The Government of Kenya targets to reduce the national housing deficit so that the right to adequate housing as enshrined in article 43 (1b) of the constitution of Kenya is fulfilled (Republic of Kenya, 2010). *Pomeroy (2001)* argues that any initiative that seeks to address access to affordable housing should not only look at the supply side but to also consider demand. The supply measures include support for public/non-profit production, incentives for private developers, reducing development cost, cost effective designs while the demand measures are rent supplement, shelter allowance and any other incentives that drive demand up *(World Bank, 1989)*. The housing units can be availed in large quantities but if rent or mortgage is not affordable, it will be an exercise in futility.

3.4.1 Household Income and Rent / Mortgage Affordability

The low and middle level group faces a serious challenge in accessing decent housing due to limitations by the meagre monthly earnings. Recent survey shows that almost 90% of Kenyans who are either low or middle class cannot afford mortgage repayment for an entry level house (*Centre for Affordable Housing Finance in Africa (CAHF), 2012). CAHF (2012*) argues that the middle-income earners are paid up to a maximum of Kshs. 119,999 per month while the low-income counterparts get up to a maximum of Kshs. 23,672 and are therefore unable to either service monthly mortgage repayments or rent payment obligations. The implication is that the majority of the low/middle level employees cannot afford mortgage repayments for a basic entry level house while the fewer who can afford may not be able to adequately cater for other basic needs.

The concept of housing affordability as argued by *Susiliwati and Miller (2013)* is that the monthly mortgage repayment or rent should not exceed 30% of a household's gross income. This implies that for low and middle-income level employees, the mortgage repayment should range between Kshs. 7,102 and Kshs. 30,000. The rule of thumb indicates that a maximum of 30% of the gross earnings should be spent on housing as either rent or mortgage to enable the rest cater for other basic needs like food, education, clothing and healthcare *(Disney, 2007)*. Applying the 30% rule of thumb on minimum rent for civil servants housing scheme of Kshs. 18000, the minimum income for this category of civil servants should be Kshs. 54,000 which is far much higher than the minimum salary of Kshs. 12,840 set by the Public Service. Table 3.4 shows the income levels of civil servants as reflected in various job groups.

Table 3. 4: Job Group Distribution of the Entire Civil Service

Job Group	Average Gross Income	Income Status	Frequency	% age
A	12,840	low	674	0.31
B	13,365	low	197	0.09
C	13,695	low	934	0.43
D	14,650	low	8,093	3.73
E	16,180	low	4,471	2.06
F	18,220	low	87,335	40.25
G	26,650	middle	24,795	11.43
H	29,643	middle	20,094	9.26
J	35,540	middle	19,731	9.09
K	44,055	middle	28,437	13.11
L	61,345	middle	10,745	4.95
M	70,965	middle	4,507	2.08
N	80,990	middle	3,012	1.39
P	124,461	middle	2,028	0.93
Q	140,759	high	1,027	0.47
R	162,759	high	480	0.22
S	218,465	high	190	0.09
T	321,520	high	164	0.08
U	528,443	high	57	0.03
V	1,120,000	high	3	0.00
Total			**216,974**	**100.00**

Source: Adapted from Rapid Result Initiative: Staff Audit in the Civil Service and Teachers Service Commission (2011)

From Table 3.4, 213,000 out of 216,974 representing over 90% of the civil service workforce fall within the low and middle-income level bracket and therefore face serious challenges alongside private sector employees with similar incomes in accessing quality housing from the formal market due to limitations by the meagre monthly incomes *(Republic of Kenya, 2004b)*. A survey conducted by *Cytonn Real Estate (2015)* reveals that rental schemes are generally more affordable than mortgage schemes. Table 3.5 shows the mortgage affordability indices across the Nairobi Metropolitan area.

Table 3. 5: Mortgage Affordability Indices Across the Nairobi Metropolitan Area

Zone	Median H/hold income (Kshs)	House Price/m2 (Kshs)	Monthly Mortgage Payments (Kshs)	Qualifying H/hold Income (Kshs)	Mortgage Affordability index
Satellite Towns	200,000	65,843	82,985	228,209	91
Lower Middle	200,000	74,976	100,979	252,446	79
Low Income	56,250	49,452	33,418	83,545	67
Upper Income	450,000	130,140	460,019	1,150,048	46
High Income	1,300,000	247,879	1,235,790	3,089,475	42
Median	200,000	97,295	135,635	358,070	66

Source: *Cytonn Real Estate (2015)*

Cytonn Real Estate (2015) argues that households should not commit more than 40% of monthly income on mortgage repayments, otherwise it becomes a burden and puts pressure on other basic necessities. This threshold has a slight variation from the globally acceptable housing affordability threshold of 30% *(Disney, 2007)*. The affordability index of households is therefore 40% of income divided by the amount of mortgage repayment multiplied by 100 implying that an affordability index of 100 or more confirms eligibility or ability to service the mortgage. From Table 3.5, it can be stated with certainty that house mortgages are un affordable across the Nairobi Metropolitan area with the highest affordability index of 91 in satellite towns and lowest affordability index across the high income. This is so because of cheaper land in satellite towns lowering housing development cost *(Hassconsult, 2014)*.

Household income, expenditure and savings are indicators of social status and therefore by extension impacts on the ability of households to afford housing within their neighbourhood and beyond *(Kabo, 2006 and Rapoport, 2000)*. Table 3.6 shows median household income, expenditure and savings at national, rural, peri- urban and urban areas. From Table 3.6, the national median household income, expenditure and savings are Kshs 7,000, Kshs 6,000 and 2,000 respectively which are quite low.

Table 3. 6: Households by Median Income, Expenditure and Savings

Regional Category	Household Income Kshs	Household Expend. Kshs	Household Savings Kshs
National	7,000	6,000	2,000
Rural	5,000	5,000	1,500
Urban	13,000	9,700	3,000
Peri-urban	6,000	5,000	2,000

Source: *2012/2013 Kenya National Housing Survey*

Currently, rent for a two-bed roomed and a three-bed roomed at Ngara Civil Servants Housing Scheme which is subsidized is Kshs 18,000 and Kshs 23,000 respectively *(Republic of Kenya, 2013a)*. The mortgage rate with a repayment period for 20 years in respect of same house types is Kshs 23,000 and Kshs 32,000 respectively from the same source. *Hassconsult (2014)* projects the average rent of 1-3 bed roomed house in the formal market as Kshs 70,182 showing a pronounced margin between the low/middle civil servants' income level and market pricing of housing of comparative status. It is therefore evident that the house rents/mortgage rates are grossly unaffordable by most citizens with the implication that the current housing approach needs to be reformed to enhance accessibility to quality. The role of affordability of housing rents and mortgage rates in enhancing access to quality housing is well articulated in the review of global housing delivery approaches in chapter two which highlighted the 30% affordability threshold that should guarantee access to quality housing by the low and middle level income earners *(Schwartze and Wilsine, 2006; and Disney, 2007)*. This argument implies that improved access to quality housing partly revolves around affordability of housing rents and mortgage rates.

The available options are therefore: -

- Increase income which can only be determined by the prevailing economy.
- Provide subsidized rents or mortgage requiring bridging financing.
- Develop appropriate design, technology and materials.
- Provide social housing to the bottom end income group.

3.4.2 Financing Housing Programmes

To provide access to housing for every low and middle-income earner implies that a different housing delivery system or strategy will need to be developed. The government of Kenya has over time since adopted various housing delivery systems to address the challenge but much has not been achieved due to a number of constraints, key among them is capacity in financing housing programmes *(Olima and Moko, 2014).* Both internal and donor financing has been used to develop site and service schemes, tenant purchase schemes, rental and slum upgrading programmes (Mitullah, 1993). The funding allocations from the exchequer have however been minimal. For example, the total allocation and actual expenditure for housing development in the last four financial years was only Kshs. 18,490,000,000.000 which is quite insignificant (*Economic Survey, 2016).* This can only put up 1233 entry level housing units costed at Kshs 1,500,000 per unit justifying the magnitude of the public financing challenge. Table 3.7 indicates the treasury funding allocation and actual expenditure on housing development over the last four years.

Table 3. 7: Treasury Funding Allocation and Expenditure on Housing Development for the Last Four Financial Years

Financial Year	Allocation/Expenditure in Kshs Million		Expenditure as a % of Total Allocation
	Allocation	**Expenditure**	
2011/2012	3875.5	3191.0	82.3
2012/2013	5208.2	3452.9	66.3
2013/2014	7032.0	6088.6	86.6
2014/2015	7395.0	6857.0	79.2

Source: *Economic Survey (2016)*

The funding has not only been inadequate but has not been substantially enhanced over the years while the mortgage finance is quite expensive and is only benefitting the high-income earners *(Kidundi, 2010).* The mortgage market is also complicated with low capacity. For instance, as at 2014 there were only 22,000 mortgages in the whole country worth 164 billion *(Central Bank of Kenya, 2015)*. For a country with a population of 43 million this translates to one mortgage for every 1,954 Kenyans. The mortgage uptake in Kenya from 2010 to 2014 is shown in Table 3.8.

Table 3. 8: Mortgage Uptake in Kenya from 2010 to 2014

Year	No. of Mortgages	Mortg. (Kshs million)	% Increase
2010	15,049	4.0	
2011	16,135	5.7	7
2012	18,587	6.4	15
2013	19,879	6.9	7
2014	22,013	7.5	18

Source*: CBK (2015)*

Cytonn Real Estate (2016) contend that there has been a slow growth in the financial market which has limited borrowing for real estate development due to stringent lending conditions. For instance, the mortgage capacity was 2.5% of the GDP in 2007 and only grew to 3.5% of the GDP in 2015 recording an insignificant growth in the eight-year period. These proportions are insignificant compared to mortgage market in the US where the mortgage capacity is 70% of the GDP *(Noppen, 2012).*

The Government of Kenya is however currently exploring other financing options to bridge in the treasury exchequer shortfall for the implementation of public housing programmes *(Republic of Kenya, 2013g).* Five housing schemes have been planned for implementation in various parts of the country through Public Private Partnership (PPP) delivery method (*Republic of Kenya, 2013a)*. Table 3.9 shows details of housing schemes expected to benefit from the PPP programme.

Table 3. 9: Proposed New Housing Schemes

Item No.	House Type	No. of Units	Project Type
1	2/3 Bed Room	160	Kunsville, Nyeri
2	2/3 Bed Room	300	Hobley, Mombasa
3	2/3 Bed Room	300	Shauri Moyo Kisumu
4	2/3 Bed Room	450	Park Road Nairobi
5	2/3 Bed Room	1,500	Shauri Moyo Nairobi

Source: Housing Directorate (2013a)

The PPP financing that was meant to bring on board private sector financing for the low and middle level housing has met some bottlenecks and therefore put on hold implying that the government has reverted back to conventional financing strategy *(Rono, 2015).* One of the

main challenges of implementing the PPP financing in Kenya is that the projects that were considered lacked the level of economy of scale that can attract private investors. The review of global housing approaches in chapter two has however revealed cases of successful PPP financing initiatives in the developing countries. *Ibem (2010); and Idrus and Siong (2008)* cite successful PPP strategies in Nigeria and Malaysia respectively. The PPP financing initiative in Kenya should never be abandoned but be restructured and aligned with the successful models identified through the review of literature.

3.4.3 Planning, Design and Development Control on Housing Delivery.

In Kenya, housing planning, design and development control is guided by the Building Code, Physical Planning Act CAP 286 and Development Ordinances/Zoning Regulations. The Physical Planning Act demands that any person(s) or organization intending to carry out development on land or extensions to existing premises must seek for development permission formerly from Local Authorities but currently from County Governments (*Republic of Kenya, 2012c*). The Building Code also known as the Local Government Adoptive Bye Laws (1968 Order) provides minimum space standards, standards of materials of construction, clearances on siting of buildings in plots and minimum natural ventilation/lighting requirements in habitable spaces as well as specifying structural, fire and public safety minimum standards *(Republic of Kenya, 1968). Gichunge (2001)* accordingly views a Building Code as a planning tool that sets standards of construction, materials specifications and minimum space standards.

To compliment the Building Code, UN Habitat has set standards for overcrowding in housing occupancy as not more than 2 persons sharing a room space *(Ranson, 1988)*. Further, the Directorate of Housing has set minimum family dwelling as a two-roomed structure with $36m^2$ as minimum area *(Republic of Kenya, 2016d)*. These minimum standards have profound ramifications on the unit costs of housing that more often causes constraints on access to quality housing by the low and middle level income earners. *Kvarstrom (2014)* argues that the Building Code is old and at the same time based on imported standards that are not appropriate to the prevailing set up thus making housing costs un affordable mainly by the low and middle level income earners.

The Development Ordinances and Regulations guide on plot densities and ratios that control the extent of ground coverage and gross allowable area for development *(Republic of Kenya, 2016e)*. This limits the total number of housing that can be constructed in a plot within a

particular zone. For example, in Nairobi County, the Development Ordinances and Zoning Regulations provides ground coverages ranging from 25-50%, plot ratios ranging from 25-150% and minimum plot areas ranging from 0.05-0.5 hectares in respect of housing development as shown in Table 3.10.

Table 3. 10: Ground Coverage, Plot Ratio and Minimum Plot Sizes in Low and Middle Level Residential Zones in Nairobi.

Zones	Ground Coverage (%)	Plot Ratio (%)	Minimum Plot Area (Ha)
Ziwani/Starehe	35	75	0.05
Nairobi West	35	75	0.5
Madaraka	35	75	0.5
South B	35	75	0.5
South C	35	75	0.5
Nairobi Dam	50	75	0.5
Ngummo	50	75	0.5
Langata	50	75	0.5
Imara Daima	50	75	0.5
Tassia	50	75	0.5
Fedha	50	75	0.5
Embakasi Area	50	75	0.5
NHC Estates Kibera	50	75	0.5
Dagorreti Area	50	75	0.1
Githurai	50	75	0.05
Zimmerman	50	75	0.05
Kahawa	50	75	0.05
Kasarani	50	100	0.05
Makadara	50	100	0.05
Donholm	50	75	0.05
Uhuru	50	75	0.05
Buru Buru	50	75	0.05
Umoja (1-2)	50	75	0.05
Umoja Innercore	50	150	0.05
Komarock	50	75	0.05
Kayole	50	75	0.05

Source: *Adapted from Nairobi County Government (2016)*

Architects and Planners apply these development control standards to plan and design housing schemes. Previous studies indicate that design is a determinant of housing cost and therefore has a major bearing on housing accessibility by the low and middle level income earners. *Kvarstrom (2014)* argues that certain design decisions could drastically reduce housing construction costs by 50%. Construction cost is influenced by design and is also a major determinant of the overall housing development cost. *Moko and Olima (2014)*; and *Shelter Afrique (2013)* cite construction cost as the most significant factor in housing development cost in Nairobi. *Shelter Afrique (2013)* observes that 70% of construction is the material content while 30% is devoted to labour. It is therefore imperative to know the proportions of various items that constitute the housing development cost in order to ascertain which variables to target in a cost reduction strategy. Figure 3.3 shows a typical housing development cost structure from a housing project in Mavoko managed by Shelter Afrique.
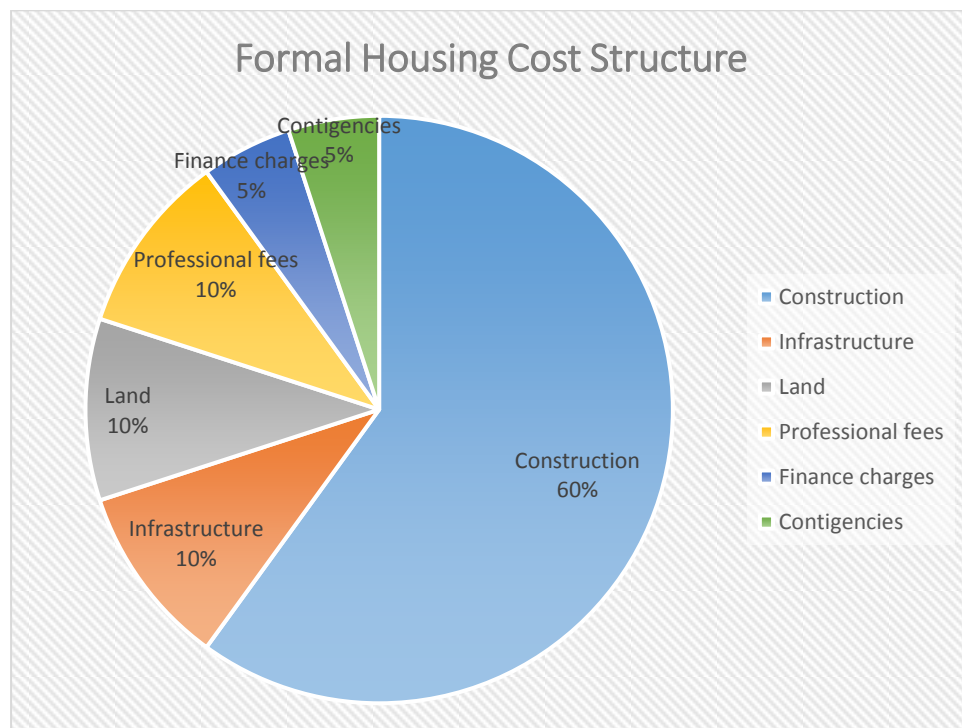
Figure 3. 3: Formal Housing Cost Structure

Source: *Shelter Afrique (2013)*

 The American Institute of Architects (2013) highlights major design factors which should be evaluated during costs analysis of any building project which includes clients' requirements and budget, climatic issues, surrounding socio-environmental issues, codes and regulations, site characteristics including availability of infrastructural services, appropriate building

materials/technology and sustainability concepts. *Syagga (1985)* however looks at the impact of design on maintenance cost of housing and cites major design parameters that influence maintenance cost as size, standard of finishes, perimeter and level of building services.

These findings closely concur with the quality affordability planning and design model identified through the review of global housing delivery approaches discussed in chapter two *(Sidi, 2011)*. In this model, among the critical parameters for quality affordable housing is the dwelling unit norms such as size of space, type of space, space arrangements, social status, amenities, orientation and building materials which in essence are planning and design ingredients. Any strategy for reducing housing construction cost must evaluate the cost effectiveness of design both at construction and post occupancy *(Kvarstrom, 2014)*. Planning, design and development is therefore a key component of housing delivery system in Kenya implying that the critical challenges associated with it need to be addressed to improve accessibility to quality housing in particular to the low and middle level income earners.

3.4.4 Construction Materials and Technology

Adoption of alternative cheap building materials and technology is one way of reducing housing construction costs and has been used to success in a number of developing nations *(Ugochukwu and Chioma, 2015)*. *Syagga (1993)* argues that since building materials form a major component of housing construction costs, reaching up to about 68%, any low-cost housing approach has got no option but to factor material cost. *Kvarnstro (2014)* further highlights the significant role of alternative low-cost building materials and technology in housing slum dwellers in Nairobi and goes further to suggest use of stabilized blocks in addition to lean concrete floor slab elements such as landis or waffle slabs that offer opportunities for cost effective prefabrication technology for high-rise low-cost housing.

In addition, as the construction cost continues to rise every day, just like in other parts of Africa, research institutions in Kenya have been involved in studies towards the establishment of alternative cheaper materials and technology to lower costs and therefore increase access to affordable housing. In Kenya, the Directorate of Housing in partnership with the Housing and Building Research Institute of the University of Nairobi (HABRI) established an Appropriate Building and Technologies Programme whose mission is to facilitate provision of improved affordable housing in both rural and urban environments *(Republic of Kenya, 2013c). Ondola (2014), Noppen (2012), Nabutola (2013) and Republic of Kenya (2004)* however argue that though some findings have been established, the

dissemination and use has been minimal due to in-appropriate building standards and bye laws curtailing the application of the new cost-effective materials and technology. This fact is also confirmed by *Kvarnstro (2014) and Syagga (1993)* who further decries the lack of economic and political support as additional challenges curtailing new research and implementation of findings. This programme has therefore a long way to go for its impact to be felt since it is also facing acute financing challenges with the draft revised building code having remained unlegislated since more than two years ago.

Despite the numerous challenges encountered, a number of organizations have come up with appropriate technologies and materials for low construction in Kenya. The expanded polystyrene styrofoam (EPS), precast concrete and aluminium formwork technology are slowly gaining prominence in low and middle level housing construction in Kenya *(Mwololo, 2016)*. These alternative materials are faster to assemble and come in as precast units from the factory. *Mwololo (2016)* strongly believes that the alternative technologies are able to deliver housing within a relatively shorter time than the conventional concrete and stone/mortar construction as they require less labour and no curing period. In addition, these technologies could realize cost savings of up to 30% can realized. The Directorate of Housing however argue that other than the faster delivery time there are no meaningful cost saving benefits from these innovations *(Republic of Kenya, 2016d)*. Table 3.11 shows major Appropriate Technology organizations operating in Kenya together with technology innovation and typical projects undertaken.

Table 3. 11: Major Appropriate Technology Organizations Operating in Kenya, Technology Innovation and Typical Projects.

Item No.	Name of Organization	Tech./Materials	Typical Projects
1	Boleyn Magic Wall Ltd	EPS/Precast Concrete	• Moke Gardens-Lukenya. • Safaricom Housing Scheme. • Boleyn Rose Gardens.
2	ELSEK Group of Companies	EPS/Galvanized Steel Formwork	• Kikambala Housing Scheme. • Presbyterian University of East Africa.

Item No.	Name of Organization	Tech./Materials	Typical Projects
3	EPCO Builders Ltd	Aluminium Formwork	3500 Relocation Units at Kibera for Kenya Railways. 2500 Housing Units for NSSF at Nyayo Estate
4	KOTO Housing Kenya	EPS	200 Housing Units for the Police in Kisumu & Machakos
5	Cemex Holdings Ltd	EPS	1050 Housing Units for the Police/Prisons in Nairobi & Kiambu.
6	National Housing Corporation	EPS	• La Casa Apartments in Rongai. • 45 Housing Units at Ruai Police Station.
7	Directorate of Housing/University of Nairobi	Stabilized Soil Blocks/Sisal Cement Roofing Tiles	Projects mostly in peri-urban/rural areas

Source: *Mwololo (2016)*

Despite the great speed associated with these alternative technologies, experts are still cautious on customer/consultant acceptability as well as whether they meet economies of scale required to address the enormous annual demand shortfall.

The findings concur with the concept of appropriate building materials as advanced by previous studies cited in the review of global housing delivery approproaches discussed in chapter two. For instance, *Murray (2008) and Dale (2007)* contend that cheap appropriate materials / technologies could enhance affordability if their concept is anchored on the following key principles that also guide sustainable development.

- Accessibility and maximization of savings from transport;
- Cost effective materials and technology;
- Recycling of waste water;
- Recycling of construction waste;

In addition, the review of literature has confirmed that well-designed sustainable buildings are based on cost effective construction materials and technology that would lower construction costs, conserve water and energy including reduction of operating and maintenance costs for housing *(Susilawati and Miller, 2013).*

The appropriate building materials and technologies just like energy and water efficient buildings are therefore key elements of sustainable housing. The above elements if incorporated could improve accessibility to quality housing by the low and middle-income level earners through reduction of building costs as well as improvement of the quality of the immediate environment. It is therefore pertinent that the government repeals the restrictive building standards and bye laws including sourcing for adequate funding to enhance the capacity of the existing building research institutions to promote research into cheap appropriate building materials / technologies.

3.4.5 Land and Infrastructure

Land is a natural resource which is a major component in housing development. Infrastructure on the other hand are non-natural services meant to improve on value of land. Land as a natural physical resource is entrenched in the Constitution of Kenya, 2010 which categorizes it as public, private or community *(Republic of Kenya, 2010).* The future of the housing delivery sector lies in un-locking the existing bottlenecks in land and administration and management that have been with us since the pre-independence era *(Matindi, 2008 and Nabutola, 2013). Gichunge (2001)* observes that land and property law in Kenya was inherited from the British Colonialists and has since been in operation. Prior to the enactment of the National Land Commission, land use and property management have been governed by scattered pieces of legislation that include; Registered Land Act Cap 300, Registration of Titles Act Cap 281, Land Consolidation Act Cap 283, Trust Land Act Cap 295, Physical Planning Act Cap 286, Sectional Properties Act and Limitation of Actions Act Cap 22 (Nabutola, 2013 and; Kimani and Musungu, 2010). The new National Land Commission Act was meant to address the shortfalls in these legislations but still has a long way to go. High land costs and lengthy stringent registration processes are experienced mainly as a result of in-appropriate land policies leading to many citizens lacking land ownership, in- adequate land for development and high housing development cost in most urban centres *(World Bank, 2012).* High land prices have been witnessed in every urban centre and in particular the Nairobi Metropolitan Area where land prices have gone up by 535% over the past seven

years with an acre that costed Kshs 30million in 2007 going for Kshs 170million in 2014 *(Hassconsult, 2014)*. According to *Mwaniki (2016)*, the sharp rise in land prices is attributed mainly to improved infrastructure along the Thika Road, Northern By-pass and Southern By-pass. Figure 3.4 shows land prices in selected zones in Nairobi Metropolitan Area.
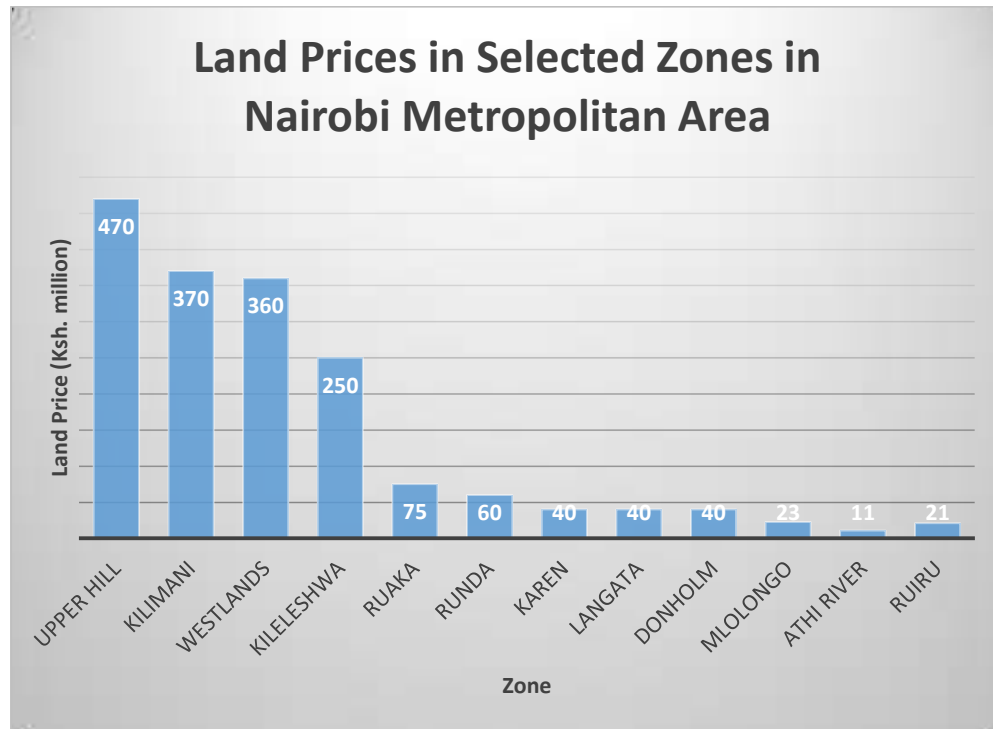
Figure 3. 4: Land Prices in Selected Zones in the Nairobi Metropolitan Area

Source: *Hassconsult (2014)*

From Figure 4.4 land is most expensive in Upper Hill at Kshs 470million per acre and least expensive in Satellite Towns like Athi River where it goes for Kshs 11million per acre. The implication of this scenario is that the housing development will be higher in zones with higher land prices making housing from these zones in-accessible by the low and middle level income bracket.

Besides the prohibitive land cost, most citizens especially those living in slums and informal settlements have had no formal possession of land ownership. *Habitat for Humanity International (2016)* observes that 68% of Kenyans do not possess land documentation or tenure meaning they cannot access mortgage finance products from the formal financial market for lack of the required collateral. This is attributed to in-appropriate land laws. The lengthy bureaucratic property and land registration processes have made it cumbersome to

acquire property ownership in real time causing delays in submission of collateral. Table 3.12 shows property registration processes data from selected countries in Africa.

Table 3. 12: Length and Cost of Property Registration Processes in Selected African Countries

Country	Days to Register Property	Cost of Registration as a % of Property Value	No. of Procedures for Registration
Kenya	73	4.3	9
South Africa	23	5.9	6
Tanzania	68	4.4	8
Uganda	52	1.9	12
Zambia	40	8.2	5

Source: *World Bank (2012)*

Table 3.12 indicates that Kenya's property registration processes are the lengthiest and expensive in Africa. *Arvantis (2013) and Olingo (2016)* argue that in order to enhance private sector participation in housing development, in particular low and middle level housing sector, simplified and relaxed land regulations will be imperative. The complexity and multiplicity are witnessed in the cost and number of days for property registration *(World Bank, 2012)*. Other than property registration and tenure, trunk infrastructural service is also a key ingredient that determines housing development cost. The developers have to incur huge costs of providing infrastructural services in cases where construction is planned on land that is not serviced *(Shelter Afrique, 2013)*. Infrastructural services become un-available as one move away from the CBD to the suburbs where land is comparatively cheaper.

The finding that serviced land is either too costly or scarce is also echoed from those from the review of global housing delivery approaches. The UN Habitat (2011) argues that trunk infrastructure which consists of water, sewerage, access roads and electric power is one of the factors linked to high land price responsible for high development cost and by extension low access to quality housing by the low and middle level income earners. Similarly, *UN Habitat (2012)* contends that land ownership, land use and land cost remain stumbling blocks to the accessibility of quality housing by the low and middle level income earners as a result of the existing land zoning patterns and scarcity of urban land that makes it difficult to provide housing as a basic right. The Government as a facilitator needs to link up with County

Governments to provide serviced land as an incentive to private developers. The existing land policies also need to be reformed to make the property registration processes shorter and cheaper.

3.4.6 Policy Framework for Delivering Housing in Kenya

Policy frame work spells out the manner in which housing programmes are implemented right from planning through construction up to post occupancy *(Kimani and Musungu, 2010).* It sets out the legal regime and all the actors involved in housing development. The first housing policy was formulated through Sessional Paper No.5 of 1966/67 and called upon local authorities and other state agencies to implement programmes for the supply of rental housing *(National Housing Corporation, 2012).* However, this policy did not achieve much calling for introduction of various interventions and strategies, for instance, Shelter for the Homeless and the National Shelter to the Year 2000 whose aim was to agitate for change in the existing housing policy *(Nabutola, 2013).* This occasioned the enactment of the National Housing Policy, 2004 through Sessional Paper No.3 of 2004 which brought more hope as the government made a commitment to address the housing accessibility challenges countrywide by bridging the housing delivery supply and demand shortfall *(Republic of Kenya, 2015).* The intention of this policy was to enable more Kenyans access quality housing with basic infrastructural and social services for healthy living environment especially in urban set ups.

Despite this the intervention has not been able to address the shortfalls of an annual demand of 150,000 units against an annual production of 30,000 units leading to proliferation of squatter and informal settlements in Kenya's urban centres *(Ondola et al, 2013; Nabutola, 2013; Republic of Kenya, 2004a and Okonkwo, 1996).* The *UN Habitat (2013b)* observes that 60% of Kenyan citizens in urban centres are living under squalid un-sanitary conditions in slums and other informal settlements. Continuing along the path of further reforms the government introduced Legal Notice No.98 on the establishment of the Civil Servants Housing Fund of 2004 which up to 2013 has only delivered 1142 housing unit to civil servants whose current population is about 217,000 *(Republic of Kenya, 2013a).* In an effort to address the dilemma of slums and other informal settlements, *Ondola et al (2013) and UN Habitat (2013b)* argue that the government found it necessary to introduce the Slum Upgrading/Prevention Policy, 2004 and the Kenya Slum Upgrading Programme (KENSUP). By and large the policy instruments formulated so far have failed to satisfactorily improve accessibility to quality housing by the low and middle level income earners in Kenya

justifying for further reforms on the existing housing policy. Several drafts of the reviewed housing policy abound since 2011 and the new Housing Policy was just legislated in 2017 for lack of political good will *(Republic of Kenya, 2017).* In addition, despite that the newly enacted Constitution of Kenya, 2010 guaranteeing every Kenyan through Article 43 (1b) the right to accessible and adequate housing, accessibility to quality housing by the low and middle level earners continues to remain a pipe dream *(Republic of Kenya, 2010).* The status of the quality housing accessibility is therefore a momentous dilemma to researchers and housing policy makers as we ponder on what kind of policy reforms to put in place.

The lack of major reforms in the existing housing policies among world nations to be able to address the housing needs of the low and middle level income earners contrasts previous studies in the review of related literature in chapter two. This may be attributed to lack of good will and funding required by the Kenyan government to push for the required reforms *(Ondola, 2014).* The US and UK have successively reviewed their housing policies with reforms targeting the low and middle level income earners which to date have registered some positive impact *(White House, 2013 and Hull, 2012).* All is not lost since Malaysia, a developing nation at a particular point in time had similar challenges but reviewed their housing policies severally and are now way better off *(Abdullahi and Azziz, 2011).* Kenya likewise, should review her housing policy in the context of the constraints identified in this chapter. The constraints focus on housing delivery components such as housing actors, delivery methods, land/infrastructure, building materials/technology, planning process (design and development control), construction process, construction cost, household income, mortgage/rent, research, customer satisfaction, policy intervention and monitoring/control.

Some of the identified housing delivery components closely mirror those identified from the review of global housing delivery approaches discussed in chapter two. For instance, Kenna (2013) and Alakeson (2011) cite that costly land, restrictive planning / development control regulations, low profitability of low / middle grade housing, prohibitive taxation system, and expensive mortgage products as major barriers to access to quality housing by the low and middle level income earners in the UK. Lack of commonality on some constraints may be attributed to successful policy reforms that have with time eliminated certain constraints in the UK housing delivery approaches. As earlier explained, this enquiry is underpinned by systems theory as confirmed through the review of related literature in chapter two calling for the identified housing delivery components to be aligned in a systems theory architecture of input, throughput, external environment, feedback and output as highlighted in Table 3.13.

Table 3. 13: Housing Delivery Components in a Systems Framework

Item No.	Input	Throughput	External Environment	Feedback	Output
1.	Housing Actors	Planning Process	Construction Cost	Policy Intervention	The
2.	Delivery Methods		Household Income		Desired
3.	Land / Infrastructure	Construction Process	Mortgage Rate / Rent	Monitoring & Control	Housing Units
4.	Building Materials / Technology	Financing Strategy	Research in to Alternative Materials / Technology		

Source: *Author (2016)*

According to *Heylighen (1998) and Freetutes (2014)* systems has components which are interactive and interdependent but configured in distinct levels such as input, throughput, external environment, feedback and output. The housing delivery system in Kenya as established by the findings is not a fully functional system partly attributed to lack of synergistical relationship between the delivery components. It therefore becomes imperative that this scenario is addressed to improve access to quality housing by the low and middle level public sector employees. The study therefore investigated how the systems approach model formulated in chapter 2 can be applied to address the quality housing accessibility dilemma by the low and middle level public sector employees in Kenya.

3.5 Summary

This chapter has examined the existing housing delivery approach and confirmed that it has not addressed the needs of the low and middle level earners. Only 8% of this income can access quality housing from the formal market due to a number of reasons that include in-appropriate designs, restrictive development control standards, in-appropriate land laws, high cost of land, lack of serviced land, in-appropriate delivery methods, limited access to mortgage, lack of focus in research in to alternative materials, high cost of construction materials and in-appropriate institutional and legal framework. It has also established the failure of the existing housing delivery approach to address the housing needs may be attributed to its in-ability to function as a system. The chapter has further grouped the identified housing delivery constraints into their originating components which has been

embodied into a systems architecture. The next chapter, research methodology discusses the methodological approach that was adopted for the study.

CHAPTER FOUR

4.0 RESEARCH METHODOLOGY

4.1 Introduction

This chapter details procedures of going about the study. It focuses on background to study area, research strategy / design, target population, sample/sampling techniques, methods of data collection and analysis. It further presents the means by which to achieve reliability and validity of data and results respectively. Clarity in these procedures would enable any interested party to replicate research whenever need arises.

4.2 Background to the Study Area

The study intended to make enquiries on the existing housing delivery approach in Kenya with a view of developing an appropriate systems model framework to facilitate housing provision for the low and middle level formal sector employees. The bulk of these employees live in cities and urban centres in line with data from an Economic Survey conducted in 1999 *(Republic of Kenya, 1999).* The latest statistical information reveal that the City of Nairobi is the most populous at 3.36 million and hence with the largest concentration of this group of formal sector employees justifying considering the City of Nairobi as a study area (Economic Survey, 2015). This is reinforced further by the fact that the majority of the subjects for the investigation (housing experts, consultants, contractors and affordable housing providers) are based in Nairobi.

The public sector is the major employer of formal sector employees with civil servants forming the bulk of the employees at 217,069 *(Republic of Kenya, 2011).* The majority of these workers live in the City of Nairobi while the rest are scattered in various Counties. Over 90% of these workers are either low or middle level and are facing quality housing accessibility challenges *(Economic Survey, 2013c).* The study therefore targeted public servants and in particular civil servants living in Nairobi. There are about 33,000 civil servants working in various ministries and departments in Nairobi, some of whom live in public housing while others live in privately rented housing in various parts of Nairobi *(Republic of Kenya, 2015).* Since independence, the total number of housing provided for public servants is only 43,000 which is insignificant compared to the population of public sector employees *(Republic of Kenya, 2013a).* Despite the gazettement of a subsidiary

legislation No. 58 of 2004 to facilitate affordable housing for civil servants, only a paltry 2,830 have benefitted so far.

Ngara Phase I, Ngara Phase II, Shauri Moyo, and Jogoo Road Housing Schemes costing kshs. 2.6 billion and totalling 971 units are the largest public-sector housing schemes developed for the low and middle level civil servants in recent times between 2008 and 2012 *(Republic of Kenya, 2013a).* Ngara Phases I and II housing schemes are located behind Ngara Post Office along Desai Road less than one kilometre from the Central Business District while Jogoo Road and Shauri Moyo housing schemes are along the busy Jogoo Road between Makadara Railway Station and City Stadium roundabout but also within vicinity of the Central Business District.

 For a comparative study, Police Housing Scheme in Ruai located off Kangundo road with 45 units was also included being the most recent public housing that has been constructed through emerging alternative technology. These housing schemes were therefore purposively selected and are all located in the City of Nairobi which is the Capital City of Kenya. Figure 4.1 shows the map of the City of Nairobi.

Figure 4. 1: Map of the City of Nairobi

Source*: Google Map (2016)*

4.3 Research Strategy and Design

A mix of qualitative and quantitative research strategies were adopted for the investigation. The data collected were both numerical and descriptive justifying the adoption of the dual research strategy. Quantitative and qualitative approaches were therefore applied in analysing numerical data and descriptive data respectively. The mixed approach was informed by the nature of data required to support investigations on the study objectives.

The research design was cross section survey structured to make enquiries from public servants and housing experts on why the existing housing delivery approach has failed to address the housing needs of the low and middle-income earners and how to employ a systems model to remedy the situation. According to Gichunge (2000), a survey design is better where no treatment or control is necessary and where random sampling is most

appropriate. The study objectives and nature of data dictated that a survey design be employed. The mix research strategy and design proposed for the study is a methodology that can add more value to an investigation. Methodological pluralism as advanced by *Smith (1975)* is based on the premise that different kinds of complementary data about a problem may be acquired using a combination of techniques. *Saunders et al (2003) and Jick (1979)* argue that using multi-methods allows for triangulation to take place and therefore contribute to a greater understanding of the topic of study. The adoption of a mix of qualitative and quantitative strategies therefore presented a better opportunity to evaluate the research problem in a more holistic manner.

4.4 Target Population, Sample and Sampling Techniques

For the purpose of this study, the target population comprised low and middle level public servants and housing provision experts in Kenya. The accessible population from which the sample was taken focused on a representative portion of the target population and which for this investigation is shown in Table 4.1

Due to time and resource constraints, the study was restricted to a representative portion of the target population. The limitation was occasioned by the fact that this was an academic research programmed to be undertaken within the above constraints dictating that a sample be drawn from the accessible population. *Mugenda and Mugenda (2003)* argue that the sample population for a study that has adopted a statistical analysis technique should not be less than 10% of the accessible population as long as the number of observations is not less than thirty (30). This view point is also supported by *Arleck and Settle (2005.)* In this enquiry, *Mugenda and Mugenda (2003)* statistical formula as appended herein below was adopted to enhance the representativeness of the sample.

$nf = (n/1+n/N)$ where;

nf is sample size for populations < 10000

n is sample size for populations $> 10000 = 384$

N is the population estimate $= 1275$

Sampling was done in such a way to provide for optimal sample size representative to the accessible population thereby enhancing validity by minimizing sampling error. A stratified random sampling technique followed by systematic random sampling technique through use

of random tables was employed to select sample population. The selection of the key housing informants for interview, and in particular housing policy makers, affordable housing providers, previous consultants and mortgage experts was purposively done. The accessible population, sample frame, sampling techniques and sample sizes for both questionnaire survey and interview are shown in Table 4.1 and 4.2 respectively.

Table 4. 1: Population Target, Sample & Sampling Technique (Questionnaire Survey)

Item No.	Accessible population	Sample frame	Sampling technique	Sample size
1.	1016No. House owners and tenants i.e. 140No. Ngara I, 516No. Ngara II, 140No. Shauri Moyo, 175No. Jogoo Road and 45No.Ruai	Register from Estates Managers	Stratified / systematic random sampling techniques – Mugenda & Mugenda formula for Populations < 10,000 $nf = n/(1+n/N)$ where nf-sample size for pop. <10000 n-sample size for pop,>10000=384 N-estimate of pop. =1275	235
2.	Public Sector Housing Experts i.e. 33No. Directorate of Housing technical staff, 208No. Directorate of Public Works technical staff, 18No. National Housing Corporation technical staff	Human Resource Staff Records	Ditto	60
TOTAL	1275			295

Source*: Author (2016)*

Table 4. 2: Population Target, Sample and Sampling Techniques (Interview)

Item No.	Accessible population	Sample frame	Sampling technique	Sample size
1.	10No. Housing Policy makers, 12No. Housing Mortgage Experts, 30No. Affordable Housing Providers, 5No. Previous lead consultants	Lists from the Directorate of Housing	• Purposive sampling (Targeting 3 of each category) on basis of the most active in liaison with the Directorate of Housing • All the 5 previous lead consultants (entire population)	17

Source: *Author (2016)*

Sample frame from which the sample was drawn is attached as Appendix 1A.

4.5 Data Collection

This section discusses constraints encountered during data collection, various data collection tools used and pretesting of the questionnaires.

4.5.1 Constraints During Data Collections

Data collection took a period of four (4) months from August 2016 to November 2016 longer than anticipated due to bureaucratic bottlenecks at data source. In addition, there was some delay in commencement of the data collection attributed to late acquisition of research permit from the National Council for Science, Technology and Innovation (NACOSTI}, a copy of which has been attached as Appendix 1B. The guidelines of the research permit also restricted the researcher not to commence data collection before obtaining formal clearance from the local County Director of Education and County Commissioner. Data collection therefore commenced by seeking consent of heads of various organizations that were targeted. Some respondents given their nature of work, gave appointments they could not honour prompting undesirable repeat visits.

4.5.2 Data Collection Tools

 In this study, data collected were both qualitative and quantitative. The data collection tools were semi-structured self-administered questionnaires, semi-structured interviews, observation checklists and document review. The above multiple data collection instruments were incorporated to secure adequate data to facilitate thorough investigations of the research problem. *Smith (1975)* advances the richness of methodological pluralism in research enquiries where different kinds of complementary data may be acquired using a combination of different data collection tools justifying the adoption of multiple data collection techniques.

4.5.2.1 Semi-structured Questionnaires

Questionnaires with both closed and open-ended questions were administered through physical delivery to the heads of households in the sample population which included households living in the five selected housing schemes and housing experts in the public sector. Some questions were in "yes" and "no" format while others were in 1 in 5 Likert scale or open ended. The majority of the questions were Likert scale whose responses are normally qualitative but assigned numerical ratings which in this enquiry ranged from 1 to 5. This is based on the view of *Arleck and Seattle (2005)* who argue that a Likert scale is more appropriate where responses are derived from ranking items on a single dimension or continuum.

A pioneer Likert scale theorist (Likert, R) believe that Likert scale is one of the important tools for measuring attitudes involving asking subjects to respond to a series of statements on the extent to which they agree or view the statements *(Likert, 1932)*. Accordingly, Likert scale adopts predetermined choice response formats designed to measure perceptions, opinions and attitudes. This position is also recognized by *Bowling (1997) and; Burns and Groove (1997). McLeod (2008)* consequently view a Likert scale as an ordinal scale that measures the levels of agreement or disagreement assuming the strength and intensity which is linear; and can be better analysed through use of the mode in descriptive statistics. *Munshi (2008)* however argue that the number of scale points and their placement depend on semantics of the instrument requiring that the scales be tailor made and pretested before application. This informed the need to pre-test the questionnaires which predominantly had Likert scale type questions. The questionnaires are attached as Appendix 2A and Appendix 2B targeting public housing experts and households respectively.

4.5.2.2 Structured and Semi-structured Interview

Interviews with the aid of interview schedules were used to obtain views of previous lead consultants of selected housing schemes and key housing informants. The interview schedules to the previous lead consultants were structured with only closed ended questions while those meant for interviewing the key informants were semi-structured with both closed and open-ended questions. All the five lead consultants who participated in the design and supervision of the selected housing schemes were interviewed to obtain their views on planning and construction processes. Further interviews were directed to a total of 9 key informants with representations in 3 specific categories. The informants were selected purposively based on active participation in housing programmes focusing on the low and middle level earners and categorized as shown in Table 4.3.

Table 4. 3: List of Key Informants and Enquiry Focus

Item No.	Category of key informants	Interview enquiry focus
1	**Policy Makers-Directorate of Housing** Departments of Civil Servants Housing Scheme, Estates & Housing	Policy issues on housing demand & supply
2	**Mortgage Institutions** Jami Bora, Equity, Kenya Commercial Bank	Mortgage policy & accessibility
3	**Affordable Housing Providers** National Housing Corporation (NHC), Shelter Afrique, Habitat for Humanity	Cheaper alternative materials & technologies

Source: *Author (2016)*

The interview guides are attached as Appendix 3A-Housing Policy Makers, Appendix 3B-Mortgage Institutions, Appendix 3C-Affordable Housing Providers and Appendix 3D-Previous Lead Consultants

4.5.2.3 Document Review

A document review guide was used to aid collection of secondary data from targeted public and private sector organizations purposively selected. The task involved perusing various

housing related reports stored in hard and soft copy from the Directorate of Housing, Central Bank of Kenya, Nairobi County Government, Kenya National Bureau of Statistics, National Housing Corporation, Hassconsult, Cytonn Real Estate and Shelter Afrique. Some prominent organizations declined to provide the needed data for unknown reasons.

4.5.2.4 Observation

An observation checklist was prepared and used as a guide by the researcher to collect data on the five housing schemes. The checklist focused on planning, design, materials / technology of construction and property management. A digital camera was used to capture appropriate features and elements to authenticate data in the checklist. The data from the observation were also used to confirm the reliability of data from other sources where appropriate. The observation checklist has been attached as Appendix 2C.

4.5.3 Pre-testing of Questionnaires

Questionnaires Appendices 2A and 2B were subjected to piloting or pre-testing to establish their reliability prior to administering to the sampled subjects. Piloting enhances the reliability of the data collection tool and hence ensures consistency in repeat measurements *(Kothari, 2010 and Bryman, 2008).* This was necessary to improve the accuracy of the data that was used for the study. *Mugenda and Mugenda (2003)* view 1 – 10% of the sample population as appropriate for pre-testing of the questionnaires with the bigger the sample, the smaller the percentage. Accordingly, the study targeted 10% of the sample population to improve the representativeness of the findings of pilot study. 6 and 25 questionnaires were therefore administered to public housing experts and households respectively. The results were as shown in Table 4.4.

Table 4. 4: Results of Pre-test of questionnaires

Questionnaire Type	Response Rate	% of Accurate Responses	% of Questions Not Answered
2A	100%	90%	5%
2B	100%	85%	8%

Source: *Author (2016)*

From Table 4.4, it can be observed that the response rate was 100% which is quite good. There were however some questions in both questionnaires that were neither answered accurately nor answered at all raising questions on whether the respondents understood them well implying the data collection instruments may not have been wholly reliable. To enhance reliability, the questions at stake were either adjusted or overhauled by making them more simple, precise and less ambiguous.

The study went further to establish Cronbach's alpha as measure of the extent of reliability of the questionnaires that were administered to sampled public housing experts and households. According to *UNCLA (2008)*, Cronbach's alpha is a measure of internal consistency with respect to scale reliability and therefore a measure of coefficient of reliability. The computation of the Cronbach's can be computed manually using SPSS computer software analysis or manually by applying the equation below (Mugenda, 2008).

Alpha = Nr/(1+r(N-1)

Where; r is the mean item correlation and N is number of items.

It can be very tedious to calculate the correlations of each item with every other item to compute the mean inter-item correlation implying that it is best to apply computer-based software application. In this regard, the study employed SPSS version 18 computer software to compute the alpha coefficients.

Cronbach's alpha coefficient has values that ly between 0 and 1where coefficients greater than 0.7 is usually taken as having acceptable internal consistency, in other words reasonable reliability *(Pallant, 2011 and McClelland, 2015)*. The results with respect to the reliability of the questionnaires 2A and 2B are displayed in Table 4.5.

Table 4. 5: Cronbach's Alpha Test

Questionnaire Type	Sample Size	No. of Items (N)	Cronbach's Alpha
2A	60	6	0.742
2B	235	24	0.805

Source: *Author (2016)*

The results of Cronbach's alpha test shows that the alpha coefficients are 0.742 and 0.805 in respect of questionnaires 2A and 2B respectively. In both cases the alpha coefficient is greater than 0.7 implying that both questionnaires had acceptable reliability and could therefore yield consistent results with repeat trials. Failure of the questionnaires to achieve acceptable reliability results would prompt further tests such as mean item, inter item correlation and item total statistics to be to isolate outliers for amendments. The questionnaires as key data collection tools exhibited internal consistency meaning they were reliable for use in investigating how to improve access to quality housing by the low and middle level public sector employees.

4.6 Study Variables

The literature review has confirmed the significant independent variables in each of the major components of the housing delivery system i.e. input, throughput, output, external environment and feedback as illustrated in Table 4.6.

Table 4. 6: Significant Independent Variables

Input	Throughput	Output	External Environment	Feedback
-Housing Actors -Delivery Methods -Land / Infrastructure -Building Materials / Technology	-Planning Process -Construction Process -Financing Strategy	-Market Housing -Social Housing -Customer Satisfaction	-Housing Cost -Household income -Mortgage Rate / Rent -Research in to Alternative Materials / Technology	-Customer Satisfaction -Policy Intervention -Monitoring & Control

Source: *Author (2016)*

These variables are factors of the characteristics and components of the housing delivery system and are believed to contribute to the functional and performance attributes of the housing delivery system. The significance of these variables was discussed and authenticated through an interview with the Director of Civil Servants Housing Department. The housing expert viewed construction cost and household as the most significant determinants of access to quality housing and were therefore adopted to craft the study hypotheses.

The study adopted the Spearman's rank correlation technique to establish the appropriateness of the above independent variables in improving access to quality housing (dependent variable) through use of 1 in 5 Likert scale ranking. The details of the Likert scale ranking included; 1-not appropriate, 2-less appropriate, 3-neutral, 4-appropriate, 5-very appropriate. Besides correlating the variables, each variable was assessed individually in more detail through use of descriptive statistics. It was therefore necessary that the variables be operationalized as shown in Appendix 4.

4.7 Data Analysis

Data analysis was conducted by employing computer based Statistical Package for Social Sciences (SPSS) version 18 software. Raw data obtained from field survey were converted into a format that facilitates analysis. Prior to analysis, raw data were categorized and coded. The mode of analysis was both quantitative and qualitative. The study objectives and nature of data dictated the analysis procedure that was employed. Qualitative analysis was applied to analyse descriptive data while quantitative method took care of numerical data. Descriptive and inferential statistical procedures were employed to analyse data collected from the field.

4.7.1 Grounded Theory and Descriptive Statistical Analysis

Qualitative analysis targeted data from interviews of the key housing informants and open-ended questions from self-administered questionnaires. The grounded theory technique where data collection and analysis went hand in hand was used to establish trends, themes and relationships from information gathered from interview of key informants and open-ended questions. Responses from Likert scale questions although qualitative were assigned numerical weightings and analysed quantitatively alongside quantitative data through application of descriptive statistical analysis technique. According to *Mugenda and Mugenda (2003)* descriptive statistical analysis is a measure of distribution of scores or measurements by employing central tendency statistics that include mean, mode and median. In this enquiry,

descriptive statistical analysis involved computation of frequency count and mean item scores presented as tables, histograms, bar charts and pie charts.

4.7.2 Inferential Statistical Analysis

The inferential statistical method involved correlation of the 13 independent variables with dependent variable and chi – square test for confirmation or rejection of the study hypotheses at a statistical significance level of 0.05.

4.7.2.1 Correlation Analysis

The responses on the association of the independent variables with dependent variables were in Likert scale rankings which were ordinal in nature. *Kothari (2010)* argues that Spearman's rank correlation is appropriate where data are ordinal justifying its adoption. A multiple correlation analysis was therefore performed on the 13 independent variables and 1 dependent variable (access to quality housing). The conceptual relationship between the independent and dependent variables in a systems configuration is as shown in Figure 4.1.

INDEPENDENT VARIABLES   INFLUENCES   DEPENDENT VARIABLES

Inputs   **Outputs**

Housing actors Delivery methods Land/infrastructure Building materials/Tech	

External environment Construction cost Household income Mortgage rate/rent Research (Materials/Tech.)	Access to quality housing by the low/middle Income earners

Throughput   Construction Process   Planning process   Financial Strategy

Feedback   Policy intervention   Monitoring & control

Figure 4. 2: Conceptual Framework

Source: *Author (2016)*

Multicollinearity test was subjected to the independent variables to establish whether there existed high correlation between the independent variables. *Field (2013) and Kothari (2010*) argue that high correlation distorts the relative contribution of each independent variable in influencing the dependent variable meaning that where two independent variables are highly associated with coefficients of more than 0.8 it is advisable that one is dropped.

4.7.2.2 Null Hypothesis Testing

The study tested four null hypotheses on the theoretical view that household income and housing cost are major determinants of access to quality housing which is measured in terms of affordability and customer satisfaction. The null hypotheses that were tested were thus;

1) There is no significant relationship between household income and affordability.

2) There is no significant relationship between housing cost and affordability

3) There is no significant relationship between household income and customer satisfaction.

4) There is no significant relationship between housing cost and customer satisfaction.

The responses on the variables originated from a 1in 5 Likert scale questions giving rise to ordinal data implying that chi-square test was the most appropriate under these circumstances. *Kothari (2010) and Mugenda (2011)* argue that chi-square test is more appropriate where data are grouped and also ordinal. The application of a 1in 5 Likert scale meant there were five possible scenarios justifying the adoption of 4 degrees of freedom. A two-tailed chi-square test was therefore conducted at 4 degrees of freedom and 95% confidence level. The calculated chi-square value (x^2) were computer generated through application of SSPS software version 18.

The calculated chi-square value was compared with table value at 5% significant level and 4 degrees of freedom. The null hypothesis would be accepted if the calculated chi-square was greater than the table value. On other hand if the calculated value was less than the table value, the null hypothesis would be rejected implying the particular variable in question is a significant determinant of access to quality housing. P values were computed to establish the significance of the results of the null hypothesis. Observed P values less than 0.05 meant that the rejection of chi-square test was significant at 5% significant level or vice versa *(Piegorsch, 2002).*

The information collected, method of collection and analysis technique were dependent on the four specific objectives outlined in chapter one. Table 4.7 shows a summary of objectives, information types, sources, collection instruments and method of analysis.

Table 4. 7: Summary of the Objectives, Information Types / Sources, Collection Tools & Method of Analysis

Item No.	Objective	Information Type	Inform. Source	Collection Tool	Method of Analysis
1	Examine the existing housing delivery approach for the low/middle including identification of its components	Review of related literature/records on the Kenyan housing delivery approach & its components	Journals, Text books, Internet, GOK records	Critical review, Desk review	Content analysis, Document review
2	Evaluate the extent to which the housing delivery approach is embodied in a systems approach	Level of existence of systems characteristics i.e. holism, synergism, interdependency, interactiveness, feedback mech. in housing delivery components	Experts	Question.	Descriptive statistics such as frequency count/mean item scores
3	To assess the challenges of the existing public sector housing delivery approaches & how best to address them.	The shortfalls of housing delivery approaches at input, throughput, external environment & feedback.	Households Experts	Question. Interview,	Descriptive statistics (frequency count/mean item scores), grounded theory
4	To formulate a systems frame work for improving accessibility to quality housing by the low and middle level public sector employees.	Enhancement of the appropriateness of the delivery approaches at input, throughput, external environ. & feedback in improving access to quality housing.	Experts Households	Question. Interview	Descriptive statistics i.e. frequency count & mean item scores. Spearman's rank correl. Chi-square test, grounded theory

Source: *Author (2016)*

4.8 Research Validity, Reliability and Replicability

Reliability and validity determine the extent to which data is accurate and the representativeness of the results respectively while replicability refers to repeating the study by similar methodology to achieve similar results. According to *Mugenda and Mugenda (2003),* reliability is a measure of the degree to which research instruments yield consistent results after repeated trials. None consistent measurements after repeated trials under normal circumstances is caused by random error and is one of major causes of in-accurate findings *(Bryman, 2008).* It was therefore necessary to put in place measures for minimizing random error.

In this study, the research instruments were designed in such a manner that minimizes these types of errors. The questionnaires were simple, precise and clear without unnecessary ambiguities while the interviews were as objective as possible to avoid bias. Two research assistants who were recruited to conduct interviews were trained prior to the exercise to ensure accuracy and objectivity. The research instruments were pre-tested and adjusted accordingly to improve on the accuracy of the data that were obtained. Cronbach's alpha test was applied to establish the level of internal consistency of questionnaires 2A and 2B whose results had coefficients more 0.7. *Pallant (2011) and McClelland (2015)* believe that alpha coefficients greater than 0.7 imply that the tools of data collection are reliable indicating the two questionnaires adopted for the study were reliable. There are other methods for determining reliability but Cronbach's alpha was more appropriate since most of the questionnaires were Likert scale type *(UCLA, 2008).* To further check on reliability of data from questionnaires and interview, the research also adopted observation checklist.

Kothari (2010), defines validity as the measure of accuracy to which the results represent the phenomenon under investigation or whether the results from the sample can be generalized to the target population. Unlike reliability that is caused by random error, validity is influenced by systematic error, meaning that while reliability is concerned with internal properties of a measure, validity refers to the relationship between data and the variable being measured *(Mugenda, 2008).* Consequently, validity involves how accurately the data obtained from the field represents study variables. It therefore follows that every effort should be put in place to minimize systematic error to ensure representativeness of the results from sample population to the wider target population. The validity of the research was enhanced by adopting random sampling techniques to ensure the selection was by chance rather than through a biased

technique. Stratified sampling prior to systematic random sampling was necessary to enhance homogeneity across the population. An optimal sample population and higher response rates also guaranteed the validity of the research. To have a clearly defined procedure for undertaking the study implies that similar results will prevail through repeated trials meaning that the study can be replicated.

4.9 Summary

This chapter has discussed in detail the methodological approach that was adopted for the enquiry. The research strategy that was adopted was both qualitative and quantitative while the research design was a cross sectional survey involving obtaining responses (primary data) from sampled households and housing experts through self-administered questionnaires and interviews. Secondary data was collected through document review of records from purposively selected organizations and review of related literature. Observation checklist was also adopted to complement data. Sampling techniques included stratified / systemic and purposive methods. Data were analysed qualitatively through grounded theory and quantitatively through both descriptive and inferential statistics. The descriptive statistics adopted frequency count and mean item scores. On the other hand, inferential statistics involved use of Charles Spearman's rank correlation analysis and chi-square test for null hypothesis.

This chapter has focused on the methodological procedures that guided the enquiry. The next chapter is based on primary data from fieldwork. It starts by evaluating the response rate and the profiles of the public-sector housing experts and key informants who participated in the questionnaire survey. It assesses the extent to which the housing delivery components are embodied in a systems model as well as the appropriateness of the housing delivery components linked to views expressed by the public-sector housing experts and key informants.

CHAPTER FIVE

5.0 HOUSING DELIVERY APPROACH AND ITS CHALLENGES

5.1 Introduction

Literature review has confirmed that systems exist in distinct components of input, throughput, feedback, external environment and output; and at the same possess unique characteristics *(Stave and Hopper, 2007 and; Saleemi, 2009)*. It becomes imperative to assess the extent to which the housing delivery components have embodied systems approach and the challenges that have limited access to quality housing by the low and middle level income earners. The assessment was based on primary data collected through self-administered questionnaires, interview schedule and observation checklist. Questionnaires appendix 2A and Appendix 2B were administered to sampled public sector housing experts and households respectively to obtain their perception on housing delivery related issues. On the other hand, structured interviews were administered to previous lead consultants who managed the construction of the five selected housing schemes.

This chapter details the response level and profiles of the respondents to whom questionnaires and iterviews were administered to assess whether the response rate and qualifications / experience met the required threshold. It also assesses the extent to which the housing delivery components are embodied in a systems model. It further assesses the challenges of the existing housing delivery approaches based on responses from sampled public housing experts and households. The last section is a summary of the key findings.

5.2 Response Rate and Profile of the Respondents

This section assesses the response rate and profiles of the sampled public-sector housing experts to determine whether the level of response and qualifications/experience were adequate for this enquiry.

5.2.1 Response Rate

Questionnaires were administered to public sector housing experts sampled from housing related key public sector organizations and households sampled from five selected housing schemes in Nairobi. The response rates for the public-sector experts and households were as shown in Table 5.1.

Table 5. 1: Response Rate

Item No.	Item Description	Public Sector Housing Experts- Appendix 2A	Households Appendix 2B
1	No. of Questionnaires Issued	60	235
2	No. of Questionnaires Returned	47	167
3	Percentage Response	78%	71

Source*: Author (2016)*

Mugenda and Mugenda (2003) views a response rate of at least 50% as satisfactory. Table 5.1 indicates a response rates of 78% and 71% from public sector housing experts and households respectively which was accordingly good enough for the study. Survey enquiries rely on large samples to guarantee optimal response with some recording responses as low as 20-30 % *(Bryman, 2008 and Kothari, 2010).* A good response rate improves representativeness of results to the target population and therefore the validity and reliability of the enquiry.

5.2.2 Profiles of the Public-Sector Housing Experts

5.2.2.1 Employment Organization

Public sector housing experts were asked to indicate their employment organization and responses were as shown in Figure 5.1.
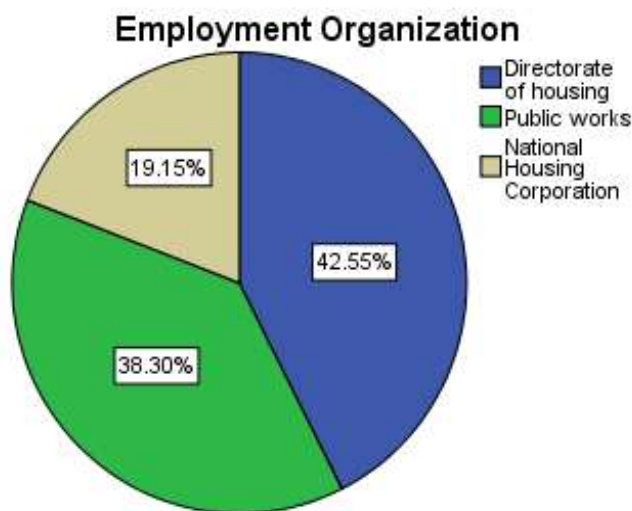
Figure 5. 1: Employment Organization of the Public-Sector Housing Experts

Source: *Author (2016)*

The findings show that 20 of the respondents were from the Directorate of Housing and this represented 42.6%, 18 of the respondents were from the Directorate of Public works and this represented 38.3 % and 9 of the respondents were from the National Housing Corporation and this represented 19.1 %. The Directorate of Housing, Directorate of Public Works and National Housing Corporation are major public-sector entities that are involved with formulation and implementation of housing policy in Kenya. It was therefore necessary that these organizations are included in the study.

5.2.2.2 The Professions of the Public-Sector Housing Experts

This question was intended to establish the professional discipline of the respondents. From the findings, 21 out of the 47 respondents were architects and this represented 44.7 %, 10 out of the 47 respondents were engineers and this represented 21.3 % , 4 out of the 47 respondents were quantity surveyors and this represented 8.5 %, 3 out of the 47 respondents were estates managers and this represented 6.4%, 3 were mortgage officers and this represented 6.4 % ; 2 out of the 47 respondents were building surveyors and this represented 4.26 % while 4 out of the 47 respondents were valuers which represented 8.5 %. The findings are summarized in Figure 5.2.
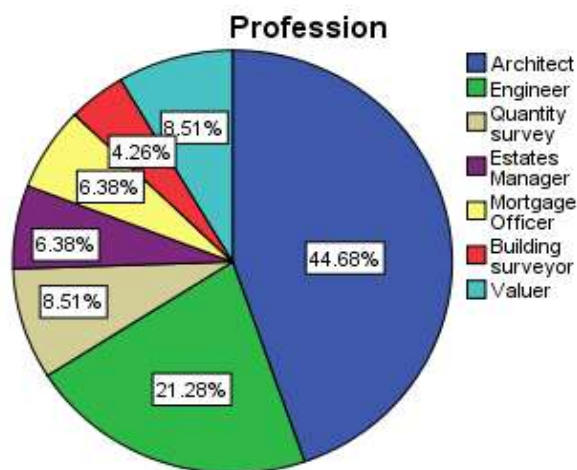
Figure 5. 2: The Profession of the Public-Sector Housing Experts

Source*: Author (2016)*

 All the respondents were housing experts that offer professional services to housing development in their respective disciplines and therefore knowledgeable on issues that affect accessibility to quality housing.

5.2.2.3 The Experience of the Public Housing Experts

The inquiry in this section was intended to establish the level of experience of the respondents in regard to the low / middle level housing development. The findings show that 21.28 % of the respondents had below 4 years of experience, 29.79 % had 5-10 years of experience and 48.94 % over 10 years in experience as shown in Figure 5.3.
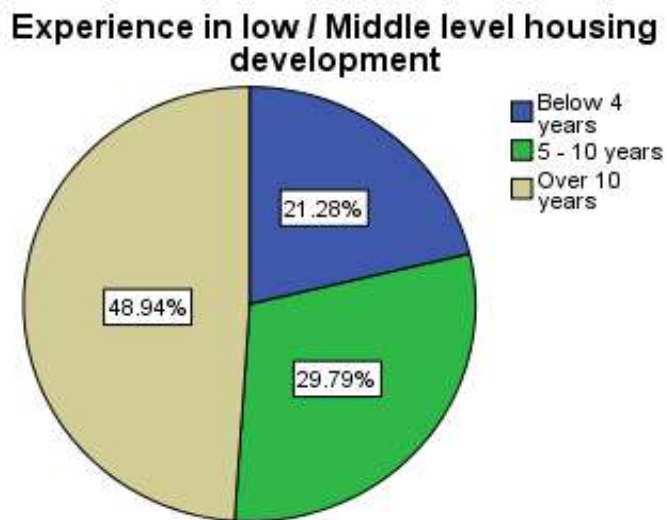
Figure 5. 3: Experience of the Public-Sector Housing Experts

Source: *Author (2016)*

The findings indicate that majority of the respondents had over 10 years of experience and hence they understood issues on delivery of low /middle level housing to great length. In conclusion, the respondents were knowledgeable and experienced in the area of study. This was necessary in order to guarantee accuracy of the responses.

5.2.3 Qualification and Experience of the Key Housing Informants

It was necessary that the qualification and experience of the respondents who were interviewed be analysed to ascertain level of accuracy of the data that were obtained. The category of key informants, their designation and experience are shown in Table 5.2.

Table 5. 2: Qualification and Experience of the Key Informants

Item No.	Category of Key Informants	Designation	Experience
1	**Policy Makers-Directorate of Housing** Departments of Civil Servants Housing Scheme, Estates and Housing	Heads of Departments	Over 10 years
2	**Mortgage Experts from** Jami Bora, Equity, Kenya Commercial Bank	Heads of Mortgage Department	Over 10 years
3	**Affordable Housing Providers** National Housing Corporation (NHC), Shelter Afrique, Habitat for Humanity	Chief Architect and Heads of Technical Support	Over 10 years

Source*: Author (2016)*

Table 5.2 shows that the housing policy makers who were interviewed were senior civil servants heading key Departments of the Directorate of Housing responsible for policy matters concerning housing delivery in Kenya while the mortgage experts were officers heading Mortgage Departments of the three Mortgage Lending Institutions that were selected and therefore knowledgeable in matters pertaining to housing mortgage. On the other hand, the Affordable Housing Providers that were interviewed included the Chief Architect, National Housing Corporations as well as Heads of Technical Support Departments of Shelter Afrique and Habitat for Humanity who deal directly with the implementation of affordable housing programmes and understand well affordable housing parameters. In addition, all the respondents had over 10 years' experience in the implementation of low and middle level income housing programmes. The qualification and experience of the respondents were therefore adequate to guarantee accurate results.

5.2.4 The Profiles of the Previous Lead Consultants

The previous lead consultants were from those firms who were commissioned to design and supervise the implementation of the five selected public housing schemes. The consultancy firms were Space & Systems, Baseline Architects, National Housing Corporation and Directorate of Public Works.

All the respondents were professionally registered architects with over 10years experience and also having offered professional services to housing development in their respective disciplines and hence knowledgeable on the issues affecting access to quality housing. Accordingly, the respondents were knowledgeable and experienced in the study area implying the accuracy of the responses that were received. The lead consultants and the housing schemes they designed / supervised are shown in Table 5.3.

Table 5. 3: Lead Consultants and Housing Schemes

Item No.	Lead Consultant	Housing Scheme
1	Baseline Architects	Ngara Phase 1 & 2
2	National Housing Corporation	Shauri Moyo
3	Directorate of Public Housing	Ruai Police
4	Space and Systems	Jogoo Road

Source: *Author (2016)*

5.3 The Extent of the Embodiment of Housing Delivery Components to Systems Model

This section has relied on data obtained through administering questionnaires to 47 sampled public-sector housing experts. The enquiry focus was to assess in a Likert scale of 1 in 5 the extent to which the existing housing delivery approach is embodied in a systems model. The findings in this section therefore revolves around two issues that include the extent to which the housing delivery components are aligned with the systems architecture of input, throughput, external environment, feedback and output; and the extent to which the characteristics of the housing delivery components match those from a systems model.

5.3.1 The Extent of Alignment of Housing Delivery Components to Systems Framework

This enquiry sought to determine the extent of embodiment of housing delivery components in a systems frame work through an examination of the order of appropriateness of housing

delivery components in the improvement of accessibility to quality housing by the low / middle income earners. The housing delivery components were grouped by the author to assume a theoretical representation of a systems architecture of input, throughput, output, external environment and feedback / control. The findings indicate that housing inputs such as the housing actors, construction inputs and housing delivery methods had a mean item score of 4.43, throughput such as Planning process, construction process and financing had a mean item score of 4.43, external environment such as housing cost, household income, mortgage rate / rent and research into alternative material / technology had a mean item score of 4.76; and feedback / control such as customer satisfaction, policy intervention, policy reforms and monitoring/ control had a mean item score of 2.85. The results are summarized in Table 5.4.

Table 5. 4: The Extent to which the Housing Delivery Components Have Embodied Systems Model

Systems Components	Mean Item Score
Input such as actors, delivery methods & construction inputs	4.43
Throughput such as planning process, construction process & financing	4.43
External Environment such as housing cost, income, mortgage/rent & research	4.76
Feedback/Control such as customer satisfaction, policy intervention, policy reforms & monitoring/control	2.85

Source: *Author (2016)*

This shows that housing inputs, throughput and external environment all had mean scores above 3.00 and were considered to be appropriate in order of contribution to the improvement of accessibility to quality housing by the low / middle income earners while the feedback / control at a mean item score of less 3.00 considered as less appropriate. The critical housing components and subcomponents therefore fall within the input, throughput and external environment with external environment as the most significant.

The finding regarding the significance of the external environment variables such as housing cost, mortgage rate / rent, housing income and research into appropriate materials in determining access to quality housing closely mirrors those from *Republic of Kenya (2014), Moko and Olima (2014), Noppen (2012) and CAHF (2012)*. This finding shows how the

external environment variables are highly rated in the current housing delivery approach. In line with systems theory, components are meant to be interdependent and also interact within themselves to determine the level of output desired *(Hjorland and Nicolaisen, 2005)*. The majority of the respondents considered the external environment as being most significant but see feedback and control as being less significant contrary to systems theory where components are meant to be equal and in synergistic relationship in their contribution to the desired output.

This finding contradicts systems theory configuration as elaborated in the review of literature. Systems theorists argue that a functioning system must exist strongly at all levels (input, throughput, external environment, feedback and output) and any shortfall at any level affects its effectiveness and efficiency (Bertalanffy, 1968 and Boulding, 1956). In line with this thinking, *Heylingen (1998) and Freetutes (2014)* contend that a functional system must have an elaborate feedback and control mechanism that would check on the adequacy of the quality and quantity of output being delivered to the external environment and be able to send back feedback impulses in form of policy interventions to enable the system adjust the level of inputs.

This explains why the existing housing delivery system has failed to address the housing needs of the low / middle level income earners. The existing housing delivery system is thus incomplete as it lacks a proper feedback mechanism in correct proportions necessary for instituting the relevant policy reforms and interventions to guarantee access to quality housing by the low and middle level income earners. It is therefore safe to conclude that the existing housing delivery components are not configured in a systems frame work.

5.3.2 The Extent of Incorporation of Systems Characteristics in the Housing Delivery Components

This enquiry was meant to understand whether the existing housing delivery components have features that are aligned to the characteristics of a model system. From the findings, it is clear that the statements that the above components are un- able to deliver the programmed output when one or more components has / have failed i.e. the whole is bigger than parts had a mean of 2.85, there is interactivity and interdependency of housing components on one another had a mean of 4.31, the components interact with one another to achieve a common objective had a mean of 4.26 and there is an existing feedback mechanism between input, external environment and output to regulate the housing market had a mean of 2.90. The results are captured in Table 5.5.

Table 5. 5: The Extent to which the Housing Delivery Components Have Embodied Systems Characteristics

Systems Characteristics	Mean Item Score
The housing delivery components are un-able to deliver programmed output when one or more components has / have failed i.e. the whole is bigger than the parts	2.85
There is interactivity & interdependency of the housing delivery components	4.32
Housing delivery components interact to achieve a common objective	4.26
There is an existing strong feedback mechanism to regulate the housing market	2.85

Source: *Author (2016)*

From the findings, it can be concluded that the majority of the respondents agreed to both statements that there is interactivity or interdependency of the housing components on one another and the components interact with one another to achieve a common objective had means above 3 in 1 in 5 Likert scale and consequently significant characteristics of the housing delivery components. However, the statements that housing delivery components are un- able to deliver the programmed output when one or more components has / have failed i.e. the whole is bigger than parts and that there is an existing feedback mechanism between input, throughput, external environment and output to regulate the forces that control the housing market had means less than 3.00 and were therefore less significant in 1 in 5 Likert scale.

The findings disagree with systems theorists' view that a working system must have components that are interdependent / interactive in addition to the existence of a feedback control mechanism. The holistic nature of systems is a critical trait without which a system cannot operate while a feedback mechanism is a control component for communication with the external environment to re-adjust its self to enable the system achieve the desired output and also continue existing or else it dies *(Boulding, 1956; Hylingen, 1998 and Freetutes, 2014)*. These findings indicate that the housing delivery approach in Kenya lacks some critical characteristics of systems and may be the cause for its in ability to meet the housing needs of the low and middle level income earners. Given that two critical characteristics of systems have been identified as being less significant, the existing housing delivery approach is therefore not a complete system. *Boulding (1956) and Bertalanffy (1968)* assert that a

system is a whole with parts that interact synergistically and also has a feedback control mechanism to be able to achieve its objectives.

In conclusion, for the existing housing delivery approach to succeed, it must have components and characteristics that fully reflect those of a complete system as defined by the systems theorists. The existing housing delivery approach should therefore be embodied with basic systems characteristics and also restructured to fit a complete systems configuration of input, output, throughput, external environment and feedback. The next section discusses sub components or variables forming part of input, throughput, external environment, output and feedback. These are in essence housing delivery components that need to be fitted in a systems configuration. In this enquiry, the output is the desired quality housing models that can be accessed by the low and middle level earners to be delivered in adequate quantities.

5.4 Challenges of the Existing Housing Delivery Approach

This section assesses in a systems' context the challenges of the existing housing delivery approach that have limited access to quality housing by the low and middle level income earners. It further discusses the means of addressing the challenges in the context of systems model.

5.4.1 General Challenges Advanced by Public Sector Housing Experts

47 out 60 housing experts sampled from public sector organizations that included National Housing Corporation (NHC), Directorate of Housing and Directorate of Public Works were asked to give their opinion on the general challenges encountered in the delivery of quality housing for the low / middle income earners. The expertise opinions were collected through use of self-administered questionnaires.

The findings show that 12.5 % of the respondents considered lack of / high cost of land and infrastructural services, 12.5 % considered high cost of construction, 12.1 % considered lack of an integrated planning in housing programs and delivery methods, 12.0 % considered in appropriate / inadequate financing mechanism more so inaccessibility to mortgages and low treasury financing, 11.2 % considered lack of focus on research in appropriate materials and technologies, 11.2% considered low household income, 8.7% considered high development control and planning standards, 8.3 % considered lack of political good will, 7.2 % considered in-appropriate housing policy and 4.3 % considered in-appropriate design by the

consultants, as challenges in the delivery of quality housing for the low / middle income earners. The results are displayed as Figure 5.4.
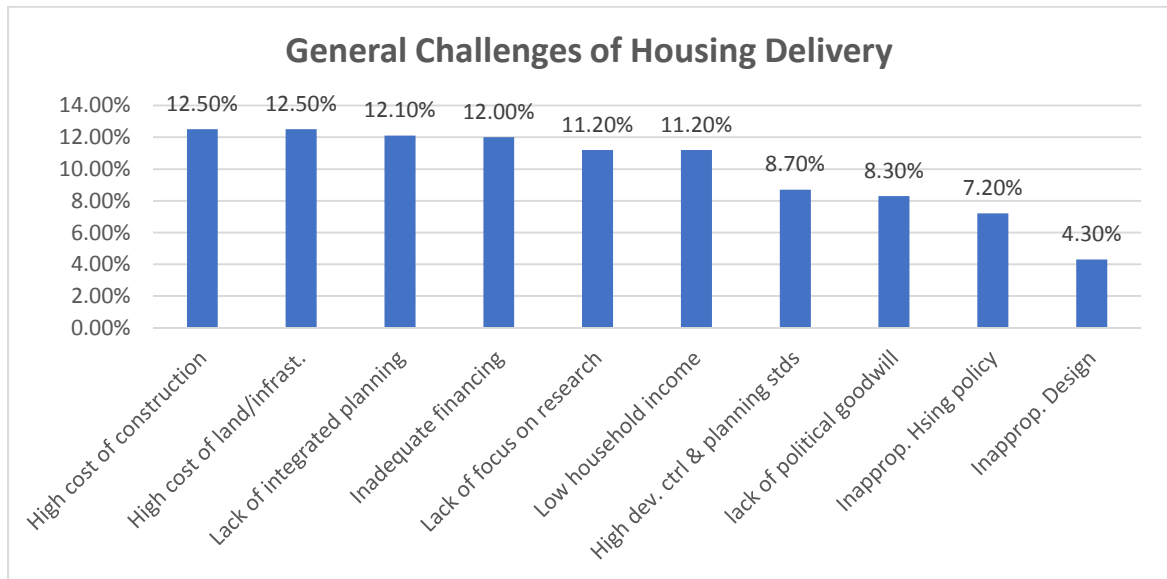
Figure 5. 4: General Challenges of the Existing Housing Delivery System

Source: *Author (2016)*

The findings further show that lack of / high cost of land and infrastructural services at 12.5 %, high cost of construction at 12.5 %,, lack of integrated planning in housing programmes / delivery methods at 12.1%, inadequate financing mechanism at 12 %, low household income at 11.2%, lack of focus in research on appropriate materials / technology at 11.2%, high development control / planning standards at 8.7% and lack of political good will at 8.3% have stood out as the most significant challenges to the delivery of quality housing.

These findings closely agree with those from *CAHF (2012), Noppen (2012), Njathi (2011) and Okonkwo (1996)* whose investigations focused on the Kenyan housing delivery situation. The findings also mirror those from *Alakeson (2011) and Makinde (2013)* based on enquiries conducted in the UK and Nigeria respectively. These significant challenges affect the systems subcomponents of input, throughput, feedback and external environment of the housing delivery system responsible for determining the accessibility of quality housing by the low and middle level income earners.

Systems theory indicates that if the above significant challenges impact on any of the components or sub components of the housing delivery system, it will not perform as desired meaning that in this case the needs of the low and middle level income owners will not be addressed *(Hjorland and Nicolaisen, 2015)*. It is therefore imperative that appropriate

solutions to the challenges are sought to ensure the sub components and components perform towards the overall objective of the housing delivery system which should be to ensure access to quality housing by all including the low and middle level income earners. The critical challenges that need to be addressed have been listed under the systems theory architecture of input, throughput, feedback, external environment and output as shown in Table 5.6 at the end of this chapter.

The challenges that limit access to quality housing by the low and middle level income earners cited above need to be resolved so that the plight of the low and middle level formal sector income earners is addressed. Enquiries were therefore equally directed to 47 out of 60 housing experts sampled from public sector housing organizations to express their opinion through self-administered questionnaires on appropriate means of addressing the challenges that limit accessibility to quality housing by the low and middle level income earners.

The findings indicated that 10.8 % of the respondents considered provide appropriate housing policy intervention to effectively regulate the housing sector, 13.8 % considered streamlining land administration and management, 14.6% considered lower costs on building materials / construction equipment (lower taxation), 13.5 % considered streamlining planning standards and development control, 9.2 % considered provision of free land with infrastructural services, 14.2 % considered stimulating research into appropriate materials / technology, 13.1 % considered subsidizing housing rents / mortgage to enhance accessibility to quality housing and 10.8 % considered the government needs to entrench effective measures to control the prevailing macro-economic climate as shown in Figure 5.5.

Means of Addressing the Challenges
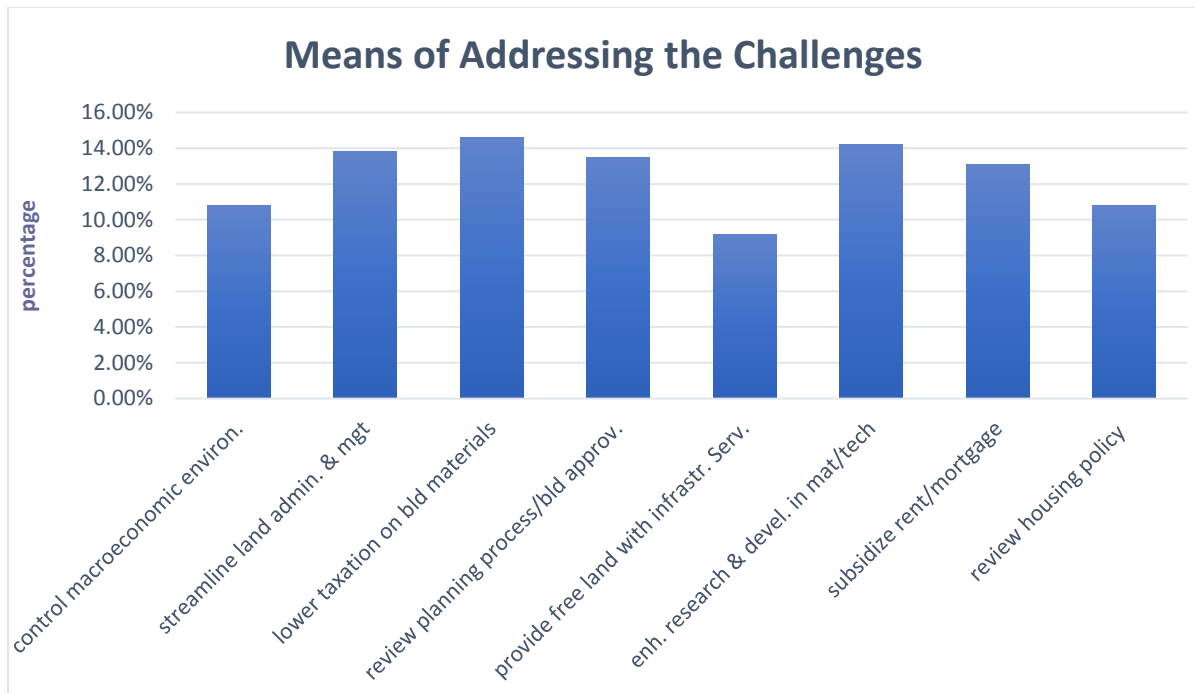
Figure 5. 5: Means of Addressing the Housing Delivery System Challenges

Source*: Author (2016)*

In line with systems theory, the significant variables need to be configured in a systems frame work of input, output, throughput, external environment and feedback *(Bertalanffy, 1968 and Boulding, 1956).* Variables with percentages above 10.8% were significant and guaranteed representation at all levels of systems frame work. From the findings, it is clear that the majority of the respondents considered lower costs on construction materials and equipment (14.6%), streamlining research into alternative materials and technology (14.2%), streamlining land administration and management (13.8%), streamlining planning standards and development control (13.5%), subsidizing housing rent / mortgages (13.0%) to enhance accessibility to quality housing, provide appropriate policy intervention measures to regulate the housing sector (10.8%) and entrench effective measures to control the prevailing macro-economic climate (10.8%) as the most significant means of addressing the challenges that have since curtailed housing development for the low / middle level earners. These critical means of addressing the challenges are essentially incentives that need to be provided by the state to boost housing supply and demand.

The findings agree with those from *Republic of Kenya (2016c)* who acknowledges that these incentives are sure ways of enhancing access to quality housing by the lower end income group. Although the Directorate of Housing has put in place some incentives a lot more

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remains to be undertaken. The findings also mirror those from *Makinde (2013) and Ibem (2010)* reflecting on low and middle level housing delivery challenges in Nigeria. This however contrasts findings from *Quigley and O'Regan (2000), Alakeson (2011), Makendel (2014), Cohen (2013) and Affordable Housing Institute (2013)* who focus more on heavy subsidy as a significant means of delivering quality housing to the low and middle level income citizens in the developed world. Although the US and the UK, among the nations of the developed world have strong economies capable of supporting heavy subsidy and other raft of incentives to house the lower end income group, it however remains to be seen what level of subsidies can be shouldered by weak economies of the developing world *(Hull, 2012 and Millennial Housing Commission, 2012)*.

Given that only 8% of the low and middle level earners can access quality housing and because housing is also a right recognizable by the Constitution of Kenya 2010, the government of Kenya has got no other option but to adopt these significant incentives some of which are currently being addressed to a small scale. According to *Republic of Kenya (2013f)*, some legislation has been undertaken with a view to reforming the mortgage market as well as consideration of tax rebates to make investments in the low and middle grade housing development attractive. Some of the significant legislations put in place include; Legal Notice No. 115 of 2008-VAT Exemption, Stamp Duty Amendment Act 2010-Reduction of Rate of Penalty / Stamp Duty Charges and Banking Amendment Act 2010-Expansion of Mortgage Lending Capacity. Lately, parliament has legislated the Banking Amendment Act 2016 which has capped interest on loans at 4% above Central Bank of Kenya lending rates.

While the impact of the incentives provided through previous legislations have not been felt for lack of political support and low economies of scale, it remains to be seen what level of impact it will have on accessibility to quality housing. Already, the Banking Amendment Act 2016 which was expected to revolutionize the mortgage sector by providing cheaper mortgage products has met certain bottlenecks *(Central Bank, 2016)*. Perhaps the on-going initiative by the savings and credit co-operative societies where members acquire housing mortgage interest free could be an alternative financing model but only if they enhance their capacity *(Herbling, 2017)*. The incentives are policy decisions by the state as a major actor in the housing delivery system and consists of monitoring tools, controls, interventions and reforms on the external environment necessary for an effective feedback mechanism on the

reassessments of the levels of input and throughput to enhance accessibility to quality housing by the low and middle level income earners.

There is therefore needed a greater state intervention so that the challenges of the existing housing delivery systems are addressed through the appropriate incentives from regular reforms of the existing housing policy just as it happened in the US and European countries. The concept of social housing being practiced in Europe and the Far East is a direct benefit of state incentives driven through policy reforms *(Hull, 2012 and Millennial Housing Commission, 2012).* Although Kenya has factored social housing in the current housing policy, its implementation remains impeded because of lack of a clear reforms agenda to initiate the much-needed incentives *(Republic of Kenya, 2013b).*

The most significant factors identified from the enquiry are drawn from the main components of systems architecture of input, throughput, external environment, feedback and output. The current housing components have failed to address the housing accessibility needs of the low and middle level income earners due to challenges earlier identified through this enquiry. To address these challenges, the investigation has revealed the most significant incentives as stimulate research into alternative materials and technology, lower costs on building materials and construction equipment, streamline planning standards and development control, streamline land administration and management, subsidize housing rents and mortgage, provide appropriate policy intervention measures to regulate the housing sector and entrench into policy that all housing developers should dedicate some proportion of housing development to the lower end income group. The incentives for addressing the housing accessibility challenges have been structured into a systems architecture as show in Table 5.7 at the end of this chapter.

5.4.2 General Challenges Advanced by the Households

Section 5.4.1 has assessed the general challenges to access to quality as perceived by the public-sector housing experts. This section assesses the general challenges on access to quality housing as perceived by the households living in the selected five housing schemes. It also compares the two sets of general challenges expressed by the public-sector housing experts and households.

The respondents (households) were asked to rank on a Likert scale of 1 in 5 their level of agreement with different challenges impacting on housing accessibility by their respective income groups. The findings show that stringent mortgage lending conditions had a mean

score of 4.21, high construction cost (4.17), high rent / mortgage rates (4.38) and inappropriate building code (3.57). This shows that high rent / mortgage rates at 4.38, stringent mortgage lending conditions at 4.21, high cost of construction at 4.17 and inappropriate building code at 3.57 were significant challenges that the respondents face in accessing quality housing quality since their mean item scores were all more than 3, the theoretical mean of a 1in 5 Likert scale as shown in Figure 5.6.
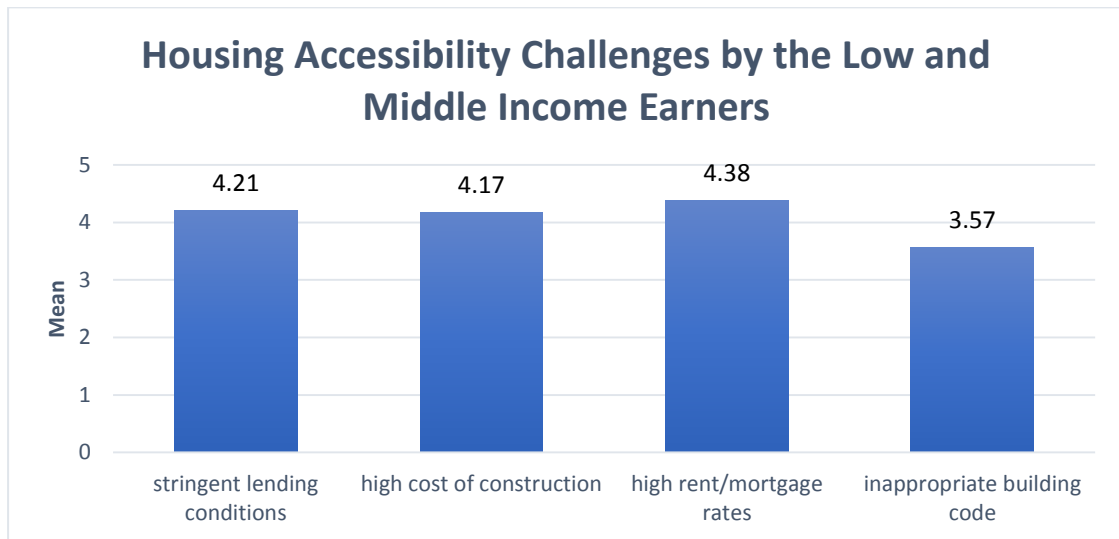
Figure 5. 6: Housing Accessibility Challenges by the Low / Middle Income Earners

Source: *Author (2016)*

These in essence are mostly affordability related constraints except the in-appropriate building code. The inappropriate building code however also contribute indirectly to low affordability as it limits specification of cheaper alternative materials / technology *(Gichunge, 2001)*. The findings on the general challenges as perceived by the public-sector housing experts were however more comprehensive and also covered non-affordability related issues such as lack of integrated planning, inadequate financing and lack of political goodwill. In addition, the views expressed by public sector housing experts did not closely agree with those from households that stringent lending conditions and high rent / mortgage rate were the most significant challenges. The variance in the two findings may be attributed to the fact that households hold the view that affordability related constraints are more significant impediments in addressing their housing needs than other challenges while the public-sector housing experts felt a comprehensive approach encompassing all constraints would be a more practical approach in dealing with the housing accessibility challenges of the low and middle level income earners.

In-adequate financing, in-appropriate housing policy and lack of political goodwill also contribute a great deal to limited access to quality housing by the low and middle level income earners *(Republic of Kenya, 2014)*.

The significance of high construction cost and in-appropriate building code (an element of high planning /development control standards) in limiting access to quality housing were however commonalities across the two perceptions. The findings agree well with those from *Noppen (2012) and Njathi (2011).* This equally agrees with those from *schwartze and Wilsine (2006); and Disney (2007)* who argue in favour of the significance of affordability related factors in improving access to quality housing by the economically weaker segments of the society. The general challenges of access to quality housing as perceived by the households are affordability related and therefore fit as part of Table 5.6 where the general housing delivery challenges as perceived by the public-sector housing experts have been structured in a systems frame work of input, throughput, external environment, feedback and output. A functional system can only continue to survive if the critical components exist as part of the whole meaning the whole is bigger than the parts where any omission of any part or component renders the whole non-functional *(Boulding, 1956 and Bertalanffy, 1968).* It therefore follows that the critical affordability challenges of the low and middle level households are incorporated as part of the housing delivery system so that it functions appropriately in order to enhance accessibility to quality housing by the low and middle level income earners. Subsequently, housing cost, mortgage / rent and the building code are therefore important components of a housing delivery system.

Having identified the critical housing accessibility challenges by the low and middle level income incomers, it was imperative to identify the significant means of addressing them. The significant means of addressing the housing accessibility challenges are those that enhance the affordability of the households. The respondents (households) were asked to rank on a Likert scale of 1 in 5 the level of agreement on various means of addressing housing accessibility challenges for their respective income group. The findings show that lower development control and design standards had a mean score of 3.65, subsidize house rent / mortgage (4.22), lower taxation on construction inputs (4.18), adopt cheaper alternative materials and technology (4.36) and review existing housing policy (4.76) as shown in Figure 5.7.
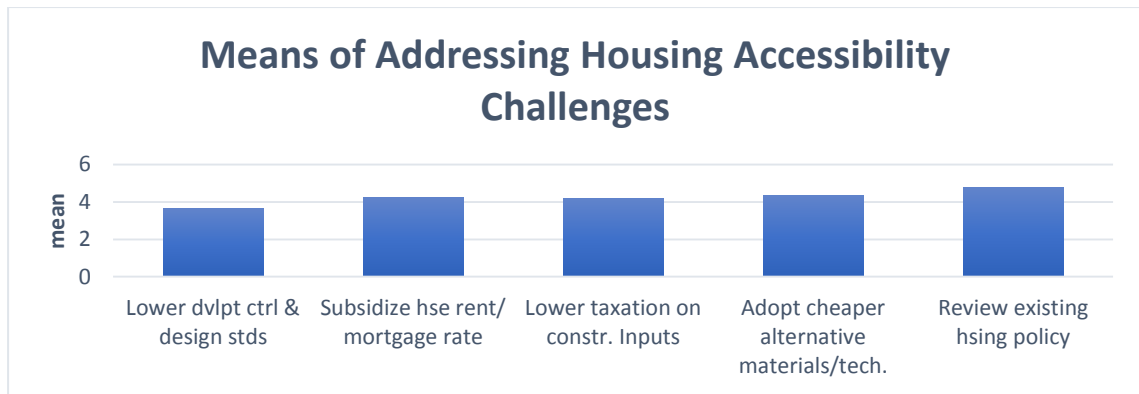
Figure 5. 7: Means of Addressing Housing Accessibility Challenges

Source*: Author (2016)*

The findings indicate that review of existing housing policy at 4.76, adopt cheaper alternative materials / technology (4.36), subsidize house rent / mortgage at 4.22, lower taxation on construction inputs (4.18) and lower development control / design standards (3.65) are all significant means of addressing the challenges in accessing quality housing having exceeded 3, the theoretical mean of a 1 in 5 Likert scale. The means of addressing the general challenges as perceived by the households majorly focus on affordability related incentives except review housing policy which does not directly influence affordability but could indirectly influence access to quality housing at demand and supply points. This scenario may be partly attributed to a notion by households that eliminating or minimizing affordability challenges could be the only significant means of addressing the housing needs of the low and middle level income earners.

By and large, the views expressed by the households on the means of addressing the challenges more or less mirrors those from the public-sector housing experts which covers a wider range of issues and therefore more comprehensive. The only divergence is the inclusion of the need to control macro-economic climate as part of the views projected by the public housing experts. However, managing the macro-economic climate also includes lowering taxation, one of the critical means of addressing the challenges prioritized by the households. The two sets of findings on the means of addressing the challenges were therefore merged and configured into a systems frame work as shown in Table 5.7.

The findings closely agree with those from *Republic of Kenya (2014) and Njathi (2011)*. The findings also agree with those from *Schwartze (2006) and Republic of USA* (2012) who contend that housing affordability related factors are critical in providing quality housing to the lower end income groups in the US. These are essentially measures that can be in built

through reforming the existing legal and institutional framework. *Hull (2012) and Weiss (2002)* highlights the importance of reviewing housing policy to facilitate the lower end income group access quality housing. These challenges need to be identified through customer satisfaction surveys and relayed back through an appropriate feedback mechanism for formulation of regular policy reforms in the context of the housing systems architecture of input, throughput, output, external environment and feedback mechanism.

5.5 Challenges Specific to Key Housing Delivery Components

The literature review has confirmed the significant roles construction materials / technology, planning / development control, household income, mortgage finance and delivery methods can play in enhancing access to quality housing by the low and middle level income earners *(Noppen, 2012 and CAHF,2012)*. Despite this fact, these housing delivery components are constrained in one way or another limiting their contribution towards access to quality housing by the low and middle level income earners. While the question of low household income is simply dependent on a nation's economic performance, the other components are hinged on resolving complex issues *(UN Habitat, 2013a).* Section 5.4 has exhaustively discussed the broad and general challenges of the existing housing delivery approach based on responses from the public-sector housing experts and households. This section discusses the challenges specific to key housing delivery components that have limited their performance in contributing to access to quality housing.

5.5.1 Challenges of Housing Delivery Methods

Eleven theoretical challenges identified through the review of literature were subjected to ranking by the sampled public-sector housing experts. This was necessary to obtain their opinion on the critical challenges facing the existing housing delivery methods. The findings show that 7.3 % of the respondents identified corruption during allocation of site and service housing units, 7.3 % of the respondents perceived core unit in site service schemes as too small and does not meet the needs of a family, 9.4 % perceived high purchase price for tenant purchase housing, 11.5 % identified high mortgage, 9.8 % singled out high cost of rental housing, 9.8 % cited lack of collateral for mortgage housing, 8.0 % cited defaults on payments on mortgage housing, 10.5 % identified relocation of households during slum upgrading, 9.8 % perceived the designer as having minimal flexibility in enhancing unit size on slum upgrading programs, 8.9% perceived in-appropriate design, 8.7 % perceived movement of slum dwellers from upgraded units to other slums and 7.7 % identified in-

appropriate housing policy as challenges attributed to the existing housing delivery methods. The summary of the results from the enquiry are captured in Figure 5.8.
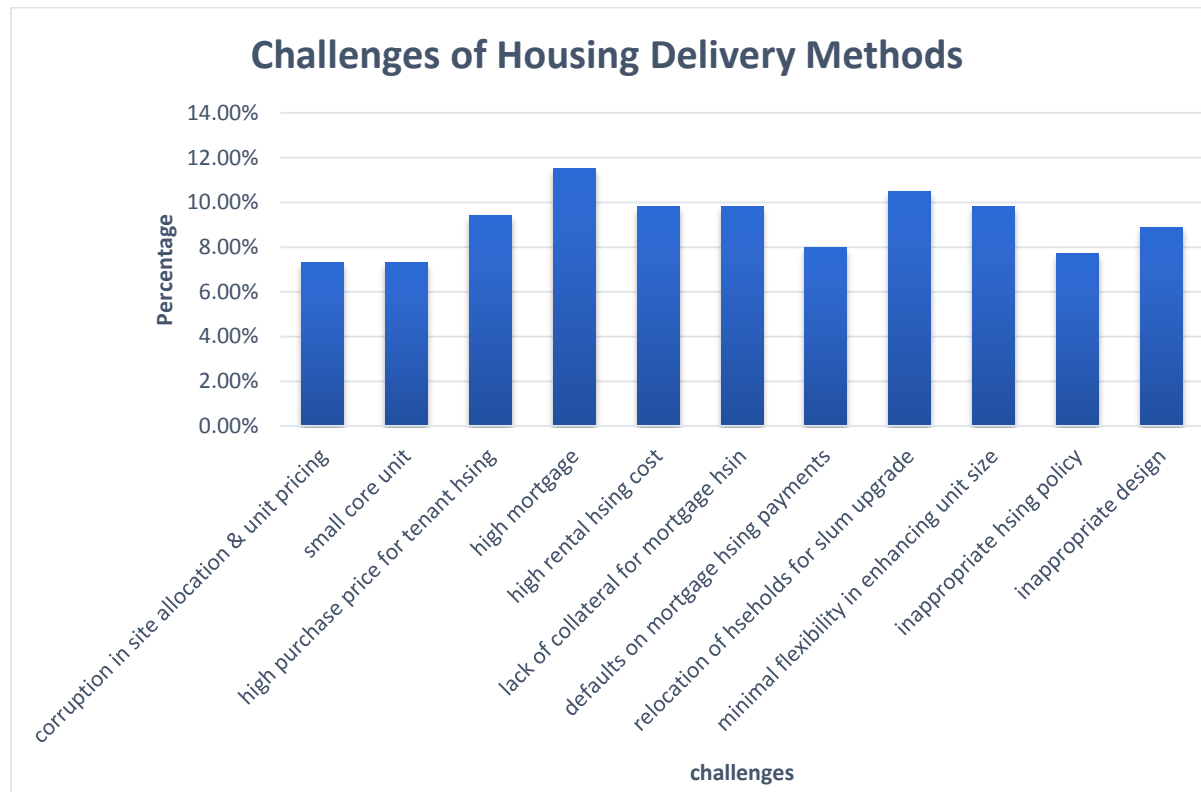
Figure 5. 8: Challenges of the Existing Housing Delivery Methods

Source: *Author (2016)*

It is clear that all these variables were all considered significant by the respondents as challenges of the existing housing delivery methods. The percentage response for these challenges are above the mean percentage of 9.1 % justifying their significance. The ranking of the challenges shows high mortgage rate as most significant followed by relocation of households during slum upgrading programmes, lack of collateral, designer has minimal flexibility in enhancing unit size under slum upgrading, high cost for rental housing and high price for tenant purchase scheme were ranked in this order as the critical challenges of the existing housing delivery methods that have limited access to quality housing by the low and middle level earners. Accordingly, these are the key challenges that should be targeted for either elimination or minimization in an effort to increase access to quality housing by the low and middle level earners. The interpretations of these findings are that all the existing housing delivery methods somehow are associated with one or more of these challenges. The conclusion that can be drawn from these findings is that high mortgage rate in mortgage housing and relocation of households in slum upgrading programs rank as most significant among the challenges of housing delivery methods at 11.5% and 10.5 respectively.

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The findings closely agree with those from *Mitullah (1993)* who argue that the World Bank financed Umoja tenant purchase scheme in Nairobi failed to meet its initial objective of housing the low and middle-income due lack of conceptualization of the adopted housing delivery vehicle to guarantee affordability. The findings are partly similar to those from *Kieti (2015)* who views interest rates on mortgage loans as quite significant in impacting negatively on housing affordability and hence limiting access to quality housing by the low and middle level income earners in Kenya. Notwithstanding the above, these findings also agree with those from *Baharogin and Lindfield (2000)* who reflect on high mortgage rates associated with capitalists' states that are responsible for low access to quality housing by the low and middle level income earners. The high mortgage rate is a cause of concern to housing policy makers as only 8% of Kenyans can access financing from the mortgage market while most slum upgrading programmes in Kenya have met serious challenges on relocations of the existing households *(Noppen, 2012)*. According to the Central Bank of Kenya (CBK) April 2016 Report, the mortgage lending interest rates have been ranging from 14.5-20% which has been unrealistically high and has forced the government to cap the same at 4% above CBK lending rates but the control may not achieve much in the short run because of the low mortgage capacity which is only 2.5% of the GDP *(Central Bank of Kenya, 2016). Herbling (2017*) cites that the initiative being fronted by savings and credit co-operative societies could serve an alternative financing model but lacks capacity.

The significant specific components challenges were merged with the general challenges and configured into a systems frame work shown in Table 5.6. In a systems framework, housing delivery methods are part of the critical sub components of housing delivery inputs. According to systems theory, the significant challenges facing these sub components also affect the input and by extension the overall functioning of the housing delivery system making it not possible to guarantee accessibility to quality housing by the low and middle level income earners. These findings also agree with systems dynamics where the whole is bigger than the parts when any of the parts are interfered with, the system malfunctions. For instance, *Hjorland and Nicolaisen (2005)* contend that a system is a whole with several parts that cooperate to realize a common aim. The existing scenario therefore needs to be reversed through adoption of appropriate strategies to enable the delivery methods respond to the needs of the low and middle level income earners.

The respondents were further asked to provide appropriate solutions to curb the challenges of existing housing delivery methods. The findings indicate that 9.3 % of the respondents considered streamlining of housing allocation procedures as being essential to curbing

challenges of existing housing delivery methods, 9.7% considered provision of reasonable sized core unit, 14.7 % considered provision of cheaper alternative materials / technology, 13.0 % considered subsidize rent / mortgage, 10.4% considered expansion of mortgage market, 11.2 % considered reforms to slum upgrading policy, 9.7% considered appropriate design and 10.0% considered appropriate housing policy as means of curbing challenges of the existing housing delivery methods. The results are summarized in Figure 5.9.
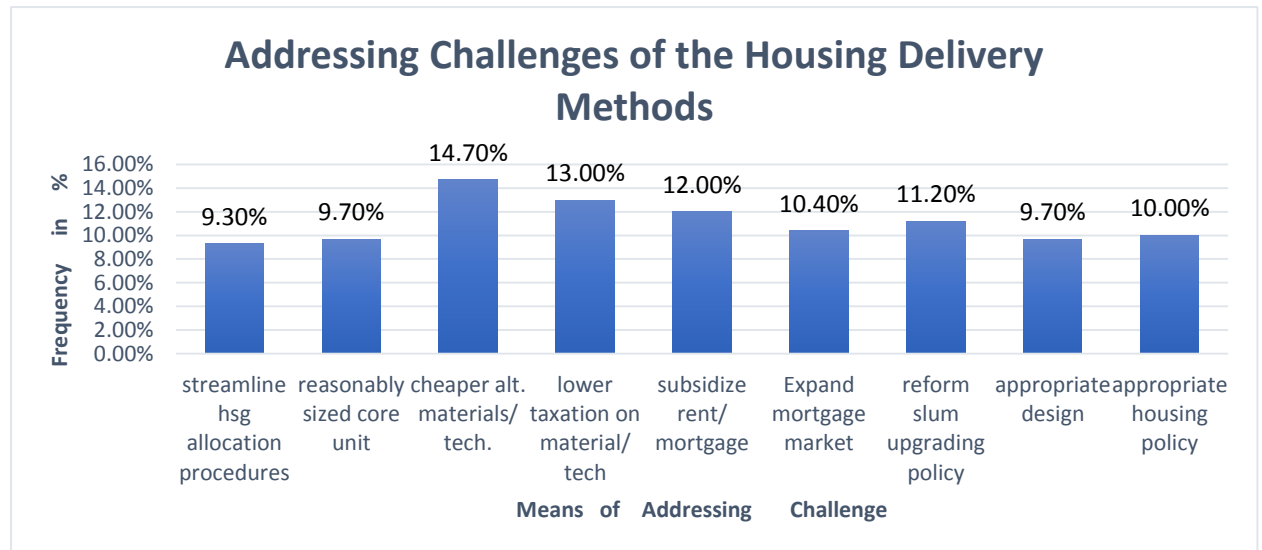
Figure 5. 9: Addressing Challenges of Housing Delivery Methods

Source: *Author (2016)*

Generally, it is evident that provision of cheaper alternative materials / technology stood out as the most significant solution to the challenges facing the housing delivery methods followed by subsidize rent / mortgage, reform the slum upgrading policy and provide appropriate housing policy. The critical role that alternative materials and technology could play in reducing development cost and by extension improving accessibility to quality housing mirrors findings by *Magutu (2015), Kvarnstrom (2014) and Syagga (1993*) who focused on the Kenyan housing accessibility situation and decry the slow take up for lack of political support, inadequate funding and inadequate sensitization. The findings also agree with those from *Ugochukwu and Chioma (2015)* who contend that the housing accessibility dilemma by the low and middle level Nigerian citizens could be best resolved through sustainable exploitation of cheap locally available materials and technologies capable of minimizing construction costs by almost 60 %.

The significant specific components' means of addressing challenges were merged with the general ones and configured into a systems frame work shown in Table 5.7. In line with

systems theory, the significant solutions to the challenges facing the housing delivery methods would not only improve the performance of the housing delivery methods but also the overall achievement of the existing housing delivery system in enhancing accessibility to quality housing by the low and middle level income earners. Although housing delivery methods fall at input level, the solutions to their challenges go beyond the input level confirming the level of interdependency and interactivity required to make the existing housing delivery approach function appropriately. For instance, subsidizing rent / mortgage rate is an activity at the external environment level while reforming the slum upgrading policy as well as appropriate housing policy are intervention measures at feedback level.

This finding closely mirrors the interdependency and interactivity of the components of a functional system as projected by systems theorists. *Saleemi (2009), Amagoh (2008) and Hopper (2007)* view a working system as that whose components are interdependent and interactive implying that a functional housing delivery system should consist of components that are interdependent and interactive. The significant means of addressing the housing delivery methods' challenges should therefore target housing models anchored on appropriate design, accessible mortgage financing, appropriate policy frame work, conducive incentives and corrupt free allocation criteria so as to satisfy the social economic needs of the low and middle level income earners.

5.5.2 Housing Mortgage System

As discussed earlier at the beginning of this chapter, access to finance and household income are key in the provision of quality affordable housing to the low and middle level income earners. Unfortunately, only 8% of the Kenyan urban dwellers have access to housing finance and there are only 22,000 active mortgage institutions in the entire country where the mortgage market is only 2.5% of the GDP as opposed to 70% in the US *(Noppen, 2012). Nabutola (2004)* adds that the Kenyan money market is expensive mainly as a result of the higher risks that raise interest rates. The study therefore examined the critical challenges that affect mortgage accessibility.

Public sector housing experts were asked to rate hypothesized challenges of the existing housing mortgage system in 1 in 5 Likert scale in order of agreement with mortgage accessibility challenges. The findings show that stringent lending conditions had a mean score of 4.34, low level of household income (4.38), low capacity of mortgage market (4.32), lengthy land adjudication procedures (4.41), high land rate and stamp duty (4.03) while

others included; high and costly approval process (2.1), few large mortgage providers (2.1), lengthy repayment periods (2.1) and payment defaults (2.1) with missing values at 19.1 %. The findings are summarized in Figure 5.10.
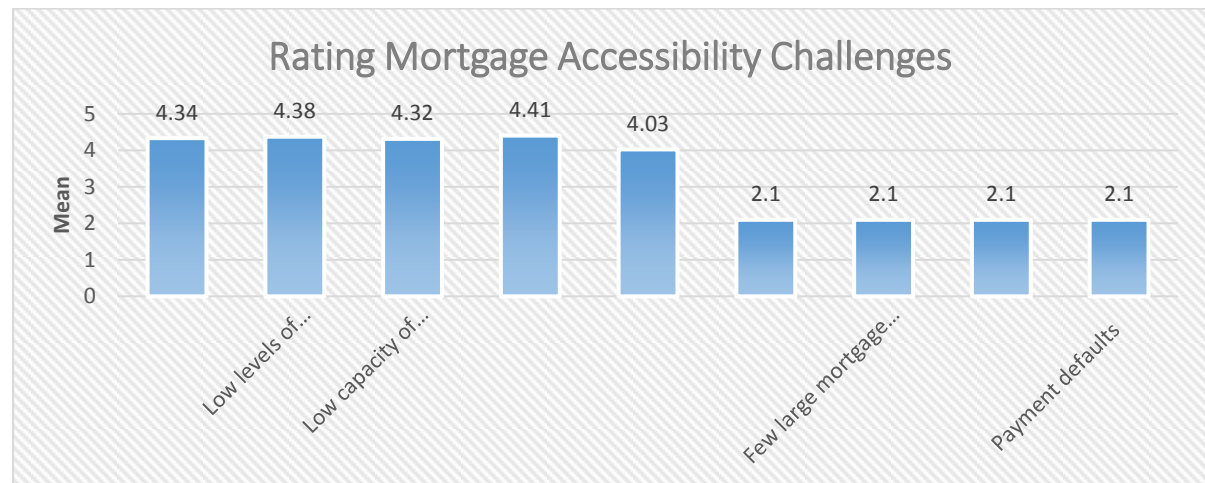
Figure 5. 10: Rating Mortgage Accessibility Challenges

Source*: Author (2016)*

The findings show that lengthy adjudication procedures at 4.41, followed by low levels of household income at 4.38, stringent lending conditions at 4.34 and low capacity of mortgage market at 4.32 were the critical mortgage accessibility challenges. These findings agree well with the arguments of *Joint Center for Housing (2005), Noppen (2012) and Republic of Kenya (2013d)* who view the lengthy land adjudication, low levels of household income, stringent lending conditions and low capacity of mortgage market as major bottlenecks of accessibility to mortgage finance by the low / middle income earners. The findings further mirror those from *McCarril and Griffin (2012), Karuppanan (2011) and Choguill (2007)* who argue that affordability related challenges including mortgage accessibility constraints are critical causes for low access to quality housing by the low and middle-income earners in both developing and developed nations.

The findings from some previous studies however have a slight variance. For instance, *Ngugi and Njori (2013)* cite high taxation as a major challenge to accessibility to mortgage while *Kieti (2015)* view interest rates on mortgage as the most significant constrain. The high taxation and high interest rates cited by the two authors could both fall as items under the stringent lending conditions advanced through the study as one of the significant mortgage finance accessibility challenges. The significant specific components' challenges were

merged with the general challenges and configured into a systems frame work shown in Table 5.6. The configuration of the housing delivery components in a systems frame work captured in Table 5.6 shows that mortgage falls at the external environment level. The findings however show that the mortgage accessibility challenges do not only originate from the external environment but also from other systems levels. For instance, lengthy adjudication processes as a challenge to mortgage financing is grounded at the input level showing the need for interdependency and interactivity of housing delivery components to be able to address access to quality housing by the low and middle level income earners. In the perspective of systems theory, the significant challenges facing housing delivery components also affect the input and by extension the overall functioning of the housing delivery system making it not possible to guarantee accessibility to quality housing by the low and middle level income earners.

The findings generally agree with those from the literature review. It follows arguments by systems theorists that systems components are interdependent and interactive but also exist as a whole where the whole is bigger than the parts *(Amagoh, 2008; Meles et al, 2010 and; Baldwin and Sauser, 2009).* In addition, the significance of addressing mortgage finance accessibility challenges in capitalistic economies is exemplified in a mortgage finance model projected by *Baharogin and Lindfield (2000)* who argue that these challenges must be tackled from both supply and demand ends. According to *Central Bank of Kenya (2016)*, there are only 44 mortgage lending institutions in Kenya whose lending capacity is only 2.5% of the GDP. On the other hand, the National Housing Policy 2017 proposes radical reforms in the land administration procedures to make them more responsive to the mortgage system.

Addressing the housing mortgage system's challenges should focus on enhancing the capacity of the existing mortgage market, minimizing cost of mortgage products, reforming the restrictive lengthy land administration / management procedures and putting in place conducive lending conditions. In addition, as explained earlier, managing the critical challenges in a systems perspective will enable the low and middle level income earners access affordable finance to enable them own quality homes. The significant specific components' challenges and the means of addressing them were merged with the general challenges and configured into a systems frame work shown in Tables 5.6 and 5.7 respectively at the end of this chapter.

5.5.3 Planning and Development Control

The purposively selected four lead consultants were asked to cite the challenges they experienced with the existing planning and development control tools in the pursuit of enhancing affordability of housing units. The findings show that high standards had a mean of 3.14, non-recognition of cheap alternative materials and technology had a mean of 3.29 while low density had a mean of 3.57 as shown in Figure 5.11.
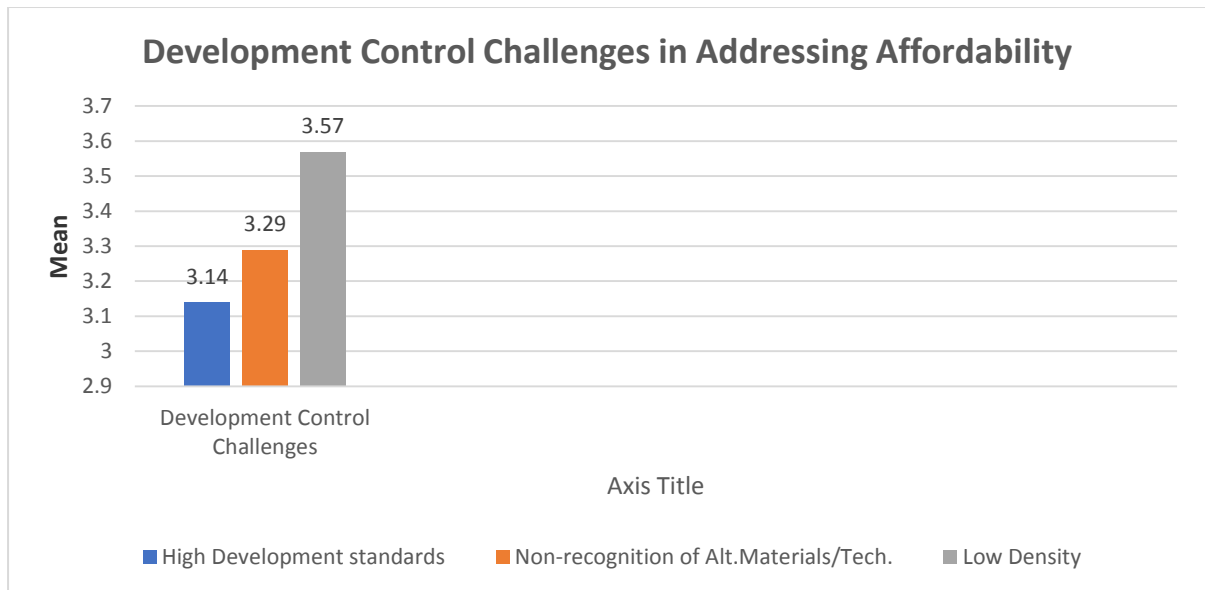
Figure 5. 11: Planning and Development Control Challenges Designers Face in Addressing Affordability

Source: *Author (2016)*

This implies that all the factors were above the theoretical mean of 3 in the Likert scale of 1 in 5 and therefore considered moderately agreeable by the respondents as the challenges experienced with the existing planning and development control tools in designing affordable housing units for the low and middle level income earners. The findings closely agree with those from Gichunge (2001), Kvarstrom (2014) and; Kimani and Musungu (2010) who view the existing planning and development control tools as too old and restrictive leading to high housing development costs in Kenya. The findings also agree with those from *Abdullahi and Azziz (2011)* who believe that unlocking housing delivery crisis for the low and middle level Malaysians rests partly with tackling the slow development control processes, restrictive legislations and high development control standards. It follows that there is need to review these tools to enhance the performance of planning as a key component of housing delivery system by lowering the planning and development control standards, making them responsive

to cheap alternative materials / technologies and adopting optimal densities. The significant specific components' challenges and the means of addressing them were merged with the general challenges and configured into a systems frame work shown in Tables 5.6 and 5.7 respectively at the end of this chapter.

5.5.4 Cheap Alternative Materials / Technology

Any challenges on cheap alternative materials / technologies is bound to affect the basic aim of a housing delivery system in providing quality housing to all including the low / middle level income earners implying that the challenges should be identified and mitigated against. Investigations were made into the challenges on the uptake of the existing alternative materials and technology in Kenya. The findings showed that lack of sensitization had a mean of 4.25, security concerns had a mean of 3.88, existing high design / development control standards had a mean of 4.00 and ignorance had a mean of 3.63 as shown in Figure 5.12.
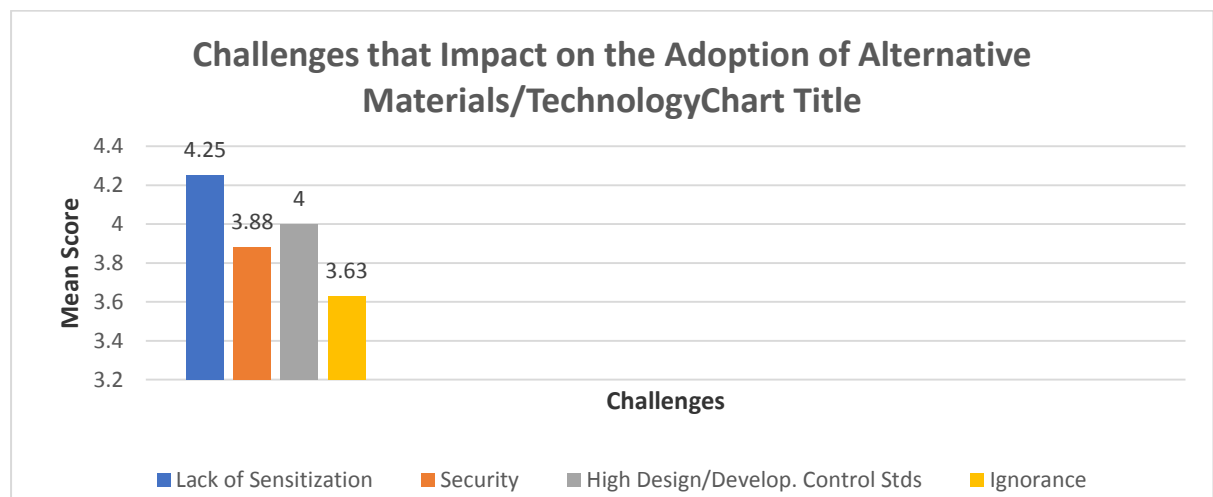
Figure 5. 12: Challenges that Impact on the Adoption of Alternative Materials/Technology

Source: *Author (2016)*

This implies that all the factors were significant challenges on the adoption of existing alternative materials and technology in Kenya since their means were above the theoretical mean of 3 in a Likert scale of 1in 5 with lack of sensitization as the most significant. These findings closely agree with those from *Syagga (1993), Noppen (2012), Kvarstrom (2014) and Magutu (2015)* with regard to the adoption of cheap alternative materials / technologies in Kenya. This contrasts the views of *Ugochukwu and Chioma (2015)* who argue that greater savings in construction cost of about 60 % could be realized if the alternative materials /

technologies are wholly local. Addressing the challenges on the uptake of the cheap alternative materials / technology should therefore target sensitization of consumers, dissemination of research findings and the review of the existing restrictive planning / development control standards are practical ways of creating awareness, minimizing poor perception and legislating economically viable standards thereby enhancing the uptake of the various non-conventional materials and technology.

The significant specific components' challenges were merged with the general challenges and configured into a systems frame work shown in Tables 5.6 and 5.7 respectively at the end of this chapter. Elimination of these challenges on cheap alternative materials and technologies would certainly improve the contribution of this important component towards the success of the housing delivery system in improving quality housing accessibility by the low / middle level earners by increasing affordability through drastic reductions of the housing development cost.

5.6 Configuration of Challenges into a Systems Frame Work

The study investigated general and housing delivery components' specific challenges based on views obtained from public sector housing experts and households through questionnaire survey. This was necessary to arrive at a comprehensive view on the challenges that have limited access to quality housing by the low and middle level formal sector employees. The general and specific based challenges including the means of addressing them based on experts' / households' perceptions were merged. As demanded by objective No. 3, the challenges and the means of addressing them were assessed in the context of systems model. Heylighen (1998) and Freetutes (2014), contend that a functioning system is structured into input, throughput, external environment, feedback and output. The inputs are sourced from the external environment and processed at the throughput to deliver the desired output to the formal market *(Heylighen, 1998).* Any challenges on the quality and quantity of the output would automatically generate reactions from the feedback mechanism in the form of policy interventions that would trigger the system to re-adjust its self to deliver the desired output.

The challenges from the study findings affect the functioning of the housing delivery system at input, throughput, external environment and feedback levels. Since components of a functioning system are meant to be interdependent and interactive, any disorder occasioned by the challenges on any component can cause the system to be either unfunctional or partially functioning. This scenario is reflected from the viewpoints of systems theorists that

the whole is bigger than the parts meaning that these challenges should not just be addressed in piece meal but comprehensively (Boulding, 1956 and Bertalanffy, 1968). The significant general challenges and the means of addressing them were configured into a systems' framework of input, throughput, external environment, feedback and output as shown in Tables 5.6 and 5.7.

Table 5. 6: Significant Housing Delivery Challenges in a Systems Context

Systems Components & Challenges				
Input	Throughput	External environment.	Feedback mech. (monitoring/control/ intervention)	Output
Lack of/costly land/infrastructural services	Inappropriate/ in adequate financing	High cost of construction	Lack of political good will	In-appropriate/ in-adequate housing
In-appropriate materials/ technology.	Lack of integrated planning	Lack of focus on research into appropriate material/ technology.	In-appropriate housing policy	
In-effective housing delivery methods	Restrictive planning/ development control	High cost of mortgage/rent		
		Low household income		

Source*: Author (2016)*

Table 5. 7: Significant Means of Addressing Housing Delivery Challenges in a Systems Context

Systems Components & Challenges				
Input	Throughput	External environment.	Feedback mech.	Output
Streamline land administration and management	Streamline planning standards and development control	Lower taxation on construction inputs	Effective policy interventions to regulate housing sector	Adequate quality housing units in the market
Adopt cheap alternative materials/ technology.		Stimulate research into alternative materials/technology	Entrenching the the housing pol. into the constitution.	
Adopt appr. delivery method		Subsidize rent/mortgage		
		Effective control of the prevailing macro-economic climate		

Source: *Author (2016)*

At the input level, lack of / costly land and infrastructural services, in-appropriate materials / technology and in-effective delivery methods mitigated on by streamlining land administration and management, choice of appropriate delivery method and adoption of cheap alternative materials / technology. At throughput level, the in-adequate / in-appropriate financing, restrictive planning / development control and lack of integrated planning would be resolved through alternative financing and streamlining planning / development control. On the other hand, at the external environment level, the high cost of construction, high cost of mortgage / rent, low household income and lack of focus in research in to cheap alternative materials / technologies would be addressed by lowering taxation of construction inputs, subsidizing rent / mortgage, effective control of the prevailing macro-economic climate and

stimulating research into alternative materials / technology. In addition, at feedback level, the lack of political good and in-appropriate housing would be addressed by the state through formulation of effective policy intervention measures and entrenching the housing policy into the constitution.

5.7 Summary

The study adopted systems theoretical model to investigate how to improve access to quality housing by the low and middle-income earners. The findings indicate that the existing housing delivery approach is not a fully operational system. For instance, its feedback mechanism is extremely weak and cannot effectively relay impulses in the form of policy interventions back to the system in order that the desired output is delivered to the formal market. In addition, the study has also established that the existing housing delivery approach lacks certain basic characteristics of a working system.

Further investigations revealed that the views of the public-sector housing experts and households on the general challenges of the existing housing delivery had insignificant variance. The only variance was that the challenges as perceived by the households focuses more on affordability related issues which incidentally were also captured from views of public sector housing experts. The findings show the significant general challenges that have impacted negatively to access to quality housing as lack of / high cost of land / infrastructural services, high cost of construction, lack of integrated planning in housing programmes / delivery methods, inadequate financing mechanism, low household income, lack of focus in research on appropriate materials / technology, high development control / planning standards and lack of political good will.

On the other hand, the significant means of addressing the general challenges include; lowering costs on construction materials and equipment, streamlining research in to alternative materials and technology, streamlining land administration and management, streamlining planning standards / development control, subsidizing housing rent / mortgages to enhance accessibility to quality housing, providing appropriate policy intervention measures to regulate the housing sector and entrenching effective measures to control the prevailing macro-economic climate. The means of addressing the challenges are essentially incentives that should be provided by the state at levels of input, throughput, external environment and feedback to guarantee the desired output which in this enquiry is quality housing that can be accessed by the low and middle level income earners. In addition, the findings on challenges specific to key housing delivery components show that some of

challenges are not among the general challenges cited above but are specific to the individual housing delivery components. The significant challenges specific to housing delivery methods were high mortgage rate, relocation of households during slum upgrading programmes, lack of collateral, designer has minimal flexibility in enhancing unit size under slum upgrading, high cost for rental housing and high price for tenant purchase scheme while those specific to mortgage finance system included lengthy adjudication procedures, low levels of household income, stringent lending conditions and low capacity of mortgage market. On the other hand, the significant challenges specific to planning and development control were high standards, non-recognition of cheap alternative materials / technology and low density while those specific to adoption of cheap alternative materials / technology included lack of sensitization, insecurity concerns, existing high design / development control standards and ignorance.

The significant components' specific challenges were merged with the general challenges. The findings indicate that these components' specific challenges together with the general challenges can be addressed in a systems configuration of input, throughput, external environment, feedback and output through review of land adjudication / management procedures, planning / development control regulations, and mortgage financing policy and general housing policy as well as adopting appropriate delivery methods and subsidy. The challenges of the housing delivery approach were two pronged and focused on findings based on views from both the public-sector housing experts and households for reasons of inclusivity of divergent views. In addition, the investigation generated findings on general challenges as well as components' specific challenges in order to broaden an understanding of challenges that have impacted negatively on access to quality housing by the low and middle level income earners. This ensured that the challenges were dealt with in a more comprehensive manner.

This chapter has discussed the extent to which the housing delivery components have been embodied in a systems model and the challenges of the housing delivery approach based on expertise views of sampled public-sector housing experts, key informants, previous lead consultants and households. The next chapter discusses the appropriateness of housing delivery components linked to the selected housing schemes and based on responses from households and previous lead consultants.

CHAPTER SIX

6.0 HOUSEHOLDS' AND LEAD CONSULTANTS' ASSESSMENT OF HOUSING DELIVERY

6.1 Introduction

This chapter outlines the assessment of the housing delivery approach in relation to the appropriateness of a section of its components linked to the five selected housing schemes. The assessment of the appropriateness of housing delivery components was based on primary data collected through self-administered questionnaires, interview schedules and observation checklist. Questionnaire 2B was administered to sampled households residing in the five purposively selected housing schemes to obtain their perceptions on appropriateness of various housing delivery components on housing related issues that directly affect them. On the other hand, an interview schedule, appendix 3D was applied to interview the previous lead consultants who managed the implementation of the five selected housing schemes in respect to their planning and design. In addition, an observation checklist, appendix 2C and photography were also adopted to capture more data based on planning and design of the housing schemes.

This chapter discusses the response level of the sampled households from the five-selected public housing schemes to whom questionnaires were administered to assess whether the response rate met the required threshold. It further assesses the appropriateness of the housing delivery components based on responses from sampled households and previous lead consultants. The last section is the conclusion that summarizes the key findings.

6.2 Response Rate and Profile of the Respondents

This section assesses the response rate and profiles of the sampled public-sector housing experts to ascertain whether the level of response and qualifications / experience were adequate for this enquiry.

6.2.1 Response Rate

Questionnaires were administered to 235 households out of which 167 returned representing 71% response rate as shown in Table 5.1 in chapter five. A response rate of 71% from households was accordingly good enough for the study.

6.2.2 Profile of Households and Housing Schemes

This section displays the general information of the households concerning their distribution by estate, marital status and size of households.

6.2.2.1 Distribution of Households by Estate

The respondents were asked to indicate their places of residence (estate). From Figure 6.1, it is clear that 17.96 % were from Ngara civil servants phase 1 (30 respondents), 37.13% were from Ngara civil servants phase 2 (62 respondents), 17.96% were from Jogoo Road civil servants (30 respondents), 18.55% were from Shauri Moyo civil servants (31 respondents) and 8.38 % were from Ruai police housing (14 respondents).
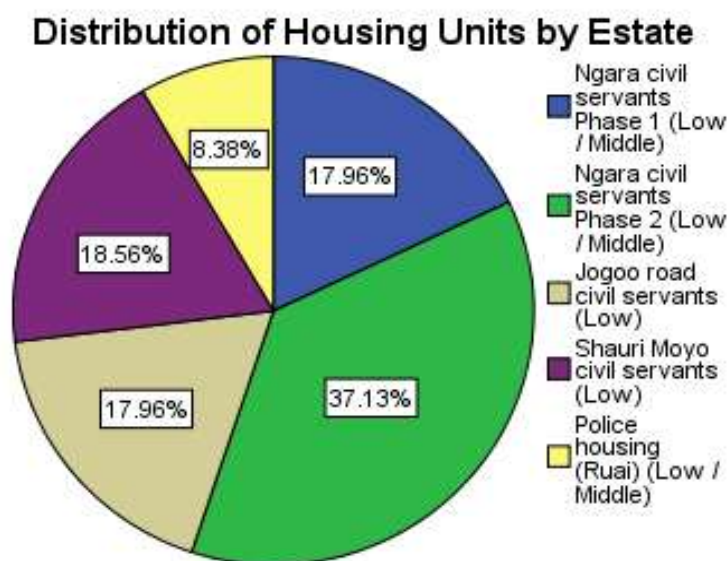
Figure 6. 1: Distribution of Households by Estate

Source: *Author (2016)*

Majority of the respondents were therefore from Ngara civil servants housing scheme phase 2 which houses both the low and middle level income earners.

6.2.2.2 Marital Status of Households

The respondents were asked to indicate their marital status. The findings show that 124 respondents were married representing 74.3 % and 39 respondents were single representing 23.4 % while 4 cases were missing representing 2.4 %. It is therefore evident that the majority of the respondents are married and therefore have bigger households. Marital status is a design parameter which is a determinant of house size and by extension construction cost that is key in determining accessibility to quality housing by the low and middle level income earners.

6.2.2.3 Size of Households

The respondents were asked to state the size of their households. The findings show that 15 respondents lived in a 1 – member household category representing 9%, 111 respondents lived in a 2-5 members' household category representing 66.5 % and 33 respondents lived in a more than 5 members' household category representing 19.8%. There were 8 missing cases representing 4.8 %. The findings show that the majority of the respondents fall under household category of 2-5 members. The findings are summarized in Figure 6.2.
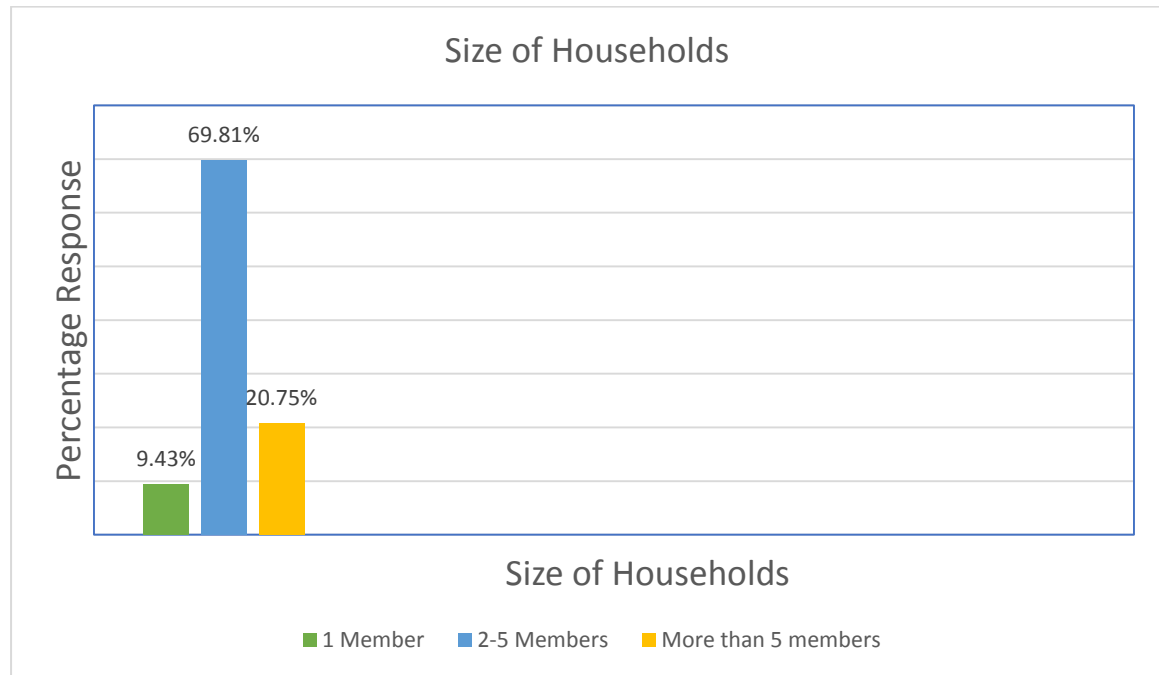
Figure 6. 2: Size of Households

Source: *Author (2016)*

These findings agree with the Kenya National Housing Survey 2012 / 2013. The size of household is a basis for deriving the minimum size of the dwellings for any income group. The fact that some respondents at 19.8 % live in households of more than five members indicates that a sizeable number live in crowded spaces, contrary to international standards. Cross tabulation shows that the majority of these persons were those earning below kshs 15,000 and belong to the low income group. The World Health Organization (WHO) on the other hand specifies the minimum housing unit space of 5- 11 m^2 per person *(Ranson, 1988)* which is above the actual space provided for the majority of households living in the five housing schemes. This finding broadly compares with that of *UN Habitat (2013a)* that the majority of Kenyan urban dwellers at 60% live in overcrowded and squalid un-sanitary conditions. This state of affairs is attributed to the high housing cost which has to be scaled down through various design parameters including reducing the house size. Design as a

component of the housing delivery system needs to balance housing cost with house size needs to be able to address affordability and customer satisfaction which are also components of the housing delivery system. In this kind of arrangement, the various housing delivery components such as design, construction cost and customer satisfaction interact with one another to deliver affordable housing of appropriate sizes and numbers to satisfy demand. In line with systems theory, the level of customer satisfaction with housing category is meant to trigger policy interventions at design level so that the house unit sizes are delivered within the desired proportions in the formal market to satisfy the needs of all income groups.

6.3 Components Based on Questionnaires to Households

Questionnaires were administered to 235 households out of which 167 responded. The questions targeted specific components of the existing housing delivery approach that include; the levels of household income / tenure systems, rent / mortgage rate, affordability of rent / mortgage and customer satisfaction. The data obtained were analysed through descriptive statistics which yielded frequency counts and mean item scores. This was necessary to assess the appropriateness of the housing delivery components in improving access to quality housing by the low and middle level income earners.

6.3.1 Household Income

Employees in the formal sector have incomes spread across three broad classifications namely; low, middle and high (Republic of Kenya, 2011). This study has however focused on the low and middle-income earners for the reason that they are the most disadvantaged given that only less than 10 % can access quality housing from the formal market *(Noppen, 2012 and Okonkwo, 1996)*. The study therefore investigated the levels of income of the low and middle level households living in the five selected public housing schemes located in the City of Nairobi and how this has influenced the tenure systems.

The respondents were asked to indicate their gross income earnings. The findings show that 27.74 % earned kshs. 12, 840 – 25, 000 (lower income), 37.42 % earned kshs. 25, 000 – 50, 000 (middle income), 25.16 % earned kshs 97,290 (upper middle income) and 9.68 % earned above kshs. 97,290 (high income). The results are summarized in Figure 6.3.
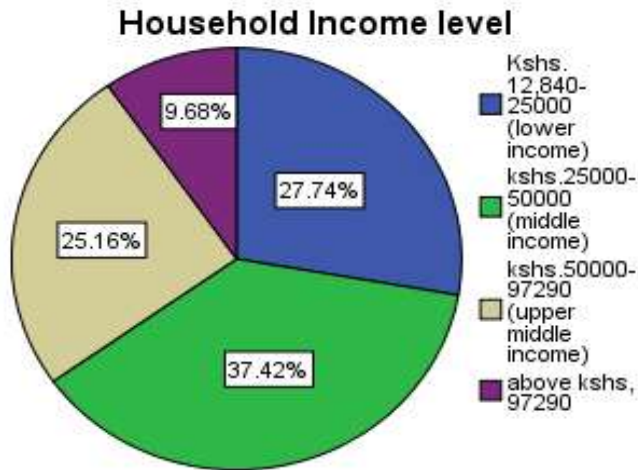
Figure 6. 3: Household Income Levels

Source: *Author (2016)*

The findings indicate that the number of upper middle / high-income earners were significant at 34.32% and yet they were not among the targeted income group indicating that the targeted low and middle-income group were not wholly considered during allocation. The lower income group with income bracket of kshs 12,840 – 25,000 cannot however afford high cost of housing with rents / mortgage rates above kshs 25, 000 which the upper middle / high income earners can comfortably shoulder *(Republic of Kenya, 2013a)*. The monthly mortgage rate for a two-bed room house at Ngara housing scheme is kshs 25,000 while rent for a similar housing is just Kshs 18,00 *(Republic of Kenya, 2013a).* Applying the 30 % threshold rule of thumb on gross income, this mortgage rate can only be comfortably accommodated by those earning at least kshs 75,000 implying that the entire low-income group cannot access the two-bed room houses at Ngara housing scheme. This partly explains why most of the low and middle-income households in the five housing schemes at 68.71 % have preference to rental system of tenure at the expense of the mortgage system.

The findings accordingly also indicate the non-inclusiveness of the housing allocation as only 27.74 % of the respondents had income levels designated as low income and yet the houses were meant for both the low and middle-income earners. The unfair allocations of public housing to non-deserving households who have better incomes are among the corruption cases in low and middle level housing schemes that have also been witnessed in Malaysia and South Africa which past studies contend could be minimized through adoption of computerized open registration system with a view of providing a more efficient and transparent allocation system

(Shuid, 2010 and; Kangethe and Manomano, 2014).

Noppen (2012), CAHF (2012) and Republic of Kenya (2011) cite household income as one of the critical components of housing delivery system. The household income influences design and by extension housing cost. *Kvarnstrom (2014) and American Institute of Architects (2013)* highlight the important role design plays in determining housing cost. Accordingly, household income must interact with design, housing cost and other housing delivery components so that the desired output is delivered to the market to fulfil systems dynamics. Housing allocation can be corruptly done causing failure of the targeted income group to access quality housing. Corrupt practices manifested through nepotism and favouritism are major impediments to access to quality housing by the targeted income groups *(Kangethe and Manomano, 2014).* An open computerized housing allocation system should therefore be put in place to ensure that housing meant for specific income groups is not corruptly acquired by higher income groups *(Martini, 2012).*

Respondents were also asked to indicate the tenure system of their residences. The findings as shown in the Figure 6.4 indicate that tenants were 113 tenants representing 68.71% and the owners were 51 representing 31.29 %.
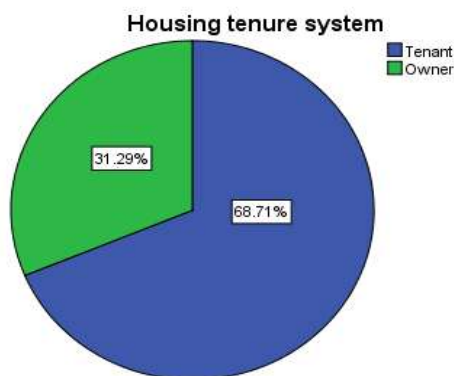
Figure 6. 4: Housing Tenure Systems

Source*: Author (2016)*

The findings show that most of the respondents are tenants. The preference to rental system may be because most respondents cannot afford high rates associated with mortgage system. The average mortgage rate for a simple two bed room house in the public housing schemes is kshs 23, 672 which most respondents cannot afford *(CAHF, 2012)*. Cross tabulation of results shows that the majority of those on rental tenure are the low-income earners who cannot afford mortgage and therefore prefer this tenure for reasons of affordability. The findings

agree well with those from the 2012 / 2013 Kenya National Survey report (*Republic of Kenya, 2014*). The findings also concur with previous findings as illustrated in the review of literature dominated by the shift by the developing countries from the conventional exchequer financing of public housing to public private partnerships financing initiative *(Makinde, 2014)*. This strategy has been adopted to some level of success by Nigeria and Malaysia through focusing on more developing affordable rental housing units than mortgage housing which are expensive and cannot be affordable by the majority of the low and middle level citizens *(Ibem, 2010 and; Isa and Jusan, 2012)*.

Although rental housing system is cheaper and can be easily accessed by the low and middle-income earners, it denies them the right of owning their own homes. It therefore follows that a mixed tenure system may be appropriate so that those who can afford mortgage can have an opportunity of owning homes as demonstrated in hybrid housing delivery model by *Wong and Hui (1998)*. In a systems context, a functional housing delivery system should put in place an appropriate feedback mechanism to relay the demand levels of rental and mortgage housing in order that the housing delivery system can initiate reforms necessary for the reorganization of the housing delivery inputs levels to meet the desired output *(Heylighen, 1998)*. As cited earlier, lack of an effective feedback mechanism may be the cause of the current housing accessibility crisis for the low and middle level income earners calling for a need to put in place a regular housing needs assessment and policy reforms to address the emerging constraints.

6.3.2 Range of Rent / Mortgage Chargeable in the Five Housing Schemes

Just like household income, rent / mortgage is another key determinant of access to quality housing. According to *Republic of Kenya (2013d)*, 60 % Kenyan citizens in urban setups live in slums and other squatter settlements in squalid unsanitary conditions partly due to high rents / mortgage rates and therefore cannot access quality housing in the formal market *(Un Habitat, 2013a)*. The high-end income earners can access quality housing of any size and complexity whereas the lower end income group live on less than 1.25 dollars a day and therefore cannot access quality housing from the market *(UN Habitat, 2013b)*. This study therefore investigated the levels of rent and mortgage paid by the sampled households across the five-selected public housing schemes. The rent / mortgage rates were then compared with income levels to establish affordability of the housing units.

The enquiry was meant to establish the range of rent paid by the respondents. The findings show that 26 respondents which represented 23.0 % stated that they paid a range of less than

kshs 5, 000; 45 respondents which represented 39.8 % stated that they paid rent on a range of kshs 5,000 -10,000, 36 respondents which represented 31.9 % stated that they paid rent on a range of kshs 10, 000 – kshs. 15,000 and 6 respondents which represented 5.3 % paid rent on a range of above kshs. 15, 000. Figure 6.5 shows rent chargeable across the five housing schemes.
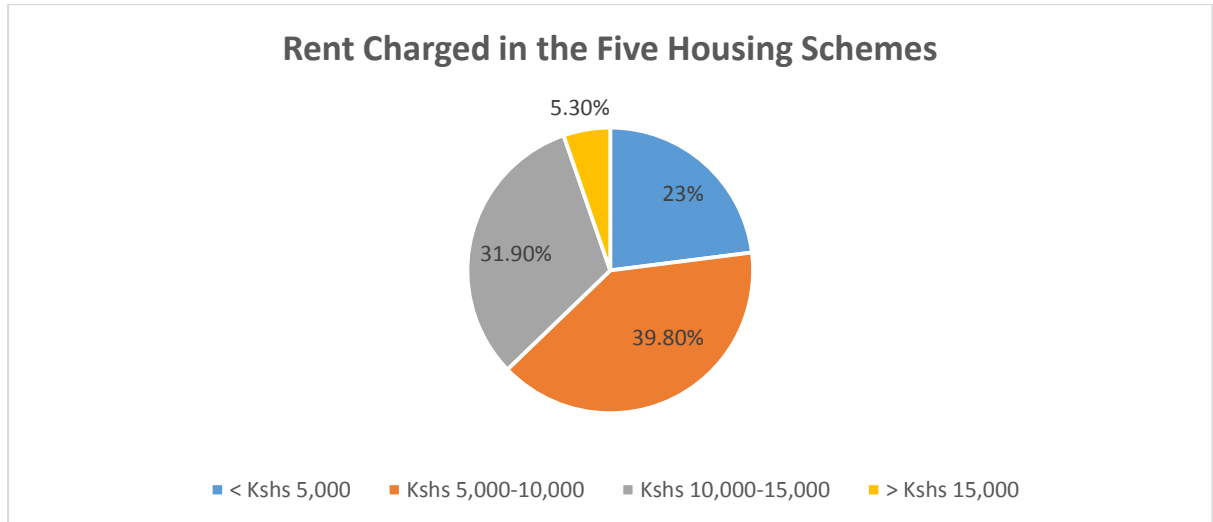
Figure 6. 5: Rent Chargeable in the Five Housing Schemes

Source: *Author (2016)*

The findings show that majority of the respondents pay rent on a range of kshs 5, 000- kshs 10, 000. These findings agree with those from the *Republic of Kenya (2014)* which argue that rental housing is more accessible than mortgage housing by the low and middle level income earners because they are cheaper.

On the other hand, an inquiry was made to establish the range of mortgage paid by the respondents. 9 respondents which represented 8.0 % stated that they paid mortgage on a range of less than kshs. 10, 000; 6 respondents which represented 5.3 % stated that they paid mortgage on a range of kshs 10, 000 – kshs 20, 000; 11 respondents which represented 9.7 % stated that they paid mortgage on a range of kshs 20, 000 – kshs 30, 000; 59 respondents which represented 52.2 % stated that they paid mortgage on a range of kshs 30, 000 – kshs 40, 000; 12 respondents which represented 10.6 % stated that they paid mortgage on a range of kshs 40, 000 – kshs 50, 000 and 16 respondents which represented 14.2 % stated that they paid mortgage on a range above kshs. 50, 000 as shown in Figure 6.6.
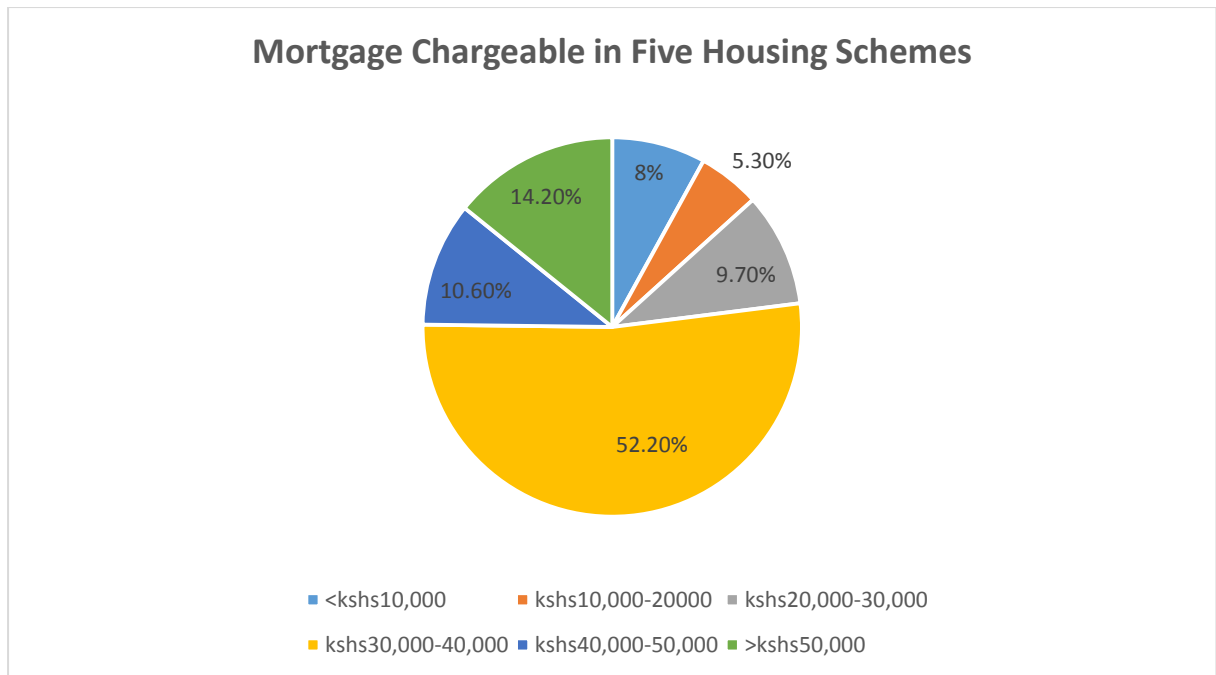
Figure 6. 6: Range of Mortgage Chargeable in the Five Housing Schemes

Source*: Author (2016)*

More than 50% of the respondents therefore paid mortgage at a range of kshs 30, 000-40,000. This means that most of the respondents paid mortgage above kshs 30, 000, rates that cannot be sustained by income levels of the majority of the low / middle level earners. Although the five housing schemes were planned for the low / middle level income civil servants, the real intention was not achieved because of the high mortgage rates that were skewed in favour of the high-income group. This finding is in line with those from *Republic of Kenya (2014), CAHF (2012), Hassconsult (2014) and Cytonn Real Estate (2015)*. This finding also concurs with those from previous studies on developing countries such as Nigeria and Malaysia *(Makinde, 2013 and Shuid, 2004)*.

It however contrasts the scenario presented in the developed countries such as the US and UK with better per capita income and therefore shoulder heavy subsidy necessary in scaling down rent / mortgage rates to the level affordable by the low and middle level income earners *(Shwartze, 2006 and Hull, 2012)*. Accordingly, the rental system is one of the alternative options for housing the low / middle level earners in developing nations who cannot afford the expensive mortgage housing. This is so because it is cheaper to acquire a rental house than a mortgage house meaning this can be an appropriate tenure system where households are financially constrained.

Affordable rent and mortgage as earlier confirmed by this study are some of the critical components of the housing delivery system that influence accessibility to quality housing by

the low and middle level income earners. Mortgage and rent affordability indices could be incorporated not only at design stage but also during allocation of housing units in completed housing schemes. At design stage, appropriate design could be applied within the affordability indices of the different income groups while during allocation, the rent / mortgage rates of housing units would be matched with the affordability indices of different income groups.

6.3.3 Affordability of Rent / Mortgage Across the Five Housing Schemes

This section investigates the optimal thresh hold for housing affordability and its application in deriving housing affordability indices across the selected housing schemes.

6.3.3.1 Optimal Housing Affordability Thresh Hold

The study assessed the households view on the reasonable affordability threshold in other words, the reasonable proportion of rent / mortgage rate to the gross household income. This enquiry was meant to establish the appropriate proportion of income that the respondents can comfortably set aside to cater for house rent or mortgage. The findings show that 21.0 % indicated a proportion of less than 10 % of their income, 49.1 % indicated a proportion of 10-30%, 15.6 % indicated a proportion of above 30 % and 44 % were missing cases. These findings are reflected in Figure 6.7.

Proportion of Rent/Mortgage Rate Compared to Income

■ <10% ■ 10-30% ■ >30% ■ Missing
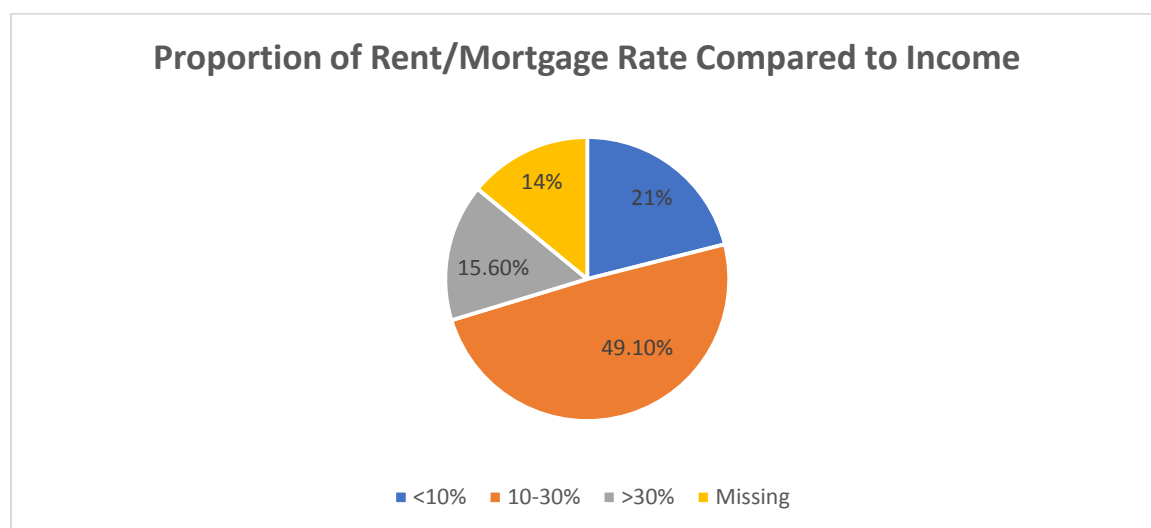
Figure 6. 7: Appropriate Proportion of Rent / Mortgage Rate to Household Income

Source: *Author (2016)*

70% of the respondents therefore stated that their earnings can comfortably accommodate rents and mortgages which are 30% or less of house hold income. The finding closely agrees with *Disney (2007)*. *Disney (2007)* argues that when housing cost is more than 30% of

income it becomes a burden and interferes with budget lines of the other basic needs such as food, clothing, education and health care. A proportion of at most 30% is an appropriate measure of housing affordability which by extent determines quality housing accessibility by the low and middle level earners. This indeed can be employed by housing providers to either plan for housing schemes for different income groups or allocation of housing units from the existing housing schemes signalling the critical role housing affordability can play in any housing delivery system.

6.3.3.2 Rent / Mortgage Affordability Indices Across the Selected Housing Schemes
The median household incomes were compared with the median mortgage rates for each income group and the acceptable 30% threshold applied to determine mortgage affordability across the five housing schemes. The mortgage affordability indices were calculated by dividing 30 % of the gross median income by the mortgage payable after which the resultant sum was multiplied by 100 as shown in Table 6.1.

Table 6. 1: Mortgage Affordability Indices for low/middle level Public-Sector Employees in Nairobi.

Income Group	Median Income	30% H/Income	Median Mortgage	Mortg. Aff. Index
Lower Income	Kshs 18750	Kshs 5625	15000	37.5
Lower Middle Income	Kshs 37500	Kshs 11250	25000	45
Middle Income	Kshs 75000	Kshs 25000	45000	55.6
Upper Middle Income	Kshs 120000	Kshs 36000	60,000	60

Source: *Author (2016)*

Table 6.1 shows that all the mortgage indices across the five housing schemes are below the threshold of 100 implying no household can comfortably service mortgage loans. The finding closely mirrors those from *Republic of Kenya (2014), Central Bank of Kenya (2014)* and *Cytonn (2015)*. This is despite the fact that *Cytonn (2015)* having adopted an affordability threshold of 40 %. Further findings show that mortgage affordability indices increase from 37.5 at the lower end income group to 60 at the higher end income. The mortgage affordability indices therefore have direct positive relationships with household income. These findings mirror those from *Family and Community Service (2013), Schwartze and Wilsine (2006) and Disney (2006)*

The median household incomes were compared with the median rents for each income group and the acceptable 30% threshold to able to determine rent affordability across the five

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housing schemes. The rent affordability indices were calculated by dividing 30 % of the gross median income by the rent chargeable after which the resultant sum was multiplied by 100 as shown in Table 6.2.

Table 6. 2: Rent Affordability Indices for low/middle level Public-Sector Employees

Income Group	Median Income	30% H/Income	Median Rent	Rent Aff. Index
Lower Income	Kshs 18750	Kshs 5625	5000	112.5
Lower Middle Inc.	Kshs 37500	Kshs 11250	7500	150
Middle Income	Kshs 75000	Kshs 25000	15000	160
Upper Middle Inc.	Kshs 120000	Kshs 36000	20000	180

Source: *Author (2016)*

Households whose rent affordability indices are less than 100 cannot comfortability pay rent but have to forego certain basic needs such as food, clothing and healthcare *(Cytonn, 2015* and *Disney, 2007).* From Table 6.2, it is certain taht the rents chargeable for public housing are affordable amongst the low and middle level income earners since affordability indices are all above100. The *Republic of Kenya (2013a)* argues that this has been possible mainly as result of the level of subsidy provided by the government in the form of free serviced land. Further findings show that affordability indices increase from 112.5 at the lower end income group to 180 at the higher end income. The rent affordability indices therefore have direct positive relationships with household income. These findings mirror those from *Family and Community Service (2013), Schwartze and Wilsine (2006) and Disney (2006).* According to *Noppen (2012)* and *CAHF (2012*), this scenario is completely different in private housing where the low and middle level earners are unable to access quality housing due to low affordability, a scenario that is also supported by *McCarril and Griffin (2012).* The findings has however deviated from those from the *Republic of Kenya (2014)* for reasons of inclusion of the private sector in the target population.

The findings have shown that the rent affordability indices are reasonable and range from 112.5 – 180 while the mortgage affordability are extremely low and range from 37.5 – 60. Despite this, it could be better if a dual system of tenure is maintained even though the mortgage system is currently unaffordable by the low and middle public-sector employees.

This is necessary to enable some employees' own homes that are critical assets at old age; and this can only be guaranteed if the mortgage rate is drastically reduced. The critical factors that can be adopted to reduce mortgage rates are those that also lowers housing development cost and have been discussed later in this thesis report.

6.3.4 Customer Satisfaction

The level of household satisfaction with the available housing in the market is critical for policy makers to enable them determine what type of reforms are necessary to guide future housing development programmes. Systems theory dictates that when customers are dissatisfied with the output which in this study is quality housing, the system must release a feedback so that interventions are initiated to reorganize the input, the throughput and external environment for the achievement of the desired output *(Boulding, 1968 and Bertalanffy, 1956)*. Earlier findings from the study revealed that the feedback mechanism for the existing housing delivery approach is weak and this fact has negatively affected the output in the market. This section therefore assesses the level of satisfaction of households with the five housing schemes in respect to construction standards, level of infrastructural utility provision standards, adequacy and affordability of the housing units.

Households in the five housing schemes were asked to state housing construction standards in their respective residences. The findings show that 9 respondents were living in temporary housing structures representing 5.4 % and 153 respondents were living in permanent structures representing 91.6 %. Observation by the researcher however, indicated that all the five selected housing estates / schemes were of permanent construction as well as in habitable state for reason of having been designed and supervised by professionally qualified consultants. This scenario contradicts the general poor state of the majority of privately constructed low and middle level housing or shelter, most of which have been designed and supervised by un-qualified persons *(UN Habitat, 2013b)*. The 5.4 % of respondents who indicated their houses were of temporary construction might have confused the Expanded Polystyrene Styrofoam (EPS) technology used at Ruai as temporary construction, implying the poor perception the respondents have on this alternative construction technology. The general comment No.4 of the 1966/1996 UN Committee on economic, social and cultural rights convention defined housing as not just a roof over one's head but this should incorporate security of tenure, availability of services, affordability, appropriate location and cultural decency showing the importance of quality considerations in housing delivery system *(UN Habitat, 1996)*. The existing standards as outlined in the building code and development

control standards are however too restrictive and therefore pose bottlenecks to accessibility to quality housing by the low and middle level income earners. This in essence is one of the challenges identified during the review of literature and has been addressed at the later stages of the thesis report.

The same households were asked to evaluate the extent of their agreement with the standard of infrastructural utilities in their housing estates. The findings show that safe water was available with a mean of 3.81, safe sewerage system was available with a mean of 3.85, waterborne sanitation was available with a mean of 3.53, pit latrine was available with a mean of 2.51 and electricity was available with a mean of 4.14. The findings are summarized in Figure 6.8.
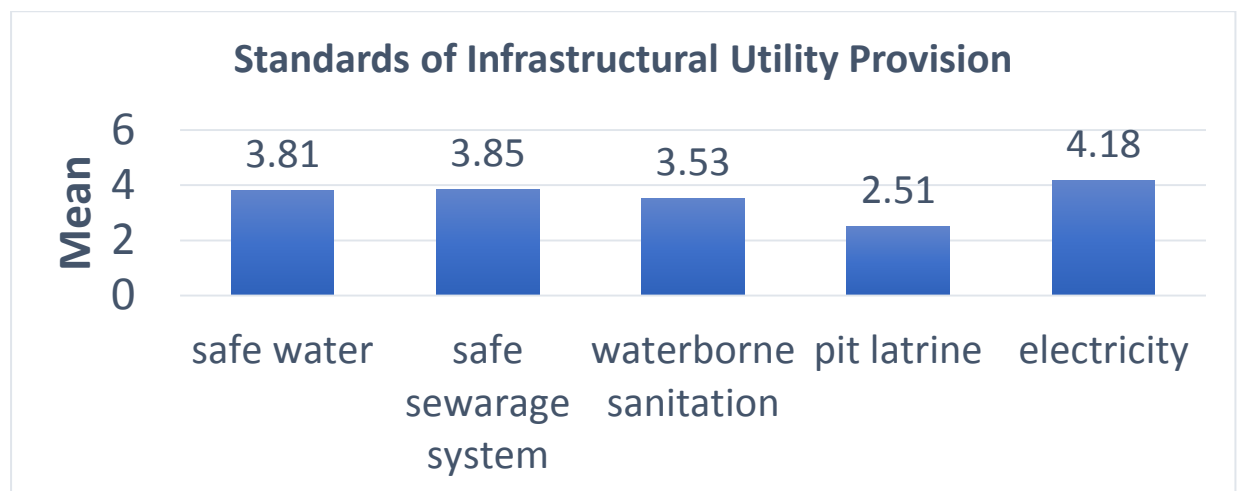
Figure 6. 8: Standards of Infrastructural Utility Provision

Source*: Author (2016)*

The findings indicate that electricity was to a great extent available in the housing estates of the respondents in comparison to other factors, safe sewerage system (moderate extent), safe water (moderate extent) and waterborne sanitation (moderate extent) and pit latrine (little extent). This status was also confirmed by observations by the researcher. However, water and electricity supply are supplemented by the borehole and generator respectively only in Ngara Phase I and II housing schemes. The other estates quite often suffer from frequent power blackouts and dry taps as confirmed by the respondents. The pit latrines were however rare and only found in some housing schemes where they serve residences mainly for emergencies whenever taps run dry. The findings therefore, confirm reasonable level of basic infrastructural utilities provision in all the housing schemes save for lack of backup systems and agree with the *Republic of Kenya (2014)).* The findings however contradict the poor global infrastructural services standards in slums and other squatter settlements inhabited by

one billion out of three billion people living in urban set ups as held by *UN Habitat (2013b)*. As stated earlier, this divergence is mainly attributed to free infrastructural services being offered by the state as subsidy in the implementation of public housing programmes *(Republic of Kenya, 2013a).*

The households were asked to indicate the house type they occupy and their perception of adequacy. The findings on house type showed that 4.3 % of the housing units were one-roomed, 2.9 % were two-roomed, 23.9 % were one bed roomed, 31.2 % were two-bed roomed and 37.7 % were three-bed roomed. The findings are summarized as Table 6.3.

Table 6. 3: Distribution of House Types

Item No.	House Type	Frequency	Percentage
1	One Room	6	4.3
2	Two Rooms	4	2.9
3	One Bed Room	33	23.9
4	Two Bed Rooms	43	31.2
5	Three Bed Rooms	53	37.7
	Total	138	100

Source: *Author (2016)*

The findings show that most of the housing units were three-bed roomed meaning that the low-income earners were not adequately catered for in the planning of these housing schemes. This finding contradicts the current market demand / supply equation as reflected in the staff audit in the civil service conducted in 2011which indicates that there is more demand for housing at the lower end implying that there is need to review the existing housing supply strategy to reverse the current trend *(Republic of Kenya, 2011)*. It also contradicts the global situation which cites that there are more lower end income earners than the middle / high income earners calling for enhanced supply of housing units for this category of income earners *(UN Habitat, 2013c; World Bank, 2012 and World Bank, 1989).* The variance may be attributed to corrupt housing allocation system that favoured the middle / high income earners some of whom were not targeted for inclusion in the selected housing schemes. The implication of this state of events is that the housing delivery system for the extreme lower end may not be functional and therefore un-able to deliver the desired output to address their needs. A functional housing delivery system should in essence incorporate an

appropriate monitoring and feedback mechanism to be able to determine shortfalls in the output with a view of reorganizing inputs so that the desired output is delivered to the market. The respondents were further asked to express their perception of the adequacy of the housing units in a Likert scale of 1 in 5. The findings show that the statement that the house I occupy is adequate in size for my family needs had a mean score of 3.60, the statement that the house I occupy has adequate bedrooms and lounge had a mean score of 3.07 and the statement that I propose more bedrooms to cater for my family needs had a mean score of 3.62. The summary of the findings is shown in Figure 6.9.
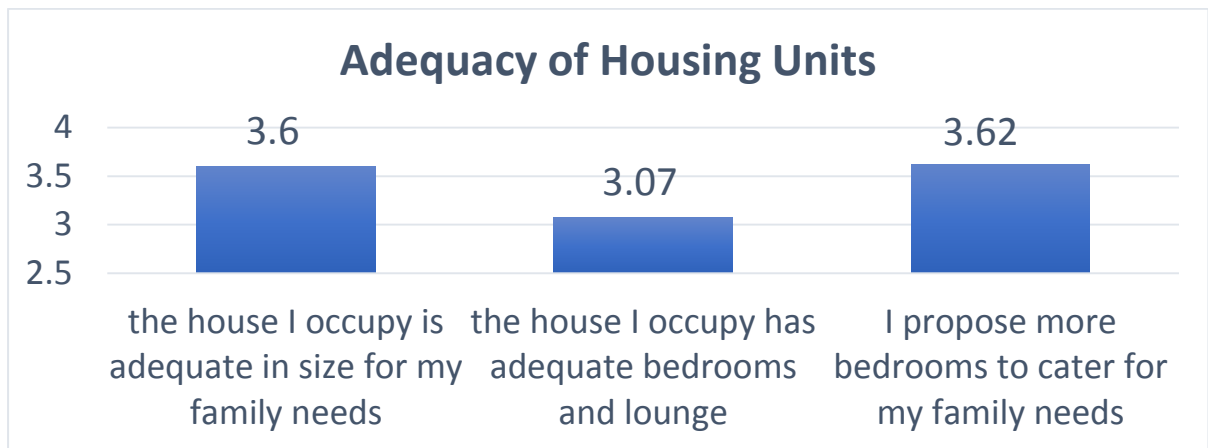
Figure 6. 9: Adequacy of Housing Units

Source*: Author (2016)*

It is therefore important to note that the housing units were to a little extent inadequate. This means that almost 50 % of the households were satisfied with the size of the available housing units. The majority of the unsatisfied respondents could be amongst the high-end income group that were unfairly allocated at the expense of the deserving income group and this fact was confirmed through cross tabulation showing this income group earned more than Kshs 50,000. The findings concur with those from *Kabo (2006)* who contend that design and house type have a significant effect on potential user's rating.

The findings contradict the prevailing dissatisfaction from the low / middle level income households living in privately constructed housing in the formal sector where house unit sizes are grossly in-adequate leading to overcrowding contrary to World Health Organization standards as cited by *Ranson (1988)*. The contradiction could be explained by the fact that public housing complies to a great extent with existing housing standards. A fully functional housing delivery system should send signals from user reaction of the dissatisfied consumers i.e. the low and middle level earners to a feedback or intervention mechanism to enable the delivery system adjusts the components to address the concerns in the housing market. There

is therefore need to put in place a mechanism for obtaining regular user reaction surveys to generate appropriate policy reforms to enhance accessibility to quality housing.

Further enquiries were directed to the households to establish whether or not they face challenges in paying house rent or mortgage. The findings show that 31.1 % (Yes) and 53.9 % (No) while missing cases were 12.0 % as reflected in Figure 6.10.
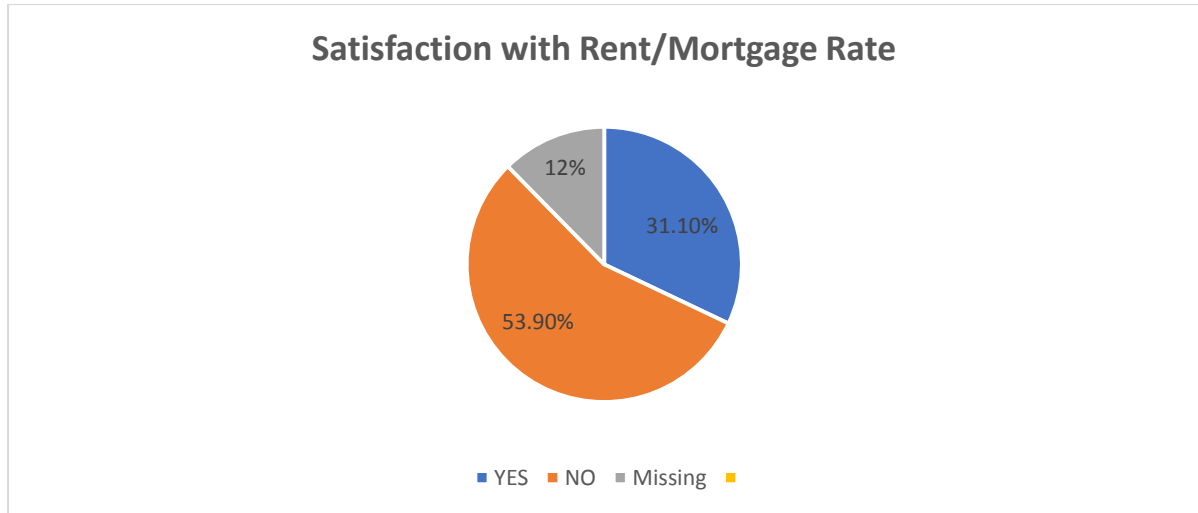
Figure 6. 10: Households Satisfaction with Rent and Mortgage Rate

Source: *Author (2016)*

From the findings, it can be stated that the majority of the respondents have got no difficulty in paying rent or servicing mortgages given the prevailing house rents / mortgage rates. It can be argued that the housing allocation did not take consideration of the lower end income group to whom the housing schemes were targeted but relied on some criteria that favoured the high-income earners. This was confirmed through cross tabulation where the majority of those who expressed they had no difficulty in paying rent were earning more than Kshs 50,000 and were upper middle-income earners for whom these housing schemes were not planned for. It is for this reason that the findings contradict the general housing affordability in the formal market where the low / middle level income earner at 90% cannot afford quality housing from the formal market *(CAHF, 2012 and Okonkwo, 1996)*. The contradiction may be due to corrupt practices at housing allocation stage which many researchers feel has partly contributed to failure of the low and middle-income earners to access quality housing. For instance, *Shuid (2010) and Shutina (2010)* cite bureaucratic and corrupt practices in Malaysia and Albania respectively that contributed to the low and middle earners unfairly left out of housing schemes meant for them.

Appropriate housing allocation criteria should therefore be embedded in the housing delivery system to minimize nepotism and corruption in the current housing delivery systems with a

view of enhancing accessibility to quality housing by all including the low and middle level earners. *Zhang and Hashim (2011)* believe that the challenges of the unfair housing allocation system in China could be addressed through theory of justice which entails systemic legal frame comprising housing legislation, enforcement and sanctions. This theoretical model could be incorporated in developing nations including Kenya to eliminate unfair practices in housing allocation. Generally, it can be concluded that the higher end income households who were unfairly allocated housing units were satisfied with the rent / mortgage rates while the low and middle level income earners meant to benefit from the housing scheme were dissatisfied since the rent / mortgage rates were high implying that accessibility to the housing units is challenged.

6.4 Components Based on Interview of Previous Lead Consultants

This section discusses the appropriateness of housing delivery components based on expert views that were sought from previous lead consultants. The enquiry focused on the appropriateness of land / infrastructure, planning, design, development control and construction management in improving access to quality housing by the low and middle level income earners in relation to the five housing schemes that were surveyed. Data collection on the five housing schemes was partly achieved through observation checklist and photography. In addition, structured interviews were administered to the previous lead consultants who took part in the implementation of the housing schemes to provide critical planning and design issues that were the basis of the projects.

The consultants were requested to give an insight into whether the construction processes were delivered within set time schedule, budgetary ceiling and quality standards. Observation yielded qualitative data displayed as photographs and drawings in addition to quantitative data which were analysed together with data from structured interview schedule through descriptive statistics. One consultant had been commissioned to undertake two housing schemes while the rest handled one housing scheme each. The lead consultants were sourced from Space & Systems, Baseline Architects, National Housing Corporation and Directorate of Public Works.

All the respondents were professionally registered architects with over 10years experience and also having offered professional services to housing development in their respective disciplines and hence knowledgeable on the issues affecting access to quality housing. Accordingly, the respondents were knowledgeable and experienced in the study area

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implying the accuracy of the responses that were received. The lead consultants and the housing schemes they designed / supervised are shown in Table 6.4.

Table 6. 4: Lead Consultants and Housing Schemes

Item No.	Lead Consultant	Housing Scheme
1	Baseline Architects	Ngara Phase 1 & 2
2	National Housing Corporation	Shauri Moyo
3	Directorate of Public Housing	Ruai Police
4	Space and Systems	Jogoo Road

Source: *Author (2016)*

6.4.1 Land and Infrastructure

Without land and infrastructure no development is possible and this fact displays the central role they play in housing development. *Shelter Afrique (2013)* argues that the combined cost of land and infrastructure is 20 % of the housing development cost making them significant determinants to access to quality housing by the low and middle level income earners. Land and infrastructure are so related that one cannot discuss either without referring to the other. For instance, provision of infrastructure to land sharply increases its value *(Mwaniki, 2016)*. Observation checklist shows that the land for developing the five housing schemes were under state ownership significantly reducing housing development cost.

This explains why the rent / mortgage rates in the five housing schemes are below market rates. At Ngara housing scheme the rents for two and three bed roomed housing units are Kshs 18,000 and Kshs 23,000 respectively *(Republic of Kenya, 2013a)*. On the other hand, the average rent of 1 – 3 bed roomed house in the formal market is Kshs 70,182 *(Hassconsult, 2014)*. This level of subsidy has been possible due to provision of free land by the state for housing development increasing the level of affordability of rent / mortgage rates in the five housing schemes. This strategy is necessary to enhance access to quality housing by the low and middle level income earners.

The lead consultants were asked to confirm whether the land used for developing the housing schemes were serviced. The findings show that 71.43 % of the respondents stated Yes and 28.57% stated No. This implies that most of the land was serviced by the government contributing significantly in reducing housing development cost and by extension subsidizing house rents / mortgage rates. Free infrastructural services can greatly reduce development

cost and therefore improve access to quality housing. For instance, *Shelter Afrique (2013)*, contends that infrastructural services account for 10% of the overall housing development cost indicating the central role free infrastructural services from the government can play in cutting down housing development cost. The findings mirror past studies which indicate that most countries, developed and developing such as the US, UK, Malaysia and Nigeria have relied on subsidy that includes state provision of free serviced land to substantially lower development cost *(Schwartze, 2006; Hull, 2012; Abdullahi and Azziz, 2011; and Makinde, 2013).* Free land and infrastructural services can therefore be provided by the state to enhance access to quality housing by the low and middle level income earners.

6.4.2 Planning Process

This section evaluates the planning and design of the five housing schemes in relation to the existing standards. It focusses on the appropriateness of the various development control tools and design models across the five housing schemes and how to improve them with a view of enhancing access to quality housing by the low and middle level income earners.

Plot sizes, plot ratios and densities are tools for development control and therefore differ from one zone to another. These tools determine house types and number of housing units to be developed on any given parcel of land meaning they influence access to quality housing. Enquiries were made from the lead consultants to state plot sizes and densities of housing units provided by them with regard to the existing planning and development control regulation. The plot sizes and housing unit densities for the specific housing schemes are as shown in Table 6.5.

Table 6. 5: Land Size and Density of Housing Units in the 5 Housing Schemes

Housing schemes managed by consultants	Size of land set aside for housing scheme	Density of units
Police housing (Ruai)	0.5 Acres	100 units per Acre
Civil servants' housing (Ngara)	15 Acres	44 units per Acre
Civil servants' housing (Shauri Moyo)	1 Acre	100 units per Acre
Civil servants' housing (Jogoo Road)	1 Acre	200 units per Acre

Source: Author (2016)

The plot sizes ranged from 0.5-15 acres with the largest at Ngara Civil Servants Housing and the least at Ruai Police Housing. The densities of the housing units ranged from 44-200 units per acre with the highest at Jogoo Road Housing and lowest at Ngara Housing. The lowest

density was witnessed in Ngara Housing with as low as 44 units per acre as shown in Figure 6.12 (Google Map for Ngara Housing). The google maps for Jogoo Road, Shauri Moyo and Ruai Police housing schemes showing layouts of housing units have been attached as appendix 5.

Figure 6. 11: Google Map of the Multi-storeyed Ngara Housing Estate

Source: *Google Earth (2016)*

These densities and plot sizes are within the minimum standard of 0.125 acres for plot size and 50% ground coverage for the housing scheme zone set by the Nairobi County Development Ordinances and Zoning Regulations. These minimum standards however limit housing supply in Kenya *(Gichunge, 2001)*. Observations by the researcher revealed that all housing schemes except Ruai Police Housing were designed as multistoreyed apartments resulting to higher plot ratios which facilitates better returns from urban land that has become scarce as well as expensive. There is evidence from the consultants who were interviewed that per unit cost of housing escalates with number of storeys but this could however be traded with savings from lower ground coverage, a view point that the researcher who is architect with long experience also agrees with. Most of the housing units have been

generally designed as 5 storeyed blocks of flats save for Ngara Housing phase 2 that has three 10 storeyed blocks of flats and Ruai Housing which is single storeyed.

The high-rise housing development occasioned by expensive land has also been witnessed in low and middle level housing schemes in the China, Siri Lanka and Malaysia *(Mostafa, Wong and Chui, 2002; Samaratunga, 2013 and Shuid, 2010)*. The exorbitant land prices in urban set ups have limited access to quality housing by the low and middle level income earners globally but this challenge could be addressed through high-rise development which in essence saves land which is getting scarce in urban centres day by day. Plates 6.1 and 6.2 show typical 10 storey blocks of flats at Ngara Housing and single storey blocks of housing units at Ruai Police Housing respectively. Photographs for Jogoo Road and Shauri Moyo housing schemes are attached as Appendix 6.

Plate 6. 1: A Nine-Storey Block of Flats at Ngara Housing with Higher Plot Ratio but Lower Ground Coverage

Source: *Author (2016)*

Plate 6. 2: Single Storey Blocks of Housing Units at Ruai Police Housing with Lower Plot Ratio and Higher Ground Coverage

Source: *Author (2016)*

The lead consultants were asked to indicate how the housing scheme unit densities compare with the minimum standards for development control. The findings show that 57.14% consider it to be the same, 14.25 % consider it to be more and 28.57% consider it to be less as shown in Figure 6.13.
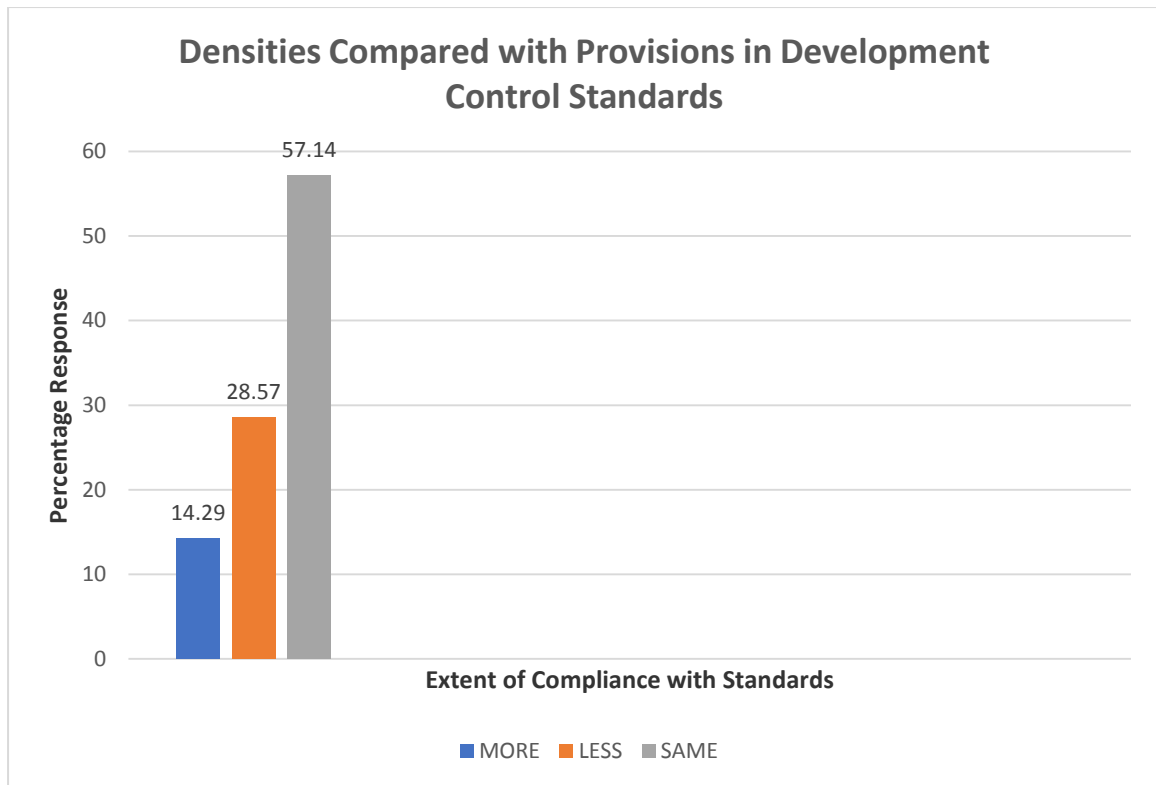
Figure 6. 12: Densities of Housing Units Compared with Development Control Standards

Source: *Author (2016)*

This means that most of the respondents agreed that the densities for housing units were the same or less compared to the ones provided in the development control standards indicating a higher level of compliance. As argued by *Republic of Kenya (2013a) and Gichunge (2001),* the high development control standards for instance, density control limits the number of housing units that can developed within a piece of land which in essence is quite costly in urban setups. The finding contradicts the high densities being witnessed in slums and other squatter settlements which house about one billion people worldwide *(UN Habitat, 2013c).* Lack of land ownership in slums and squatter settlements makes development control impossible and is therefore responsible for the extremely high densities. Densities higher than those in the minimum standards could be adopted to enhance access to quality by the low and middle level income earners but caution should be taken to ensure the internationally accepted standards for overcrowding is not exceeded.

The extent to which housing densities influence affordability and by extension access to quality is paramount in planning housing for the low and middle level income earners. The study investigated how densities influence affordability of housing by the low and middle level income earners by obtaining perceptions from the previous lead consultants. The

findings show that 3 respondents which represented 75 % strongly agreed and 1 respondent which represented 25 %. From these findings, it is clear that housing density has an influence on housing affordability as perceived by the majority of the respondents. On the other hand, housing affordability increases demand which by extension enhances accessibility to quality housing by the low and middle level income earners *(Sidi, 2011)*.

The findings mirror past studies in the US, China and Malaysia where relaxed density standards have been adopted to develop high rise apartments housing thousands of low and middle level income earners *(Quigley and O'Regan, 2000; Zang and Hashim, 2011 and Shuid, 2010)*. It therefore follows that Kenya among other developing countries could relax the restrictive density standards which would ultimately increase affordability and subsequent access to quality housing by the low and middle level income earners. According to *Disney (2007) and; Schwartze and Wisine (2006)*, housing is affordable when rent or mortgage rates do not exceed 30 % of the gross household income. Given this scenario, affordability is therefore a function of rent or mortgage rate and gross household income. High densities lower housing development cost through minimization of development land and hence lower rent or mortgage rates thereby enhancing access to quality housing by the low and middle level income earners.

Other than density, other equally important tools of development control include plot ratio, zoning regulation and building code. The previous consultants were asked to rank the development control planning tools through a Likert scale of 1 in 5 in order of significance in application. The findings show that plot ratio had a mean of 3.29, zoning regulation had a mean of 3.71 and building code had a mean of 4.14 as shown in Figure 6.14.
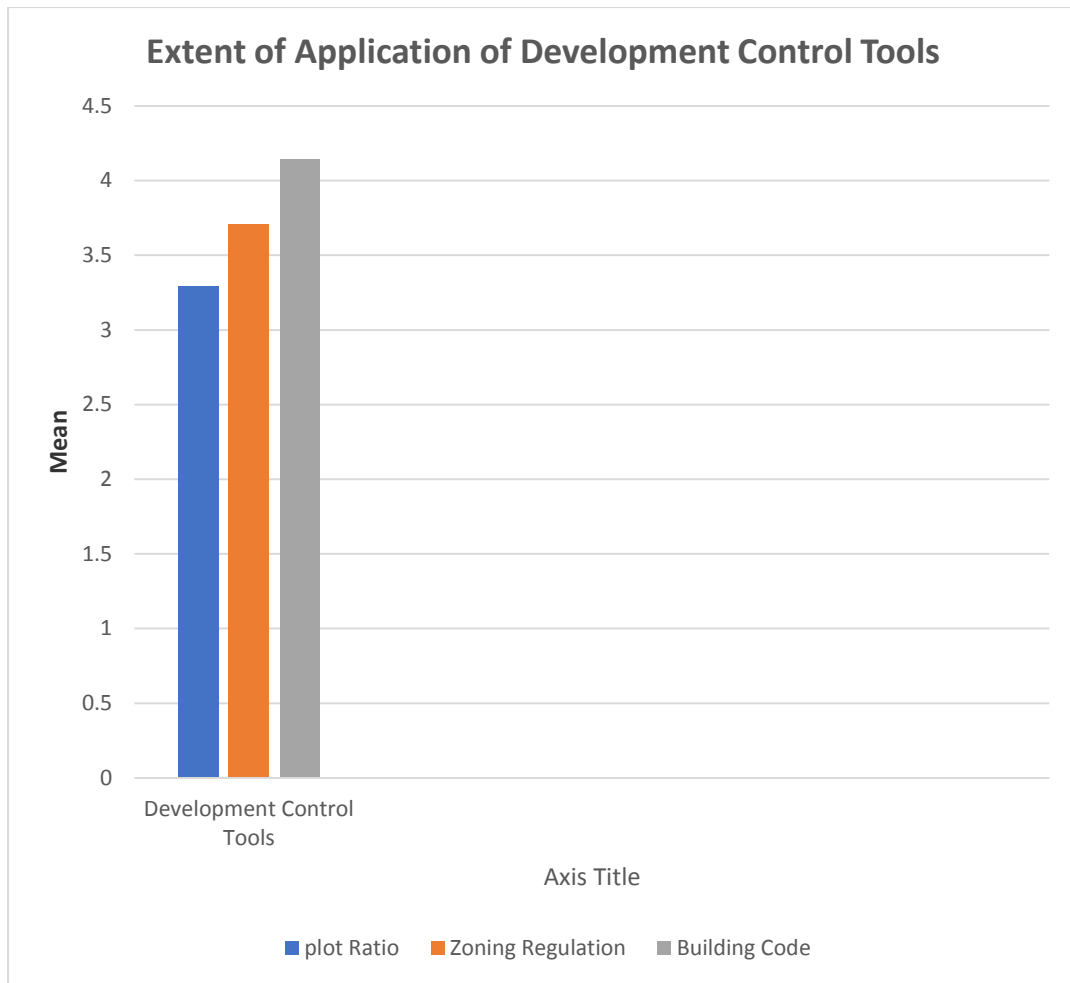
Figure 6. 13: Extent of Application of Development Control Tools

Source: *Author (2016)*

This means that the building code was to a great extent considered as a development control planning tool in comparison to plot ratio and zoning that were of moderate extent. *Republic of Kenya (2004a), Kimani and Musungu (2010), Noppen (2012) and Nabutola (2013)* however view these development control tools as outdated as well as too restrictive. Further, attempts to revise the existing building code have been unfruitful for lack of the political good will. For instance, the draft revised building code has remained unlegislated since 2011 for lack of political good will. Clause 30 of the Physical Planning Act Cap 286 and clause 4 of the Building Code provides that person(s) intending to carry out any construction related development must seek for permission previously from the defunct local authorities but currently from county governments meaning that these regulations shall continue to operate until such a time that the draft revised building code shall have been legislated *(Republic of Kenya, 2012c and Republic of Kenya, 1968).*

The findings are similar to past studies undertaken in Nigeria and Malaysia where it became prudent that the restrictive codes be reviewed so that more low and middle citizens can access quality housing from the formal market *(Ibem, 2010 and Abdullahi and Azziz, 2011).* However, in Zimbabwe the housing standards not only had negative impacts but also realized positive impacts such reduced housing costs through more plots sharing cost of infrastructural development although the negative impacts outweighs the positives *(Zami and Lee, 2007)* The building code and other development control tools should therefore be proactive and accommodate cheap alternative materials and technologies to be able enhance access to quality housing by the low and middle level income earners.

6.4.3 Housing Design and Cost

Besides development control, design types for housing units also play a pivotal role in influencing access to quality housing by the low and middle level income earners (Kvarstrom, 2014). The review of literature indicates that various design parameters such as floor area, perimeter, standards of construction materials, shape, technology and ceiling

height influence housing cost and by extension access to quality housing *(Kvarstrom, 2014 and American Institute of Architects, 2013)*. This study accordingly investigated the role of design in influencing access to quality housing by interviewing the previous lead consultants of five selected public housing schemes. The lead consultants were each asked to state house types they designed for the five selected housing schemes. The findings showed that 2 respondents out of 4 which represented 50 % had developed one-bed roomed, two-bed roomed and three-bed roomed housing units while 2 respondents out of 4 which represented 50 % had developed one-bed roomed and two-bed roomed housing units. From Table 6.6, the floor areas for one-bed roomed units ranged from 33.5-35m^2, two-bed roomed units from 45.7-63m^2 and three-bed roomed units from 76-95m^2.

Table 6. 6: House Sizes / Types Designed by the Consultants

Consultant	Housing Scheme	House Size/Type
Baseline Architects	Ngara Phase 1 &2	1 b/r (35m^2), 2 b/r (54m^2), 3 b/r (76m^2)
Space & Systems Architects	Jogoo Road	1 b/r (35m^2), 2 b/r (46m^2)
National Housing Corporation (NHC)	Shauri Moyo	1 b/r (35m^2), 2 b/r (63m^2)
Directorate of Works/NHC	Ruai police Housing	1 b/r (33.5m^2), 2b/r (45.7m^2), 3b/r (95m^2)

Source: *Author (2016)*

The mean scores were 37.5m^2 for 1 bed roomed units, 61.5m^2 for 2 bed roomed units and 85.6m^2 for 3 bed roomed units. From the findings, it follows that the 1 and 2 bed roomed units appears in all the five housing schemes while the 3 bed roomed units are only found in three housing schemes. The floor areas of house types differ from consultant to consultant depending on design efficiency. For instance, Figures 6.15 and 6.16 show two house design types from different consultants with similar schedule of accommodation (all 2 bed rooms) but have significantly divergent floor areas i.e. 63.m^2 at Shauri Moyo Housing against 46m^2 at Ruai Police Housing. Designs for other house types have been attached as Appendix 7.
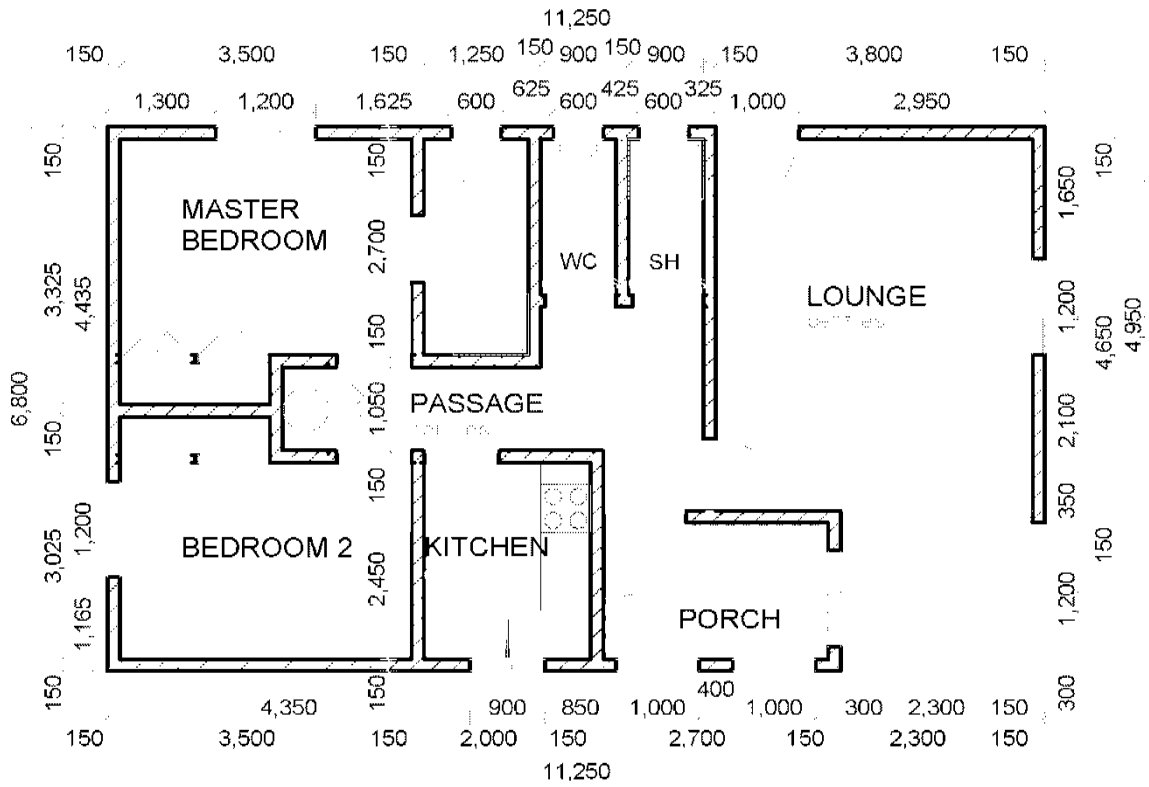
SHAURI MOYO 2 BEDROOM

Figure 6. 14: 2 Bed Roomed House Type at Shauri Moyo Housing with Generous Space Provision

Source: *Author (2016)*

Figure 6. 15: Compact & Space Efficient 2 Bed Roomed House Type at Ruai Police Housing

Source: *Author (2016)*

The space difference between the housing unit at Shauri Moyo and the one at Ruai is 18m^2 which is quite pronounced and yet they were all designed for the same income group. Adopting a unit cost of kshs 50,000 per m^2 this translates to cost saving of Kshs 900, 000.for the housing unit at Ruai Police housing confirming the extent to which design can be applied to minimize construction cost and therefore enhance accessibility to quality housing. Similar cost savings is also applicable to the two-bed roomed house type at Jogoo Road Housing with the same floor area as the one at Ruai Police Housing. These findings agree well with those from *Cunningham (2013) and Commission for Architecture and Built Environment (2006)* who argue that design parameters such as functionality, geometrical configuration, floor area and legislative constraints influence housing construction cost and access to quality housing in the context of housing development in Ireland and England. *Shelter Afrique (2013)* estimates construction cost as 60% of the overall housing development cost justifying the

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need to focus on it where housing development cost minimization is the preferred strategy in improving accessibility to quality housing.

In addition, the housing planners and policy makers must ensure that the distribution of the housing unit sizes / types are aligned to the socio-economic strata of those meant to be housed otherwise the affordability question may lock out the would-be beneficiaries. *Makinde (2015)* argues on the extent to which socio-cultural aspects such as environmental dwelling unit, physical, behavioural and economic elements could be applied to address the housing needs of the lower end income citizens of Nigeria, a strategy that could also be adopted by other developing countries like Kenya. The in-ability for policy makers to factor socio-cultural parameters in housing development partly explains why most of the low and middle level income earners in Kenya did not benefit from the existing public housing schemes *(Kabo, 2006). Syagga (1985), Noppen (2012) and Kvarstrom (2014)* argue that unit floor area influences housing development cost and by extension rent / mortgage rate chargeable justifying the need for lead consultants to come up with innovative designs that utilize spaces efficiently. Efficient design culminating to optimal spaces for the different house types coupled with positive socio-cultural norms could effectively improve the contribution of planning as a critical component of the housing delivery system.

Further enquiries were made to the lead consultants on the criteria used in the choice of the house size. The findings showed that 2 respondents out of 4 which represented 50 % considered the income of the household while 2 respondents which represented 50 % had considered the development cost. This implies that most of the respondents considered development cost and household income as critical criteria in arriving at house sizes / types. This finding agrees well with those from *CAHF (2012) and; Moko and Olima (2014)*. It however partly disagrees with those from *Makinde (2015) and Sidi (2011)* whose models include other factors such as environmental, dwelling unit, physical, tenure, structural, cultural and behavioural elements. While development cost can be minimized through efficient design solutions, income levels can best be enhanced through better economic performance beyond the control of the design teams. Other than development cost and household income, other socio-cultural elements as explained above should also be factored to arrive at designs which are acceptable to the users *(Rapoport, 2001)*. These elements are essentially components of housing delivery system grouped as part of the external environment and in line with systems theory, any deficiency in them would fail the overall functioning of the housing delivery system leading to constraints in quality housing accessibility status.

The study went further to explore ways of reforming the building code minimum space standards with a view of bringing down development cost. The enquiry investigated how the building code space provision standards can be reviewed to enhance affordability of housing and by extension accessibility to quality housing. The findings showed that lowering the floor area standards had a mean of 4.13 and lowering the ceiling height standards had a mean of 2.50. This means that most of the respondents agreed with lowering floor area standards as the most effective way of enhancing affordability / accessibility to quality housing by the low / middle level income earners. Lowering floor area and ceiling height is however restricted to minimum standards defined by the building code. For instance, clause 159 (1) of the building code provides that a habitable room should allow for 2.4m as the minimum ceiling height while clause 159 (4) sets the minimum floor area of a habitable space as 9m^2 *(Republic of Kenya, 1968)*. The finding partly mirrors that from *Cunningham (2013)* whose finding is more comprehensive but based on the Irish context where other parameters such geometric specifications, whole life costs, location and legal regime also equally matter.

Further investigations were made into the design parameters that influence housing cost and by extension the housing accessibility in order of significance. The findings showed that floor area had a mean of 4.25, height had a mean of 3.63, choice of materials had a mean of 4.00, shape had a mean of 3.50 and choice of technology had a mean of 3.62 as shown in Figure 6.17.
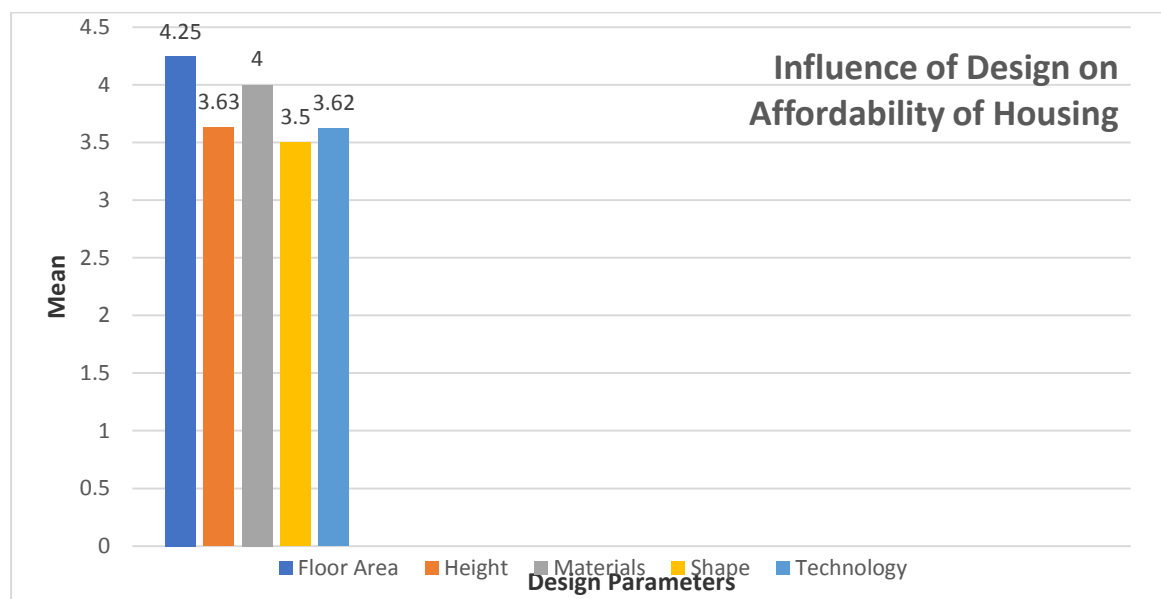
Figure 6. 16: Influence of Design on Affordability of Housing

Source: Author (2016)

The findings imply that all the listed parameters are significant determinants of housing construction cost with floor area as the most significant with a mean of 4.25. This finding compares well with those from *Syagga (1985), Noppen (2012) and Kvarstrom (2014)*. It also concurs with past studies in Ireland and Poland. In the context of Ireland, *Cunningham (2013)* emphasizes the significant role of functionality, economic factors and geometric specifications. On the other hand, *Belniak et al (2013)* conducted their study in Poland focusing more on shape and believes that a square shape as best in minimizing costs in relation to foundations and walls while a rectangular shape is best at reducing costs associated with internal layouts. In line with systems theory, construction cost and design as components of the housing delivery cost are interactive and interdependent. Any challenges on either will not only affect the components but the housing delivery system as a whole entity *(Saleemi, 2009; Stave and Hopper, 2007)*. Given this fact, inappropriate design will increase construction cost and subsequently minimize accessibility to quality housing by the low / middle level income earners.

6.4.4 Appropriate Housing Model Design for the Low/Middle Level Earners

Systems inputs are processed at the throughput level and interacts with the external environment to give rise to desired output which in this case are affordable quality housing units in adequate quantities. System theorists contend that when the output is not appropriate the feedback mechanism relays impulses to the system to readjust the level of input, throughput and external environment so that the desired output is delivered to the formal market. Applying this theory, design as a process of planning can be reformed to deliver appropriate housing model that is accessible by the low and middle level earners. Investigations were consequently made on the category of housing that is appropriate for the low-income earners to improve affordability to quality housing. The findings indicate that 1 respondent out of 4 which represented 25 % stated two rooms, 2 respondents which represented 50 % stated one bed roomed unit and 1 respondent which represented 25 % stated other units which were bedsitters. The findings are shown in Table 6.7.

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Table 6. 7: Category of Housing that is Appropriate for the Low-Income Earners

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Two rooms	1	25.0	25.0	25.0
	One B/R Unit	2	50.0	50.0	75.0
	Others (Bedsitter)	1	25.0	25.0	100.0
	Total	4	100.0	100.0	

Source: *Author (2016)*

This means that most of the respondents considered one bed roomed units as appropriate for the low-income earners to improve affordability to quality housing. These findings contradict the Directorate of Housing minimum housing type standards of a bed sitter which is currently being applied in the on-going police and prisons housing *(Republic of Kenya, 2016c)*. Earlier findings revealed that an average size of a household in Kenya is five members which mirrors the findings by the *Republic of Kenya (2014)*. Any house size below one bed room would compromise on cultural aspects such as privacy and social standing of the Kenyan workers. This is reflected in findings by *Makinde (2015)* who propagates the significance of socio-cultural norms in addressing households' satisfaction.

While architects can reduce floor areas to enhance the affordability of the housing units, there is a limit to which they can go given the minimum standards prescribed by the building code and the overcrowding standards set by the World Health Organization (WHO). Clause 216 of the Building Code states that a habitable space should allow for a minimum of $5m^2$ per person while the World Health Organization specifies the minimum standards for overcrowding as $7m^2$ per person in urban settings (*Republic of Kenya, 1968 and Ranson, 1988)*. The minimum set standards therefore limit the performance of design towards the achievement of affordability and the subsequent accessibility to quality housing by the low/middle level income earners. The bottom line is that the contribution of design as a component of the housing delivery system would adversely be affected unless the minimum standards are reviewed. The respondents were further asked to state the minimum floor area appropriate for the low-income earners. The findings showed that 1 respondent which represented 25 % stated 20 m^2; 2 respondents which represented 50 % stated 40 m^2 while 1 respondent which represented 25 % stated 60 m^2 translating to a mean score of $40m^2$ as shown in Table 6.8.

Table 6. 8: Minimum Area of Appropriate Housing for Low Income Earners

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20m2	1	25.0	25.0	25.0
	40m2	2	50.0	50.0	75.0
	60m2	1	25.0	25.0	100.0
	Total	4	100.0	100.0	

Source: *Author (2016)*

40 m^2 should therefore be considered as the minimum area of appropriate housing units for the low-income earners. This minimum is within the minimum standards set by both the Building Code, Directorate of Housing and World Health Organization (*Republic of Kenya, 1968; Republic of Kenya, 2016a and Ranson, 1988)*. For instance, the Directorate of Housing specifies 30m^2 as minimum size of a low-cost house while WHO specifies 23m^2 for the same house type. On the other hand, the building code does not specifically refer to standards for house type but only specifies that a habitable room should be minimum 8.3 m^2. Based on minimum standards obtained from the findings, when a unit cost of Kshs 50,000 for a house constructed from conventional materials and technology is applied, this would translate to Kshs 2,000,000 for which no low-income earners can afford its mortgage rate and only a few middle-income earners can afford its rent on the basis 30% rule of thumb on gross household income. The options available include;

- Subsidize rent / mortgage rates
- Adopt partly incremental system and partly rental system
- Adopt cheap non-conventional materials and technology
- Adopt social housing strategy
- House the extreme lower end income group through 2 roomed units of 20m^2.

These options are each challenged in one way or another. For instance, subsidy would exert heavy financial burden on the government, incremental system would initially provide constrained space while rental system would deny ownership leaving tenants at the mercy of the landlords, non-conventional materials / technology lack economies of scale, social housing requires heavy financing and adopting a 20m^2 two roomed unit will contravene some basic cultural norms like boys and girls sharing space for sleeping. The option with the least

challenge to mitigate on is to partly adopt the incremental system and rental system in the short run but consider social housing in the long run.

On the other hand, the respondents were asked to state the category of housing that is appropriate for the middle-income earners. The findings showed that 1 respondent stated two bed roomed unit which represented 25.0 % while 3 respondents stated three bed roomed unit which represented 75.0 % as shown in Table 6.9.

Table 6. 9: Category of Housing Appropriate for the Middle-Income Earners

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Two B/R	1	25.0	25.0	25.0
	Three B/R	3	75.0	75.0	100.0
	Total	4	100.0	100.0	

Source: *Author (2016)*

This means that majority of the respondents stated three bed roomed unit as being appropriate for the middle-income earners. The findings concur with minimum standards set by Directorate of Housing and WHO *(Republic of Kenya, 2016c and Ranson, 1988).* The researcher as an architect with long experience argues that this housing type takes cognizance of the socio-economic status of middle income level earners as well as cultural considerations such as households' size, cultural identity and income levels. A good design needs to balance and integrate social status, cultural values and the economic wellbeing of the households in order to arrive at an appropriate house *(Kabo, 2006 and Rapoport, 2000).*

The respondents were further asked to state the minimum area appropriate for housing the middle-income earners. The findings showed that 1 respondent which represented 25 % stated 60 m^2; 2 respondents who represented 50 % stated 80 m^2 while 1 other respondent stated 100 m^2 which represented 25% translating to a mean score of 80m^2 as shown in Table 6.10.

Table 6. 10: Minimum Area of Appropriate Housing Unit for the Middle-Income earners

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	60m2	1	25.0	25.0	25.0
	80m2	2	50.0	50.0	75.0
	100m2	1	25.0	25.0	100.0
	Total	4	100.0	100.0	

Source: *Author (2016)*

This means that 80 m^2 should be considered as the minimum area of appropriate housing unit for the middle-income earners. This meets the minimum standards set by the Building Code, Directorate of Housing and World Health Organization (*Republic of Kenya, 1968; Republic of Kenya, 2016a and Ranson, 1988).* For instance, the Directorate of Housing specifies 30m^2 as minimum size of a middle grade house while WHO specifies 23m^2 for the same house type. On the other hand, the building code does not specifically refer to standards for house type but only specifies that a habitable room should be minimum 8.3 m^2. Based on the minimum standards obtained from the findings, applying a unit cost of Kshs 50,000 per m^2 for a house constructed in conventional materials and technology would translate to Kshs 4,500,000 whose mortgage or rent cannot be shouldered by the middle income on the basis of the 30% rule on gross household income. This brings into focus four scenarios for accommodating this category of income earners;

- Subsidize rents / mortgage
- Adopt incremental housing
- Adopt cheap non-conventional materials / technology
- House the category of income earners through adoption of a 60m^2 two bed roomed units.

The four options each have drawbacks. For instance, subsidy require heavy financing from the exchequer, incremental housing would provide constrained space initially, the available non-conventional materials / technologies lack economies of scale and adoption of a two-bed roomed unit may compromise cultural values requiring girls not to share rooms with boys. It is apparent that the adoption of a two-bed room unit and incremental housing have lesser challenges to deal with than the rest of the scenarios as either the girls or boys can use the

kitchen or lounge for sleeping at night. In the long run, the non-conventional materials / technologies should have gained sufficient economies of scale to be able to adequately support the low / middle level housing sector.

6.4.5 Materials of Construction in the Five Housing Schemes

Materials alongside other construction inputs are key in guaranteeing access to quality housing by the low and middle level income earners. Previous studies hold that materials account for a significant proportion of housing construction cost indicating its prominent role in housing development for the lower end income group *(Syagga, 1993 and Kvarstrom, 2014)*. Cost effective materials of construction could therefore improve access to quality housing by the low and middle level income earners who are less endowed economically. An assessment was conducted on the materials specified in the key building elements of the housing units across the five housing schemes through the researcher's observation and interview of the previous lead consultants. The findings showed that the roof structure was generally constructed from sawn timber and reinforced concrete while the ceiling was mainly soft board and plastered concrete slab. The roof cover was predominantly corrugated galvanized iron sheets except at Ngara Housing where clay tiles had been adopted. The internal walls were mainly natural stone and concrete blocks which were plastered and painted save for Ruai Police Housing where the EPS panels had been adopted. The floors were mass concrete / reinforced concrete finished mainly in sand cement screed, pvc tiles and ceramic tiles in wet areas. The external walls were generally keyed masonry save for the nine storied towers at Ngara Housing and Ruai Police housing which had plastered external walls. A detailed assessment of the materials of construction is shown in Table 6.11.

Table 6. 11: Materials Specified in Key Building Elements

		Count
Roof structure	Sawn timber	2
	Steel	2
	Total	4
Roof cover	Clay tiles	1
	Corrugated galvanized sheets	3
	Total	4
Ceiling	Concrete slab, soft board ceiling	3
	Soft board	1
	Total	4
Internal wall finish	Plastered and painted natural stone/concrete blocks	3
	Plastered and painted EPS	1
	Total	4
Floor slab	Mass concrete floor slab	1
	Reinforced concrete slab/mass concrete	3
	Total	4
External wall finish	Keyed masonry	3
	Plastered EPS	1
	Total	4
Floor finish	ceramic tiles/pvc tiles	2
	screed	2
Total		4

Source: *Author (2016)*

The responses show that the housing schemes managed by the previous lead consultants were constructed in conventional technology and materials except Ruai Police Housing that adopted the EPS technology which is non-conventional. Materials / technology is a key component of the housing delivery system which according to *Syagga (1993*) contributes to 68% of the construction cost. This view point mirrors findings from *Ugochukwu and Chioma (2015)* who argue that in Nigeria, cheap locally available materials and technologies could minimize housing construction cost by approximately 60% and therefore one of the

significant affordable strategies for addressing the housing needs for the urban poor. Appropriate design must therefore specify economically effective materials of construction to lower construction cost and accordingly enhance accessibility to quality housing by the low / middle level earners.

 Further investigations were made on the extent to which the respondents agreed with various statements on choice of materials of construction with respect to building code compliance and affordability. The findings showed that the statement that choice of materials had lower standards than the building code standards had a mean of 1.63, the choice of materials had same standards as the building code standards had a mean of 4.38, application of non-conventional cheap local materials / technology will enhance affordable housing had a mean of 3.63 and adopting 150mm thick walling as load bearing for single storey building will enhance affordable housing had a mean of 3.00 as shown in Figure 6.18.
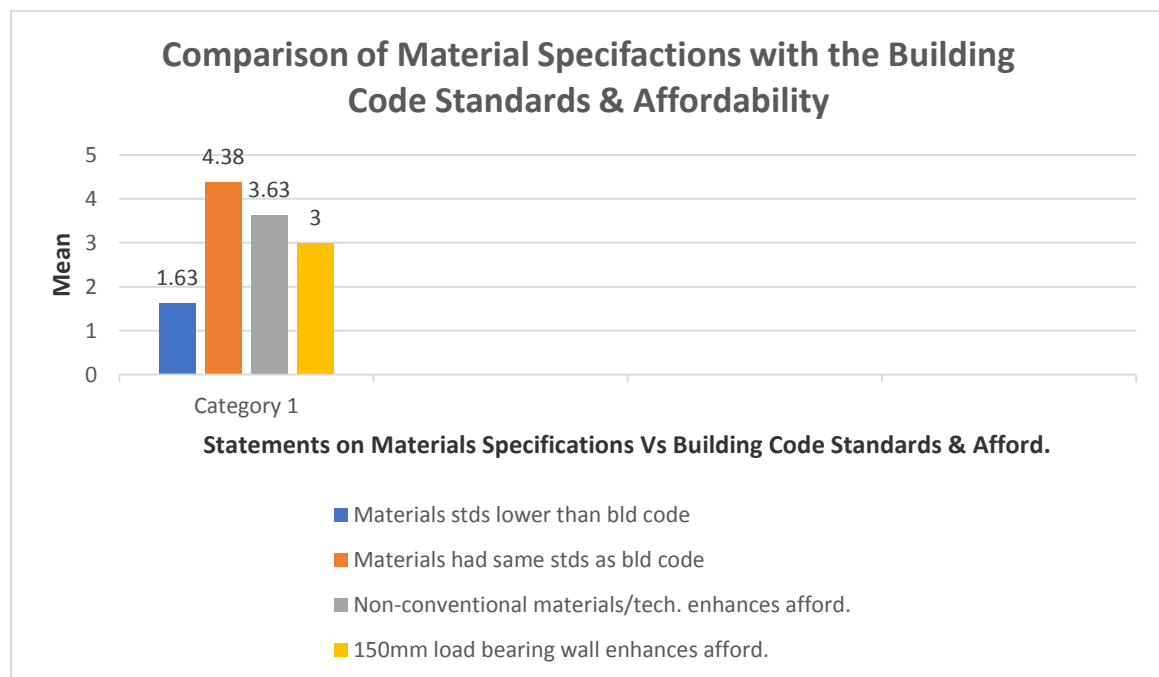
Figure 6. 17: Comparison of Materials Specifications with the Building Code and Affordability

Source: *Author (2016)*

This means that most of the respondents agreed on the statement that the choice of materials had same standards as the building code standards at a mean of 4.38 closely followed by application of appropriate non-conventional cheap local materials / technology will enhance affordable housing which had a mean of 3.63. The findings reveal that the consultants strictly respect and apply the building code minimum standards but feel that these standards should

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be reviewed to accommodate appropriate non-conventional materials and technology so as to drastically reduce housing construction costs. The findings mirror those from *Ugochukwu and Chioma (2015)* who view cheap locally available materials and technologies unlike the conventional ones, as one of the significant means of addressing the housing accessibility challenges from the Nigerian urban poor. *Republic of Kenya (2013a) and Gichunge (2001)* argue that the building code standards are so restrictive that they do not recognize cheaper non-conventional materials and technology. The role of planning, design and development control as a critical components of housing delivery is accordingly jeopardized leading to higher development costs and subsequent in-accessibility to quality housing by the low / middle level income earners unless local cheap alternative building materials and technologies are invented and adopted.

6.4.6 Alternative Materials and Technology

Since materials form a significant proportion of construction cost it becomes imperative that cheap alternative materials of construction be sought to be able to address the quality housing accessibility dilemma by the low and middle level income earners. An enquiry was therefore made into the extent to which the respondents agreed with the various existing alternative materials and technologies that would reduce the cost of housing and by extension increase housing accessibility. The findings show that interlocking soil blocks had a mean of 3.38, interlocking bricks had a mean of 3.13, EPS technology had a mean of 3.75 and cement sisal fibre roofing sheets had a mean of 3.50 as shown in Figure 6.19

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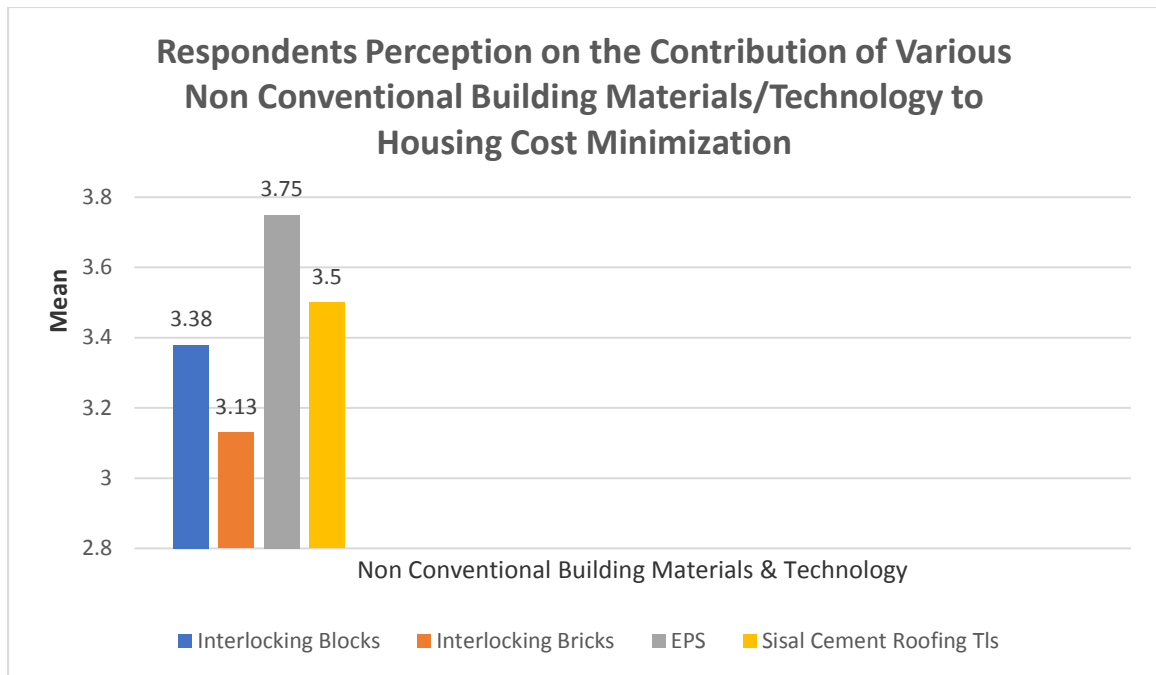
Figure 6. 18: Rating of the Contribution of Various Non-Conventional Building Materials/Technology to Housing Cost Minimization.

Source: *Author (2016)*

The findings show that all the responses were above the theoretical mean of 3 in a 1 in 5 Likert scale and were all considered significant in relation to their contribution to the minimization of cost of housing with the Expanded Polystyrene Styrofoam (EPS) panel technology as the most significant. The findings highlight the respondents' acceptance of the emerging non-conventional materials / technologies. The findings compare well with those from *Ugochukwu and Chioma (2015) and; Patil and Mutkekar (2014)* who view the significance of locally produced non-conventional materials in minimizing housing construction cost to enhance access to quality housing by the lower end citizens in Nigeria and India respectively.

Concerted research into cheap non-conventional materials could therefore play a significant role in improving access to quality housing by the low and middle level citizens in Kenyan and other developing countries. A few non-conventional materials and technologies have been developed but have faced certain challenges *(Magutu, 2015)*. The interlocking blocks technology have been developed by the Directorate of Housing in Kenya who has set up regional centres for technological transfer while the interlocking bricks technology has been developed by various organizations that include Innovation Housing, Hydraforms South Africa, Easy Nyumba Company and World Haus. Although the interlocking bricks or blocks technology have considerable savings on mortar and speed of jointing, their uptake is quite

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slow and they are mostly concentrated in peri-urban and rural areas *(Noppen, 2012)*. The EPS which still lack adequate economies of scale is advanced by National Housing Corporation, Boleyn Magic Wall Panel Ltd., ELSEK Group of Companies and KOTO Housing Kenya *(Mwololo, 2016)*. The major projects where the EPS technology has been applied include the police and prisons housing programme being implemented in Nairobi, Kiambu, Machakos and Kisumu counties *(Republic of Kenya, 2016d)*. The cement sisal fibre roofing tiles were developed by the Directorate of Housing in collaboration with the University of Nairobi but have faced similar challenges *(Syagga, 1993)*.

The promoters of the materials and technologies are enthusiastic about some level of cost benefits and considerable speed of delivery as well as the low dead weight of the structures. *Mwololo (2016)* highlights cost savings of up to 20%, 30% reduction of self-weight and comparative faster construction speed which enable construction of a modest house in one month. Housing design consultants from the Directorate of Works who were interviewed were however cautious on this matter arguing that there is no meaningful cost savings other than comparative faster speed of delivery. *Syagga (1993)* decry the slow growth of this sector due to lack of political and economic support by the government. These findings contradict those from Ugochukwu and Chioma (2015) who argue that locally manufactured materials / technologies could minimize construction costs by approximately 60% and therefore greatly enhance access to quality housing by the low and middle level Nigerian citizens. This disparity may be attributed to high content of imported ingredients of most non-conventional materials / technologies in Kenya compared to Nigerian situation where they are almost 100% local.   Any challenges on cheap alternative materials / technologies is bound to affect the basic aim of a housing system of providing quality housing to all including the low / middle level income earners implying that the challenges should be identified and mitigated against. The challenges and how to address them is discussed in the chapter five.

6.4.7 Construction Processes

Construction process just like planning process is a key component of any housing delivery system. Theoretically, time and cost are key determinants of the success of construction processes. A project completed within specifications, time schedule and budget is deemed successful. *Mbatha (1986), Endut, Akintoye and Kelly (2006); and Boru (2016)* argue that the relative quality, cost and time are measures of the performance of the construction processes. The lead consultants were asked to appraise the success of the construction processes by

stating whether the processes were concluded within set time schedule, budget and specifications. The results of the interview are as shown in Table 6.12.

Table 6. 12: Level of Success of the Construction Processes

Item No.	Name of Housing Scheme	Cost Overrun (Yes/No)	Time Overrun (Yes/No)	Workmanship (Poor/Reasonable)
1	Ruai Police	Yes	Yes	Reasonable
2	Ngara Phase 1	Yes	Yes	Reasonable
3	Ngara Phase 2	Yes	Yes	Reasonable
4	Shauri Moyo	Yes	Yes	Reasonable
5	Jogoo Road	Yes	Yes	Reasonable

Source: *Author (2016)*

The results indicate that while the workmanship was satisfactory across the five public housing schemes, evidence shows that all the housing schemes were associated with time and cost overruns. The findings closely agree with those from *Mbatha (1986)*. The findings also mirror those from *Khabisi (2013) and; Endut, Akintoye and Kelly (2006)* highlighting experiences on causes and impacts of cost and time overruns in South Africa and Malaysia respectively. Moreover, *Rugenyi (2015)* views the triple constraints of time, cost and quality as key areas that project managers should focus on for project success. The time and cost overruns may be attributed to client, consultant and contractor related factors.

Further interview of the consultants revealed that changes of project scope, contractors' cash flow problems, delays in decision making, inappropriate planning, inaccurate documentation, use of unqualified inexperienced consultants / contractors, inadequate funding, delayed payments, contractual disputes, ineffective quality control and lack of effective monitoring tools were the significant causes of failure of the construction processes. In line with systems theory failure of one component renders the whole un-operational *(Bertallanffy, 1968 and Boulding, 1956)*. The consultants argued that if any of these causes is not managed well it is likely to impact negatively on project time schedule, budget and quality. The consultants interviewed were in consensus that the success factors of the construction processes include; effective cost planning / control, use of qualified experienced contractors / consultants, prompt decision making, prompt release of payments, prompt resolution of disputes, effective quality control, adequate funding and effective project management. The findings closely

agree with those from *Khabisi (2013); Boru (2016); Auma (2014) and; Endut, Akintoye and Kelly (2006).*

There is however some slight variance mainly due to the scope and focus of some past studies. For instance, *Ngachu (2013)*'s scope is based on public sector projects but is however extensive and even encompasses external environment and supply chain related factors while *Morris (1990)* castigates the state for being responsible for time and cost overruns majorly attributed to public sector system in India that is prone to poor project design / implementation, in-adequate funding of projects, bureaucratic in-decision and in-effective coordination of stakeholders. Notwithstanding the above scenarios, *Enshasi, Kumarashwamy and Al-Najjar (2010)* view the factors as more related to strikes and border closures which have become part and parcel of life at Gaza Strip in Palestine. Managing the significant causes of failure of the construction processes by adopting the critical success factors will certainly improve the management of housing projects by ensuring they are completed within scheduled time, budget and specifications to enhance access to quality housing by the low and middle level income earners.

6.5 Summary

From the findings, it is evident that the level of the existing housing delivery system components has failed to address the needs of the low and middle level income earners. The study has confirmed that this scenario is due to the fact that the housing delivery components are deficient at input, throughput, external environment and feedback levels resulting to in-appropriate output in the formal housing market. Further as established from earlier findings at the beginning of this chapter, the housing delivery components are not fully interdependent / interactive justifying the in-effectiveness and in-efficiency of the existing housing delivery system. Accordingly, the output delivered in the formal housing market in terms of quality housing cannot be accessed by the low and middle level income earners for being un-able to meet the current supply and demand equation.

At input level, the housing schemes have adopted conventional building materials / technology and housing delivery methods which are in-appropriate / too costly and few emerging materials have not been extensively been adopted. The answer to this dilemma lies with putting in place concerted efforts on research into cheap alternative materials / technology as well as extensive sensitization of consumers. This is in addition to choose of a delivery method that meets the socio-economic needs of the low and middle income earners.

At the throughput level, the planning / construction processes are either in-efficient or in-appropriate causing development cost to soar up extensively. The planning and design of the housing schemes were in-appropriate for reasons of the restrictive development control tools such as zoning regulations, plot ratio / development control and building code. The inappropriate development control tools have resulted into high construction cost and hence limiting access to quality housing by the middle level income earners. These development control tools were however borrowed from the colonial era and have since not been reviewed for lack of political good will. The study identified ways of minimizing the limitations that include; reviewing of the existing development control tools, adoption of cost effective design options including use of appropriate design parameters, building capacity of housing research institutions and acquisition of affordable serviced land.

At the external environment level, the housing development cost is quite high implying that rents / mortgage rates cannot be comfortably be accommodated within the globally accepted 30 % threshold of the prevailing income levels of the low and middle-income earners while the research into cheap alternative building materials / technology has not yielded much for lack of capacity and sensitization. The study suggests measures that policy makers should consider such as provision of state subsidies at demand / supply levels, capacity building of housing research institutions as well as effective dissemination of findings.

 At feedback level, no effective monitoring and control measures were provided for to manage the construction processes leading to failure of projects delivery within set time and budget. On the other hand, the housing schemes were however completed within the desired quality standards given that the project consultants and contractors that were procured were technically qualified and experienced. The findings further revealed that changes of project scope, contractors' cash flow problems, delays in decision making, inappropriate planning, inaccurate documentation, use of unqualified inexperienced consultants / contractors, inadequate funding, delayed payments, contractual disputes, ineffective quality control and lack of effective monitoring tools were the significant causes of failure of the construction processes.

This chapter has discussed the appropriateness of the housing delivery approach based on perceptions of households and previous lead consultants. The findings generally reveal that most of the housing delivery components discussed under this chapter have challenges have been discussed in chapter five. The next chapter discusses the correlation of the housing delivery system components as study variables with a view of identifying the significantly appropriate housing delivery components in improving access to quality housing. It also

discusses hypotheses testing and the challenges of the existing housing delivery approach in improving access to quality housing.

CHAPTER SEVEN

7.0 KEY EXPERTS' AND INFORMANTS' ASSESMENT OF HOUSING DELIVERY

7.1 Introduction

The components of the existing housing delivery approaches were identified through the review of related literature. These components were subsequently configured into a systems framework of input, output, throughput, external environment and feedback which forms theoretical underpinning of this enquiry. They include; actors, delivery methods, land / infrastructure, building materials / technology, construction cost, household income, mortgage rate / rent, research into alternative materials / technology, customer satisfaction, policy intervention and monitoring / control *(Republic of Kenya, 2013b; Noppen, 2012 and CAHF, 2012)*. In the systems context, these components are meant to be interdependent as well as interactive to be able to deliver to market the desired output *(Bertalanffy, 1968 and Boulding, 1956)*. In line with the foregoing, a system can perform effectively and efficiently if all components are appropriate justifying the need to assess the components of the existing housing delivery approach.

This chapter begins by discussing the findings on the appropriateness of the components of the housing delivery approach based on perceptions of the key public housing experts and informants. It also discusses the relationship between access to quality housing by the low and middle level earners (dependent variable) and housing delivery approach components (independent variables) in order to determine the significant variables that contribute most in enhancing access to quality housing. It proceeds further to discuss the findings with regard to null hypotheses testing to ascertain whether the existing theoretical relationship between housing cost / household income and access to quality housing holds. In addition, it displays a working systems framework improving access to quality housing by the low and middle level employees in Kenya and a chapter summary. The enquiries relied on primary data collected through self-administered questionnaires and interview schedules. Questionnaire appendix 2A was administered to sampled public sector housing experts to obtain their perception on housing delivery related issues. On the other hand, interview schedules appendices 3A, 3B and 3C were adopted to administer face to face interviews to purposively selected key housing informants (policy makers, mortgage institutions and affordable housing providers).

7.2. Components Based on Questionnaires to Public-Sector Housing Experts

The literature review confirmed that the existing housing delivery approach has failed to provide adequate quality housing to the low and middle level income earners because of certain constraints and weaknesses within the delivery components. This section analyses primary data on the assessment of the appropriateness of components based on responses from public sector housing experts. The housing delivery components assessed in this chapter include; housing actors, delivery methods, financing strategies and mortgage systems.

Questionnaires were administered to 60 public sector housing experts out of which 47 responded. The respondents had adequate qualifications and experience as discussed in section 5.2 of chapter five and therefore provided accurate responses required for the study. The enquiry targeted the appropriateness of housing actors, delivery methods, financing and mortgage. The data obtained were analysed through descriptive statistics which yielded frequency counts and mean item scores. This was necessary to assess the appropriateness of the components in improving access to quality housing by the low and middle level income earners.

7.2.1 Housing Actors

Housing actors or in other words stakeholders in the housing fraternity are varied and appear at all levels of implementation of housing projects. The review of literature reveal that these actors are assigned different roles and can be in the form of state agencies, private entities and non-governmental organizations (NGOs). This enquiry therefore identified the key actors and the role they play in the implementation of housing programmes for the low and middle level income earners.

7.2.1.1 State Policy Makers and Implementers of Housing Programmes

This enquiry was meant to provide an understanding of the roles of state in regard to improving accessibility of quality housing for the low / middle income earners. The question was in 1 in 5 Likert scale to enable the respondents rate housing policy reform statements provided by the researcher. From the findings, the statement that the government needs to provide appropriate regulatory and institutional framework in regard to the implementation of housing programmes had a mean of 4.49, financial and human resources need to be allocated so as to facilitate development of comprehensive and accessible housing had a mean of 4.36, new reforms can reduce time for property registration and building approval had a mean of 4.26, well organized secondary mortgage market be linked to the capital markets and

institutional investors had a mean of 3.85 and housing actors need to complement the efforts of one another to provide access to quality housing by the low / middle level income had a mean of 4.06. The results are summarized in Table 7.1.

Table 7. 1: The Role of the State in Housing Policy Reforms

Policy Reform Statement	Mean Item Scores
Provide an appropriate regulatory and institutional framework	4.49
More financial and human resources be allocated to facilitate development of comprehensive and accessible housing	4.36
There is need to reduce time for property registration and building approval	4.26
Housing actors need to complement the efforts of one another to enhance access to quality housing by the low / middle level income	4.06
Well organized secondary mortgage market be linked to capital markets and institutional investors	3.85

Source: *Author (2016)*

In order of ranking, the need for the government to provide appropriate regulatory and institutional framework in regard to housing planning process was considered by the majority of the respondents as being the most significant in its role to improving accessibility to quality housing for the low / middle income earners. Other significant reforms included financial and human resources need to be allocated so as to facilitate development of comprehensive / accessible housing and reducing time for property registration / building approval. The level of reforms in the Kenyan housing sector do not measure up to those undertaken by the developed nations thus causing a serious housing accessibility dilemma by the low and middle level income earners. The US and the UK were able to improve the housing accessibility by the lower end group by regularly reforming their housing policies through provision of an enabling environment (Hull, 2012 and Weiss, 2002).

Generally, state agencies have a bigger role to play in delivery of quality housing for the low / middle income earners given that the mean scores achieved through this enquiry were all above 3.0 mark in 1 in 5 Likert scale. *Republic of Kenya (2016)* identifies the Directorate of Housing, Directorate of Lands, Directorate of Public Works, County Governments and

National Housing Corporation as key state agencies responsible for housing policy formulation and implementation of housing programmes. *Mitullah (1993)* on the other hand blames other implementing agencies such as the defunct Nairobi City Council, United States Agency for International Assistance (USAID), defunct Ministry of Local Government, Ministry of Lands and Housing, and National Housing Corporation (NHC) for lack of coordination that lead to failure to realize the main objective of the donor funded Umoja housing scheme in addressing the needs of the low-income earners. This contradicts the high level of interdependency / interactivity required of systems components as projected by systems theorist in the review of literature.

Accordingly, the state needs to provide an enabling environment through appropriate reforms through which different actors, both public and private can interact with one another. In line with systems theory, housing components and sub components should interact within themselves and the immediate socio-political environment to facilitate the delivery of the desired output and by extension continue existing *(Rapoport, 2001)*. According to system theorists, a working system is that which operates as a whole and stops working if one or more parts fail *(Bertallanffy, 1968 and Boulding, 1956)*. Aligning housing delivery with systems architecture will essentially guarantee adequate supply of quality housing units for the low / middle level income earners.

7.2.1.2 Development Control Actors

An enquiry was made to provide an understanding of the actors that developers seek permission from most during development. The respondents were asked to indicate the statutory bodies that any building development plans have to be subjected to. The findings show that physical planning department is sought permission from at 20 %, county government at 21%, NEMA at 21 %, Public health department at 17% and NCA at 21 % as shown in Figure 7.1.

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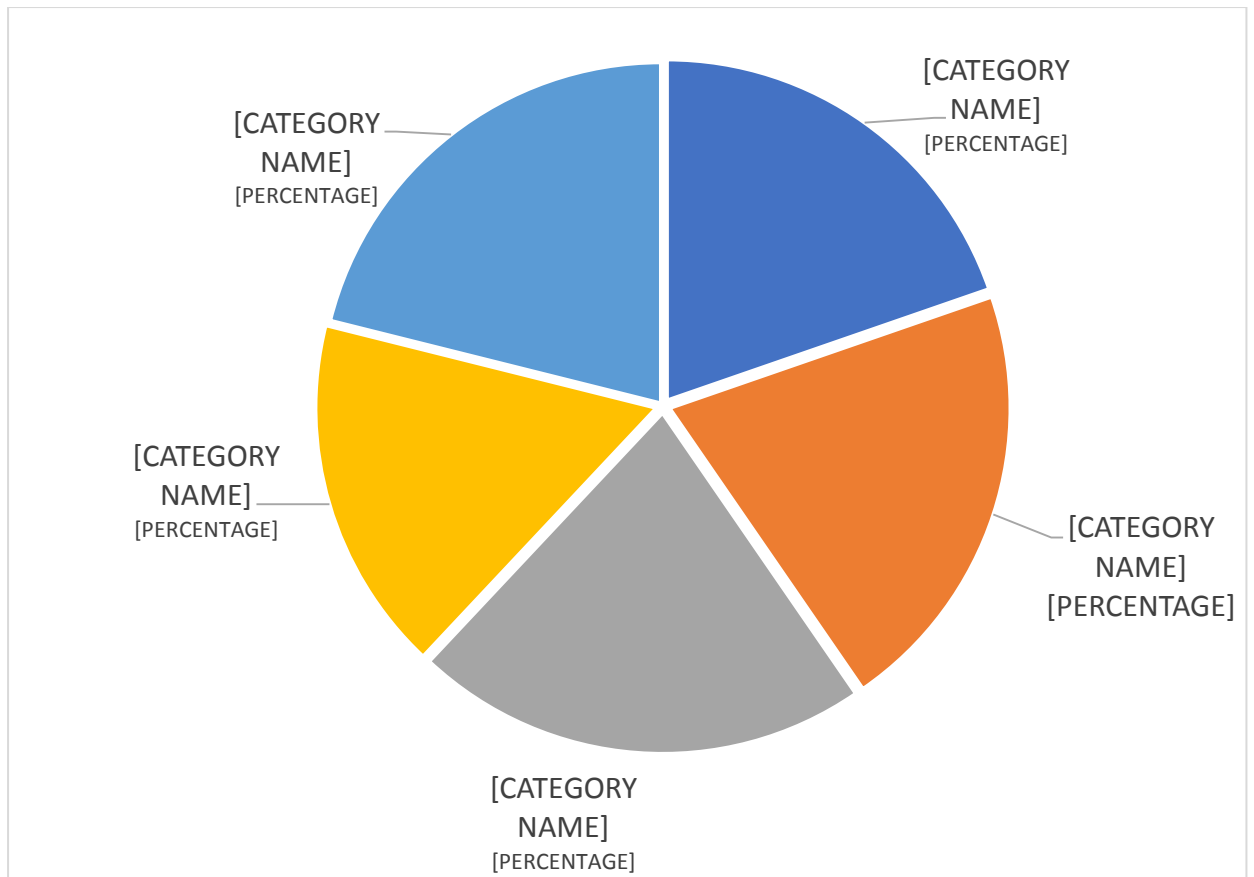
Figure 7. 1: Development Control Actors

Source: *Author (2016)*

The findings indicate that generally the respondents seek permission from relevant bodies prior to development and hence they can be significant in contributing to policy development through planning and development control. The planning regulations and development control has however set high standards which are costly and have consequently restricted housing supply and affordability especially for the low and middle level income earners *(Gichunge, 2001 and; Kimani and Musungu, 2010)*. The existing statutes, for instance, the Physical Planning Act, the National Construction Authority Act, National Environment Management Act and Public Health Act have set high standards for planning and development of construction activities in Kenya. The 2012/2013 Kenya National Housing Survey spells out the critical role these actors play in housing planning and development control *(Republic of Kenya, 2014)*. However, the institutions or actors provided for in these statutes work in a non-synergic manner and in addition charge high approval fees that add to the overall development cost that in the end determine the cost of rent / mortgage charges *(Arvantis, 2013)*. In-ability of the actors to act in a synergistic manner contradicts systems

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attributes and also the manner in which actors in the developed world operate. The weak institutional and legal regime in Kenya may be the cause for this state of affairs.

7.2.1.3 Private Sector Actors

The public housing experts were asked to state the critical private organizations for enhancing access to quality housing for the low and middle-income earners. The findings are as tabulated in Table 7.2.

Table 7. 2: Private Sector Actors in Housing Development

Financial Institutions	Co-operative Organizations	Design/Construction Team	International Donors	Developers
Mortgage Institutions Micro-fin. Institutions Commercial Banks Central Bank	NACHU Housing Co-operatives SACCOs	Consultants Manufacturers Suppliers Contractors	World Bank USAID ADB	UN-Habitat Shelter Afrique Jamii Bora Pamoja Trust Habitat for Humanity CAHF Employers Real Estate Development Individuals

Source: *Author (2016)*

The findings as shown in Table 7.2 indicate that the private sector organizations can be broadly categorized as financial institutions, co-operative organizations, design / construction teams, international donors and developers. The identified private sectors closely reflect those from *Maigua (2014), Makinde (2013), Noppen (2012), Matindi (2008) and Onyango (2008)*. The private sector organizations need to complement the efforts of state agencies to improve access to quality housing by the low and middle level earners. The *Republic of Uganda (2016) and Republic of Kenya (2016)* cite the critical role of the county / local and national governments in rallying both private and public-sector actors such as non-governmental organizations (NGOs), community-based organizations (CBOs), co-operatives, commercial banks, mortgage institutions, microfinance institutions, building societies, regional development authorities, real estate developers, employers and individuals.

Close collaboration between the public and private sectors should be able to yield the synergy which has been missing in the existing housing delivery systems and cause for failure to realize 'adequate housing for all principle'. Hassanali (2009) contends that the role of the

state in housing development has been peripheral due to financial constraints leaving the private sector to should the burden of providing housing. Incidentally, the private sector developers have focused more on housing development in the upper segments for reasons of profitability. *Kieti (2015)* however cites that the existing housing finance institutions and commercial banks have not lived up to expectations and should therefore be reformed to provide affordable mortgage products with a view of improving access to home ownership. Public sector funding has also been grossly inadequate to deliver the existing housing shortfall in developing countries. *Republic of Uganda (2016), Republic of Kenya (2016) and Makinde (2014)* argue in favour of public private partnership financing model in order to bridge the gap in the public-sector financing.

The level of incentives provided by the Kenyan government is not adequate to entice the private sector to engage in low and middle housing development which hither to has been considered non-lucrative *(Chepsiror, 2010)*. This contrasts the level of incentives provided by the developed nations such as US, UK and China who have focused more on selective tax exemptions / abatements, zoning bonuses, rent subsidy, free serviced land, conducive land administration / management regulations, accessible mortgage products and non-restrictive development control regulations *(Schwartz, 2006; Hull, 2012; and Mostafa, Wong and Chui, 2002).* The reason why the developed world is able to provide this level of incentives may be attributed to better economic performance. It is therefore clear that the state as a major stakeholder with the mandate to formulate conducive policies that can revolutionize the housing sector needs to take a leading role in coordinating the inputs from both the private and public sectors in an attempt to create synergic relationships between the various actors.

7.2.2 Housing Delivery Methods

A number of housing delivery methods have been adopted by successive governments since the colonial era *(NACHU, 2013)*. Despite this, the majority of low and middle-income earners in Kenya at 90% have not been able to access quality housing in the formal market partly due to challenges associated with the constraints and weakness of the methods (*Noppen, 2012) and Okonkwo, 1996)*. The enquiry in this study therefore focused on ranking the different housing delivery methods in order of appropriateness, their challenges and how to address them. Questionnaires designed in a 1 in 5 Likert scale were administered to 60 sampled public-sector housing experts out which 47 responded.

The housing delivery methods were identified through the review of literature and include; site and service, tenant purchase, rental and slum upgrading. From the questionnaires,

sampled housing experts in the public sector were asked to rank the identified housing delivery methods in order of contribution to accessibility to quality of housing by the low / middle level income earners. The investigation was meant to rate the level of agreement of the respondents to the contribution of various housing delivery methods to improved accessibility to quality housing by the low / middle income earners. The findings show the mean ratings as follows; tenant purchase scheme (3.68), site / service scheme (3.66), slum upgrading (3.55) and rental scheme (3.21) as shown in Figure 7.2.
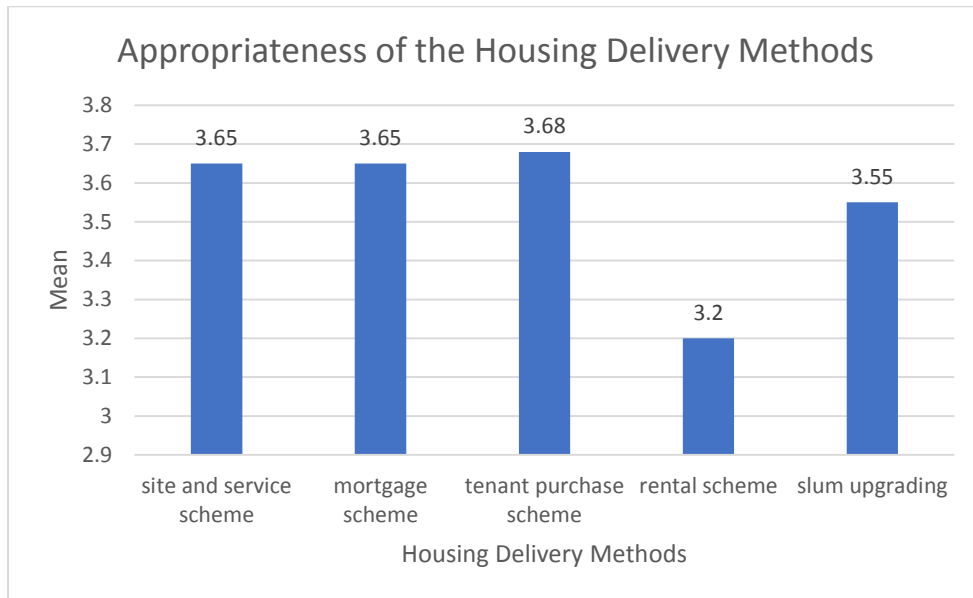
Figure 7. 2: Ranking of the Housing Delivery Methods

Source: *Author (2016)*

The findings indicate that the majority of the respondents considered tenant purchase scheme to greatly contribute to accessibility to quality housing by the low / middle income earners, followed by mortgage scheme, site / service scheme, slum upgrading and rental scheme in that order. The explanation of these findings may be based on the fact that tenant purchase schemes, mortgage schemes and site service schemes would deliver additional housing in the market for ownership. On the other hand, slum upgrading would best improve on quality rather than increasing the numbers. Further, delivery through rental scheme would leave tenants at the mercy of the landlords who can increase house rents at will thereby aggravating housing affordability unless appropriate policy controls and subsidy programs are put in place. The significance of rental delivery method is attributed to the relative cheapness compared to the mortgage and tenant purchase options; and its popularity compares with the findings in 2012/2013 Kenya National Housing Survey *(Republic of Kenya, 2014)*. The

findings by *Njathi (2011)* however identifies site and service as the most effective delivery method in enhancing access to quality housing by the low and middle level income earners. From the findings, it is evident that rental and site / service schemes are more popular as being more affordable options to the low and middle level income earners.

Adoption of the affordable housing delivery methods is a strategy that has been articulated in the review of literature. In pursuit of affordable housing model for the low and middle level income earners, *Disney (2007)* argued that housing is affordable when rent or mortgage is less 30% of gross household income otherwise it becomes a burden as households forego basic necessities such as food, clothing and healthcare These delivery methods were identified earlier through literature review as sub components of the housing delivery system meaning that it was important to investigate the most significant that would make the existing housing delivery system function and be able to address the needs of the low and middle-income earners.

7.2.3 Housing Financing Strategies

The private and public housing sector world over have adopted various strategies in financing housing programmes for the low and middle level income earners. Kenya, one of the developing countries has not been left behind in her endeavour to cater for the housing needs of the low and middle level citizens but has faced numerous challenges with the existing financing strategies. *Noppen (2012)* argue that housing developments are capital intensive and yet it can be very difficult to secure financing at reasonable rates since very few mortgage products target the lower end income group who incidentally happens to be the majority. Appropriate financing mechanism consequently remains key in housing provision for the low and middle-class citizens. This enquiry therefore investigated the appropriateness of the existing financing strategies using a 1 in 5 Likert scale with a view of identifying the critical ones that would enhance access to quality housing by the low and middle level income earners.

The respondents were asked to rank the appropriateness of various financing strategies in improving accessibility to quality housing by the low / middle level employees. The findings show that public private partnership had a mean score of 3.69, public financing had a mean score of 4.23, cooperative savings and credit had a mean score of 4.28, commercial banks had a mean score of 2.90, micro finance institutions had a mean score of 3.26, group savings had

a mean score of 3.76 and individual income had a mean score of 3.82 while for the others category the offshore financing strategy featured. The findings are shown in Table 7.3.

Table 7. 3: Appropriateness of Financing Strategies

Item No.	Financing Strategy	Mean Item Score
1	Public private partnership	4.69
2	Co-operative savings and credit	4.28
3	Public exchequer (GOK)	4.23
4	Individual income	3.82
5	Group savings	3.76
6	Micro finance institutions	3.26
7	Commercial banks	2.90
8	Others (offshore)	1

Source: *Author (2016)*

From the findings, it can be noted that public private partnership, public exchequer financing and cooperative savings / credit were ranked as being very appropriate financing strategies in improving accessibility to quality housing by the low / middle income employees in Kenya. Micro finance and individual income were however ranked as being appropriate in improving accessibility to quality housing by the low / middle level employees while commercial banks were ranked as being least appropriate in improving accessibility to quality housing by the low / middle level employees in Kenya. *Kieti (2015), Ndung'u (2014) and Arvantis (2013)* contend that financing remains the most significant determinant of access to quality housing. The government of Kenya has been directing public exchequer financing to the low / middle grade housing while the private sector has neglected this area for non-profitability and concentrated more on financing the lucrative high-end housing *(Kidundi, 2010 and Chepsiror, 2010)*. According to the Economic Survey 2016, the impact of public financing is quite minimal while cooperative financing could be a step in the right direction but lacks economy of scale. Further, housing programmes earmarked for implementation through PPP financial approach have been shelved due to certain bottlenecks. In view of this scenario, the majority of the low / middle level earners at 90 % cannot afford housing in the formal market *(Okonkwo, 1996 and Republic of Kenya, 2013c)*.

Public exchequer financing of housing schemes has been grossly inadequate and has also been dwindling, calling for alternative financing strategies for instance public private partnership and cooperative financing which requires restructuring to meet the housing needs

of the low and middle level income earners *(Rono, 2015)*. Systems function well if components and sub components are appropriate in addressing its objectives *(Meles et al, 2010)*. In this enquiry financing strategies are varied and the most significant strategies in guaranteeing accessibility to quality housing by the low and middle level income earners should be considered. In order of appropriateness, this include public exchequer financing, cooperative savings / credit financing and public private partnership each of which has been confirmed to be appropriate depending on income levels and whether the housing scheme is private or public.

The future of public financed housing that has traditionally been used to provide affordable low and middle level housing is threatened given the dwindling public exchequer allocations over the years and may only be reversed by alternative financing from other quarters. Herbling (2017) projects the emerging role of co-operative savings and credit societies (saccos) in providing tenant purchase housing schemes to members in arrangement where members pay 10% of the house cost upfront while the balance of the cost is recovered as monthly rent for 20 years without attracting any interest. This arrangement is in its infancy stage and involves only a few co-operatives such as Kimisitu, Safaricom, Habitat and Nation housing co-operatives; and has attracted financial support from international donors including the World Bank and Un Habitat to finance development of some housing projects. Although they charge rents which are reasonable (Kshs 15,000 – 25,000 for a 2-bed roomed house), it remains to be seen whether they can develop sufficient capacity to address the huge housing shortfall in respect of the low and middle level income earners.

On the other hand, *Olima and Moko (2014)* view the emerging public private partnership as an avenue for acquiring private sector financing of public housing projects in Kenya where housing exchequer allocations have been dwindling over time. The public private partnership is however a new concept in Kenya and has faced certain challenges which may be attributed to lack of effective institutional and legal regime. The public private partnership financing models in some developing nations such as Nigeria and Malaysia have however somehow succeeded to address housing concerns for the low and middle level income earners through public housing programmes *(Makinde (2013) and Shuid (2004)*. It therefore becomes necessary that the drawbacks that befell public private partnership financing model at infancy in realizing quality and accessible housing for the low and middle level income earners in Kenya be investigated with a view of aligning it with successful models in other countries founded on appropriate institutional and legal frame work.

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7.3 Components Based on Interview of Key Housing Informants

Key informants pertinent to housing delivery for the low and middle level earners were purposively selected and interviewed on policy reforms needed to enhance the functioning of the various components of the existing housing delivery system. The selection was guided by the Directorate of Housing and depended on how actively an organization has contributed to the delivery of low and middle level housing in Kenya. Due to time and budgetary constraints, only 3 key informants were selected in each category of Policy Makers, Mortgage Lending Institutions and Affordable Housing Providers.

Some of the prominent key informants for example Housing Finance-Kenya, UN Habitat and World Bank were approached but could not avail themselves and were therefore substituted accordingly. The profiles of the key informants as discussed in section 5.2 of chapter five indicated that were qualified and had vast experience in the implementation of low and middle level housing programmes and this enhanced the accuracy of responses. The results from the interview were analysed through grounded theory technique where data collection and analysis went simultaneously. The verbatim report of the interviews are attached as Appendix 8. The results and discussions presented in this section are based on the common themes, patterns and categories that emerged during the interview of the respondents.

7.3.1 Policy on Housing Demand and Supply

The interview demonstrated that generally, the prevailing housing situation in Kenya is characterized by inadequate supply for housing units in particular to the low / middle income group as well as costly houses in terms of rent. Therefore, the supply does not meet the demand as the low / middle income group is not catered for adequately in the existing housing provision. These findings are similar to those of *CAHF (2012) and World Bank (2011)* showing that over 90% of Kenyans who are classified as low / middle income earners cannot access quality housing from the formal market. The findings also mirror those from *Chow (2014) who* argues that the sharp increase in house price is attributed to forces of demand and supply with household income and cost of construction determining demand and supply respectively. The findings are further supported by *Central Bank of Kenya (2016)* which demonstrate high mortgage rates of between 14.9% and 21% which mostly favour the high-income earners. This study alongside others for example, *Republic of Kenya (2013) and Okonkwo (1996)* show that housing supply and demand can be improved in order to meet the needs of the low / middle income earners.

What was clear is that a number of strategies such as adoption of cheap alternative materials / technology; lower taxation on consumption materials / equipment; sourcing more funding for public housing; using incentives to bring on board more developers and non-profit housing organization; relaxation of mortgage lending conditions; use of public private partnership financial model and reforming of the housing policy could help to improve housing supply so as to meet the demand from the low / middle income earners. These findings are similar to those from *Noppen (2012)* on the subject of the ABC of making housing affordable. The findings by *Moko and Olima (2014)* identified public private partnership, government incentives and adoption of alternative materials and technology as critical housing accessibility factors which are however included as part of the study findings. The findings on the strategies for improving demand and supply closely mirror those established through review of literature. For instance, *Makinde (2013) and Ibem (2010)* highlight strategies such as infrastructural provision, favourable mortgage regime, improved access to land, faster registration of property, speedier development approval and PPP financing model that Nigeria, a developing nation just as Kenya have adopted to address housing supply and demand challenges that have continued to bedevil the low and middle level income earners.

Further interview however revealed that the house size should reflect the social status of the income group to minimize housing cost and that every housing should have basic infrastructural facilities such as safe water, reliable electricity and safe sewerage disposal to meet global housing standards as outlined in comment No.4 of the 1996 Committee on Social, Economic and Cultural Rights Convention of the UN. The finding on minimum housing standards also agrees with those of World Health Organization which emphasize more on minimum standards of overcrowding *(Ranson, 1988).*

The housing informants interviewed also identified the lack of a formalized housing allocation criteria as one of the significant factors that has also impeded access to quality housing by the low / middle level income earners. Family size, income level and years of service were common themes that emerged as key housing allocation criteria. In addition, the respondents felt that the present ad hoc housing allocation criteria is riddled by challenges such as corruption, non-inclusive allocation committee and income levels that excludes majority of the low / middle income earners, a scenario also propagated by the households from the five selected housing schemes. This view point is also held by *Kang'ethe and Manomano (2014)* who decry high level of corruption experienced in the allocation of housing at Golf Course in South Africa. The findings also agree with those from *Shuid (2010)*

who feels that corrupt practices such as nepotism and favouritism are mainly propagated by bureaucrats / politicians and have also impeded access to quality housing by the low and middle level income earners in Malaysia.

The interview demonstrated that these challenges could be addressed by entrenching the allocation criteria in a legal frame work with a view of reconstituting the housing allocation committees and eliminating the corruption practices. What did not come out clear from this study are the ways in which corrupt practices can be eliminated which *Shutina (2010)* however feels fall in the ambit of the government based on low cost housing allocation experiences in Albania. Based on the studies by *Nick (2015) and Martini (2012),* the vice could also be minimized by the government vide tailor made range of measures that instil a culture of integrity, deter and detect un ethical behaviour, take corrective action and build confidence of the applicants through reforming the existing legal and institutional framework to seal the inherent weaknesses.

Development control and design standards are important in order to enhance accessibility to quality housing by the low / middle income earners. The interview confirmed that faster and less costly development control processes can be realized through development of appropriate legal and institutional framework which allow the participation of the public and also related professionals, a view point also projected by former lead consultants. This finding also agrees with the case fronted by *Shuid (2010)* in regard to making the housing delivery system in Malaysia more responsive to the needs of the low and middle level income earners. Development control has previously been the mandate of the defunct local authorities and is currently discharged by county governments riddled with bureaucratic red tape and also charge high approval fees but at the same time lack key technical staff. Government records indicate that the Physical Planning Act Cap 286, Local Government Adoptive By-laws (Building Code) and Development Ordinances / Zones are tools that guide development control and planning in Kenya. The Physical Planning Act Cap 286 provides that any developer intending to carry out development must seek for development permit from the relevant county government (formerly local authority) while the Building Code guides on minimum design standards. The Zoning Ordinances on the other hand regulate land use, population density and intensity of land use in any particular zone and hence specifies plot density and ratio *(Gichunge, 2001)*. According to 2012 / 2013 Kenya National Housing Survey the above control tools are intended to ensure efficient land use, promotion of environmental sustainability in addition to guaranteeing health and safety.

The housing informants felt that these planning and development control tools are bottlenecks to accessibility to quality housing by the low / middle level income earners given the high standards associated with them. This finding compares well with those from *Joint Housing Centre (2005) and Gichunge (2001)* who argue that the planning and development tools are stringent and restrictive to the extent that they do not recognize certain innovative alternative materials and technology implying the existing high construction cost will continue to negatively affect the lower end income earners if no appropriate strategy is taken.

The interview further demonstrated that by streamlining the existing planning and development control tools to accommodate cost effective alternative materials / technology and design standards in line with the current technological advances can be beneficial in terms of enhancing accessibility to quality housing by the low / middle level earners. This argument is similar to those fronted by the former lead consultants. The findings mirror the viewpoints propagated by *Shuid (2010) and Ibem (2010)* on the means of addressing planning / development control challenges affecting access to quality housing by the low and middle level income earners in Malaysia.

While the respondents felt that serviced land is a crucial resource in housing development they regretted that its price is market driven leading to high housing development cost and by extension a drawback to access to affordable housing, a finding that mirrors the position taken by public sector housing experts. *Republic of Kenya (2016a), Republic of Kenya (2014) and Gichunge (2001)* further highlight scarcity of serviced land in particular in the urban areas with the greatest concentration of the low and middle level employees, the majority of whom cannot access quality housing. Accordingly, it was demonstrated that the government needs to repossess all its grabbed land and also buy land in the peri-urban areas including infrastructural provision with a view of developing a land bank for housing development in respect of the socially disadvantaged citizens. The key informants interviewed felt that this could go a long way in fulfilling the right to adequate housing as provided for by the United Nations Human Rights proclamation of 1948 and Article 43(1b) of the Constitution of Kenya *(UN Habitat, 1948 and Republic of Kenya, 2010)*.

The existing land policy in Kenya is characterized by lengthy and bureaucratic adjudication process as well as corrupt practices. The *Joint Centre for Housing (2005) and Republic of Kenya (2013d)* cite that the bottlenecks in the land adjudication processes and systems makes it difficult to transfer and acquire property rights needed to guarantee financial credit for

housing development or mortgage deposit. It is yet to be seen how the recently enacted National Land Commission Act will address these challenges. As long as land is not affordable, the cost of rent and house mortgage will always go up *(World Bank, 2012). Moko and Olima (2014)* view the lack of affordable land as a critical challenge to accessibility to quality housing by the low / middle income earners.

The informants showed that land policy can be reviewed so as to facilitate housing development for this income group by the government providing serviced land for construction of affordable housing. These sentiments are also shared by *Weiss (2002) and Hull (2012)* who argue policy reforms in the US and UK respectively also targeted land as a key determinant of access to quality housing by the low and middle level income earners. The question of affordable land therefore remains key in addressing the housing needs of the low and middle level income earners in Kenya.

On the other hand, economic policies came out as a major theme during the interview. Economic factors are important since they have an impact on the housing construction for the low / middle income earners. The key economic factors that were projected by the key informants in the interview include the cost of construction inputs such as materials, labour, equipment; taxation of construction inputs; cost of financing such as bank loans / mortgages; inflation; per capita and poverty. The findings closely mirror those from *Quigley and O'Regan (2000)* who argue that the success of housing strategy for the low and middle-class citizens in the US relied mainly on a raft of economic incentives that included selective tax exemptions / abatements, rent subsidy, conducive mortgage regime and better household income, sentiments similarly shared by *Alakeson (2011)* who cites the important role positive economic policies has played in improving access to quality housing by the low and middle-class citizens in the UK.

Issues of affordability of housing in Kenya has been manifested through delinquencies and defaults on servicing of loans. As per the Central Bank of Kenya (CBK), mortgage market survey for 2011 and 2012, there was increase in the value for non-performing loans from kshs 3.6 billion in 2011 to kshs 6.9 billion in 2012 displaying how severe the situation is. This represents over 90 % growth in terms of non-performing loans on mortgages. This is similar to the findings of this study where economic policies have been highlighted as having a major impact on the cost of housing construction for the low / middle income earners. The interview further revealed that inflation rate, per capita income, the cost of financing mortgage and

taxation levels of construction inputs such as materials, labour or equipment if not adequately controlled by the state through structured fiscal and monetary policies can certainly increase housing cost and hence make rent un-affordability as well as cause defaults in servicing of loan mortgages.

What was observed from the interview in terms of the means of addressing the challenges of accessibility to quality housing by the low / middle income earners was the need to expand the mortgage market; reforming land administration and adjudication procedures; improve socio- economic status of the low / middle income earners, streamline the regulatory framework, provide incentives to private developers, enlisting the support of non-profit affordable housing providers as well as review mortgage lending conditions, some of which were cited by the public sector housing experts. These findings compare well with those from *Makinde (2013) and Ibem (2010)* who contend that the housing accessibility situation by the low and middle level income earners in Malaysia could be addressed through appropriate housing policy reforms, infrastructure provision by the state, favourable mortgage regime, improved access to land, faster registration of land and speedier development approval.

In Kenya, housing is financed and developed by both the private sector and government organizations. The private sector developers for reasons of profitability have concentrated more on housing the high-end income group leaving the government the burden of shouldering the responsibility of addressing the housing needs of the lower end income group *(Chepsiror,2010; Noppen,2012 and Arvantis,2013).* The Ministry of Infrastructure, Housing and Urban Development administers government policy in relation to housing development *(Republic of Kenya, 2014).* The National Housing Corporation and County Governments are responsible for the actual implementation of housing development programs *(National Housing Corporation, 2012).* The housing informants expressed that the government does not have enough financial muscle to address the housing needs of the low / middle income earners single handily and therefore must partner with the private sector to address the huge shortfall which the government estimates at 120,000units per year. Kenya should therefore adopt successful PPP financing models practiced in Nigeria and Malaysia to encourage more private sector participation in public housing *(Ibem, 2010 and; Isa and Jusan, 2012).* The themes in the interview revealed that reduction in the mortgage rates, reducing the cost of construction inputs, having an appropriate design and provision of incentives are necessary to boost housing supply. This view point was also corroborated by households and public-sector housing experts.

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7.3.2 Housing Mortgage and Finance

The review of literature has revealed that the housing financing system in Kenya has major implications on access to quality housing *(Moko and Olima, 2014)*. Generally, the present housing finance system in Kenya has faced numerous bottle necks curtailing access to affordable finance by the low / middle level income earners *(Kieti, 2015 and Kidundi, 2010)*. The interview demonstrated that high cost of lending; lack of collateral from the low / middle income earners; stringent lending conditions; low income levels for the low / middle income earners and inflation by banks (hidden charges) came out as the challenges that the housing mortgage system face in addressing housing accessibility for the low / middle lever earners, a view point also shared with public sector housing experts. This finding is also echoed by *Gichunge (2001)* that decrees the lack of a well-developed financial system that does not adequately serve the housing financial needs of the lower end income group as a major constrain in housing accessibility. Accordingly, the existing financial institutions have not therefore evolved to facilitate borrowing by the lower end income group.

In addition, it was confirmed from the mortgage institutions that many low / middle income earners are defaulting on mortgage repayments attributed to meagre income levels, a position *Kidundi (2010)* also agrees with. This is coupled with the movement of tenants to cheaper options as stated by the Habitat for Humanity and Jamii Bora who were representatives of non-governmental affordable housing providers. The finding on the challenges generally compares well with the capitalist finance model in developing countries by *Baharogh and Lindfield (2000)* where at supply side, the finance market cannot guarantee adequate finance base to satisfy the needs of most households while at the demand side, the mortgage lending rates are beyond the affordability of most households. This essentially locks out the majority of the low and middle-income earners from accessing finance from the formal mortgage market.

The housing informants felt that the inappropriateness of legal and institutional framework characterizes the present housing finance systems. To address the legal and institutional bottle neck, the housing informants revealed that the government of Kenya could reform the mortgage financial system into one that mediates between the borrowers and the savers in order for resources and risks to be allocated in a strategic manner for the mutual benefit of both parties. Further, the government should rely less on the banking system in support of borrowing for the housing needs and solicit for other alternative financing sources including reforming the existing tax system and equity market. Part of strategy could be to embrace

reforms undertaken by successful world nations such as the US and UK bearing in mind the economic limitation of Kenya *(Weiss, 2002 and Hull, 2012)*. On the other hand, a middle ground approach between extreme capitalist and socialist markets propagated by *Wong and Hui (1998)* could be adopted. This is so because the extreme capitalist ideals would work against affordability by the lower end income group while extreme socialist approach would adopt the level of subsidy that cannot be shouldered by weak economies like Kenya. All these partly contribute to the need to reform the legal and institutional framework in order to improve accessibility to quality housing by the low / middle income earners.

7.3.3 Cheap Alternative Materials and Technology

Appropriate alternative materials or technology if adopted could drastically reduce housing cost and by extension increase access to quality housing by the low and middle level income earners *(Syagga, 1993 and Kvarnstrom, 2014)*. Some of the local alternative materials / technologies as established through the interview of key informants included the use of interlocking block, EPS boards, sisal cement roofing tiles, precast concrete elements and aluminium formwork technology. The interlocking blocks and sisal cement roofing technologies have been developed by the Directorate of Housing in collaboration with the University of Nairobi while the NHC, ELSEK Group of Companies, KOTO Housing Kenya Ltd. and Boleyn Magic Wall Panel Ltd. have established local factories manufacturing the EPS panels *(Mwololo, 2016)*. In addition, Boleyn Magic Wall Panel Ltd specializes in precast concrete technology while EPCO Builders Ltd. specializes mainly in aluminium formwork technology. While there is a consensus on the benefits of time saving of up to more than 50% opinion is divided on cost saving capability (*Republic of Kenya, 2016e)*. The promoters contend that cost savings of 10-20% could be realized but the consumers on the other hand are however sceptical on any cost benefits *(Mwololo, 2016)*. The interview of key informants however revealed that large housing schemes of reasonable economies of scale can realize some level of cost saving.

The key informants just as the former lead consultants also believe there is need to review the restrictive development control and planning regulations that do not recognize alternative materials and technologies. *Syagga (1993)* argues that the fact that cost of materials account for 68% of the total construction cost implies that any strategy for minimizing cost of materials including adoption of local alternative materials will certainly enhance quality housing accessibility by the lower end income group. The findings of this study are also similar to those from *Kvarnstrom (2014)* who also recognizes adoption of alternative

materials and methods of construction as a critical determinant of access to quality housing by the economically disadvantaged citizens. This is so because the cost savings realized from use of these methods or materials can lower the construction cost and hence make cost of accessing housing by the low / middle income earners affordable. *Syagga (1993) and Kvarnstrom (2014)* believe that with appropriate economic and political support research into cheap alternative materials and technologies could be enhanced in a much wider scale. The economic and political support according to the key informants would include adequate budgetary provision and the requisite legal regime respectively.

Further, alternative materials and technology have been shown to be currently in use in order to provide affordable housing to some segments of the low / middle income earners but lacks capacity due to a number of bottlenecks *(Syagga, 1993 and Kvarsstrom, 2014).* The challenges on research into the alternative materials and technology identified by the key informants include low adoption, security concerns, poor perception by the public, inadequate financing, inappropriate legal / institutional framework, low capacity of institutions and lack of dissemination of research findings which have led to low level of accessible housing for the low / middle level income earners.

The interview also demonstrated that these challenges can be addressed by sensitization of consumers, increase funding allocation to research, having an appropriate legal / institutional framework, expanding research infrastructure and dissemination of research findings. The former lead consultants who were interviewed share similar views on these findings. The findings agree with studies from *syagga (1993), Arvanitis (2013) and Kvarnstro (2014)*. The findings however slightly contradict those from *Murray (2008) and Dale (2007)* who also focus on environmental sustainability issues such as minimum pollution to the environment, recycling of waste water and recycling of construction waste in addition to conventional cost saving strategies of alternative materials and technologies. The findings from the interview of the key housing informants as cited could in essence be factored in future housing policy reforms to guarantee access to quality housing by the low and middle level income earners by drastically lowering housing development cost.

7.4 Correlation Between Independent and the Dependent Variables

A 1 in 5 Likert question was administered to 60 sampled public-sector housing experts to obtain their perceptions on the ranking of independent variables on their contribution to access to quality housing by the low and middle level housing. 47 responded representing

78% response rate which was adequate for the study. The profile of the respondents as discussed in section 5.2 of chapter five shows that the respondents had adequate qualifications and vast experience in the implementation of low and middle level housing programmes. Spearman's rank correlation was adopted for analysis since the data obtained from Likert questions are normally ordinal in nature *(Kothari, 2010)*. Spearman's Correlation Coefficient also known as the Spearman Rank Correlation is denoted by rho (ρ), or r. It measures the strength of association of two variables and it is similar to Pearson Bivariate Correlation Coefficient *(Field, 2013)*.

The study therefore employed spearman's rank correlation statistical analysis to correlate the 13 independent variables against accessibility to quality housing (dependent variable). The literature review earlier on confirmed that the 13 independent variables exist in a systems frame work of input, throughput, external environment, feedback mechanism and output. The independent variables therefore consisted of mortgage / rent, housing actors, building material / technology, customer satisfaction, construction cost, monitoring / control, research in to alternative materials / technology, financing strategy, delivery methods, land / infrastructure, construction process, planning process (design / development control), household income and policy intervention. Correlation analysis measures the strength of relationship of association between variables in a single value of between -1 and + 1 referred as correlation coefficient. When there is a positive correlation coefficient, it shows a positive relationship between two variables while a negative correlation coefficient shows a negative relationship between two variables.

The findings of this study show that all the 13 independent variables had positive correlation with accessibility to quality housing (dependent variable). A value of 0 indicates that there is no association between the two variables. As cited in *Wong & Hiew (2005),* the correlation coefficient value (r) range from 0.10 to 0.29 is considered weak, from 0.30 to 0.49 is considered medium and from 0.50 to 1.0 is considered strong. The findings as shown in correlation analysis output file attached as Appendix 9 show that all variables had positive relationships with each other; the strongest being indicated between construction cost and accessibility to quality housing (0.796) while the weakest association was shown between customer satisfaction and accessibility to quality housing (0.101). The correlation between the independent variables and dependent variables are summarized in Figure 7.3.
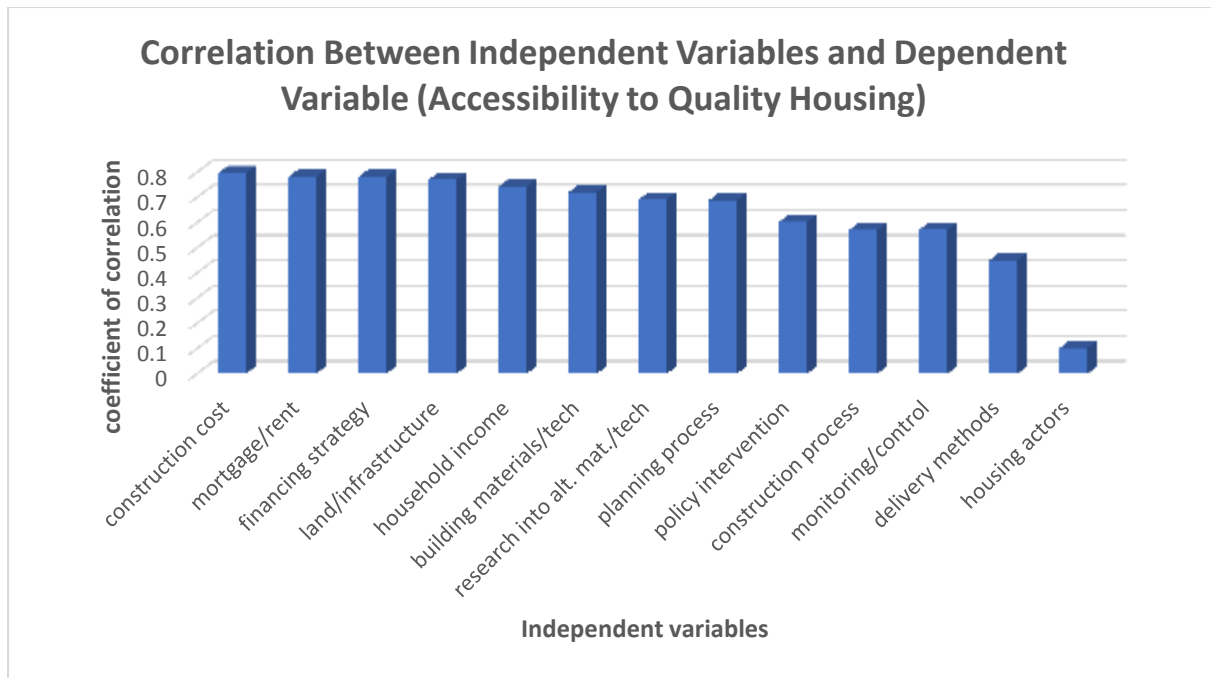
Figure 7. 3: Correlation Analysis Between Independent Variables and Dependent Variable

Source: *Author (2016)*

The most significant variables were those with coefficients of 0.5 and above as argued by Field (2013). These included; construction cost (0.796), mortgage / rent (0.781), financing strategy (0.781), land / infrastructure (0.770), household income (0.743), building materials & technology (0.721), research in to alternative materials / technology (0.692), planning process (0.689), policy intervention (0.603), monitoring / control (0.572) and construction process (0.571). However, according to *Field (2005)*, correlation coefficients between these significant independent variables should not go beyond 0.8 to avoid multicollinearity. The findings as shown in Appendix 9 indicate that the correlation coefficients between the significant independent variables range from 0.00 – 0.593 implying there is no significant multicollinearity problem in this research. The findings show construction cost followed by mortgage / rent, financing strategy, land / infrastructure and household income as the most significant in improving access to quality housing by the low and middle level income earners in Kenya, a view point also projected by the key housing informants who were interviewed. Findings mirror those from *Noppen (2012) and CAHF (2012)* whose focus is more on key determinants of access to quality housing in the Kenyan context. The findings also closely agree with past studies from other countries. For instance, studies by *Quigley and O'Regan (2000)* believe that these significant variables are partly responsible for the success

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of the housing strategy for the low / middle level US citizens while *Chow (2014)* cites construction cost and household income as critical in determining demand and supply by this income group. It follows that the significant variables need to be factored in the Kenyan housing delivery system, in particular to address access to quality housing by the low and middle level income earners. The above eleven most significant variables have been aligned with systems components model as shown in Table 7.4.

Table 7. 4: Embodying Significant Variables in a System's Framework

Input	Throughput	External environment	Feedback Mechanism	Output
Land/infrastructure Building materials/tech.	Financing strategy Planning process Construction process	Construction cost Mortgage/rent Household income Research	Policy intervention Monitoring/contr.	Accessible Quality Housing

Source: *Author (2016)*

From Table 7.1, the significant variables are the key components of housing delivery system that should be interdependent and interactive with themselves to generate quality housing that can be accessed by the low and middle level income earners in line with systems theory. System theorists contend that in the event that the desired output is not delivered in the formal market, a functional feedback mechanism should send signals to the system to re-adjust the components through appropriate policy forms *(Bertallanffy, 1968 and Boulding, 1956).* As established through findings in chapter five, the feedback mechanism in the existing housing delivery system is either non-functional or in-efficient. The housing policy makers should therefore entrench into a legal frame structures that puts in place regular housing needs assessment, policy interventions or reforms and appropriate monitoring tools to address the weak feedback mechanism.

7.5 Hypotheses Testing

Literature review confirms that housing cost is indirectly a theoretical determinant of access to quality housing. Housing cost has components such as land (10 %), infrastructure (10 %), construction (60 %), professional fees (10 %), finance charges (5 %) and contingency (5 %) all of which impact directly on rent / mortgage rate (Shelter Afrique, 2013). Rent / mortgage rate essentially influences affordability and by extension access to quality housing by the low and middle level income earners. On the other hand, *Schwartze and Wilsine (2012); and Disney (2007)* believe that the 30 % threshold on gross household income is appropriate measure of affordability of house rents / mortgage rates. The implication of this state of affairs is that household income is also a critical determinant of access to quality housing by the low and middle level income earners. The two variables therefore stand out theoretically as key determinants of access to quality housing by the low and middle level income earners. In this study, access to quality housing were measured in terms of affordability and customer satisfaction. This study therefore tested the theoretical relationship between housing cost / household income and affordability / customer satisfaction by the low and middle level income earners. The following null hypotheses were therefore crafted;

Null Hypothesis No.1:

There is no relationship between housing cost and affordability by the low and middle level income earners.

Null Hypothesis No.2:

There is no relationship between household income and affordability by the low and middle level income earners.

Null Hypothesis No.3:

There is no relationship between housing cost and customer satisfaction by the low and middle level income earners.

Null Hypothesis No.4

There is no relationship between household income and customer satisfaction by the low and middle level income earners.

Likert questions in a scale of 1 in 5 were administered to 60 public sector housing experts sampled from National Housing Corporation (NHC), Directorate of Housing and Directorate of Public Works out of which 47 responded. The hypotheses testing involved the use of chi-square test at 5% significant level and four degrees of freedom. The adoption of chi-square test was necessary since the data obtained from the Likert scale were ordinal in nature. The calculated / observed value of chi-square (x_o^2) was computed using version 18 SSPS computer software and compared with the critical table / expected value (x_e^2). If the critical table value exceeds the calculated value then the null hypothesis would be rejected or vice versa. The findings show that the critical table value for chi-square in all the null hypotheses was 9.488 which was greater than the calculated chi-square value for hypothesis No.1 of 3.062, No.2 of 2.237, No.3 of 2.080 and No.4 of 1.870 as shown in Table 7.5.

Table 7. 5: Results of the Null Hypothesis Test

Null Hypothesis Test	Degrees of Freedom	Significance Level	Table/ Expected X2	Calculated/ Observed X2	P Value
Hypothesis No.1: No relationship between housing cost & affordability	4	0.05	9.488	3.062	0.038
Hypothesis No.2: No relationship between income & affordability	4	0.05	9.488	2.237	0.180
Hypothesis No.3: No relationship between housing cost & customer satisfaction	4	0.05	9.488	2.080	0.010
Hypothesis No.2: No relationship between income & customer satisfaction	4	0.05	9.488	1.870	0.030

Source: *Author (2016)*

The fact that the critical table chi-square values in all cases were greater than the calculated chi-square values implies that the four null hypotheses were rejected. This confirms that housing cost and household income are associated with affordability and customer satisfaction by the low and middle level income earners. This view point was also supported by sampled households across the five selected public housing schemes as well as key housing informants who were interviewed. The findings mirror those from *Chow (2014)* who views development cost and household income as critical determinants of access to quality housing (affordability and customer satisfaction) by the low and middle level income earners in China.

The strong link between housing development cost and household income with accessibility to quality housing (affordability and customer satisfaction) confirms that housing development cost, household income, housing affordability and customer satisfaction are significant components in housing delivery for the low and middle level earners. *CAHF*

(2012) and Noppen (2012) contend that the affordability and customer satisfaction of housing by the low and middle level earners is limited majorly by the high housing development cost and low household income which ultimately dictate housing supply and demand in the formal market respectively. The theoretical implication is that lower housing development costs would lower housing rents / mortgages as well as increase production of affordable housing while higher household income would increase affordability and by extension demand *(Arvantis, 2014)*. The significance of housing cost and household income in contributing to access to quality housing is confirmed by an earlier finding in regard to correlation of the independent and dependent variables from where they ranked highly. Housing cost and household income appear in the external environment of the housing delivery system as its key components and should be focussed on by housing policy makers in order to enhance access to quality housing by the low and middle level income earners.

Minimizing housing development cost can be achieved through various strategies identified in the chapter five that include lowering taxation on construction inputs, adoption of cheap alternative materials / technologies, application of efficient designs, reviewing the restrictive planning / development control regulations and provision of free serviced land. On the other hand, household income depends on economic performance of the state who is vested with powers to initiate appropriate reforms in monetary and fiscal policy to improve the per capita income *(Schwartze, 2006 and; Abdullahi and Azziz, 2011)*. Moreover, the state could also offer some level of subsidy where households are economically constrained and are not capable of accessing quality housing from the formal market.

7.6 Systems Approach for Improving Access to Quality Housing by the Low and Middle Level Public Sector Employees

According to pioneer system theorists, systems have unique components and characteristic that make them work lest they lose their functionality (Boulding, 1956 and Bertalanffy, 1968). Helighen (1998) and Freetutes (2014) argue that systems have five main components in form of input, throughput, external environment, feedback and output which operate as whole entity implying that if one component is disturbed the system either loses part of its functionality or ceases to function altogether. Literature review revealed that the unique characteristics of systems and components assist them to achieve the main aim for which they exist (Baldwin and Sauser, 2009). The key characteristics of systems include; interactive and interdependency of components, a whole with several parts that cooperate to achieve a

common objective, communicates beyond its boundary, hierarchical nature, ability to maintain equilibrium when disturbed and has a strong feedback mechanism for its survival. The configuration and characteristics as discussed in the foregoing represents traits for a perfect functioning system.

The theoretical systems approach for delivery of housing for the low and middle level public sector employees captured as Figure 2.12 in chapter two was modelled on the premise of a perfect functional housing delivery system with the above basic systems characteristics and configuration. The study employed this model to investigate in the systems context why the majority of the low and middle level public sector employees in Kenya are un-able to access quality housing from the formal market and what housing delivery approach needs to be put in place address the housing accessibility dilemma. The study established that the current housing delivery approaches in Kenya are not fully functional as they do not have the basic configuration characteristics of perfect functioning systems. In addition, the feedback component is weakly represented and is not able to convey feedback necessary to adjust the levels of the other systems components for the achievement of the desired objective, which in this particular case is adequate quality housing. Further, the findings cited a number of constraints in the current delivery approaches and the means of addressing them in the systems context which are captured at the end of section 7.5.

The achievement of the purpose of the study therefore revolves around reforming the delivery approach so that it becomes a fully operational system with basic configuration and characteristics as well as strengthening the feedback mechanism. Key recommendations in regard to the other constraints should also be factored in the alternative delivery approach. The recommended policy actions should tackle the constraints at input, throughput, external environment, feedback and output. The answer to the plight of the thousands of the low and middle level employees facing quality housing accessibility dilemma therefore lies in integrating the theoretical model with the study findings to generate an alternative housing systems framework approach that can address their concerns. Figure 7.4 represents a systems approach for improving access to quality housing by the low and middle level public sector employees in Kenya.
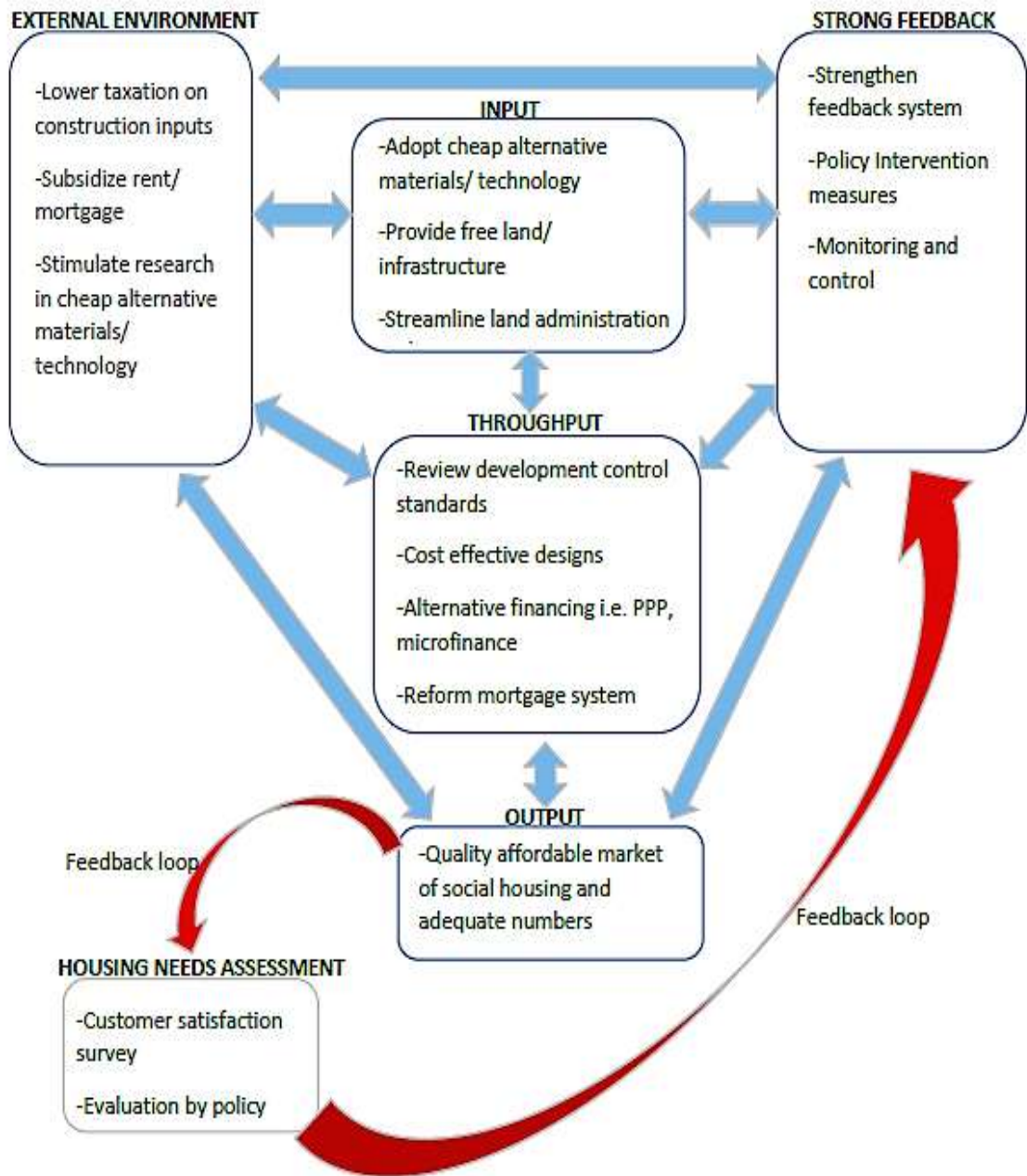
Figure 7. 4: A systems Approach for Improving Access to Quality Housing

Source: *Author (2016)*

Legend

━━▶ Interdependency/Interactivity amongst the components to be enhanced .

━━▶ Feedback loop which needs to be strengthened.

7.7 Summary

The study through views expressed by public sector housing experts and key informants assessed the appropriateness of some housing delivery components such as housing actors, delivery methods, financing strategies, mortgage systems, alternative materials / technology, construction cost, land / infrastructure and policy; and concluded that they are either / both in-adequate or / and un-interactive. At input level, the various housing actors have not complemented the efforts of one another in a synergistic manner, the building materials / technology are in-appropriate / too costly, land / infrastructure is either too costly or not available and housing delivery methods are in-appropriate. At the throughput level, the financing mechanisms are either in-adequate or in-appropriate. In addition, at the external environment level, the housing development cost is quite high implying that rents / mortgage rates cannot comfortably be accommodated within the globally accepted 30 % threshold of the prevailing income levels of the low and middle-income earners while the research into cheap alternative building materials / technology has not yielded much for lack of capacity and sensitization. On the other hand, at feedback level, monitoring and policy intervention measures have not provided for regular user reaction surveys in the form of housing needs assessment to address customer dissatisfaction.

 Further findings however showed positive aspects of some components. For instance, most of the key housing actors are in place and exist as state policy makers / implementers, development control institutions, and private sector operatives while the significantly appropriate housing delivery methods in enhancing access to quality housing were tenant purchase, mortgage, site / service and slum upgrading schemes. An assessment of financing mechanisms however showed that public private partnership, public exchequer and co-operative savings / credit ranked as the significantly appropriate financing options. These significantly appropriate ingredients need to be factored in a systems frame work of input, throughput, external environment and feedback to improve the quality and quantity of the output in the market.

Systems dynamics demand that a fully operational system should have components that are interdependent and interactive with one another. Accordingly, the housing inputs interact and get processed at the throughput level to generate the output (number of housing units within the desired quality and quantity). A deficient output does not meet the housing needs of the low / middle level income earners and would automatically trigger off a feedback mechanism

in the form of policy reforms to enable the housing system adjust levels of the inputs for processing so as to deliver the desired quality and quantity of housing units.

Housing needs are not static implying that policy reforms should also be dynamic in tandem with the level of housing needs *(Hull,2012)*. Perhaps it would make a lot more sense to conduct housing needs assessment periodically to keep the housing delivery system abreast with globalization. Globally, most of the partly successful developing and developed nations have reviewed their housing policy severally to address the concerns of housing as a human right. *Weiss (2002)* cites the journey of housing reforms in the USA since 1948 while in the UK the reforms commenced from 1913 and in both cases the reforms targeted the lower end income groups. Malaysia on the other hand have had some success stories on affordable housing through policy reforms targeting the low and middle level income earners (*Abdullahi and Azziz, 2011).*

Demand and supply forces in a capitalist market determine the level of pricing and the number of housing units delivered. According to *Centre on Capitalism and Society (2014),* a capitalistic economy is anchored in a theory that promotes private ownership and competition in a free market economy where prices and production are controlled by demand supply forces, a scenario that is also applicable in the Kenyan economy. This study has therefore provided policies to the government to control the demand and supply of housing so as to cater for the low / middle income earners majority of whom cannot access quality housing from the formal market because of the capitalistic nature of Kenya's economy. Policies in areas such as research into cheap alternative materials / technology, lowering interest / mortgage rates, lowering taxation on construction inputs, exercising stringent fiscal discipline to control inflation and improving socio economic status of citizens were highlighted by the key informants as critical in satisfying housing supply and demand by the low / middle income earners. The findings generally reveal that most of the housing delivery components whose appropriateness has been discussed under this chapter have challenges. These challenges and the means of addressing them are covered under chapter five.

The study also investigated the correlation of the independent variables and dependent variable (access to quality housing). The independent variables significantly associated to access to quality housing include construction cost, mortgage / rent, financing strategy, land / infrastructure, household income, building materials & technology, research in to alternative materials / technology, planning process, policy intervention, monitoring / control and construction process. The multicollinearity test on the significant variables showed that associations of variables were within the allowable limit. These variables therefore if factored

in a systems configuration of input, output, throughput, external environment and feedback would enhance access to quality housing by the low and middle level income earners.

Housing development cost and household income, the theoretically significant determinants of access to quality housing were subjected to null hypothesis tests. The null hypothesis tests were all rejected. This shows that both housing cost and household income have relationships with access to quality housing (affordability and customer satisfaction) and therefore are in a practical sense key determinant of access to quality housing by the low and middle level income earners.

The next chapter, chapter eight is the conclusion and recommendations from the study. Chapter eight consists of summary of main findings, the conclusion and recommendations. It discusses the main findings with a view of drawing appropriate conclusion and recommendations on the enquiry. It also states the extent to which the enquiry has filled the existing knowledge gap as well as research gaps related to this enquiry that are outstanding to be undertaken in the future.

<center>**CHAPTER EIGHT**</center>

8.0 SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

This chapter discusses a summary of main findings from the investigations as aligned to the research objectives with the aim of drawing conclusion and recommending policy actions to be undertaken by housing policy makers. It also discusses the contribution of the study to the body of existing knowledge and further areas of research to be undertaken in the future. It therefore comprises summary of main findings, conclusion, recommendations, contribution to knowledge and further areas of research.

8.1 Summary of Main Findings

The aim of the study was to evaluate the challenges faced by the current housing delivery approach in Kenya and how best to address those challenges in the context of systems approach to improve accessibility to quality housing by the low / middle level formal sector employees. Five research objectives were crafted to realize the aim of the study. This section therefore discusses a summary of the main findings as aligned to these objectives.

8.1.1 Findings on Objective No. 1

Objective No.1 was to examine the existing housing delivery approach for the low and middle level income earners including identification of its components. The findings indicate that the existing housing delivery approach has failed to address the housing needs of the low and middle level formal sector employees. Only less than 10% of this income group are able to access quality housing from the formal market. Among the critical constraints that are responsible for this crisis include; un-affordable house rents / mortgage rates, in-adequate public exchequer allocations, in-appropriate financing mechanisms, restrictive planning and development control regulations, high cost of land / infrastructure, in-appropriate land statutes, in-appropriate housing policy, in-efficient construction processes, high cost of construction, low household income, in-adequate research into cheap alternative materials / technology, in-appropriate housing delivery methods, lack of effective monitoring, costly in-appropriate building materials and lack of synergy among the actors. Further findings identified the components of the existing housing delivery approach that include housing actors, delivery methods, land / infrastructure, building materials / technology, planning process, construction process, financing strategy, construction cost, household income, mortgage rate / rent, research, policy intervention, customer satisfaction and monitoring / control.

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8.1.2 Findings on Objective No. 2

Objective No.2 was to evaluate the extent to which the housing delivery approach components are embodied in a systems model. The findings on rankings of the various systems components in improving access to quality housing indicate that housing inputs such as the housing actors, construction inputs and housing delivery methods had a mean item score of 4.43, throughput such as planning process, construction process and financing had a mean item score of 4.43, external environment such as housing cost, household income, mortgage rate / rent and research into alternative material / technology had a mean item score of 4.76; and feedback / control such as customer satisfaction, policy intervention, policy reforms and monitoring / control had a mean item score of 2.85. The findings therefore established that the existing housing delivery approach is not fully configured in a systems model. As established by the study, the approach is adequately configured at input, throughput and external environment while its feedback mechanism is weak and is partly responsible for its failure to address the housing needs of the low and middle level income earners. The feedback component for any working system is responsible for initiating impulses to the system to re-adjust the levels of other components whenever there is a problem with the quality and quantity of the output delivered to the market which in this enquiry is quality housing that is accessible by the low and middle level income formal sector employees. Further findings on whether the existing housing delivery approach has the basic characteristics of systems indicate that the statements that the above components are un- able to deliver the programmed output when one or more components has / have failed i.e. the whole is bigger than parts had a mean of 2.85, there is interactivity and interdependency of housing components on one another had a mean of 4.31, the components interact with one another to achieve a common objective had a mean of 4.26 and there is an existing feedback mechanism between input, throughput, external environment and output to regulate the housing market had a mean of 2.90. Two characteristics of a working systems i.e. the whole is bigger than the parts and existence of feedback mechanisms had low mean item scores and therefore weakly represented in the existing housing delivery approach. The fact that the existing housing delivery approach is not fully configured in a systems frame work and does not have some basic characteristics of a proper system implies that it exists as a partial system. According to systems theorists, a fully operational system should have the unique features stated above but also exist in the form of input, throughput, external environment, feedback mechanism and output or else it ceases to exist.

8.1.3 Findings on Objective No. 3

Objective No. 3 was to assess the challenges of the existing housing delivery approach and how best to address them in the context of systems model. The findings show that there was insignificant variance between two sets of views from public sector housing experts and households. For instance, households' responses focused more on affordability related concerns which in essence were also captured elaborately from views expressed from the public-sector housing experts. The findings show that lack of high cost of land / infrastructural services at 12.5 %, high cost of construction at 12.5 %,, lack of integrated planning in housing programmes / delivery methods at 12.1%, inadequate financing mechanism at 12 %, low household income at 11.2%, lack of focus in research on cheap appropriate materials / technology at 11.2%, high development control / planning standards at 8.7% and lack of political good will at 8.3% have stood out as the most significant challenges to the delivery of adequate and quality housing. Further findings show that the majority of the respondents considered lower costs on construction materials and equipment (14.6%), streamlining research in to alternative materials and technology (14.2%), streamlining land administration and management (13.8%), streamlining planning standards and development control (13.5%), subsidizing housing rent / mortgages (13.0%) to enhance accessibility to quality housing, provide appropriate policy intervention measures to regulate the housing sector (10.8%) and entrench effective measures to control the prevailing macro-economic climate (10.8%) as the most significant means of addressing the challenges that have curtailed housing development for the low / middle level income earners. In addition, the findings on challenges specific to key housing delivery components show that some of the challenges are not among the general challenges cited above but are specific to the individual housing delivery components. The significant challenges specific to housing delivery methods were mortgage rate, relocation of households during slum upgrading programmes, lack of collateral, designer has minimal flexibility in enhancing unit size under slum upgrading, high cost for rental housing and high price for tenant purchase scheme while those specific to mortgage finance system included lengthy adjudication procedures, low levels of household income, stringent lending conditions and low capacity of mortgage market. On the other hand, the significant challenges specific to planning and development control were high standards, non-recognition of cheap alternative materials / technology and low density while those specific to adoption of cheap alternative materials / technology included lack of sensitization, insecurity concerns, existing high design / development control standards and ignorance. The general and specific challenges from both the public-sector housing experts

and households were merged into a comprehensive format. The significant comprehensive challenges and the means of addressing them were configured into a systems' architecture of input, throughput, external environment, feedback and output. At the input level, lack of / costly land and infrastructural services, in-appropriate materials / technology and in-effective delivery methods could be mitigated on by streamlining land administration / management, choice of appropriate delivery method and adoption of cheap alternative materials / technology. At throughput level, the in-adequate / in-appropriate financing, restrictive planning / development control and lack of integrated planning could be resolved through alternative financing and streamlining planning / development control. On the other hand, at the external environment level, the high cost of construction, high cost of mortgage / rent, low household income and lack of focus in research in to cheap alternative materials / technologies could be addressed by lowering taxation of construction inputs, subsidizing rent / mortgage, effective control of the prevailing macro-economic climate and stimulating research into alternative materials / technology. In addition, at feedback level, the lack of political good will and in-appropriate housing policy could be addressed by the state through formulation of effective policy intervention measures and entrenching the housing policy into the constitution. In line with systems dynamics, the systems components of input, throughput, external environment and feedback are meant to be interdependent and interact to be able to release the desired adequate / affordable housing at the output level.

8.1.4 Findings on Objective No. 4

Objective No.4 was to assess the appropriateness of the housing delivery components in improving accessibility to quality housing. The literature review identified housing delivery components such as housing actors, delivery methods, land / infrastructure, building materials / technology, planning process (design and development control), construction process, construction cost, household income, mortgage / rent, research, customer satisfaction, policy intervention and monitoring / control. Each one of these housing delivery components were assessed separately. Correlation analysis of variables as well as testing of study hypotheses were evaluated and tested respectively.

8.1.4.1 Housing Actors

Housing actors or in other words stakeholders in the housing fraternity are varied and appear at all levels of implementation of housing projects. The review of literature reveal that these actors are assigned different roles and can be in the form of state agencies, private entities and non-governmental organizations (NGOs). The findings indicate that the state agencies

comprise state ministries, departments and parastatals responsible for policy formulation and implementation for housing development programmes while planning / development control actors include National Construction Authority (NCA), National Environmental Management Authority (NEMA), County Government, Physical Planning Department and Public Health Department which draw statutory powers from the constitution to regulate construction. On the other hand, private sector actors are mainly financial institutions, co-operative organizations, design / construction teams, international donors, non-governmental organizations (NGOs) and private developers. Further findings identified the significant roles that should be played by the state and other actors. The findings show that the statement that the government needs to provide appropriate regulatory and institutional framework in regard to the implementation of housing programmes had a mean of 4.49, financial and human resources need to be allocated so as to facilitate development of comprehensive and accessible housing had a mean of 4.36 and new reforms can reduce time for property registration and building approval had a mean of 4.26.

8.1.4.2 Housing Delivery Methods

Housing delivery methods were identified through the review of literature and included site and service, tenant purchase, rental and slum upgrading. The study assessed the appropriateness of the identified housing delivery methods. The appropriateness of the housing delivery methods in order of significance as analysed through mean item scores include; tenant purchase scheme (3.68), site / service scheme (3.66), slum upgrading (3.55) and rental scheme (3.21). The study went further and identified the constraints of the housing delivery methods. In order of significance, these included high mortgage rate (11.5%), relocation of households during slum upgrading programmes (10.5%), lack of collateral (9.8%), designer has minimal flexibility in enhancing unit sizes during slum upgrading (9.8%), high cost of rental housing (9.4%) and high price of tenant purchase schemes (9.4%).

8.1.4.3 Housing Financing Strategies

Appropriate financing mechanism remains key in housing provision for the low and middle-class citizens. This enquiry therefore ranked the appropriateness of the existing financing strategies. The findings show that public private partnership (4.69), cooperative savings / credit (4.28), public exchequer financing (4.23), individual income 3.82 and micro-finance (3.62) were significant financing strategies.

8.1.4.4 Housing Mortgage System

The study examined the critical constrains that the housing mortgage system has faced. The findings show that lengthy adjudication procedures at 4.41, followed by low levels of household income at 4.38, stringent lending conditions at 4.34, low capacity of mortgage market at 4.32 and high land rate / stamp duty at 4.03 were the critical mortgage accessibility constraints.

8.1.4.5 Household Income

The study investigated the level of income of the low and middle level households living in the five selected public housing schemes located in the City of Nairobi and how this has influenced the tenure systems. The findings show that 27.74 % earn kshs. 12, 840 – 25, 000 (lower income), 37.42 % earn kshs. 25, 000 – 50, 000 (middle income), 25.16 % earn kshs 97,290 (upper middle income) and 9.68 % above kshs. 97,290 (high income). The findings indicate that the majority of the respondents were middle / upper middle-income earners at 37.42% indicating the targeted lower income group were not wholly considered during allocation. The low / middle income group cannot however afford high cost of housing with income levels of kshs 12,840 – 50, 000. Further findings indicate that tenants were 68.71% while housing owners were 31.29 % displaying more preference to tenancy occasioned by the low-income status of most households.

8.1.4.6 Rent / Mortgage Chargeable

The study investigated the range of rent and mortgage paid by the sampled households across the five-selected public housing schemes and comparing the same by the respective income levels to establish affordability of the housing units. The findings show that the majority of respondents at 94.5% pay rents of between Kshs 5,000 – 15,000 which compared to household income are affordable. On the other hand, most respondents at 62.5% pay mortgage rates of between Kshs 30,000 – 50,000 which when compared with affordability threshold of 30% are un-affordable meaning the respondents are overburdened to the extent that they forego other basic necessities. The findings have shown that the rent affordability indices are reasonable and range from 112.5 – 180 while the mortgage affordability are extremely low and range from 37.5 – 60.

8.1.4.7 Customer Satisfaction

The study assessed the level of satisfaction of households with the five housing schemes in respect to construction standards, level of infrastructural utility provision standards, adequacy and affordability of the housing units. The findings show that the house construction standard was 91.6 % permanent and habitable while the level of infrastructural utility provision show that safe water was available with a mean of 3.81, safe sewerage system was available with a mean of 3.85, waterborne sanitation was available with a mean of 3.53, pit latrine was available with a mean of 2.51 and electricity was available with a mean of 4.14. The findings on adequacy of housing units show that the statement that the house I occupy is adequate in size for my family needs had a mean score of 3.60, the statement that the house I occupy has adequate bedrooms and lounge had a mean score of 3.07 and the statement that I propose more bedrooms to cater for my family needs had a mean score of 3.62 were all significant since their mean item scores were all more than 3, the theoretical mean of a 1in 5 Likert scale. The findings on whether the respondents had difficulties in paying house rent / mortgage show that 31.1 % (Yes) and 53.9 % (No) while missing cases were 12.0 %. This is based on earlier findings where rents were established as affordable while mortgage rates were un-affordable.

8.1.4.8 Land and Infrastructure

Without land and infrastructure no development is possible and this fact displays the central role they play in housing development. Observation checklist shows that all the land for developing the five housing schemes were mostly serviced and provided by the state significantly reducing housing development cost. The level of subsidy has been possible due to provision of free land / infrastructure by the state for public housing development thereby increasing the level of affordability of rent / mortgage rates in the five housing schemes. The findings on whether the land set aside for development were serviced show that 71.43 % of the respondents stated Yes while 28.57% stated No.

8.1.4.9 Planning Process

The findings on planning process encompass the appropriateness of the various development control tools and design models across the five housing schemes and how to improve them with a view of enhancing access to quality by the low and middle level income earners.

a) Development control

In Kenya development control is achieved through various tools such as plot densities, plot ratios and development ordinances / zoning regulations. The findings established that the plot sizes across the five housing schemes ranged from 0.5-15 acres with the largest at Ngara Civil Servants Housing and the least at Ruai Police Housing while the densities of the housing units ranged from 44-200 units per acre with the highest at Jogoo Road Housing and lowest at Ngara Housing. The prevailing plot sizes and densities were within standards in the Nairobi development ordinances / zoning regulations showing that all the former lead consultants complied with the provisions in this development tool. The findings on the extent of compliance to development control standards show that 57.14% consider it to be the same, 14.25 % consider it to be more and 28.57% consider it to be less. The findings on the rankings of the extent of application of development control tools show that plot ratio had a mean of 3.29, zoning regulation had a mean of 3.71 and building code had a mean of 4.14 implying all tools are significantly applied. The findings on challenges on development control tools show that high standards had a mean of 3.14, non-recognition of cheap alternative materials and technology had a mean of 3.29 while low density had a mean of 3.57.

b) Design and Housing Cost

Besides development control, design types for housing units also play a pivotal role in influencing access to quality housing by the low and middle level income earners. The findings on house design types showed that 2 respondents out of 4 which represented 50 % had developed one-bed roomed, two-bed roomed and three-bed roomed housing units while 2 respondents out of 4 which represented 50 % had developed one-bed roomed and two-bed roomed housing units. The floor areas for one-bed roomed units ranged from 33.5-35m^2, two-bed roomed units from 45.7-63m^2 and three-bed roomed units from 76-95m^2. The average floor areas for each category were 37.5m^2 for 1 bed roomed units, 61.5m^2 for 2 bed roomed units and 85.6m^2 for 3 bed roomed units. The findings on the key criteria the lead consultants employed to arrive at house size showed that 2 respondents out of 4 which represented 50 % considered the income of the household while 2 respondents which represented 50 % had considered the development cost. On the other hand, findings on how to review the building code standards to enhance affordability show that lowering the floor area standards had a mean of 4.13 and lowering the ceiling height standards had a mean of 2.50. The findings in reference to significant design parameters show that floor area had a mean of 4.25, height had

a mean of 3.63, choice of materials had a mean of 4.00, shape had a mean of 3.50 and choice of technology had a mean of 3.62. The findings on appropriate design model for the low income indicate that 1 respondent out of 4 which represented 25 % stated two rooms, 2 respondents which represented 50 % stated one bed room unit and 1 respondent which represented 25 % stated other units which was a bedsitter. The findings on the minimum floor area showed that 1 respondent which represented 25 % stated 20 m^2; 2 respondents which represented 50 % stated 40 m^2 while 1 respondent which represented 25 % stated 60 m^2 translating to a mean score of 40m^2. On the other hand, the appropriate design model for the middle-income show that 1 respondent stated two bed rooms which represented 25.0 % while 3 respondents stated three bed rooms which represented 75.0 %. The findings on the minimum floor area for the middle-income show that 1 respondent which represented 25 % stated 60 m^2; 2 respondents who represented 50 % stated 80 m^2 while 1 other respondent 100 m^2 which represented 25% translating to a mean score of 80m^2.

8.1.4.10 Materials of Construction

Materials form a significant proportion of construction cost meaning that they are major determinants of access to quality housing by the low and middle level income earners. Observation by the researcher shows that the materials of construction across five housing schemes were mainly the conventional ones which are expensive and have in the past limited access to the quality housing except Ruai police housing which adopted the EPS technology. The findings show that the conventional materials were applied on the other four housing schemes (Ngara 1, Ngara 2, Shauri Moyo and Jogoo Road). The roof structure was generally constructed from sawn timber and structural steel while the ceiling was mainly soft board and plastered concrete slab while the roof cover was predominantly corrugated galvanized sheets except at Ngara Housing where clay tiles had been adopted. The internal walls were mainly natural stone and concrete blocks which were plastered and painted save for Ruai Police Housing where the EPS panels had been adopted. The floors were mass concrete / reinforced concrete finished mainly in sand cement screed, pvc tiles and ceramic tiles in wet areas. The external walls were generally keyed masonry save for the nine storied towers at Ngara 1 Housing and Ruai Police housing which had plastered external walls.

8.1.4.11 Cheap Alternative Materials / Technologies of Construction

Literature review and an earlier finding have indicated that cheap alternative materials / technologies can significantly reduce construction cost and by extension enhance access to quality housing by the low and middle level income earners. The findings on the rankings of

the various non-conventional materials / technologies in regard to housing cost minimization show that interlocking soil block had a mean of 3.38, interlocking bricks had a mean of 3.13, EPS technology had a mean of 3.75 and cement sisal fibre roofing sheets had a mean of 3.50. The findings on challenges that have limited the adoption of non-convention materials / technologies show that lack of sensitization had a mean of 4.25, security concern had a mean of 3.88, existing high design and development control standards had a mean of 4.00 and ignorance had a mean of 3.63.

8.1.4.12 Construction Process

Literature review has confirmed that the construction process can lead to either project success or failure. A successful project is one that has been completed within set project schedule, budget and quality specifications. The results on the level of success indicate that while the workmanship was satisfactory across the five public housing schemes, evidence shows that all the housing schemes were associated with time and cost overruns. Further interview of the consultants revealed that changes in project scope, contractors' cash flow problems, delays in decision making, inappropriate planning, inaccurate documentation, use of unqualified inexperienced consultants / contractors, inadequate funding, delayed payments, contractual disputes, ineffective quality control and lack of effective monitoring tools were the significant causes of failure of the construction processes.

8.1.4.13 Housing Policy Interventions and Reforms

The study interrogated the expert opinions of key housing informants through semi-structured interviews to obtain fundamental policy reforms or interventions that needs to be undertaken to enhance access to quality housing by the low and middle level income earners. The interview demonstrated that generally, the prevailing housing situation in Kenya is characterized by inadequate supply for housing units in particular to the low / middle income group as well as costly houses in terms of rent / mortgage rates. This study shows that housing supply and demand can be improved in order to meet the needs of the low / middle income earners through a number of strategies such as adoption of cheap alternative materials / technology; lower taxation on consumption materials / equipment; sourcing more funding for public housing; using incentives to bring on board more private developers and non-profit housing organization; relaxation of mortgage lending conditions; use of public private partnership financial model through reforming the existing housing policy to improve housing supply so as to meet the demand from the low / middle income earners. The findings from the key housing informants indicate the need to carry out the periodic housing policy

reforms through regular housing needs assessment. Further findings indicate that the needs assessment should involve monitoring the levels of demand and supply periodically which should be applied to formulate policy reforms or interventions that should therefore revolve around critical housing components such as land / infrastructure, planning and development control, rent / mortgage, taxation of construction inputs, fiscal / monetary policy, public private partnership, cost effective design, research in alternative materials / technology, housing allocation criteria and incentives. This is necessary to ensure delivery of adequate quality housing that meets the needs of all low and middle level income formal sector employees.

8.1.4.14 Correlation Analysis and Null Hypotheses Test

The findings on correlation analysis between 14 independent variables and dependent variable (access to quality housing) show that significant variables include; construction cost (0.796), mortgage / rent (0.781), financing strategy (0.781), land / infrastructure (0.770), household income (0.743), building materials / technology (0.721), research in to alternative materials / technology (0.692), planning process (0.689), policy intervention (0.603), monitoring / control (0.572) and construction process (0.571). The null hypotheses (ho) tests were rejected implying that there were associations between household income / housing cost with access to quality housing by the low and middle level formal sector employees.

8.1.4.15 Findings on Objective No. 5

Objective No. 5 is based on a synthesis of all findings put together from objective No. 1-4. It is an alternative delivery approach based on the principles of systems theory discussed in chapter two. It was formulated from the findings of the study that with the aim of improve access to quality housing by the low and middle level public sector employees. It is therefore a systems framework housing delivery with basic systems characteristics and configuration of input, output, throughput, external environment and feedback. The captures the policy recommendations derived from findings and is represented as a systems dynamic model as Figure 7.4 in chapter seven.

8.2 Conclusion

The findings indicate that the existing housing delivery approach has failed to address the housing needs of the low and middle level public sector employees. It has components such as construction cost, mortgage / rent, financing strategy, land / infrastructure, household income, building materials / technology, research in to alternative materials / technology,

planning process, policy intervention, monitoring / control and construction process. These components exist as a partial system which have failed to perform to achieve its main objective of providing adequate quality housing to all including the low and middle level public sector employees. The housing delivery approach is not fully functional as it lacks the basics of a functioning system in terms of configuration and characteristics. The shortfalls of the delivery approach exist at all levels such as input, throughput, feedback, external environment and output.

At input level, the housing schemes have adopted conventional building materials / technology and housing delivery methods which are in-appropriate / too costly and a few emerging non-conventional materials have not been extensively adopted while land / infrastructural services were either not there or too costly. At the throughput level, the planning / construction processes are either in-efficient or in-appropriate and the financing mechanisms are either in-adequate or in-appropriate. In addition, at the external environment level, the housing development cost is quite high implying that rents / mortgage rates cannot be comfortably accommodated within the globally accepted 30 % threshold of the prevailing income levels of the low and middle-income earners while the research into cheap alternative building materials/technology has not yielded much for lack of capacity and sensitization. On the other hand, at feedback level, monitoring and policy intervention measures have not provided for regular user reaction surveys in the form of housing needs assessment to address customer dissatisfaction.

The findings have established that addressing the deficiency would involve the periodic policy reforms that target the constraints at the level of input, throughput, external environment, feedback and output so as to make it achieve its main object for which it exists. . At the input level, lack of / costly land and infrastructural services, in-appropriate materials / technology and in-effective delivery methods mitigated on by streamlining land administration and management, choice of appropriate delivery method and adoption of cheap alternative materials / technology. At throughput level, the in-adequate / in-appropriate financing, restrictive planning / development control and lack of integrated planning could be resolved through alternative financing and streamlining planning / development control. On the other hand, at the external environment level, the high cost of construction, high cost of mortgage / rent, low household income and lack of focus in research into cheap alternative materials / technologies could be addressed by lowering taxation of construction inputs, subsidizing rent / mortgage, effective control of the prevailing macro-economic climate and

stimulating research into alternative materials / technology. In addition, at feedback level, the lack of political good will and in-appropriate housing policy could be addressed by the state through formulation of effective policy intervention measures and entrenching the housing policy into the constitution.

In line with systems dynamics, the systems components of input, throughput, external environment, feedback and output should be interdependent and interactive so as to deliver adequate and affordable housing to the formal market at the output level. The challenges of the existing housing delivery approach appear at input, throughput, external environment, feedback and output implying that they need to be addressed comprehensively at all levels since any challenge not addressed would render the housing delivery system have partial or total failure and thus impact negatively on the quality or quantity of the output. The systems theoretical framework in chapter 2 depicts a perfect system with the characteristics and configuration of a fully functional system capable of achieving its main objective for which it exists and therefore does not much the current housing delivery approach which has failed to realize its objectives. The study relied on this theoretical framework to achieve its aim which was to investigate why the current housing delivery approach has failed to address the housing needs of the low and middle level public sector employees in Kenya and how best to address the problem. The findings from objectives 1-4 were translated into policy actions and applied to formulate a systems framework that will guarantee adequate and quality housing for the low and middle level public sector employees

8.3 Policy Recommendations

The state as a major stakeholder should;

1. Transform the Existing Housing Delivery Approach into a Functional System

Systems theorists argue that a properly functioning system exists in the form of input, throughput, external environment, feedback and output where all these components are interdependent / interactive and also complement the efforts of one another. This enquiry has confirmed that the existing housing delivery approach is not a fully functional system. Its feedback mechanism is extremely weak and the components including the actors do not operate synergistically rendering the system either in-active or partially functional causing failure in delivering quality housing to the low and middle level formal sector employees. Addressing the shortfall of the feedback mechanism would involve entrenching it in the

existing housing policy so that regular housing needs assessment is conducted through user reaction surveys from households and evaluation by housing experts. The housing needs assessment reports would inform the nature of policy reforms necessary to address the housing needs of the low and middle level formal sector employees at any given time. As confirmed earlier in literature review, housing policy is dynamic and bound to attract reforms whenever need arises. On the other hand, lack of synergy among the components including the actors would be addressed through an effective legal and institutional frame work that clearly spells out the interdependencies and interrelationships among the components.

2. Provide Incentives for Concerted Participation of the Private sector in Housing Provision for the Lower End Income Earners

The study established that the housing provision through public sector organizations has not met expectations due to in-adequate exchequer allocations. In addition, the private has focused more on housing provision for the economically endowed high-end income earners for profitability reasons leaving the lower middle and low-income earners in a serious dilemma. Despite the government putting in place a number of incentives, the plight of the low and middle level income earners remains un-resolved. The various existing tax incentives, legislation of the public private partnership act and the recent capping of interest rates have not achieved much. It is therefore necessary that the following further incentives be entrenched in existing housing policy;

> a) Further tax exemptions on construction inputs for housing programmes that target households who earn less than Kshs 25,000. The lowest category of public servants earns about Kshs 13,000.

> b) Provision of free serviced land for construction of housing for the lower end income group to minimize housing development cost.

> c) Lower the existing planning / development standards to reduce construction cost and approval process.

> d) Reform the existing land administration / management procedures to reduce cost and time for land registration processes.

3. Reform the Existing Finance Mechanism

The findings have indicated that government allocation to public housing have been dwindling over time meaning that few new public houses would be delivered in the near future. This is not withstanding the fact that what is being delivered by the government at the moment as public housing is grossly in-adequate. While mortgage financing could be an alternative for public sector workers, the findings have shown that the majority of the low and middle level workers cannot access mortgage because of mortgage accessibility challenges such as borrowing cost and capacity of the mortgage market. It is noted that the capping interests by the government has not translated into anything meaningful for the low and middle level income earners. In addition, the public private partnership financing approach although one of the significant financing options identified through the study, failed to take off when recommended for use in low and middle level public housing programmes due to some bottle necks. It is therefore recommended as follows;

a) The government should reform the Central Bank Act so that it attracts more players in the market such as micro-finance institutions in order to build capacity of the mortgage market and also promote cheaper mortgage products.

b) The government should review the existing Public Private Partnership Act to attract private investors to provide the much-needed funding gap.

4. Revamp the Existing Housing Research Infrastructure.

The findings established that research into cheap alternative materials / technology was among the means of reducing high construction cost that has curtailed access to quality housing by the low and middle level public sector employees. The recommendations target strategies on how to come up with a housing research infrastructure that makes available cheaper alternative materials / technology in a scale that can address the needs of the low and middle level public sector employees. The study therefore recommends as follows;

a) Provide and entrench in the national housing policy a national housing research institute that would spearhead national research initiatives on cheap alternative materials / technology.

b) The proposed research institute should sensitize the consumers and disseminate cheaper alternative materials / technologies arising from the research findings through seminars and workshops involving regular meetings with stakeholders.

c) Provide for a housing research fund to finance research into cheap alternative materials / technologies.

5. Reform the Public Housing Allocation System

The findings have established that although the five selected housing schemes were meant for the low and middle level civil servants, the beneficiaries were mostly drawn from the upper middle and high-income earners. The allocation system was biased to the would-be beneficiaries. It is therefore recommended that an open computerized system should be adopted as a more accountable option to ensure that housing programmes only benefits those for whom they were planned.

8.4 Contribution to Knowledge

The findings have generally contributed to the existing body of knowledge. The statement of the problem and related literature has confirmed that no known study has been directed in this area. Moreover, no known study has employed system theory to address the housing needs of the low and middle level income formal sector employees. The above scenario together with the fact that the low and middle level income earners have continued to suffer from quality housing accessibility crisis implied that there was an existing knowledge gap to be filled. The study consequently applied systems theoretical model to investigate the challenges of the existing housing delivery approach and the means of addressing them with a view of improving access to quality housing by the low and middle level income public sector employees in Kenya. The study identified the constraints of the existing housing delivery approach and recommended policy interventions by the state needed to address them such as putting in place a proactive feedback mechanism, appropriate incentives, reforming the mortgage market and expanding the existing research infrastructure for investigating cheap alternative materials and technologies. It is therefore anticipated that the policy initiatives to be put in place will go a long way in resolving the dilemma in housing the low and middle level public sector employees in Kenya and thus partly filling the existing knowledge gap in housing provision.

8.5 Areas for Further Research

Housing provision in Kenya is a basic right recognized by article 43 (1b) on the economic and social rights section of the Constitution of Kenya. While the high-end income earners can access quality housing in the formal market with ease, the low and middle-income earners who constitute over 90 % are experiencing quality housing accessibility crisis mainly as a

result of high rent / mortgage rates and low supply. This enquiry has focused in housing provision for the low / middle level income public sector employees. Further research should target housing provision non-public sector employees to fulfill a comprehensive investigation of the housing accessibility dilemma for employees in Kenya.

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Appendix 1A: Sample Frame

TECHNICAL STAFF AT DIRECTORATE OF PUBLIC WORKS

Teams	Architects	Q/surveyors	Civil/struct. engineers	Electrical engineers	Mechanical engineers	No. of staff in each team
Team 1	6	3	5	3	4	21
Team 2	5	5	5	3	3	21
Team 3	4	3	3	3	4	17
Team 4	5	4	5	3	3	20
Team 5	5	4	4	4	4	21
Team 6	6	4	5	3	4	22
Team 7	7	5	4	3	3	24
Team 8	6	4	4	4	3	21
Team 9	6	5	4	4	3	22
Team 10	6	5	4	3	3	21
Total	56	42	43	33	34	**208**

TECHNICAL STAFF AT NATIONAL HOUSING CORPORATION

Architects − 6 No.

Quantity Surveyors – 5 No.

Civil / Structural Engineers – 4 No.

Electrical Engineers – 2

Mechanical Engineers – 1

Total Staff – 18 No

TECHNICAL STAFF AT DIRECTORATE OF HOUSING

Architects – 6 No.

Quantity Surveyors – 5 No.

Estates Officers – 11 No.

Mortgage Officers – 3 No.

Building Surveyors – 5 No.

Valuers – 3 No.

Total Staff – 33 No.

LIST OF NON-PROFIT AFFORDABLE HOUSING PROVISION ORGANISATIONS

1. UN Habitat
2. Shelter Afrique
3. Jamii Bora Makao
4. Habitat for Humanity
5. Edermann Properties (Chinese affordable housing developers for low / middle income)
6. Equity Bank (provision of affordable housing)
7. Housing Finance Co Kenya (provision of mortgage / housing development)
8. National Housing Corporation
9. World Bank
10. National Cooperative Housing Union (NACHU)
11. Hass Consultants (trends in property index & pricing inflation)
12. Innovation Housing – (new technology in interlocking bricks company)

Appendix 1B: Research Permit

×1

**NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION**

Telephone: +254-20-2213471,
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Fax: +254-20-318245, 318249
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Ref: No.   NACOSTI/P/16/42916/10241

Date:
19th April, 2016

Raphael Rauf Odida Ochieng
University of Nairobi
P.O. Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *"A systems approach to housing delivery for the low and middle level formal sector employees in Kenya,"* I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending 19th **April, 2017.**

You are advised to report to **the Chief Executive Officers of selected Government Agencies, 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.

DR. STEPHEN K. KIBIRU, PhD.
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The Chief Executive Officers
Selected Government Agencies.

The County Commissioner
Nairobi County.

National Commission for Science, Technology and Innovation is ISO 9001: 2008 Certified

Appendix 2A: Questionnaire (Targeting public housing experts)

Dear Respondent,

This questionnaire aims to collect research data information related to the housing provision for the low / middle level employees in Kenya earning between Kshs. 12,840/= to Kshs. 97,290/= per month towards the award of a Doctor of Philosophy (Ph.D) Degree in the school of Built Environment, University of Nairobi. The information given is therefore specifically meant for academic purposes and will be treated as confidential.

Please answer the following questions according to the instructions given

SECTION 1: INFORMATION ON THE RESPONDENT

Please tick in the box adjacent to your response

1. Employment sector

Mortgage Finance Sector [ ]   Construction [ ]   Public Housing Sector [ ]

Non – Profit Housing Sector [ ]   Others (Specify)…………………………..

2. Profession

    Architect [ ]   Engineer [ ]   Quantity Survey [ ]   Estates Manager [ ]

    Mortgage Lender [ ]   Others (Specify) …………………………..

3. Experience in Low / Middle Level Housing Development

    Below 4years [ ]   5-10 years [ ]

    Over 10 years [ ]   others (Specify)…………………………..

SECTION 2: HOUSING DELIVERY AS A SYSTEM

This study intends to investigate the extent to which systems approach can be applied to improve accessibility to quality housing by the low / middle level employees. In this context, housing delivery approach can be structured in a systems model to incorporate input, throughput, output, feedback and external environment.

4. Housing Delivery Systems

Kindly tick in the appropriate box on each housing delivery method in the Likert scale of 1in5 to indicate where you strongly disagree (SD), disagree (D), neither agree nor disagree (N), agree (A) OR strongly agree (SA) with their contribution to accessibility to quality housing by the low/middle income earners. Where 1 = strongly disagree, 2= Disagree, 3 = Neutral, 4 = Agree and 5 = strongly Agree.

	1	2	3	4	5
Housing delivery method					
Site and service scheme					
Tenant purchase scheme					
Rental scheme					
Slum upgrading					

5. The Role of the State/Other Actors in Delivery of Quality Housing for the Low/Middle Income Earners

a. Kindly tick in the appropriate box on each statement in the Likert scale of 1in5 to indicate where you strongly disagree (SD), disagree (D), neither agree nor disagree (N), agree (A) OR strongly agree (SA) with the statements on planning agencies where 1 = strongly disagree 2= Disagreed 3 = Neutral 4 = Agree and 5 = strongly Agree

Statement	1	2	3	4	5
Government needs to provide an appropriate regulatory and institutional framework in regard to housing planning process					
Financial and human resources need to be allocated so as to facilitate development of comprehensive and accessible housing					
New reforms can reduce time for property registration and building approval					
Well organized secondary mortgage market be linked to capital markets and institutional investors					
Housing actors need to complement the efforts of one another to provide access to quality low/middle level housing					

b. Housing Planning and Development Control

Do you seek development permission from the following institutions?

Institution	Tick appropriately
Physical Planning Department	
County Government	
National Environmental Authority (NEMA)	
Public Health Department	
National construction Authority (NCA)	
Others (specify) ……………	

6. **Embodying Housing Delivery Components in a Systems Framework**
   a. Please indicate by ticking in the box provided your order of appropriateness of the suggested components of inputs, throughout, external environment and feedback on a Likert scale of 1in 5 where you indicate not appropriate, less appropriate, neutral, appropriate and very appropriate. Which 1= not appropriate, 2= less appropriate, 3 = neutral, 4 = appropriate and 5 = very appropriate on the order of contribution to the improvement of accessibility to quality housing by the low and middle level employees.

Component	1	2	3	4	5
Housing inputs: Housing actors, construction inputs and housing delivery methods					
Throughput; Planning process, assembly of building components and financing					
External Environment: such as income, mortgage rate/rent, subsidy, alternative material/technology					
Feedback and control: on customer satisfaction, policy reforms and monitoring and control					

   b. Kindly tick in the appropriate box on each statement in the Likert scale of 1in5 to indicate where you strongly disagree (SD), disagree (D), neither agree nor disagree (N), agree (A) OR strongly agree (SA) where 1 = Strongly Disagree 2= Disagreed 3 = Neutral 4 = Agree and 5 = Strongly Agree

Statement	1	2	3	4	5
The above components are un- able to deliver the programmed output when one or more components has/have not failed i.e. the whole is bigger than parts					
There is interactiveness and interdependency of these housing components on one another					
The components interact with one another to achieve a common objective					
There is an existing feedback mechanism between input, external, environment and output to regulate the housing market					

7. **Challenges in the Delivery of Housing to the Low/Middle Income Earners**

a. What are the challenges you face in the existing housing delivery system methods?

Challenges	Tick appropriately
Corruption during allocation for site and service housing units	
Core unit is too small and does not meet the needs of a family	
High purchase price for tenant housing	
High rent/mortgage	
High cost for rental housing	
Lack of collateral for mortgage housing	
Defaults on payments on mortgage housing	
Relocation of households during construction for slum upgrading	
Designer has minimal flexibility in enhancing unit size on slum upgrading programmes	
Movement of slum dwellers from upgraded units to other slums	
In- appropriate housing policy	
Others (specify)….	

b. What solutions do you propose to curb challenges on the existing housing delivery methods?

Solutions to Challenges	Tick appropriately
Stream line housing allocation procedures	
Provide reasonably sized core unit	
Provide cheaper alternative materials/technology	
Lower taxation on materials/technology	
Subsidize rent/mortgage	
Expand mortgage market	
Reform slum upgrading policy	
Source for alternative land elsewhere to settle some of the slum dweller	
Appropriate housing policy	
Others (specify)	

b. Generally, what are the challenges in delivering quality housing for the low/middle income earners?

Challenges	Tick appropriately
High cost of land /infrastructural services	
Inadequate financing mechanism more so mortgages and treasury financing	
High cost of constructions	
Lack of an integrated planning in housing programs and delivery methods	
Lack of political good will	
In-appropriate design by the consultants	
Lack focus on research on appropriate materials and technology	
High development control and planning standards	
In-appropriate housing policy	
Others (specify)….	

8. **Incentives for Addressing the General Challenges**

Generally, what incentives need to be provided by the government and other actors in order to encourage low/middle cost housing development?

Incentives	Tick appropriately
Monitor and control macro-economic environment to regulate mortgage market	
Stream line land administration and management	
Lower taxation on building materials /construction equipment to lower housing development cost	
Stream line planning process and building approval	
Provision of free land with infrastructural services	
Stimulate research and development in appropriate materials/technology	
Subsidize housing rents/mortgage to enhance accessibility to quality housing.	
Put in a policy that any housing developer must dedicate some proportion of housing development to lower end income group	
Others (specify) ………….	

9. **Housing Financing Strategies**

   Rank the appropriateness of the following financing strategies in improving accessibility to quality housing by low / middle level employees in Kenya through a Likert Scale of 1in5 where 1 = not appropriate, 2 = less appropriate, 3 = neutral, 4 = appropriate and 5 = very appropriate

Strategy	1	2	3	4	5
Public Private Partnership					
Public financing					
Cooperative savings and credit					
Commercial banks					
Macro finance institutions					
Group savings					
Individual income					
Others specify……					

10. **Housing Mortgage**

   a. Kindly tick in the appropriate box on each statement in the Likert scale of 1in5 to indicate where you strongly disagree (SD), disagree (D), neither agree nor disagree (N), agree (A) OR strongly agree (SA) with the statements on mortgage accessibility

constraints where 1 = Strongly Disagree 2= Disagreed 3 = Neutral 4 = Agree and 5 = strongly Agree

Constraint	1	2	3	4	5
Stringent lending conditions					
Low levels of household income					
Low capacity of mortgage market					
Lengthy land adjudication procedures					
High land rate and stamp duty					
Others specify……					

b. To what extent do you agree that the following statement provide solutions to addressing housing mortgage constraint where 1= no extent, 2 = little extent, 3 = moderate extent, 4 = great extent 5 = very great extent

Statement	1	2	3	4	5
Relax lending conditions					
Subsidize mortgage rates					
Expand mortgage market					
Reform land adjudication process					
Reduce land rate and stamp duty					
Others specify					

11. Factors influencing accessibility to quality housing by the low/middle level earners

    b. Please indicate by ticking in the box provided your order of appropriateness of the suggested factors influencing housing accessibility on a Likert scale of 1in5 where you indicate not appropriate, less appropriate, neutral, appropriate and very appropriate in which 1= not appropriate, 2= less appropriate, 3 = neutral, 4 = appropriate and 5 = very appropriate on the order of contribution to the accessibility to quality housing by the low and middle level employees.

No.	Factor	1	2	3	4	5
Inputs						
1.	Housing actors					
2.	Delivery methods					
3.	Land / infrastructure					
4.	Building material / tech					
Throughput						
5.	Planning process (design / development control					
6.	Construction process					
7.	Financing strategy					
Feedback mechanism						
8.	Customer satisfaction					
9.	Policy intervention					
10.	Monitoring / control					
External Environment						
11.	Research in to alternative materials					
12.	Construction cost					
13.	Household income					
14.	Mortgage / rent					

Appendix 2B: Questionnaire (Targeting beneficiaries of housing schemes)

Dear Respondent,

This questionnaire aims to collect research data related to the housing provision for the low / middle level employees in Kenya, with gross earnings between

Kshs. 12,840/= to Kshs. 97,290/= per month towards the award of a Doctor of Philosophy (Ph.D.) Degree in the School of Built Environment, University of Nairobi. The information given is therefore specifically meant for academic purposes and will be treated as confidential.

SECTION 1: INFORMATION ON THE RESPONDENT

Please tick your response in the box adjacent to your response

1. Name of Housing Estate

   Ngara Civil Servants [ ] Jogoo Road Civil Servants [ ]   KPC Embakasi [ ]

   Shauri Moyo Civil Servants [ ]   Police Housing Ruai [ ]

Others (Specify) ……………………………………………………………….

2. Marital status

        Married [ ]   Single [ ]

3. Size of Household

        1 member [ ] 2-5 members [ ]   More than 5 member [ ]

4. Housing tenure system

        Tenant [ ]   owner [ ]

5. Household Income Level

        Kshs12, 840 – kshs. 25, 000 (lower income) [ ] kshs. 25, 000- kshs. 50,000 (middle income) [ ] Kshs.50, 000 – kshs. 97, 290 (upper middle income) [ ] above kshs. 97, 290

6. House / Mortgage Rate

        Kshs.4, 000-kshs 10,000 [ ] Kshs. 10,000- 15, 000 [ ]

        Kshs. 15,000-Kshs. 35,000 [ ] above kshs. 35,000

        House Construction Standards:

        Temporary [ ]   Permanent [ ]

7. To what extent do you agree on the availability of the following on a Likert scale of 1-5 in your area where 1= no extent, 2= little extent, 3 = moderate extent, 4 = great extent and 5 = very great extent

Statement	1	2	3	4	5
Safe water					
Safe sewerage system					
Waterborne sanitation					
Pit latrine					
Electricity					
Others specify…					

8. Size of Housing Unit

      1 Room [ ] 2 Rooms [ ] 1B/R [ ]   2 B/R [ ] 3 B/R [ ]

SECTION II: EXISTING HOUSING ACCESSIBILITY & CHALLENGES

1. Adequacy of Housing Unit:

      a. Kindly tick in the appropriate box on each statement in the Likert scale to indicate where you strongly disagree (SD), Disagree (D), neither agree nor disagree (N), agree (A) OR strongly agree (SA) with the statements where 1 = strongly disagree 2= Disagreed 3 = Neutral 4 = Agree and 5 = strongly Agree

Statement	1	2	3	4	5
The house I occupy is adequate in size for my family needs					
The house I occupy has adequate bedrooms and lounge of sitting room is big enough					
I propose a 2 or more-bedroom house size to cater my family needs					

2. Housing Affordability and challenges

      a. Do you experience any difficulties in paying the house rent / mortgage?

          Yes [ ]   No [ ]

      b. What proportion of your income are you comfortable to set aside for housing rent or mortgage?

          [ ] Less than 10% [ ] 10 – 30% [ ] Above 30%

      c. Rank in a Likert Scale of 1 in 5 the level of significance of challenges citizens of your income group face in accessing quality housing where 1 = not significant, 2 = less significant, 3 = neutral, 4= significant and 5 = very significant

Challenge	1	2	3	4	5
Stringent mortgage lending conditions					
High cost of construction					
High rent/ mortgage rates					
Inappropriate building code					
Others specify					

d. Please rank in a Likert Scale of 1 in 5 the level of agreement of the following options on addressing housing accessibility challenges for your income group where where 1 = strongly disagree 2= Disagreed 3 = Neutral 4 = Agree and 5 = strongly Agree

Options	1	2	3	4	5
Lower development control and design standards					
Subsidize house rent/mortgage rate					
Low taxation on construction inputs					
Adopt cheaper alternative materials and technology					
Review existing housing policy					
Others specify					

Appendix 2C: Observation Checklist

1. HOUSING SCHEME PARTICULARS

Name of Housing Scheme ....

Location of Scheme ....

Housing Category ....

Number of Units ....

Density of Units ....

Floor Area of Units ....

Number of Storeys ....

Unit cost ....

2. CONSTRUCTION MATERIALS FOR BUILDING ELEMENTS

  a. Roof: Pitched or flat

Roof trusses...

Roof cover..

  b. Floor:

Floor slab ....

Floor finish..

  c. Walls:

Structural walls ....

Internal wall finish ....

External wall finish..

  d. Ceiling:

Brandering...

Ceil finish..

  e. Foundation

Type of foundation: Strip foundation or column Pad foundation

Others (Specify)...

  f. Structural support: RC frame or load bearing walls

Others (specify)..

  g. Openings

External doors ....

Internal doors ....

Windows ....

h. WATER SUPPLY (Please tick)

Borehole [ ] Piped water [ ]   Roof catchment [ ]

Others (specify)...

i. POWER SUPPLY (Please tick)

Generator [ ] Solar [ ]   KP&L Co. Ltd [ ]

j. DAY LIGHTING

Natural Lighting in habitable rooms

Yes [ ]   No [ ]

Appendix 3A: Interview Guide (Targeting key informants)

½ Hrs.

The purpose of this interview is to collect data related to the housing provision for the low / middle level employees in Kenya whose gross earnings is between Kshs. 12,840/= to Kshs. 97,290/= per month. The data collected will be used in preparation of research report in the award of a Doctor of Philosophy (Ph.D.) Degree in the school of Built Environment, University of Nairobi. The information provided is therefore meant for academic purposes and will be treated as confidential. Please answer the following questions in your capacity as a housing provision expert.

1. General Information

a) What is your current job description in your organisation?

b) How long have you dealt with housing provision related matters?

c) As an expert in housing what is the general prevailing housing delivery situation in Kenya?

d) Are the housing needs for the low / middle level income earners catered for in the formal market? Please explain.

2. Housing Supply & Demand:

a) Explain how the supply of housing can be improved to meet demand by the low / middle level income earners can be improved.

b) Given that the majority of the low / middle income earners cannot afford quality housing explain how the affordability can be improved to meet demand

c) What size of housing is appropriate and affordable by the low level income earners?

d) What size of housing is appropriate affordable for the middle level income earners?

3. Housing Allocation Criteria

State the criteria for allocating housing financed by public funds.

What are the challenges of the current housing allocation criteria?

How can these challenges be addressed to improve accessibility to quality housing by all income groups?

4. **Housing Policy**

   a. What are the challenges of the existing housing policy in improving access to quality housing by the low / middle level income earners?

   b. How can the existing housing policy be reformed to improve accessibility to quality housing by the low / middle level income earners? Explain why this is so?

5. **Development Control & Design Standards**

   a. How can the development control and design standards be reformed to enhance accessibility to quality housing by the low / middle level earners?

   b. How can the land policy be reviewed to facilitate housing development?

6. **Economic Policies**

What economic factors influence cost of housing construction and what policies can the government put in place to control them to satisfy housing supply and demand by the low / middle income earners?

7. **Alternative Materials and Technology**

   a. What are the achievement of research into alternative materials and technology?

   b. What the challenges has research into alternative material and technology faced and how can these challenges be addressed?

   c. What are the challenges of the adoption of the existing alternative materials and technology and how can these be addressed?

8. **Social Housing**

   a. What income groups qualify for social housing in Kenya?

   b. Social housing in Kenya has failed to meet the needs of the lower end income group. Explain why this is so and how the challenges can be addressed?

Appendix 3B: Interview Guide (Targeting housing mortgage experts)

1/4 Hrs.

The purpose of this interview is to collect data related to the housing provision for the low / middle level employees in Kenya whose gross earnings is between Kshs. 12,840/= to Kshs. 97,290/= per month. The data collected will be used in preparation of research report in the award of a Doctor of Philosophy (Ph.D.) Degree in the school of Built Environment, University of Nairobi. The information provided is therefore meant for academic purposes and will be treated as confidential. Please answer the following questions in your capacity as a housing provision expert.

1. **General Information**
   a. What is your current job description in your organisation?
   b. How long have you dealt with housing mortgage related matters?
   c. As an expert in housing mortgage, what is the general prevailing housing mortgage market in Kenya?
   d. Are the housing mortgage needs for the low / middle level income earners catered for in the formal market? Please explain.
   e. Do we have any policy governing housing mortgage lending institutions? Please expound.

      f. What lending conditions have you formulated for your organization?

2. **Housing Mortgage Provision Challenges**
   a. What challenges do you encounter while processing mortgage finance for the low and middle-income earners?
   b. How can these obstacles be mitigated to widen the accessibility bracket to housing mortgage finance by the low/middle income earners?
   c. What is the future of the housing mortgage market in addressing housing needs of the low/ middle income earners?

Appendix 3C: Interview Guide (Targeting non-profit affordable housing providers)

½ Hrs.

The purpose of this interview is to collect data related to the housing provision for the low / middle level employees in Kenya whose gross earnings is between Kshs. 12,840/= to Kshs. 97,290/= per month. The data collected will be used in preparation of research report in the award of a Doctor of Philosophy (Ph.D.) Degree in the school of Built Environment, University of Nairobi. The information provided is therefore meant for academic purposes and will be treated as confidential. Please answer the following questions in your capacity as a housing provision expert.

1. **General Information**
   a. What is your current job description in your organisation?
   b. How long have you dealt with affordable housing related matters?
   c. As an expert in affordable housing what is the general prevailing affordable housing situation in the formal market in Kenya?

2. **Housing Affordability**
   a. Are the housing needs for the low / middle level income earners catered for in the formal market? Please explain.
   b. Do we have any policy governing provision of affordable housing in Kenya? Please expound.
   c. What are the measures of housing affordability in Kenya?
   d. What challenges do the low/middle income earners face in accessing affordable housing?
   e. How can the housing affordability challenges for the low/middle level income earners be addressed?

3. **Affordable Housing Schemes**
   a. State any major affordable housing scheme you have been involved with in Kenya?
   b. Which income group did you target for this housing scheme?
   c. In this housing scheme, what non-conventional materials and technology did you employ to make the housing affordable?
   d. What cost savings did you realize from applying the alternative materials and technology?

e. What other housing affordability parameters did you include to further lower housing cost?

f. How does the housing rent/ mortgage compare with the income levels of the households?

g. State any challenges the households of the above housing scheme have faced?

Appendix 3D: Interview Guide (targeting previous lead consultants)

Dear Respondent,

This questionnaire aims to collect research data related to the housing provision for the low / middle level employees in Kenya, with gross earnings between Kshs. 12,840/= to Kshs. 97,290/= per month towards the award of a Doctor of Philosophy (Ph.D.) Degree in the School of Built Environment, University of Nairobi. The information given is therefore specifically meant for academic purposes and will be treated as confidential.

Please answer the following questions according to the instructions given.

SECTION 1: INFORMATION ON THE RESPONDENT

Please tick in the box adjacent to your response

1. **Profession**

   Architect [ ]   Project manager [ ]

   Others (Specify) ....

2. **Experience in Low / Middle Level Housing Development**

   Below 5 years [ ]   5-10 years [ ] Over 10 years [ ]

   Others (Specify) ....

3. **Housing Scheme Managed by Consultant**

   Name of housing scheme designed and supervised by the consultant

   Civil Servants Housing (Ngara) [   ]   Civil Servants Housing (Jogoo Road) [   ]

   Civil Servants Housing (Shauri Moyo) [ ] KPC Housing (Embakasi) [ ]

   Police Housing (Ruai) [ ] Others (Specify) ....

4. **Planning and Development Control**

   a. Respond to the following questions on a table on planning and control on the above housing schemes:

Question	Respond as appropriate
What size of land was set aside for the housing scheme for which you were a consultant (answer in acres)	
What is the density of the housing units? (answer in units/ m²)	

   b. How does this density compare with what is provided in the development control standards? Please tick your response in the box provided

Same [ ]   More [ ]   Less [ ]

c. Housing density influences housing affordability. Please tick your response as appropriate.

Strongly agree   [ ]

Agree   [ ]

Neutral   [ ]

Disagree   [ ]

Strongly disagree   [ ]

d. Kindly tick as appropriate whether: the land for development was serviced.

Yes [ ]   No [ ]

e. Kindly tick in the appropriate box on each of the statement in the Likert scale of 1in5 to indicate the extent of consideration of the development control planning tools in your design where 1 = no extent 2= little extent 3 = moderate extent 4 = great extent and 5 = very great extent

Tool	1	2	3	4	5
Plot ratio					
Zoning regulation					
Building code					
Others specify ……					

f. Kindly tick in the appropriate box on each statement in the Likert scale of 1in5 to indicate where you strongly disagree (SD), Disagree (D), neither agree nor disagree (N), agree (A) OR strongly agree (SA) with the statements on the challenges experienced with the existing development control standards while addressing affordability of housing units where 1 = strongly disagree 2= Disagreed 3 = Neutral 4 = Agree and 5 = strongly Agree

Statement	1	2	3	4	5
High standards					
Non-recognition of cheap alternative materials and technology					
Low density					
Others specify ……					

5. Housing Unit Sizes:

a. What was the size of the housing units in terms of rooms developed for the housing scheme?

Two Rooms [ ]   One B/R [ ]   Two B/R [ ]   Three B/R [ ]

Others (Specify) ....

    b. What criteria guided the choice of house size?

          Size of family [ ]   Income of households [ ]   Development cost [   ]

          Others (Specify)………………………………………………………….

    c. What floor area was provided in each case?

          Two Rooms………m²1B/R………m²   2B/R….m²   3B/R...…m²

          Others…………………………. (m²)

    d. In your opinion, rate the following statements based on the sizes above where $1 =$ strongly disagree 2= Disagree 3 = Neutral 4 = Agree and 5 = strongly Agree.

Statement	1	2	3	4	5
The sizes provided are adequate for low level income group					
The sizes provided are adequate for the middle level income					
The sizes are too tight as compared to the building standards					
Others specify….					

    e. Kindly tick in the appropriate box on each statement in the Likert scale of 1in 5 to indicate where you strongly disagree (SD), disagree (D), neither agree nor disagree (N), agree (A) OR strongly agree (SA) with the statements on how the building code house size standards can be revised to enhance affordability of houses where $1 =$ strongly disagree 2= Disagreed 3 = Neutral 4 = Agree and 5 = strongly Agree

Statement	1	2	3	4	5
Lower the floor area standards					
Lower ceiling height standards					
Others specify…….					

6. Design standards

a. Kindly indicate the materials that were specified in various building elements.

Building element	Material
Roof cover	
Roof structure	
Ceiling	
Walling	
Floor slab	
External wall finish	
Internal wall finish	
Floor finish	
Others specify….	

b. Kindly tick in the appropriate box on each statement in the Likert scale of 1in5 to indicate where you strongly disagree (SD), disagree (D), neither agree nor disagree (N), agree (A) OR strongly agree (SA) with the statements from the choice of materials from (a)compared to the building code standards on the building materials where 1 = strongly disagree 2= Disagreed 3 = Neutral 4 = Agree and 5 = strongly Agree

Statement	1	2	3	4	5
Choice of materials had lower standards than the building code standards					
Choice of materials had same standards as the building code standards					
Adoption of non-conventional cheap local materials /technology will enhance affordable housing					
Adopting 150 mm thick walling as load bearing for single storey building will enhance affordable housing					
Others (Specify)……. ……………….					

7. Proposed Output (Housing Design Model)

a. Housing category and size

i. What category of housing is appropriate for the low-income earners to improve accessibility?

One Room [ ] Two Rooms [ ]   One B/R Unit [ ] Two B/R Unit [ ]

Others (Specify) ....

ii.   What is minimum area of appropriate housing units for the low-income earners?

10m² [ ]   20m² [ ]   40m² [ ]   60m² [ ]

Other (Specify) ....

iii.   What category of housing is appropriate for the middle-income earners?

One B/R [ ] Two B/R [ ] Three B/R [ ] Four B/R [ ]

Others (Specify) ....

iv.   What is the minimum area of an appropriate housing unit for the middle income earners?

40m² [ ]   60m² [ ]   80m² [ ]   100m² [ ]

Others (Specify) ....

8. Housing Design Parameters

Rank in a Likert Scale of 1 in 5 the significance of the listed design parameters in influencing housing cost and by extension housing supply where 1= not significant, 2 = less significant, 3 = neutral, 4 = significant and 5 = very significant

Design parameter	1	2	3	4	5
Floor area					
Height					
Choice of materials					
Shape					
Choice of technology					

9. Alternative Materials / Technology

a. To what extent do you agree on the alternative materials and technology that would be adopted to reduce cost of housing and by extension increasing housing supply shown in the table below where 1= no extent, 2= little extent, 3 = moderate extent, 4 = great extent and 5 = very great extent

Alternative materials	1	2	3	4	5
Interlocking soil block					
Interlocking bricks					
Expanded Polystyrene Styrofoam (EPS)					
Sisal fibre roofing					
Others specify….					

b. Rank in a Likert scale of 1 in 5 the significance of the challenge of adoption of the existing alternative materials and technology in Kenya where 1= not significant, 2 = less significant, 3 = neutral, 4 = significant and 5 = very significant

Challenge	1	2	3	4	5
Lack of sensitization					
Security					
Existing high design and development control standards					
Ignorance					
Others specify….					

10. Construction Process

Was /were the project(s) you managing completed within set time schedule? Yes / No.

Was /were the project(s) you managed completed within set time budget? Yes / No.

Was /were the project(s) you managed completed within set quality standards? Yes / No.

Appendix 4: Operationalization of Study Variables

Item No.	Name of Variable	Rating Scale	Benchmark	Source of Data
1.	**COMPONENTS INPUTS** **a) Actors** • Types /level of appropriateness	Likert scale	N/A	Questionnaires to Experts
	• Actors synergic relationship	Yes / No	N/A	
	b) Delivery Methods • Types/ appropriateness	Likert scale	N/A	
	c) Construction Inputs			
	• Alternative materials		N/A	
	• Alternative technology		Conventional materials & technology	Document Review of GOK Records
	• Subsidized / Free Land	Yes / No		
	• GOK provided Infrastructural services		N/A	
	• Labour Intensive			
	• Project funding (adequacy)		Cost of project	
2.	**COMPONENTS THROUGHPUT** **a) Planning**			
	• Design process - Challenges/ Mitigation	Likert scale	N/A	Interview of Lead Consultants/ Observation
	• Appropriateness of design			
	• House types	No. of bed rooms		
	• Size of housing	M^2		
	• Influence of design/ Development control tools on access to quality housing	Likert scale		
	• Planning/develop. Control - Challenges/ mitigation	Likert scale		
	• Development control Standards - Ranking	Likert scale		
	• Appropriateness of development control	Likert scale		

	tools			
	b) **Construction**			
	• Time overruns	Yes / No	Contract period	
	• Cost overruns	Yes / No	Contract sum	
	c) **Financing strategy**			
	• Various forms/ Limitations & how to address them			Questionnaire to Experts
	• Appropriateness of financing strategy	1 in 5 Likert scale	N/A	
3.	**COMPONENTS EXT. ENVIRONMENT** **a) Economy**			
	• GPD			
	• Inflation	Percentage	N/A	Document Review of GOK Records
	• Interest Rates			
	• Rent/mortgage rate			
	• Taxation	Kshs		
	• Cost of construction			
	b) Social			
	• Housing Taste - Bedrooms	1or 2 or 3 B/R	N/A	Questionnaire to Households
	• Household size	No.	N/A	
	• Household income	Kshs		
	c) Political			
	• Development standards - Plot coverage - Plot density	Percentage Units / m²	Development Standards	Observation by Author
	• Design standards - Floor area - Height	m² m	Dept. of Housing standards	
	• Subsidy - Tax waiver on inputs - Subsidized rent	Yes / No	N/A	Document Review of GOK Records
	• Incentives - Free Land - Free Infrastructure	Yes / No Yes / No	N/A	
	• Land Rates	Kshs. / Per year		
	• Tenure systems	Public or Individual	N/A	Questionnaire to Households
	• Building Code (restrictive)	Yes / No.		
	• Land Adjudication Process	Slow – o, Fast – 1		
	• Housing Policy (conducive)	Yes / No		
	d) Globalization			

	• Modern materials - Cost effective	Yes / No	Market cost of similar materials	Interview of Lead Consultants

	• Modern technology
	  - Cost effective
	  - Efficiency
		Yes / No	Market cost effectiveness / efficiency of similar technology	

	• Challenges of adoption of cheap alt. materials/tech.	Likert scale	N/A	
4.	**COMPONENTS** - **OUTPUT**			

	(a) Market Housing
	  - Numbers
	  - Size
		No. of units 1or2or3 B/R, m^2	N/A	Observation by Author

	(b) Social Housing
	  - Number
	  - Size			

5.	**COMPONENTS** - **FEEDBACK**			

	a) Customer satisfaction
	  - Quality standards (reasonable)
	  - Size of units (reasonable)
	  - No. of units (Adequacy)
		Yes / No	Development standards Design standards No. of Households who can afford	Questionnaire to Households

	b) Interventions - Review of Housing Policy	Yes / No		Interview of experts
	c) Monitoring/control -Availability	Yes / No		
6.	**CHARACTERISTICS** - **HOLISM / SYNERGISM**			
	a) Actors (Team Spirit)	Yes / No	N/A	Questionnaire to Experts
	b) Delivery methods (coherent of different methods)	Yes / No	N/A	
	c) Construction Inputs (Availability of all/)	Yes / No	N/A	
	d) Planning process (co-ordination)	Yes / No	N/A	
	e) Construction Activities (co-ordination)	Yes / No		
	f) Financing strategy (co-	Yes / No		

	ordination of different sources)		N/A	
	g) Economic factors (Control)	Yes / No		
	h) Political Factors (Goodwill)	Yes / No		
	i) Social Factors (incorporation in design)	Yes / No		
	j) (Alternative materials / Technology)	Yes / No		
	k) Adequacy of Housing Units (Nos.)	Yes / No		
	l) Satisfaction of Households	Yes / No		Questionnaire to Households
	m) Policy Interventions (Availability)	Yes / No		Interview of experts
7.	**CHARACTERISTICS** - **GOAL DIRECTNESS**			
	System objectives	Clear – 1, Not Clear - 0	N/A	
	CHARACTERISTICS - **INTERDEPENDEN CY** Interdependency of systems parts		N/A	Questionnaire to Experts
	CHARECTERISTICS - **SYSTEMS BOUNDARY** Possession of external boundary with environment	Yes / No	N/A	
	CHARACTERISTICS - **FEEDBACK** Possession of feedback mechanism to facilitate adjustment			
	CHARACTERISTICS - **OPENNESS /CLOSEDNESS**	Open – 1, Closed - 0		

Appendix 5: Google Maps of Other Housing Schemes

Appendix 5 Cont'd

Appendix 5 Cont'd

SHAURI MOYO GOVERNMENT QUARTERS

Appendix 6: Photo Graphic Views of Blocks of Flats in Other Housing Schemes
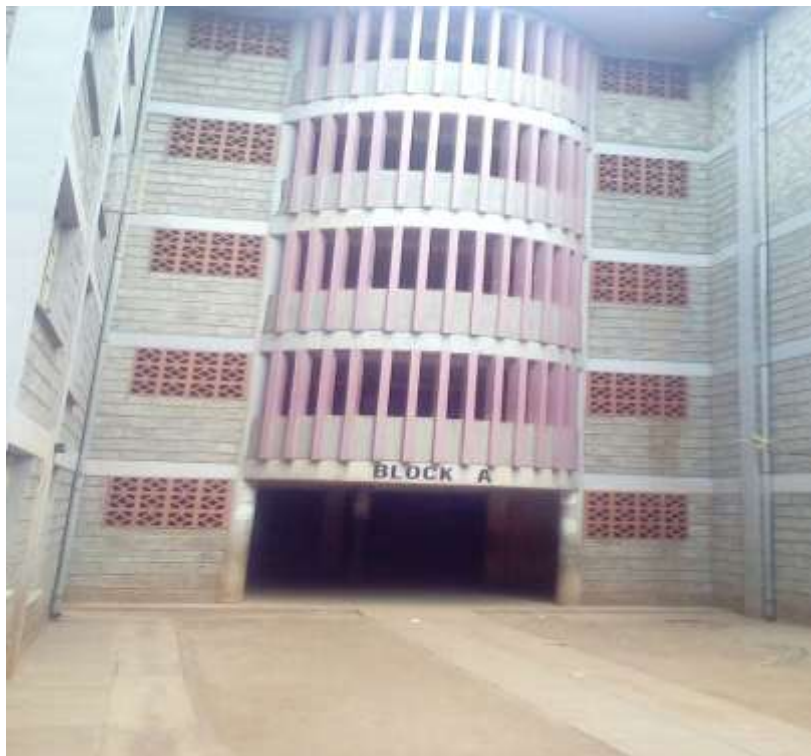
Front View of a Typical Flat at Jogoo Road Housing

Side View of a Typical Flat at Jogoo Road Housing

Rear View of a Typical Flat at Shauri Moyo Housing

Front View of Blocks of Flats at Ngara Phase 2

Appendix 7: Layouts of Housing Units in Other Housing Schemes

TYPICAL UNIT FLOOR LAYOUT FOR
3-BEDROOMED FLATS.
(TOWER WITH LIFTS)

TOTAL AREA =76m^2

6,600

150 | 900 | 150 | 900 | 150 | 1,050 | 150 | 3,000 | 150

300 | 600 | 450 | 600 | 380 | 900 | 820 | 1,200 | 1,350

150

1,950

150

WC
cer.tiles

SH
cer.tiles

900

150

KITCHEN
cer.tiles

2,000

150

BALCONY

PASSAGE
terrazzo

ROOM 2
cer.tiles

ROOM 1
cer.tiles

5,450

150

150

3,000

150

3,000

150

6,450

150 | 150

1,200 | 900 | 1,050 | 600 | 1,200 | 1,350

150 | 1,950 | 150 | 1,050 | 150 | 3,000 | 150

6,600

AREA: 33.53M²

RUAI 1 BEDROOM

scale 1:100

283
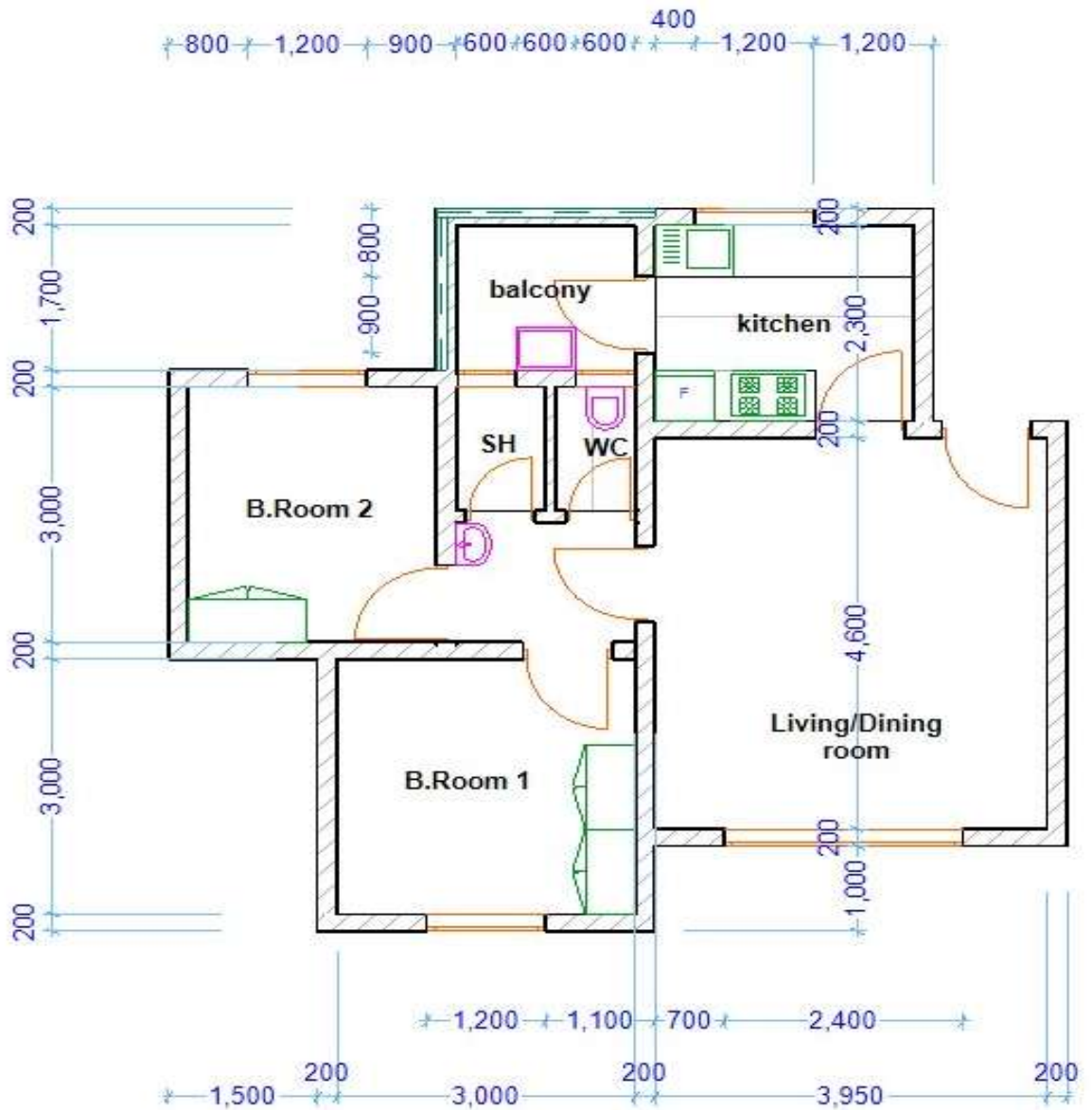
TYPICAL UNIT FLOOR LAYOUT FOR JOGOO RD HOUSING
TOTAL AREA= 46m²

Appendix 8: Data from Interview of Key Informants.

1. **Interview of housing policy makers**

Interviewee 1

Interviewer: How long have you dealt with housing provision related matters?

Interviewee: *I have been involved with housing provision related matters for 23 years now.*

Interviewer: As an expert in housing what is the general prevailing housing delivery situation in Kenya?

Interviewee: *Generally, in Kenya there is inadequate supply of housing units for the low / middle income earners. Nonetheless, the cost of rent is high and so the supply does not meet the demand. Personally, I feel that the low / middle income earners are not adequately catered for in the housing provision.*

Interviewer: Please comment on whether or not the housing needs for the low / middle level income earners are catered for in the formal market

Interviewee: *As I have stated before, the low / middle income earners are not catered for in the housing provision. This is because of the un-affordable rents as well as high mortgage rates since the mortgage market is filtered towards the high-income earners with the capacity to make payments*

Interviewer: Explain how the supply of housing can be improved to meet demand by the low / middle level income earners can be improved.

Interviewee: *Supply of housing is still a challenge in this country. However, adopting cheap alternative materials and technology, reforming the housing policy to accommodate the low / middle income earners and also using public private partnership financing model can help to improve the situation.*

Interviewer: What size of housing is appropriate and affordable by the low level income earners?

Interviewee: *The size of the housing appropriate to the income of this group should be 2 rooms with a service core.*

Interviewer: State the criteria for allocating housing financed by public funds and the challenges it has faced.

Interviewee: *The current house allocation criteria include seniority, family size, income level. The housing allocation system faces challenges such as corruption and non-inclusivity , mortgage market not working for the low / middle income group such as high cost of lending, inadequacy in the mortgage market and lack of a strong regulatory framework.*

Interviewer: You have talked about challenges of housing allocation system, how can these challenges be addressed to improve accessibility to quality housing by all income groups?

Interviewee: *Thanks for your question, it necessary to reform the allocation criteria and eliminate the corruption practices. In addition, challenges on the mortgage market should be addressed by expanding the mortgage market and streamlining the regulatory framework.*

Interviewer: Comment on the existing land policy challenges to accessibility of quality housing by the low/middle income earners

Interviewee: *The land policy in Kenya is characterized by lengthy and bureaucratic adjudication process and corruption practices. However, these issues can be addressed through reformation of the land policy and elimination of the corrupt practices.*

[10:40]

Interviewee: *Thank you for your time and have a blessed day.*

Interviewer 1: You're welcome

Interviewee 2

Interviewer: How long have you dealt with housing provision related matters?

Interviewee: *I have worked in this area for a period of 20 years.*

Interviewer: As an expert in housing what is the general prevailing housing delivery situation in Kenya?

Interviewee: *There are costly houses which cannot be afforded by all individuals more so the low / middle income earners. This makes difficult for the low / middle income earners to afford the houses in the formal market.*

Interviewer: Please comment on whether or not the housing needs for the low / middle level income earners are catered for in the formal market

Interviewee: *The low / middle income earners cannot afford the houses whose rent and mortgage rates are above the roof implying they are not catered for by the present housing delivery system.*

Interviewer: Explain how the supply of housing can be improved to meet demand by the low / middle level income earners can be improved.

Interviewee: *The strategies include sourcing for more funding of public housing, adopting efficient design and using appropriate incentives to bring on board more developers and non-profit housing organizations. These can help remedy the current low housing accessibility situation.*

Interviewer: What size of housing is appropriate and affordable by the low-level income earners?

Interviewee: *The size of the appropriate housing should be at least one bed room with basic amenities such as water, electricity, shower, kitchen and flush toilet.*

Interviewer: State the criteria for allocating housing financed by public funds.

Interviewee: *Presently, the criteria for the housing allocation for the low / middle income earners is in order of seniority or the position you hold in government, the years of service in the government, marital status and the level of income. This has unfairly left out the majority of the low-income earners from benefitting. The allocation systems is also associated with high levels of corrupt practices.*

Interviewer: You have talked about challenges of housing allocation for this income group, how can these challenges be addressed to improve accessibility to quality housing by all income groups?

Interviewee: *Means of addressing the challenges are; expanding the mortgage market, reforming the land administration and adjudication procedures, improving the socio-economic status of the low / middle income earners, streamlining the regulatory and the review of mortgage lending conditions.*

Interviewer: Comment on the existing land policy challenges to accessibility of quality housing by the low / middle income earners.

Interviewer: *Land as physical resource and a component of housing cost is by itself a problem in this country. Acquisition of land is a lengthy process and this is an area that need to be looked at keenly if the need to ensure affordable housing for the low / middle income earners is to be realized.*

Interviewee 3

Interviewer: How long have you dealt with housing provision related matters?

Interviewee 3: *I have been working on matters of housing provision in the last 19 years.*

Interviewer: As an expert in housing what is the general prevailing housing delivery situation in Kenya?

Interviewee: *There is low supply of housing units for the low / middle income earners. Further, the houses are costly due to the high rates of rent and mortgage.*

Interviewer: Please comment on whether or not the housing needs for the low / middle level income earners are catered for in the formal market.

Interviewee: *The low supply of housing units and high rates of rent and mortgage imply that the needs of the low-income earners are not catered for in the formal market. In addition, more than 90% of the low and middle level cannot access quality housing from the formal market. In fact, the low and middle level are part of Kenyans languishing in the slums and other informal settlements.*

Interviewer: Explain how the supply of housing can be improved to meet demand by the low / middle level income earners can be improved.

Interviewee: *The Government as a major stakeholder should create incentives to other players such as reduce taxation on consumption materials / equipment, lower development planning and control standards, reform the housing policy and relax the mortgage lending conditions.*

Interviewer: What size of housing is appropriate and affordable by the low-level income earners?

Interviewee: *A minimum of one bed room should be appropriate housing for the low income level earners and this should be to address social cultural norms of the households. The basic house should have basic utilities like water, electricity and flush toilet.*

Interviewer: State the criteria for allocating housing financed by public funds.

Interviewee: *The criteria for the housing allocation for the low / middle income earners is based on the seniority, years of service and level of income. This means that majority of the low / middle level income earners are excluded from the allocation criteria presently in use. Nonetheless, the housing allocation is characterized by corrupt practices, high cost of lending and stringent lending conditions.*

Interviewer: How can the challenges be addressed to improve accessibility to quality housing by all income groups?

Interviewee: *There is need to expanding the mortgage market, reform the land administration and adjudication procedures, improve the socio-economic status of the low / middle income earners and streamline the regulatory systems.*

Interviewer: Comment on the existing land policy challenges to accessibility of quality housing by the low/middle income earners.

Interviewer: *Land administration and management system in Kenya has some teething problems. Acquisition of land is a lengthy process and this is an area that need to be looked at keenly to ensure affordable housing for the low / middle income earners is realized. Further, putting in place appropriate development control and design standards to accommodate cheaper alternative materials / technology will go a long way in enhancing accessibility to quality housing.*

2. Interview of housing mortgage experts

Interviewee 1

Interviewer: How long have you dealt with housing mortgage related matters?

Interviewee: I have worked in the banking industry on matters of mortgages for the last 15 years.

Interviewer**:** As an expert in housing mortgage, what is the general prevailing housing mortgage market in Kenya?

Interviewee: *The mortgage market in Kenya suffers high mortgage rates, low capacity and stringent lending conditions.*

Interviewer: Comment on whether or not the housing mortgage needs for the low / middle level income earners are catered for in the formal market

Interviewee: *They are not catered for; mortgage market is tilted towards the high-income earners who have capacity to repay.*

Interviewer: Comment on the policy framework for lending mortgage lending in Kenya.

Interviewee: *The current mortgage systems puts in place basic policy requirements such proof of ability to repay and collateral as guarantee which could be in form of land title.*

Interviewer: What lending conditions have you formulated for your organization?

Interviewee: *Ability to repay pegged on not more than 2/3 gross salary and a land title free from any encumbrances.*

Interviewer: What challenges do you encounter while processing mortgage finance for the low and middle-income earners?

Interviewee: *Defaults in repayments, in-appropriate collateral and low income for borrowers especially the lower end income group*

Interviewer: How can these obstacles be mitigated to widen the accessibility bracket to housing mortgage finance by the low/middle income earners?

Interviewee: *Cheaper mortgage products, less stringent lending conditions and longer repayment periods to reduce monthly premiums.*

Interviewer: What is the future of the housing mortgage market in addressing housing needs of the low/ middle income earners?

Interviewee: Lowering mortgage rates to attract the low / middle income earners and expanding the mortgage market to service more customers.

Interviewee 2

Interviewer: How long have you dealt with housing mortgage related matters?

Interviewee: *My experience in this industry is well over 10 years.*

Interviewer**:** As an expert in housing mortgage, what is the general prevailing housing mortgage market in Kenya?

Interviewee: *Currently the capacity of the mortgage market is grossly in-adequate to meet the demand.*

Interviewer: Comment on whether or not the housing mortgage needs for the low / middle level income earners are catered for in the formal market

Interviewee: *Mortgage products are too expensive and cannot be comfortably afforded by the low and middle level income earners.*

Interviewer: Comment on the policy framework for lending mortgage lending in Kenya.

Interviewee: *The mortgage system has stringent lending conditions such as requirement for collateral and the high mortgage rates to cushion the mortgage institutions from risks.*

Interviewer: What lending conditions have you formulated for your organization?

Interviewee: *The lending conditions include collateral for security and ability to repay being assessed on gross household income.*

Interviewer: What challenges do you encounter while processing mortgage finance for the low and middle-income earners?

Interviewee: *The main challenges are low household income and repayment defaults for borrowers.*

Interviewer: How can these obstacles be mitigated to widen the accessibility bracket to housing mortgage finance by the low/middle income earners?

Interviewee: *These can be mitigated on by lowering mortgage rates through construction of affordable houses through adopting efficient design, use of cheap alternative materials / technology as well as provision of free land / infrastructural services.*

Interviewer: What is the future of the housing mortgage market in addressing housing needs of the low/ middle income earners?

Interviewee: *The future of the mortgage market is relaxing the lending conditions to broaden the bracket for the low / middle income earners who can access housing mortgage products and also expanding the mortgage market to service more customers.*

Interviewee 3

Interviewer: How long have you dealt with housing mortgage related matters?

Interviewee: *I have been working in the banking industry as a mortgage expert for the past 17 years.*

Interviewer**:** As an expert in housing mortgage, what is the general prevailing housing mortgage market in Kenya?

Interviewee: *The mortgage market is experiencing high mortgage rates and low capacity of the mortgage market*

Interviewer: Comment on whether or not the housing mortgage needs for the low / middle level income earners are catered for in the formal market

Interviewee: *We target the high-income earners whose incomes are certain because they are not likely to default and also because their incomes can sustain repayments.*

Interviewer: Comment on the policy framework for lending mortgage lending in Kenya.

Interviewee: *Policy puts in place stringent lending conditions to reduce risks.*

Interviewer: What lending conditions have you formulated for your organization?

Interviewee: *The lending conditions include need for collateral security and income levels that can guarantee repayments and 15 years repayment period.*

Interviewer: What challenges do you encounter while processing mortgage finance for the low and middle income earners?

Interviewee: *The challenges encountered include low incomes from borrowers that cannot guarantee repayments*

Interviewer: How can these obstacles be mitigated to widen the accessibility bracket to housing mortgage finance by the low / middle income earners?

Interviewee: *These obstacles ca be mitigated by constructing cheaper affordable houses through adoption of cheaper materials / technology to lower housing cost and also an improvement on the per capita income so that the general level of remuneration of workers is enhanced.*

Interviewer: What is the future of the housing mortgage market in addressing housing needs of the low / middle income earners?

Interviewee: *The mortgage market needs to be expanded and mortgage rates reduced to address supply and demand from the low / middle income earners.*

3. Interview of non-profit affordable housing providers

Interviewee 1

Interviewer**:** How long have you dealt with affordable housing related matters?

Interviewee: *We have been involved on matters of affordable housing for a period of 30 years.*

Interviewer**:** Comment on the affordability of the low / middle level housing market in Kenya?

Interviewee: *Rents and mortgage rates are beyond the reach of many low / middle level income earners.*

Interviewer: Comment on whether or not the housing needs for the low / middle income earners are catered for in the formal market.

Interviewee: *There are few low / middle level income earners that are able to afford quality housing in the formal market*

Interviewer: What are the measures of housing affordability in Kenya?

Interviewee: *Ability to comfortably pay their rent / mortgage on time within not more than 40% of gross household income.*

Interviewer: What challenges do the low / middle income earners face in accessing affordable housing?

Interviewee: *The challenges the low and middle level income earners face are low household income; high rent / mortgage and limited supply of housing.*

Interviewer: How can the housing affordability challenges for the low/middle level income earners be addressed?

Interviewee: *Increase socio-economic status of households, subsidize the rents / mortgages and adoption of cheap alternative materials / technology.*

Interviewer: State any major affordable housing scheme you have been involved with in Kenya?

Interviewee: *Major affordable housing schemes we have been involved with are Kenya Workers Housing Trust; Kingara Greens Apartments and KPA Bellevue Apartments*

Interviewer: Which income group did you target for this housing scheme?

Interviewee: *We targeted the low / middle income in these housing schemes.*

Interviewer: In this housing schemes, what non-conventional materials and technology did you employ to make the housing affordable?

Interviewee: In these housing schemes the predominant non-conventional materials / technology was interlocking blocks and EPS boards

Interviewer: What cost savings did you realize from applying the alternative materials and technology?

Interviewee: *The savings realized from these alternative materials ranged from 20-30 %.*

Interviewer: What other housing affordability parameters did you include to further lower housing cost?

Interviewee: *Besides cheap alternative materials and technology we also employed efficient design and cheaper financing products to further lower housing cost.*

Interviewer: State any challenges the households of the above housing schemes have faced?

Interviewee: *Key challenges faced by most of the households considered were default in repayments and loss of collateral.*

Interviewer: How can the challenges be addressed?

Interviewee: *These challenges could be addressed by lower mortgage rates, cheaper construction inputs and appropriate design.*

Interviewee 2

Interviewer**:** How long have you dealt with affordable housing related matters?

Interviewee: *I have been involved on matters of affordable housing for a period of 20 years.*

Interviewer**:** Comment on the affordability of the low / middle housing market in Kenya?

Interviewee: *The houses are quite expensive and beyond the reach of most low and middle level income earners.*

Interviewer: Comment on whether or not the housing needs for the low / middle income earners are catered for in the formal market.

Interviewee: *There are few low / middle level income earners who are able to afford quality housing in the formal market.*

Interviewer: What are the measures of housing affordability in Kenya?

Interviewee: *Housing is affordable when not more than 30% of gross household income can pay for rent or mortgage.*

Interviewer: What challenges do the low / middle income earners face in accessing affordable housing?

Interviewee: *The challenges the low / middle experience are low household income; high rent / mortgage and limited supply of housing.*

Interviewer: How can the housing affordability challenges for the low/middle level income earners be addressed?

Interviewee: *Means of addressing the challenges include increase socio-economic status of households, application of cheap alternative materials and subsidize the rents / mortgages.*

Interviewer: State any major affordable housing scheme you have been involved with in Kenya?

Interviewee: *The major affordable housing schemes are Kibera Olympic, Stoni Athi, NHC Madaraka, Langata Phase VI and Ruai Police Station.*

Interviewer: Which income group did you target for this housing schemes?

Interviewee: *We targeted the low / middle level income for the housing schemes.*

Interviewer: In these housing schemes, what non-conventional materials and technology did you employ to make the housing affordable?

Interviewee: *The predominant non-conventional materials / technology used in construction are interlocking blocks and EPS boards.*

Interviewer: What cost savings did you realize from applying the alternative materials and technology?

Interviewee: *The savings realized from use of the non-conventional materials / technology ranged from 10-20 %.*

Interviewer: What other housing affordability parameters did you include to further lower housing cost?

Interviewee: Other affordability parameters employed were efficient design and cheaper financing strategy

Interviewer: State any challenges the households of the above housing scheme have faced?

Interviewee: *The challenges the households faced were majorly defaults in repayments and loss of collateral.*

Interviewer: How can the challenges be addressed?

Interviewee: *The challenges the households face could be addressed through lower mortgage rates, lower construction cost, free land / infrastructural services and appropriate design.*

Interviewee 3

Interviewer**:** How long have you dealt with affordable housing related matters?

Interviewee: *I have been involved on matters of affordable housing for a period of 18 years.*

Interviewer**:** Comment on the affordability of the low / middle housing market in Kenya?

Interviewee: *Most of the houses available in the formal market are too expensive for the low / middle level forcing some to move to the slums.*

Interviewer: Comment on whether or not the housing needs for the low / middle income earners are catered for in the formal market.

Interviewee: Only a few low / middle level income earners are able to afford quality housing in the formal market.

Interviewer: What are the measures of housing affordability in Kenya?

Interviewee: *Housing is affordable when rent / mortgage is no more than 30% of gross household income.*

Interviewer: What challenges do the low/middle income earners face in accessing affordable housing?

Interviewee: *The challenges the low and middle level households face includes inadequate supply, inefficient design, low household income and high rent / mortgage.*

Interviewer: How can the housing affordability challenges for the low/middle level income earners be addressed?

Interviewee: *Means of addressing housing affordability challenges are; enlisting support of non-profit housing organizations, use of appropriate design, increase socio-economic status of households, provide free land / infrastructure and subsidize the rents / mortgages.*

Interviewer: State any major affordable housing scheme you have been involved with in Kenya?

Interviewee: *We have been involved with Maai Mahiu IDP Housing and Mt. Elgon homes.*

Interviewer: Which income group did you target for this housing scheme?

Interviewer: *We targeted both the low / middle income earners.*

Interviewer: In these housing schemes, what non-conventional materials and technology did you employ to make the housing affordable?

Interviewee: *The non-conventional materials / technology employed during construction were interlocking blocks, sisal cement roofing tiles, and EPS boards.*

Interviewer: What cost savings did you realize from applying the alternative materials and technology?

Interviewee: *The cost saving realized was between 20-30 %.*

Interviewer: What other housing affordability parameters did you include to further lower housing cost?

Interviewee: *The other parameters applied to further low housing cost were free land, efficient design and cheaper financing options.*

Interviewer: State any challenges the households of the above housing scheme have faced?

Interviewee: *The major challenge was default in repayments by households.*

Interviewer: How can the challenges be addressed?

Interviewee: *Reduce mortgage rate through lowering costs of construction inputs, adoption of cheap alternative materials / technology and efficient design.*

Appendix 9 Correlation Analysis

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Nonparametric Correlations

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a. Based on availability of workspace memory

Spearman's Rank Correlation Analysis

			by the low / middle income earners	Delivery methods	Land / infrastructure	Building material / tech	process (design / construction control)	Construction process	Finance strategy	Policy intervention	Monitoring / control	Research in to alternative materials/tech	Construction cost	Household income	Mortgage / rent	Housing actors
Spearman's rho	Accessibility to quality housing by the low / middle income earners	Correlation Coefficient	1.000	.451	.770	.721	.689	.571	.781	.603	.572	.692	.796	.743	.781	.324
		Sig. (2-tailed)	.	.255	.447	.957	.121	.771	.004	.155	.115	.880	.	.036	.907	.497
		N	47	47	47	47	47	47	47	47	47	47	47	47	47	47
	Delivery methods	Correlation Coefficient	.451	1.000	.342	.081	.064	.043	.052	.417	.015	.309	.	.201	.033	.096
		Sig. (2-tailed)	.255	.	.018	.589	.668	.762	.919	.004	.919	.034	.	.176	.020	.187
		N	47	47	47	47	47	47	47	47	47	47	47	47	47	47
	Land / infrastructure	Correlation Coefficient	.770	.342	1.000	.005	.593	.165	.397	.121	.132	.203	.	.011	.189	.059
		Sig. (2-tailed)	.447	.018	.	.975	.000	.268	.006	.418	.375	.172	.	.940	.204	.696
		N	47	47	47	47	47	47	47	47	47	47	47	47	47	47
	Building material / tech	Correlation Coefficient	.721	.081	.005	1.000	.140	.087	.000	.045	.114	.037	.	.208	.236	.070
		Sig. (2-tailed)	.957	.589	.975	.	.348	.559	.999	.764	.445	.804	.	.160	.110	.639
		N	47	47	47	47	47	47	47	47	47	47	47	47	47	47
	Planning process	Correlation Coefficient	.689	.064	.593	.141	1.000	.059	.539	.067	.083	.231	.	.301	.256	.025

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		by the low / middle income earners	Delivery methods	Land / infrastructure	Building material / tech	process (design / construction control)	Construction process	Finance strategy	Policy intervention	Monitoring / control	Research in to alternative materials/tech	Construction cost	Household income	Mortgage / rent	Housing actors
(design / development control)	Sig. (2-tailed)	.121	.668	.000	.348	.	.694	.000	.655	.581	.118		.040	.082	.867
	N	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Construction process	Correlation Coefficient	.571	.045	.165	.087	.059	1.000	.094	.404	.555	.407		.207	.407	.020
	Sig. (2-tailed)	.771	.762	.268	.559	.694	.	.531	.005	.000	.005		.162	.005	.113
	N	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Financing strategy	Correlation Coefficient	.781	.052	.397	.000	.539	.094	1.000	.020	.076	.513		.336	.209	.289
	Sig. (2-tailed)	.004	.919	.006	.999	.000	.531	.	.892	.611	.000		.021	.159	.049
	N	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Policy intervention	Correlation Coefficient	.603	.417	.121	.045	.067	.404	.020	1.000	.435	.421		.046	.032	.216
	Sig. (2-tailed)	.155	.004	.418	.764	.655	.005	.892	.	.002	.003		.760	.829	.145
	N	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Monitoring / control	Correlation Coefficient	.572	.051	.132	.572	.083	.555	-.076	.435	1.000	.385		.121	.475	.167
	Sig. (2-tailed)	.115	.919	.375	.445	.581	.000	.611	.002	.	.008		.418	.001	.277
	N	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Research in to alternative materials	Correlation Coefficient	.692	.035	.203	.037	.231	.407	.513	.421	.385	1.000		.198	.410	.272
	Sig. (2-tailed)	.880	.034	.172	.804	.118	.005	.000	.003	.008	.		.183	.004	.064

		by the low / middle income earners	Delivery methods	Land / infrastructure	Building material / tech	process (design / construction control)	Construction process	Finance strategy	Policy intervention	Monitoring / control	Research in to alternative materials/tech	Construction cost	Household income	Mortgage / rent	Housing actors
	N	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Construction cost	Correlation Coefficient	.796	.	.	.	.	.	.	.	.	.	.	.	.	.
	Sig. (2-tailed)	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	N	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Household income	Correlation Coefficient	.743	.201	.011	.208	.301	.207	.336	.046	.121	.198	.	1.000	.051	.032
	Sig. (2-tailed)	.036	.176	.940	.160	.040	.162	.021	.760	.418	.183	.	.	.736	.138
	N	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Mortgage / rent	Correlation Coefficient	.781	.332	.189	.236	.256	.407	.209	-.032	.475	.410	.	.051	1.000	.394
	Sig. (2-tailed)	.907	.020	.204	.110	.082	.005	.159	.829	.001	.004	.	.736	.	.006
	N	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Housing actors	Correlation Coefficient	.102	.096	.059	.070	.025	.234	.289	.021	.162	.272	.	.213	.394	1.000
	Sig. (2-tailed)	.497	.187	.696	.639	.867	.113	.049	.145	.277	.064	.	.138	.006	.
	N	47	47	47	47	47	47	47	47	47	47	47	47	47	47