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Strategic Approaches and Delivery of Affordable Housing in Nairobi City County, Kenya

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ABSTRACT

Affordable housing system is a word used in Kenya to refer to that part of society whose revenue is below the average revenue of the family. Affordable housing becomes a main problem particularly in developing countries where it is not possible for a majority of the population to purchase homes at market price. Most individuals around the world live in towns and 1 billion live in slums, which will double by 2030. Urban populations are increasing at a pace that is much quicker than they can be consumed and managed, resulting in requirements on services and infrastructure that exceed supply. This leaves most inhabitants in many emerging market towns with few choices but living in slums. Increasing access to affordable housing of high quality has a deep effect on the person as well as on society as a whole. However, housing is a difficult and capital-intensive industry characterized by delays and regulatory problems, resulting in it rarely gaining the spotlight on impact investors and social entrepreneurs. Therefore, this study aimed to determine the influence the strategic approaches adopted by the government in delivering affordable housing in Kenya with specific focus on Nairobi County. The specific objectives of this study were to determine the influence of modern construction technologies, innovative housing financing, collaborative approach and legal and regulatory reforms in delivering affordable housing in Kenya with specific focus on Nairobi County. The research was anchored on the theory of monopoly rivalry, regulatory theory and the model of cooperative strategy. The research also demonstrated a conceptual framework for the connection between the factors. Descriptive research design was used in the study. For this research, the target population was officers in the county government concerned with a total of 106 homes. Stratified random sampling and simple random sampling methods were utilized in selecting a sample size of 64, which represented 60 percent of the entire research population. Research used primary and secondary data. The primary data was collected using a semi-structured questionnaire administered to officers by drop-down and later by selecting technique. Using SPSS (version 21), data gathered was analyzed using descriptive and inferential statistics. The study revealed that the use of modern construction technologies greatly influenced the delivery of affordable housing. The study also revealed that the innovative housing financing influenced the delivery of affordable housing to great extent. The study further found that the collaborative approaches had influenced the delivery of affordable housing by the government to a great extent. Based on the findings the study recommended that the government sensitize the developers to fully adopt modern technologies in construction of the houses, so as to reduce the costs of the houses. Additionally, the study recommended that the government come up with innovative financing such as allowing the access of pension benefits by individuals to help in financing the ownership of houses. The study also recommended that the government seek more collaborative opportunities such as through public private partnerships to help in realizing the goal of delivering affordable housing especially to the low income earners.

Key Words: *Strategic Approaches, Modern Construction Technologies, Innovative Housing Financing, Collaborative Approach, Delivery of Affordable Housing*

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1. Introduction

Affordable housing system is a word used in Kenya to refer to that part of society whose revenue is below the average revenue of the family. Affordable housing becomes a main problem particularly in developing countries where it is not possible for a majority of the population to purchase homes at market price. We live in a globe where most individuals reside in towns and 1 billion live in slums, which will double by 2030 (Hassanali, 2009). The availability of adequate accommodation is regarded one of human beings ' fundamental requirements, the absence of which is considered to be devoid of fulfillment of life and absence of quality of life. Over the previous four centuries, the provision of such accommodation has been hampered by fast population growth in urban regions worldwide, particularly in developing countries (Gurran, et al., 2017). The absence of affordable housing is extremely expressed by the proliferation of informal settlements in urban regions, according to UN-Habitat (2013). Consequently, governments around the globe have developed policies to relieve the scenario. For example, in China, individuals residing in informal settlements receive a one-time equity grant depending on their current housing's market value to allow them to access mortgage instruments (Tommelein & Li, 2016). Incentives in the form of tax reductions or tax exemptions are provided to developers. As a consequence, over the past five years, China has created more than 20 million housing units.

In Malaysia, the state has created low-cost housing a compulsory housing development section supported by housing developers who have to provide low-cost housing for 30% of their total housing growth (Toole & Chinowsky, 2017). The policy is enforced through administrative processes that force developers to provide a part of low-cost housing development to obtain local authorities ' approval of growth. Governments in some low-income or middle-income nations such as Colombia, El Salvador, the Philippines, Indonesia, Myanmar and Sri Lanka have been successful in preventing slum development by investing in low-cost and affordable housing to anticipate and plan for increasing urban communities (Mansuri & Rao, 2014). Population growth in Africa will continue to rise, with UN-Habitat (2013) estimating that the urban population will rise from 294 million to 742 million by 2030. This rise in population growth means that governments and urban executives across the continent will have significant issues offering affordable housing for low-income earners in particular (Lizarralde & Massyn, 2014). This is worrying because governments are unable to satisfy people's accommodation requirements as they are. Stiff competition produced by market forces in metropolitan regions of Sub-Saharan Africa exacerbates the condition as low-income earners are relegated to the background and unable to maintain up with this competition (Mansuri & Rao, 2014). The rivalry also considerably increases the price of housing to the extent that even the lowest standard of official accommodation remains unaffordable for low-income earners.

Success stories in providing accommodation for low-income earners have been reported in nations like Egypt and Tunisia. The respective central governments were at the forefront in implementing inclusive housing, land reforms and regularization policies in these nations. But the state still has to create schemes in Ghana that can provide alternative housing alternatives for all revenue groups (Tipple & Korboe, 2017). For many Ghanaians, adequate and affordable housing continues to be an illusion. Other approaches continue to provide

households with their own accommodation. In Ghana, housing production is mainly driven by individual homes rather than developers of government or real estate. It is estimated that private people produce about 90 percent of Ghana's residential inventory (Tipple & Korboe, 2017). These families generate housing through self-help approach-building houses for their own occupation by private people primarily through incremental housing policies. These policies rely greatly on the household's revenue level.

In Kenya, it implies that very little is left for accommodation because low-income earners spend most of their revenue on other fundamental necessities. In addition, low-income households do not have access to housing finance equipment to help them buy or construct official homes (Shafie, 2015). Recent World Bank statistics (2016) estimate that about 92 percent of Kenya's urban population is unable to afford a mortgage loan while rural income is too small to be considered. The loans accessible are channeled to households with high and middle incomes. As a consequence, the low-income section of the urban population, which includes the vast majority of urban residents, continues mainly unavailable for quality accommodation. This leads to housing being taken over by middle-income earners who can readily access funding (Muraya, 2012). As a consequence, the housing gaps between the poor and the economically well-off families are increased. Access to housing finance for low-income earners will be provided by finding steps to solve this issue and subsequent execution. Indeed, financing costs are one of the most prohibitive variables in Kenya's low- and middle-income market. Currently, 80 percent of Kenya's fresh housing supply meets the requirements of middle-to-high income families, yet among low-income households is the biggest need. The annual low-income housing deficit is 156,000 units of housing (Okumu, 2016). Kenya's complete housing deficit is 2,000,000 units. Only one-fifth of families live in their own homes in metropolitan regions while renting four-fifths (Kariuki, 2015). Therefore, the government should operate torward to close the housing gaps to accommodate all household cadres in official accommodation. This research aims to identify the approaches employed by governments (national and county) to provide affordable housing in metropolitan regions.

The process of formulating and achieving goals is known as the function of strategic management and strategy as the means to achieve the goal. Strategy is the overall design or plan an organization chooses to use its resources to advance or respond to the set of objectives (Henderson, 2014). Strategies most often devote a general programme of action and deployment of resources to attain comprehensive objectives. An organization is considered efficient and operationally effective when coordinated between goals and strategies. The sections must be integrated into a full framework by OSOU, (2016). Strategy enables the organisation respond with due diligence to its uncertain circumstances. The organization is like a boat without a rudder without a strategy. It's like a tramp to go there without a destination. Without effective implementation of an adequate policy, the future is always dark and there is a greater likelihood of business failure (Henderson, 2014).

Modern building techniques and new methods of building are developing in relation to providing affordable housing. Nevertheless, despite the need for long-term company significance, most building organisations do not adopt innovation adequately as a strategic objective (Dulaimi et al., 2012). Kenyans have been slow to embrace contemporary building technologies and have a powerful prejudice towards traditional stone and cement products and methods (Noppen, 2012). The present research aims to determine how public implementation of contemporary building techniques affects the provision of affordable housing. Innovative financing of housing is also a main approach to be evaluated by the research. Reliance on current structures for mobilizing and access to housing finance and other financial assets has proven unsustainable in response to the enormous housing needs of

the ever-increasing urban population in the county. Therefore, it is appropriate to create alternative schemes based on incremental housing development through economic engineering (Darinka, 2018). The research will try to identify what the government has embraced innovative housing funding and how it affects the delivery of affordable housing.

Another significant strategy for providing affordable housing is to adopt a cooperative approach. There is, for example, recurrent state slum eviction, paving the way for infrastructural growth, with no resettlement plan and no tenure safety, and no extensive policy support for bad housing growth (Darinka, 2018). Housing options for low-income individuals in informal settlements are presently restricted to accessible shelters. In terms of reaching the poor, meeting the level of affordability, and housing volume relative to demand, the government's current housing strategies for the poor seem to have failed due to a number of variables such as lack of recipient involvement, lack of funds, and actor coordination and communication. This requires a new strategy that can solve the current top-down policy problems.

In general, affordable housing has been referred to as housing that meets the requirements of families whose income is insufficient to enable them to access suitable housing on the market without help (World Bank, 2017). According to Milligan et al (2007), affordable housing has been described as housing suitable for the requirements of a range of low to moderate revenue homes and priced so that low and moderate incomes can satisfy their other vital cost of living. In this case, affordable housing can refer to any housing where the cost of the tenant is not strictly regulated by the market, but is made cheaper by some form of government intervention. There is presently an enormous housing deficit whose back log remains difficult to eradicate due to the increasing domestic demand on the one side and the continuing shortage of housing on the other (Milligan et al., 2007). Government of Kenya and other household stakeholders are striving to tackle the problem of affordable housing through multiple approaches mentioned in the paragraphs below. Land use and other land regulatory policies have a deep impact on the country's supply of affordable housing.

Lack of appropriate soil for urban development, especially for low-income housing, is perhaps the single most significant obstacle to attaining the objective of affordable housing (Rumelt, 2011). Land scarcity contributes to greater land prices, present neighbourhood overcrowding, and illegal land invasion and growth of squatter settlements. This trend can only be reversed by offering adequate and affordable land for low-income housing. To enhance the supply of urban land, financial and technical capabilities of the municipalities need to be strengthened. Conditions for promoting the growth of private land development agencies should also be developed. Governments should develop a regulatory structure to ensure that all revenue groups are served by such private sector land developers. The country's housing finance institutions provide services to only a small proportion of the population. Housing financing is provided mostly through non-official sources of loans (Rumelt, 2011). This is the consequence of national policies that fail to promote domestic savings and the growth of domestic financial institutions and tools. Without collateral, low-income groups depend completely on casual loan sources, which are expensive and mostly short-term.

Establishing and reinforcing processes for funding low-income housing in rare instances (since there are a few) and including informal settlements in this relationship is a basic problem. It has been hard for the urban population to finance and facilitate infrastructure to satisfy the fundamental requirements of urban communities housing requirements. This is due to the high standard which in most cases makes the provision of infrastructure very costly. All too often, infrastructure facilities are subsidized unnecessarily and subsidies are often

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misdirected. As government officials have generally been unable to provide infrastructure to the increasing amount of urban communities, this task has increasingly been assumed by individual homes, community organizations and informal businesses. GOK, (2017) argues that infrastructure and facilities need to be improved to promote affordable housing development. These facilities include, among other things, sewerage systems, appropriate running clean water, and power supply (World Bank, 2017). Support should be provided for small-scale building operations. Support should be given to small-scale building companies operating especially in informal settlements. Measures in this context include formulating more realistic norms for planning and constructing, simplifying administrative processes for obtaining licenses and permits. Developing loan processes for tiny building entrepreneurs; encouraging cooperative agreements to operate and, in particular, obtain building materials; facilitating the participation of smaller businesses in large-scale public sector contracts are other examples of such support measures. Building materials are often the single largest input to building housing. It is estimated that a normal low-income official residential unit can take up to 70% of the price of construction equipment alone. Kenya is mainly dependent on imported construction materials and techniques, despite being endowed with abundant natural resources that can fulfil its need for building materials manufacturing (Ferguson, 2018). While there is substantial research on local construction materials, few of these study projects have been successful in disseminating results to prospective customers.

Nairobi City County is one of the 47 county authorities established by the enactment of the new constitution in 2010. The County was created on the same boundaries of what was once known as Nairobi Province in March 2013. Nairobi City County has an estimated 3.5 million population, but the population continues to grow at a rate of 3 percent each year. The county also consists of 17 parliamentary constituencies (sub-counties) and 85 electoral districts each represented by an elected district assembly member (NCC, 2019). The county of Nairobi has the Nairobi Integrated Urban Development Master Plan (NIUPLAN) in place to integrate present and proposed master plans to foster collaboration among various mandated stakeholders. Before September 2013, the preparation of the Integrated Master Plan began and was participatory in nature to allow residents to contribute their views. The integrated master plan aligns with Kenya Vision 2030 aimed at turning Kenya into a middle-income economy by 2030 (Nairobi City County, 2019).

Nairobi County has an annual housing requirement of 150,000 to 200,000 housing units per year, according to the World Bank (2016), yet only about 15,000 requests for growth are presented. More than 48 percent of the supply is for high middle revenue, 35 percent for high revenue and only 2 percent for low revenue despite having the biggest need for accommodation. Due to the proliferation of slums and informal settlements, the housing supply shortfall for low income is met. More than 60% of Nairobi inhabitants live in informal settlements. The county of Nairobi offers only about 17,000 housing units; all created in colonial times. The county is characterized by inadequate supply of accessible and decent accommodation for low-and middle-income earners. In addition, city land values are so high that low-income housing cannot be delivered in suitable places (World Bank, 2016). State and employers have relinquished the function of providing housing to their employees, who in turn compete for the private sector's restricted housing units, in tenements and in the informal sector. As an unofficial manner to cope with insufficient housing supplies, the proliferation of poorly serviced slums and informal settlements is widespread. This research aimed to identify the strategic strategies taken by the government to relieve this issue and its impact on the provision of affordable housing.

2. Statement of the Problem

Providing official housing to low-income households increases the families living circumstances and ensures quality of life for them. However, affordable housing has become a significant problem for domestic and local authorities as the development of the population, particularly low-income earners, rises significantly annually (Muraya, 2012). This amplifies the accommodation inequalities between middle-and high-income earners on the one side and low-income earners on the other. The government's participation in providing affordable housing has also been minimal, and individual families have had to obtain official housing, which is hard with the minimum funds available to them.The role of the government in providing housing was limited to just a few projects in the informal settlements as a direct provider as opposed to the facilitator role that would be ideal in the presence of a legal and regulatory framework (Muraya, 2012). This could be ascribed to a number of factors including corruption, lack of political will, and over-reliance on donors to elevate informal settlements as well as absence of participation of stakeholders that led to court battles over government and community property that would be perfect for low-cost building. As such, public activities in housing provision were erratic, inadequate and ineffective in achieving low-income households.

Several studies on the provision of affordable housing in Kenya have been performed. In the delivery of affordable housing in Kenya, Ngigi (2015), conducted a survey evaluating alternative building techniques. The research found that the technology used in the projects was a comparatively economical technique in terms of quality control, waste reduction, improved material handling, decreased material transport expenses, improved monitoring and oversight, effectiveness, and labor crew performance and durability. However, the study focused on using technology to provide affordable housing as the only strategy. Kibati (2015), also performed a survey on the impacts of supply side institutional positions on the affordability of accommodation among Kenyan low-income earners. The research found that a important beneficial connection exists between the role of housing policy of the National Government and the affordability of housing among low income earners. Although the research recognized the role played by the government in providing affordable housing, it did not discuss the policies adopted by the government to do so. Muigai (2016), conducted a survey to develop a suitable financing approach for Kenya's low-and middle-income housing markets. The research found that due to elevated interest rates and collateral requirements, the present housing funding alternatives were not suitable for low and middle income earners. However, the research concentrated only on the housing provision funding strategy. From the research reviewed, it was evident that very few studies in the delivery of affordable housing had been performed on public policies. This research sought to close this gap by identifying the strategic strategies available to the government and how they helped the government deliver affordable housing in Kenya, particularly in Nairobi County. The results of the research would be widespread for all other counties and the investigator hoped that his suggestions would be replicable in other areas of the nation.

3. Objectives of the Study

The overall objective of this study was to identify the strategic approaches adopted by the government to deliver affordable housing in Kenya, with particular emphasis on Nairobi County.

Specific Objectives were:

i. To evaluate the adoption of modern construction technologies in delivering affordable housing in Nairobi County.

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ii. To assess how adoption of innovative housing financing influences the delivery of affordable housing in Nairobi County.

iii. To establish how adoption of collaborative approach influences the delivery affordable housing in Nairobi County.

4. Literature Review

The study reviewed literature related to the government's strategic approaches to deliver affordable housing. The study specifically sought to determine what other authors had established about the adoption of modern building technologies, innovative housing financing, and collaborative approach, and how they related to the provision of affordable housing. The review identified the existing gaps in the different scholars ' context and methodology. The review also highlighted what other nations had done to reduce housing shortages and provide affordable housing.

4.1 Theoretical Framework

The study was anchored on the Q Theory of Housing Investment, regulation theory the collaborative approach model and Monopolistic Competition Theory.

4.1.1 Q Theory of Housing Investment

James Tobin presented Q theory in 1969 (Jud & Winkler, 2003). Hayashi (1982); and Takala and Tuomala (1990) are other recent Q theory proponents. Q theory states that investment in any asset is a function of the Q ratio: the ratio of the asset's market valuation to its cost (or marginal cost) of replacement. If Q>1, then a company should invest; if a company has a marginal Q=1, investment should stop. If Q<1, the company should not invest because it costs less than its purchase (replacement) cost to acquire an asset on the market. In housing, consumer arbitration is what drives investment in housing between fresh and current home markets. For instance, if current homes are costly compared to new homes, more new homes will be required for housing customers. If current homes are inexpensive compared to new homes, more current homes and few new homes will be purchased by customers. This theory was important to the research as it evaluates the competitive atmosphere in which builders and developers are price-takers, providers react to the requirements of housing customers and create new homes when current home prices are high compared to new homes.

4.1.2 Regulation Theory

The theory of economic regulation is an economic theory first created by Arthur Cecil Pigou (1932). The theory claims that regulations are given to correct inefficient or unfair market procedures in reaction to government demand. Regulation is presumed to benefit society as a whole instead of particular interests. The regulatory body is considered to represent the interests of the society it operates in rather than the private interests of the regulators (Jessop, 1990; Goodwin, 2001; Levy & Spiller, 1994; Newbery, 1999). The case for economic regulation is based on the presence of important market failure arising from economies of scale and scope of production, data imperfections in market operations, the existence of incomplete markets and externalities, and the resulting impacts on the distribution of revenue and wealth. It has been suggested that market failures could be more pronounced in developing nations and therefore the case for government regulation is greater (Stiglitz, 1998).

This theory was important in the context of this study and in particular in explaining that government regulation is necessary in order to make housing because of incomplete markets

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and externalities and the resulting impacts of earnings and wealth distribution, accessible to low-income earners.

4.1.3 Collaborative Approach Model

The Collaborative Housing Approach emerged through the UN Center for Human Settlements in the 1980s. It focused on institutional limitation and the imperfect market, not just urban poor participation (Safler, 1983). In the late 1980s, the United Nations Center for Human Settlements (UNCHS, Habitat) focused on state, market, NGOs and community collaboration to enhance community capacity (UNCSH, 1990). The strategy integrates the notion of good governance and provision of supportive housing into the low-cost housing solution of third world cities. The strategy, using housing as a means of social mobility, regarded the well-being and opportunities of low-income groups in the town. It therefore concentrated on the health problems of housing units together with adequate room for social and economic operations (UNCSH, 1990).

The collaborative approach model was used to argue for the relevant stakeholders in providing affordable housing to the people of Nairobi County for the use of collaboration by both the national government and the county government. The model was suitable for this study as it seeks to involve the community affected by the lack of resources within the interactive space of the governance with the aim of obtaining the support of the government in providing practical answers to their problems.

4.1.4 Monopolistic Competition Theory

The proponent of the theory of monopoly competition is Edward Hastings Chamberlin, who wrote a pioneering book on the subject, Theory of Monopoly Competition in 1933. Monopoly competition is a form of imperfect competition, so many manufacturers sell products that are differentiated as replacements but not perfect substitutes (such as branding, quality, or place). Monopolistically competitive markets have the following features: there are many manufacturers and many customers on the market, and no company has complete price control on the market. Consumers perceive non-price differences between the products of the competitors. There are few entry and exit barriers. Producers have a level of price control. Given these circumstances, the sloping demand curve faces a monopoly competition company. Although not flat, the demand curve is extremely elastic. This means that while the company is a price maker in monopoly competition, it cannot totally ignore the pricing of competing companies in the long run.

The monopolistic theory of competition was used to argue for the existence of controlled market prices for housing by producers where consumers have no say on the market price of housing. Housing stakeholders including developers and mortgage lenders continue to increase house prices, denying access to affordable housing to low-income earners. This theory applies to housing affordability because competition between mortgage distribution channels should lower mortgage interest rates because, while the company is a price maker in monopoly competition, it cannot totally overlook the pricing of competing companies in the long run. So, while each mortgage lender has differentiated mortgage loan products and is thus a price maker, it cannot disregard the competitors ' rates ' mortgage loan products.

4.2 Empirical Literature

4.2.1 Modern Construction Technologies and Affordable Housing

In the delivery of affordable housing in Kenya, Ngigi (2015), conducted a study evaluating alternative building technologies. To carry out the evaluation, the study adopted cross-sectional design. The study adopted a case study design combining strategies for quantitative

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and qualitative research. As part of a multi-stage selection procedure, the study used purposive sampling technique. In questionnaires and face-to-face interviews, primary data were collected. The method used for analyzing data was partly quantitative and partly qualitative. The study established that the technology used in the projects was a relatively economic method in terms of quality control, waste reduction, better handling of materials, reduced transport costs of materials, improvement on follow up, and supervision, efficiency and in terms of output of labour crew and durability. These findings proved that the technology used improved time scheduling of the work during construction hence improved productivity. The high wastage reduction and re-cyclingof off cuts meant saving on materials costs.

McCoy (2015) stated that the U.S. construction industry is often defined as traditional and resistant to innovative building products and methods being adopted. Several literature and practice surveys recognized significant impediments to the implementation of homebuilding technology on the housing market, such as the cyclical nature of construction, the dominance of tiny businesses, problems of housing system compatibility, heavy dependence on subcontractors, inadequate labour skills, bad communication between homebuilders and manufacturers, varied building codes and absence of building skills.

Jain and Paliwal (2016) also conducted a survey on the implementation in India of suitable and cost-effective housing techniques. The research was an overview of India's housing status. The research discovered that a variety of technology alternatives were accessible for multiple building components, resulting in cost-effectiveness and not affecting the performance features expected from a decent house at the same moment. Green (2017) ascribed the Japanese achievement to an imprecise mix of Total Quality Management (TQM), JIT, teamwork and production chain leadership in relation to management methods. He went on to argue that the primary argument in support of TQM is that it promotes staff to define themselves as part of a supply chain, which includes a series of interactions between providers and clients, and that this gives workers a feeling of self-esteem in serving the next individual in the chain, rather than satisfying themselves with the assignment.

4.2.2 Innovative Housing Financing and Affordable Housing

Muhoro (2015), a case study of Khayelitsha Township in Cape Town, South Africa, conducted a study on innovative solutions to affordable housing in the GAP sector. This study of studies used a methodology of qualitative research. The study used qualitative research design for a case study. The snowball sampling method was used in the gap market in Khayelitsha Township to obtain data from participants. The research found that developers and banks had alliances to finance end-users and assist with developer liquidity. The research also found that there were partnerships between developers and government to acquire property cheaply and that the government used cross-subsidies to subsidize housing for lower-income families through the use of mixed-income housing projects.

Makachia (2015), conducted a survey on viable growth innovative housing funding. The study approach was triple, literature review, empirical information collection in residential properties, and economic simulation model creation. The research found that formal funding schemes are insufficient to address deep-rooted urban housing demand, and economic organizations should innovate schemes that recognize individual formal and informal savings, increase development, sublet and reinvest as options. The research found that the development of alternative structures through financial engineering based on incremental housing development was appropriate. This option should mobilize formal and informal funds to stimulate household savings, incremental development, rent and reinvestment. This

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was suitable for people and small developers such as chamas, housing cooperatives and other microfinance companies.

Biitir (2016), conducted a self-help housing strategy survey on providing affordable housing for low-income groups in the Tamale metropolitan area. The research used both main and secondary data collection techniques of quantitative and qualitative methods. Some of the methods used to obtain the information were questionnaire survey at household and institutional level, main informant interviews and focus group discussions. The research found that personal savings were the primary source of funding housing development, and as a result, the construction method took 5 to 8 years to finish the key house. The research suggested that the Tamale Metropolitan Assembly partner with microfinance organizations introduce innovative housing microfinance financing to provide phased tiny and inexpensive loans to assist builders obtain property and build buildings. The Assembly could set up a revolving loan fund in combination with its development partners to provide affordable housing financing for low-income groups.

4.2.3 Collaborative Approach and affordable housing

Okupe (2014), conducted a survey on the private sector's role in Nigeria's housing delivery, which was an efficient approach to Nigeria's housing delivery. He claims that both the formal and informal private industry provide the bulk (more than 90%) of Nigerian housing shares and that most of them are for the low-income category. It is therefore expected that government and non-governmental organizations will need to synergize and ensure policy formulation and development aimed at creating an enabling strategy whereby low-income households can build or own homes at their convenience using affordable building materials and technology, but without compromising their health and well-being.

Begum (2015), in Dhaka, conducted a survey on enhancing housing access for low-income groups, from rhetoric to fact in community involvement. The aim of this study was to investigate community involvement in low-income individuals in Dhaka as a contributor to affordable housing. A blended technique was used to gather data as it was deemed appropriate to gather information from various groups of respondents including slum homes, public officials, NGO managers, scientists, and community leaders. The research found that community participation and recipients ' active involvement in the delivery of any service is critical to a program's achievement as the participation of individuals advances their interests, needs, and ambitions in the development discourse. The research also found that people's involvement in development programs offered many benefits by providing community members with the chance to contribute and create community initiatives to encourage community development.

Darinka (2018), conducted a survey on cooperative housing and housing suppliers in Vienna, Austria and Lyon, France, which was an analytical framework for multi-stakeholder cooperation in housing co-production. The research embraced an approach to the survey of case studies. The research found that both projects were highly user-led, carrying from the start and throughout their growth a vision and a set of principles. Residents had a veto on the key values that drive their projects. Both sought social inclusion and affordability through tenure and revenue mix mechanisms, linked to allocation systems for local social housing. In both instances, established suppliers of housing were main stakeholders, assuming the role of developers and estate managers. Both also maintained land and buildings ownership, served as intermediary lenders, and enforced policies of local authority for social housing distribution. In both examples, the relationships were established from the early stages of the project between the group of residents and housing providers and were initiated by groups of residents. This corresponds to the elevated level of customer participation that each of these

organizations has taken over the course of their project, particularly with regard to the general guiding principles and architectural design elements.

5. Conceptual framework

A conceptual framework is a structure that attempts to clarify the study's connection between variables and demonstrates the connection using diagrams. It is a hypothesized model that identifies the ideas and relationships under research (Mugenda & Mugenda, 2009). The occurrence or change of independent variables will lead in the dependent variable being changed. The research variables ' connection is as illustrated in Figure 1.
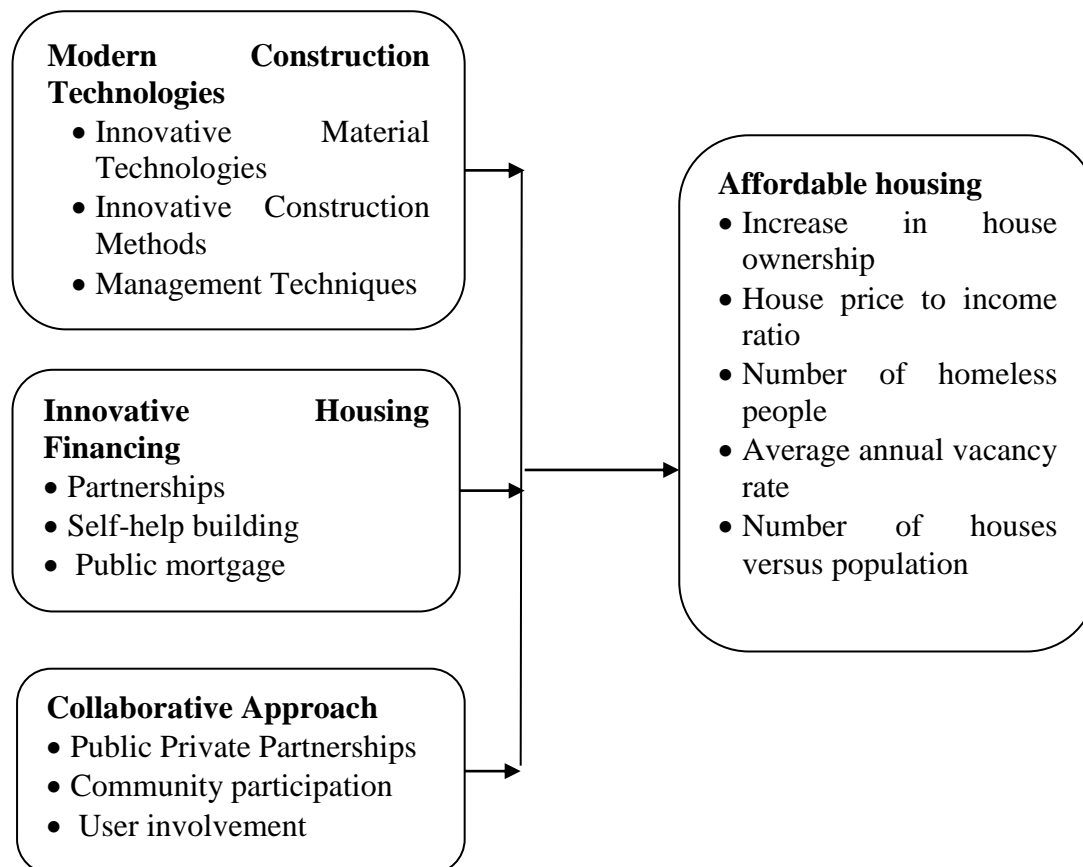

Figure 1: Conceptual Framework

Source: Author (2020)

6. Research Methodology

The suitable design for this research was the descriptive survey design as it is a fact-finding investigation that seeks to find out the current state of affairs in the county. To obtain primary data, qualitative and quantitative data collection techniques were used. The county public service board obtained the list of participants. This included senior management of the different agencies (Chief Officers, Directors, HODs, Senior Administrators, Enforcement Officers, and Supervisors). Stratified random sampling technique was used in the research. Stratified random sampling is an unbiased method to group heterogeneous population into homogeneous sub-sets and then create a representative range within the individual sub-set. The aim of stratified random sampling is to acquire from distinct subgroups the necessary representation in the population. Stratified random sampling was perfect for this research

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because the offices from which the survey was conducted was unique because it falls within distinct categories.

Mugenda and Mugenda (2009), noted that social research employees may embrace certain undefined methods. One such practice shows that if the population is a few hundreds, it will be done by 40 percent or more specimens: if many hundreds; 20% will do it; and if several thousand, 5% or less will do it. Therefore, a sample size of 60 percent was used for this research, taken from a complete target population of 106 people making up a sample size of 64 participants. The use of 60 percent as a sample size was chosen in line with Mugenda and Mugenda (2009), recommending that if the population is few hundreds a sample population of 40 percent and above be suitable. Equally essential is the fact that within the distinct strata the investigator must use simple random sampling. With this technique, the researcher has more statistical precision than stratified sampling method. This is because the variation within the subgroups is lower than the variations when dealing with the whole population. Since this technique has high statistical accuracy, it also requires a small sample size that can save a lot of time, money and effort for researchers. Stratification can result in a lower estimation mistake than a simple random sample of the same size would generate.

To collect the primary data, the research used questionnaires. The primary reason the investigator used a questionnaire is because it allowed the investigator to ask standardized questions and thus guarantee compatibility of the answers. The investigator obtained approval from the university to undertake the study and then contacted the National Commission for Science, Technology and Innovation as well as the department of the county government involved with housing and urban development to allow the research to be carried out in their offices. Then the investigator hired research assistants to help in the collection of information. The investigator booked meetings with the county government officials involved with housing and urban development and then visited the offices together with the research assistants. Questionnaires were given by the investigator to the participants. The investigator provided the potential participants with clear guidance on how to fill out the questionnaires and retrieve the questionnaires personally as quickly as they were duly filled in.

To evaluate the information gathered, the research used descriptive statistical methods. The questionnaires were cross-checked to guarantee that the questions were answered correctly. The answered questions were coded and the entire information was organized before the data was analyzed. Before being analyzed, qualitative information was split into topics and sub-themes. The Statistical Package for Social Science (Version 21) was used in the assessment of the information gathered. Central trend and percentage measurements was used in the assessment and displayed in a tabular form to improve data interpretation. The information was also presented and interpreted using the frequencies and percentages. The study also investigated the link between the dependent variable, distribution of affordable housing and the independent variable, using multiple linear regression model; contemporary building techniques, innovative housing funding, cooperative strategy. The need for correlation between factors informs the use of multiple linear regression. The model of regression was the following:

$$N = \pi_0 + \alpha_1 S_1 + \alpha_2 S_2 + \alpha_3 S_3 + \varepsilon$$

Where:

N = Delivery of affordable housing;

S_1 = Modern construction technologies;

S_2 = Innovative housing financing;

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S_3 = Collaborative approach;

α_0 = Constant

α_1 - α_3= coefficients of variables

ε = error.

Quantitative data will be shown in tables and graphs and explanations in prose.

7. Research Findings and Discussion

To compute the correlation (strength) between the study variables and their findings the researcher used the Pearson's coefficient of correlation (R) as illustrated in table 1.

Table 1: Coefficient of Correlation

		Delivery of affordable housing	Modern Construction technologies	Innovative Housing Financing	Collaborative approach
Delivery of affordable housing	Pearson Correlation	1			
	Sig. (2-tailed)				
Modern Construction technologies	Pearson Correlation	.6520	1		
	Sig. (2-tailed)	.0032			
Innovative Housing Financing	Pearson Correlation	.6150	.3421	1	
	Sig. (2-tailed)	.0041	.0014		
Collaborative approach	Pearson Correlation	.7460	.1240	.0621	1
	Sig. (2-tailed)	.0030	.0120	.0043	

Source: Author (2020)

From the study findings, there was a strong positive correlation between delivery of affordable housing (dependent variable) and modern construction technologies, innovative housing financing, collaborative approach (independent variables) as shown by Pearson Correlation r values more than 0.5. As shown in table 4.8, it was clear that there was a positive correlation between delivery of affordable housing and modern construction technologies as shown by a correlation figure of 0.652. It was also clear that there was a positive correlation between delivery of affordable housing and innovative housing financing with a correlation figure of 0.615, there was also a positive correlation between delivery of affordable housing and collaborative approach with a correlation value of 0.7460. There was no multi co-linearity problem.

Coefficient of determination explains the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable (delivery of affordable housing) that is explained by all the three independent variables (modern construction technologies, innovative housing financing, collaborative approach). The three independent variables that were studied, explain 83.4 percent of the delivery of affordable housing as represented by the adjusted R^2. This therefore means that other approaches not studied in this research contribute 16.6 percent of the delivery of affordable housing in the county. Therefore, further research should be conducted

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to investigate the other approaches (16.6 percent) that influence the delivery of affordable housing.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.913	0.834	0.751	0.4538

Source: Author (2020)

Simple regression analysis was conducted to determine the relationship between delivery of affordable housing and the three independent variables. As per the SPSS generated table 3, the equation ($Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \varepsilon$) becomes: $Y = 1.308 + 0.731X_1 + 0.613X_2 + 0.785X_3$. The regression equation above has established that taking all factors into account (modern construction technologies, innovative housing financing, collaborative approach) constant at zero, delivery of affordable housing by the government will be 1.308. The findings presented also shows that taking all other independent variables at zero, a unit increase in modern construction technologies will lead to a 0.731 increase of delivery of affordable housing by the government; a unit increase in innovative housing financing will lead to a 0.613 increase of delivery of affordable housing by the government and a unit increase in collaborative approach will lead to a 0.785 increase in delivery of affordable housing by the government. This means that collaborative approach contributes most to delivery of affordable housing by the government followed by modern construction technologies, while innovative housing financing contributed the least to delivery of affordable housing by the government.

Table 3: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.308	1.342		1.623	0.357
Modern construction technologies	0.731	0.310	0.172	2.098	.0225
Innovative housing financing	0.613	0.156	0.210	3.532	.0246
Collaborative approach	0.785	0.322	0.067	3.542	.0201

Source: Author (2020)

At 5% level of significance and 95% level of confidence, innovative housing financing showed a 0.0246 level of significance; modern construction technologies showed a 0.0225 level of significance and collaborative approach showed a 0.0201 level of significance hence the most significant factor. This implies that all the three independent variables (modern construction technologies, innovative housing financing, collaborative approach) significantly affected the dependent variable (delivery of affordable housing).

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8. Conclusions

Based on the findings the study concluded that there was use of modern construction technologies in the delivery of affordable housing in the county. The study further concluded that the use of modern construction technologies greatly influenced the delivery of affordable housing. The study also concluded that material costs had significantly decreased with the implementation of contemporary building techniques. Additionally, the study concluded that technology adoption decreased waste during building, that innovation and the implementation of contemporary building technology would make housing more affordable and that technology decreased building costs. The study also concluded that by adopting contemporary building technology, maintenance costs were significantly decreased and that adopting low-cost construction techniques would boost the supply of low-cost homes.

On innovative housing financing, the study concluded that the government had adopted some innovative housing financing in the delivery of affordable housing in the county. The study also concluded that the innovative housing financing influenced the delivery of affordable housing to great extent. The study concluded that property developers should depend on the provision of equity and limit excessive debt to reduce housing prices. Additionally, the study concluded that; incremental housing mortgages would boost housing affordability; that allowing individuals to access their pensions for use in acquiring a house would help raise the number of people accessing mortgage loans and that establishing a mortgage liquidity facility would reduce interest rates on mortgages respectively. The study also concluded that reducing interest spreads would boost housing affordability and that offer of surety by the Government on mortgage funds offered by housing microfinance would reduce interest rates reducing mortgage interest rates would boost housing affordability.

On adoption of collaborative approaches in the delivery of affordable housing, the study concluded that the government had instituted collaborative approaches in ensuring delivery of affordable housing in Nairobi County. The study further concluded that the collaborative approaches had influenced the delivery of affordable housing by the government to a great extent. The study concluded that facilitating the operation of NGOs in the housing industry would boost low-cost housing supply, the involvement of insurance companies and pension funds in the housing finance market would improve the quantity of accessible long-term loans and that improving effectiveness and transparency in land transfer and fee registration would encourage developers to build more low-cost housing units. Additionally, the study concluded that establishing a mortgage development group consisting of all stakeholders would reduce interest rates on mortgages and that attracting foreign investors to invest in low-cost housing would improve low-cost housing units. The study also concluded that provision of low-cost housing property would encourage developers to build more low-cost housing units.

On delivery of affordable housing, the study concluded that there was still a great room for improvement in as far as the delivery of affordable housing was concerned. This is despite the fact that the study established that house revenue price had been enhanced, that there had been an increase in ownership of houses and that increased number of units had been supplied.

9. Recommendations

Based on the findings the study recommended that the government sensitize the developers to fully adopt modern technologies in construction of the houses, so as to reduce the costs of the houses. Additionally, the study recommended that the government come up with innovative financing such as allowing the access of pension benefits by individuals to help in financing

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the ownership of houses. The study also recommended that the government seek more collaborative opportunities such as through public private partnerships to help in realizing the goal of delivering affordable housing especially to the low income earners.

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