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**FACTORS AFFECTING THE SUPPLY OF AFFORDABLE
RESIDENTIAL HOUSING UNITS IN KENYAN URBAN AREAS:
A CASE OF NAIROBI CITY AND ITS ENVIRONS**

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FACTORS AFFECTING THE SUPPLY OF AFFORDABLE RESIDENTIAL HOUSING UNITS IN KENYAN URBAN AREAS: A CASE OF NAIROBI CITY AND ITS ENVIRONS

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Abstract

Purpose: The study focused on the factors affecting the supply of affordable residential housing units in Kenyan urban areas in the case of Nairobi city and its environs.

Methodology: A descriptive survey research design was used. The target population comprised of all the real estate agents, valuers and property managers with headquarters in Nairobi totaling 90. A sample of 40% or 36 firms was taken and a random stratified sampling technique was used to select the sample units. The study used primary data collected through using questionnaires as well as secondary data as a source of literature review. The data collected was analyzed by use of descriptive statistics. In particular, frequency tables and proportions or percentages were used. In addition factor analysis was used to supplement the descriptive statistics.

Results: Findings from factor analysis indicated that the factors affecting the supply of affordable residential housing in Nairobi could be reduced to a three factor model. Findings from the study indicated that upon calculation of the rotated factor loadings, the Eigen Values of the three factors were still greater than 1 and the three factors still explained 75.51% of the total variance. The Unrotated factor loadings gave a clear picture of the importance of the variables to the factors. It seemed from the study that Factor1 was mostly defined by 'legal' variable, factor2 by 'cost' variable, and factor3 by 'financial', 'socioeconomic' and 'infrastructural' variables.

Unique contribution to theory, practice and policy: The study recommended that to address cost related constraints to the supply of affordable housing in Nairobi, the architectural community should engage in research on cheap building products. The government through the central government and through the newly created counties should make infrastructural investment a priority. The legal framework relating to housing needed to be overhauled by the introduction of a new act on housing. It was the responsibility of the government in collaboration with the private sector to ensure that the high level of unemployment was addressed, that the inflation rate was lowered to an acceptable level and that the economic growth was enhanced. It was important to increase the access of mortgages and housing finance products to both the banked and the unbanked. The factors affecting the demand of affordable residential housing in Nairobi and other urban areas would form an area of further study. In addition, the determinants of the prices of residential and non-residential houses in Nairobi would form an interesting study.

Keywords: supply, affordable residential housing units, urban areas

1.0 BACKGROUND OF THE STUDY

According to Wafula (2005), Nairobi occupies about 8% of Kenya's total land surface but generates about 40% of the nation's GDP. Nairobi has a population of about 4 Million people by day and 3 Million by night (by 2004 statistics). Of these, 60% live in what can be referred to as informal settlements or slum. Although it is still largely rural, the country has experienced rapid urban population growth because of rural-urban migration.

In 2004, it was estimated that 30% of the population lived in urban areas. By comparison, the 1948 census recorded only 5% of the population in urban areas. Nairobi, the capital city, accounts for a quarter of the country's urban population. The city has a population density of 3,080 persons per sq. km compared to 50 persons per sq. km. countrywide. This has put a strain on an already stretched urban infrastructure, housing stock and services, leading to the growth of informal settlements and slums. Sixty percent of the population lives within the informal settlements occupying 5% of the land designated for the residential purposes (Shitote *et al*, 2010)

Kibera, Nairobi's largest informal settlement, has approximately 500,000 inhabitants and is one of the most densely populated places in Sub-Saharan Africa. The high density is due largely to high occupancy rates of more than four people living in a single 10 foot by 10-foot room. This scenario has had a negative impact on the livelihoods of the poor urban slum dwellers and has contributed to their poor health, low productivity and vulnerability to eviction and violence (Wafula, 2005).

The housing market in Kenya has evolved considerably since independence in 1963. The 1968/76 National Housing Policy promoted a strong role for the government in providing affordable housing for the citizens of the country through its parastatal or quasi-government institution, the National Housing Corporation (NHC), through municipal councils, and through civil service housing. For more than two decades, the NHC was the market leader in the housing industry, responsible for the development of government run and managed public housing. The Nairobi City Council and local authorities throughout the country augmented the public housing of NHC by developing and managing a considerable stock of housing units, largely in urban centers. Concurrently, the government provided housing to civil servants working at national, provincial, parastatal and municipal levels of administration at a time when one in two wage earners were public sector employees (Shitote *et al*, 2010).

In the late 1970s and onwards, however, the urban housing situation in the country deteriorated. Demand for housing radically outstripped supply as people migrated to cities, the national economy – itself suffering from poor performance – could no longer finance public housing, and poor governance led to the near collapse of parastatal institutions, including NHC. The advent of structural adjustment policies in the 1980s and 1990s compounded the problem as government down-sized the civil service and the housing benefits associated with it (Wafula, 2005)

Throughout the post-colonial period the private sector was active in the housing sector, supported by a private construction and building materials industry. Private housing developers and private service providers, however, worked largely in the high-end of the market among a small but growing middle class of non-civil servant wage earners. Low-income urban households, largely poor rural migrants, constructed semi-permanent, ill-serviced housing units

in informal settlements or became tenants paying rent to the owners of these types of structures (Bellagio Study and Conference Center, 2005).

1.1 Problem Statement

Housing is a human right in as much as air and/or water. Like food, even those who cannot afford it need it perhaps much more than those who can, because the latter could be in it for the investment returns. According to an article posted in the Daily Nation (2010), the demand of housing units is believed to be higher than the supply of housing units. Statistics from the government and private sector players indicate that the annual demand for housing in Kenya stands at 150,000 units. This demand far outstrips the supply, which is estimated at about 35,000 units a year. The noted shortfall in housing has been met through proliferation of squatter and informal settlements and overcrowding. Some of the factors that have been argued as contributing to this status quo include the high costs of constructions, the poverty level in Kenya, inconsistent legal framework and poor policies in the housing sectors, corruption, inadequate financial deepening in the housing finance sector, and poor infrastructure among others.

According to experts in the housing sector, several interventionist strategies by the government such as the introduction of slum upgrading projects and the effort of the private sector to aggressively meet the demand of housing have not been successful. This study therefore sought to address this problem by undertaking a research on the factors affecting the supply of housing units in Kenya and also discussed how these factors could be addressed.

1.2 Research Objectives

- i. To establish the cost related factors that affect the supply of housing units in Kenya
- ii. To establish the infrastructural, legal and policy related factors that affect the supply of housing units in Kenya
- iii. To determine the financial and socio economic related factors that affect the supply of housing units in Kenya
- iv. To front recommendations and interventionist strategies on how to address the housing shortage in Kenya

2.0 LITERATURE REVIEW

Kenya is experiencing an acute shortage of housing for both its rural and urban population. The problem has been more evident over the last two decades as a result of the country's depressed economic performance. There is proliferation of informal settlements due to high demand for housing. There are also related problems such as violation of set standards/by-laws in the construction of housing units and increased conflicts between tenants and landlords. These problems are especially manifest in the low-income areas within towns/cities. In rural areas the status of housing is characterized by poor quality of materials and the construction methods used (Shitote et al, 2010).

Supply-side policies directly attack the supply constraint by increasing the stock of housing. In contrast, demand-side policies try to increase the ability of low income households to pay for housing. The rise in low income housing demand will tend to induce a rise in housing prices

(hopefully to a degree that leaves housing no less affordable for those low income households than before such policies are imposed). In the long-run the rise in demand, particularly at the low-end of the housing market, will feed into relatively higher returns for investors in housing stock to service those households, and will lead to an increase in the construction of low income housing stock (Republic of Kenya, Sessional paper no3, 2004).

Real estate has several unique characteristics that affect its value. There are economic characteristics and physical characteristics. The economic characteristics that influence value are scarcity, improvements, permanence and area preference. Scarcity is simply demonstrated in the saying, "They aren't making any more." The supply of land has a ceiling and cannot be produced more than what exists today. This value of this supply however, is influenced by other characteristics. Permanence has to do with the infrastructure. As buildings, houses or other structures are demolished, the infrastructure, such as sewers, drainage, electricity, and water remain intact. Area preference refers to the choices of the people in any given area. This is usually referred to by most people when they talk about real estate as, "location, location, location." The location of a preferred area, for whatever reasons, is what makes values of homes higher. Conversely, the location of a no preferred area, for whatever reason, is what makes the values of homes less. The physical characteristics of land represent its indestructible nature, immobility and non-homogeneity.

Housing supply can be thought of as stock of units, flow of services or quality of accommodations from the stock (Souza, 2005). Housing supply is not easy to determine due to the difficulty of assessing and measuring the supply of available land for development. But it is assumed that in the long run housing supply is infinite, and that developers will find a higher and better use of the land, and if that means building up or tearing down an existing structure, they will. A fundamental concern with housing supply is the relationship between the total number and type of housing units within the country and the number of households wishing to occupy those housing units. Is the supply of housing sufficient to meet housing demand, or is there a shortage leading to overcrowding, use of substandard or improvised dwellings, and homelessness? An adequate supply of housing, including appropriate growth in the housing stock over time, helps to avoid short-term fluctuations in housing prices and rent levels, and thus assists with the affordability and tenure security of housing. Conversely, an insufficient supply of housing can contribute to inflation in the cost of housing (Gans & King, 2003).

Critical factors affecting the supply of housing include a) the availability and cost of land. Other factors influencing the supply of new housing include: b) the availability of infrastructure, including the supply of essential services (roads, sewerage, drinking water, etc.) , c) regional development policies and regulations that address environmental concerns, for example, the Resource Management Act as well as natural hazards, changes in development levies imposed by local authorities, and government interventions (e.g. those aimed at improving the sustainability of the housing stock, and regulatory statements in general) d) the availability of finance at an affordable price and for different ownership structures such as multiple-owned land, f) The performance and efficiency of the building and construction sector, including the length of time it takes the building industry to adjust to changing demand for housing. Industry efficiency can be affected by labour market constraints, industry capability, the costs of construction, and building techniques (Smith, Rosen, & Fallis, 1988).

A study by Bellagio Center(2005) dubbed “ setting Kenya into context” assessed the state of housing finance in Kenya and concluded that in order to develop the housing finance sector ,the Government of Kenya needs to review and appropriately modify the banking sector legislation to promote housing finance; work with other partners, promote new financing products (including those that lend to progressive housing and seek alternative forms of collateral) and institutions that intermediate between the financial sector and the housing market; recognize, promote and integrate the informal and innovative financing mechanisms that have emerged in the country through measures such as the Micro Finance Bill; review and modify foreclosure laws and practices; establish a housing levy similar to the National Social Security Fund (NSSF) to enable the construction of low-income housing; develop the legal and institutional mechanisms for the establishment of a Secondary Mortgage Market to raise long-term finance through mortgage-backed securities; review the Retirement Benefits Act, the insurance Act, the NSSF Act and the Pensions Act to permit limited assignment of life insurance and benefits so that over 300,000 members will have an opportunity to access finance for housing. Also review their investment guidelines to promote their participation in the housing finance market.

Installation of services in the form of roads, water supply, sewerage, drainage and other utilities are part of the components for suitable housing. The capital required to install these services is high, and the further these services have to be carried the more expensive they become to install because of the long distance. The city of Nairobi does not have enough financial capacity to service all land, especially land occupied by low income households. Most low income households are usually located on undesirable land which may require large capital to install services. The cost of providing infrastructure is therefore directly proportional to availability of serviced land and accessibility thereof. Access of such facilities to low income households is very costly (Tomlinson, 2007).

The problem of housing affordability is easily stated: low income households are unable to purchase housing services that satisfy minimum levels of quality. Not surprisingly, this problem is most salient in larger cities where factors such as population density have driven high land prices (Souza, 2005). Upon closer examination, however, affordability problems fall into two classes: long and short term. The long-term affordability problem involves households who, for the foreseeable future and for whatever reason, will be unlikely to have an income that would allow them to purchase appropriate housing services. The short-term affordability problem concerns households who over time have an *average* income that would be sufficient to purchase appropriate housing in the private market, but who face short-term *fluctuations* in income that precipitate housing stress or crises. That is, a household may face the short-term loss of employment or the illness of a primary income provider or a rise in interest rates or rents precipitated by macroeconomic conditions. Such households may find themselves unable to afford their current accommodation in the short-term and face hardship from being forced to move; losing personal capital incorporated into their homes. These short-term fluctuations harm both the households and the parties providing them with housing. As a result, households with a higher risk of short-term income fluctuations may find it difficult to gain appropriate housing in the private market (Souza, 2005).

The long-term and short-term affordability problems have different causes and, hence, require different policy approaches. The long-term problem is a problem of low income as opposed to an

issue of housing policy per se. Government interventions that are designed to improve conditions in the housing market are no solution to this type of problem: there is no sense in improving the operation of a market that these households cannot effectively access. The long term affordability problem requires anti-poverty programs with housing as a key element. The short-term problem is a problem of income fluctuations rather than a permanent lack of income and earning power. Left untreated it can lead to transitions to longer-term problems but at its heart the problem is the lack of a mechanism to deal with short-term income loss (Gans & King, 2003).

3.0 RESEARCH METHODOLOGY

A descriptive survey research design was used. The target population comprised of all the real estate agents, valuers and property managers with headquarters in Nairobi. The number of Real estate agents and developers identified as the population was ninety. A sample of 40% or 36 firms was taken and a random stratified sampling technique was used to select the sample units. The study used primary data collected through using questionnaires as well as secondary data as a source of literature review. The data collected was analyzed by use of descriptive statistics. In particular, frequency tables and proportions or percentages were used. In addition factor analysis was used to supplement the descriptive statistics.

4.0 RESULTS AND DISCUSSIONS

4.1 Response Rate

The successful response rate was 89 % (32). The unsuccessful response rate was 11 % (4).

4.2 General Information

The majority of the respondents were male (19, 59%) while female respondents were 13(41%). The findings imply that the real estate and property supply market is dominated by men.

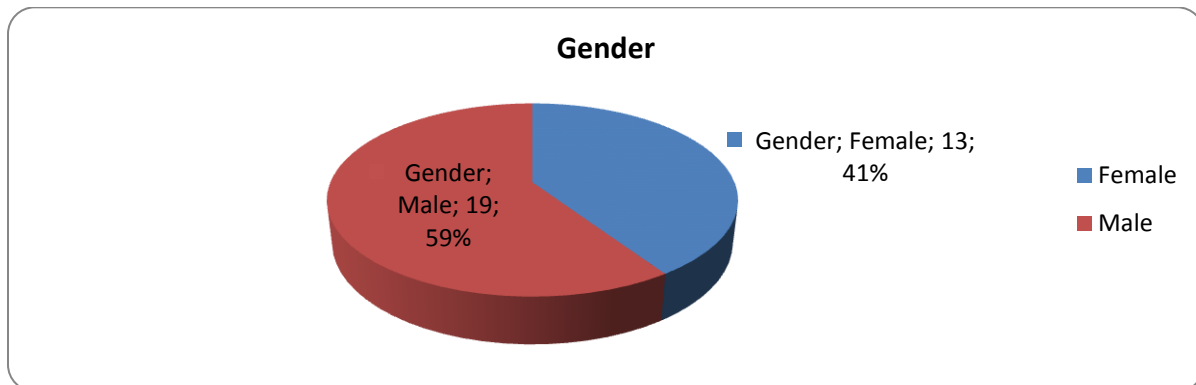


Figure 1: Gender

The majority of respondents 19(59%) in the study were university graduates. Meanwhile, 9(28%) were college graduates while the remainder 4(13%) were post graduates. The finding implies that the respondents in the real estate supply market are highly educated.

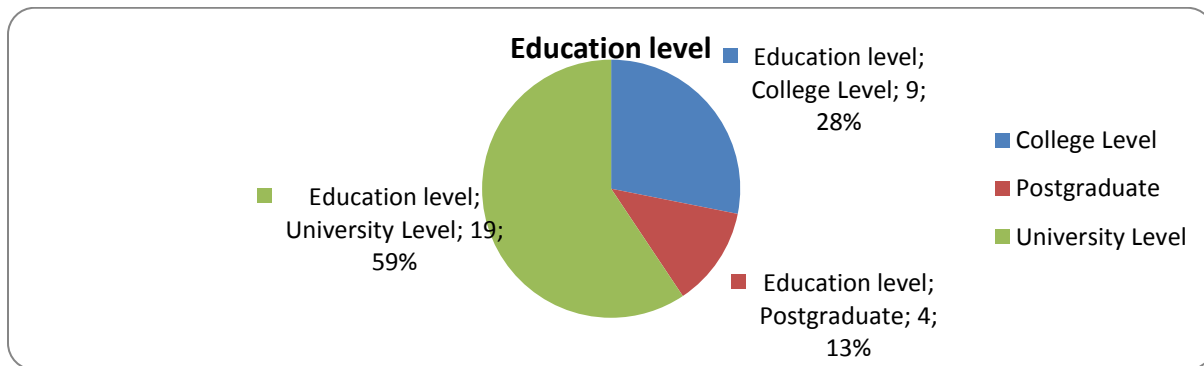


Figure 2: Education Level

The majority of the respondents in the study, 18(56%) were in current employment for more than 5 years. Meanwhile, 6(19%) were in employment for 3 to 5 years, 6(19%) were in employment for 1 to 2 years while the rest 2(6%) were in employment for less than one year. The finding implies that the respondents of the study are appropriate as they have enough experience in the real estate supply market.

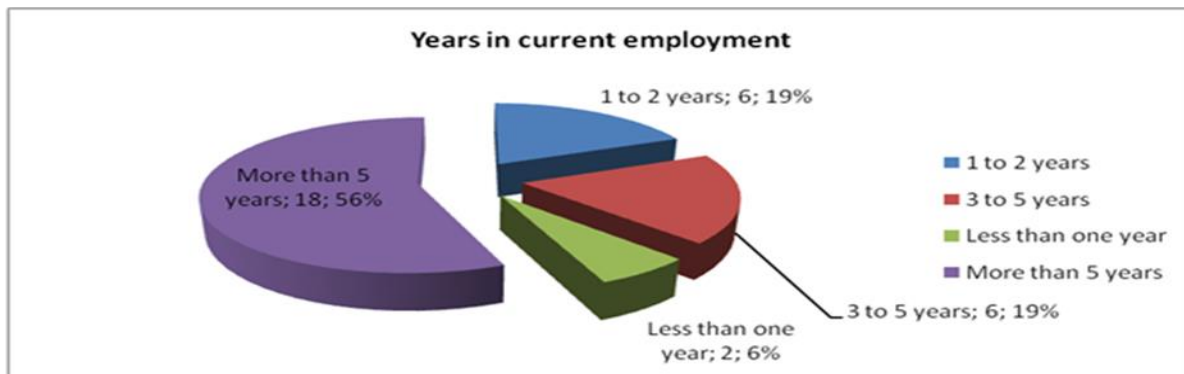


Figure 3: Years in Current Employment

4.3 Factors affecting Supply of Residential Houses

The study was an analysis of the factors affecting the supply of residential housing in Nairobi and attempted to find answers to the following questions.

What are the cost related factors that affect the supply of housing in Kenya?

What are the infrastructural, legal and policy related factors that affect the supply of housing in Kenya?

What are the financial and socioeconomic related factors that affect the supply of housing in Kenya?

In an attempt to answer these questions, factor analysis was applied. This consisted of calculation of Eigen values, factor loadings and regression coefficients for the variables under study. The first step was to calculate the Eigen values.

4.3.1 Eigen Values and Unrotated Factor Loadings

Using Stata command “factor, financial, socioeconomic, legal, infrastructure pcf” the following results were obtained. According to the Kaiser criterion, only those factors with an Eigen value of more than one should be retained. Therefore, Factor1, Factor2 and Factor3 were retained from 5 possible factors. Findings indicate that Factor1 (Eigen Value of 1.51872) explains 30.37% of the total variance. Factor2 (Eigen value of 1.23069) explains 24.61% of the total variance. Factor3 (Eigen value 1.02622) explains 20.52% of the total variance. The cumulative (total) variance explained by the three factors is 75.51%

Table 1: Eigen Values-Unrotated

Column1	Column4	Column2	Column3	
Factor analysis/correlation		Number of obs	32	
Method: principal-component factors		Retained factors	3	
Rotation: (Unrotated)		Number of params	10	
Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.51872	0.28802	0.3037	0.3037
Factor2	1.23069	0.20447	0.2461	0.5499
Factor3	1.02622	0.2423	0.2052	0.7551
Factor4	0.78392	0.34346	0.1568	0.9119
Factor5	0.44046	.	0.0881	1

Source: Own Computation

Factor loadings are the weights and correlations between each variable and the factor. The higher the load, the more relevant it is in defining the factor’s dimensionality. A negative value indicates an inverse impact on the factor. It is not automatically clear from the table, which variables define which factors, hence, the need for rotated factor loadings.

Table 2: Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Factor3	Uniqueness
financial	-0.2797	-0.6102	0.5174	0.2817
socioeconomic	0.4562	0.1271	0.7426	0.2242
legal	-0.536	0.599	0.4466	0.1545
infrastructure	0.8286	-0.2792	0.0781	0.2293
cost	0.5084	0.6368	-0.0382	0.3346

Source: Own Computation

4.3.2 Rotated factor loadings

Using the Stata command, “rotate”, the following Eigen values and rotated factor loadings were obtained. By default the rotation is varimax which produces orthogonal factors. This means that factors are not correlated to each other. This setting is recommended when you want to identify variables to create indexes or new variables without inter-correlated components.

The table below indicates that the Eigen Values are still greater than 1 that the three factors still explain 75.51% of the total variance.

Table 3: Orthogonal Varimax Rotated Eigen Values

Column1	Column4	Column2	Column3	
Factor analysis/correlation		Number of obs	32	
Method: principal-component factors		Retained factors	3	
Rotation: orthogonal varimax (Horst off)		Number of params	10	
Factor	Variance	Difference	Proportion	Cumulative
Factor1	1.34922	0.09756	0.2698	0.2698
Factor2	1.25166	0.07691	0.2503	0.5202
Factor3	1.17475	.	0.235	0.7551

Source: Own Computation

The pattern matrix here offers a clearer picture of the relevance of each variable in the factor. Factor1 is mostly defined by ‘legal’, factor2 by ‘cost’, and factor3 by ‘financial’, ‘socioeconomic’ and ‘infrastructural’.

Table 4: Rotated factor loadings (pattern matrix) and unique variances

Variable	factor1	factor2	factor3	Uniqueness
financial	0.0227	-0.8248	0.1936	0.2817
socioeconomic	0.0233	-0.0098	0.8804	0.2242
legal	0.904	0.0441	0.1619	0.1545
infrastructure	-0.7286	0.117	0.4755	0.2293
cost	0.0058	0.7454	0.3313	0.3346

Source: Own Computation

Below is a conversion matrix to estimate the rotated factor loadings (RFL), which is generated from the product of Factor loadings and Factor rotation. This matrix may be used to reconstruct the original Unrotated matrix.

Table 5: Factor rotation matrix

Column1	Factor1	Factor2	Factor3
Factor1	-0.7118	0.4467	0.542
Factor2	0.5994	0.7886	0.1373
Factor3	0.3661	-0.4226	0.8291

Source: Own Computation

4.3.3 Regression scoring coefficients

Using the Stata command “predict factor1 factor2 factor 3” and assuming regression scoring, the following scoring coefficients were obtained. Hence, the following linear equation can be established.

$$\text{Factor1} = 0.018\text{financial} + 0.113\text{socioeconomic} + 0.702\text{legal} - 0.496\text{infrastructure} + 0.058\text{cost}$$

$$\text{Factor2} = -0.686\text{financial} - 0.090\text{socioeconomic} + 0.042\text{legal} + 0.032\text{infrastructure} + 0.573\text{cost}$$

$$\text{Factor3} = 0.250\text{financial} + 0.776\text{socioeconomic} + 0.236\text{legal} + 0.327\text{infrastructure} + 0.221\text{cost}$$

It can be inferred from the study that ‘legal’ has the largest regression coefficient among variables defining factor1, indicating that an increase of ‘legal’ by 1% leads to an increase in factor1 by 0.7%. ‘Cost’ has the largest coefficient among variables defining factor2. This finding implies that an increase in ‘cost’ by 1% leads to an increase in factor1 by 0.57%. ‘Socioeconomic’, ‘infrastructure’, and ‘financial’ have the largest coefficients among the variables defining factor3. The finding implies that an increase in ‘Socioeconomic’, ‘infrastructure’, and ‘financial’ by 1% leads to an increase in factor3 by 0.77%, 0.32% and 0.25% respectively.

Table 6: Regression scoring coefficients

Scoring coefficients (method = regression; based on varimax rotated factors)

Variable	factor1	factor2	factor3
financial	0.01845	-0.68635	0.25013
socioeconomic	0.11302	-0.09022	0.77697
legal	0.70226	0.04221	0.2363
infrastructure	-0.49649	0.03267	0.32768
cost	0.05825	0.57327	0.22163

Source: Own Computation

5.0 DISCUSSION CONCLUSIONS AND RECOMMENDATIONS

5.1 Findings

Findings from factor analysis indicated that the factors affecting the supply of affordable residential housing in Nairobi could be reduced to a three factor model. The three factor model was arrived at using the Kaiser criterion, where factors with an Eigen value of more than 1 were retained while the others were dropped.

Findings from the study indicated that upon calculation of the rotated factor loadings, the Eigen Values of the three factors were still greater than 1 and the three factors still explained 75.51% of the total variance. The Unrotated factor loadings gave a clear picture of the importance of the variables to the factors. It seemed from the study that Factor1 was mostly defined by ‘legal’ variable, factor2 by ‘cost’ variable, and factor3 by ‘financial’, ‘socioeconomic’ and ‘infrastructural’ variables. When regression scoring coefficients were calculated, it was inferred from the scores that ‘legal’ had the largest regression coefficient among variables defining factor1, indicating that an increase of ‘legal’ by 1% leads to an increase in factor1 by 0.7%.

‘Cost’ had the largest coefficient among variables defining factor2. This finding implied that an increase in ‘cost’ by 1% leads to an increase in factor1 by 0.57%. ‘Socioeconomic’, ‘infrastructure’, and ‘financial’ had the largest coefficients among the variables defining factor3.

The finding implied that an increase in ‘Socioeconomic’, ‘infrastructure’, and ‘financial’ by 1% leads to an increase in factor3 by 0.77%,0.32% and 0.25% respectively.

5.2 Conclusions

It is possible to infer from the study that:

- i. Cost related factors affect the supply of affordable housing in Nairobi
- ii. Infrastructural related factors affect the supply of affordable housing in Nairobi
- iii. Socioeconomic factors affect the supply of affordable housing in Nairobi
- iv. Legal and policy related factors affect the supply of affordable housing in Nairobi
- v. Financial deepening factors affect the supply of affordable housing in Nairobi
- vi. That the factors affecting the supply of affordable housing in Nairobi can be reduced to a three factor model
- vii. That factor1 is best defined by legal and policy related factors
- viii. That factor2 is best defined by cost related factors
- ix. That factor3 is best defined by socioeconomic factors, infrastructural factors and financial deepening factors.

5.3 Recommendations

The following recommendations are in line with the findings of the study.

Cost related factors

To address cost related constraints to the supply of affordable housing in Nairobi, the architectural community should engage in research on cheap building products. Cement and building materials manufacturers should lobby the government so that power costs incurred in manufacturing are reduced. In so doing, the cost of construction will reduce significantly.

Infrastructural related factors

The government through the central government and through the newly created counties should make infrastructural investment a priority. This can be achieved through increased budgetary allocation to road constructions, public health centers and schools, colleges and universities. In a addition, water and sewerage facilities should be enhanced through the various parastatals such as Nairobi water and sewerage company.

Legal and policy related factors

The legal framework relating to housing needs to be overhauled by the introduction of a new act on housing. However, the introduction of new laws will not be sufficient. It is therefore important to put in measures to ensure implementation and adherence to such laws. For instance, the current restructuring of the judicial systems is a welcome move, as it will ensure speedy resolution of housing related cases.

Socioeconomic factors

It is the onus of the government in collaboration with the private sector to ensure that the high level of unemployment is addressed, that the inflation rate is lowered to an acceptable level and that the economic growth is enhanced. These efforts are in line with Vision 2030 which aims to

increase the annual economic growth rate to 10% up to the year 2030, reduce unemployment and stabilize macroeconomic indicators such as inflation.

Financial deepening factors

It is important to increase the access of mortgages and housing finance products to both the banked and the unbanked. First and foremost, the interest rates for mortgages are unfathomable high. In addition, there is need to introduce financial instruments that will enhance the participation in real estate markets, for instance REITS.

5.4 Suggestions for Further Studies

The factors affecting the demand of affordable residential housing in Nairobi and other urban areas would form an area of further study. In addition, the determinants of the prices of residential and non-residential houses in Nairobi would form an interesting study.

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