

Infrastructure Development and Real Estate Values in Meru County, Kenya

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Abstract

The real estate industry has increasingly become a key pillar industry in Kenya. However, in recent years the real estate prices have risen rapidly with home prices increasing sharply in comparison to prices of goods and services in other industries. At the same time, housing demand has posed an economic and social challenge arousing continental and universal concerns. The main objective of this paper was to analyse the effects of infrastructure development on real estate values in Meru County, Kenya. The findings indicate that the factors that lead to high prices in the real estate sector include improved transport networks, improved social amenities, industries, expanded educational institutions and commercial centers.

Key words: Real Estate Values, Infrastructure Development, Property

1. Introduction

Kenya has seen a significant rise in infrastructure development in the recent past, especially in sectors such as real estate development, energy and transport. This could be due to factors such as demand for housing by the rising population, infrastructure demands caused by growing investors interest in the country and the Kenyan government vision 2030 economic blue print whose aim is to make Kenya a middle level economy by the year 2030 (UN report, 2012). Over the past decade, the real estate sector in Kenya has been robust and the sector seemed resilient even with the 2008 post-election violence and the 2008 global economic crisis that adversely affected the tourism and agricultural sectors. In 2010, the construction sector is estimated to have created several private sector jobs. However in 2011, the Kenya shilling weakened against major currencies, there was double digit inflation and increasing levels of interest rates that seem to have adverse effects on the Kenyan real estate sector which seemed to be resilient. Property developers and buyers are faced with challenges in meeting finance costs due to high interest rates exacerbated by the tightening of monetary policy meant to enhance the stability of the shilling and inflation. According to a property index captured in a Knight Frank (2013) report, the Kenyan luxury real estate saw the greatest price increase globally. The value of Nairobi's prime real estate grew by 25% while at the Kenyan Coast it went up by 20% outdoing other major cities like Miami, London, Moscow, New York, Shanghai and Singapore.

As the population growth rate increases in Kenya, the government and private sector players have attempted to meet the infrastructure needs of the residents by providing road, rail, airport, and port improvements. With these improvements comes the debate on the environmental, economic and social impacts of these projects. However, the effects of these changes on real estate have been overlooked. Recently, the Kenyan real estate market can be said to experience a price bubble and its further development is rather unpredictable. Land prices in neighboring areas where large infrastructure projects are taking place have increased rapidly as property sellers anticipate the demand for more land. This follows the establishment of new amenities that would transform sleepy rural villages into urban estates for middle and high income earners, even though the uptake of these projects was slowed down by the 2012/2013 unfavorable macroeconomic environment. Hence some property developers abandoned their projects or postponed the phases under development.

Ascertaining if and how much infrastructure development can affect the property price level can enable policy makers to adopt appropriate measures in real estate development. There is insufficient empirical literature on determinants of real estate asset values in Kenya except reports and business journals that focus on trends, prices, demand, supply and mortgage rates in the real estate sector. Hence this study will empirically test the relationship between infrastructure development and real estate values in Kenya. This paper attempts to give some explanations for the increase in real estate values in Kenya and further provide approaches that drive the real estate values towards reasonable levels and bring out some counter-measures that would control a real estate bubble in Kenya resulting from infrastructure development. Therefore this paper aims to establish the effects of transport networks development, expansion of social amenities, industrial development, expansion of educational institutions and growth in commercial developments on real estate values in Meru County, Kenya. This paper is divided into the following sections; introduction, literature review, research methodology, data analysis and conclusions and recommendations.

2. Literature Review

2.1 Concept of Infrastructure

Infrastructure network is the very socio-economic climate created by the institutions (public or private) that serve as conduits of trade and investment. The role of infrastructure in the context of integration is transformative, through enhancing change of resources into outputs or enhancing trade by removing barriers. Therefore, an improvement in a country's infrastructure is one of the key factors affecting the long term growth of such a country. The linkages between infrastructure and economic growth are varied and complex. Infrastructure does not only affect production and consumption directly, it also creates many direct and indirect externalities (Ajibola et al., 2010).

Adebayo (2012) indicates that one of the determinants of the property values is infrastructural facilities, the preserve of which leads to appreciation of property values and its absence affects neighborhood prices adversely. Infrastructure development is a key driver of increased productivity and economic growth across the African continent hence leading to improved living standards, poverty reduction and the attainment of the Millennium Development Goals (MDGs). Stern (1991) indicated how adequate infrastructure was vital for productivity and growth, especially the transport system. Similarly, Anyanwu and Erhijakpor (2010) indicate that road infrastructure significantly leads to poverty reduction in Africa. Canning and Pedroni (2008) indicate that there is a positive correlation between improved infrastructure and economic growth. There has been improved economic growth at over five per cent per annum in the recent past despite the World Economic Forum Global Competitiveness Index of 2012-2013 indicating that Africa remained the least competitive global region.

2.2 Transport Networks

Several studies suggest that the characteristics of the local neighborhood, transport system and environment quality are vital in the determination of residential property prices. For instance Boucq and Stratec (2011) undertook a study on the effect of rail transport infrastructure on property prices in France and found that infrastructure developments lead to property gains. In Kenya, from 2010 to mid-2012 the travel time to Kiambu from Nairobi CBD was more than two hours during peak period due to traffic jams and ongoing construction of the Thika super highway transport network on that route. Hence with the completion of the super highway, travel time was reduced to half an hour during peak time and fifteen minutes off peak and subsequently a rapid increase in the real estate values of properties in the area. The above findings are similar to several studies done on transport network developments and property prices.

However the development of a transport network can lead to a reduction in property values especially if it leads to easier accessibility to the properties near the transport network. In the United Kingdom (UK), John (1998) examined how new transport infrastructure influenced property values in the South Yorkshire. The study found that anticipation of the construction of a super tram led to the reduction of house prices. This is possibly because of expectations of the disruptions during the building of the system. However, on completion of the super tram, the negative effect on property prices has disappeared and the study has also shown that the type of neighborhood is a major influence on house prices.

2.3 Social Amenities

Hammer et al (2000) suggest that a residential property user may be prepared to pay a high value for a property depending on his consideration for basic facilities such as accessibility, water and electricity. Ki and Jayantha (2010) investigated how redevelopment affected housing values in specific locations. The findings showed a significant rise in property values from implementation to after completion of the redevelopment project. Also Mallios (2009) while using the hedonic pricing model assessed the economic value of irrigation water as one of the attributes of agricultural parcel lands. The findings indicated that proximity of irrigation water affects the value of land.

Nubi (2003) describes infrastructure as the aggregate of all facilities that allows a city to function effectively. It is also seen as a wide range of economic and social facilities crucial to creating an enabling environment for economic growth and enhances quality of life. They include housing, electricity, pipe-borne water, drainage, waste disposal, roads, sewage, health, education, telecommunications and institutional structures like police station, fire fighting stations, banks and post office. In other words, infrastructure is the large scale public services or systems, services and facilities of a country or region that are necessary for economic activity, including power and water supplies, public transportation, telecommunications, roads and school. Real estate has no value if it has no utility, if it is not scarce and if it is not effectively demanded. Real estate has significance only as it satisfies man's needs and desires. It is this man's collective desire for property that gives rise to value

(Olusegun, 2003). Thus, the ability of a property to satisfy man's needs and desires together with its degree of scarcity and utility compared with others makes man to ascribe value to it. Property value, therefore, according to Millington (2005) is the money obtainable from a person willing and able to purchase property when it is offered for sale by a willing seller, allowing for reasonable time for negotiation and with the full knowledge of the nature and uses which the property is capable of being put. Real estate is a heterogeneous good that is comprised of a bundle of unique characteristics reflecting not only its location, but equally affected by other amenities such as the quality of neighborhood and infrastructure.

2.4 Industrial Development

Friso de vo (2012) argues that industrial sites causes several negative externalities, such as noise, air, water and soil pollution, congestion and obstruction of view hence reducing value of residential property value, the adverse effect diminish with distance resulting to increased property values in their direct vicinity. Des Rosiers et al (2009) in their study discovered that negative externalities linked to water supply and quality problems in a given neighborhood adversely affected property values within the study location. Kutz (2008) indicates that infrastructural projects produce significant environmental and social costs, the source of impacts that have been identified and which are known to cause significant negative impacts are noise and air pollution, compulsory acquisitions of land and impacts on local bio diversity. Carey (2011) indicates that most externalities affect property values in a spatially distributed manner and the common negative externalities entail loss of visual amenity, air and noise pollution. It is important to note that environmental attributes would affect real estate values. The vital environmental considerations would include open space, nuisances, hazards emanating from nearby facilities such as shopping centers, factories, and schools; adequacy of public utilities such as street lights, sewers and electricity; general maintenance; street pattern, width, and maintenance.

2.5 Education Infrastructure

As much as the influence of public schools on state and local development may not be directly ascertained there are a few studies arguing that school quality has a direct and positive influence on residential property values. Studies by Barrow and Rouse (2012); Black (2010); Figlio and Lucas (2010) indicates that homes in high-performing school districts sell for higher prices than homes in low-performing school districts holding all other factors constant. The impact can measure in the thousands of dollars and increase home values as much as fourteen percent (Figlio and Lucas, 2010, Black, 2010). In addition, as indicated earlier, increased school spending has been linked to significant increases in real estate values (Barrow and Rouse, 2012; Dee, 2000; Black, 2010) and more people are more willing to live in a neighborhood with good schools even if it means paying higher taxes.

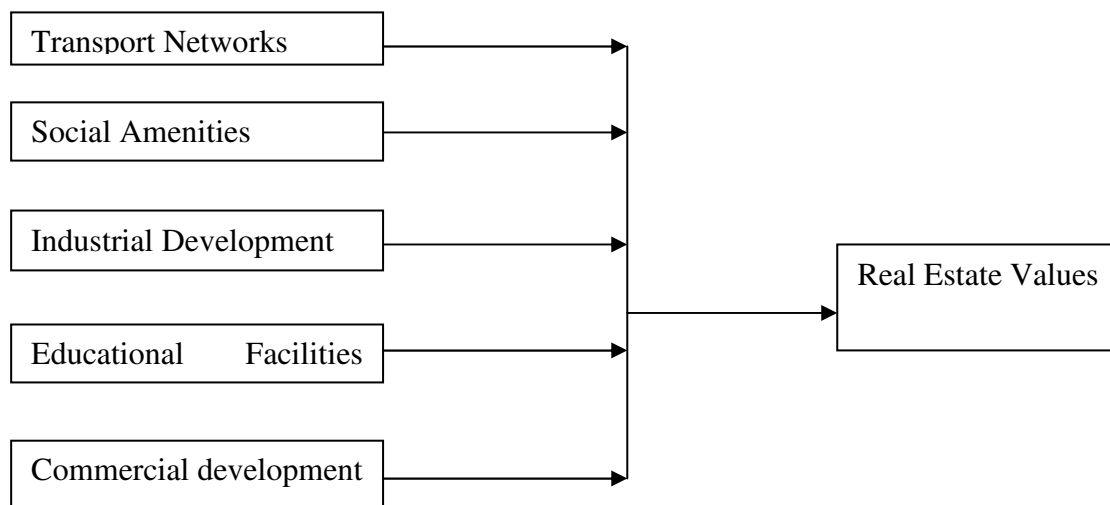
2.6 Commercial Developments

On the other hand, income levels, profitability of business, inflation and interest rates are also important factors in determining general level of value at any given point in time (Gallimore, et al, 2011). Households, who have the same tastes and income, tend to live within the same area. Therefore, the factors such as the size of households, their age, income and education levels and the availability and cost of mortgage financing have to be incorporated in affecting the types of housing and the values. High-income residents will seek out a part of city that may offer leisure facilities, parks, amenities and the most convenient form of transportation and infrastructure. This also indicates that the proximate and relevant influences on the property are related to the same influences operating on other properties in the neighborhood. Also social considerations in neighborhood analysis involve characteristics of neighborhood occupants and it may affect real estate values. Relevant characteristics may be the availability and quality of services, including recreation facilities and shopping. Residents are attracted to a location because of status, physical environment, and availability of services, affordability, and convenience. However, residential groups generally socialize with those of a similar educational, cultural or social level.

2.7 Conceptual Framework

The conceptual framework shown below represents the conceptualized interaction among transport networks, social amenities, industrial development, educational facilities development, commercial development and real estate values. Therefore the conceptual framework generally depicts the effects of infrastructure development on real estate values.

Figure 2.1: Conceptual Framework



3. Research Methodology

3.1 Research Design

In this paper the descriptive survey research design was used. According to Saunders et al., (2009) descriptive research answers research questions on who, what, where, when and how is the research problem. Hence the descriptive approach achieved this by describing the data and characteristics about the population of the phenomenon being studied. The survey research design used qualitative and quantitative measures thus enhancing data collection.

3.2 Population and Sample Size

The target population was 955 real estate property owners in Meru County, Kenya. The study used stratified sampling technique to come up with the sample. This was based on the target population being heterogeneous which consists of five areas, all of which were represented in the sample as shown in the table below. Stratified random sampling technique was used as it ensured that all the areas were represented. Purposive sampling technique was then used to select samples from the stratum (individual residents) and from three real estate sectors which include commercial, residential and agricultural property. The technique was used within each stratum since it was possible to identify respondents that are knowledgeable and can provide the researcher with appropriate in-depth information. Sekaran (2013) indicates that purposive sampling involves the choice of subjects who are most advantageously placed or in the best position to provide information required. The sample size is 20% of the target population since it is representative of the entire population.

Table 3.1: Sample Size

Location	Sub-Location	% Distribution	Target Population	Sample
Muthaara	Athanja	11.5%	110	22
Chugu	Kithoka	22.5%	215	43
Municipality	Kaaga	44.5%	425	85
Maua	Amwathi	13.1%	125	25
Amugaa	Nchiru	8.4%	80	16
Total		100%	955	191

3.3 Data Collection

The study used both primary and secondary data sources. Primary data, also known as raw or original data, was new data obtained from the respondents while secondary data already exists, which is data on real estate values. While primary data was collected through a questionnaire, secondary data was collected from Knight Frank price index reports of 2009 to 2012. To enhance a high response rate, the study put into consideration the research ethical issues. The researcher explained to the respondents (property owners in Meru County) the importance of the study and reminded them of the same (informed permission). The questionnaire was administered through drop and pick-later method to the respondents.

3.4 Data Analysis and Model Specification

After data collection, the filled-in and returned questionnaires were edited for completeness, coded and entries made into Statistical Package for Social Sciences (SPSS). Coding is the technical procedures where symbols, which are normally numerals, are assigned to the raw data in order to transform them into an easily tabulated and counted format. In regression analysis, it is also of interest to characterize the variation of the dependent variable around the regression function. The multiple regression model is shown below;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon_i$$

Where;

Y = Real estate values per acre

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5 =$ multiple regression coefficient for independent variables

$X_1 =$ Transport

$X_2 =$ Social amenities

$X_3 =$ Industrial development

$X_4 =$ Educational institutions

$X_5 =$ Commercial developments

$\varepsilon_i =$ error term

4. Data Analysis

4.1 Response Rate

The study dealt with a sample of 191 respondents from Meru County. Out of the 191 questionnaires, 172 were received back. This is a reliable response rate for data analysis as Babbie (2002) posited that any response of 50% and above is adequate for analysis. The response rate was 90% as shown in the table that follows:

Table 4.1: Response Rate

Response	Frequency	Percentage
Response	172	90%
Non response	19	10%
Total	191	100%

4.2 Infrastructure Development

98.3% of real estate property owners agreed and 1.7% disagreed with the research question that real estate values have been affected by the infrastructure developments in Meru County. This shows that majority of respondents agree that the infrastructure developments have a significant effect on determining real estate values in Meru County.

Table 4.2: Infrastructure Development

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	169	98.3	98.3	98.3
No	3	1.7	1.7	100.0
Total	172	100.0	100.0	

4.3 Transport

When residents were asked if transport networks affect the real estate values 62.2% said that it has highly increased values, 33.7% moderately increased and 4.1% said the values have stagnated. This shows that transport alone has a significant effect on determination of real estate values in the county. Therefore the development of new transport networks shows that the real estate values will continue to fluctuate and also maintenance of existing transport networks has a similar effect on the real estate values in Meru County. On various factors put across the question new roads had a mean of 1.51, existing roads repair had 2.18, new airport had 2.73, railway cargo services had 3.83 and train passenger services had 4.76. This means that construction of new roads has the biggest effect on real estate values among other factors.

Table 4.3: Transport

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Construction of new roads.	172	1	5	1.51	1.062
Repair of existing roads.	172	1	5	2.18	.618
Construction of new airport.	172	1	5	2.73	.700
Railway cargo services.	172	1	5	3.83	.757
Train passenger services	172	1	5	4.76	.830
Valid N (listwise)	172				

4.4 Social Amenities

When asked about social amenities 89% of the respondents said that there are new and existing social amenities in their respective regions and 11% responded that there are no social amenities in their areas. This means that social amenities were a relevant factor in the determination of real estate values. Power has the greatest impact on real estate values with a mean of 1.67, availability of piped water was second at 1.90, then recreation facilities at 3.20, sewerage at 4.09 and the last was sports facilities at 4.12.

Table 4.4: Social Amenities

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Power and lighting	172	1	5	1.67	1.015
Piped water	172	1	5	1.90	.918
Recreational facilities	172	1	5	3.20	.794
Sewerage	172	1	5	4.09	1.274
Sports facilities	172	1	5	4.12	.660
Valid N (listwise)	172				

4.5 Industrial Developments

When asked if there were new or existing industrial development in their area, 80.8% of the respondents said yes and 19.2% responded no. Hence creation of jobs and a ready market for farm produce can be determined by availability of industries, as a result of the changes in real estate values due to demand. From the descriptive statistics, we can conclude that new industries and improvements of existing industries have the greatest effect on real estate values at mean of 2.26 and 2.55 respectively, then mineral prospecting activities has mean of 2.71 followed by new agro processing industries at 3.44 and improvement of existing agro factories at 4.03.

Table 4.5: Industrial Development

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
New industries	172	1	5	2.26	1.691
Improving old factories	172	1	5	2.55	1.022
Mineral prospecting	172	1	5	2.71	.984
New agro factories	172	1	5	3.44	.938
Improving old agro fact.	172	1	5	4.03	1.485
Valid N (listwise)	172				

4.6 Educational Institutions

90.9% of respondents said they have witnessed expansion of educational institutions and 8.1% said they have not seen any developments in educational institutions. Developments of new universities and colleges has the greatest effect on real estate values at mean of 1.81, followed by secondary schools at 1.87, increased number of teachers stands at 3.31, an increase in primary school student numbers stands at 3.60 and teachers investing in real estate property has the least effect at 4.30.

Table 4.6: Educational Institutions

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
New Universities and Colleges.	172	1	5	1.81	1.365
Expanding Secondary schools.	172	1	5	1.87	.645
Increased number of teachers.	172	1	5	3.31	.867
Increased primary students	172	1	5	3.60	.569
Teachers investing in property.	172	1	5	4.30	1.355
Valid N (listwise)	172				

4.7 Commercial Developments

89.5% responded yes while 10.5% responded no when asked if there are new commercial developments in their respective areas. It is evident that there are new commercial developments in the County and this has led to an increase in demand hence affecting the real estate values in Meru County. We can conclude that there is a close relationship between various types of commercial developments. The new shopping malls have a mean of 2.39, followed by increased number of small and medium enterprises at 2.87, new tourist hotel at 2.91, then increased business stand at 3.19 and new local hotels has the least impact at 3.64. This means that all these developments lead to increased demand for real estate property hence the increase in real estate values in Meru County.

Table 4.7: Commercial Development

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
New shopping malls.	172	1	5	2.39	1.340
Increased SMEs.	172	1	5	2.87	1.228
New tourist hotels.	172	1	5	2.91	1.743
Increased business.	172	1	5	3.19	1.527
New local hotels	172	1	5	3.64	.732
Valid N (listwise)	172				

4.8 Regression of Variables

The study results in table 4.8 gives the joint relationship between the real estate development and transport and communication factors, social amenities, industrial development, educational institutions and commercial development where it indicates the extent to which each factor affects the growth of real estate values.

Table 4.8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.813 ^a	.893	.881	1.77177

a. Predictors: (Constant), transport and communication factors, social amenities, industrial development, educational institutions, commercial development

The study results indicate that, transport and communication factors, social amenities, industrial development, educational institutions and commercial development accounts for 89.3% (R square = .893) of the variability in the real estate value while other factors not mentioned in this study account for 10.7% (100% – 89.3%). Also the findings indicate that had the study been conducted from entire population of the study, then the findings would be 12% less variance (100% – 88%) as indicated by the adjusted R square. This means that infrastructure development has a great impact on determination of real estate values among other factors hence infrastructure developments would lead to demand for real estate property and this in turn will affect values of real estate property as shown in the regression model summary above.

The study conducted a multiple regression analysis so as to determine the relationship between the effects of infrastructure development on real estate values and the five factors investigated in this survey. The regression

equation showed that all five variables had a positive relationship with real estate values, whereby educational facilities development contributed more to the real estate values followed by industrial development, commercial development, transport networks while social amenities contributed the least to the increase in real estate values. Testing the significance of these relationships at a significant value below 0.05 at 5% level indicates that the relationship is statistically significant. Thus the transport networks had a positive significant value (p-value=0.045) which was below 0.05 therefore giving a statistically significant results which can be relied on to explain the variability in the real estate values. Other variables in the study such as social amenities had a positive (p-value=0.004), industrial developments had a positive (p-value=0.018), educational institutions also had a positive (p-value=0.006) and commercial developments had a positive (p-value=0.011). Since the p-values were all below 0.05 at 5% level, then the results can be relied upon to explain the relationship between the variables. Therefore the regression equation ($Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \epsilon$) is as follows;

$$Y = 1.249 + 7.462X_1 + 1.420X_2 + 8.622X_3 + 8.924X_4 + 7.739X_5$$

Where; Y = real estate values, X_1 = transport networks, X_2 = social amenities, X_3 = industrial development, X_4 = educational institutions and X_5 = commercial development.

Table 4.9: Multiple Regression Table

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t.	Sig.
(Constant)	1.249E10	2.257E9		5.536	.000
Transport Networks	7.462	1.000	.076	.746	.045
Social Amenities	1.420	2.072	.117	.686	.004
Industrial Development	8.622	3.736	.039	.231	.018
Educational Institutions	8.924	1.095	.152	.473	.006
Commercial Developments	7.739	2.003	.023	.532	.011

Dependent Variable: Real Estate Values

The given equation is answered by the values Unstandardized Coefficients (B) where all of them are significant since their p values (Sig. <0.05) is less than 0.05 testing at 95% confidence level. The results indicate that all the factors have a positive influence to the real estate values. According to the regression equation established, taking all five factors (transport networks, social amenities, industrial developments, educational facilities developments and commercial development) constant at zero, the real estate values as a result of these independent factors (X_1, X_2, X_3, X_4 , and X_5) will be 1.249. The study findings also shows that taking all other independent variable at zero, the transport networks affects the real estate values positively by 7.462 times, social amenities affects the real estate values positively by 1.420 times. Industrial developments affects the real estate values positively by 8.622 times, educational facilities development as well affects the real estate values positively by 8.924 times as well as commercial development affecting the real estate values positively by 7.739 times.

5. Conclusion and Recommendations

The study concludes that the effect of infrastructure development on real estate pricing is evident in Meru County. This is because Meru is one of the areas that has strategic development programs in place hence attracting investors and speculators who are hoping to cash in on ambitious development programs, as a result demand is high hence pushing the prices higher. There are several factors that cause fluctuations on the real estate prices. The factors that would lead to high pricing of the real estate include improved transport networks, improved social amenities, more industries, expanded educational institutions and more commercial centers. These factors are some of the key drivers of demand in real estate property that causes an increase in the pricing of real estate. The perception of the respondents was that the pricing of the real estate was quite high in towns as compared to the remote areas.

This study recommends that County governments should come up with development programs which will open up the rural areas so that there will be an even spread of demand in the real estate property across the country. This will have a counter balancing effect where the urban property and rural property will have slight variance in

prices. This will then ensure that property is affordable to most residents. Mapping and zoning of areas should also be done for proper regulation and planning of the efficient use of real estate. This means that there should be designated residential, commercial, industrial, educational, health, agricultural and public recreation areas. Introduction of real estate investment trusts, housing cooperatives and investment groups should be considered so that the local communities will not end up being pushed out of their prime land by rich investors. Banks and other financial institutions should come up with financing programs which will be easily accessible to the public and aimed at improving ownership and investment in real estate sector. This will encourage competition and as a result we will have stable and more reasonable prices of real estate property.

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