INFLUENCE OF SUPPLY-SIDE FACTORS ON PROVISION OF AFFORDABLE HOUSING: A CASE STUDY OF REAL ESTATE DEVELOPERS IN KIAMBU COUNTY, KENYA

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DECLARATION

I declare that this research thesis is my original work and that it has not been presented in any other university for academic work.

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DEDICATION

This study is dedicated to my loving family, my son Andreas, Sister Irene, and David, my loving father, for their support and patience during my studies.

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ABSTRACT

This research focuses on understanding the effects of supply-side factors on affordable housing delivery by developers in Kiambu County-Kenya. Some of the areas of concern are land acquisition, the cost of building materials, the economy, the political environment, and the part played by infrastructure in these factors. Based on theories like Supply and Demand, Housing Market Segmentation, Business Cycle, and Public Choice, this study employs a mixed-methods technique to involve a targeted 114 respondents, including real estate developers, heads of housing, and sub-county planners. Quantitative data was collected using structured questionnaires while qualitative data was collected through semi-structured interviews. Analyzing data descriptively and inferentially, correlation and regression identified major challenges, mainly scarcity of land, high costs of materials for affordable housing, and fluctuations in economic conditions. From the analysis of the results in this study, it is evident that land availability is a contributing factor to affordable housing in Kiambu County since there is a positive relationship between the accessibility of land and housing provision ($r = 0.342$, $p = 0.000$). The study established that affordable housing is influenced by the cost of building materials, where high cost immensely affects the capacity to provide housing ($ß = 0.367$, $P < 0.05$). The study reveals that the economic factors, particularly financial stability, and available credit ratings, positively contribute to affordable housing in Kiambu County ($ß = 0.195$, $*p = 0.020$). The findings show that the economic factors, specifically financial stability, and available credit ratings, have a significant and positive relationship with affordable housing in Kiambu County ($ß = 0.195$, $*p = 0.020$). Analyzing the impacts of government policies on the provision of affordable houses was positive but not significant ($\sigma = 0.130$; $p = 0.064$), meaning that the current policies in Kiambu County may not fix housing problems. The introduction of infrastructure development into the model increased the R^2 value, indicating better explanatory power. Interaction terms such as availability of land and infrastructure development ($\beta = -0.113$, $p = 0.000$) and cost of building materials with infrastructure development ($\beta = 0.176$, $p = 0.033$) were significant, highlighting that infrastructure development can enhance or mitigate the impacts of other supply-side factors on housing provision. The study recommends that the following policy interventions be made: It is these reforms that should address issues to do with holding land for speculative purposes and encourage the release of land for affordable housing projects. The study recommends that specific financial incentives should be introduced to help reduce the high cost of building materials as the study established that high costs of these materials are among the factors that lead to making houses less affordable. This study recommends that the county government should focus on infrastructural development in areas considered suitable for affordable housing. This study recommends an efficient approval mechanism, a clear code regarding construction, and a robust policy on mixed-income developments. It is crucial to enact policies that will help develop close ties between public agencies, developers, and non-profit organizations to enhance the implementation and regulation of the policies.

DEFINITION OF TERMS

Availability of land: It means the existence of plots of land that can be bought, developed, and used to build buildings for habitation. The extent of available land depends on specificities such as policies governing the use of land, ownership, and the degree of urban sprawl in an area.

Cost of building materials: These are the costs that real estate developers incur when procuring, transporting, and utilizing essential materials like cement, steel, and bricks to develop housing units. This is true because fluctuations in inflation and the availability of raw materials can increase the cost of building materials, as can government policies influencing the costs of materials used in construction.

Economic environment: This means the circumstances and influences that affect the general performance of an economy in a given country or geographical area. Factors like fiscal policies, monetary policies, economic growth, and inflation are included in the economic environment.

Government policies: Refers to the statutes, rules, and principles laid down by the government to regulate the operations of real estate developers and other players in the housing industry. Communal policies may encompass a wide range of regulations connected with housing provision, such as land use regulations, building standards and codes, taxes, and subsidies.

Provision of affordable housing: Refers to the acts of creating and delivering housing units that are favorable for low and middle-income earners. Affordable housing can be provided through the use of subventions, tax exemptions as well as public-private cooperation

Decent houses: Pertaining to the dwelling that complies with the standard living and habitation conditions and is acceptable in society. Typically, such standards include sanitation, structural integrity, safety, and enough space to accommodate the occupant's needs.

Affordability: This term connotes the financial ability to own or hire a residential compound or house without a lot of budget constraints within the individual or family. This means that the cost of either buying or hiring a house is within a significant portion of the population.

ABBREVIATIONS and ACRONYMS

HOPP: Homeowner Protection Program.

HUD: Department of Housing and Urban Development.

LIHTC: Low-Income Housing Tax Credit

MLTMFP: Multi-Layered Tenure Mixed Financing Project.

NPPF: National Planning Policy Framework.

PMAY: Pradhan Mantri Awas Yojana.

RERA: Real Estate Regulatory Authority.

US: United States

ZNHA: Zimbabwe National Housing Authority.

CHAPTER ONE

INTRODUCTION TO THE STUDY AND BACKGROUND

1.0 Introduction

This part covers contextual information relating to management of project that builds this study's foundation. It also includes problem statement, the study purpose and its relevance in filling the existing gap in the prevailing knowledge body. The additional sections included are objectives, questions of study, scope, and importance of investigation.

1.1 Background of the Study

Emerging as another cogent issue, the provision of affordable houses has long been a concern in many world regions. Affordable housing is a concern that has become more evident in the world today in developing nations as these bear the pressure of growing population and scarcity of resources. The United Nations Sustainable Development Knowledge Platform (2018) reported that about one billion people have no access to decent housing, and the figure is expected to increase building houses in the future main strategy issue in numerous countries. In real estate the supply-side aspects include all attributes within an economy that affect the supply of goods and services. These include land and property availability for developers, construction materials, labor, and finance (*Baek & Kim, 2018*). Supply-side factors are important for affordable housing because real estate developers are an important source of affordable housing. Land is one of the most sensitive supply-side determinants of affordable housing delivery (*World Bank, 2019*).

The People's Republic of China has in its efforts to try and solve the housing issue available in the country, put the following measures in place. In September 2010, the central government started a bi-yearly state-run program of building 36 million cheap houses, which was later extended to 2020 (Liu & Zhang, 2015). To this end, the government made capital subsidies for real estate developers for the delivery of affordable housing units. There are also other different

aids to low-income households whereby the government, through the Housing Provident Fund, gives loans to people who would wish to purchase houses that are cheaper. However, there are still some barriers that possibly affect the provision of affordable housing to people in China.

In India, especially where there is an issue of providing affordable housing, the government embarked on a number of activities that help in the realization of the goal, among them being the Pradhan Mantri Awas Yojana (PMAY) program. As denoted by Gupta and Gupta (2020), the PMAY was launched in the year 2015 with the lofty goal of experimenting with how to construct houses for all by the year 2022. Developers take subsidies to build affordable housing units; on the other hand, the individual qualifying households benefit from grants and cheap credit for buying units. Policies, including RERA and other policies, were required to increase responsibility and a clear picture of the real estate sector along with FDI inflows (Rajagopal & Sane, 2019).

Earlier researches in the United States show that the largest supply of affordable houses comes from the Low-Income Housing Tax Credit (LIHTC) program, which offers tax credits to developers after they have developed units of affordable houses (Desmond *et al*., 2018). The other districts where these households can get financial help are Department of Housing and Urban Development (HUD), for instance, Voucher Program known as Section 8 Housing Choice. Furthermore, several capitals and countries incorporated certainly affordable zoning where designers are forced to dedicate certain number of units of new development to affordable housing (Desmond *et al*., 2018).

United Kingdom has more policies for affordable houses have been enacted by the government to boost the number of affordable staking, and the Affordable Homes Program offered funds to develop affordable homes (Ellen & Horn, 2020). Concerning housing availability, the government has implemented the Help to Buy program, which seeks to assist qualified persons

in purchasing a house. Furthermore, the government has addressed the issues of poor-quality rental housing in the following ways: The government has provided Quality Affordable rental homes depending on the sector it served through an Initiative called Private Leased Segment (Ferrari *et al*., 2018).

A number of policies have been put up by Ghanaian government tackling the problem, including; Affordable Housing Project, National Housing Policy and Ghanaian Home Loans Scheme. Nonetheless, needs for inexpensive houses remains a challenge widespread across the globe, where demand is very high, necessitating private partnership (Asare *et al*., 2021). Interventions on affordable housing in Zambia include; Zambian National Housing Authority (ZNHA), Medium to Long Term Mortgage Financing Program (MLTMFP) and Home Ownership Promotion Program (HOPP). Availability of cheap houses is still low, and there is a strong desire for the reception of more private-public partnerships within the housing segment (Chanda & Kaliba, 2020).

In South Africa, various policies have been put in place for the solution towards inexpensive shelter including FLISP, Social Housing, and RDP. Conversely, demand for cheap houses is quite high, and some weaknesses since provided houses are situated in parts where the necessary infrastructure and services are convenient (Siyongwana & Mbewe, 2020). The Nigerian government has also embarked on introducing measures to resolve the problem of the housing deficit through the following: among these, National Housing Fund, Family Homes Fund and Mortgage Refinance Company.

Nonetheless, there are challenges to making the house affordable, such as shortage of capital, challenges in getting cheap capital, and questions about the quality and safety of houses provided (Adedeji *et al*., 2023). Thus, there is awareness in Egypt of some policies that have been initiated by the government in addressing question of houses of expense, relating to

mortgage finance fund and social housing program. Nonetheless, costs of inexpensive houses remain inadequate and it is challenging to ensure that the delivered housing corresponds to the prioritized areas in terms of proximity to necessary services and products (Elkhouly & Elragal, 2020).

In developing nations like Kenya, this challenge is worsened by the scarcity of space and inadequate capital to support mass housing projects. Thus, affordability has emerged as a crucial challenge in providing housing to the government and other stakeholders in the sector (Nduru, 2021). It can also be noted that the problem of affordable housing is nowadays a genuinely global one. A recent survey conducted by the UN in 2018 found that more than 1.6 billion populations globally are not adequately housed. Currently, it stands at 1.7 billion and, according to statistics, should reach 2.2 billion in 2030. This outcome stated, amount of the populace settled informally increased by 40% between the years 2,000 and 2015. It stressed necessity of improving the real estate sector's regulation and raising the volume of public investment in housing. There are significant indicators that express the availability of cheap houses in terms of the number of real estate developers offering such houses. Issues like government interference, economic policies, and land availability have influenced real estate developers' provision of affordable housing (Alfahad & Ahmad, 2022).

Regarding social rights, there is the matter regarding providing affordable houses in East Africa, particularly in Kenya. The Africa Development Bank report on African economies indicates that the continent has a severe housing backlog. In Kenya, the need for housing has grown much faster than its provision, and currently, over 40 percent of urban families are homeless in that they are living in substandard structures (Lokuruka, 2020). Further, the report highlighted that there is the necessity to create better policies in land management; the report also pointed out to recognize necessity to upturn access to funding housing development programs.

Housing demand in Kenya is on the rise for quite some time now due to factors such as a growing population and enhanced income. In the present day, the Kenyan government is promoting the building of cheap abodes through the provision bonuses to developers and cheap land. However, such policies still did not reach the optimal effect, as the need for affordable shelter was still more significant than its availability (Institute for Housing Studies, 2020).

Kiambu County, for instance, has experienced a surge in the demand for housing because of the continued expansion of urban people in the recent past (Kavesh, 2021). However, the availability of affordable houses in the county has not been able to meet the demand in the market due to shortage. Therefore, the government has had to try to boost the housing supply for both homeowners and renters. The construction industry has failed to respond to the need for affordable houses, leading to increased housing costs (Abuya, 2020).

Based on the Kiambu County Government report, the forecast of demand for affordable housing in Kiambu County in 2023 reveals potential challenges with an average annual population growth of 3%. With the current population of 2 million, 20% of the housing shortage, and 30% of the population living in urban areas, 72,000 people may need affordable housing. These figures may be estimates only, but they all point to the need for solutions to address the population growth debacle. Partnership and quantitative approaches can be instrumental in tackling the emerging shifts in affordable housing requirements in Kiambu County.

1.1.1 Provision of Affordable Housing

The task of offering adequate and cheap houses is a matter of concern in many nations across the globe since it has direct repercussions on the quality of life of people and groups of people (Archer & Brown, 2019). Affordable housing is defined as housing that is at a cost which is within the reach of low and moderate-income earners (Buckle, & Kent, 2019). This includes

rental, social, and affordable home ownership markets for different populations of the community. The task of subsidizing affordable housing is complex and has to be addressed through government or state, private, and non-governmental organization collaboration (United Nations, 2019). A report by United Nations captured as “Housing as a Right: A Basic Human Right” 2019 acts as an important reference regarding reasonably priced houses conversation. In light of this, this paper argues that the right to housing is a basic human right that is critical to eliminating poverty and development that is sustainable. Here, pointing out that it is essential to promote policy and strategy that encourages provisions of affordable houses in order to redress housing imbalance and meet houses requirements of helpless people (Brown & Archer, 2019).

Administration involvement is necessary in delivery of inexpensive houses. Government guidelines and programs that are meant to enhance affordable housing are land release for affordable housing, provision of subsidies for developers, and Affordable Housing Requirements, which compel the developer setting a portion of the new houses as reasonable units (Kaliba & Chanda, 2020). United States has Section 8 Housing Choice Voucher Program, Housing and Urban Development (HUD) and Low-Income Housing Tax Credit (LIHTC) among the numerous programs to enhance affordable housing (Metzger, 2019).

Private sectors have an important role in solving the problem of affordable housing. In collaboration with private developers, public-private partnerships can involve the necessary skills and finances so as to generate affordable housing units (Dannels, 2018). These include incentives such as tax reliefs, subsidies, grant funding as well as the receipt of favorable land use conditions. In terms of quantitative delivery, the private sector can bring innovative financial models, effective building and construction methods, and sound management solutions for affordable housing projects to achieve sustainability (Buckle, & Kent, 2019).

The community is key when it comes to affordable housing. In this regard, local community-based organizations, non-governmental organizations, and residents' associations help agitate for affordable housing, surveying the people's needs, confirming developments meet requirements of society's people. Participation of the people to make decisions fosters proprietorship and builds fabric of affordable housing projects. Moreover, these community actors serve as a bridge between developers and residents, ensuring transparency, inclusivity, and that housing projects are culturally appropriate and socially sustainable. Their involvement helps tailor solutions that reflect the economic realities and priorities of the local population, thereby enhancing long-term success (Kaliba & Chanda, 2020)

Kenyan government has taken various measures in enhancing inexpensive provision of houses. The Affordable Housing Program (AHP) a popular plan that forms part of the Big Four Agenda and seeks to construct 500,000 cheap houses by 2022 according to Ministry of Transport, Infrastructure, Housing, Urban Development, and Public Works (2020). AHP gives tax exemptions, lowers development costs, and grants sustainable mortgage financing to eligible applicants. Also, the government has formed the National Housing Corporation (NHC) to coordinate and implement affordable housing projects across the country (Ewing & Ritzer, 2019).

The private sector has a critical function in supplying affordable houses in Kenya. Due to the growing demand, local and foreign real estate developers have also increased investment in affordable housing projects (Ching & Phoon, 2019). For instance, Cytonn Investment and Suraya Property Group have embarked on developing affordable houses for low to middle-income earners. These projects commonly implement new covering structures, such as rent-to-own and share equity, which assist people in achieving homeownership (Cytonn Investments Report, 2021).

1.1.2 Supply-Side Factors

In the field of real estate, the supply-side aspects include all attributes within an economy that affect the supply of goods and services. These are land and property availability for developers, construction materials, labor, and finance (Baek & Kim, 2018). Supply-side factors are important for affordable housing because real estate developers are an important source of affordable housing. Land is one of the most sensitive supply-side determinants of affordable housing delivery (World Bank, 2019). An increase in the cost of raw materials, including steel and cement, affects the construction costs and, in extension, the prices of housing units (Chanda & Kaliba, 2020).

1.1.2.1 Availability of Land

Land availability plays critical role in provision of housing by the real estate developers. The fact that in urban areas land is highly priced it makes it housing more complex. In addition, the land accessibility affects where the land project is located in turn affecting the infrastructure costs and market demand. Developers often struggle to secure land parcels that are adequately serviced and affordable, impacting the scale and pricing of their projects. Zoning laws, land tenure systems, and bureaucratic delays in land acquisition further complicate development processes. Rapid urbanization and competition from agriculture and commercial sectors worsen these challenges. Therefore, availability and suitability of land are key supply-side factors influencing affordable housing outcomes and hence an understanding of land dynamics is crucial in formulating strategies to affordable housing (National Association of Home Builders, 2021).

1.1.2.2 Cost of Building Materials

The costs of building materials significantly affect the capacity of real estate developers to deliver affordable housing in any part of the world. Costs of materials may be affected by the import tariffs, inflation, disruptions in the supply chain which the developers use to pass the costs to the occupiers of the houses/ home buyers. Locally available materials may offer some reliefs both the quality and consistency in available may be a challenges resulting in dependence on imports. These dependences expose the developers to the variability as a result of the changes in world prices and though resulting in costs that are quite hard to fix. The effects of higher costs in buildings results in low profits margins that might discourage the investors in low –income housing segments. Economies of scale as well as innovative technologies in building such as use of light bricks can help lower the construction costs and assure buyers of affordable houses.

An increase in the cost of raw materials, including steel and cement, affects the construction costs and, in extension, the prices of housing units (*Chanda & Kaliba, 2020*). Housing developers seek to reduce the costs of building construction in order to offer affordable houses; this may be threatened by volatile costs of materials. The COVID-19 situation worsened this situation; there was a significant hike in the prices of construction materials, making it a problem for developers to build affordable housing units (National Association of Home Builders, 2021).

1.1.2.3 Economic Environment

Economic factors have a role to play in influencing provision of affordable housing. Economic factors such as availability of bank credits, interests' rates, purchasing powers of the consumers are key economic varaibles that have a play in the provision and access to affordable housing.

Unemployment, high interests' rates have a negative effect on both supply and demand side within the real estate. During financial difficult times developers my sow down the construction while the buyers may lack the purchasing powers, a strong economy fosters investment in housing while instability of the economy leads to high risks and adversely effects of long-term planning. A supportive economic condition is therefore suitable within real estate sector (Urban Land Institute, 2021).

In the case of affordable housing projects, developers need enough financial resources to deliver their projects properly. Thus, inadequate funds available for financing could limit developers from engaging in such projects at any given time *(Chikozho & Zhou, 2018*). Reports by Coalition of Housing at National Low Income countries (2021) capture key barriers to the production of homes to be occupied by low-income earners, and among them is the lack of funding. These types of concentration are especially associated with the availability of affordable housing to clients by real estate developers. Cost factors that determine housing units include land, building materials, human resources, and Capital, and this creates a challenge to the developers to source units at affordable prices. That means addressing these supply-side issues is fundamental in an effort to bring down the cost of housing to make it affordable for every citizen (Elkhouly & Elragal, 2020).

1.1.2.4 Government Policies

Government policies exert a great influence on the ability of real estate developers to provide affordable housing. Government policies including taxes, rates, construction and building licenses, and land use planning could favor or discourage construction of houses. Delays and complex approval process in housing derails construction and hinder pursuit for affordable houses. The delays have a time and cost element in housing investment, that all together could discourage housing projects. On the other side however public- private partnerships and streamlined government regulations can be a catalyst for housing development. An

intergovernmental coordination between the county and national government on matters relating to housing infrastructure development can be stewardship towards affordable housing projects (Rajagopal & Sane, 2019).

1.1.3 Real Estate Developers in Kiambu County, Kenya

Kenya`s houses deficit has propelled more activities by private developers who were formerly the major provider of formal house units, mainly in Nairobi (Mugo *et al*., 2020). The following are some of the factors that have led to developers in the private industry to seek real estate ventures. The government reduced its dominance in the housing sector, which has been common in developing nations due to the growth in the population of middle-class citizens. According to the African Development Bank (2018), the middle class in Kenya only represents 44% of the population, while that of Africa as a whole is only 34.3%. It is often accompanied by a rapid increase in populations in urban areas, expenses on food and household requirements as well demands for shelter. Contrary main providers in Kenya are private entities and are subjected to various encounters.

It has been observed that though private developers are relatively new to housing projects they complete 200 to 250 big house units at a time (ADB, 2020). Huge developments tend to offer economies of scale which impacts the house pricing at relevant marketplace. Most developers can be associated with families who initially invested in single or double housing units and evolved into SMEs capable of constructing several units (Baek & Kim, 2018).

One of the pillars of housing is laws governing the ownership of land and buildings. As for Kenya, the laws regulating plot and property origin from colonial guidelines and involve a relatively complicated tenure structure that is defined in many laws. Overall, it was maintained through customary rights and may differ according to ethnicity, kind of use, or culture (World Bank, 2018). In this regard, provisions of the 2010 constitution, especially articles 60 to 68 on equal rights to land, to offer clarity. Therefore, policy certainty and predictability are necessary

conditions for property markets. To encourage housing development by private sector, more specifically, low-income bracket, simple and flexible property guideline measures are required (UN-Habitat, 2018). Kiambu County is bestowed through massive natural properties, including vast fertile soils for farming, industries, and, lately, real estate. This is because infrastructure development, such as the Northern Bypass and the Thika superhighway, and increased relocation from Nairobi of the populace in middle class (Ochieng & Kimani, 2023). Some of the newly developed gated residents, including; Four Ways Junction on Kiambu road, Eden Ville, Five-Star Meadows, depict growing real estate business. There are emerging city projects of the houses integrated with commercial space such as shopping malls and other recreational facilities; like course of gold, Tatu City, Two Rivers Mall (TRM) leading to unprecedented increase in units for rent (Mwangi & Njoroge, 2023).

1.1.4 Infrastructure Development

Infrastructure refers to the basic framework for the acquisition of houses, including roads, utilities, and other services (National Association of Home Builders, 2021). Both favorable and unfavorable infrastructure conditions can play a role in mediating the supply-side factors in the availability of affordable homes. Similarly, as the prognosis of this aspect of infrastructural development goes on, the effects on the part of supply-side factors could also be minimized. For instance, infrastructure development can also be a reason why construction costs have been reduced, reasons why housing development sites are easily accessible, and why the housing sector has become more marketable (Elragal & Elkhouly, 2020).

Well-developed utilities including sewer-systems, access roads and electricity have an effect on lowering the projects costs and also increases the attractiveness of housing projects. Even in instances where land is affordable and materials are reasonably priced, poor infrastructure can deter development and in particular provision of housing (Elragal & Elkhouly, 2020). Conversely, an improvement on infrastructure can open up remote areas, reduce transportation

costs and overall costs of constructions projects and ultimately enhance the living standards of the residents. Infrastructure consideration for developers looks at two aspects of costs and market viability of the project. Therefore, infrastructure is a crucial enabling factor in translating supply-side inputs into viable housing outcomes

1.2 Statement of the Problem

Kiambu County with a population of 2.418 million according to 2019 Kenya National Bureau of Statistics Census. The County has grown rapidly through demographic and economic transformation, making it one of the most urbanized Counties and, therefore, experiencing tremendous pressure in the provision of accommodation, particularly affordable housing market. Over 50% of the residents live in informal settlements, thus showing the shortage of affordable houses for the low-income population (*KNBS, 2022*). The 2022 Kenya National Bureau of Statistics survey revealed how shocking it was that over 52 percent of Kiambu County inhabitants reside in irregular accommodation, thus demonstrating the acute housing deficit of affordable dwellings. According to (*KNBS, 2021)* the cost of land in Kiambu County has been on an upward rise in the last five years, with a 30% increase. Currently, it is challenging for people with low income to source land to build their houses. Information sourced from a housing affordability index utilizing data from Kiambu County indicated that 70% of the population in Kiambu could not afford the available, affordable housing as posited by Kenya Real Estate Association *(*KREA, 2019).

Present studies investigating the relationship between supply-side factors and affordable housing provision have produced varied findings; Maharani (2023) explained the impact on Jakarta's supply of affordable housing of the developer's viewpoint on the housing value chain's supply-side limitations and policy. Findings, Jakarta has not fully implemented the balanced housing strategy because local governments and private developers are not bound by provincial regulations to implement them. Chomba (2019) only concentrated on the real estate prices in

urban Kenya, focusing on real estate prices in Nairobi, specifically commercial buildings. However, it did not give a robust analysis of the factors that drive the real estate demand and supply across the country. The investigation sought to seal this information gap by delving into investment strategies and contributing to the broader real estate literature. Additionally, these studies were done in different countries with different housing requirements, political, economic and social structures implying the results cannot be generalized directly to the real estate developers in Kiambu County. Also these studies did not consider a mediating variable of infrastructure development. In filling these conceptual gaps, the current investigation established facilitating influence relating to infrastructures expansion on the association amongst building material costs, economic environment, land availability, policies of administration and cheap houses provision amongst developers in real estate in Kiambu County, Kenya.

1.3 Purpose of the Study

This outlines the general and specific objectives of the study.

1.3.1 General Specific

The general objective of the study was to investigate the effect of supply-side factors on the provision of affordable housing by real estate developers in Kiambu County, Kenya.

1.3.2 Specific Objective

i. To determine the influence of the availability of land on the provision of affordable housing by real estate developers in Kiambu County, Kenya.
ii. To establish the influence of the cost of building materials on providing affordable housing by real estate developers in Kiambu County, Kenya.
iii. To determine the influence of the economic environment on the provision of affordable housing by real estate developers in Kiambu County, Kenya.

iv. To determine the effects of government policies on the provision of affordable houses by real estate developers in Kiambu County, Kenya.

v. To establish the mediating effect of infrastructure development in the relationship between supply-side factors and affordable housing provision by real estate developers in Kiambu County, Kenya.

1.4 Research Hypotheses

H_{01}: Availability of land has no statistically significant influence on the provision of affordable housing by real estate developers in Kiambu County, Kenya.

H_{02}: Cost of building materials has no statistically significant influence on the provision of affordable housing by real estate developers in Kiambu County, Kenya.

H_{03}: The economic environment has no statistically significant influence on the provision of affordable housing by real estate developers in Kiambu County, Kenya.

H_{04}: Government policies have no statistically significant influence on the provision of affordable housing by real estate developers in Kiambu County, Kenya.

H_{05}: Infrastructure development has no statistically mediating effect on the relationship between supply-side factors and real estate developers' provision of affordable housing in Kiambu County, Kenya.

1.5 Significance of the study

Real estate developers operating in Kiambu County would benefit from the study by enabling them to understand the supply-side factors that may hinder or encourage the delivery of cheap housing. The conclusions from the study would help the developers to comprehend the conditions preventing or promoting the delivery of inexpensive houses and probably, come up with the appropriate measures to adopt. This would assist them in offering more efficiencies

when it comes to the provision of reasonable unit houses to marketplace hence improving revenues and market image.

The results would be helpful to Kenyan Government through enlightening them on difficulties experienced by developers in real estate in meeting needs for affordable houses. The recommendations would enable the nation establish strategies and undertakings effective in enhancing the delivery of cheap houses in Kiambu County and overall society. This would help the government achieve its vision of ending the housing crisis in the country and increasing the standard of living of individuals.

The results would be significant to Kiambu County administration because they would help them understand how best to provide affordable housing in the county. Study outcomes would help county administrations in articulating and implementing better guidelines and actions that can foster adequate housing, which is significantly recognized as affordable housing. This would assist the county government in enhancing its people's lives and boosting the economic stakes.

Findings would be of significant value to players in real estate, including shareholders, investors, and guideline makers keen on understanding the factors that impact affordable housing provision in Kiambu County. The study's results will assist these stakeholders in targeting financial resources for affordable housing projects, funding them, and formulating policies that will support the provision of affordable housing.

The study would also benefit researchers and academicians because they would gain insights and empirical facts that will help them understand the impact of supply-side aspects on availability of inexpensive house units in Kiambu County. Results would add to existing research regarding reasonably priced house delivery in Kenya and could be applied in forthcoming studies. Also, results would be advantageous in understanding the relevance of the present philosophies and contexts in Kenyan setting.

1.6 Scope of the Study

Investigation scope is defined as precise subject matters, issues, and factors informing an inquiry. The topic “Influence of supply-side factors on the provision of affordable housing by real estate developers in Kiambu County-Kenya,” scope concerned about elements like procedures, infrastructure, funding, and presence of land influenced provision of affordable housing by Kiambu County developers of real estates.

The geographic coverage within an investigation is an area or region the inquiry targeted. This study's geographical focus was Kiambu County, Kenya, in the country's central region. In particular, the study was to identify conditions influencing real estate developers' ability to provide affordable houses in this region.

These aspects are related since the detailed topics and factors related to the availability of affordable housing in Kiambu County are likely to be influenced by the regional economic, political, and social environment. For instance, the content scope of the study can be on the impact that locally protocols and laws on land have on accessibility and price of property for development of real estate at Kiambu County, which only covered that area.

1.7 Delimitation of the Study

The inquiry was restrictive in approach, focusing precisely on Kiambu County, Kenya, being the key geographic area inquiry. It limited its studies to supply-side elements relating to affordable housing provision by the real estate developers operating in Kiambu County. Moreover, the study also established a clear chronological data collection and analysis plan that would encompass the most recent data.

1.8 Limitations of the Study

The inquiry forecasted certain limits that might affect conduct of the research as well as the outcome of the research. Another possible source of bias was whether or not the necessary data

were freely available and easily obtained for this type of analysis. Also, the constraints, including financial, time, and issues that may hinder collection of necessary facts for the inquiry, were expected to be an issue during the research. These limitations were recognized and managed sufficiently to ensure the legitimacy and trustworthiness of the inquiry.

1.9 Assumptions of the Study

Research assumptions are; factors considered and included in the research study openly influenced ability of developers of real estate in Kiambu County to provide affordable housing and that these factors would affect the results obtained. It also assumed that data gathered through surveys, interviews, and other methods was credible to arrive at this conclusion. Moreover, it assumed that there would not be drastic changes in the policy and regulation in the real estate and housing sector in Kiambu County during the research that could bring drastic changes in affordable housing provision. Besides, it was assumed that the macroeconomic environment in Kenya, more specifically, the environment of the real estate sector, would not be significantly affected by macroeconomic shocks or instability. Lastly, the study presumed that all the key stakeholders, such as real estate developers, government agencies, and other interested parties, would be willing and able to disseminate the necessary information for the inquiry progression.

1.10 Theoretical Framework

Theoretic framework is a concept or an approach wherein research is attempted to be explained or understood to formulate a theoretical hypothesis within a specific domain of study. It offers a conceptual framework, suggestions, and definitions to help the inquiry progression because they give a view of information.

1.10.1 Supply and Demand Theory

Supply and Demand Philosophy or price theory was named by the political economist and originated by him and published in 1776. In economics, the theory is a basic principle that shows how the availability of a product and the demand for the said product influences the price of the product in the market (Been *et al*., 2019). This concept posited being a service or products prices in a free marketplace is likely arrived at through interaction of amount of this produce in the market, which manufacturers are agreeable to offer, and the number customers are ready to request. Fluctuations between supply and demand will invoke high prices as a message to producers to manufacture more products. On the other hand, when supply goes up front of demand, prices go lower, and this causes the producers to cut down production (Mast, 2019).

The relationship between the availability of land and real estate developers in the delivery of cheap houses in Kiambu County, Kenya, can also be explained through Supply and Demand Theory. Kiambu County is situated in the Central region of Kenya and is considered Nairobi metropolitan zone; the area has undergone tremendous expansion and increase in population density within the last one and half decades. Population growth leads to congestion, hence demanding more houses in a given area, which is limited to the area available for housing expansion (Njogu, 2019). The demand of houses has been increased by urban movement and growth in populace within Kiambu County. Consequently, given that more people are settling in the region searching for employment, the need for proper housing is evident. This surge in demand leads to increased house unit values available in the marketplace.

In Supply and Demand Theory, price will continue to rise whenever demand is high compared to supply until housing gets out of reach for most people (Njogu, 2019). In Kiambu County,

this factor is key in influencing the supply of housing units because the amount of land available for real estate development is significant. The unavailability of adequate land suitable for building homes hinders the ability of real estate developers to initiate numerous new housing projects. Hence, construction activities will not be able to provide enough house units to meet growing requirements of the people, worsening the affordability crisis.

The Supply and demand Theory also postulates that where supply is limited, there typically arises a hike in the prices of homes, hence a low supply of affordable low-priced housing for the low middle-income earners (Mwangi *et al*., 2018). Besides identified relationships amongst the required and number of houses in Kiambu County, other factors include government policies, infrastructural growth, and economic factors. For example, local governments and authorities approve specific measures, including zoning and land-use regulation that affect estate development and the stock of housing units. The ease of access to basic amenities such as water, electricity, railway, and roads affect the viability of some areas for real estate investment (Kanyi, 2020). Supply and Demand Philosophy is principally a stationary model which believes quantity and requirement reach a balance over period. Nonetheless, adopting the static approach of the above assumption might not adequately address these dynamic changes in a growing urban setting such as Kiambu County. The study first and foremost looked at how these vibrant features impact the houses marketplace.

1.10.2 The Housing Market Segmentation Theory

Housing Market Segmentation philosophy was developed in 1968 by John F. K an economist. This philosophy posits that housing marketplace comprises many individual markets and that these markets are split according to specific criteria, which include income, preference, and geographical factors. They are mainly autonomous with a low level of integration; the quantity and requirement of services in a business section doesn't influence others (Mast, 2019). There

are different types of real estate markets in Kiambu County, where developers focus on distinct housing categories targeting clients with different incomes and tastes. Housing market segmentation theories postulate that developers may construct houses in various price categories to target particular groups.

In the case of rising building material prices, the cost of construction that developers have to bear also rises (Hosseini *et al.,* 2019). For instance, when price of steel, lumber and cement among key construction supplies increases, creators will likely endure high house production costs for lower and middle-income dwellers. This has affected the affordability of houses by potential homeowners, branded as among the key indicators in Kiambu County. As the following illustrates, the impact of architectural costs, particularly materials costs unswervingly upset provision of affordable houses. Increased costs of construction resulting from exclusive or costly construction supplies, real estate creators may recover these costs by hiking house prices (Been *et al.,* 2019). Consequently, the ability to offer affordable properties is gradual, especially when focusing on strata that cannot afford to pay considerable amounts of money. This hike in the price can always pose a significant challenge when it comes to allowing many potential buyers in Kiambu County to access the dream of home ownership.

Besides, the Housing Market Segmentation theory states that each segment in the housing market is sensitive to price changes to different degrees. In Kiambu County, for instance, the effects of high prices of building materials may not be the same for upscale houses or costly housing projects as those of low-cost housing. The luxury segment of the market might experience less opposition to their decision to raise the price of the products as their customers might have better-paying jobs and more freedom in purcahses (Been *et al.,* 2019). However, developers who specialize in the construction of the affordable housing segment need to keep control over construction costs while simultaneously using qualitative materials and conforming to building code requirements.

Real estate developers in Kiambu County could consider the following possibilities to overcome the mistake of escalating the building material prices and still be able to provide affordable houses to the public. Firstly, they can explore value engineering, looking for other cheaper materials or construction techniques to cut expenses while still maintaining quality (Al Mamun *et al.,* 2020). Moreover, cooperation with local governments and legislators to encourage using environmentally friendly and economical construction materials can help reduce construction costs. Furthermore, getting access to the proper funding will also assist developers in controlling their initial costs to ensure that prices remain attainable by the group of clients in mind (Maeda *et al*., 2018).

As much as the Housing Market Segmentation philosophy emphasizes demand-side allocation by house favorites, it lacks an adequate account for supply-side elements concerning cost of construction supplies. The philosophy often presumes raw material availability and views cost fluctuations as resulting from differences in demand.

1.10.3 The Business Cycle Theory

The Business Cycle Model, also recognized as economic or trade cycles, can be traced back to the nineteenth century. Nonetheless, the more specific extension of the theory is credited to the American economists Wesley Mitchell and Arthur Burns, who systematically investigated and advanced the discredited theory in the first decade of the twentieth era. They founded National Bureau of Economic Research (NBER) in US, aided in developing knowledge of business cycles. The theory seeks to provide a rationale for cycles of expansion and contractions in economic activity, usually referred to as business cycles. This cycling involves booms and busts, which translate to decline or depression periods Poterba, 1984, (Ryan-Collins, 2021).

According to Business Cycle Model, business setting is characterized by cycles of growth and stagnation. In a growing economy, people are likely to buy or rent homes because of the

improving economic conditions. Housing demand has increased. In Kiambu County, on flourishing stages of business cycles, developers are required to observe increased demand for houses in the market, including the low-end and high-end. The increase in this demand may prompt developers to construct affordable units that will meet the increasing demand. On the other hand, during economic contraction or recession phases requirement for houses could not be high (Corrigan *et al*., 2019).

For instance, in Kiambu County developers of real estate may find themselves in a position where they are unable to address demands for affordable homes adequately. Decreased buyers' interest and unpredictable market conditions may negatively affect new construction plans and drive down affordable housing stocks. However, their access to funds to support these developments might be challenging, so developers could not deliver quality and cheap housing units in the market.

The business cycle theory also focuses on government action and policies as factors in the business environment during the business cycle phase. In Kiambu County, government policies dealing with monetary and fiscal measures affect the real estate sector, as pointed out by the UN-Habitat (2018). For instance, during the recession, the government may employ the expansionary monetary approach, cutting the interest rates. It may put more money within the reach of developers, possibly helping them come up with cheap houses to provide affordable housing. Likewise, conveniently structured fiscal policies that provide incentives for affordable housing can also serve as essential enablers of such schemes (Geltner *et al*., 2021).

However, the Business Cycle Theory also has implications for the discussion on affordable housing as it notes that there is a need to consider long-run trends in the economy and demographics. Economic periods may affect mobility, employment status, and household formation (Lind, 2019). For example, during economic booms, people are laid off from their

jobs and move to Kiambu County for a better chance of employment, creating the need for housing. Real estate developers must analyze these trends to determine how best to position affordable housing projects to meet the population's needs.

Although the Housing Market Segmentation theory helps point out that the housing market is diverse, it involves making sweeping assumptions concerning the conduct of differing segments. The study should look at the subsectors within the mentioned markets in Kiambu County to gauge precise effects of supplies cost on housing delivery. The Business Cycle Theory provides a somewhat limited perspective on oscillations. Unlike other theories, its primary concern is with the growth and shrinkage phases. This might not explain specific economic features governing real estate marketplace, including, but not limited to, interest rates, credit, and income.

1.11 Conceptual Framework

In inquiry, a conceptual structure illustrates the connections between concepts and variables under consideration in a given inquiry. Independent variables include land availability, building materials costs, economic environment, and government policies. The mediating variable is infrastructure development, while the dependent variable includes the delivery of inexpensive housing.

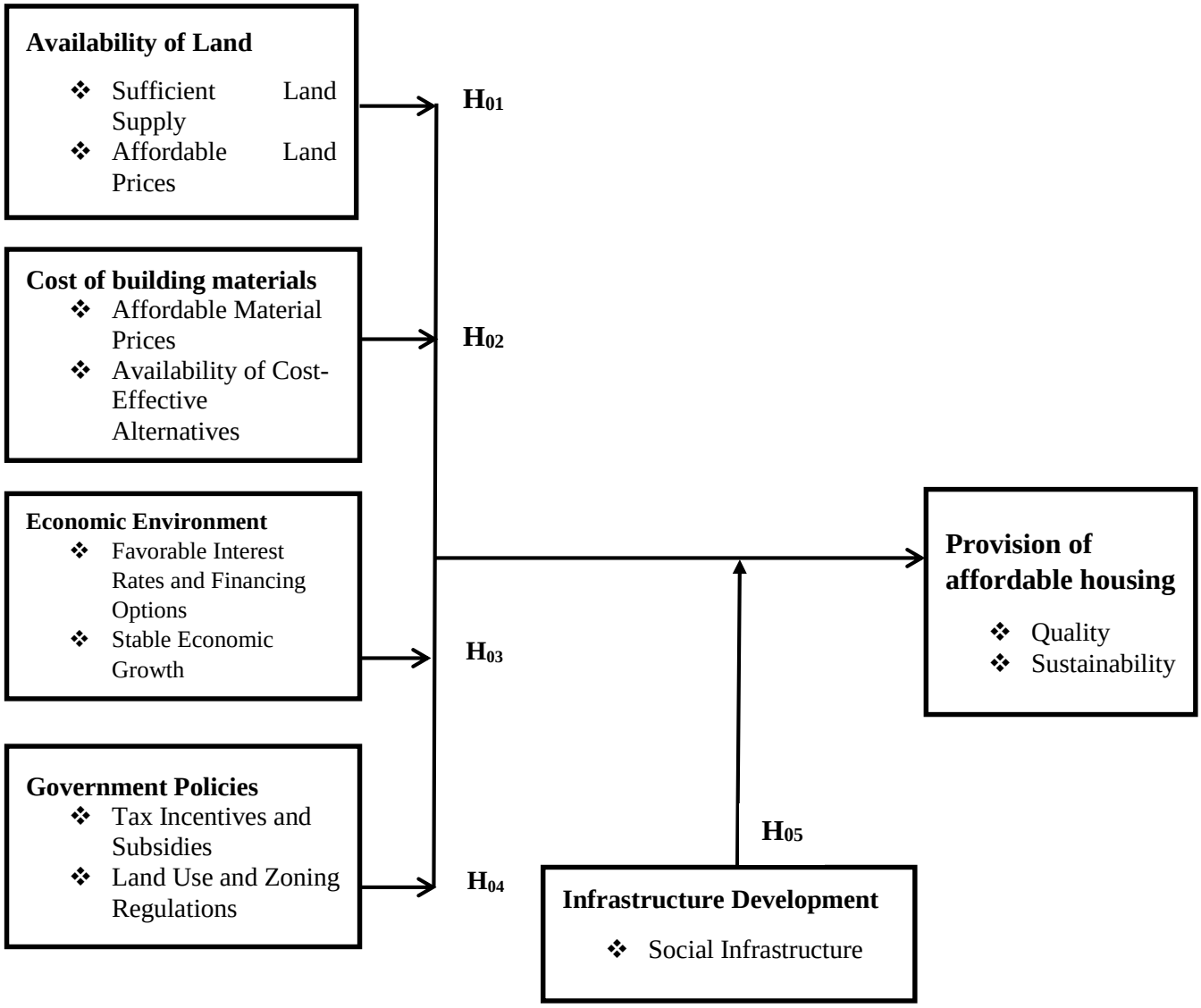


Figure 1. 1: Conceptual Framework
Source: Author 2025

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section reviews the literature for the inquiry. It consists literature review summary and offers the conceptual framework of the research. The part highlights summary discussion of shortcomings of prior studies and how the present research endeavored to fill the gaps.

2.2 Review of Literature

A literature review involves the critical analysis of one's own writing and of other works that have been written on the subject under consideration through research studies, reports, and data on a specific research question or topic. A critique of the empirical work is a significant portion of the entire inquiry procedure since it enables the creation of the basic body of knowledge on which the new research is to be grounded. In their studies, researchers can determine what has already been said, what has not been answered, and gaps that still need to be filled.

2.2.1 Availability of Land and the Provision of Affordable Housing

Land has been noted as an imperative element upsetting delivery of inexpensive houses and its impacts are seen on many fronts. The real estate developers struggle to find such accessible and affordable land for affordable housing projects, which has critically affected its feasibility. The constraints of land, particularly in the cities, are a big problem for real estate developers. In cities, the extent of provision of functional and affordable shelter is significantly influenced by access to land with clean titles. Consequently, the exchange of existing housing stock for the purchase of new stock is small given the inherent shortfalls of clean-titled land. An example is China, where the numbers showed a rising demand for land against a dwindling supply. This goes a long way in pointing out the fact that more light needs to be shed on how best to address

the question of availability with clean titles if Government is to achieve its set goal of providing decent and affordable houses.

Aurand *et al*. (2023) performed a qualitative analysis of the national housing data concentrating on affordable housing shortages for low-income earners and found there was critical scarcity of inexpensive houses for those earning lowly in United States. The study affirmed the existence of a direct link between the accessibility of land and the construction of low-rent accommodation since scarce available land contributed to the increased cost of land. Thus, the rising costs of land impacted the real estate development costs of houses in the country, thus decreasing the availability of cheap houses in the market. However, despite the revealed information, this study substantially conveys an evident lacuna, which is confined to large cities in the United States only, while no sufficient investigation has been made towards the inextricable link between the effect that the land availability has on the affording of houses in Kiambu County, Kenya. This study looked into the same shortages in a Kenyan context leading to a global viewpoint on shortages of affordable housing.

In their study, Wu (2022) used case studies and financial analysis to investigate land financing effects on urban housing affordability in China. In their findings, Wu (2022) showed that land financializations led by the government affect house availability. Most importantly, friendly land policies correlated with the availability of affordable houses to the population. This study focuses only on China, and it lacks a comparative viewpoint with other regulatory settings. Therefore, there was a need for future research to establish how and to what extent layers of land policies would affect affordable housing in Kiambu County. This study investigated land policies in Kiambu County, examining how they affect the availability of affordable housing in Kenya.

A study by Tanaka and Yamada (2021) employed a statistical analysis of the economic indicators and their effects on affordable housing in Japan and found stable economic conditions positively influence the availability of affordable housing. The study's findings help to understand the adoption of m-commerce from the Japanese context. However, the study's context is specifically to Japan and it lacks application to developing economies such as Kenya. This gap calls for a study of the socioeconomic and regulatory environment of Kiambu County, Kenya. This study analyzed how Kenya's economic conditions, including inflation and access to credit, influence affordable housing in Kiambu County.

Irungu *et al*. (2022), in their study on the challenges in accessing land in Kiambu County using qualitative interviews with local housing stakeholders in Kiambu, identified challenges such as bureaucratic inefficiencies and limited incentives for real estate developers as the key effects affecting the availability of affordable houses. Nonetheless, this study failed to explore the contingency details of how the availability of land impacts the provision of affordable homes by real estate developers. Their study identifies the barriers without providing support on the effect of supply-side factors using empirical data. Furthermore, identifying these challenges does not extend to exploring possible solutions or policies geared towards solving these issues, and we strongly recommend further research and development of more effective recommendations for Kiambu County, Kenya. This study added quantitative data on how factors like material and infrastructure costs influence the problem of the provision of affordable housing in Kiambu.

2.2.2 Cost of Building Materials and the Provision of Affordable Housing

Capital charge involves the land and is one of the components that makes up a considerable portion of the overall costs incurred when financing the incremental growth of housing development. To ensure that the house-building process is sustained in the future, it is pivotal for obtaining affordable land in the region. This availability of land determines its distribution for residential usage among various income earners. The following are the factors that define this accessibility. Historical factors, cultural factors, legal factors, economic factors, and all these factors influence the way people perceive and behave toward land tenure. Also, it is constricted by factors such as location, distribution of job centers, transportation amenities, and other essential public utilities.

Costs of constructing materials hold a central aspect of affordable housing provision, and the effects resonate in diverse scenarios globally. In their study, Diamond and McQuade (2019) used an equilibrium model method to assess public reaction to the development of affordable houses in the United States. In their study, they highlighted that community resistance can restrict the provision of affordable houses. They explained that changes in the expense of construction materials considerably impact the accessibility of cheap accommodation. The overall price of materials went up. Hence, the construction cost also went up, thus reducing the ability to offer affordable housing in these urban contexts. However, while this study helped explore the research questions pertinent to the US context, the study has created a noticeable knowledge gap on how the costs of building materials impact delivery of cheap houses in Kiambu County, Kenya. It also does not contain the economic factors affecting housing supply. This study addressed supply-side economic factors like the availability of land and cost of materials providing a comprehensive view of housing supply constraints in Kiambu County.

Similarly, Hong *et al*.'s (2018) study aimed to analyze the link between the cost of construction, prefabrication, and economic feasibility in China. The authors employed a cost-benefit analysis on the effect of prefabrication in China. Their study found that high initial costs affect the adoption of prefabrication, influencing affordability. This was evidenced by their conclusion concerning the effects of variation in the cost of materials, where the cost of constructing houses significantly influenced and affected the affordability of houses, especially in urban areas. Although the present study probed into this relationship within the Chinese context, there is a shortfall of research exploring the consequences of the cost of building materials on providing affordable houses in Kiambu County, Kenya. The study also concentrates on prefabrication and does not have data on conventional methods of construction. This study widened the scope by addressing traditional construction material costs in Kenya and investigate potential savings from different methods.

Focusing on affordable houses with housing and indoor air quality, Fernández-Agüera *et al*. (2019) explored how the cost of building materials affected the delivery of affordable housing to rural regions in Spain using case studies to assess thermal comfort and indoor air quality in low-income houses. The authors found that poor thermal comfort limits the quality of affordable housing for low-income residents. They also discussed how challenges associated with high construction materials costs make affordable housing projects untenable in these areas, hence the constrained realization of affordable housing for the inhabitants. However, the study does not focus on supply-side economic factors influencing housing affordability. Also, the fact that the context of the case is rural Spain, means that analyzing the impacts of the cost of building materials on affordable housing in Kiambu County, Kenya is pertinent. This study looks to address supply-side economic factors including material and labor costs that contribute to the overall housing affordability and quality in Kiambu County, Kenya.

In East Asia Zhu *et al.*, 2020 used quantitative analysis in investigating energy facts to understand how reliable Japan's energy supply and found that renewable energy plays an important role in stabilizing energy supply mainly in addressing the shortage of energy. The study focuses more on energy supply instead of how the various energy factors affect the affordability of affordable houses. Thus, the identification of Japan as a key country to review requires a study that looks into the impacts of building material costs to provide affordable housing in Kiambu County, Kenya. This study evaluated this by examining how renewable energy costs influence the provision of houses in Kiambu in particular where energy costs affect housing feasibility.

Similarly, another study by Lee and Shepley (2020) conducted a case study of solar photovoltaic (PV) installations in social housing in South Korea. It determined that high material costs affect accessibility and affordability of houses for low-income populations. In their findings, the authors highlighted that solar PV systems reduce energy costs significantly for low-income households fostering housing affordability. Nevertheless, this work was based in South Korea thus, and it was limited to renewable energy applications lacking a wider analysis of other supply-side factors in Kiambu County, Kenya.

In their study, Muiruri and Sang (2018) employed qualitative interviews with real estate developers and the relationship between building materials cost and affordable housing in Kiambu County, Kenya. In their findings, they highlighted those high costs of materials and inadequate financing options are key problems for private developers in the provision of affordable housing. It noted how many of these factors impacted the cost and availability of housing options, which was a significant challenge in the real estate development within the county.

However, the study focuses on the problems without highlighting how specific economic and policy factors influence housing affordability. Still, more research is necessary to analyze the essential approaches and measures that may help reduce the effects of building material prices on the affordable housing supply. Furthermore, knowledge of real estate developers' views and their approach to dealing with cost volatilities would also enhance future research attempting to solve such issues in Kiambu County, Kenya. This study broadened the findings by evaluating how economic conditions and government policies affect affordable housing from a quantitative context.

2.2.3 Government Policies and Provision of Affordable Housing

In their study, Anacker, 2019, performed a literature review examining economic and structural barriers to affordable housing across multiple regions and identified income constraints and limited government intervention as major barriers to affordable housing. The policies formulated and implemented by the government affect housing delivery by real estate developers because they set the legal framework. Restriction from zoning laws, codes, and development authorizations could each promote or hamper progress of cheap house programs. The study lacks empirical data on the specific supply-side factors that affect house affordability. This study address this gap by focusing on empirical analysis of supply-side factors within Kiambu County's real estate market.

Been *et al*., (2019) performed policy inquiry to assess effects of housing policies on affordability and their findings highlighted that restrictive housing supply led to a rise in the costs of houses limiting availability. Substantial bureaucratic restraints, complicated procedures to secure approvals, and steep charges may lead to skyrocketing prices of projects and create a perception that encourages developers to abandon affordable housing projects. Due to some resistance from real estate developers to engage in affordable housing projects,

the government can facilitate the rules that may govern affordable housing to be simpler, give incentives or subsidies, or even come up with policy frameworks that can guide the implementation of affordable housing programs. However, the study was limited to policy effects and did not analyze other factors like the cost of materials and the economic environment. Therefore, a study was necessary to address this gap on material cost and economic environment.

Similarly, Wakely's (2020) research conducted a case study and literature review analysis of partnership-based housing models in Nairobi, Kenya, examining effects of government policies on the delivery of an affordable house. They found that effective partnerships between the community and private industries support provision of inexpensive houses. On this basis, they emphasized the importance of policies promoting partnerships amongst community and private industries, allocating land for housing construction, and sponsoring subsidies for developers to enhance the accessibility of cheap houses. Nevertheless, attention to Nairobi highlights the need for research to investigate impact of government guidelines on cheap house delivery within Kiambu County setting. The study was also limited to the role of cost-related factors within public-private partnerships. To address the gaps this inquiry examined effects of the costs of land and material providing additional insights into the factors that influence partnerships in Kiambu's affordable housing initiatives.

Chan and Adabre (2019) did an empirical analysis of the success criteria for affordable and sustainable housing projects focusing on policies formulated by the Chinese government to increase affordable housing provision. They observed that the identified criteria like cost control, stakeholder engagement, and efficient resource use as crucial for success. They further observed that policies touching on the strategy of land distribution, tax exemptions, and subsidies played a crucial role in enhancing the supply of affordable housing. However, some issues involving the implementation of policies and the coordination department between the

various ministries and agencies were cited. The study does not contain empirical analysis of economic conditions affecting affordability as it focuses solely on sustainability factors. Although it enlightens the Chinese experience, it establishes the need for research that examines the impact of administration guidelines on production of reasonably priced houses by Kiambu County, Kenya developers. This study therefore addressed the gap by examining economic and cost-related factors and provides an expanded perspective on affordable housing in Kiambu County.

2.2.4 The Economic Environment and Provision of Affordable Housing

In his study, Kimemia (2023) used variables such as macroeconomic factors, financial growth and real estate investment to perform a quantitative analysis using the regression model to examines how macroeconomic variables influence the real estate sector's growth in Kenya. The study found that macroeconomic stability influences real estate investment positively with lower inflation and stable interest rates fostering growth. The research establishes a strong and positive relationship between macroeconomic factors (rate of inflation, Real Gross Domestic Product, and exchange rate) and growth. The study forms a gap in the conceptual knowledge since it discusses progress of the real estate business while this inquiry focuses on the supply of inexpensive houses. It focuses broadly on real estate investment growth without differentiating between general real estate and affordable housing. The current study particularly focused on affordable housing, examining how specific supply-side economic factors in Kiambu County affect affordable housing.

In a separate but related to the study by Akinsulire *et al*. (2024) performed a comparative review of affordable housing policies in different countries using qualitative analysis to examine economic and social outcomes. His study concluded that well-implemented affordable housing policies lead to positive social and economic effects such as improved life quality,

economic growth, and social involvement. His work showed that, for instance, changes in interest rates or unemployment levels had a great impact on house affordability. Some factors cited include decreased investment in housing projects during economic downturns, thus limiting the supply of affordable housing. However, his study is limited to a high-level comparative policy review with no empirical analysis of particular supply-side factors including the cost of construction materials and local economic conditions. To address this gap, this study empirically analyzed the effects of supply-side factors on affordable houses particularly in Kiambu County, highlighting localized approach.

Similarly, Alteneiji *et al*. (2020) performed a literature evaluation of significant success elements in public-private engagements for housing and examined how the economic environment affects affordable housing in the Philippine region, revealing that a stable economic environment drives a high GDP and low inflation rate. In their findings, they found that collaboration, risk-sharing, and transparency as critical for partnership success. As such, stability enhances the issue of affordable and available housing stock. However, the study did not focus on cost factors within public-private partnerships in relation to labor costs. Despite the usefulness of these findings within the Philippine setting, their analysis highlights the need to investigate the impact of the economic setting on t affordable housing delivery by developers in Kiambu County, Kenya. This study broadened the findings by analyzing how supply-side costs affect public-private partnerships in Kiambu's affordable housing.

To elaborate on the above arguments, Kahouli (2020) further performed an econometric analysis of the health effects on fuel poverty exploring the role of economic environment in cheap house delivery in the rural settings of France. The authors found that fuel poverty correlates with housing price inflation leading to affordability problems. The economic variables they included in their study focused on household hazards, employment status, fuel poverty, and housing prices, emphasizing the relation and impact on the affordability of houses.

Nevertheless, the study lacks focus on supply-side economics constraints that affect housing affordability. The study is set in rural France; therefore, research is needed to explain how the economic structure affects the affordable housing supply by real estate developers in Kiambu County- Kenya environment. This study examined the economic effects of housing affordability contributing to the exploration of housing quality in Kiambu County.

In another related study, Sengupta and Jha (2020) performed a qualitative review of policy responses to migrant housing needs during the COVID-19 pandemic lockdown in India to examine how the economic environment determined the provision of affordable housing for cities in India. Their findings showed that the pandemic increased the already existing housing problems for migrant workers, pointing the need for policies focused on accessing affordable houses for the low-income groups. They also showed how key economic factors such as GDP growth rates, inflationary effects, and government policies impacted housing affordability and accessibility. However, their study focused mainly on social policies in response to crises without analyzing how economic factors and supply-side factors influence affordable housing. To address this, the current study addressed supply-side economic factors in affordable housing outside the context of a crisis to provide empirical insights on how certain economic conditions influence affordability in a steady-state environment expanding the discussion for housing policies.

In their study, Justiniano *et al*. (2019), employed a quantitative model of credit supply and its impact on housing prices and found that the increased credit supply correlated with housing price inflation leading to issues with affordability They established that economic stability, low interest rates, and supportive government policies are significant for affordable housing. However, the study focuses on demand-side credit factors instead of supply-side constraints. Also, their sample source bias toward Japan underlines the importance of explaining how various factors of economic setting affect delivery of reasonably priced houses by developers

in Kiambu County, Kenya. This study complemented the above findings by exploring how supply side factors such as material costs intertwine with the availability of cred to influence affordable housing.

In the same way, Kim *et al*. (2019) performed a case analysis of urban parks and their effects on house prices and found that proximity to parks had a positive influence on housing prices making nearby houses less affordable. The study lacks the evaluation of wide economic and supply-side factors influencing affordability. Nonetheless, their studies indicate the need for direction for further study on the impacts of the economic setting on affordable housing delivery developers with regard to Kiambu County context. This study explored additional factors including, availability of land and the costs of construction expanding the housing context in Kiambu County.

By using statistical analysis of economic indicators such as GDP growth, inflation rate, governmental policies, and access to financing, Njoroge and Mwangi (2023) realized that economic stability like price rises control and rates of interest, has a significant effect on affordable housing in Kiambu County. However, they acknowledge that there is a need for additional studies on investigating other current particularistic approaches and solutions that would foster the best environment for offering affordable housing. The study does not contain specific supply-side factors such as construction material costs and availability of land. Further, gaining insights regarding the speculations and possibilities that shape real estate developers' operations would also be helpful when exposed to the economy. This study built on the above findings by incorporating land and material costs offering a comprehensive approach on supply-side and economic factors influencing affordable housing in Kiambu County.

2.2.5 Infrastructure Development, Supply-Side Factors and Affordable Housing Provision

Okpala, Nwosu, and Otty (2022) investigated how developer infrastructure fees affected the affordability of houses in Zoo Estate Enugu. The administration of a questionnaire was used to gather data. The respondents were given 92 questionnaires in all; 88 of these were collected and utilized for the study. The basic impact factors score of the respondents were analyzed using the Relative Importance Index (RII). According to the results, the top four factors were high rents, rising housing costs, a shortage of suitable and reasonably priced housing, developer infrastructure fees that improve accessibility, etc. The analysis's findings show that developer infrastructure fees raise rents and property values, which has a big impact on how affordable housing is. According to the study, the State Government should fund and maintain infrastructure using money received from property taxes or ground rent rather than inventing a new name such as Infrastructure Development Fund (IDF) or Infrastructure Development Charge (IDC).

Mohammed (2021) in their study investigated how Kenyan county governments' economic progress was impacted by incremental infrastructure. The study's primary premise was that significant infrastructure expenditures have been made, and it is critical to evaluate how these investments affect Kenyan counties' economic development. Data for the study was gathered from 47 Kenyans between 2015 and 2018. Prais-Winsten regression analysis, correlation, and descriptive statistical methods were used to analyze the data. The results showed that the economic development of Kenyan county governments was significantly and favorably correlated with the infrastructure of transportation, water and sanitation, and social services. According to regression analysis, Kenyan county governments' economic development (GCP)

and transport infrastructure had a positive (B=0.0276746) but negligible (P value = 0.707>0.05) association. The results also showed that Kenyan county governments' economic development (GCP) and water and sanitation infrastructure were positively (B=0.0547272) and significantly (Pvalue=0.022<0.05) correlated. Finally, the results show that social infrastructure and Kenyan county governments' economic development (GCP) had a significant (P-value=0.013<0.05) and positive (B=0.0877086) association. The study found that social infrastructure and water and sanitation infrastructure have a good and significant impact on Kenyan county governments' economic development (GCP). To boost the counties' economic development, the report suggested that county governments increase funding for social infrastructure, water and sanitation, and transportation. In order to ascertain their influence on the economic development of counties, the report also suggested conducting more research on the effects of infrastructure types other than transportation, water and sanitation, and social infrastructures.

The impact of infrastructure development spending on Kenya's industrial sector's performance was empirically examined by Lelei (2020). Its particular goal was to ascertain how government spending on the construction of energy, transportation, and information, communication, and technology infrastructure affected Kenya's manufacturing sector's percentage of GDP. Using time series data from 1990 to 2017, this study estimated the parameters of the linear equation using the Ordinary Least Squares approach. The analysis discovered that information was positive (0.11345), energy was negative (-0.23974), and the coefficient of transit was positive (0.128). All of these findings were statistically significant. The study suggests that in order to achieve manufacturing's substantial contribution to Kenya's GDP, economic growth, and development, the government should invest more money in the development of transportation and information, communication, and technology infrastructures.

2.3 Summary of Literature Review and Research Gaps

Table 2.2 succinctly summarizes the examined literature and the research gaps that have been identified. This section lists the particular topics of interest that were investigated in earlier research, draws attention to the knowledge gaps that were found, and describes how the current study which is the main emphasis of the study addressed these gaps.

Table 2. 1: Summary of Literature Review and Research Gaps

Researcher(s)	Focus	Methodology	Major findings	Gaps In Research	Addressing the research gap
Chomba, J. M. (2019)	An evaluation of the real estate prices concerning Kenyan urban areas with a particular focus on commercial buildings in Nairobi	The researchers adopted an exploratory research design that involves surveys, face-to-face interviews with the real estate developers, and statistical analysis of the land use metrics. They compared how the availability of land, in terms of vacant space and development potential, correlates with the provision of affordable housing stock during the three years.	He discovered that the market demand level, land accessibility, and location dictate the price of real estate for commercial purposes.	Since the study focused on real estate as an asset class and did not delve into the factors that affect the demand and supply in Kenya, this study seeks to identify such factors and enrich the literature on the subject.	To address research gaps, the study focused on administered questionnaires to policymakers and urban planners to elicit their perspectives on the impact of land use regulations and zoning policies on the availability of land for affordable housing. Based on the methodology used above, the following conclusion can be made: This combined approach gave a better understanding of the factors that influence the availability of land for affordable housing.

Lee & Chen (2019)	The study seeks to assess the impact of various sources of funding on real estate developers' delivery of affordable housing.	The researchers compared the affordable housing projects in the various urban areas by developing case studies. They collected information on sources of finance, including subsidies, private capital, and tax credits, to estimate the effects of funding on the availability of low-cost houses in the next four years.	The study notes that inadequate capital as a financing factor was a significant constraint in the development of affordable housing in Africa, according to real estate developers. Fundamental problem: Poor financing sources hinder developers from starting and finishing affordable homes.	The study lacks an assessment of the long-term sustainability of different financing options and their implications for affordable housing provision	The study evaluated the long-term sustainability of affordable housing developments funded through different financing alternatives by conducting a longitudinal analysis in order to fill the research gap. This shed light on how well various financing options support a steady supply of reasonably priced housing.
Martinez & Kim (2020)	This research aims to assess the impact of local authority policies and ordinances on affordable housing that property developers have developed.	The researchers compared and contrast the findings of one city or region with those of another regar ding government policies concerning affordable housing. They analyzed policy documents for three years and	The research findings show that sound public policies like density bonuses, incentive zoning, and efficient approval processes facilitate the delivery of affordable housing. On	The study fails to analyze how political and community factors influence the development of local government policies regarding the provision of affordable housing.	The study polled community members and local government representatives about their opinions on affordable housing policies and the crucial elements in order to close the research gap to consider when developing them. This helped in understanding various

		interview local officials and real estate developers to measure the effects on the affordable housing supply	the other hand, restrictive policies limit the possibility of developers offering competitive housing units.		intersections and factors surrounding policy decision-making and its implications for affordable housing supply.
(Wambugu, 2018)	To what extent can low-income earners access affordable housing facilities in Nairobi?	The researchers followed the development of affordable housing projects through case studies and interviews with developers and workforce training organizations. They did this concerning the availability of labor, skills development initiatives, and supply of affordable homes within the four years.	A correlation between the income level and affordable housing facilities with a resident in Nairobi.	A conceptual knowledge gap is present because the previous study involved the availability of affordable housing, while this study is on the availability of affordable housing.	To fill this gap, the study used questionnaires and interviews with real estate developers to assess their experiences and approaches to attracting and maintaining competent human capital for affordable housing projects. This included information on the challenges in the employment realm pertinent to developers and probable approaches to managing the challenges.
(Park & Davis, 2022)	This paper's objective is to evaluate the extent to which infrastructure and transportati	The researchers mapped the completed affordable housing projects by their proximity to existing	This study establishes that access to public transportation and service-related facilities	The study falls short in analyzing the impact-cost of developing infrastructure and providing affordable	To address the research gap, this study undertook a cost-benefit analysis of infrastructure development for the provision of

	on access have impacted developers' provision of affordable houses.	infrastructure and transport channels. They also obtained survey data and interview the developers over a four-year period regarding their perceptions of infrastructure and transport when choosing project sites.	influences decision-making by developers in selecting sites for affordable housing units.	housing.	affordable housing. This determined the economic viability of infrastructural developments for affordable housing.

Source: Literature Review (2025)

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter details the methods employed in the whole research. It examines the study area, design of the study, target and research population, sampling and data collection method, research tools, data analysis from pilot tests, and, lastly, ethical considerations that were taken into account during the project.

3.2 Research Philosophy

Research viewpoint may be described as the principles that were embraced by the researcher while developing the study and the role played by the research in determining the nature of knowledge (Kopparapu *et al*., 2016). It becomes the epistemology of the researcher similar to the choices about research methodologies, data acquisition, and understanding (Tamminen and Poucher, 2020).

Thus, the research philosophy used in this study was both positivism and interpretivism. Interestingly, positivism was adopted by real estate developers in the collection of factual information about the supply-side factors in delivering affordable housing. Interpretivism was employed to understand the perceptions and meaning the developers accented to when constructing affordable housing and other pertinent aspects (Tamminen & Poucher, 2020).

3.3 Research Design

Research design is an important component of any research activity and it is a plan or strategy that a given researcher employs in executing his research. It explained the layout of the research process and offered guidance on collecting and analyzing data in order to respond to the questions of relevance in research or hypothesis (Dannels, 2018). Based on this, the research

work used an exploratory research design that included both quantitative and qualitative approaches to data collection. This approach was adapted to come up with an exhaustive explanation of all parameters that were used in the implementation of cheap houses in Kiambu County. This means that this type of design enabled researcher data collection at a certain moment and examines it.

3.4 Research Site and Rationale

This study was conducted among the residents of Kiambu County. Kiambu County was chosen since it has recently undergone high levels of urbanization, implying a high demand for shelter, especially low-cost housing. Furthermore, there had been a trend towards more real estate developers appearing in the county, and it was essential to determine elements that affected delivery of inexpensive houses.

3.5 Target Population

Research design was defined as the complete structure or map used to guide a research study that included the processes and strategies to be taken (Stratton, 2021). The target population included 60 real estate developers interested in Kiambu County or currently involved in projects, 50 housing officers, and 50 sub-county planners involved in affordable housing policy formulation within Kiambu County government Department of Lands.

Table 3. 1: Target Population

Categories	Frequency	Percentages
Real estate developers	60	37.5
Housing officers	67	41.9
Sub-county planners	33	20.6
Total	**160**	**100.0**

Source: Kiambu County Government Report 2022

3.6 Study Sample

3.6.1 Sample Size

The sample size is the number of participants or components taken into the sample in a particular study. It was mainly a concern in sample selection and data collection as it determined the consistency and transferability of the study's conclusions (Kyriazos, 2018). Sampling techniques spoke of the process and method of acquiring a portion of the individuals or elements from a given population to act as samples in a research study. The number of participants recruited in the study was adequate to ensure that the researchers recruited participants to represent the target population. In light of this, the margin of error can be 5% even at a 95% confidence level.

The researcher used Yamane's formula as follows to determine a sample size that was appropriate for the study's objectives:

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

Where *e* is the margin of error, n is the sample size, and N is the population size.

$$n = \frac{160}{1 + 160(0.05)2}$$

$$n = 114$$

In relation to the study's objectives, a sample size of 114 respondents was sufficient.

Table 3. 2: Sample Size

Categories	Frequency	Sample Ratio	Sample Size
Real estate developers	60	1.4	42.9
Housing officers	67	1.4	47.9
Sub-county planners	33	1.4	23.6
Total	**160**		**114**

Source: Kiambu County Government Report 2022

3.6.2 Study Sample Procedure

How a small group of people or components would be chosen from a broad population for a specific research topic is related to sampling procedures (George & Mallery, 2019). The sample strategy employed in this investigation was stratified random sampling. This was due to the fact that the target population was diverse and readily separated into classes, allowing for the study of each class without interfering with the others.

3.7 Data Collection Procedures

Questionnaires and structured interviews were used to gather primary data from the selected study sample. The data collection instrument for this study included the questionnaire administered to the identified and selected real estate developers who participated in the study. The researcher ensured that the participants appreciated the study's relevance and volunteered to offer their views willingly.

3.7.1 Research Instruments

Instruments, also called data collection instruments or simply tools, refer to the tools or techniques employed in collecting data in a study. These instruments were developed to elicit data and evidence about the research questions and objectives (Afolayan & Oniyinde, 2019). Self-administered questionnaires were used to gather quantitative information, while interviews using interview schedules with open-ended questions were used to gather qualitative information. The questionnaire and the interview guide were developed based on the study's specific objective.

3.7.2 Piloting of the Research Instrument

Piloting a research instrument is the process of conducting a trial run of the instrument to calibrate it for the actual research study (Latif & Sajjad, 2018). A pilot study was conducted to confirm the reliability and validity of the research instrument. The pilot study focused on conducting a survey of eleven (11) real estate developers in Nairobi County by completing the questionnaire. This comprised 10% of the focus respondent population not in the target population set. The questionnaire used in the pilot study was reviewed based on the feedback received.

3.7.3 Instrument Reliability

Vakili and Jahangiri (2018), posited that reliability in a study concerned with the accuracy and dependability with which the instrument captured the notion, as well as the extent of reliability of the measurement. Cronbach's alpha was used to measure internal consistency. Cronbach's alpha was a reliability coefficient that measures the weighted percentage of positive interitem correlation. Therefore, the coefficient of internal consistency, according to Cronbach's alpha, ranged from 0 to 1 (Taber, 2018).

The alpha coefficient value was used to measure the scale's reliability, such that higher numbers posited a higher level of reliability and lower numbers a lower level of reliability. According to Taber (2018), an acceptable level of alpha coefficient should be above 0.70 and this study the levels of 0.7 were reliable enough.

3.7.4 Instrument Validity

Appearing in research and measurement, instrument or measurement validity was a term that addressed the degree to which the instrument or tool, including a questionnaire, test, survey, or scale, measured one construct or concept as it was supposed to. In other words, it assessed the data quality by ascertaining whether the instrument provided the requisite data for a specific

research purpose regarding validity and reliability. Internal validity issues were essential to enhance the reliability of the study's findings. The focus was put on the reliability of the conclusion about a particular study rather than on the purity of the result (FitzPatrick, 2019).

Validity was defined as the extent to which an assessment instrument captured what it was designed to capture. It was used to determine the level of data generalization in the survey about a specific phenomenon (FitzPatrick, 2019). The validity aspects of the present research included face validity, content validity, and criterion validity. Construct and face validity were achieved by consulting experts in strategic management about the contents of the instrument.

3.7.5 Data Analysis

Data analysis is the act of carrying out investigations on the data with a view of identifying certain patterns, trends or specific pieces of information. The first set of data was proofread to correct any mistakes that the people in the survey could have made. The results gathered from the self-administered questionnaires were sorted into groups that relate to the different study variables to reduce the likelihood of confounding and mistakes.

This research used both quantitative and qualitative data analysis techniques in the course of the study. Measurements like the mean and standard deviation were adopted so that the data and its basic parameters could be described in a visually simple manner. To analyze the data, the Statistical Package for Social Sciences (SPSS) version 23 was used to render the frequency counts and percentages for the given data set in order to interpret and verify it according to the outline of the study as well as the research questions and hypotheses stated. The results were summarized in tables and described in plain language so that the utility of the findings could be conveyed meaningfully and effectively.

Regarding the dependent variable, it stayed the same. Therefore, the study used linear and stepwise multiple regression analysis to determine the relationship between the predictor and dependent variables. Simple and stepwise multiple regression analysis examined the supply-side factors and their related explanatory variables. In this case, the analysis involved applying linear and multiple regression models to determine the medialis and modulators of the predictor and the dependent variable.

The adjusted R-square value defined the extent to which the study factors explained the variability of the variables. The beta (β) coefficients indicated the nature and strength of the relationships and the proportion of the variance in firm performance explained by each independent variable. To be in consonance with Alrawabdeh (2014) and Broderick et al. (2013), the study's significance level was set at 0.05. The null hypothesis was rejected if the calculated p-value was less than or equal to 0.05. Pearson coefficient indicated the level of relationship between the factors, whereas simple and multiple regressions showed the correlation between the factors under consideration.

3.8 Empirical Model

The study examined the direct connection between supply-side factors and real estate developers' provision of affordable housing by employing linear and stepwise multiple regression analysis. To address objectives 1 to 4, a model denoted as 3.1 was utilized. In this model, the investigation focused on how the availability of land (X1), the cost of building materials (X2), the economic environment (X3), and government policies (X4) affected the provision of affordable housing by real estate developers in Kiambu County, Kenya (Y).

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e \quad \text{.....3.1}$$

This model aimed to evaluate the impact of supply-side factors (comprising independent variables X1, X2, X3, and X4) on the availability of affordable housing (represented by the

dependent variable Y). The model was expressed as a linear equation, including a constant coefficient (β0), regression coefficients (β1, β2, β3, β4), and the error term ε. These coefficients quantified the influence of the independent variables (X1, X2, X3, and X4) on the dependent variable (Y), while the corresponding β coefficients assessed hypotheses outlined in Chapter One, ranging from H01 to H04.

In order to investigate potential mediation, in accordance with Hypothesis 5 (H05), four models were constructed, following the recommendations of Baron & Kenny (1986). Model (3.2) was utilized to establish the foundational model that examined the interplay of supply-side factors concerning the provision of affordable housing. Model (3.3) gauged the connection between infrastructure development (the mediating variable) and supply-side factors. Model (3.4) was applied to explore the relationship between the mediator (infrastructure development) and the dependent variable (provision of affordable housing).

Finally, Model (3.5) verified the presence of either complete, partial or no mediation concerning the impact of infrastructure development on the predictor and the dependent variable. By conducting a straightforward regression analysis involving X (the composite index of supply-side factors) and Y (the availability of affordable housing), Model (3.2) was generated.

$Y = \beta 0 + \beta_1 X + \varepsilon$ ……...……...3.2

Under model 3.3, a basic regression analysis was performed using X (the composite index of supply-side factors) to forecast M (the composite index of infrastructure development).

$M = \beta_0 + \beta_1 X + \varepsilon$...…… …….…….....3.3

Conducting a straightforward regression analysis using M (the composite index for infrastructure development) to anticipate Y (the availability of affordable housing), we derive Model 3.4.

$Y = \beta_0 + \beta_1 M + \varepsilon$...…… …….…….....3.4

Executing multiple regression analyses using X (the composite index for supply-side factors) and M (the composite index for infrastructure development) to forecast Y (the availability of affordable housing) established Model 3.5.

$Y = \beta 0 + \beta_1 X + \beta_2 M + \varepsilon$ ……...….3.5

Where;

M represents the mediating variable, which signifies the composite index for infrastructure development, while X denotes the multidimensional independent variable, which is expressed as the composite index for supply-side factors.

Y referred to provision of affordable housing (dependent variable)

Where;

M: Composite index for infrastructure development

X: Composite index for supply-side factors

Y: Performance $\beta 1$ and $\beta 2$ are the slope variables to be estimated, and ε: Error term

Table 3. 3: Criteria for Mediation Decision Making

Step	Nature of the Outcome	Conclusion
1	If one or more of the above relationships (model 3.2,3.3 and 3.4) is non- significant	There is no mediation
2	Assuming models 1-3 are significant, and then proceed to model 4. If effect of M is significant on controlling X. X no longer significant on controlling M	There is full mediation
3	If both X and M significantly predict Y	There is partial mediation

Determining a mediating effect can result in three possibilities: complete, partial, or no mediation. The criteria for making this determination rely on the significance of the β4 and β7 coefficients, following the approach of Hayes (2009) and Baron & Kenny (1986). Complete mediation is established when β1 is significant in both models 3.2 and 3.4 but becomes insignificant in model 3.5, while β2 is significant in model 3.5.

Partial mediation occurs when β1 is significant in models 3.2 and 3.4, and β1 is significant in models 3.3 and 3.5, with β2 being significant in model 3.5. No mediation is indicated if β1 is insignificant in both models 3.2 and 3.3, β1 in model 3.2 is significant and equal to β1 in model 3.5, and β2 is not significant in model 3.5. The p-value determines the significance level of the coefficients, which are considered insignificant if their p-value is above 0.05; otherwise, they are considered significant. The null hypothesis is retained when coefficients are insignificant, and vice versa.

3.9 Hypotheses Tests

Hypotheses tests were conducted using the following empirical models as displayed in Table

Table 3. 4: Summary of Hypotheses Testing

Research Objectives	**Hypotheses**	**Statistical Models**	**Interpretation ofResults**
1. To ascertain how land availability affects real estate developers' ability to provide affordable housing in Kiambu County, Kenya.	H01: In Kiambu County, Kenya, real estate developers' ability to provide affordable housing is not statistically impacted by the availability of land.	Regression model for objective1-4 $Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + e$……Model 3.1 Where Y= provision of affordable housing X1 = Availability of land X2= Cost of building materials X3 = Economic environment X4= Government policies βi=Beta coefficients (0,1,2,3,4) ϵ= error term	The interpretationof results is based on β_i and F Value If the p-value<0.05 Rejectthe null hypothesis If p-value is > 0.05, Do not reject the null hypothesis
2. To determine how building material costs affect real estate developers' ability to provide affordable housing in Kiambu County, Kenya	H02: In Kiambu County, Kenya, the cost of building materials has no statistically significant impact on the availability of affordable homes by real estate developers.		
3. To ascertain how the economic climate affects real estate developers' ability to provide affordable housing in Kiambu County, Kenya.	H03: The economic climate has no statistically significant impact on Kenya's Kiambu County real estate developers' ability to provide affordable housing.		

4. To determine the impact of governmental policies on the supply of reasonably priced housing by real estate developers in Kiambu County, Kenya	H04: The provision of affordable housing by real estate developers in Kiambu County, Kenya, is not statistically impacted by government regulations.		
5. In Kiambu County, Kenya, real estate developers are seeking to ascertain how infrastructure development mediates the relationship between supply-side factors and the provision of affordable homes.	H05: The relationship between supply-side determinants and the supply of affordable housing by real estate developers in Kiambu County, Kenya, is not statistically mediated by infrastructure development.	Stepwise regression$M = \beta_0 + \beta_1 X + \varepsilon$ $Y = \beta_0 + \beta_1 M + \varepsilon$ $Y = \beta_0 + \beta_1 X + \beta_2 M + \varepsilon$ Where Y = provision of affordable housing β=intercept X= supply-side factors' compositeindex M= infrastructure development's composite index ϵ= the error term	If β_1 and β_2 are significant, thereis partial mediation If β_1 is insignificant andβ_2 is significant,Full mediation If β_2 is insignificant, Nomediation

3.10 Diagnostic Tests

Various diagnostic tests were conducted before performing inferential analysis to check whether the data conformed to the fundamental statistical assumptions required for linear and multiple regression analysis, as Amrhein et al. (2019) described. These diagnostic tests included Kaiser Meyer Olkin (KMO), normality, linearity, multicollinearity, and homoscedasticity.

3.10.1 Test of Normality

A normality test was used to determine if the data follows a normal distribution, thus requiring generalization. Due to the low sample size (n=114), the researcher used the Shapiro-Wilk

test to determine the normality of the data. In this way, the non-normality may have arisen due to skewness, kurtosis, or both, which the Shapiro-Wilk test can detect. This is a statistic with a range of 0 to 1; if the value for this statistic is over 0.05, the data is considered always normally distributed (Sulewski, 2020). In this case, the level of significance was set at 5%. The normality assumption was made for $P > 0.05$, while a departure from normality was assumed for $P< 0.05$.

3.10.2 Test of Linearity

This analysis looked for a direct relationship between the variables of interest as the independents and the dependent. This indicated that as the explanatory variable's value rose by one unit, the value of the outcome variable also rose by one unit. The order of variables and their statistical connection as a function of Pearson's product-moment correlation coefficient was determined. Correlation coefficients were usually in between -1 and 1.

The correlations could be positive, meaning that the increase of one variable resulted in the decrease of the other variable, or they could be negative, meaning that the two variables were inversely proportional (Schad et al., 2020). The relationship between the correlation coefficient and the strength of the linear relationship is such that the larger the absolute value of a correlation coefficient the tighter the relationship.

In doing so, if the selected "p-value" was less than the significance level alpha ($\alpha = 0.05$), the null hypothesis was rejected. Since the correlation coefficient of the two selected variables was statistically substantially different from "zero," it was concluded that there was enough evidence to infer the possibility of a meaningful linear relationship or correlation between them. When the p-value was less than the significance level ($\alpha = 0.05$), the null hypothesis was not rejected (Maulud & Abdulazeez, 2020). The explanatory variable had a positive direction, indicating linearity, if the correlation coefficient's p-values were less than 0.01.

3.10.3 Autocorrelation

For regression analysis, it was assumed that the autocorrelation was zero (Anselin, 2020). Autocorrelation also could be a positive integer as well as a negative integer. If there were minor standard errors, then the predictors' estimates would be more precise than they were (Sarstedt et al., 2019). The null hypothesis was wrong and had to be rejected if a serial was discovered. The current values problematic in Autocorrelation resulted in poor formation of coefficients thereby producing wrong figures.

Since the concept of autocorrelation in panel data was established to be akin to cross-dependence testing, it was done using the Pesaran test. If significance had been tested, it would have been possible to apply autocorrelation (cross-sectional dependency) (Ching & Phoon, 2019). When cross-sectional data dependencies were found, they were handled by 'deleting' the dependent variable.

3.10.4 Test of Homoscedasticity

The rationale for this test was to see whether the variability of the dependent and independent variables was equal. It was a method of ascertaining whether the presumed homoscedasticity of a dependent variable was valid for a wide range of independent variable values (Yang & Mathew, 2018). In this research, homoscedasticity was checked by applying the Breusch-Pagan chi-square test, which tested whether the variance in a regression's errors depended on the independent variable's values.

The test statistic follows the chi-square distribution with nχ2 degrees of freedom. If the test statistic of a statistic test had a p-value significantly below some criterion, such as $p<0.05$, then the null hypothesis was rejected, and homoscedasticity was assumed (Sarstedt *et al*., 2019).

3.10.5 Test of Multicollinearity

A multicollinearity test was conducted to demonstrate the independent variables' linear regression. As the independent variables became more correlated, the reliability of the regression coefficients in the multiple regression analysis lessened (Shrestha, 2020). To assess multicollinearity levels, the study adopted the variance inflation factor (VIF) or inverse of tolerance test. When the VIF value was more than 10, it indicated the presence of a multicollinearity problem. Intolerance values equal to or greater than 0.1 signified a critical concern, while intolerance values below 0.2 were considered to depict a potential concern.

3.11 Legal and Ethical Considerations

It was a requirement that the researcher give the participants consent to participate in the study. Also, the researcher made some effort to ensure that the participants' anonymity was preserved throughout the study. The researcher also ensured that the study was ethical and that all the ethical measures were considered.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter only concentrated on exploring research findings sourced from 114 participants. It is divided into five sections covering dependent variable, overview of respondents, descriptive and inferential analysis, response rate, reliability and validity of data, background information of respondents, and the four dimensions of supply-side aspects, specifically land availability for construction, cost of construction supplies, economic setting in Kiambu and roles of state, and political policies as the independent variable and infrastructure development as the mediating variable for the association among supply-side elements, delivery of cheap houses by developers in Kenya.

4.2 Response Rate

The data was gathered from 114 respondents comprising Real Estate Developers, Housing Officers, and Sub-County Planners, which was deemed adequate for the study's objectives. Out of these, 93 questionnaires were successfully completed and returned. This represented an 81.6% response rate, elaborated in Table 4.1.

Table 4. 1: Response Rate

	Frequency	**Percentage (%)**
Distributed Questionnaires	114	100.0
Questionnaires Returned	93	
Response Rate		**81.6**

Source: Researcher (2024)

According to Wu *et al*.'s (2022) recommendations, the response rate is viewed as excellent. They suggest that a response rate of 50% is enough for analysis and reporting, while 60% is generally seen as good, and anything over 70% is excellent. Batty et al. (2020) also agree, stating that a response rate exceeding 70% is outstanding. Consequently, grounded on these principles, the response rate for this inquiry can be considered acceptable.

4.3 Reliability and Validity of Research

In this study, data regarding supply-side aspects affecting delivery of reasonable houses by developers in Kiambu County, underwent a reliability test. This test aimed to determine the consistency of the data collection methods in producing similar findings or data after repeated attempts. The results of this test are presented in Table 4.2 below.

Table 4.2: Reliability Test

Study Construct	Number of Items	Cronbach Alpha
Availability of Land	7	0.717
Cost of Building Materials	7	0.892
Economic Environment	7	0.765
Government Policies	7	0.787
Provision of Affordable Housing	5	0.763

Source: Researcher (2024)

According to Revelle and Condon (2019), Cronbach's alpha (α) is usually expected to be at least 0.7 to ensure data reliability. Hence, the values in Table 4.2 for the Availability of Land (α = 0.717), Cost of Building Materials (α = 0.892), Economic Environment (α = 0.765), Government Policies (α = 0.787), and Provision of Affordable Housing (α = 0.763) all surpass this benchmark. These findings confirm that the data collected for the five independent variables in the study is reliable enough.

The questionnaires were additionally examined to ensure their validity and significance. As per Sürücü and Maslakçi (2020), factor analysis is a method used to explore and determine if the variables being studied can explain the dependent variable. In this research, validity was focused on determining whether the outcomes would clarify the supply-side elements affecting the delivery of inexpensive houses by developers in Kiambu County, Kenya.

4.4 Demographic Characteristics

Displays the personal details of the individuals who participated in the research investigation.

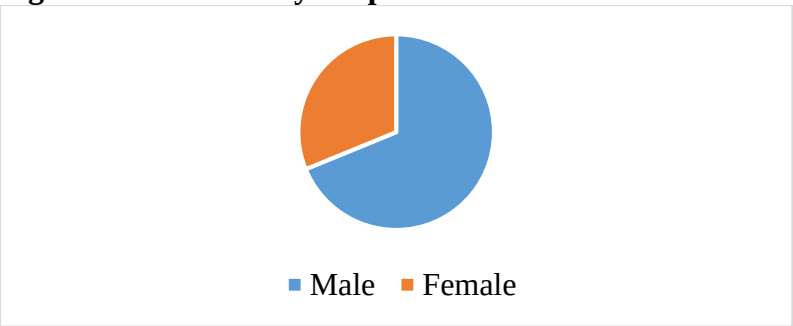
4.4.1 Demographic Characteristics of the Respondents

It provides background details of the participants, encompassing their gender, age group, and the highest level of education they have achieved.

4.4.2 Distribution of the Respondents Based on the Gender

Figure 4.1 presents the distribution of respondents based on gender in the study examining the impact of supply-side aspects on delivery of reasonably priced houses by developers in Kiambu County.

Figure 4. 1: Gender by Respondents



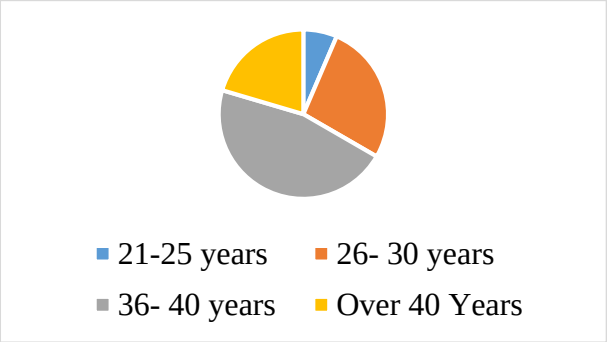
Source: Researcher (2024)

Males dominated the study, accounting for 68.8% of the total respondents, while females accounted for 31.2%. Such gender distribution could be attributed to the demographics of people engaging in real estate development activities within the region. Also, in the study by Dernberger and Pepin (2020) carried out in urban housing development, a similar trend was observed, whereby male respondents dominated female respondents.

4.4.3 Age Distribution of Respondents

The age distribution of the participants in the study that evaluated the connection between supply-side variables and the availability of reasonably priced homes through real estate developers in Kiambu County, Kenya, is displayed in Figure 4.2.

Figure 4. 2: Age of the Respondents



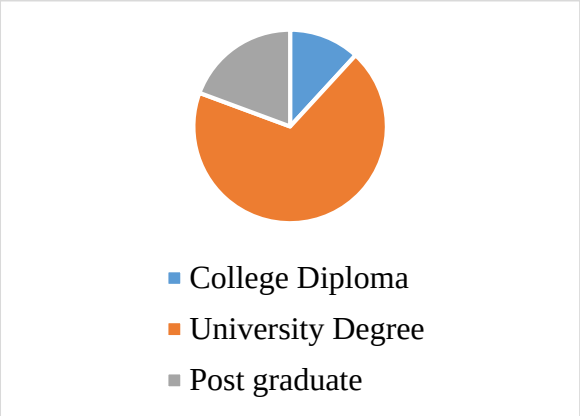
Source: Researcher (2024)

Analyzing the data on age distribution, it is evident that 26.9 % and 46.2 % represent people of 26-30 years and 36-40 years, respectively, meaning people in their late twenties to early 40s essentially participate in real estate development in Kiambu County. This age distribution means that these ages are probably involved in the housing sector and could impact the supply side of the affordable housing agenda. These results align with the findings of Flora (2020) in a related survey in the neighboring county, where the participants were 4 respondents in their late twenties to early forties, which implies a similar demographic pattern in our study.

4.4.4 Level of Education

Figure 4.3 indicates the educational level distribution of the respondents in the study that examined the impact of supply-side elements on affordable housing delivery by developers in Kiambu County, Kenya.

Figure 4. 3: Level of Education



Source: Researcher (2024)

According to the data, 68.8% of respondents reported having a university degree, 19.4% possessing post-graduate qualifications, and 11.8% having college diplomas. From this educational profile, one can infer that people with higher education qualifications participate in development of real estate in Kiambu County. This finding is comparable with data obtained by Revelle and Condon (2019), who also pointed out that real estate developers' education levels are comparable, suggesting that educated people are more engaged in the housing industry.

4.5 Descriptive Statistics

The descriptive statistics present the findings that shed light on each supply-side factor and its role in providing affordable housing. For instance, when examining land availability, the conclusions are similar to those of Aurand *et al*. (2023) and Wu (2022), where the authors pointed out that restricted land increases costs, reducing affordable housing. On the same note, the study's conclusion on land speculation and policy restrictions relativized with literature by Nzau (2020) and Alexandri and Janoschka (2018), where policy hurdles were noted as instrumental in denying the production of affordable houses.

These alignments suggest that, notwithstanding the regional variations, the issues of supply-side characteristics in Kiambu County are similar to those in global contexts. However, local policy modifications could help alleviate these difficulties.

4.5.1 Availability of Land on the Provision of Affordable Housing

The study aimed in establishing land availability's role in the delivery of reasonably priced housing by developers in Kiambu County, Kenya. The results are displayed in Table 4.3.

Table 4. 3: Availability of Land on the Provision of Affordable Housing

	N	Mean	Std. Deviation
Limited availability of land increases the cost of acquiring land for affordable housing projects, making them less viable.	93	4.086	.8804
The government's land-use policies ensure adequate land availability for affordable housing development.	93	4.14	1.069
Land speculation and hoarding contribute to the scarcity of affordable land for housing development in Kiambu County.	93	4.12	.883
Collaborative efforts between real estate developers and local authorities are essential to identify and allocate land parcels for affordable housing projects.	93	4.15	.988
Land titling issues and unclear property rights hinder the efficient use of land for affordable housing development in Kiambu County.	93	4.12	.895
Encouraging mixed-use zoning regulations can optimize land use and promote the integration of affordable housing within urban areas.	93	4.16	.863
Investing in land banking strategies can help mitigate the challenges of land scarcity and support long-term affordable housing initiatives	93	4.04	1.021

Source: Researcher (2024)

Results in Table 4.3 indicated that 85% of participants agreed strongly that the scarcity of land makes land acquisition for affordable housing projects expensive and less profitable. This assertion is supported by the mean value of 4.086 and the standard deviation of 0.8804.

Also, the participants expressed agreements in high levels that land use policies formulated by the government are essential in the availability and allocation of land to developers to facilitate the construction of affordable houses (mean 4.14, SD = 1.069). This assertion is in line with the study conducted by Lawson and Ruonavaara (2019), who pointed out that supportive government, should step in and solve the problems relating to the availability of land for housing.

The study also revealed that land speculation and hoarding were the main reasons for the high cost of land that hinders affordable land for house development in Kiambu County because 83% of the respondents strongly agreed with the statement mean of 4.12, standard deviation =

0.883. This is supported by Debrunner and Hartmann (2020), where the impacts of speculative business strategies revealed limited space for affordable land supply.

Additionally, the respondents stressed that real estate developers and local authorities must work together to determine the land to be developed as affordable housing (mean = 4.15, standard deviation = 0.988). In support of Adabre and Chan (2019), the public sector must involve the private sector in the land distribution to provide housing.

The study also mentioned that land titling problems and ill-defined property rights hinder the efficient use of land for affordable housing (mean = 4.12, S.D = 0.895). This finding supports the study by Diamond and McQuade (2019), which urged effective land rights frameworks to improve land utilization for housing.

Additionally, the respondents agreed with mixed-use zoning regulation, which has been deemed a way of enhancing the use of the available land and incorporating affordable houses in the urban space (mean = 4.16, SD = 0.863). This aligns with Been et al. (2019), which highlighted the possibility of increased land use intensity for new housing following mixed-use zoning.

Another strategy perceived to reduce the impacts of land scarcity was land banking investment (mean = 4.04, SD = 1.021) to support affordable shelter projects in the future. This study's findings correspond with the works of Chan and Adabre (2019) on the effectiveness of land management policies in tackling the scarcity of land for housing development.

4.5.2 Cost of Building Materials on the Provision of Affordable Housing.

The purpose of the study was to evaluate how building material costs affected real estate developers' capacity to build reasonably priced homes in Kiambu County, Kenya. The results are shown below in Table 4.4:

Table 4. 4: Cost of Building Materials on the Provision of Affordable Housing

	N	Mean	Std. Deviation
High costs of building materials often result in delays or compromises in the quality of affordable housing construction.	93	4.02	1.113
Government subsidies or incentives for locally sourced building materials could alleviate the burden of high construction costs for developers.	93	4.10	1.054
Improving infrastructure for producing and distributing building materials can help reduce transportation costs and make materials more affordable.	93	4.26	.908
Innovative construction techniques, such as prefabrication or alternative materials, can mitigate the impact of volatile material prices on housing affordability.	93	4.31	.707
Collaborating with suppliers and manufacturers to negotiate bulk purchase discounts can lower the overall cost of building materials for affordable housing projects.	93	4.37	.704
Sustainable building practices can lead to long-term cost savings in materials and energy consumption for affordable housing developments.	93	4.29	.774
Research and development efforts focused on creating affordable and durable building materials are essential for sustaining affordable housing initiatives in Kiambu County.	93	4.28	.901

Source: Researcher (2024)

From the results presented in Table 4.4, it is possible to establish the extent of the impact of the cost of building materials on affordable housing provision in Kiambu County, Kenya. This study further showed that the respondents agreed that high building materials costs often lead to cost escalation and compromises in the quality of affordable housing programs, with a mean score of 4.02 and a standard deviation of 1.113. This indicates that the accessibility of the materials determines the possibility and effectiveness of the housing endeavors. This echoes similar sentiments to those of earlier works by Adabre and Chan (2019).

The respondents also expressed their consent on a mean of about 4.10 standard deviation of 1.054 with the idea that government subsidies or incentives on locally sourced building materials may help ease the pressure on developers to fund construction costs. This has

immense implications for government involvement in subsidizing affordable housing projects through optimizing materials costs, as further supported by Diamond & McQuade (2019).

Further, enhancing manufacturing and distribution facilities for building materials to cut transport costs was considered necessary (mean = 4.26, standard deviation = 0.908). This observation can be well discussed in infrastructure development by emphasizing that construction materials must remain affordable and accessible to everyone, as emphasized by Been et al. (2019).

In addition, new construction methods, such as using other materials, helped reduce the effect of fluctuating material prices on affordable housing, with a mean score of 4.31 and a standard deviation of 0.707. This finding resonates with Samarasinghe's (2020) suggestions that called for the integration of new construction techniques, which can reduce costs.

Also, engaging suppliers and manufacturers for bulk purchases at a concessionary rate was perceived to be a plausible strategy for reducing the cost of building materials in affordable housing projects (mean = 4.37, Standard Deviation = 0.704). This is in line with the research by Anacker (2019), who discussed the importance of material cost savings through strategic partnerships.

Finally, sustainable building practices were rated as crucial in achieving cost savings of building materials and energy in affordable housing developments, with a mean score of 4.29 and a standard deviation of 0.774. This decision aligns with the current trend of moving towards green and sustainable housing, as Kulshreshtha *et al*. (2020) identified.

Also, the respondents strongly agreed that the research and development of affordable and durable building materials are crucial in maintaining affordable housing in Kiambu County, with a mean score of 4.28 and a standard deviation of 0.901. This highlights the need to seek

solutions in technological adoptions and material selection to deal with cost issues affecting housing construction per the principles espoused (Baek & Kim, 2018).

4.5.3 Economic Environment on the Provision of Affordable Housing

This research aimed to establish the role of the economic setting in production of cheap houses by developers in Kiambu County, Kenya. The results are presented in Table 4.5 below.

Table 4. 5: Economic Environment on the Provision of Affordable Housing

	N	Mean	Std. Deviation
Economic downturns often result in reduced purchasing power, making it challenging for individuals to afford housing even with subsidized options.	93	4.25	.952
Access to affordable financing options, such as mortgage loans or microfinance schemes, is critical for promoting homeownership in Kiambu County.	93	4.27	.796
Inflationary pressures can increase construction costs and undermine efforts to provide affordable housing solutions.	93	4.29	.867
Job creation and income levels directly influence the demand for housing, particularly among low to middle-income earners.	93	4.08	1.106
Market demand for affordable housing is sensitive to fluctuations in interest rates and lending policies by financial institutions.	93	4.27	.886
Strengthening local industries and promoting entrepreneurship can stimulate economic growth and improve housing affordability in Kiambu County.	93	4.27	.874
Diversifying the economy to reduce dependency on specific sectors can enhance resilience against economic shocks and support sustainable housing development.	93	4.31	.872

Source: Researcher (2024)

From Table 4.5, it can be deduced that the majority of the respondents strongly agree that purchase power reduces during economic downturns, which means it is very hard for people to maintain housing even with subsidies. This was evidenced by the mean score of 4.25 and standard deviation of 0.952. This supports earlier observations that housing affordability is sensitive to overall economic conditions, as argued by Osafo and Ameh (2020).

They also add that funding was another factor that was deemed essential to support homeownership in Kiambu County, with a mean of 4.27 and a standard deviation of 0.796 for a mortgage loan or microfinance. This highlights the necessity of the availability and extension of financial services in achieving the provision of affordable housing, as postulated in Aalbers (2019).

Furthermore, they opined that the study revealed that inflationary pressures affect housing affordability since they cause an escalation in the cost of construction and impede the provision of adequate housing solutions (mean = 4.29; standard deviation = 0.867). This leads to the need for controlling the inflation factor by using other strategies in housing development and taking measures to control the costs involved in the housing development process, as supported (Buckle & Kent 2019).

Additionally, employment opportunities and the level of income derived from the jobs were deemed important indicators for housing demand, especially from low—to middle-income earners (mean = 4.08, standard deviation = 1.106). This goes along with the relationship between economic opportunities and housing affordability, as highlighted by Dang *et al*. (2019).

Furthermore, the market demand for affordable housing was observed to be influenced by financial institution interest rates and lending policies, with a mean score of 4.27 and a standard deviation of 0.886. This underlines the importance of stable financial environments and lending conditions to support affordable housing programs, as the study by Ellen and Horn (2020) points out.

Further, they affirmed that increasing local industry and supporting entrepreneurship were viewed as approaches towards boosting the economy and, hence, the affordability of houses in Kiambu County (mean = 4.27, standard deviation = 0.874). This aligns with the need for

economic diversification and local development strategies as the key to healthy housing markets, according to insights derived from Ewing and Ritzer (2019).

Finally, respondents strongly agreed that diversification of the economy to minimize dependency on specific sectors was considered a way of improving the ability to cope with economic shocks and promote sustainable house construction, with a mean score of 4.31 and a standard deviation of 0.872. This underscores the need for medium and long-term economic vision and policies aimed at the structural transformation to address the housing question – a proposition supported by (Chikozho and Zhou, 2018).

4.5.4 Government Policies on the Provision of Affordable Housing

The research aimed to determine the impact of policy on affordable housing through real estate developers in Kiambu County, Kenya. The findings are shown in Table 4.6 below.

Table 4. 6: Government Policies on the Provision of Affordable Housing

	N	Mean	Std. Deviation
Streamlining approval processes and reducing bureaucratic hurdles can expedite the development of affordable housing initiatives.	93	4.39	.808
Incentives such as tax breaks or subsidies encourage real estate developers to invest in affordable housing projects.	93	4.26	.908
Land-use planning regulations should prioritize land allocation for affordable housing developments to address housing shortages.	93	4.01	.853
Rent control policies are crucial in ensuring housing affordability for low-income households in Kiambu County.	93	4.25	.803
Affordable housing quotas within larger residential developments can promote socioeconomic integration and inclusive urban planning.	93	4.28	.713
Transparent and consistent enforcement of building codes and standards is essential to ensure the safety and quality of affordable housing units.	93	4.28	.785
Collaborative partnerships between government agencies, private developers, and non-profit organizations are key to implementing effective housing policies and programs.	93	4.18	.846

Source: Researcher (2024)

The results presented in Table 4.6 portrayed that most of the respondents had strongly agreed that streamlining the approval processes and reducing bureaucratic bottlenecks were deemed

paramount in speeding up affordable housing development initiatives, scoring a mean value of 4.39 with a standard deviation of 0.808. This underscores efficiency in the administrative procedures and the need for reforms in the housing provision regulatory framework, as Chen and Zhang proposed (2019).

Furthermore, most respondents also concurred those motives, including tax credits or grants, compelling real estate developers to undertake affordable housing projects since their mean value was 4.26 with a standard deviation of 0.908. This ties in with the rationale behind providing financial incentives to encourage the private sector to invest in the provision of affordable houses, as posited in Osafo and Ameh's (2020) study.

Also, land-use planning was important in regulating house shortages by providing affordable housing development protocols (mean = 4.01, standard deviation = 0.853). This call for the need to reform the land-use policy and spatial planning strategies in solving the housing affordability challenges, therefore, affirms the recommendation made by Hong *et al*., (2018)

In addition, rent control policies were deemed very relevant to housing affordability goals for the low-income category in Kiambu County, with a mean score of 4.25 and a standard deviation of 0.0803. This supports the understanding that rent regulation mechanisms are crucial for safeguarding vulnerable groups and ensuring housing affordability, as Kahouli (2020) supports.

In addition, quotas for affordable housing within larger dwelling projects were viewed as a way to enhance the social and economic mix and, therefore, integrate different groups of people into the urban environment (mean = 4.28, standard deviation = 0.713). This confirms the applicability of mixed-income housing policies aimed at creating diverse neighborhoods as proposed by (Mast, 2019).

Furthermore, meeting the requirement of enforcing building codes and standards visibly and without bias was considered crucial to providing safe and quality affordable houses, with an

average score of 4.28, with a standard deviation = 0.785. This emphasizes the original argument that there is a need for government regulation and enforcement mechanisms to ensure that housing is of acceptable quality as informed (Muiruri & Sang,).

Finally, inter-sectorial linkages between the government, private sector, and Non-Governmental Organizations were deemed pertinent in implementing housing policies and programs and, therefore, received a mean score of 4.18 with a standard deviation of 0.846. This underscores the need for cross-sector collaboration and integration in tackling myriad housing matters, which conforms to findings from Rajagopal and Sane (2019).

4.5.5 Infrastructure Development

The study intended to establish the mediating consequence of infrastructure expansion on connection among supply-side elements and the affordability of houses provided to developers in Kiambu County, Kenya. Results are presented in table 4.7 below.

Table 4. 7: Infrastructure Development

	N	Mean	Std. Deviation
Adequate infrastructure, such as roads and utilities, is essential for successfully implementing affordable housing projects in Kiambu County.	93	4.2473	.80293
Improving transportation networks and accessibility enhances the desirability and value of affordable housing developments.	93	4.2366	.66591
Investments in water and sanitation infrastructure are necessary to support the health and well-being of residents in affordable housing communities.	93	4.1720	.74635
Integrated urban planning initiatives prioritizing infrastructure development can unlock the potential for sustainable, affordable housing solutions.	93	4.1075	.86555
Public-private partnerships are instrumental in financing and delivering infrastructure projects that complement affordable housing developments.	93	4.2366	.81291
Access to amenities such as schools, healthcare facilities, and recreational spaces enriches the quality of life for residents in affordable housing communities.	93	4.2903	.76016
Community engagement and participatory approaches in infrastructure planning ensure that the needs and preferences of residents are adequately addressed in affordable housing developments.	93	4.2581	.75041

Source: Researcher (2024)

From the result outlined in Table 4.7, it was evident that inadequate infrastructure like roads and utilities were key factors that would hinder the implementation of affordable housing projects in the county, according to most of the respondents. This was evident from the mean, where the value of 4.2473 was found with a standard deviation of 0.80293. This emphasizes the need for basic infrastructure in the delivery of materials, including housing and other needs to support community construction, in line with the findings made by Mohd Thas Thaker and Ariff, (2020).

However, the study noted that transportation networks and accessibility were key factors that increased the desirability and value of affordable housing, with a mean value of 4.2366 and a standard deviation of 0.66591. This supports that connectivity is a core aspect in improving the outcomes of affordability and livability of houses, as Alteneiji *et al*. (2020) concluded.

Further, improvements in water and sanitation facilities were considered essential to cater to the health needs of tenants in the affordable housing (mean = 4.1720, standard deviation. = 0.74635). This underscores the significance of basic necessities in enhancing the structural and functional provision of housing, especially for vulnerable populations, which [is in concordance with Ebekozien *et al*., (2020).

In addition, the responses in this study indicated a need for integrated urban planning measures, especially focusing on infrastructure development, with a mean of 4.1075 and a standard deviation of 0.86555. This supports the need to undertake comprehensive approaches in formulating solutions to housing and infrastructure depletions, as proposed by Akinwande and Hui (2024).

Furthermore, funds sourcing and implementation of infrastructural development for additional affordable housing support were acknowledged to involve public-private partnerships (mean = 4.2366, standard deviation = 0.81291). This aligns with previous studies in that the partnerships undertaken are a key determinant in tackling the infrastructure deficit and housing accessibility.

Also, perceived attributes about community resources, including schools, health facilities, and parks, were reported to positively enhance the well-being of residents living in affordable housing, depicting a mean value of 4.2903 and a standard deviation of 0.76016. This stresses that a broader scale of community development should be encouraged in order to enhance social inclusion in communities.

Finally, there was recognition of the importance of community involvement and participation in designing infrastructures that meet residents' needs and preferences, with a mean of 4.2581 and a standard deviation of 0.75041. This aligns with the observation that equitable decision-making in housing provision is sustainable (Lateef Olanrewaju & Idrus, 2020).

4.5.6 The Provision of Affordable Housing

The research aimed at ascertaining the availability of affordable houses by real estate developers in Kiambu County, Kenya. The findings are presented in Table 4.8 below.

Table 4.8: Provision of Affordable Housing

	N	Mean	Std. Deviation
Real estate developers' provision of affordable housing is a critical measure of their social responsibility towards the community.	93	3.95	.889
Real estate developers prioritizing affordable housing demonstrate their commitment to addressing the housing needs of the less privileged in society.	93	4.18	.779
Real estate developers' provision of affordable housing is essential in promoting social inclusion and reducing poverty.	93	4.19	.756
Real estate developers who invest in affordable housing can benefit from a stable and long-term source of revenue.	93	4.25	.686
Real estate developers' provision of affordable housing is a critical measure of their contribution to sustainable development and social welfare in the community.	93	4.24	.713

Source: Researcher (2024)

In Table 4:8 findings, the level of social responsibility as perceived by the respondents is the provision of affordable housing by real estate developers, which was perceived to be highly important and received a mean score of 3.95 and a standard deviation of 0.889. This is particularly so given that the developers' core business involves the construction of houses that meet citizens' shelter demands and the provision of efficient housing solutions to enhance welfare, all of which are indicative of corporate social responsibility.

Furthermore, real estate developers who provided affordable houses were regarded as responsive to the needs of less privileged people in society, with a mean score of 4.18 and a standard deviation of 0.779. This shows how developers' actions affected the social nature of housing by enhancing the affordability factor and social justice.

The role played by the real estate developers who designed small houses for low-income earners was perceived to have an impact on social inclusion and poverty reduction. The mean was 4.19, and the standard deviation was 0.756. This underscores the provision of affordable shelter in reducing prejudices based on economic capabilities.

Additionally, those who engaged in real estate development for affordable houses were perceived to reap the benefit of an assured and steady source of income in the long run, with a mean score of 4.25 and a standard deviation of 0.686. This indicates that efficient, affordable housing developments are capable of being financially sustainable in terms of business sustainability principles without compromising society's social goals.

Lastly, addressing the issue of affordable housing by real estate developers was deemed an important corporate social responsibility (CSR) practice concerning sustainable development and the welfare of the community, with the mean being 4.24 and Std. Deviation being 0.713. This also sheds light on the relationship between housing provision and environmental stewardship and the impact on the well-being of communities.

4.6 Inferential Analysis

The endeavor to ascertain the associations between the dependent variable and the independent variables aims to elucidate potential rationales for the various scenarios delineated within the dataset. These associations were discerned through inferential statistical methods, encompassing a correlation analysis involving all variables and a regression analysis.

4.6.1 Regression Analysis

The regression analysis conducted in this study examined the four supply-side factors affecting affordable housing provision: availability of land, cost of construction materials, economic factors, and government policies. The variables that were proven to be significant at the 0.05 level were land availability, building material costs, and the economic environment, which were indicated to affect the price of buildings significantly.

These findings support previous studies, as mentioned in Aurand *et al*. (2023) and Wu (2022), who observed that land availability positively correlates with affordable housing in other studies. The above findings are consistent with the study by Hong *et al*. (2018) and Diamond

& McQuade (2019), which also established a strong relationship between the cost of building materials and housing prices at the global level.

4.6.1.1 Diagnostic Test

4.6.1.1.1 Test for Normality

To evaluate normality, utilizing the Kolmogorov-Smirnov test is warranted in this instance owing to the relatively substantial sample size, surpassing 100. The furnished table delineates the findings of the normality assessment as indicated within the Kolmogorov-Smirnov columns.

Table 4. 9: Kolmogorov-Smirnov test for normality

Variable	Kolmogorov-Smirnov Statistic	Df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Provision of Affordable Housing	0.086	93	0.232	0.975	93	0.135

Source: Researcher (2024)

Based on the results in Table 4.9, where p = .232 at the 0.05 significance level, the null hypothesis, which posits that the data adheres to a normal distribution, was not refuted. Consequently, it can be deduced that the data demonstrates characteristics of normal distribution, thereby validating its appropriateness for further analysis.

4.6.1.1.2 Test for Multicollinearity

Table 4.10, presented below, displays the variables' collinearity statistics, employing the Variance Inflation Factor (VIF) as a metric to gauge the level of multicollinearity among the independent variables.

Table 4.10: Collinearity Statistics

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	0.261	0.521		0.477	0.638		
	Availability of Land	0.342	0.09	0.405	4.274	0	0.891	1.117
	Cost of Building Materials	0.367	0.09	0.467	4.587	0	0.775	1.288
	Economic Environment	0.195	0.076	0.244	2.426	0.02	0.811	1.231
	Government Policies	0.130	0.104	0.018	1.121	0.064	0.944	1.055

a Dependent Variable: Provision of Affordable Housing

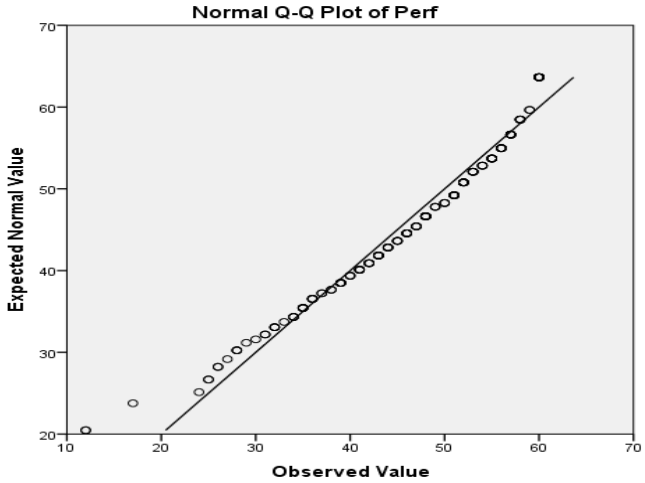
***Source: Researcher (2024*)**

Variance Inflation Factor (VIF) values between 1 and 5 suggest minimal or negligible correlation among the variables, whereas values exceeding 10 denote substantial multicollinearity that may impact the accuracy of results. In this instance, the VIF values spanned from 1.054 to 1.287, signifying the absence of multicollinearity among the independent variables.

4.6.1.1.3 Homoscedasticity Test

Homoscedasticity denotes a condition wherein the dependent variable exhibits uniform variability across all values of the independent variables (Garson, 2012). The assessment of homoscedasticity involves scrutinizing the variance in residuals within the employed regression model. Conversely, the absence of uniform variability across the values of independent variables is termed heteroscedasticity.

Figure 4. 4: Homoscedastic Test



***Source: Researcher (2024*)**

The probability-probability plot (P-P Plot) is a graphical tool for evaluating both the normality and homoscedasticity of data distribution. It juxtaposes a variable's empirical cumulative distribution function against a specific theoretical cumulative distribution function (Park, MacInnis, & Priester, 2008). When the distributions align, the plot exhibits a linear pattern traversing the origin with a unit slope. A more pronounced straight line in the P-P plot corresponds to a greater adherence of the variable distribution to both normality and homoscedasticity (Garson, 2012).

In Figure 4.4, the normal P-P plot of customer satisfaction illustrates minimal deviations of the points from the line intersecting the plane at 450. This ensures that the data concerning the dependent variable (provision of affordable housing) adheres to normality and homoscedasticity, justifying the adoption of the multiple linear regression model in the study.

In this case, the model yielded an R-value of 0.813, indicating a strong relationship among the variables. This suggests that the model is a reliable predictor of the outcome. Additionally, with an R Square value of 0.694, it can be concluded that 69.4% of the variance in the dependent variable (Provision of Affordable Housing) can be explained by the predictor variables (land

availability, building material costs, economic conditions, and government policies), as shown in Table 4.11 below.

Table 4.11: Model Summary

Model	Model R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.813a	0.694	0.662	0.22774

a. Predictors: (Constant): land availability, building material costs, economic conditions, and government policies

Source: Researcher (2024)

Additionally, the findings in the ANOVA table suggested that the model significantly predicted the extent of affordable housing provision in Kiambu County, as presented in Table 4.12 below:

Table 4. 12: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.106	4	7.659	0.019[b]
	Residual	84.284	88		
	Total	**95.390**	**93**		

a. *Dependent Variable:* ***Provision of Affordable housing In Kiambu County***

b. *Predictors: (Constant):* ***Land Availability, Building Material Costs, Economic Conditions, and Government Policies.***

Source: Researcher (2024)

According to the results of the ANOVA test conducted to test the significance of the overall regression model and the results obtained F-statistics = 7.659, Sig = .019<.05, the p-value p=0.019<0.05 is below the significance level (p = 0.05), implying that there was a positive and significant relationship between supply-side factors of land availability, building material costs, economic conditions, & government policies and provision of affordable housing in Kiambu County.

Table 4. 13: Coefficients

Model		Coefficients[a] Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)					
	Availability of Land	0.342	0.09	0.405	4.274	0
	Cost of Building Materials	0.367	0.09	0.467	4.587	0
	Economic Environment	0.195	0.076	0.244	2.426	0.02
	Government Policies	0.130	0.104	0.018	1.121	0.064

a. Dependent Variable: Provision of Affordable housing In Kiambu County

***Source: Researcher (2024*)**

The data from Table 4.13 above show that the Beta coefficients (β values) are estimated linear coefficients in the model. For instance, (β1) means that as land becomes available by one unit, the provision of affordable housing in Kiambu County increases by 0.342 units.

Table 4.13 above depicts the regression analysis results with the predisposing factors of self-employment affecting the independent variables. The analysis of the collected data indicates that Land Availability, Building Material costs, and Economic Conditions are statistically significant at $p < 0.05$. This is evident from the p-values derived for the coefficients of the independent variables. It is crucial to note, nevertheless, that government policies were left out of the model because they did not significantly contribute to it at the 0.05 level. The following is a presentation of the model utilised in this regression analysis:

$$Y = \varepsilon 1 + \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_i X_i$$

Where: Y represents the dependent variable,

β_0, β_1, $\beta_2 \ldots \beta_i$ represent the regression coefficients

X_1, $X_2 \ldots$ Xi represent the independent variables, and;

$\varepsilon 1$ represents the constant term

The model for this investigation is as follows, with the beta coefficients entered as they were obtained from the coefficients in Table 4.16 above:

PAF = 0.342**AL** + 0.367**CBM** + 0.195**EE**

Where: PAH represents the Provision of Affordable Housing (Y)

AL represents the Availability of Land (β1)

CBM represents the Cost of Building Materials (β2)

EE represents the Economic Environment (β3)

The p-value was calculated as a test statistic based on the research hypothesis developed in this study. Since it measures the likelihood that the data in the working research will confirm the null hypothesis put out in the study, the p-value can be crucial. Consequently, the null hypothesis will be rejected in any situation where the p-value is smaller than the chosen significance level. Thus, the alternative hypothesis is accepted and the null hypothesis is rejected if the p-value is smaller than α, indicating that the coefficient in this instance is significant at the α level against the null hypothesis. Conversely, the p-value exceeds α, the researcher does not reject the null hypothesis because the coefficient is not statistically significant against it.

In this case, the null hypotheses developed were:

$H0_1$: Availability of land has no statistically significant influence on the provision of affordable housing by real estate developers in Kiambu County, Kenya.

$H0_2$: Cost of building materials has no statistically significant influence on the provision of affordable housing by real estate developers in Kiambu County, Kenya.

$H0_3$: Economic environment has no statistically significant influence on the provision of affordable housing by real estate developers in Kiambu County, Kenya.

$H0_4$: Government policies have no statistically significant influence on the provision of affordable housing by real estate developers in Kiambu County, Kenya.

In hypothesis 1, the p-value $p=0.000<0.05$ is below the significance level ($p = 0.05$), leading to the rejection of the null hypothesis in favor of the alternative. The significant p-value for land availability indicates a strong positive effect of land availability on Kiambu's affordable housing which aligns with the studies of Aurand *et al.* (2023) and Wu (2022) who found land scarcity and pressure on costs limit affordable housing in their study. This suggests that across different geographies, the availability of land continuously influences the provision of affordable housing. This finding is validated by the local context of Kiambu County with particular emphasis on the role of accessible land for sustainable development.

This study is in tandem with the findings of Alexandri and Janoschka (2018) who performed a qualitative analysis of housing policies and economic crises in Spain and Greece. In their findings, the authors found that economic crises increase issues of housing affordability especially for low-income groups. They confirmed that the availability of a limited amount of land was one of the major concerns that hindered the construction of affordable housing in the regions in question, and consequently, residents face affordability issues.

The findings agree with those of Nzau (2020) performed a comparative analysis of Nairobi and California's real estate policies for affordable housing and found that equitable policies can foster access to affordable housing but they need to be customized to local contexts. Some barriers pointed out by the study include high land use restrictions and complex approval procedures, which go a long way in explaining the current supply constraints in affordable housing.

In hypothesis 2, the p-value p=0.000<0.05 is below the significance level (p = 0.05), shows that the cost of building materials significantly influences the provision of affordable housing agreeing with the findings from the studies done by Diamond and McQuade (2019) and Hong *et al*. (2018) who showed that an increase material cost limit affordable housing development, as high costs are moved on to the customers or prevent projects from being financially viable. This agreement shows that high costs of building materials constrain the provision of affordable housing universally. In Kiambu County, this highlights the need for cost-reduction strategies to allow more affordable housing development.

In agreement with these results is Fernández-Agüera *et al*. (2019) who explored how the cost of building materials affected the delivery of affordable housing to rural regions in Spain using case studies to assess thermal comfort and indoor air quality in low-income houses. The authors found that poor thermal comfort limits the quality of affordable housing for low-income residents. They also discussed how challenges associated with high construction materials costs make affordable housing projects untenable in these areas, hence the constrained realization of affordable housing for the inhabitants.

The findings further agree with those of East Asia Zhu *et al*., (2020) who used quantitative analysis to analyze the energy data to understand the reliability of Japan's energy supply and found that renewable energy plays an important role in stabilizing energy supply mainly in addressing the shortage of energy.

For hypothesis 3, the p-value p=0.000<0.02 is below the significance level (p = 0.05), resulting in null hypothesis rejection. This agrees with the findings from Tanaka and Yamada (2021) and Juma (2014) studies which highlighted that economic stability supports affordable housing. The agreement indicates that stable economic conditions are beneficial universally to the efforts of affordable housing both in the context of developing and developed regions. In

Kiambu, this shows that inflation management and access to affordable financing could be helpful policy areas to promote affordable housing.

These findings further agree with the results by Akinsulire *et al*. (2024) who performed a comparative review of affordable housing policies in different countries using qualitative analysis to examine economic and social outcomes. His study concluded that well-implemented affordable housing policies lead to positive social and economic effects such as improved life quality, economic growth, and social involvement. Their work showed that, for instance, changes in interest rates or unemployment levels had a great impact on house affordability. Some factors cited include decreased investment in housing projects during economic downturns, thus limiting the supply of affordable housing.

The results are also in agreement with the findings of Kahouli (2020) who performed an econometric analysis of the health effects on fuel poverty exploring the role of the economic environment in affordable housing delivery in the rural settings of France. The authors found that fuel poverty correlates with housing price inflation leading to affordability problems. The economic variables they included in their study focused on household hazards, employment status, fuel poverty, and housing prices, emphasizing the relation and impact on the affordability of houses.

However, in hypothesis 4, the p-value $p=0.064>0.005$ exceeds the significance level ($p = 0.05$), hence failing to reject the null hypothesis. This indicates that government policies are not statistically significant suggesting limited effect on the provision of affordable housing in Kiambu County. This disagrees with the findings from the studies of Been *et al*. (2019) and Wakely (2020) which found that supportive government policies and public-private partnerships were crucial in the efforts to provide affordable housing. This indicates that government policies are essential for the provision of affordable housing in some regions;

however, Kiambu County's policies may lack the required support or enforcement to make a significant influence.

These results are in tandem with the findings of Chan and Adabre (2019) who did an empirical analysis of the success criteria for affordable and sustainable housing projects focusing on policies formulated by the Chinese government to increase affordable housing provision. They observed that the identified criteria like cost control, stakeholder engagement, and efficient resource use as crucial for success. They further observed that policies touching on the strategy of land distribution, tax exemptions, and subsidies played a crucial role in enhancing the supply of affordable housing.

Thus, three of the four hypotheses were rejected, with only one remaining. Land availability, building material costs, and economic conditions were found to be statistically significant at the 0.05 level, indicating their importance in affordable housing provision. However, while government policies play a role, there was insufficient evidence to include them in the model for Kiambu County, Kenya.

4.7 Mediation Analysis

Mediation analysis assesses if a Mediating variable influences the relationship between dependent and independent variables. It has been done through regression, including independent variables, the mediator, and their interaction. Standardization reduces multicollinearity. In the mediation analysis, infrastructure development emerged as a significant mediator of the relationship between supply-side factors and affordable housing provision. The interactive effects revealed that infrastructure development can either amplify or dampen the impacts of factors such as land availability, and costs of building materials on affordable housing initiatives.

This interaction corroborates findings by Park and Davis (2022) and Muiruri & Sang (2018) who posited that proximity to infrastructure influences the developer's decision-making on affordable project initiatives. As infrastructure contributes to enhancing accessibility to homes as well as enhancing living standards, it contributes to increasing the appeal and feasibility of affordable housing projects in agreement with Alteneiji *et al*., (2020).

Kiambu County could reduce some of the limitations on affordable housing from the supply side by enhancing infrastructure and, therefore, show the need to link and complement urban planning and infrastructure development in tackling housing issues. Table 4.14 displays the resulting model with standardized coefficients for easier interpretation.

Table 4. 14: **Mediation Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.831a	0.672	0.656	0.33612	0.692	19.091	4	32	0.000
2	.857b	0.768	0.697	0.31515	0.0791	1.951	5	27	0.018

a Predictors: (Constant): Land Availability, Building Material Costs, Economic Conditions, and Government Policies
b Predictors: (Constant), Land Availability (LA), Building Material Costs (BMC), Economic Conditions (EC), and Government Policies (GP), Interaction ZLA, ZID, Interaction ZBMC_ZID, Interaction ZEC,_ZID, Interaction ZGP, ZID

***Source: Researcher (2024*)**

The model summary displays the R and R^2 values initially without the mediating variable and subsequently with its inclusion, showing interaction effects. The R^2 change, at .0791, represents a 79.1% increase in explained variation due to interactions. Significantly, the F change was observed at p = 0.05 (p = 0.018).

Table 4. 15: **Mediation Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.269	0.593		0.456	0.652
	Availability of Land	0.329	0.081	0.390	3.934	0.000
	Cost of Building Materials	0.399	0.087	0.501	4.604	0.000
	Economic Environment	0.165	0.080	0.215	1.9798	0.029
	Government Policies	0.137	0.103	0.125	1.167	0.068
2	(Constant)	0.625	0.611		1.025	0.312
	Availability of Land	0.429	0.094	0.515	4.679	0.000
	Cost of Building Materials	0.301	0.103	0.389	2.951	0.008
	Economic Environment	0.197	0.084	0.257	2.333	0.023
	Government Policies	0.065	0.118	0.069	0.547	0.069
	Infrastructure Development	-0.156	0.082	-0.214	-1.914	0.048
	Interaction ZLA, ZID	-0.113	0.080	-0.176	-1.436	0.000
	Interaction ZBMC, ZID,	0.176	0.091	0.272	1.942	0.033
	Interaction ZEC, ZID,	-0.182	0.085	-0.275	-2.082	0.041
	Interaction ZGP, ZID	-0.043	0.079	-0.066	-0.579	0.070

a Dependent Variable:

***Source: Researcher (2024*)**

Additionally, Table 4.15 presents the coefficients derived from both models, one without the mediating variable and the other with the interaction term. The mediating variable (Infrastructure development) in the second model was statistically significant ($p = 0.048$) at the 0.05 significance level. Moreover, interactions between the mediating variable and Land Availability ($p = 0.000$), Cost of Building Materials ($p = 0.033$), and Economic Environment ($p = 0.041$) were statistically significant at the 0.05 significance level. To assess mediation, the relationship can be explained using the provided equation below:

$Y = \beta 0 + \beta 1\ (X1 \ldots Xi) + \beta 2\ (MOD) + \ldots + \beta i\ (X1 \ldots Xi)\ (MOD) + \varepsilon 2$

Where: Y represents the dependent variable,

$\beta 0$, $\beta 1$, $\beta 2 \ldots \beta i$ represent the regression coefficients, X_1, $X_2 \ldots X_i$ represent the independent variables, and;

MOD Represents the Mediating Variable

$\varepsilon 2$ Represents the Constant Term

As a result, after entering the coefficients into the model mentioned above, the final regression model that incorporates the mediating variable's statistically significant interactions will be:

PAH = 0.625 – 0.113(INT, LA, ID) + 0.176(INT_ BMC, ID) - 0.182 (EC_ID)

Where: PAH represents the Provision of Affordable Housing (Y) ($\beta 1$) LA represents the Land Availability ($\beta 2$) BMC represents the Building Material Costs ($\beta 3$) EC represent Economic Conditions while ID represents Infrastructure development (MOD)

Consequently, based on the hypothesis generated earlier in the research:

$H0_5$: Infrastructure development does not mediate the relationship between supply-side factors and provision of affordable housing by real estate developers in Kiambu County, Kenya. In this case, since the p-value, p = 0.048, was statistically significant at the 0.05 significance level, therefore we reject the null hypothesis above. These study findings disagree with the findings of Okpala, Nwosu and Otty (2022) who examined the effect of developer infrastructure fees on Zoo Estate Enugu's housing affordability.

A questionnaire was administered in order to gather data. Eighty-eight of the 92 questionnaires that were given to the respondents were collected and utilised for the study. The respondents' scores on the fundamental effect elements were examined using the Relative Importance Index

(RII). High rents, rising housing costs, a shortage of suitable and reasonably priced homes, developer infrastructure fees that improve accessibility, etc., were ranked first, second, third, and fourth, respectively, according to the results.

The analysis's findings show that developer infrastructure fees raise rents and property values, which has a big impact on how affordable housing is. According to the study, the State Government should fund and maintain infrastructure using money received from property taxes or ground rent rather than inventing a new name such as Infrastructure Development Fund (IDF) or Infrastructure Development Charge (IDC).

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The research findings are compiled in this chapter and contrasted with the data acquired from the literature review. Additional suggestions are also given for directing future studies in the field and for the proper implementation of the results to industry.

5.2 Summary of the Findings

5.2.1 Availability of Land on the Provision of Affordable Housing by Real Estate Developers

From the analysis of the results in this study, it is evident that land availability is a contributing factor to affordable housing in Kiambu County since there is a positive relationship between the accessibility of land and housing provision the p-value $p=0.000<0.05$ is below the significance level ($p = 0.05$), leading to the rejection of the null hypothesis in favor of the alternative.

The significant p-value for land availability indicates a strong positive effect of land availability on Kiambu's affordable housing which aligns with the studies of Aurand *et al.* (2023) and Wu (2022) who found land scarcity and pressure on costs limit affordable housing in their study. This suggests that across different geographies, the availability of land continuously influences the provision of affordable housing. This finding is validated by the local context of Kiambu County with particular emphasis on the role of accessible land for sustainable development.

5.2.2 Cost of Building Materials on the Provision of Affordable Housing by Real Estate Developers

The study established that inexpensive houses are influenced by the cost of building materials, where high cost immensely affects the capacity to provide housing. The p-value $p=0.000<0.05$

is below the significance level (p = 0.05), showing that the cost of building materials significantly influences the provision of affordable housing agreeing with the findings from the studies done by Diamond and McQuade (2019) and Hong *et al*. (2018) who showed that an increase material cost limit affordable housing development, as high costs are moved on to the customers or prevent projects from being financially viable. This agreement shows that high costs of building materials constrain the provision of affordable housing universally. In Kiambu County, this highlights the need for cost-reduction strategies to allow more affordable housing development.

5.2.3 Economic Environment on the Provision of Affordable Housing by Real Estate Developers

The study reveals that the economic factors, particularly financial stability, and available credit ratings, positively contribute to affordable housing in Kiambu County. From the results the p-value p=0.000<0.02 is below the significance level (p = 0.05), resulting in null hypothesis rejection. The findings show that the economic factors, specifically financial stability, and available credit ratings, have a significant and positive relationship with affordable housing in Kiambu County. This agrees with the findings from Tanaka and Yamada (2021) and Juma (2014) studies which highlighted that economic stability supports affordable housing. The agreement indicates that stable economic conditions are beneficial universally to the efforts of affordable housing both in the context of developing and developed regions. In Kiambu, this shows that inflation management and access to affordable financing could be helpful policy areas to promote affordable housing.

5.2.4 Government Policies on the Provision of Affordable Housing by Real Estate Developers

According to the results, analyzing the impacts of state guidelines on delivery of cheap houses was positive but not significant. The p-value p=0.064>0.005 exceeds the significance level (p = 0.05), hence failing to reject the null hypothesis. This indicates that government policies are not statistically significant suggesting limited effect on delivery of cheap houses in Kiambu County. This disagrees with results from studies of Been *et al*. (2019) and Wakely (2020) which found that supportive government policies and public-private partnerships were crucial in the efforts to provide affordable housing. This indicates that government policies are essential for the provision of affordable housing in some regions; however, Kiambu County's policies may lack the required support or enforcement to make a significant influence

5.2.5 Mediating Role of Infrastructure Development on the Relationship between Supply-Side Factors and Provision of Affordable Housing

The mediation analysis demonstrated that infrastructure development significantly mediates association amongst supply-side elements and affordable housing delivery. The introduction of infrastructure development into the model increased the R^2 value, indicating better explanatory power. Interaction terms such as availability of land and infrastructure development (β = -0.113, p = 0.000) and cost of building materials with infrastructure development (β = 0.176, p = 0.033) were significant, highlighting that infrastructure development can enhance or mitigate the impacts of other supply-side factors on housing provision.

This study results were in agreement with the findings of Okpala, Nwosu and Otty (2022) who examined the effect of developer infrastructure fees on Zoo Estate Enugu's housing affordability. The analysis's findings show that developer infrastructure fees raise rents and

property values, which has a big impact on how affordable housing is. The results are also in tandem with the findings of Mohammed (2021) who examined the impact of incremental infrastructure on Kenyan county governments' economic growth. The study's primary premise was that significant infrastructure expenditures have been made, and it is critical to evaluate how these investments affect Kenyan counties' economic development. The results showed that the economic development of Kenyan county governments was significantly and favourably correlated with the infrastructure of transportation, water and sanitation, and social services.

5.3 Conclusions of the Study

The study mad conclusions based on the unique findings of the study associated with the formulated research hypothesis to address the objectives of the study.

5.3.1 Availability of Land on the Provision of Affordable Housing by Real Estate Developers

With respect to the test for hypothesis one, the study concluded that land availability is a contributing factor to affordable housing in Kiambu County since there is a positive association amongst the accessibility of land and houses provision.

5.3.2 Cost of Building Materials on the Provision of Affordable Housing by Real Estate Developers

Test for hypothesis two concludes that cheap houses is influenced by the cost of building materials, where high cost immensely affects the capacity to provide housing since the cost of building materials influences affordably ordained housing in Kiambu County and that lack of raw materials or high cost of these resources have implications in terms of project timeline and quality, hence working against project feasibility and quality.

5.3.3 Economic Environment on the Provision of Affordable Housing by Real Estate Developers

Test for hypothesis three concluded that the economic factors, particularly financial stability, and available credit ratings, positively contribute to affordable housing in Kiambu County. At the same time the economic factors, specifically financial stability, and available credit ratings, have a substantial and positive association with affordable housing in Kiambu County.

5.3.4 Government Policies on the Provision of Affordable Housing by Real Estate Developers

Test for hypothesis four analyzed the impacts of government guidelines on provision of inexpensive houses was positive but not significant since the current policies in Kiambu County may not fix housing problems.

5.3.5 Mediating Role of Infrastructure Development on the Relationship between Supply-Side Factors and Provision of Affordable Housing

Test for hypothesis five concluded that study findings that infrastructure development significantly mediates the connection among supply-side elements and affordable house provision. Introduction of infrastructure development into the model increased the R^2 value, indicating better explanatory power. Interaction terms such as availability of land and infrastructure development and cost of building materials with infrastructure development were significant; highlighting that infrastructure development can enhance or mitigate the impacts of other supply-side factors on housing provision.

5.4 Recommendations

5.4.1 Policy Reforms to Address Land Scarcity

Since land availability is a contributing factor to affordable housing in Kiambu County since there is a positive association among accessibility of land and house delivery, the study recommends that the following policy interventions be made: It is these reforms that should address issues to do with holding land for speculative purposes and encourage the release of land for affordable housing projects. For instance, clearance systems that sought to increase taxes on vacant land would help reduce the incidences of people hoarding land, waiting for prices to increase, and speculating in the real estate market.

Since the regulatory measures and enhanced property rights, including title conveyance, may point directly at the availability and cost of land, which are integral to housing costs in Kiambu County, investors should look into the following policies that impact land.

5.4.2 Financial Incentives for Affordable Housing

Owing to the fact that affordable housing is influenced by the cost of building materials, where high cost immensely affects the capacity to provide housing since the cost of building materials influences affordably ordained housing in Kiambu County and that lack of raw materials or high cost of these resources have implications in terms of project timeline and quality, hence working against project feasibility and excellence.

The study commends those specific financial incentives be introduced to help reduce the high cost of building materials as the study established that high costs of these materials are among the factors that lead to making houses less affordable. Authorities should impose exemptions on the VAT on locally-produced building materials, supply grants for procuring materials in large quantities, and on imported construction materials that are vital to the creation of affordable homes, authorities could offer concessional tariffs.

5.4.3 Enhanced Infrastructure Development

Inquiry results disclose that feasibility of affordable housing is highly dependent on infrastructure such as roads, water, and electricity. Hence, this investigation proposes that county governments need to focus on infrastructural development in areas considered suitable for affordable housing. Moreover, focusing on the upgrades of transport connections and communication and utilization of other vital infrastructures would not only enhance the appeal of affordable housing areas but effectively serve residents' needs, thus improving the sustainability of such projects in the long run.

5.4.4 Comprehensive Housing Policy Framework

It was concluded that analyzing the impacts of government policies on the provision of affordable houses was positive but not significant since the current policies in Kiambu County may not fix housing problems. This study recommends an efficient approval mechanism, a clear code regarding construction, and a robust policy on mixed-income developments. It is crucial to enact policies that will help develop close ties between public agencies, developers, and not for profit institutions to enhance the implementation and regulation of the policies. This would offer developers a robust and conducive legal environment through which they could develop reliable programs for affordable houses within Kiambu County.

5.5 Areas of Further Research

Further research areas might involve examining the long-term impacts of policy reforms on affordable housing provision, assessing innovative financing mechanisms' effectiveness, investigating how infrastructure development affects housing affordability socioeconomically, and exploring community perceptions and experiences in affordable housing initiatives.

REFERENCES

Abuya, D. O. (2020). *Management of The Effects of Land Use Changes On Urban Infrastructure Capacity: A Case Study of Ruaka Town, Kiambu County, Kenya* (Doctoral dissertation, University of Nairobi).

Adedeji, I., Deveci, G., & Salman, H. (2023). The challenges in providing affordable housing in Nigeria and the adequate sustainable approaches for addressing them. Open Journal of Applied Sciences, 13(03), 431–448. https://doi.org/10.4236/ojapps.2023.133035

Afolayan, M., & Oniyinde, O. (2019). Interviews and questionnaires as legal research instruments. *10.7176/JLPG/83-08*, *83*, 51–59. https://doi.org/10.7176/jlpg/83-08

African Development Bank. (2018). African Economic Outlook (Publication No.). African Development Bank Group.

Akinsulire, N. a. A., Idemudia, N. C., Okwandu, N. a. C., & Iwuanyanwu, N. O. (2024). Economic and social impact of affordable housing policies: A comparative review. *International Journal of Applied Research in Social Sciences*, *6*(7), 1433–1448. https://doi.org/10.51594/ijarss.v6i7.1333

Al Mamun, A., Afroz, R., & Hoque, A. (2020). Value Engineering in the Construction Industry: A Comprehensive Review. Buildings, 10(10), 188.

Alexandri, G., & Janoschka, M. (2018). Who loses and who wins in a housing crisis? Lessons from Spain and Greece for a nuanced understanding of dispossession. *Housing Policy Debate*, *28*(1), 117-134.

Alteneiji, K., Alkass, S., & Abu Dabous, S. (2020). A review of critical success factors for public–private partnerships in affordable housing. *International Journal of System Assurance Engineering and Management*, *11*(6), 1192-1203.

Amrhein, V., Trafimow, D., & Greenland, S. (2019). Inferential statistics as descriptive statistics: There is no replication crisis if we don't expect replication. *The American Statistician*, *73*(sup1), 262-270.

Anacker, K. B. (2019). Introduction: Housing affordability and affordable housing. *International Journal of Housing Policy*, *19*(1), 1-16.

Anselin, L. (2020). Local spatial autocorrelation. *Other Local Spatial Autocorrelation Statistics*.

Archer, T., & Brown, T. (2019). Affordable housing in the United Kingdom: An overview of policy landscape. Housing Studies, 34(7), 1194-1214. doi: 10.1080/02673037.2018.1543635.

Asare, A. K., Fenteng, K. A., & Owusu-Manu, D. G. (2021). Assessment of affordable housing delivery in Ghana. Journal of Engineering, Design and Technology. https://doi.org/10.1108/JEDT-10-2020-0311

Aurand, A., Emmanuel, D., Threet, D., Rafi, I., & Yentel, D. (2023). *A shortage of affordable homes*. Washington, DC: National Low Incoming Housing Coalition.

Baek, C., & Kim, H. (2018). Affordable housing provision in South Korea: Policy implementation and challenges. Cities, 72, 320-327.

Batty, G. D., Gale, C. R., Kivimäki, M., Deary, I. J., & Bell, S. (2020). Comparison of risk factor associations in UK Biobank against representative, general population based studies with conventional response rates: prospective cohort study and individual participant meta-analysis. *bmj*, *368*.

Been, V., Ellen, I. G., & O'Regan, K. (2019). Supply skepticism: Housing supply and affordability. *Housing Policy Debate*, *29*(1), 25-40.

Burgess, G., Monk, S., & Whitehead, C. (2011). Delivering local infrastructure and affordable housing through the planning system: the future of planning obligations through Section 106. *People, Place and Policy*, *5*(1), pp. 1-11.

Buckle, R., & Kent, J. (2019). Economic environment and the availability of affordable rental housing in New Zealand. Housing Studies, 34(3), 466-485.

Chan, A. P., & Adabre, M. A. (2019). Bridging the gap between sustainable housing and affordable housing: The required critical success criteria (CSC). *Building and environment*, *151*, 112-125.

Chanda, M. P., & Kaliba, C. (2020). Affordable housing delivery in Zambia: Achievements, challenges and prospects. Journal of African Real Estate Research, 5(1), 17-37. https://doi.org/10.1108/JARER-02-2020-0010

Chen, L., & Zhang, H. (2019). Government Policies and Affordable Housing in China: A Review of Successes and Challenges. Journal of Urban Economics, 22(1), 112-129.

Cheruiyot, K., & Isutsa, D. (2018). Public Participation in Development Control in Kiambu County, Kenya. International Journal of Social Sciences and Humanities, 2(1), 11-21.

Chikozho, C., & Zhou, R. (2018). The impact of the economic environment on housing affordability in Zimbabwe. Journal of Housing and the Built Environment, 33(3), 377-396.

Ching, J., & Phoon, K. K. (2019). Impact of autocorrelation function model on the probability of failure. *Journal of Engineering Mechanics*, *145*(1), 04018123.

Corrigan, E., Foley, D., McQuinn, K., O'Toole, C., & Slaymaker, R. (2019). Exploring affordability in the Irish housing market. *The Economic and Social Review*, *50*(1, Spring), 119-157.

Cytonn Investments. (2021). Affordable Housing. Retrieved from https://www.cytonn.com/affordable-housing.

Dang, T. T., Vu, L. T., & Nguyen, H. H. (2019). Factors affecting the feasibility of affordable housing projects in Vietnam. Journal of Construction in Developing Countries, 24(2), 1-18.

Dannels, S. A. (2018). Research design. In *The reviewer's guide to quantitative methods in the social sciences* (pp. 402-416). Routledge.

Dernberger, B. N., & Pepin, J. R. (2020). Gender flexibility, but not equality: Young adults' division of labor preferences. *Sociological Science*, *7*, 36-57.

Desmond, M., Gershenson, C., Kiviat, B., & Vest, A. (2018). Affordable housing and city planning: A review of the evidence. Cityscape: A Journal of Policy Development and Research, 20(1), 7-40.

Diamond, R., & McQuade, T. (2019). Who wants affordable housing in their backyard? An equilibrium analysis of low-income property development. *Journal of Political Economy*, *127*(3), 1063-1117.

Ehwi, R. J. (2022). Modelling the supply-side factors influencing the provision of amenities in gated communities: The case of the Greater Accra Metropolitan Area in Ghana. *Journal of Urban Affairs*, *46*(9), 1744–1774. https://doi.org/10.1080/07352166.2022.2124917

Elkhouly, M. A., & Elragal, A. A. (2020). Social housing and affordable housing policies in Egypt: Critical analysis of trends and challenges. Journal of Urban Management, 9(3), 94-106. https://doi.org/10.1016/j.jum.2020.09.002

Ellen, I. G., & Horn, K. M. (2020). The low-income housing tax credit program: A review of the evidence. Annual Review of Economics, 12(1), 545-568. doi: 10.1146/annurev-economics-081019-124946

Ewing, S., & Ritzer, G. (2019). Inequality and the high cost of housing in the United States: The cost disease perspective. Housing Policy Debate, 29(5), 645-666.

Fernández-Agüera, J., Domínguez-Amarillo, S., Alonso, C., & Martín-Consuegra, F. (2019). Thermal comfort and indoor air quality in low-income housing in Spain: The influence of airtightness and occupant behaviour. *Energy and Buildings*, *199*, 102-114.

Ferrari, E., Gibb, K., & Berry, M. (2018). Affordable housing in the UK: A critical review of the literature. Journal of Housing and the Built Environment, 33(3), 513-530. doi: 10.1007/s10901-017-9579-5

FitzPatrick, B. (2019). Validity in qualitative health education research. *Currents in Pharmacy Teaching and Learning*, *11*(2), 211-217.

Flora, D. B. (2020). Your coefficient alpha is probably wrong, but which coefficient omega is right? A tutorial on using R to obtain better reliability estimates. *Advances in Methods and Practices in Psychological Science*, *3*(4), 484-501.

Geltner, D. M., Miller, N. G., Clayton, J., Eichholtz, P. M., & Miles, M. (2021). Commercial Real Estate Analysis and Investments. Cengage Learning.

George, D., & Mallery, P. (2019). IBM SPSS statistics 26 step by step: A simple guide and reference. Routledge.

Gupta, V., & Gupta, M. (2020). Affordable housing in India: Challenges and opportunities. Housing Studies, 35(3), 441-458. doi: 10.1080/02673037.2019.1692382

Han, X., & Feng, C. (2024). Effects of Affordable Housing Land Supply on Housing Prices: Evidence from 284 Cities in China. *Land*, *13*(5), 580. https://doi.org/10.3390/land13050580

Hong, J., Shen, G. Q., Li, Z., Zhang, B., & Zhang, W. (2018). Barriers to promoting prefabricated construction in China: A cost–benefit analysis. *Journal of cleaner production*, *172*, 649-660.

Hosseini, M. H., Shirmohammadi, N., & Moghimi, R. (2019). The Role of Housing Market Segmentation in Decreasing Urban Segregation. European Journal of Sustainable Development Research, 3(3), 46-55.

Institute for Housing Studies. (2020). Affordable rental housing policy landscape in Kenya. Retrieved from https://www.ihsnairobi.org/wp-content/uploads/2020/06/Affordable-Rental-Housing-Policy-Landscape-in-Kenya.pdf.

Irungu, M. N., Diang'a, S., & Gwaya, A. (2022). Constraints Facing the Effective Implementation of Affordable Housing Programme in Kiambu County. *East African Journal of Engineering*, *5*(1), 195-204.

Kanjumba, F. (2017). Economic and Innovative Factors Influence on Funding of the Supply-Side of Housing in Nairobi, Kenya. *Business and Management Studies. 3*. 39. 10.11114/bms.v3i4.2316.

Kimemia, J. W. (2023). Integrated macroeconomic variables and financial growth of the real estate sector in Kenya. Journal of Finance and Accounting, 7(10), 79–91. https://doi.org/10.53819/81018102t4232

Justiniano, A., Primiceri, G. E., & Tambalotti, A. (2019). Credit supply and the housing boom. *Journal of Political Economy*, *127*(3), 1317-1350.

Kahouli, S. (2020). An economic approach to the study of the relationship between housing hazards and health: The case of residential fuel poverty in France. *Energy Economics*, *85*, 104592.

Kain, J. F. (1968). Housing segregation, Negro employment, and metropolitan decentralization. The Quarterly Journal of Economics, 82(2), 175-197.

Kanyi, M. W. (2020). Effects of Government Policy Instruments on the Supply of Affordable Housing in Kenya. International Journal of Science and Research, 9(2), 185-195.

Kavesh, M. (2021). Affordable Housing in Kiambu County: Challenges and Opportunities. Journal of Urban Economics and Management, 2(1), 17-32.

Kim, H. S., Lee, G. E., Lee, J. S., & Choi, Y. (2019). Understanding the local impact of urban park plans and park typology on housing price: A case study of the Busan metropolitan region, Korea. *Landscape and Urban Planning*, *184*, 1-11.

Kyriazos, T. A. (2018). Applied psychometrics: sample size and sample power considerations in factor analysis (EFA, CFA) and SEM in general. *Psychology*, *9*(08), 2207.

Latif, K. F., & Sajjad, A. (2018). Measuring corporate social responsibility: A critical review of survey instruments. *Corporate Social Responsibility and Environmental Management*, *25*(6), 1174-1197.

Lee, J., & Shepley, M. M. (2020). Benefits of solar photovoltaic systems for low-income families in social housing of Korea: Renewable energy applications as solutions to energy poverty. *Journal of Building Engineering*, *28*, 101016.

Leeson, P. T., & Thompson, H. A. (2021). Public choice and public health. *Public Choice*, 1-37.

Li, W., & Li, X. (2018). China's affordable housing policies: Evaluation and outlook. Land Use Policy, 78, 425-434. doi: 10.1016/j.landusepol.2018.06.008

Lind, H. (2019). Population and economic development in Kenya 1962-2013. Economic Change and Restructuring, 52(4), 341-376.

Maeda, D., Rabinowitz, A., & Sabherwal, S. (2018). Financing Affordable Housing Development in Developing Countries. World Bank Group, Policy Research Working Paper 8468.

Maharani, P. (2023). *Understanding developer's perspective and supply-side constraints of inclusionary housing in Jakarta, Indonesia*. Retrieved from http://hdl.handle.net/2105/70416

Mast, E. (2019). The effect of new market-rate housing construction on the low-income housing market. *Upjohn Institute WP*, 19-307.

Maulud, D., & Abdulazeez, A. M. (2020). A review on linear regression comprehensive in machine learning. *Journal of Applied Science and Technology Trends*, *1*(4), 140-147.

Ministry of Transport, Infrastructure, Housing, Urban Development, and Public Works. (2020). Affordable Housing Program. Retrieved from https://www.housingandurban.go.ke/affordable-housing-program/

Mitchell, W. C. (1923). Business cycles: the problem and its setting. National Bureau of Economic Research.

Mugo, C. K., Owino, J. O., & Oluoch, A. (2020). Effect of Land Use Planning Policies on the Provision of Affordable Housing in Kiambu, Kenya. Journal of Geography, Environment and Earth Science International, 24(7), 27-36.

Muiruri, C. W., & Sang, P. (2018). *Critical factors and real estate development by private developers in Kiambu County, Kenya* (Doctoral dissertation, KENYATTA UNIVERSITY).

Mwangi, L. W., Njuguna, J., & Karanja, P. (2018). Factors Affecting Supply of Affordable Housing in Kenya: A Case of Thika Municipality. Journal of Construction Project Management and Innovation, 8(2), 1887-1905.

National Association of Home Builders. (2021). COVID-19 Pandemic Continues to Impact Construction Costs. Retrieved from https://www.nahb.org/news-and-economics/industry-news/press-releases/2021/04/covid-19-pandemic-continues-to-impact-construction-costs.

National Low Income Housing Coalition. (2021). Out of Reach 2021. Retrieved from https://reports.nlihc.org/sites/default/files/oor/2021/index.html

Ngugi, K., & Mwangi, P. (2018). Government Policies and Affordable Housing: A Case Study of Nairobi, Kenya. International Journal of Urban Planning, 45(3), 215-232.

Njogu, F. K. (2019). Housing Affordability in Nairobi: A Conceptual Framework. International Journal of Academic Research in Business and Social Sciences, 9(3), 139-151.

Njoroge, P., & Mwangi, J. (2023). The Influence of Economic Environment on Affordable Housing Provision in Kiambu County, Kenya. Journal of Urban Development, 28(1), 45-62.

Nzau, B. M. (2020). *Harnessing the real estate market for equitable affordable housing provision in Nairobi, Kenya: insights from California, USA*. University of Salford (United Kingdom).

Ochieng, P., & Kimani, J. (2023). The Effect of Building Material Costs on Affordable Housing Provision in Kiambu County, Kenya. Journal of Urban Development, 28(1), 112-129.

Okpala, C., Nwosu, C.C., & Otty, E. (2022). *The Impact of Developer Infrastructure Charges on Housing Affordability in Zoo Estate Enugu*. 10.35629/5252-04046676.

Olanrewaju, A., Lim, X.Y., Tan, S.Y., Lee, J.E., & Adnan, H. (2018). *Factors Affecting Housing Prices in Malaysia: Analysis of the Supply Side. Planning Malaysia Journal*

Poterba, J. M. (1984). Tax Subsidies to Owner-occupied Housing: An Asset Market Approach. The Quarterly Journal of Economics, 99(4), 729-752.

Rajagopal, G., & Sane, R. (2019). Affordable housing in India: An overview of policy landscape. Habitat International, 90, 101836. doi: 10.1016/j.habitatint.2019.101836

Revelle, W., & Condon, D. M. (2019). Reliability from α to ω: A tutorial. *Psychological assessment*, *31*(12), 1395.

Revelle, W., & Condon, D. M. (2019). Reliability from α to ω: A tutorial. *Psychological assessment*, *31*(12), 1395.

Ryan-Collins, J. (2021). Breaking the housing–finance cycle: Macroeconomic policy reforms for more affordable homes. *Environment and Planning A: Economy and Space*, *53*(3), 480-502.

Sarstedt, M., Mooi, E., Sarstedt, M., & Mooi, E. (2019). Regression analysis. *A concise guide to market research: The process, data, and methods using IBM SPSS Statistics*, 209-256.

Schad, D. J., Vasishth, S., Hohenstein, S., & Kliegl, R. (2020). How to capitalize on a priori contrasts in linear (mixed) models: A tutorial. *Journal of memory and language*, *110*, 104038.

Sengupta, S., & Jha, M. K. (2020). Social policy, COVID-19 and impoverished migrants: challenges and prospects in locked down India. *The International Journal of Community and Social Development*, *2*(2), 152-172.

Shrestha, N. (2020). Detecting multicollinearity in regression analysis. *American Journal of Applied Mathematics and Statistics*, *8*(2), 39-42.

Siyongwana, P. N., & Mbewe, M. F. (2020). Challenges facing the delivery of affordable housing in South Africa. Journal of Construction Project Management and Innovation, 10(1), 2421-2437. https://doi.org/10.19085/journal.cppi.v10i1

Stratton, S. J. (2021). Population research: convenience sampling strategies. *Prehospital and disaster Medicine*, *36*(4), 373-374.

Sulewski, P. (2020). Modified Lilliefors goodness-of-fit test for normality. *Communications in Statistics-Simulation and Computation*, *51*(3), 1199-1219.

Sürücü, L., & Maslakçi, A. (2020). Validity and reliability in quantitative research. *Business & Management Studies: An International Journal*, *8*(3), 2694-2726.

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in science education*, *48*, 1273-1296.

Tamminen, K. A., & Poucher, Z. A. (2020). Research philosophies. In *The Routledge international encyclopedia of sport and exercise psychology* (pp. 535-549). Routledge.

Tanaka, S., & Yamada, T. (2021). The Relationship Between Economic Environment and Affordable Housing: Lessons from Japan. Journal of Urban Economics, 25(2), 76-93.

UN-Habitat. (2018). Urban Land Governance for Affordable Housing. Retrieved from https://unhabitat.org/urban-land-governance-for-affordable-housing

United Nations. (2019). Housing as a Right: A Basic Human Right. Retrieved from https://www.un.org/sites/un2.un.org/files/housing_a_basic_human_right.pdf

Urban Land Institute. (2021). The State of the Real Estate Industry 2021. Retrieved from https://www.uli.org/wp-content/uploads/ULI-Documents/The-State-of-the-Real-Estate-Industry-2021.pdf

Vakili, M. M., & Jahangiri, N. (2018). Content validity and reliability of the measurement tools in educational, behavioral, and health sciences research. *Journal of Medical Education Development*, *10*(28), 106-118.

Vuluku, Gayline & Gachanja, James. (2014). Supply Side Aspects of Residential Housing for Low Income Earners in Kenya. *Research in Applied Economics. 6*. 271. 10.5296/rae.v6i3.6171.

Wakely, P. (2020). Partnership: a strategic paradigm for the production & management of affordable housing & sustainable urban development. *International Journal of Urban Sustainable Development*, *12*(1), 119-125.

World Bank. (2018). Affordable Housing: A Resource for Policy Makers in Emerging Markets. Retrieved from

https://www.worldbank.org/en/topic/urbandevelopment/publication/affordable-housing-a-resource-for-policy-makers-in-emerging-markets

World Bank. (2019). Developing Kenya's Mortgage Market. Retrieved from http://siteresources.worldbank.org

Wu, F. (2022). Land financialisation and the financing of urban development in China. *Land Use Policy*, *112*, 104412.

Wu, M. J., Zhao, K., & Fils-Aime, F. (2022). Response rates of online surveys in published research: A meta-analysis. *Computers in Human Behavior Reports*, *7*, 100206.

Yang, Y., & Mathew, T. (2018). The simultaneous assessment of normality and homoscedasticity in linear fixed effects models. *Journal of Statistical Theory and Practice*, *12*, 66-81.

Zhang, J., & Xu, Y. (2019). Affordable housing in China: Policies, practices, and prospects. Cities, 92, 166-176. doi: 10.1016/j.cities.2019.04.00

Zhu, D., Mortazavi, S. M., Maleki, A., Aslani, A., & Yousefi, H. (2020). Analysis of the robustness of energy supply in Japan: Role of renewable energy. *Energy Reports*, *6*, 378-391.

APPENDICES

Appendix I: Questionnaire

The questionnaire is meant to collect information on "***Influence of supply-side factors on the provision of affordable housing by real estate developers in Kiambu County, Kenya"***. Kindly answer the questions by writing a brief statement or ticking in the boxes provided as will be applicable. The information provided will be treated as strictly confidential and at no instance will your name be mentioned in this research. This research is intended for an academic purpose only.

Section A: Background Information

1. Gender

Male [ ] **Female** [ ]

2. Age

21-25 years [ ] 26- 30 years [ ]

36- 40 years [ ] Over 40 Years [ ]

3. Level of education

College Certificate [ ] College Diploma [ ]

University Degree [ ] Post graduate [ ]

SECTIONB: SUPPLY-SIDE FACTORS

Part A: availability of land

4. Please use the point scale below to indicate your level of agreement by ticking each one of the given statements.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

	Opinion	1	2	3	4	5
1	Availability of land is a critical factor that affects the provision of affordable housing by real estate developers in Kiambu county, Kenya.					
2	Real estate developers in Kiambu county face significant challenges in providing affordable housing due to limited availability of land.					
3	The government needs to address the issue of limited availability of land to enable real estate developers in Kiambu county to provide affordable housing to the residents.					
4	Limited availability of land leads to high land prices, which in turn, results in the provision of expensive housing by real estate developers in Kiambu county.					

5	The government needs to implement policies that ensure the equitable distribution of land to promote the provision of affordable housing by real estate developers in Kiambu county.					
6	The availability of land in Kiambu county is a significant determinant of the quality and quantity of affordable housing provided by real estate developers.					
7	Real estate developers in Kiambu county need to adopt innovative strategies to address the issue of limited availability of land and provide affordable housing to the residents.					

Part B: Cost of Building Materials

5. Please use the point scale below to indicate your level of agreement by ticking each one of the given statements.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

	Opinion	1	2	3	4	5
1	The cost of building materials is a crucial factor that impacts the provision of affordable housing.					
2	It is evident that high costs of building materials make it extremely challenging for developers to construct affordable homes for low- and moderate-income families.					
3	The Kenyan government has developed policies and regulations that help to address the high cost of building materials in Kiambu County, Kenya, to promote the provision of affordable housing by real estate developers.					
4	Real estate developers take the initiative to explore alternative construction methods and materials that are more cost-effective to provide affordable housing for low- and moderate-income families.					
5	Promoting affordable housing can help boost economic growth by providing stable and adequate housing for the residents.					
6	Real estate developers in Kiambu County, Kenya, work in collaboration with local communities and stakeholders to ensure that their affordable housing projects meet the needs of the community.					
7	Addressing the cost of building materials in Kiambu County, Kenya, is just one aspect of the solution for promoting affordable housing.					

Part C: Economic Environment

6. Please use the point scale below to indicate your level of agreement by ticking each one of the given statements.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

	Opinion	1	2	3	4	5
1	The economic environment has a significant impact on the provision of affordable housing by real estate developers in Kiambu county, Kenya.					
2	Real estate developers in Kiambu county face challenges in providing affordable housing due to the prevailing economic environment in the county.					
3	The government needs to create a conducive economic environment that promotes the provision of affordable housing by real estate developers in Kiambu county.					
4	The economic environment affects the demand and supply of affordable housing, which has implications for real estate developers in Kiambu county.					
5	A stable economic environment with low inflation and interest rates is essential for real estate developers in Kiambu county to provide affordable housing to the residents.					
6	The economic environment affects the cost of materials and labor, which can have significant implications for the provision of affordable housing by real estate developers in Kiambu county.					
7	Real estate developers in Kiambu county need to adapt to the prevailing economic environment by adopting innovative strategies to provide affordable housing to the residents.					

Part D: Government Policies

7. Please use the point scale below to indicate your level of agreement by ticking each one of the given statements.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

	Opinion	1	2	3	4	5
1	Government policies have a significant effect on the provision of affordable housing by real estate developers in Kiambu county, Kenya.					

2	Real estate developers in Kiambu county are subject to various government policies that affect their ability to provide affordable housing to the residents.					
3	The government needs to implement policies that promote the provision of affordable housing by real estate developers in Kiambu county.					
4	Government policies affect the cost of land, materials, and labor, which can have significant implications for the provision of affordable housing by real estate developers in Kiambu county.					
5	The government needs to provide incentives to real estate developers in Kiambu county to promote the provision of affordable housing to the residents.					
6	Inefficient and ineffective government policies can hinder the provision of affordable housing by real estate developers in Kiambu county.					
7	Real estate developers in Kiambu county need to engage with the government to influence policy decisions that promote the provision of affordable housing to the residents.					

Part E: Provision of Affordable Housing

8. Please use the point scale below to indicate your level of agreement by ticking each one of the given statements.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

	Opinion	1	2	3	4	5
1	The provision of affordable housing by real estate developers is a critical measure of their social responsibility towards the community.					
2	Real estate developers who prioritize the provision of affordable housing demonstrate their commitment to addressing the housing needs of the less privileged in society.					
3	The provision of affordable housing by real estate developers is an essential factor in promoting social inclusion and reducing poverty.					
4	Real estate developers who invest in the provision of affordable housing can benefit from a stable and long-term source of revenue.					
5	The provision of affordable housing by real estate developers is a critical measure of their contribution to sustainable development and social welfare in the community.					

Thank you for your assistance

Appendix II: Interview Guide

You are requested to answer all questions in this research interview guide. The information provided shall be treated with confidentiality and will be used purposely for this study. This study aims at ***"The effect of supply-side factors on the provision of affordable housing by real estate developers in Kiambu County, Kenya".*** In this regard, I kindly request for your cooperation in responding to the attached interview guide.

NB: Do not write your name on this Interview Guide

1. Can you describe the challenges or opportunities related to the availability of land for affordable housing projects in Kiambu County?

2. How does the availability of land affect your decision to develop affordable housing projects in this region?

3. What are the primary factors influencing the cost of building materials in your affordable housing projects in Kiambu County?

4. How do fluctuations in the cost of building materials impact the feasibility of affordable housing projects?

5. How do economic conditions, such as inflation or economic growth, affect your decisions to invest in affordable housing developments in Kiambu County?

6. Can you describe any economic factors that have positively or negatively impacted your affordable housing projects?

7. How do government policies and regulations influence your affordable housing projects in Kiambu County?

8. Are there specific government incentives or barriers that have affected your work in the affordable housing sector?

9. Can you provide examples of how infrastructure development has impacted your affordable housing projects in Kiambu County?

10. What is the role of the department of lands in shaping affordable housing policies in Kiambu County?

11. How do you perceive the collaboration between real estate developers and government agencies in addressing affordable housing needs?

12. Are there specific challenges or successes related to affordable housing policies or initiatives in Kiambu County?

Appendix II: Nacosti Permit

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