Housing Co-operatives Member Participation and Housing Affordability in Nairobi County, Kenya

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Abstract
Member participation is an active process in which people take initiatives and actions stimulated by their thinking and deliberation, which affect co-operative performance. Nevertheless, low member participation in housing co-operative is the biggest challenge facing housing co-operatives. This paper examined the following objectives; to determine the social-economic characteristics affecting member participation in a housing co-operative, to analyze housing affordability indicators, to describe the level of member participation in the housing co-operatives, and to examine the influence of members' participation on housing affordability in housing co-operatives in Nairobi County, Kenya. Data was collected from 35 housing co-operatives societies registered under the state department of co-operatives in Nairobi County. The paper collected both primary and secondary data and was analyzed both descriptively and inferentially. Hypothesis testing was analyzed by mixed-effects model and correlation analysis. The result reveals that socioeconomic characteristics influence member participation in housing co-operative also, there was a significant relationship between member participation and housing affordability. Therefore, the paper recommends continuous provision of education and training for existing and incoming members to enlighten them about their democratic rights entrenched in co-operative principles and bylaws. Also the State Department of Co-operatives should sensitize co-operative members on the importance of active participation in the co-operative organization.

Keywords: Participation, Co-operatives, Affordability, Housing deficit.

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INTRODUCTION

A world where only a few people can afford housing is not a sustainable one to live in as affordable housing offers an excellent quality of life and personal fulfillment opportunities such as social, environmental, and economic aspects (World Economic Forum, 2019). The provision of safe and adequate housing in most cities has been the major challenge facing societies. According to the United Nation human rights report of 2020, it indicates that 1.8 billion people live in life-threatening structures and sometimes lack even a toilet, many due to unresponsive housing supply and scarcity of affordable housing (UN-Habitat, 2020). Bredenoord (2016) noted that the most pressing needs of affordable housing are on low-income households. Therefore, it is apparent that housing shortages cannot be solved without focusing on affordable housing.

As a result of active participation and growing housing needs and speculation in the market, it led to the rise of an alternative co-operative housing model (Visković *et al.,* 2020). International Co-operative Alliance (2018) defines a housing co-operative as a group of people united to provide affordable housing through democratic member control. Housing co-operatives are own private

entities run and managed by the members. As such, housing co-operatives emphasize the importance of empowering individuals through democratic member participation.

Democratic member participation influences the overall costs of affordable housing. The essence of the housing co-operatives is anchored on member participation, and the lack of such engagements would make them lose their true identity (Ponka, 2018). Member participation in this context refers to the degree of involvement in the co-operative activities and usage of the services (Mahazril *et al*.,2012).

Housing affordability is subjective, and it means different to different people. Bieri (2014) refers to housing affordability regarding housing cost and non-housing cost about individual income. Ryan and Enderle (2012) measured housing affordability using income and price. However, housing affordability goes beyond meeting housing and non-housing expenses. Mulliner *et al*., (2012) emphasized social, economic, and environmentally friendly housing. In the context of this paper, housing affordability is defined as the ability of the housing co-operatives to acquire and live in co-operative housing. A study by Visković *et al.* (2020) in Slovenia found that members were involved in planning and designing, building, managing, and cohabiting, which reduced the total construction cost. In Spain, members developed strategies, approved and monitored projects, paid the entry fee, attended workshops and general assembly (Cabré and Arnau 2017). A study conducted by Sushila *et al.*, (2010) among co-operatives in Malaysia found that members' participated in the policy-making process through attending meetings and patronizing co-operative products and services that led to affordable housing. In India, a study by Prakash (2012) established that active member participation in business operations and organizational structure led to improved co-operative performance.

In Africa, the provision of affordable housing was pegged on active member participation in housing co-operatives by various studies. In Angola, a study by Centre for Affordable Housing Finance (2017) found that members of housing co-operatives participated in capital contributions, contributing monthly fixed charges, electing a board of directors. This action led to improved security of tenure, infrastructure, and proper housing maintenance that reduced the overall cost per member. In Zimbabwe, members of housing co-operatives participated through contributions towards a capital share contribution, building material, constructions, and attending the general meeting that led to affordable housing (Chirisa *et al.,* 2014). However, housing affordability in the housing co-operative is attributed to many factors that most countries in Africa have tried to address. Similarly, in South Africa, Jimoh and van Wyk (2012) found that members of the housing co-operative participated in the training, financial contribution, attending the meeting, procurement of materials, and land acquisition. The problem of housing in Kenya has been progressively increasing as people migrate to urban towns. It is always difficult to find adequate, affordable housing, and this is reflected in the huge amount of housing deficit across the country. According to Mwangi (2020) housing deficit stands at 2 million housing units with annual demand of 250 000 units against a supply of 50 000 with only two percent set aside for low-income households. Although the government of Kenya 2017 initiated the Big 4 Agenda, which established the Affordable Housing Programme (AHP) to address the issues of affordable housing, particularly to low – middle income. Several housing models have been adopted in Kenya to facilitate the provision of affordable housing, but the housing co-operative approach has received little attention in Kenya.

Housing co-operatives have contributed to provision of affordable housing with their meager resources from the members. In 2019 memberships of housing co-operatives in Nairobi County was 48,803 with a share

capital of Ksh. 852,368,182 and asse base of Ksh. 15,394,682,905 (State Department of Co-operative (SDC), 2019). The SDC report further states that the average growth rate of share capital and assets has been 0.25% and 0.11%, respectively, over a three-year period. This is a clear indication that housing co-operatives can provide sufficient affordable housing in Kenya, as reflected through their contributions. However, Mbito and Iteyo (2018) found that the issues of land conflicts in the housing co-operatives were rampant among members, leading to disunite and lack of participation in various housing co-operatives. Studies (Wanyama 2009; Muthyalu 2013, and Hidayat *et al*., 2014) have emphasized the importance of active member participation in co-operative activities as the backbone of the success of the co-operatives. To this end low member participation is the biggest challenge facing housing co-operatives in provision of affordable housing. Several scholars have made contributions in member participation in the housing co-operatives. A study by Ronoh *et al.,* (2020) assessed the effect of financing decisions on housing co-operatives, particularly the effect of budgeting techniques on the performance of housing co-operatives. Similarly, Kimanzi *et al.,* (2019) investigated the financial structure and operating efficiency of housing co-operatives. Onchieku and Ragui (2019) investigated the effect of strategic leadership on the performance of housing co-operative societies in Nairobi County, Kenya. Wangechi (2018) sought to establish the determinants of financial sustainability of housing co-operatives in real estate development. Despite the valuable contributions made by the previous studies, low member participation in the housing co-operatives has not comprehensively studied.

The International Co-operative Alliance (ICA) in the 2nd and 3rd co-operative principle (Democratic Member Control and Member Economic Participation) clearly state the importance of a member being involved in co-operatives organization which is the spirit of co-operatives. According to the International Labour Organization (ILO) shared the same fundamental philosophical tenets with ICA emphasizing on active member participation in the management and administrative functions their co-operatives (ILO and ICA, 2015). The Sessional Paper No. 3 of 2016 on National Housing Policy 2016 emphasized co-operation and active participation of all relevant actors and individuals in the housing sector. This argument justifies why it is essential to examine the role of member participation in housing co-operatives. Therefore, the delivery of quality affordable housing largely depends on active member participation. Low member participation has remained a challenge for housing co-operatives which needs solutions.

Specific objectives of the study are: (i) to analyze housing affordability indicators, (ii) to analyze member socioeconomic characteristics on housing affordability in the housing co-operatives, (iii) to describe the level of members' participation in the housing co-operatives, and (iv) to examine the influence of members' involvement on housing affordability in housing co-operatives in Nairobi County, Kenya. The following research questions were addressed: what are housing affordability indicators? What is the level of member participation in the housing co-operatives? Research hypothesis: Ho: Member socioeconomic characteristics has no significant effect on the housing affordability in the housing co-operatives, Ho: Member participation has no significant effect on the housing affordability in the housing co-operatives.

THEORETICAL UNDERPINNINGS

Participatory Democracy Theory: The study is guided by participatory democracy theory. Pateman (1970) argues that an individual need to have equal power to make valuable participation for an effective decision-making process. Democratic participation allows individuals to exercise their democratic rights in various co-

operative activities. Co-operatives are known to be schools of participation (Figure 1). This will create confidence among the members to uphold and defend their housing co-operative in one spirit. The choice of theory was necessitated by the multidisciplinary nature of the housing co-operative, which required a theory that can adequately cover the housing co-operative needs of the members and at the same time address issues of participation. The housing co-operatives fulfil the wishes and needs of the members. Each member has a responsibility and obligation to support and promote co-operative activities by involvement in decision making and patronization. In the housing co-operatives, nothing can be decided outside the members. This is a clear indication that members are the backbone of the co-operatives and lack of membership means that the co-operative does not exist (Sørvoll and Bengtsson 2018).

Active involvement of members in decision-making and patronization of services is what makes co-operative housing affordable. Affordability can be achieved through the pooling of resources so that their buying power is leveraged, leading to lowering the cost per member in all transactions (Sanjinés and Barenstein,2018). Member involvement in price negotiation, participation in meetings, attending training, selection of housing location, and consultation on housing design led to affordable housing (Taiwo and Okafor 2011). Affordability is evident when members actively participate in all stages of housing development. Member participation has empowered individuals to become part and parcel of the political process, and their voice has been well recognized (Davidson *et al.,* 2007).

Typologies of Participation: The most widely cited and influential typology of public participation is Arnstein's (1969) ladder of public participation, which consists of eight levels of participation (Figure 1), each representing a different level of participation. From the top is citizen control, delegated power, partnership, consultation, informing, placation, therapy, and manipulation. Further classified these levels into citizen control (actual power), tokenism (counterfeit power), and non-participation (no power). The extent of citizen participation and real power to determine the process and outcomes are defined by the level of participation.

At the lowest end of the ladder (non-participation), the powerful individuals determine what is going to be implemented by the group, and citizens have no control over it. At the middle level (tokenism) is where participants hear about intervention and give their input. However, their inputs have no effect on the outcome. At the highest end of the ladder, participants have more power to negotiate and make changes to their projects. The participant has the power to decide on their group. This is the level at which housing cooperatives co-opted in their operation. Housing co-operatives are owned and managed by the members who are supreme in decision making. Nothing can be decided outside these people.

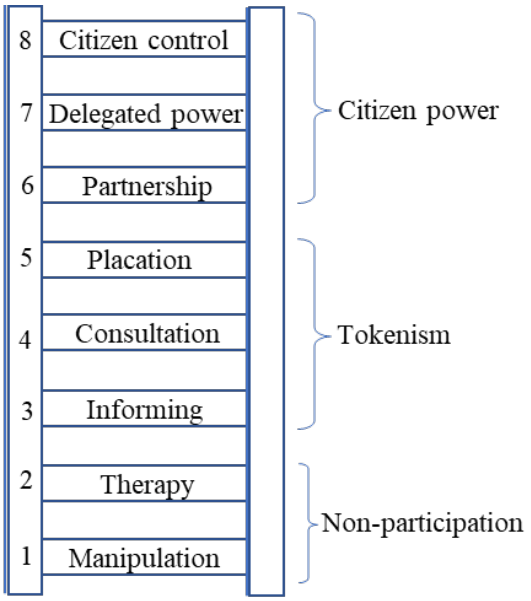

Figure 1: A ladder of citizen participation Source: Arnstein, S. (1969)

There has been the improvement of Arnstein's (1969) ladder of public participation. According to the International

Association of Public Participation (IAP2, 2019), designed spectrum to assist with selecting the level of participation in the public participation process. The study identified five levels of participation in the spectrum, including informing, consult, involve, collaborate and empower, modified from Arnstein's ladder of participation. However, depended on the goals, time frame, resources, and level of concern in decision making. World Bank (1996) argues that giving information and consultation is part of participation and equates the provision of information with empowerment.

METHODOLOGY

Area of Study: The study was conducted in Nairobi City County because it hosts the highest number of housing co-operatives and membership. Second, Nairobi City County has the highest informal settlements without adequate housing (International Institute for Environment and Development, 2019). Third, Nairobi City County is the largest and fastest-growing city in Kenya (Mutisya, 2015). It provides ground for collecting valid and reliable data about the effect of member participation in housing co-operatives on housing affordability.

Research Design: Mixed method approach incorporated the quantitative and qualitative approach was adopted for this paper. The quantitative research design was collected using questionnaires to assess the significance of member participation on housing affordability through housing co-operatives in Kenya without considering experimental control by the researcher, and a qualitative approach was used to collect data from the key informant through interviews. The causal approach was, however, used to determine the cause-effect relationship between member participation and affordable housing. The descriptive design as adopted in the study was to determine the status of phenomena; to fact find and examine traits and characteristics without necessarily exploring relationships of causative factors (Saunders and Thornhill, 2012). The cross-sectional approach helped to collect data from one point in time, which is considered to be useful where resources are imitated (Jogulu and Pansiri, 2011).

Sampling Procedures and Sample Size: Based on multistage sampling, the paper employed both non-probability and probability sampling techniques to select the housing co-operatives and members to participate in the study. The multistage sampling technique was adopted considering the multilevel structure of the population of members nested (grouped) in a housing co-operative. The first stage of multistage sampling was to draw 35 housing co-operatives to be considered in the study based on purposeful sampling. Criteria used to select 35 housing co-operatives out of 115 were based on compliance with the co-operative society act amended 2004, stating that every registered co-operative must file annual returns. The paper considered a five-year period (from 2012 to 2017) consecutive filing of audit books. The co-operative housing models were used as strata to group the housing co-operatives based on the model adopted. The prior paper carried out of profiling housing co-operatives models informed the stratification, which grouped the housing co-operatives into three models. Proportionate distribution of housing co-operatives adopting the ascertain model was used to determine the number of housing co-operatives selected from each model. The second stage of the sampling technique was to choose the 394 members from the 35 housing co-operatives selected in stage 1. The number of members per housing co-operative selected was based on the proportionate distribution with probability proportional to the size of co-operative (membership) with an average of 11 members per housing co-operative. Simple random sampling was then used to select the members to include in each housing co-operative. Members were selected randomly from the register books in a respective housing co-operative with the manager's help. A lottery method was used to execute simple random selection for the

members. A total of 394 members were sampled across 35 housing co-operatives with 11,000 members. The sample size of 394 members was determined based on the sampling formula for a finite population given by:

$$n = {}^{N}/_{(1 + (N \times e^2)}$$

Where n is the sample size, N is the population size, and e is the permissible error. This formula was given provided by Yamane (1967) as a simplified sample size computation for a finite population.

Data Collection: The study used both quantitative and qualitative data collection techniques. Quantitative data were collected using a survey structured questionnaire administered to the members of housing co-operatives using a 5-point Likert scale (Never-1, Rarely-2, Moderate-3, Often-4, Always-5). A structured questionnaire was designed to collect information about member participation in housing co-operative on housing affordability. A total of 394 copies of the questionnaire were administered to the members of 35 housing co-operatives.

In addition, qualitative data were collected using key informant interviews (KIIs), member interviews, and document review analysis. A total of 10 Key Informants were selected based on knowledge, experience, and position in their respective organizations, including a deputy commissioner for the state department of co-operatives and a chairperson of the national co-operative housing union (NACHU), and eight managers of various housing co-operatives. The Key Informants provided information regarding experience in member participation in housing co-operatives, challenges prohibiting the member from participating in housing co-operatives activities, and challenges facing affordability of housing. A total of 10 members of housing co-operative were selected randomly from different housing co-operatives from the membership register. Qualitative data were recorded using field notes and electronic audio devices, then transcribed, categorized, coded, and grouped into themes for analysis with the help of Atlas software. The qualitative data were used to supplement data collected using the quantitative technique.

Creswell (2011) recommends that pre-testing of the questionnaire should be carried out and that it should include groups within the potential research participants. A sample of 30 members was randomly selected from different housing co-operatives from the neighbour county (Kiambu County) who shared similar characteristics with Nairobi County. The feedback from the 30 respondents led to the re-wording of some of the questions prior to its administration for the main study. The pilot test data collection instrument was assessed for both internal consistency and validity. This study used Cronbach's alpha (α) as an internal consistency measure. Reliability and validity of the study construct data collection instrument showed adequately reliable and valid measurements of the constructs by the indicators that were retained. The validity and reliability results are shown in Table 1. For validity, construct validity was assessed for both constructs by testing for convergent and discriminant validity to determine that the observed indicators measuring the same construct have high inter-correlations amongst themselves and no correlations with indicators of other constructs (Kline, 2011).

Reliability was checked by assessing the internal consistency of the constructs as measured by the indicators using Cronbach's alpha. The internal consistency threshold was set at to the acceptable standard of Cronbach alpha above 0.7 (Sekaran and Bougie,2010). As shown in the table, both constructs have alpha values greater than 0.7, implying adequate reliability. Further analysis was based on the 18 retained indicators of housing affordability and the 13 indicators retained on the indicators of member participation.

Table 1: Reliability and Validity

	AVE	Squared correlations	KMO & Bartlett's test	Cronbach's Alpha	
				All items	Retained
Member participation	0.540	0.235	KMO=0.850, Chi(120)=2198.483, p-value=0.000	0.878	0.879
Housing affordability	0.589	0.122	KMO=0.861, Chi(120)=3304.803, p-value=0.000	0.862	0.884

Data analysis: Data analyses were carried out with the aim of developing criteria to test the study hypothesis and draw conclusions on the objective of the study. The measurements of each of the two constructs were based on indicators that were formulated into ordinal scale measurements in a questionnaire. The indicators were all measured on a 5-Likert scale, and only the indicators that were retained following validity and reliability assessment were used in the main study. The measurement of the dependent variable (housing affordability) sought to determine the level of importance that the participants' members gave on proposed factors of affordability that were retained in the pilot study. The criteria used to identify 18 housing affordability indicators was done through an extensive literature review and semi-structured interviews with key informants and members of housing co-operatives in Nairobi County.

Respondents ranked the housing affordability criteria in relation to their housing co-operatives on an ordinal scale of importance with a 5-Likert scale ranging from not important at all-1 to most important-.5. The indicators were reduced to a single overall index of housing affordability which was calculated as a weighted average of the ordinal scores from the indicator responses of the dependent variable. The weights for the indicators were determined as proposed and used by Mulliner *et al.*, (2012) by dividing the mean score by the sum of mean scores and multiplying by 100 as given by the equation below.

$$\omega_i = \frac{\bar{X}_i}{\sum_{i=1}^{18} X_i} \times 100$$

$Where$;

ω_i is the weight of indicator i $\bar{X}_i$ is the mean of indicator i

The criteria used to identify indicators of member participation was done through an extensive literature review and semi-structured interviews with key informants and members of housing co-operatives in Nairobi County. The level of member participation was measured by the 13 retained indicators in relation to their housing co-operative. The indicators were grouped into four dimensions, then reduced to one overall member participation index. To reduce the dimensions of member participation into a single composite measure, a weighted index was used where the participation index of each indicator for the sample was deduced and used as the weights. The approach of determining the participation index was used by Tilahun (2008); Roman (2010) and Kefale *et al.* (2012). Considering the 5-Likert scale (Never-1, Rarely-2, Moderate-3, Often-4, Always-5) the overall participation index for each indicator will range from a minimum of 1 to a maximum of (5×sample size) where the sample size was expected to be 387; relative to the response rate. The overall participation index (P_i) for each indicator was dependent on the frequencies of respondents per score and was be given by the equation:

$$P_i = \sum_{j=1}^{5} F_j \times j$$

$Where$;

P_i is the overall participation index of indicator i

j are the ordinal Likert scores (1 to 5) on level of agreement of the respondents to indicator i

F_j is the Frequency (number of respondents) who responded with score j

The overall participation index for the indicators were then used to determine the weight of the indicators given by the equation

$$\omega_i = \frac{P_i}{Score_{Max}}$$

ω_i is the weight of indicator i

P_i is the participation index of indicator i

$Score_{Max}$ is the maximum score for the indicator = 5×number of retained participants in the main study.

Descriptive statistics were used to analyse and interpret findings in the form using frequency table percentages, mean, scores, and measures of dispersion for the study variables. The mean of the indicators' ordinal scores was used as the measure of central tendency and the standard deviation as the measure of dispersion with a coefficient of variation (CV). The coefficient of variation shows the dispersion (standard deviation) relative to the mean of the variable expressed as a percentage of the mean. Considering the multilevel structure of the data collected, the study used Multilevel mixed effect modelling based on Restricted Maximum Likelihood (REML). The models fitted were used to test the study hypothesis developed for the assumptions of normality and heteroscedasticity were tested. The models fitted to assess the study hypothesis considered multilevel statistical analysis techniques using the following equations:

In the equations:

$$Y_{ij} = \gamma_{0j} + \beta_1 X_{1,ij} + \varepsilon_{ij} \quad \text{(equation 1)}$$

$$\gamma_{0j} = \beta_{0j} + \mu_{1j} X_{1,ij} + \mu_{0j} \quad \text{(equation 2)}$$

The second equation can be substituted into the 1st equation to yield a formulation given by;

$$Y_{ij} = \beta_{0j} + \beta_1 X_{ij} + \mu_{1j} X_{1ij} + + + \mu_{0j} + \varepsilon_{ij}$$

In the equations:

Y_{ij} is the level of housing affordability as viewed by respondent i nested from housing co-operative j;

$X_{1,ij}$ is the participation by member i nested in co-operative j;

β_1 to β_6 are the fixed effect estimates coefficient of the predictors (level-1 effects)

γ_{0j} is the intercept which has a separate specification equation due to the 2 levels assumed to cause variation in housing affordability. In the intercept equation;

β_{0j} is the level 1 intercept which is the average housing affordability for the entire population; and

μ_{0j} is the county specific effect (cluster specific) random intercept.

μ_{1j} is the random slope (random coefficient) of independent variables at co-operative j (level-2 coefficients of X)

ε_{ij} is the overall error term

The mixed effect models fitted were assessed for the assumptions of normality and homoscedasticity. The models fitted to assess the study hypothesis considered multi-level statistical analysis techniques. Assessment of assumptions of mixed effect models should be carried out based on exploratory graphical analysis, unlike other linear regression modeling techniques that can be assessed using classical tests. The literature allowing for extension of model assumption techniques used in classical linear models to hierarchical linear mixed effect models is heavily fragmented; thus, techniques involving visualization plots of residuals are recommended to assess the distributional properties of the model residuals at both levels of the data structure (Loy *et al.,*2017).

FINDINGS AND DISCUSSION

Response Rate: Of the 394 respondents sampled, data collection was only successful for 360 respondents. All the 35 selected housing co-operatives were housing co-operatives. This translated a success collection rate of 100% representation of all the housing co-operatives sampled and a 91% response rate of all the respondents, which was considered good and adequate considering recommendations by John (2005) concluded that response rates of 60% or more are both desirable and achievable.

Analysis of Housing Affordability: Housing affordability measurements in this study considered wider dimensions of the criteria that emphasized economic, environmental, and social aspects that affect households, as noted by (Mulliner *et al.,* 2012; and Mulliner *et al.*, 2015). Housing affordability was the dependent variable and was measured using 18 observed indicator variables. The descriptive analyses of housing affordability indicators were carried out on each of the indicators. The respondents ranked the housing affordability criteria in relation to their housing co-operatives on an ordinal scale of importance ranging from 1-not important at all, 2-less important, 3-important, 4-slightly important, and 5-most important as proposed by (Rosli *et al.*, 2016; and Mulliner *et al*.,2015). An overall index of housing affordability was calculated as a weighted average of the ordinal scores from the indicator responses.

The descriptive statistics are calculated and presented in Table 2. The mean of all the indicators is above 3, which that most of the responses. The standard deviations and coefficient of variations are the measures of dispersion; most of the indicators have CVs below 50%, implying low variations relative to the mean. The overall mean score of housing affordability was 4.202 with a standard deviation of 0.805, and a coefficient of variation of 25.13% implied that the housing delivered by housing co-operatives was found to be affordable according to the member's opinion. An overall index of housing affordability was calculated as a weighted average of the ordinal scores from the indicator response.

Table 2: Analysis of Housing Affordability Indicators

Indicators	Mean	Std. Dev.	CV	Weight
Land Acquisition	4.194	0.779	19%	5.821
House Finishing	4.138	0.819	20%	5.743
Safety and security of properties	4.110	0.764	19%	5.705
Leasehold / Freehold House	4.089	0.826	20%	5.675
Interest rates and mortgage availability	4.086	0.825	20%	5.672
Size of the House	4.079	0.813	20%	5.661
Near to public schools	4.075	0.809	20%	5.656
Near to public transport	4.024	0.872	22%	5.585
Near to workplace	4.014	0.738	18%	5.571
Near to health care centres	3.961	0.790	20%	5.498
Near to child care facilities	3.958	0.817	21%	5.493
Water and Energy efficiency	3.958	0.789	20%	5.493
Materials and waste management	3.920	0.775	20%	5.441
Indoor environmental quality	3.916	0.819	21%	5.436
Near to shopping facilities	3.913	0.797	20%	5.431
Recreational facilities	3.909	0.764	20%	5.425
Traffic Congestion	3.858	0.857	22%	5.354
External pollution	3.848	0.833	22%	5.340
Overall Housing Affordability	**4.003**	**0.805**	**20%**	

The Influence of Members Socioeconomic Characteristics on Housing affordability: The socioeconomic characteristics studied included gender, years of membership, age, marital status, education level, and employment status and income level of the members. This characteristics of the members of the housing co-operatives were assessed and their possible association with the members' perception of housing affordability as shown in the Table 3.

The analysis on the gender of the respondents showed that 50 percent of the respondents studied were female. The results also showed that the gender of the respondents had no significant association with their perception of housing affordability (t=-0.663, p-value=0.508). Implying that male and female were socially and financially empowered to make independent decision on co-operative matters. This is supported by membership register showed that male and female economically participated in raising funds for housing development. On years of membership, the majority were found between 2-4, 4 -6, and 6-8 years of membership with 21.61%, 26.32%, and 19.67% respectively. Implying that years of membership goes hand in hand with accumulative savings that would qualify a member to own home. One of the members who was interviewed stated that:

> .... *this is my 6th year of membership in my housing co-operative and managed to save enough to own home where I am staying currently*…. "(Interview field data, Nairobi, August 2018)."

Respondents with more years of membership tended to accumulative more savings to acquire affordable housing which was found to be significantly associated with membership (F=2.423, p-value=0.035). According to the study by Aazami *et al.*, (2019) found that 7-9 years' membership is appropriate for a member to accumulate enough savings towards the acquisition of an affordable home. The age of the respondents was also found to have a significant association with housing affordability. The mean-score of respondents' perception of housing affordability was found to significantly differ across the age groups (F=2.313, p-value=0.044). Respondents aged between 31 and 50 were the majority who participated in the housing co-operative because they had a stable income from employment. Ifenkwe (2007) found that 63 percent of members were within the middle age bracket (26 – 49 years) who were actively involved in co-operatives activities. While the documents reviewed by the research indicated that most title deed issued for owners were aged between 30 to 50 years.

Housing affordability was, however, not found to be significantly associated with marital status (F=0.44, p-value=0.777). Contrary to Fakere and Ayoola (2018) and Ifenkwe (2007) found that married couples had a positive effect on the level of participation in housing design hence increased production. Housing affordability was significantly associated with the level of education (F=2.491, p-value=0.031), where respondents with higher education were able to understand the financial statements and utilization of members funds that facilitated to more affordable housing. Ifenkwe (2007) noted that high level of education equipped members of co-operatives to utilize credit and other technological innovation from both government and other agencies. Ajibefun and Aderinola, (2004) observed that low level of education affected farmers in improving farming techniques. Contrary to World Bank (2001) report indicated that better education had natural advantage over others in influencing public policy. Employment status, civil servants tend to view housing as more affordable compared to those employed in the private sector and the self-employed. This is because civil servants are permanent and pensionable employees with high stability of income. This critical meant was supported by one of the key informants:

Table 2: Social-economic characteristics of the members and housing affordability

		Freq.	%	Mean	Std.	Df	t-stat	p-value
Gender	Male	178	49.31	2.799	0.031	359	-0.6626	0.508
	Female	183	50.69	2.827	0.030			
Years of membership	<2 years	42	11.63	2.037	0.444	5	2.423	0.035
	2-4 years	78	21.61	2.589	0.392	355		
	4-6 years	95	26.32	2.824	0.382			
	6-8 years	71	19.67	2.809	0.390			
	8-10 years	34	9.42	3.161	0.511			
	>10 years	41	11.36	3.470	0.360			
Age	<20 years	21	5.82	2.754	0.383	5	2.313	0.044
	20-30	100	27.7	2.825	0.399	355		
	31-40	118	32.69	2.803	0.407			
	41-50	99	27.42	3.652	0.431			
	51-60	22	6.09	2.710	0.423			
	>60 years	1	0.28	2.396	0.000			
Status	Single	101	27.98	2.821	0.427	4	0.44	0.7771
	Married	216	59.83	2.820	0.413	356		
	Divorced	18	4.99	2.833	0.385			
	Windowed	26	7.2	2.715	0.351			
Education	None	2	0.55	2.806	0.179	5	2.491	0.031
	Primary	20	5.54	2.938	0.354	355		
	Secondary	32	8.86	2.785	0.441			
	Certificate	119	32.96	2.842	0.453			
	Diploma	148	41	2.788	0.406			
	Bachelors	40	11.08	2.780	0.287			
Employment status	Civil servants	199	55.12	2.879	0.398	2	6.98	0.0011
	Private sector	108	29.92	2.767	0.364	358		
	Self-employed	54	14.96	2.664	0.492			
Income	Below Ksh.10000	25	0.07	2.379	0.181	4	3.171	0.014
	Ksh. 10,000 - 50,000	53	0.15	2.421	0.276	355		
	Ksh. 50,001-100,000	214	0.6	2.608	0.477			
	Ksh. 100,001-150,000	36	0.1	2.943	0.089			
	Above Ksh. 150,000	28	0.08	3.169	0.164			

> *…I took a long-term loan to acquire my house, which I am repaying for 84 months...* (Interview field data, Nairobi, August 2018).

Long term financing has boosted majority of low-income groups to acquire home, while they can meet other financial obligations in their households. The level of income is also significantly associated with housing affordability. The higher the income the higher the status on members and vice versa (Ifenkwe,2007). The mean-score of members' perceived affordability significantly differs across the income levels (F=3.171, p-value=0.014). Members with higher incomes were able to meet their financial obligation and have enough to save for affordable housing than those with low incomes.

Level of Members Participation in the Activities of the Housing Co-operatives: The 13 retained indicators of member participation were used for further analysis of the objective, which was to assess the influence of member participation on housing affordability. The respondents were asked to rate their levels of participation based on the indicators on an ordinal scale of 5-point Likert scale (Never-1, Rarely-2, Moderate-3, Often-4, Always-5) as shown in Table 4.

Table 4: Members participation in the housing co-operatives Activities

Housing Co-operative Activities	Mean	Std. Dev.	CV	Weight
Attending meetings	3.770	1.227	33%	1.108
Electing board of directors	3.759	1.123	30%	1.104
Payment of housing co-operative dues	3.720	1.170	31%	1.093
Raising funds for co-operative	3.576	1.243	35%	1.051
Recruitment of new members	3.546	1.215	34%	1.042
Participation in selection of project site	3.452	1.132	33%	1.014
Approval of annual budget	3.349	1.327	40%	0.984
Making regular contributions/savings	3.316	1.202	36%	0.974
Participation in project appraisal	3.288	1.265	38%	0.966
Attending education and training	3.238	1.242	38%	0.951
Participation in project execution	3.211	1.206	38%	0.943
Participation in project maintenance	3.078	1.220	40%	0.904
Project planning and design	2.942	1.360	46%	0.864
Overall Participation level	**3.403**	**1.226**	**36%**	

The descriptive statistics were calculated and presented, considering the mean as the measure of central tendency and the standard deviation and the coefficient of variation (CV) as the measures of dispersion. The indicators had mean scores ranging between 2.942 and 3.770 out of 5 which do not reflect very high levels of participation. The average mean score of member participation was found to be 3.403, which shows that the respondents, on average, had moderate levels of participation. A composite weighted index of member participation was calculated from the ordinal scores of the indicator responses.

Hoque and Itohara (2008) and Kefale *et al*., (2012) Adeyemo *et al.,* (2014) classified respondents' participation into three categories, namely low, medium, and high. This categorization was based on the participation mean scores of the respondents ranging from 1- 2.99, 3.00 – 3.99, 4 -5 for low, medium, and high, respectively. The results in Table 4 show that majority (99%) of the respondents are under the medium category with a mean scores ranging from 3.00 to 3.99, while a few (1%) are under low category with a mean score of 2.942. Implying that a low and medium level of

member participation in housing co-operatives activities limited the number of affordable housing units produced. This was evidenced by low number of title deed issued for complete units for members of the housing co-operatives. Findings in Table 4 also indicate that members level of participation in relation to Arnstein's (1969) ladder of public participations was at citizen power level. Implying that members was supreme in decision making in the housing co-operative and nothing can be decided outside them.

The Influence of Member Participation on Housing Affordability: A mixed-effect regression model was fitted to assess the influence of member participation on housing affordability. The statistical model was not fitted directly from the indicators of housing affordability and member participation. The model was fitted using the composite indexes computed of housing affordability and member participation. The mixed-effect model was fitted considering the multilevel structure of the data with two levels of analysis. The mixed-effect model adopted a hierarchical technique assessing fixed effects at level 1 (respondent/member level) and random effects at level-2 (entity level) and was based on the restricted maximum likelihood (REML) estimation technique. Several scholars, including Lang and Novy (2011), Lerman (2013), and Quintas (2020), adopted a mixed effect model in their study.

The hierarchical models were fitted to assess the influence of each dimension of the member participation as fixed effects within the housing co-operatives (at level-1) and as random covariates across housing co-operatives. The analysis involved fitting a multiple regression fixed effect model of member participation as model-1 (M1) for followed by a second model (M2), which included the random effect of member participation across the firms. Following the violation of the normality assumption determined when assessing the model assumptions, the mixed effect models fitted considered bootstrapping and reporting estimated with bootstrapped standard errors to cater for the violation.

The optimal model in assessing the effect of member participation on housing affordability was found to be M1 with level-1 fixed effects and no level-2 random effects on affordability Table 5. The model showed a significant fixed effect component (Wald chi-square (1) = 5.23, p-value = 0.022) and significant random intercepts but no random slope. The fixed effect coefficients estimate showed that member participation has a significant influence on housing affordability which is fixed regardless of the entity (β =0.065, Z= 2.290, p-value = 0.022). The findings of the study are supported by Viskovi´c *et al.* (2020) reported that member participation in planning, construction, and management had a significant influence on housing affordability of rental housing co-operatives. Another study by Suter and Gmür (2013) also reported that a high level of member participation that influences lower rental and public funding to housing co-operatives. The Sessional Paper No.3 of 2004 on National Housing Policy emphasized cooperation and active participation of all relevant actors and individuals led to affordable housing.

To assess the significance of the random effect of member participation across entities, a likelihood ratio test was carried out to compare the M1 model with random intercepts and M2 with the random covariate of member participation. The LR test shows an insignificant change in the LR chi-square statistic (LR chi2 (1) = 1.30, p-value = 0.253). The p-value of the LR chi-square statistic is greater than 0.05 to imply an insignificant change in the model by including the random slopes (effects) of member participation in the housing co-operatives as a level-2 covariate. The Bayesian information criterion (BIC) statistics of M1 is less than that of M2, implying that the model (M1) without member participation as a random covariate is better compared to M2 and was thus that it was adopted as the optimal model. The

equation generated by the optimal model fitted for this dimension is given by:

$$Y_{ij} = 2.590 + \gamma_{0j} + 0.065X_{ij} + \varepsilon_{ij}$$
$$\gamma_{0j} = \mu_{0j}$$

Table 5: Relationship Between Member Participation and Housing Affordability

Mixed-effects REML regression				Wald chi2(1)	=	5.23
Log restricted-likelihood =-191.746				Prob > chi2	=	0.022
	Observed	**Bootstrap**			**Normal-based**	
Affordability (Y)	**Coef.**	**Std. Err.**	**Z**	**P>z**	**[95% Conf. Interval]**	
Member participation levels (X_1)	0.065	0.029	2.290	0.022	0.009	0.121
_cons	2.590	0.103	25.190	0.000	2.388	2.791
	Observed	**Bootstrap**		**Normal-based**		
Random-effects Parameters	**Estimate**	**Std. Err.**		**[95% Conf. Interval]**		
Housing co-operative						
sd(_cons)	0.006	0.002		0.003		0.012
sd(Residual)	0.160	0.011		0.139		0.184

LR test vs. linear regression: chi2(2) = 2.73 Prob >= chibar2 = 0.049

Level	ICC	Std. Err.	[95% Conf.	Interval]
Housing co-operative	0.039	0.015	0.018	0.081
Likelihood-ratio test		LR chi2(1)	=	1.30
(Assumption: M1 nested in M2)		Prob > chi2	=	0.253

Model	**Obs**	**ll(null)**	**ll(model)**	**Df**	**AIC**	**BIC**
M1	361	.	-191.7466	4	391.4932	407.0487
M2	361	.	-191.0941	5	392.1882	411.6326

The results of the analysis were used to test the study hypothesis. The rejection criterion was based on the p-value of the model. The significance of the fixed effect based on the p-value of the Wald Chi-square statistic and the significance of the p-value of the likelihood ratio test (change in LR) due to random slopes of the member participation was used.

H0: Member participation has no significant effect on the housing affordability of housing co-operatives.

The p-value of the Wald chi-square statistic was less than 0.05. The null hypothesis was thus rejected, and a conclusion was drawn that member participation has a significant effect on housing affordability. The effect is, however, fixed within all the housing co-operatives as implied by the insignificant random slope. The effect does not randomly change across housing co-operatives. This finding was supported by Visković *et al.* (2020) observed that member participation in attending the meeting, budgeting, and training had a positive influence on affordability. Another study by Cabré and Arnau (2017) found that member involvement and patronization of services reduced the overall cost of affordable affordability. This sentiment was supported by the chairman Ken hurt Housing Co-operative as KI stated that:

> *"…. We decided to combine our effort, funds, and labor to build our houses collectively one by one until the last house is build…."* (Interview field data, Nairobi, August 2018).

Collective building of housing reduces the overall costs of construction with great margin. This is possible because most of the

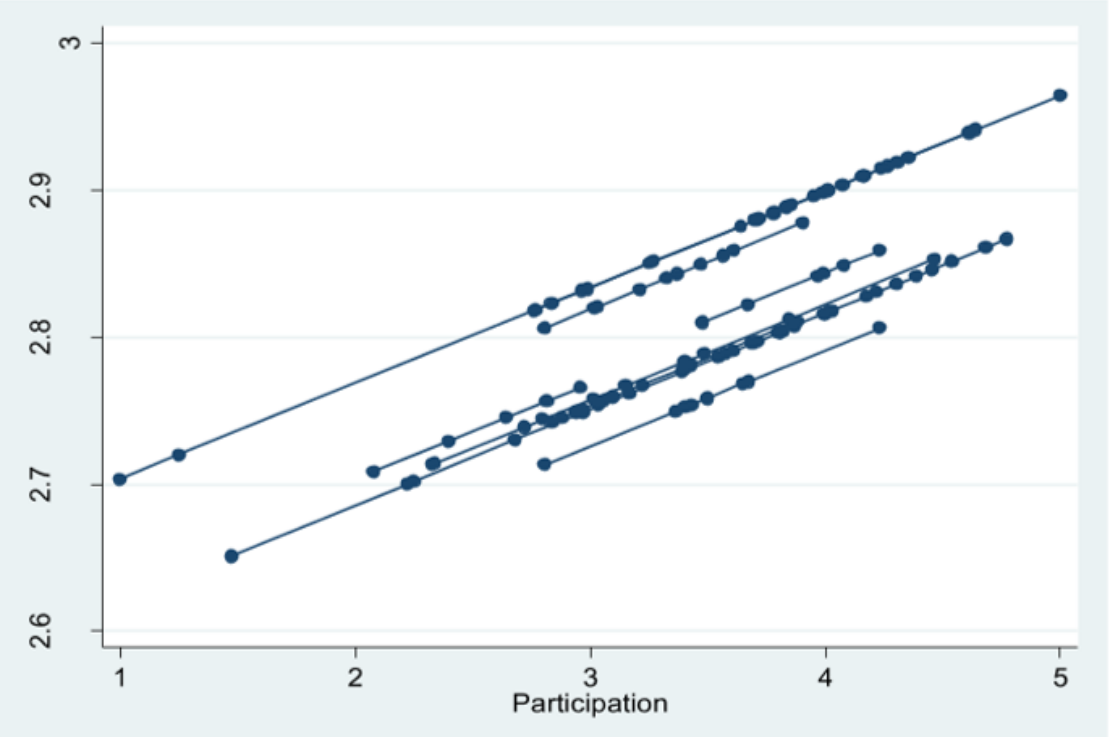

Figure 2: Mixed model of housing affordability against member participation

materials are bought in large scale and labour becomes cheaper.

Figure 2 shows the graphical presentation of the mixed effect model with fixed slopes of member participation and random intercepts with no random slopes. Different housing co-operatives have varying levels of housing affordability as displayed by different lines with different intercepts, some higher than the other as stated by a member. All the lines representing different housing co-operatives are, however, parallel. This means that the effect of member participation at the member level (level 1) is fixed across all housing co-operatives. The effect of member participation on housing affordability for each housing co-operative is the slope of the line, which is the change in y (housing affordability)/ change in x (member participation). The slope is fixed (constant at 0.065) for all the lines to imply the fixed effect of member participation across all housing co-operatives. This finding aligns with participatory democracy theory, which emphasizes active member participation in all the co-operatives activities. This active participation affects housing affordability.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions: The paper records medium level of member participation. Though the frequency of member participation in the co-operative activities tends to vary cross the housing co-operatives. Implying that affordability of housing co-operatives would have increased if the members actively participated in all the co-operative activities. Members participated in the decision-making process, attended co-operative meetings, shared contributions, patronized the co-operative activities, and elected the board of directors. Active member participation is what make co-operative different from other organization. The participatory democracy theory advocate for fairness and autonomy of members when participating in housing co-operatives. The participation had a positive impact on housing affordability. However, continuous member participation in the housing co-operatives would have deep seated repercussion on affordable housing. The study also revealed that some socioeconomic characteristics significantly

influenced the member participation in the housing co-operatives. The study showed that level of education, monthly income, years of membership, and employment status were significantly strong predictors of member participation. However, gender and marital status were not significant.

Recommendations: The findings have practical policy implication for co-operative leaders who were looking for a solution of low member participation. The paper suggests that motivation rewards alone would not make member to actively participate. It could be true that people actively participate in circumstances of trouble and tension. In addition, attitude and hostile of leaders would demotivate members from active participation in co-operatives activities. Therefore, it is important to have broad range of intervening variables like regular communication, expanded committee structure to provide membership advice and leadership guidance that would increase degree of member participation. This will improve members' participation and enhance the generation of ideas and business innovations that will boost affordable housing. In addition, the government, through the state department of co-operatives, should work closely with housing co-operatives and other stakeholders to formulate and design appropriate housing policy that can increase affordability of housing through housing co-operatives. Lastly, the state department of co-operatives should regularly organize workshops, seminars, and symposia to enlighten members about their democratic rights entrenched in co-operative principles.

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