Economic and Innovative Factors Influence on Funding of the Supply-Side of Housing in Nairobi, Kenya

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Abstract

Housing impact on an economy is undisputed. Economic factors comprising market forces, cost of inputs, the macro economy and the cost of funding are one set of factors that impacts on the funding of the supply-side of housing. Financiers' reactionary actions to encourage uptake of credit is undertaken by use of innovation and technology. This paper sets to establish the relationships between both economic and innovative factors, and funding of the supply-side of housing in Kenya and also the moderating effect of the major stakeholders. Using an explanatory form of approach in research design a survey was conducted using questionnaires to collect data from a random sample of 212 branches in Nairobi of financial institutions drawn from a population of 43 commercial banks, 9 deposit-taking MFIs and three major financiers of housing. Factor analysis, correlation analysis and ordinal logit regression were used to determine the relationships. A negative relationship between economic factors and funding of housing was found, while innovative financing and technological factors were found to have no influence. A positive moderating effect of stakeholders on the relationships between both economic factors, and innovative financing and technological factors on one side, and funding of housing was established. The implication being that economic factors play a bigger role in impacting housing and a stable economy is conducive in encouraging investments in housing, with government acting more as an enabler. Innovative financing and technology act as facilitators only.

Keywords: housing, funding, financial institutions, economic factors, innovative financing, technology

1. Introduction

Housing plays a major role to the economic development of a country. Mondejar, Cheung and Suen (2007) point out that the construction industry is one of the pillars of the world's economy and it is characterized by its temporary multiple organization nature, in that people with different skills and expertise come together to form a team for the duration of a project in order to achieve a common goal. According to the Economic Survey (2015), the construction industry in Kenya registered an accelerated growth of 13.1 per cent in 2014 compared to a revised growth of 5.8 per cent in 2013, reflected by the increase in both cement consumption by 21.8% and a 15.4% increase in the value of building plans approved by Nairobi City Council.

The demand for housing increases in response to several factors, notably urbanization and population growth (Doling, Vandenberg, and Tolentino, 2013). It is estimated by (UN-HABITAT, 2014) that by 2050, 70 percent of the world's population will be living in urban areas. Half of the world's adult population does not have an account at a formal financial institution, and 75% of poor people are "unbanked." This indicates an apparent gap in funding the real estate industry (Demirguc-Kunt and Klapper, 2014). UN-HABITAT (2014) reports that that unbanked population rely on their savings to finance their housing projects and when savings are nonexistent, they turn to informal sources.

The Kenyan population according to the 2009 census was 38.61 million but was estimated to be 46. 7 million in 2016 (The World Factbook, CIA website). UNEP (2013) observes that the housing sector has been one of the fastest growing sectors attracting a lot of players into the industry. Kenya's annual housing deficit is above 200,000 and annual supply is 50,000 (UN-HABITAT, 2010; AfDB, 2013). The population of Nairobi in 2009 was about 3.138 million (2009 census), it was estimated to be 3.915 million in 2015 and the Kenyan rate of urbanization was 4.34% annual rate of change (2010 – 15 estimate) (The World Factbook, CIA website), the demand for housing is therefore high which means that a large proportion of development of housing units is in the city. Based on the population growth and the rate of urban migration the annual increase in demand is projected to grow to 156,000, compounding the problem as there already

exists a two million-unit backlog (AfDB, 2013).

Private commercial finance institutions, which provide credit at market rates, often avoid involvement in housing finance provision for low income groups due to the fact that they lack solid collateral, have low and (or) irregular incomes and thus possess high default risk, for these households often operate mostly in the informal economy and have therefore been excluded from accessing capital to build their houses (SINA Newsletter, 2007).

Technology is one the tools used to bring innovation in the financial sector,   Saunders and Cornett, (2011) observed that it may impact a financial institution positively by enhancing product and service delivery, but some of the technologically based product innovations may turn out to be negative NPV projects. Technological advances do enable banks use better appraisal methods like discounted cash flow (DCF) methods (Myers, 2003).

Mobile banking can be used to bring about innovation in the provision of loans for housing especially to the low income sector of the economy. Economic Survey (2015); IMF (2015) report that use of mobile money transactions has been on the rise since its inception and Kenya boasts of having the world's leading mobile money system leading to increased financial inclusion.

Few studies look at the effect of economic factors on the supply-side of housing together with the effect of efforts taken by the financiers to boost uptake of credit by use of innovation and technology. Ndirangu and Nyamongo (2013), have looked at financial innovation in the banking sector; CAHF (2016); UN-HABITAT (2010, 2013, 2014), innovative housing finance; Wagura (2013), the supply side of housing but factors such as, price of houses, income per capita, inflation and interest rate (what this study would categorize as economic factors). Glossop (2008), the impact of housing on economic performance of cities in the UK, and Gibb, Maclennan and Stephens (2013), innovative financing of affordable housing in the UK and internationally.

2. Literature Review

2.1 Theoretical Framework

Underpinning this study are three main theories, the New Keynesian Theory, Schumpeter Innovation Theory, and the Stakeholders Theory. The first theory explains the economic situation that may impact funding, the second one explaining the impact innovation and technology may have on economic change, and the latter looking at the role and effect that stakeholders may have on the relationship between economic factors and funding for housing. The New Keynesian Theory explains the strong influence the monetary policy has on economic activity (Mankiw 2008). Prices of a good or service do not adjust quickly to changing economic conditions due to "stickiness" of prices, brought about by *"menu costs" and aggregate-demand externalities*, *staggering price-setting* and *coordination failure*. This friction gives rise to monetary non-neutrality and means that the competitive equilibrium outcome of the economy will, in general, be inefficient (Sims, 2012). This "stickiness" of prices then means that an increase in the money supply (decrease in the interest rate) does increase output and lower unemployment in the short run (Mankiw, 2008; Chugh, 2014; Benchimol and Fourçans, 2012; Benchimol, 2015), highlighting the government's role in improving macroeconomic conditions; such as countercyclical monetary or fiscal policy (Mankiw, 2008; Sims, 2012; Chugh, 2014). The Schumpeter Innovation Theory acts as the foundation for explaining how innovation and technology can bring about economic change. Schumpeter and other theorists have refined this theory over the years; where Schumpeter's (1934) original theory of innovative profits emphasized the role of entrepreneurship and the seeking out of opportunities for novel value-generating activities which would expand (and transform) the circular flow of income. He considered innovation as a major weapon in the competitive struggle whereby he conceptualized technological change and the institutionalization of research and development as integral drawing a clear distinction between the entrepreneurs whose innovations create the conditions for profitable new enterprises and the bankers who create credit to finance the construction of the new ventures (Schumpeter, 1939). Innovation in firms level can be achieved through the development of new products and services (technical innovation), or via new organizational and marketing methods (non-technological innovation) (Arundel, Kanerva, Van Cruysen, and Hollanders, 2007). The underlying philosophy of the Stakeholder theory emphasizes the "joint-ness" of the stakeholder interests and the need for all stakeholders to benefit over time through their cooperation (Freeman, 1984; Freeman, Harrison and Wicks, 2007).Value-creation both economic and non-economic should emanate from such a relationship (Argandona 2011; Bosse, Phillips and Harrison, 2009). This study concurs with these theories 1) by advocating the major role the government can play in boosting growth in housing, 2) recognition of the role innovation and technological advancement can bring to economic change in the banking sector, and 3) highlighting the importance of the major stakeholders in the construction industry.

2.2 Review of Related Studies

2.2.1 Effect of Economic Factors on Funding of Housing

This study confines itself to the supply-side of housing, but it has been demonstrated that the easy availability of credit for

housing sector (non-food bank credit) at cheaper rates could increase the housing prices, Himmelberg, Christopher and Sinai (2005). Demand and supply of housing is of importance as stated by Piscetek, (2013) that price is a function of supply and demand therefore naturally, the price of housing is determined by housing supply and demand, and with an equilibrium price being realized when the demand for housing equals the supply of housing.

Supply of property is inelastic in the short-term because of time lags in construction and land release, changes in housing demand have a significant effect on housing costs as supply is not able to quickly respond to increases in demand (Gans and King, 2003). Saunders and Cornett (2011) observed that high interest rates indicate restrictive monetary policy action by the central bank and this makes financial institutions' lending decisions scarcer and more expensive, they concluded that high interest rates are correlated with higher credit risk. Rapid inflation does cause large increases in the cost of materials and land (Noppen 2012).

Ooi and Le (2012) used Vector Autoregressive (VAR) models to trace the price response of existing houses to the quantity of new units launched by homebuilders in Singapore between 1996 and 2009. They found that contrary to the "competition" hypothesis prediction of a negative reaction, they found that marginal supply Granger-cause existing house prices in a positive manner. The effect was robust to the inclusion of exogenous demand factors as well as price interaction in the primary (new houses) and secondary (existing houses) market segments.

The state of the macro economy affects growth in the housing sector through the wealth and collateral effects. The positive relationship between credit and house prices is in existence since a permanent increase in housing wealth leads to an increase in household spending and borrowing when homeowners try to smooth consumption over the life cycle, while the collateral effect of house prices emanates from the fact that houses are commonly used as collateral for loans because they are immobile and therefore easily accessible to a creditor. The higher house prices do induce homeowners to spend and borrow more, but also enhances their borrowing capacity (Goodhart and Hofmann, 2008).

Economic downturns characterized by high inflation, excessive interest rates, high taxes and volatile exchange rates lead to high costs and consequently reduced investment; and an effective strategic measure in development of affordable housing is lowering the cost of construction of affordable housing (Assaf, Bubshait and Al-Muwasheer 2010).

The study then sought to test the effect of Economic factors on Funding of housing. Thus the following hypothesis was specified.

H_o: *Economic factors do not influence the funding of housing*
H_1:   *Economic factors do influence the funding of housing*

2.2.2 Effect of Innovative Financing and Technological Factors on Funding of Housing

The link between finance and economic growth was first emphasized by Joseph Schumpeter in 1911, and in Schumpeter's theory, widely known as the theory of "creative destruction," innovation and entrepreneurship are the driving forces of economic growth. Sofat and Hiro (2007) in their comparative study on creativity and innovations in retail banking sector in India found that the existing challenge then for banks was to design and innovate financial products which were convenient to use and continuously meet financial goals of the customers.

Financial innovation as defined by Noyer (2007) is the emergence of new financial instruments and services, and of new forms of organization in more sophisticated and complete financial markets. Kola and Akinyele (2010); Potluri (2008) state that creating effective communication with customers is the most important aspect in services marketing.

The role of technology and innovation in the financial services industry is evolving rapidly (Donohue, Hooker, Lewis and Pryor, 2011) point out the great impact both have on the service providers and clients they serve and the benefits are numerous and include the promises of more informed, holistic decision-making, more powerful predictive capabilities and enhanced risk and compliance frameworks in which to operate.

Jha, Gupta, and Yadav (2008) while studying awareness, expectation and acceptance levels of the customers with respect to the use and effectiveness of the new technologies in banking sector in India found that the hectic lifestyle of the people where time is a scarce resource is the main factor that compels customers to use new techniques in banking. They noted a marked kind of popularity in new technology gadgets. CPSS (2012) noted that the trend towards speed is driven by both user demand and advances in technological capability.

To bridge the supply gap, business partnerships amongst various players; financial and non-financial, in the housing sector should be formed so as to provide a progressive housing process (UN-HABITAT, 2014), bringing together finance institutions, building materials retailers, manufacturers, banks, homebuilders, community organizations, service practitioners (architects, engineers, etc.), and governments. CPSS (2012) emphasized the importance of stakeholder's partnerships when it reported that the role of non-banks in retail payment innovations has increased significantly, owing in part to the growing use of innovative technology that allows non-banks to compete in areas such as mobile and internet payments which are not yet dominated by banks. Having building materials suppliers or service providers offer

housing microfinance products such as savings, deposits and credit, then hiring finance institutions to facilitate the process would be an innovative way of financing (UN-HABITAT 2014).

Ndirangu and Nyamongo (2013) in their study of analyzing the effects of financial innovation in the banking sector on the conduct of monetary policy in Kenya during 1998-2012, using regression analysis and VAR framework, showed that the innovations have improved the monetary policy environment in Kenya as the proportion of the unbanked population has declined coupled with gradual reduction in currency outside banks and also that financial innovation has had positive outcomes and seems to improve the interest rate channel of monetary policy transmission.

Innovations in funding markets have had a significant impact on banks' ability and incentives to grant credit and, more specifically, on the effectiveness of the bank lending channel. Banks' greater reliance on market sources of funding has been a major innovation, be they traditional (the covered bond market) or the result of financial innovation (securitization activity), making the banks increasingly dependent on capital markets' perceptions (Gambacorta and Marques-Ibanez, 2011). Capital markets can also be roped in in the provision of funds for housing by use of REITs – collective investment companies that own and typically operate income producing real estate or real estate related assets by providing a way for individual investors to earn a share of the income produced through commercial real estate ownership, without actually having to go out and buy commercial real estate (Afrane, Owusu-Manu, Donkor-Hyiaman and Bondinuba, 2014).

Adoption of tax credits in the housing sector can be an innovative way of offering incentives to developers like it is done in the US housing market. Gibb, Maclennan and Stephens (2013) highlight that the US's Low Income Housing Tax Credit (LIHTC) is a large-scale and significant programme, whose existence encourages other innovations in financing, design and project delivery.

The study then sought to establish the effect innovative financing and technological factors have on funding of housing in Kenya. The following hypothesis was then specified:

H_o: Innovative financing and technological factors do not influence the funding of housing
H_1:   Innovative financing and technological factors do influence the funding of housing

2.2.3 Effect of Stakeholder Factors on Relationship between both Economic Factors and Innovative Financing and Technological Factors and Funding of Housing

Barney (2011) state that stakeholders are associated with an organization due to the utility they receive from such a relationship in various forms and this utility is based on perception. The main stakeholders in the construction industry are the developers, contractors, consultants, suppliers, financiers, the government, buyers and sellers in real estate and they do influence financing differently due to their unique interests. Moral issues concerning the stakeholders are of importance to the financiers.

Abdul-Rahman, Wang and Yap (2010) came to the conclusion that the issue of professional ethics play an important role in quality-related problems in a construction project in their questionnaire survey in the Malaysian construction industry. Chowdhury and Maung (2013) demonstrated empirically that increase in managerial efficiency increases firm's ability to acquire debt. Their argument was debt can also serve as a disciplining device and an increase in debt financing should also improve internal governance practices and indirectly compel the management to become more efficient.

Ameh and Odusami (2010) in their survey research assessed the perceptions of construction professionals regarding ethical issues in the Nigerian construction industry with a sample size of 108 construction organizations using descriptive statistics, posit that ethics affect corporate credibility and economic sustainability as well as personal security. Hassim *et al.* (2010) concur with this by pointing out that the construction industry plays a substantial role in a country's national economy, irrespective of the country's levels of economic development. Al-sweity (2013) found that the construction industry in the Gaza Strip suffer from ethical problems especially at the procurement stage, concluding that these unethical conducts have a negative impact in that it lowers profitability and quality of the projects

Mathenge (2012) in his investigation on the ethical issues facing the construction industry in Kenya, highlights that it is plagued by a lot malpractices due to unethical behavior of the stakeholders that have resulted in collapsing buildings that have been fatal.

The study then sought to examine the moderating effect of stakeholders on the relationship between Funding of housing and Economic factors. The following hypothesis was tested:

H_o: Stakeholders do not have a moderating influence on funding of housing
H_1:   Stakeholders have a moderating influence on funding of housing

3. Research Methodology

A random sample of 212 financial institutions comprising commercial banks and micro finance institutions (MFIs) was drawn from a population of 451 branches in Nairobi got from 43 commercial banks, 9 deposit-taking MFIs and three other

financiers (Shelter Afrique, East African Development Bank and International Finance Corporation) of housing in Kenya. The study tested for content validity based on expert opinion from in-depth interviews of experts in RE funding and academia. Construct validity was established by use of factor analysis. The data collection period was in the months of May and June 2015. Majority of the questions were Likert-type scales, with the other type of questions being single/multiple category scales i.e. dichotomous scales. Care was taken to ensure that the provided choices exhausted all possible responses to the question presented. The dependent variable funding was ordinal in that different categories of funding were provided ranging from less than KES 100 million to greater than KES 400 million with intervals of KES 100 million.

One hundred and fifty eight (158) questionnaires were collected, which translated to a response rate of 74.5 per cent. Factor analysis was used to see whether any data reduction was appropriate while descriptive analysis was used to draw out the different characteristics numerically; correlation analysis to establish if there existed any relationship between the independent variables (economic factors and innovative financing and technological factors) and the dependent variable (funding of housing). Several diagnostic tests were carried out to establish the suitability of the multiple regression analysis to be used, these are; multicollinearity to test the correlation of the independent variables, test of parallel lines to examine the equality of the different categories and whether the assumptions of the correlation between independent variables and dependent variable does not change for dependent variable's categories, also parameter estimations do not change for cut-off points held, lastly test of goodness of fit to test how well the model fits the data. The results of these diagnostic tests indicated that it was appropriate to use the ordinal logit regression analysis to test the relationship between the dependent and independent variables.

4. Findings

4.1 Descriptive Analysis – General Information

4.1.1 Education of the Respondent

The study found that 98.7% of the respondents had a first degree and higher therefore highly educated.

4.1.2 Total Amount Lent out for Housing

Credit for housing was categorized into different bands.

Table 1. Total Amount Lent out for Housing

TOTAL AMT. LENT OUT (KES.)	Frequency	Valid Percent	Cumulative Percent
<100m	66	42.9	42.9
100-200m	33	21.4	64.3
201-300m	21	13.6	77.9
301-400m	6	3.9	81.8
>400	28	18.2	100.0
Total	154	100.0	

The study found that (Table 1) of the amount advanced for housing majority at 43% was worth less than KES. 100 million per branch, while 21% advance loans between KES. 100 – 200 million and 14% between KES. 201 – 300 million. Only 22% advance loans for housing of more than KES. 300 million.

4.1.3 Percentage of Total Loans Advanced, Average Default Rate and Average Lending Rate

This helped bring out more of the characteristics on credit advanced for housing by a branch.

Table 2. Percentage Total Loans Advanced, Average Default Rate and Lending Rate

	Percentage of total loans advanced from your branch for housing	Average default rate observed in housing in your branch	Average Lending Rate for Housing
Mean	32.9	6.3	16.33
Median	30.00	3.00	16.00
Mode	30.00	0.00	15.00
Std.Deviation	23.1	10.6	

The study found that (Table 2) the average of the total loans advanced for housing by the Nairobi branches was 32.9% with a median and mode of 30%. The average default rate on housing loans was 6.3% while the average lending rate 16.33%.

4.1.4 Valuation Appraisal Method Commonly Used

Adoption of technology in a financial institution enables it to use more sophisticated valuation methods in appraising projects.

Table 3. Valuation Appraisal Method Commonly Used

Appraisal Method		Frequency	Valid (%)	Cumulative (%)
Valid	Payback	19	17.4	17.4
	Discounted Payback	53	48.6	66.1
	NPV	11	10.1	76.1
	IRR	26	23.9	100.0
	Total	109	100.0	
Missing	System	49	31.0	
	Total	158	100.0	

When it comes to appraisal methods used for housing projects, the study found (Table 3) that only 17.4% of the financial institutions' Nairobi branches use the Payback method while majority at 48.6% used Discounted Payback method and the rest 34% either used NPV or IRR methods.

4.2 Factor Analysis

The actual factor analysis used is the method of Principal Component Analysis and varimax rotation method. The two measures used in the study are (KMO) test and Bartlett's Test and they indicate the suitability of data for structure detection. Specifically, KMO measure of sampling adequacy is a statistic that indicates the proportion of variance in the variables that may be caused by underlying factors, while Bartlett's Test of sphericity tests the hypothesis that the correlation matrix is an identity matrix, which would suggest that the variables are unrelated and therefore unsuitable for structure detection.

4.2.1 KMO and Bartlett's Test

Table 4. KMO and Bartlett's Test for Economic Factor Construct

KMO- Measure of Sampling Adequacy.		0.462
Bartlett's Test of Sphericity	Approx. Chi-Square	143.884
	df	28.000
	Sig.	0.000

As shown in Table 4, KMO value is 0.462 and the chi square for Bartlett's Test is 143.884 with a p value of 0.000. These two tests suggest that factor analysis is appropriate for economic factors.

Table 5. KMO and Bartlett's Test for Innovative financing and Technological factor Construct

KMO Measure of Sampling Adequacy.		0.801
Bartlett's Test of Sphericity	Approx. Chi-Square	948.095
	df	136
	Sig.	0.000

As shown in Table 5, KMO value of 0.801 (greater than 0.5) and Bartlett's test had a value of 948.095 that was significant at 1 percent level indicating that innovation and technology construct can be factor analyzed.

Table 6. KMO and Bartlett's Test for Stakeholders Construct

KMO Measure of Sampling Adequacy		0.743
Bartlett's Test of Sphericity	Approx. Chi-Square	242.532
	df	6
	Sig.	0.000

The value of KMO for stakeholders (Table 6) constructs was 0.743 (greater than 0.5) implying that stakeholders construct can be factor analyzed. The chi square for Bartlett's test was 242.532 with a p value of 0.000 that was significant at 1 percent level indicating that factor analysis is appropriate.

4.2.2 Factor Analysis Results

The main objective of factor analysis is (Blumberg, Cooper and Schindler, 2014) reducing many variables to a manageable number of variables that belong together and have overlapping measurement characteristics.

Table 7. Rotated Component Matrix for Economic Factors

Economic Factors	Market Forces	Cost of Inputs	Macro Economy	Cost of Funding
Prevailing Interest Rates	0.094	-0.096	0.133	0.870
Exchange Rates	-0.090	-0.101	0.833	0.085
Inflation Rates	0.069	0.220	0.768	-0.052
Labor	0.105	0.797	0.205	0.101
Raw Materials	-0.152	0.867	-0.067	0.016
Competitors Lending Rates	-0.151	0.317	-0.120	0.585
Demand of housing	0.873	0.018	0.026	-0.038
Supply of housing	0.857	-0.074	-0.047	0.011

The results in Table 7 presents factor analysis results for the economic factors construct. All the items had factor loadings greater than 0.5 indicating that all the items are strongly correlated with all the four components – Market forces, Cost of Inputs, Macro economy and Cost of Funding. Under Market Force, there was *Demand of housing* and *Supply of housing* which had factor loadings of 0.873 and 0.857 respectively. *Labor costs* and *Raw Materials costs* had factor loadings of 0.797 and 0.867 respectively, both under Cost of Inputs. Under Macro economy, there was *Exchange rates* and *Inflation rates* with factor loadings of 0.833 and 0.768 respectively. *Prevailing interest rates* and *Competitors lending rates* had factor loadings of 0.870 and 0.585 respectively both under Cost of funds. This indicated that economic factors can be measured using the four components.

Table 8. Rotated Component Matrix for Innovative Financing and Technological Factors

Innovative Financing & Technological Factors	Technological Advancement	Innovative Marketing	Stakeholder Partnerships	Repayment Terms Innovation	Loan Uptake Incentives
105% Financing	-0.012	0.097	0.117	0.091	0.843
Moratorium on Repayments	-0.007	0.288	0.094	0.116	0.696
Create Awareness of Banks Products	0.151	0.575	0.189	0.156	0.189
Provision of Long Tenors	0.045	0.190	0.199	0.822	0.082
Flexible Loan Repayment	0.005	0.240	0.023	0.836	0.120
Equity Release	0.141	0.699	0.051	0.343	0.021
Interest Rate Rebates	0.168	0.720	0.166	0.023	0.180
Partnerships with Mortgage Providers	0.114	0.591	0.562	0.054	0.129
Partnerships with MFIs	0.136	0.261	0.824	0.080	-0.030
Partnerships with Consultants	0.120	0.404	0.772	0.069	0.076
Partnership with Landlords	0.169	-0.088	0.636	0.202	0.233
Skilled Tech. Labor in Banking	0.691	0.213	0.047	0.056	-0.072
Better Appraisal Methods used	0.784	0.278	0.122	-0.026	-0.068
Better Decision Making	0.766	0.374	0.173	0.057	0.026
Boost because of Internet	0.565	-0.196	0.255	0.511	0.186
Mobile Banking Boost	0.622	-0.086	-0.113	0.124	0.338
Satisfied Clients (Developers and Diaspora)	0.653	-0.001	0.319	-0.047	-0.077

As shown in Table 8, all items under innovation and technology had factor loadings greater than 0.5 (rounded off to one decimal place) indicating that the items are strongly correlated with either component one, two, three, four, or five, which the researcher chose to represent dependent on the implied commonality of the items, Technological Advancement, Innovative Marketing Stakeholder Partnerships, Repayment Terms Innovation, and Loan Uptake Incentives. Under Technological Advancement had *Skilled Tech. Labor in Banking, Better Appraisal Methods used, Better Decision Making, Boost because of Internet, Mobile Banking Boost* and *Satisfied Clients (Developers and Diaspora)* with factor loadings of 0.691, 0.784, 0.766, 0.565, 0.622 and 0.653 respectively. Under component Innovative Marketing, were *Create Awareness of Banks Products, Equity Release, Interest Rate Rebates*, and *Partnerships with Mortgage Providers*, with loadings of 0.575, 0.699, 0.720 and 0.591 respectively. Under component Stakeholder partnerships were *Partnerships with Mortgage Providers, Partnerships with MFIs, Partnerships with Consultants, and Partnership with Landlords* with factor loadings of 0.562, 0.824, 0.772 and 0.636, whereas those under component Repayment Terms Innovation were *Provision of Long Tenors, Flexible Loan Repayment* and *Boost because of Internet* with factor loadings of 0.822, 0.836and 0.511. *105% financing* and *Moratorium on Repayments* had factor loadings of 0.843 and 0.696 respectively, and

were correlated with component Loan Uptake Incentives. This finding indicated that innovation and technological factors can be measured using the five components.

Table 9. Component Matrix for Stakeholders Construct

Stakeholder	Suitability in Their Field
Contractors are Knowledgeable & Competent	0.790
Consultants are Competent	0.852
Developers are Competent & Trustworthy	0.854
Existence of Skilled Labor & Good working conditions	0.741

As shown in Table 9, all items under stakeholder construct had factor loadings greater than 0.5 indicating that the items are strongly correlated with component Stakeholders' Suitability in their respective field of expertise. Factors; *Contractors are Knowledgeable and Competent, Consultants are Competent*, *Developers are Competent & Trustworthy* and *Existence of Skilled Labor & Good working conditions* had loadings of 0.790, 0.852, 0.854 and 0.741.

4.3 Descriptive Analysis

4.3.1 Respondents on Extent Effect of Economic Factors on Funding of Housing

Items listed below informed by literature review and the pilot study comprised what the study grouped under economic factors. Questions using the Likert scale sought to measure the degree of influence on funding of housing ranging from (i) Very Large Extent, (ii) Large Extent, (iii) None, (iv) Small Extent, (v) Very Small Extent.

Table 10. Extent Economic Factors Have on Funding of Housing

	Very Large & Large (%)
Market Forces	
Demand of housing	87.3
Supply of housing	74.5
Cost of Inputs	
Labor	47.7
Raw Materials	70.3
Macro economy	
Exchange Rates	74.4
Inflation Rates	41.7
Cost of Funds	
Interest Rates	93.6
Competitors Lending Rates	67.7

The responses in Table 10 were given as Very large and Large extent combined to give a percentage to measure effect of economic factors on funding of housing.

4.3.2 Respondents on Extent Effect of Innovative Financing and Technological Factors on Funding of Housing

Items listed below informed by literature review and the pilot study comprised what the study grouped under innovative factors. The respondents were asked to respond to each of the statements in terms of five degrees of agreement or disagreement on effect of the items on funding of housing. These ranged from (i) Strongly Agree, (ii) Agree, (iii) Neutral, (iv) Disagree, (v) Strongly Disagree.

Table 11. Extent Innovative Financing and Technological Factors Have on Funding of Housing

	Strongly Agree & Agree (%)
Technological Advancement	
Skilled Technical Labor in Banking	77
Better Appraisal Methods used	85
Better Decision Making	81
Boost because of Internet	55
Mobile Banking Boost	51
Satisfied Clients (Developers and Diaspora)	84
Innovative Marketing	
Creation of Awareness of Banks Products	84
Equity Release of Existing Property	89
Interest Rate Rebates	70
Stakeholder Partnerships	
Partnerships with Mortgage Providers	90
Partnerships with MFIs	76
Partnerships with Building Consultants	77
Partnership with Landlords	55
Repayment Term Innovation	
Provision of Long Tenors	89
Flexibility Loan Repayment Regimes	90
Loan Uptake Incentives	
105% Financing	73
Moratorium on Repayments During Construction	81

The responses in Table 11 above were given as Strongly agree and Agree combined to give a percentage to measure effect of innovative financing and technological factors on funding of housing.

4.3.3 Respondents on Effect of Moderating Stakeholders Factors on Funding of Housing

The effect of the suitability and competence of major stakeholders on funding of housing was sought.

Table 12. Extent Moderating Factors have on Funding of Housing

Suitability in their Fields	Strongly Agree & Agree (%)
Contractors are Knowledgeable & Competent	83
Consultants are Competent	83
Developers are Competent & Trustworthy	69
Existence of Skilled Labor & Good working conditions	67

The responses in Table 12 above were given as Strongly agree and Agree combined to give a percentage to measure moderating factors effect.

4.4 Correlation Analysis

Correlation analysis is the statistical tool that can be used to describe the degree to which variables are linearly related to another.

4.4.1 Correlation between Economic Factors and Funding of Housing

Table 13. Correlation between Economic Factors and Funding of Housing

		Economic Factors
Funding for housing	Pearson Correlation	-0.022
	Sig. (2-tailed)	0.785
	N	154

The results shown in Table 13 indicate that the Pearson correlation coefficient between Funding of housing and Economic factors was -0.022 with a p value of 0.785. This indicated that Funding for housing was negatively related with Economics factors but the relationship is not statistically different from zero.

4.4.2 Correlation between Innovative Financing and Technological Factors and Funding of Housing

Table 14. Correlation between Innovative Financing and Technology factors and Funding of Housing

		Innovative Financing & Technological Factors
Funding of housing	Pearson Correlation	-0.021
	Sig. (2-tailed)	0.799
	N	153

Table 14 shows the Pearson correlation coefficient between funding of housing and innovation and technological factors was -0.021 with a p value of 0.799. This indicated a negative relationship between funding and innovative financing and technological factors, but it's not statistically significant

4.4.3 Correlation between Funding of Housing and Stakeholders

Table 15. Correlation between Funding of Housing and Stakeholders

		Stakeholders
Funding of housing	Pearson Correlation	-0.107
	Sig. (2-tailed)	0.187
	N	154

Table 15 presents the correlation results between stakeholders and funding of housing. Pearson correlation coefficient for the relationship between stakeholders and funding of housing was -0.107 with a p value of 0.187. This indicates that Funding for housing was negatively related with Stakeholders factors but the relationship was not statistically insignificant.

4.5 Regression Analysis

Multiple linear regression was used to establish the effect the independent variables (economic, and innovative financing and technological factors) have on the dependent variable (funding of housing) and also the effect of the moderating factors. Ordered logit regression was used since the dependent variable was a categorical variable that follows an increasing order.

4.5.1 Regression Analysis - Economic Factors and Funding of Housing

Table 16. Effect of Economic factors on Funding of Housing

Parameter	Estimate	Standard Error	Significance
Economic Factor	-2.681	1.121	0.017

The results for effect of economic factors on funding of housing show that the coefficient for economic factors was (Table 16) -2.681 with a p value of 0.017. The significant p value implied that economic factors do significantly influence funding of housing; significant at 5%. The negative sign of the coefficient indicated that the relationship between Economic factors and Funding of housing is negative.

According to the findings, the study rejected the null hypothesis that economic factors do not influence funding of housing.

4.5.2 Regression Analysis - Innovative Financing and Technological Factors and Funding of Housing

Table 17. Effect of Innovative financing and Technological Factors on Funding of Housing

Parameter	Estimate	Standard Error	Significance
Innovative Financing and Tech. factors	-1.188	1.075	0.269

The results shows that the coefficient for Innovative financing and Technological factors was -1.188 with a p value of 0.269 (Table 17). This p value is greater than 0.05 or 0.1 suggesting that the effect is insignificant.

The study failed to reject the null hypothesis and concluded that Innovative financing Technological factors do not significantly influence funding of housing.

4.5.3 Moderating Influence Stakeholders Have on Relationship between Funding of Housing and Economic Factors

Table 18. Moderating influence Stakeholders have on Funding of Housing and both Economic Factors and Innovative financing and Technological Factors

Parameter	Estimate	Standard Error	P value
Stakeholders	0.153	1.709	0.929
Economic Factors and Stakeholders	1.257	0.520	0.016
Innovative financing and technological factors and Stakeholders	0.682	0.411	0.097

To test for the moderating effect the study used the regression method where the independent variables (Economic Factors, and Innovative financing and Technological Factors) were interacted with the moderator. The results (Table 18) showed that the coefficient between stakeholders construct and economic factors was 1.257 with a significant p value of 0.016; thus, significant at 5%. The moderating effect of stakeholders on innovative financing and technological factors was 0.682 and a p value of 0.097, therefore significant at 10%. The finding suggested that stakeholders moderate the relationships between both economic factors and innovative financing and technological factors and funding of housing.

5. Discussion of Results

The regression analysis results showed that there existed a negative relationship between economic factors and funding of housing and the coefficient was significant at 5 percent. This means that an upward shift in the items under economic factors will reduce the probability of an individual borrowing.

The results showed that demand for housing has a greater influence on funding of housing than supply. Market forces and government intervention (Warnock and Warnock, 2008) determine the specific size of each of the housing tenures. There are two major factors that influence the level of housing supply and the responsiveness of supply to changes in prices (Ball, Goody, Meen, and Nygaard, 2011), the first factor is the fixed supply of land and the requirement to allocate it among a number of economic and social uses i.e. the planning system   and the rate at which land is released for development and the second factor is the long lead times in the construction of housing.

Cost of inputs, these being cost of labor and raw materials do not have a high effect on the availing credit for housing finance probably because these are not costs directly affecting the financial institutions. But it was found that cost of raw materials had a higher influence than cost of labor. This is in line with the cost structure of a single unit of housing (AfDB, 2013), 60% is the cost of construction that comprises 70% as the cost of materials with 30% of this being cost of labor. But this is in contrast with the findings of Wheaton and Simonton (2007) that there's no relationship found between construction costs and building activity.

Unstable macroeconomic factors negatively influence borrowing thus there would be a decline in borrowing for housing because of reduced disposable income. Exchange rates had a higher influence on funding of housing than inflation rates. Most of the materials used for finishes in housing are imported making the exchange rate significant. Kenya has adopted what is called inflation targeting (IMF, 2015) which has really worked very well in creating stability in the economy. Mallick, (2011) observes that the monetary policy can affect the construction sector especially the housing sector depending upon the credit allocation and interest rate policy in the economy. Prevailing interest rates were found to have a very big effect on funding of housing, together with competitors' lending rates. This was   in contrast with the findings of Mbusi, Kenyatta and Kivaa (2013) that there is no significant relationship between changes in interest rates (they used CBK base lending rate as a representative) and the annual change in construction output, regardless of the number of years lagged

The study found that innovative financing and technological factors had no significant influence on funding of housing in Kenya. Some of the technological and innovative factors considered in the study were recent introductions; like provision of long tenors, flexibility of loan repayment regimes, equity release of existing property in housing, interest rates reduction on timely repayments, and modern technology like internet and mobile banking among others. The finding of an insignificant influence on funding of housing by innovations and technological advancements effected, could have been masked by macroeconomic factors. UN-HABITAT (2014) reports that the cost of land and building materials throughout Africa, is too high to make it profitable for developers and private construction companies, indicating it will take more than innovative financing and technological advancements to stimulate uptake loans for housing.

A positive moderating effect of the stakeholders on the relationship between economic factors and funding of housing was established by the study. UN-HABITAT, (2014) posit that Public-private partnerships have great potential for increasing accessibility of decent housing for the excluded people, where there's a high demand of housing in Kenya. The caliber of the different stakeholders in the construction industry does have a positive significant influence in the innovations and technological advancement in the funding of housing. The stakeholders' competence in their respective fields indicates a better understanding of the construction industry and does contribute in the introduction of innovative financing and technology.

6. Conclusions

The study has made significant contribution by first establishing a negative relationship between economic factors and housing, thus confirming what theory states, that intervention of the government through the central bank is necessary in the creation of an enabling environment for investment in housing. If the economic factors are unfavorable, the disposable income reduces and thus fewer funds are available to finance housing development. This is a clear demonstration of how vital a stable economy is to the funding of housing in Kenya for this creates confidence of potential housing lenders in the

stability of the shilling and assurance that their investment in the sector will yield a good return. The study shows funding for housing is demand driven and that an unstable micro economic environment has a great effect on lending for housing. Interest rates were found to have the greatest effect on lending for housing, since it's the main determinant on how much funds will cost. The conclusion then being that the prevailing interest rates are prohibitive to allow uptake of housing loans at a level that will bridge the gap between demand and supply of housing.

The study also established that there's no significant relationship between innovative financing and technological factors and funding of housing in Kenya despite the aggressive efforts in the banking sector. Technological advancements and innovations in place do not seem to stimulate the uptake of loans for housing. The conclusion then is that technological advancement and innovation is a facilitator but not a motivator of funding.

Lastly, the study showed that major stakeholders in the construction industry namely; developers, contractors, consultants and labor force do play a significant role in upholding both the relationship between economic factors, and funding of housing and also the relationship between innovative financing and technological factors and funding of housing . Their suitability in their respective fields of expertise was important to those relationships.

7. Recommendations

Interest rates and exchange rates were found to have a big impact on credit provision in the housing sector, therefore to boost funding of housing in Kenya, the government and policy makers should ensure that interest rates are kept at a level that will encourage investments in housing. Volatility of the foreign exchange rate should be minimized to create stability since most building materials are imported.

The government could introduce more attractive tax incentives in the housing sector to spur growth as has been pointed out by UN-HABITAT (2013) that property tax incentives are intended to influence investment decisions and reward (or subsidize) certain economic activities, and this can encourage developers and the benefit would trickle down to potential home owners.

Innovative financing and technological factors were found to insignificantly influence funding of housing in Kenya. This means that as much as technology and innovation are important, it will have no major effect on the level of funding of housing in Kenya on its own. More needs to be incorporated to help boost funding in the housing sector with innovative financing in terms of new products and technology playing the role of a catalyst not a major factor.

8. Limitations of the Study and Suggestions for Further Research

A major limitation of this study was its confinement to only economic factors and innovative financing and technological factors influence on funding of housing in Kenya; other factors need to be incorporated. The effects of factors that do have an effect on funding in the housing sector needs to be studied over longer time periods thus need of use of longitudinal data.

In-depth research should be carried out on economic factors effect on funding of housing in Kenya looking at the demand side also. For innovative financing and technological factors more time needs to be given in order to assess their effect on funding of housing since most of the initiatives were recent therefore use of longitudinal data would also help.

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