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A HOUSING DELIVERY MODEL FOR PLANNINGNEEDS OF THE LOW / MIDDLE LEVEL PUBLIC SECTOR EMPLOYEES IN KENYA

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ABSTRACT

The world over, shelter or housing is considered as a basic need alongside food, clothing and health care. In recognition of this right, the Government of Kenya has put in place policies such as Sessional Paper No. 3 of 2004 and Sessional Paper No. 3 of 2016 on National Housing Policy including Legal Notice No. 98 on Civil Servants Housing. Despite these initiatives only 2080 out 250,000 public sector employees have benefitted from the Civil Servants Housing initiative launched in 2004. Further, only 43,000 public housing have been constructed since Kenya became an independent state. The housing accessibility dilemma is exacerbated by high rents and mortgage rates which are mostly within the reach of the upper middle and high-income public sector employees driving the low and middle level to live in the slums and other squatter settlements. The study evaluated theoretical determinants to access to quality housing with a view of developing a mathematical housing delivery model to address the plight of the low and middle level employees in Kenya. It employed a cross sectional survey involving administering structured questionnaires in a 1in 5 Likert format to obtain the perceptions of public sector housing experts drawn from public sector organizations. 60 out of 259 experts were sampled through stratified and simple random techniques.

Charles Spearman's correlation and "ENTER" method regression analysis were adopted for the study in respect of 13 independent variables that theoretically influence access to quality housing (dependent variable).The key significant determinants of access to quality housing were construction cost (0.796), mortgage / rent (0.781), financing strategy (0.781), land / infrastructure (0.770), household income (0.743) and building materials & technology (0.721).The regression analysis established that the adjusted R^2 (coefficient of determination) was 0.75 meaning that the 13 significant independent variables account for 75% variation in access to quality housing. The housing delivery model is thus: Housing accessibility to low / middle income earners = 5.680 + 0.044 Housing actors + 0.173 Delivery methods + 0.068 Land / infrastructure + 0.090 Building material / technology + 0.025 Planning process + 0.151 Construction process + 0.037 Financing strategy + 0.193 policy intervention + 0.66 monitoring / control + 0.117 research into alternative materials/technology + 0.193 construction cost + 0.050 household income + 0.139 mortgage / rent. In conclusion, the 13 independent variables positively explain or predict changes or variations to access to quality housing. It is therefore recommended that the government factors the model in the National Housing Policy to aid policy makers in planning for future housing programmes for the low/middle level public sector employees in Kenya.

***KEYWORDS**: Housing Delivery, Low / Middle Level, Public Sector Employees*

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INTRODUCTION

Global Housing Accessibility Dilemma for the Low and Middle Level Earners

Housing or shelter as a human right is a dilemma across the globe. This is despite the right to adequate housing or shelter having been emboldened by the UN General Assembly of 1948 through proclamation of the Universal Declaration of Human Rights (United Nations Human Rights, 1948). Later UN conventions in 1966 and 1991 regarding the Committee on the Economic, Social and Cultural Rights, specifically General Comment No. 4 clarified that adequate or quality housing should not be defined as just having a roof over one's head but should be explicitly broadened to incorporate security of tenure, availability of services, affordability, location and cultural adequacy (United Nations Habitat, 1996). This definition therefore largely explains the acceptable standard of quality of housing. Accordingly, 3.3 billion persons which is in excess of half of the world's population live in cities out of which one billion lack live in slums and squatter settlements in squalid unsanitary conditions due to inadequate quality housing (United Nations Habitat, 2013b).The huge number of the homeless globally therefore calls for concerted efforts on how to revitalize the existing housing delivery systems to address the current quality housing accessibility dilemma. In response to the foregoing, developed and developing world nations have employed differing strategies in trying to overcome the housing dilemma for the low and middle level income earners who represent the majority of those living in squalid deplorable built environment (UN Habitat, 2013a).The plight of the low and middle level public sector employees responsible for running day to day affairs of any government cannot therefore be understated.

While the housing delivery approach adopted by the developed world with well-endowed economies is hinged on policies that encourage heavy subsidy and tax incentives, the developing nations have poor economic backgrounds and therefore cannot sustain heavy subsidies and tax incentives required to facilitate access to quality housing by the low and middle level population. The developed world has adopted unique strategies in an attempt to address the housing needs of the low and middle citizens. The United States (US) has severally reviewed her housing policy though successive regimes with the aim of tackling the problem of insufficient quality affordable housing for the vulnerable groups (Weiss, 2002).In Britain, the concept of social housing came though the Housing Act, 1980 which provides for an enhanced regulatory frame work which advocates for exceptional protection for public sector employees including civil servants (tenants' / home owners) with provisions for the lifelong security of tenure, the right to tenure, 50% discounted house price, incremental purchase schemes and increased allocations to social housing (Hull, 2012). Britain's Policy is hinged more on home ownership rather than ensuring sufficient supply of housing to meet the rising demographic needs resulting in sharp rise in rents and asset price (Hull, 2012). On the other hand, the US introduced the national home ownership strategy that targets the lower income group including vulnerable federal state workers to access decent and affordable houses developed through federal governments (Millennial Housing Commission, 2002). Australian as a developed nation has adopted a strategy that focuses on households that pay more than 30% of gross income on housing cost in a bid to half their numbers by 2025 (Disney, 2007). The national affordable housing strategy not only grants cash and non-cash subsidies but also seeks to involve all stakeholders including non-profit housing development organizations. These policies seek to address the housing accessibility crisis through heavy subsidies and tax incentives to meet the requisite supply and demand equation. The approach takes a middle ground scenario between socialist and open market situations (capitalist). The extreme socialist and capitalist ideals have not been effective since extreme socialist strategy would require enormous state resources while capitalist counterpart would push housing costs unaffordable level.

Compared with the developed nations, the developing counter parts suffers weak economies which cannot shoulder the heavy subsidy associated with the strategies adopted by the developed nations implying that they have to focus to alternative appropriate solutions. The Malaysian housing policy is geared towards accommodating the disadvantaged section of the society to guarantee adequate, affordable and quality shelter (Idrusand Siong, 2008). The policy has reduced the numbers of the homeless through increased supply of public housing. In addition, the strategy has incorporated a rule that every private housing development must set aside 30% of housing units in any development for the low-income earners. Shuid (2010) on the other hand believes that to enable the low medium income Malaysian citizens who form the majority population access quality housing the Federal Governments should rely on incentives such as tax relief, lower land premium and faster approval to facilitate private developers.

This is necessary to boost housing supply initiated through public financing. The huge urban population in Nigeria has presented her monumental housing accessibility deficits particularly to the low and middle level income earners who experience supply and affordability constraints. Makinde (2013) views the housing accessibility dilemma to this income bracket as arising out of land allocation cost, high mortgage finance, high cost of construction contributing to unaffordable rents, high mortgage rates and in adequate supply of housing units.

The Government of Nigeria has put in place appropriate policy reforms that include bringing on board the private sector as a major stakeholder to increase output for the vulnerable groups (Makinde, 2013 and Ibem, 2010).This is coupled with infrastructure provision, favourable mortgage regime, improved access to land, faster registration of land, public private partnership financing option and speedier development approval. Ugochukwu and Chioma (2015) contend that appropriate materials and technologies could reduce construction costs by approximately 60%and could translate into cheaper rent / mortgage rates. These strategies have however not fully addressed the housing needs of the targeted low and middle level citizens.

Housing Delivery for the Low and Middle Level Public Sector Employees in Kenya

In Kenya, the high-end income earners can easily access quality housing from the formal market, but this remains a challenge to the low and middle level formal sector employees. Over 90% of this income group cannot access quality housing from the formal market. A review of various previous studies and policy documents of the Government of Kenya point to a gloomy picture of the existing housing accessibility status. Republic of Kenya (2017) argues that the annual supply of housing units in Kenya ranges between 30,000–35,000 units compared to a corresponding demand of 200,000 units. This serious shortfall is believed to be complicated further by the rural urban migration and high rate of population growth estimated at 4.2% (Nabutola, 2013; Republic of Kenya, 2008 and Republic of Kenya, 2004). Several past studies cite inadequate supply, unaffordable house mortgage / rent, undeveloped housing finance sector, high housing development cost, in–adequate serviced land and lack of appropriate housing policy as some of the drawbacks that have hindered access to quality housing by the low and middle level public sector employees in Kenya (Okonkwo, 1996; Noppen, 2012; Centre for Affordable Housing Finance in Africa, 2012; Republic of Kenya, 2017) and Republic of Kenya, 2013b). The foregoing situation has prompted the majority of the lower end income group to live in the slums under squalid unsanitary conditions.

Affordability challenges, corrupt housing allocation system as well as cost / time overruns of housing projects rank as some of the constrains for not providing adequate quality housing. In addition, A number of previous studies cite high cost of land / infrastructure, expensive building materials / technology, low household income and high rent / mortgage rates are among the significant challenges to access to quality housing (Moko and Olima, 2014; Ndungu, 2014; UNEP,

2012 and Njathi, 2011). Cheap alternative materials and technology could enhance affordability of the low and middle level income earners in Kenya but have faced some setbacks. Magutu (2015) believes cheap alternative materials / technologies are economical, durable and safe but decries that their use is limited due to lack of standards and sensitization of the general populace. The implication of this constrain is that housing policy makers need to review the existing standards to accommodate the emerging alternative materials / technologies and also build capacity for elaborate sensitization of consumers. In addition, housing allocation criteria as applied in Kenya is believed to be corrupt and biased leaving out most of the deserving low and middle at the expense of well-connected elites who are economically endowed (Mitullah, 1993).Martini (2012) and; Kange the and Manomano (2014) argue that nepotism, bribery and political influence ranks as some of corrupt vices that influence unfair allocation of housing units in completed public housing schemes.

It is therefore prudent that the housing allocation criteria and committees be reformed to minimize corrupt vices. Mbatha (1986), Njogu (2015) and Rugenyi (2015)on the other hand, contend that changes of project scope, contractors' cash flow problems, delays in decision making, inappropriate planning, inaccurate documentation, use of unqualified or inexperienced consultants / contractors, inadequate funding, delayed payments, contractual disputes, ineffective quality control and lack of effective monitoring tools are significant causes of delays in completing housing construction projects within programmed time, budget and quality specifications.

The foregoing has shown why it is necessary to tackle these constrains so that the quality housing accessibility challenges can be overcome.For instance ,since independence public housing stock in the entire country is only 43,000 which compared to the civil service workforce of 217,069 raises an acute shortfall in public housing provision (Republic of Kenya, 2013a).Various studies undertaken in the developed world have pointed out a number of ways of achieving the universally agreed principle for shelter. The World Bank (2012) clarifies that to enable access to quality housing for every citizen, the existing housing delivery approaches have to be reviewed.

The Government of Kenya formulated delivery strategies such as mortgage, rental, tenant purchase, site and service, cooperative and self-built housing programmes across the country (National Housing Corporation, 2018). Further, a number of policy interventions such as Sessional Paper No. 5 of 1966 / 67, Sessional Paper No. 3 of 2004, Sessional Paper No.3 of 2016, Legal Notice No. 98 of 2004 and the National Slum Upgrading / Prevention Policy of 2004 have failed to address the shortfall of quality housing provision. The World Bank (1989) believes that incentives and disincentives through various government interventions influence the demand and supply of housing. Appropriate demand and supply equation may positively or negatively influence quality housing provision to the low and middle level income earners.

The current housing delivery model has therefore not been able to address the existing quality housing accessibility dilemma since over 90% cannot access quality housing from the formal market (Centre for Affordable Housing Finance in Africa, 2012). In addition, there is no known mathematical housing delivery model applied to improve quality housing accessibility challenges in Kenya. The review of literature has identified planning process, financing strategy, land / infrastructure, construction cost, construction process, delivery methods, mortgage / rent, research in to alternative materials, housing actors, building materials / technology, household income, policy intervention and monitoring / control as independent variables that influence the dependent variable, access to quality housing. The study, therefore sought to determine the relationship between the independent variables with dependent variable with a view of developing a mathematical housing delivery model for the low and middle level public sector employees in Kenya.

Research Methodological Approach

The study evaluated the above listed 13 key theoretical determinants or independent variables that theoretically influence access to quality housing were considered alongside access to quality housing (dependent variable). The study employed a cross sectional survey involving administering structured questionnaires in a 1 in 5 Likert scale to obtain the perceptions of public sector housing experts drawn from public sector organizations such as State Department for Housing, State Department for Public Works and National Housing Corporation.60 out of 259 experts were sampled through stratified and simple random sampling techniques to enhance the representatives of the sample to the target population. The study adopted Mugenda and Mugenda (2003) formula shown below to arrive at the sample size.

nf = (n/1+n/N) where;

nf is sample size for populations < 10000

n is sample size for populations > 10000 = 384

N is the population estimate = 259

10% of the questionnaires were pre-tested through use of Cronbach's alpha coefficient analysis which yielded a coefficient of 0.742 which is acceptable. According to Pallant (2011) and McClelland (2015), Cronbach's alpha coefficient lie between 0 and 1 and any coefficient greater than 0.7 confirms the reliability of the data collection instrument.

The data that were ordinal in nature necessitating the use of Charles Spearman's rank multiple correlation analysis to establish the relationship between the independent variables and access to quality housing (dependent variable) through use of 1 in 5 Likert scale ranking (Kothari,2010). The details of the Likert scale ranking included; 1. Not appropriate, 2. Less appropriate, 3. Neutral, 4. Appropriate, 5. Very appropriate. It was then necessary to conduct multi-collinearity test between the 13 independent variables since high correlation distorts the relative contribution of each independent variable (Field, 2013). The "ENTER" method regression analysis was adopted for the study in respect of the 13 independent variables that theoretically influence access to quality housing (dependent variable). Since all the variables were useful in enhancing accessibility to quality housing by the low and middle level public sector employees, it was desirable that the "ENTER" regression technique rather than STEPWISE regression method which excludes from the study factors which have less or limited explanation of accessibility to quality housing (Field, 2013). R2 value that shows the extent in which the variation in independent variable can be accounted for within the regression model was computed (Akinwunmi 2009). The F-test statistics at 95% confidence level was finally employed to determine the significance of the results.

RESULTS AND DISCUSSIONS

The Spearman's rank correlation statistical analysis was employed to correlate the 13 independent variables against access to quality housing (dependent variable). It measures the strength of association of two variables. The 13 independent variables represented the theoretical determinants of access to quality housing by the low and middle level public sector employees. The variables were measured through a Likert scale of 1 in 5 which is ordinal in nature and could be best analyzed by the Spearman's rank correlation method (Kothari, 2010). As cited in Wong and Hiew (2005), the correlation coefficient values (r) range from 0.50 to 1.0 are considered strong. The correlation analysis indicated that all the 13 independent variables had positive correlation coefficients that ranged between 0.101–0.796. The results of the correlation show the significant variables as construction cost (0.796), mortgage/rent (0.781), financing strategy (0.781),

land/infrastructure (0.770), household income (0.743), building materials & technology (0.721), research in to alternative materials/technology (0.692), planning process (0.689), policy intervention (0.603), monitoring/control (0.572) and construction process (0.571). Multi-collinearity test on the 13 significant variables through Variance Inflation Factor (VIF) was conducted to identify and drop independent variables that were significantly correlated as this would distort the regression results (Pallant, 2013).The test results showed that the VIF values were between 1–3.756.

The VIF values were in all cases < 5 meaning there were no significant correlations among the independent variables and therefore none was dropped (Pallant, 2013). It is therefore clear that construction cost, mortgage / rent, financing strategy, land / infrastructure, household income and building materials & technology were the most significant variables in improving access to quality housing by the low and middle level public sector employees. After the correlation analysis, regression analysis was conducted on all the 13 independent variables with respect to access to quality housing (dependent variable) to determine to what extent they account for access to quality housing by the low and middle level public sector employees in Kenya. Regression analysis is a statistical procedure in the formulation of a mathematical housing delivery model depicting the association of linearly related variables for the purpose of predicting the value of the dependent variable given the values of independent variables (Kothari, 2010). According to Arleck and Seattle (2005), a multiple regression model is represented by a mathematical equation shown below:

Y = a +b□X□ + b□X□ +……Xnbn where;

Y is the dependent variable which in this case is access to quality housing.

X1-n are the independent variables which in this case are 13.

A is the constant or slope of the plotted graph.

BN-are regression coefficients or change induced in Y by manipulation of X.

The ENTER regression method taking account of all variables was appropriate in this enquiry rather than STEPWISE regression method which excludes from the study factors which have less or limited explanation of accessibility to quality housing (Field, 2013). The model summary is shown in Table 1 where all the variables were entered while the detailed multiple regression model is Table 2.

Table 1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.597a	.657	.75	.55801	2.080

In Table 1, the multiple linear regression model summary, shows that the R2value was 0.657 while the adjusted R2 was 0.75. The adjusted R2 however provides a better measure of the model with the implication that the variation of the 13 independent variables in the linear regression model accounts for75 % of the change in the dependent variable, accessibility to quality housing by the low / middle-income public-sector employees in Kenya (Akinwunmi, 2009). The mathematical housing delivery model in the form a regression equation is expressed as: Housing accessibility to low / middle income earners = 5.680 + 0.044 Housing actors + 0.173 Delivery methods + 0.068 Land / infrastructure + 0.090 Building material / technology + 0.025 Planning process + 0.151 Construction process + 0.037 Financing strategy +

0.193 policy intervention + 0.66 monitoring / control + 0.117 research into alternative materials/technology + 0.193 construction cost + 0.050 household income + 0.139 mortgage / rent.

Table 2: Multiple Regression Model Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.680	.856		6.636	.000
	Housing actors	.044	.089	.610	1.498	.622
	Delivery methods	.173	.093	.640	1.863	.072
	Land /infrastructure	.068	.102	.680	.270	.508
	Building material/tech	.090	.088	.660	1.018	.316
	Planning process (design/development control)	.025	.113	.649	1.019	.828
	Construction process	.151	.113	.610	1.335	.191
	Financing strategy	.037	.111	.780	.336	.739
	Policy intervention	.193	.126	.650	1.527	.136
	Monitoring/control	.066	.072	.610	.924	.363
	Research in to altern. materials & technology.	.117	.086	.530	1.369	.181
	Construction cost	.193	.192	.810	.538	.595
	Household income	.050	.124	.780	.331	.691
	Mortgage/ rent	.139	.122	.690	1.145	.261

The F-test was conducted at 0.05 significant level to accept or reject the null hypothesis that there is no linear relationship between the variables in the study, in other words $R^2 = 0$ (Bryman, 2008). The F-test was highly significant meaning that the null hypothesis was rejected and it can therefore be assumed that there is a linear relationship between the variables in the model. Accordingly, the 13 variables are significant in predicting accessibility to quality housing for the low and middle level public sector employees in Kenya.

It is evident from the results that the 13 independent variables are determinants of accessibility to quality housing by the low and middle level public sector employees in Kenya with construction cost, mortgage / rent and financing strategy the most significant Findings closely agree with previous studies from Ochieng (2018), Ochieng (2017), Noppen (2012) and CAHF (2012) whose enquiry focused on the determinants of access to quality housing in the Kenyan situation. Further, the results also closely mirror past studies from other countries. Accordingly, Quigley and O'Regan (2000) argue that these significant variables partly contributed to the success of the housing strategy for the low / middle level US citizens while Chow (2014) contends that construction cost and household income are critical determinants of housing demand and supply in urban China by similar income group. However, all these studies have not provided a mathematical model for planning housing needs for this income group. It follows that the model formulated by the study provides new knowledge that could be applied in addressing access to quality housing by the low and middle level public sector employees in Kenya.

CONCLUSIONS AND RECOMMENDATIONS

The study intended to identify significant determinants of access to quality housing with a view of formulating a mathematical housing delivery model that would address the needs of the low and middle public sector employees in Kenya. The study has identified construction cost, mortgage / rent, financing strategy, land / infrastructure, household income and building materials & technology as the most significant determinants of accessibility to quality housing by. It has further

formulated a mathematical housing delivery model which represents pioneering work in the field of housing provision for the low and middle level income earners. The regression analysis showed that the adjusted R2 is 0.75 implying that the variance of the 13 independent variables explains 75% change in the dependent variable (access to quality housing) which is quite significant. Based on these findings, it is necessary to recommend to housing policy makers to adopt the mathematical housing delivery model to enable them plan for adequate and quality housing provision for the low and middle level public sector employees in Kenya. The 75% change in access to quality housing is predicted by the variation of the 13 independent variables implying that there is a research gap for other researchers to investigate the variables that account for the remaining 25%.

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