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Identifying Contextual Socio-Cultural Attributes as Predictors of User Satisfaction: A Study in Transformed Public Housings in Nigeria

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Abstract

Transformation of houses is common, especially when households inhabit them for a considerable period of time. However, the scale of transformation might vary. Public housing in Nigeria has seen large scale transformations, and started to generate wide attention. The transformation phenomenon is often attributed to the exclusion of socio-cultural values in initial design that eventually results in unguided densification. But at the same time, house transformations arise from people's desires to satisfy their own ever changing housing needs. Using transformation as a sign of dissatisfaction, this study was an attempt to identify local socio-cultural attributes lack of which result in such transformations. Conditional sampling was adopted in order to find respondents across Nigeria. Socio-cultural attributes were identified from background study and were used in structuring a questionnaire-based survey. Findings from univariate and psychometric analysis based on the survey indicated that social activities and family structure were the two most significant socio-cultural attributes that guide residents' transformation decisions in public housing adjustments. This finding also appeared to be crucial as initial layouts proved not to lead to users' satisfaction. These results might be useful for prospective developers who are explicitly seeking a successful and sustainable delivery system.

Keywords: socio-cultural, user satisfaction, public housing, transformation

1. Introduction

Housing transformation is a natural consequence of inhabitation (Tipple, 1999). Transformation is operationally defined in this article as the process whereby the house dweller makes or institutes physical changes to the dwelling in order to meet needs that arise in the course of living in the dwelling. Transformation incidents can results from both internal and external reasons. The internal reasons can generate from demographic or economic changes, while the external reasons can generate from changes in the physical condition of the house. The nature and the degree of transformation vary from context to context. However, study showed that internal reasons are the major contributors towards transformation decisions (Khan, 2014a). Many researchers have tried to investigate the reasons, consequences and proposed guidelines for housing transformation. Studies on public housing transformation deserve considerable attention as it involves a significant amount of resources from the public sector. Especially in developing countries where resources are limited, it might create problems from the point of view of policy makers if it later results in any unwanted development.

Seek (1983) argued that housing stress is relieved after housing transformation, and that a transformed house is actually a reflection of a satisfied household. Khan (2014b) added that though housing stress can reach critical points many times during the life of a household large- scale transformation is likely to occur only a few times. Therefore, by studying a mature house that has gone through several transformations by a particular household, there is more possibility to uncover the attributes that contribute to housing transformation, hence user satisfaction. Moreover, occupants' needs become obvious through their domestic chores in the dwelling (Habraken, 1975). It is often claimed that socio-cultural attributes, especially context-specific ones, get less attention during such investigations in public housing design. Previous contributions in housing research in

Nigeria focussing on housing satisfaction (Ukoha & Beamish, 1997), housing policy (Ayoola & Amole, 2014; Jiboye, 2011a, 2011b; Ogu & Ogbuozobe, 2001), housing adjustment (Ibem et al., 2012), housing quality (Jiboye, 2004) and housing evaluation (Jiboye, 2010; Odediran et al., 2013) have identified the need for socio-cultural inclusion in public housing design. This study aims to fill that research gap by searching for socio-cultural attributes behind user satisfaction through studying transformed public housing units. It is an attempt to strategize guidelines for future designs of public housing.

2. Background Study

Previous Nigerian housing policies have been widely rejected by public housing residents resulting in execution of large scale housing transformations that sometimes undermined the quality of living within neighbourhoods. Scholars have attributed this to socio-cultural exclusion and inconsistency in Nigerian housing policy (Ibem et al., 2011; Olotuah & Bobadoye, 2011; Olowoyo & Khan, 2012). In spite of these challenges, public housing estates have been promoted and several state governments in Nigeria have participated in housing delivery via public housing, because it provided housing for disadvantaged people (Clapham et al., 2000). It is important to note that 40% of Nigerians who live in urban centres face serious complex housing problems due to overcrowding; with 75% of the urban residents living in slums. A full 60% of Nigerians lack decent homes (Olotuah & Bobadoye, 2011).

This study first reviews previous studies on socio-cultural attributes behind housing transformation. The list of socio-cultural attributes from those studies was then modified in order to develop the research instrument in selected housing estates. Socio-cultural issues can be tangible and intangible as well as dynamic due to changing circumstances of inhabitants. Therefore identifying the core socio-cultural attributes of user satisfaction became crucial. There were three challenges. Firstly, there are three major regions in Nigeria, Northern, Southern, and Eastern, each having its distinct cultural identity. Only the Northern region was picked for the study, to remove more complicated issues created by bigger levels of cultural diversity. Still, there are six major ethnic groups in Northern Nigeria: Hausa, Fulani, Kanuri, Nupe, Tiv, and Gwari. However, they are assumed to have many common attributes, and they were represented proportionately in the sample, so that the outcomes reflect the region as a whole. Second, living in the city limits the actual level of cultural values that can be carried from the countryside. Therefore, there was a need to filter such issues of user satisfaction that were not relevant at the urban level. And third, there was a need to identify the tangible and intangible components of socio-cultural attributes. This study mainly focused on the tangible ones.

2.1 Housing Satisfaction and Housing Transformation

Housing satisfaction is one of the fundamental concepts behind housing transformation. Evaluating the impact of users' decisions on housing arrangement over time on housing satisfaction is a necessary constituent of Environmental Impact Assessment (EIA) and Post Occupancy Evaluation (POE) that guide subsequent designs and policies. Previous studies' evaluations have shown that homogeneity in public housing layout has excluded users' needs and requirements (Kaitilla, 1993) with dissatisfaction due to lack of sensitivity towards socio-economic attributes (Ibem & Amole, 2013; Mohit et al., 2010). Interestingly, Salleh (2008) found Malaysian low-cost housing users to be generally satisfied with housing neighbourhood facilities but dissatisfied with the attributes of housing units, a trend not common in the study area under consideration. In addition, daily use of outdoor space was discovered to be fundamental in designing residential layouts in Jordan (Abu-Ghazzeh, 1999). In contrast to the homogenous housing units that are common with public housing (Tipple 1999); (Khan, 2014b) has discovered a consistent heterogeneity in the transformation of self-built neighbourhoods in Dhaka with variations of layout configurations existing on the same scale. These actions can be correlated with the level of users' involvement or consideration in the housing process consequently leading to housing satisfaction.

Furthermore, in the Netherlands and Denmark housing characteristics, quality and cost have influenced homeowners housing satisfaction (Elsinga & Hoekstra, 2005). Rapoport (2000), described family relations, family structure and social networks as integral socio-cultural components of culture that determine users' housing satisfaction. In Nigeria, housing dissatisfaction has been credited to socio-cultural exclusion in housing design (Ibem & Amole, 2013; Ukoha & Beamish, 1997). Therefore, all these attributes are vital in identifying homeowners' satisfaction derived through public housing transformation. Moreover, Maina (2013), has established correlation between transformation and user's efficacy of space in a community in this study setting, the absence which would have made residents abandon their dwellings.

2.2 Transformation in Public Housing

Though public housing may not always allow much freedom for transformation, this phenomenon has progressively proven to be inevitable as the housing process itself has remained dynamic in Nigeria. Factually,

the composition of houses and subsequent transformations are replications of socio-cultural relations in advancing housing civilization (Franklin, 2006). Consequently, reflecting family values illuminates preferences and choices in defining norms and standards (Rapoport, 2000). According to Seek (1983), socio-economic factors influence households' housing decisions with a shift from actual provision to a desired level of consumption. This could be referred to in a conventional definition as transforming a 'house' to a 'home'. In other words, transformation has the capacity "to turn a house into a home" by adding a sense of attachment to the physical attributes of the house.

Olotuah and Bobadoye (2011) revealed the failure of prototype housing in Nigeria, blaming the prominent noticeable uniformity of house form across regions, as houses quickly lose their planned concepts to unplanned layouts upon possession. Ikejiofor (1999) added that there is a general lack of awareness in both the supplier and the users, as the public sees a house as a product entirely completed before use. It seems that a conventional description of a housing package as a modern house provided by the government is just a minimum required physical plan layout and construction, negating the traditional concept of a house developing from a basic core and growing gradually along with users' needs and means.

2.3 Socio-cultural Determinants in Housing Transformation

From (Jiboye, 2004; Rapoport, 1969, 2000), the relationship between family structure, lifestyle, values, activities and identity and the house ultimately influence user satisfaction. this comes about because these parameters incorporate the smaller socio-cultural attributes of housing transformation such as gender, income, tenure status, level of education, age (Ayoola & Amole, 2014). Family activities vary over time, between groups, and express culture distribution in a system. In effect, inhabitants' activities greatly define a dwelling as a home (Rikko & Gwatau, 2011). Family structure influences spatial arrangement, matching housing and household; and leads to change of space use with the changing family unit (Rapoport, 2000). For instance, attaining adulthood and getting married impose changes to the family structure which are ultimately replicated in housing transformation (Khan, 2014a). Family values and social identities also contribute to the housing transformation as changes in values and identities lead to expansion or reduction of space requirements (Khan, 2014b). Social activities were also found to be determinants of socially-supportive building design; for example, allotted spaces had the potential to be used for communal social setting as showed in clustered dwelling units by Regnier (2003). Similarly, family lifestyle and identity, reflected in status, employment and level of education has inter-generational transmission in home ownership achievement (Mulder & Lauster, 2010).

Accordingly, Jiboye (2004), argued against the lack of consideration of users' socio-cultural attributes in housing policy, and suggested the importance of inclusion of cultural preferences and peculiarities in physical dwellings' layouts. Also, according to Gotham (2003), social change is viewed from the point of view of 'relation' and 'conflict' in socio-spatial concepts. Thus, the nature of public housing transformation has been argued to be a consequence of socio-cultural exclusion in initial designs. In the same way, Dincyurek and Turker (2007) consider the design of buildings with socio-cultural attributes in mind as efforts to preserve traditional environments. Self-expression and emotional attachments to spaces are life-long characteristics that keep manifesting spatially in the lifespan of households until they fulfil the task of expressing values in their dwelling layout (Khan, 2014b).

Some studies related to strategy-making equally relate to transformation. Ikejiofor (1999) pointed out the need for a dynamic delivery system especially for low-income groups, allowing them to build their house incrementally after delivery of the basic shelter package comprising the essentials of a plot, infrastructure, and a basic unit. He implied that the procedure should involve gradual space (plot) utilization, with the physical growth of the basic unit not restricted to a conceived plan, and in addition, allowing people to manage their own funding. At a smaller scale the growth options may remain limited and it therefore could be easier to identify the development potentials and limitations.

In light of the above, the selected socio-cultural attributes were tested in this study to determine their contributions to housing transformation and subsequent housing satisfaction.

3. Methodology

In examining the socio-cultural attributes of public housing transformation, psychometric analyses were conducted in line with (Anderson & Gerbing, 1992). Exploratory analysis, with reliability testing via Cronbach's alpha, was adopted in establishing the internal consistency of the tool. Factor analysis using principal component extraction was applied in establishing the factor coefficient of the item variables in order to extract the weak items. Confirmatory factor analysis (CFA) was conducted to ascertain the loading coefficients of variable items in determining their strength in the phenomenal construct. The strength manifested in the factor loadings of the

various factors were individually considered in the factor analysis. Subsequently, the output of the confirmatory factor analysis led to the construction of the socio-cultural composite model of user satisfaction in public housing transformation using the structural equation model (SEM). Furthermore, regression analysis was then performed to estimate the coefficient of each of the socio-cultural attributes in predicting users' satisfaction in public housing transformation.

3.1 Respondents

Information for this research was collected through a regional housing survey limited to the Northern states of Nigeria as part of a regional study on housing transformation process. The survey adopted stratified sampling with the inclusion of five states covering six major ethnic groups proportionately selected so that the desired population is socio-culturally and geographically represented. The six dominant ethnic groups have historically occupied particular states in the region. Hausa ethnic groups are found in Sokoto and Katsina states; Fulani is predominant in Adamawa state; Kanuri is concentrated in Borno state; Tiv in Benue state; while Nupe and Gwari can be found in Niger state (Mustapha, 2006).

Next, within these states, the capitals were chosen as public housing in Nigeria is concentrated in state capitals. Finally, two housing estates in each state capital considered were selected based on conditional random sampling. The conditions included: the estate is sited in the state capital, the age of the estate would not be less than five years or more than fifty years, and the occupier is the owner of the house. For each of the housing estates, a simple random sampling technique was used in selecting transformed houses. In the final sampling stage, 30 households in each estate, totalling 300, were selected by a random sampling of transformed houses adequate to represent the population. This is supported by the adoption of roasoft statistical software in sample size calculation and the minimum returned sample size table for statistical analysis (Bartlett et al., 2001) in order to justify the selected sample size.

The house types within the study areas were either semi-detached blocks of flats or bungalows with initial design layout ranging from one to three bedrooms. The survey questionnaire was delivered house-to-house. A total of 297 respondents are in the final sample received the questionnaire forms. However, the sample used included only 276 respondents as 9 forms were discarded due to missing information while 12 were not returned by the respondents.

3.2 Survey Instrument

Ukoha and Beamish (1997) assessed occupants' satisfaction with public housing in Abuja, Nigeria measuring length of stay, household size, tenure and number of habitable spaces as part of the observed variables . Similarly, Jaiyeoba and Aklanoglu (2012), while discussing socio-economic issues in socially produced low income housing in Nigeria, examined the level of education, family size, number of habitable rooms and marital status as social attributes of the low income group in housing satisfaction. The study focused on the concept of ideological and social elements of culture related to components of the built environment in housing research suggested by Rapoport (2000). Thereafter, factors were generated from these previous housing studies and modified in developing the questionnaire for this study. Consequently, a five point-Likert scale instrument measuring household activities, family structure, lifestyle, identity and values as culture components was used in examining space organisation of housing units having been tested in previous studies and in tune with environment-behaviour studies.

The five point-Likert scale instrument shown in the appendix was used as it gives the respondents the opportunity to express their feelings freely (Barnett, 1991). The instrument includes a household research questionnaire developed in English by the researcher based on available questionnaires, inventories tested and documented in previous studies and found useful for this study. The questionnaire was divided into two major sections of demographic information and the Likert-scale section with culture attributes as sub-sections. Items in each sub-section are questions related to the cultural attribute of the group developed from previous tested research. Table 6 shows observed variable items that are significant after subjecting the data to psychometric analysis.

3.3 Limitations

Due to the breadth of cultural determinants of housing and the time limit for this research, the research is limited to socio-cultural elements observed, excluding economic and physical features. Although these factors are related to decisions in housing transformation, the study concentrated on activities and activity spaces in the relationship of culture to space configuration. It therefore reports the association between socio-cultural elements and the spatial arrangement of transformed houses. It equally focused observation on variables of spatial

importance to the cultural backgrounds being studied. Daramola (2006) acknowledges that dutiful designers make function a starting point. In spite of the limitations, this research has drawn data from across states and different cultural groups in assessing user satisfaction through transformation across the region. The research identifies the dynamic socio-cultural elements that account for the transformation of planned public housing to unplanned layout in public housing design, thus facilitating an examination of the benefits of housing transformation in ensuring user satisfaction.

3.4 Measures

3.4.1 Dependent Variable

The outcome of this research is the establishment of socio-cultural characteristics of user satisfaction in the transformation of planned concepts of public housing to unplanned layouts upon user ownership / control.

3.4.2 Independent Variables

The independent variables used in examining user satisfaction in housing spatial transformation include family structure, social activities, family lifestyle, family values and social identity. However their periodic changes over time were not accessed, but only their state at the time of survey. The time dimension of the existence of the estates was determined from the year of establishment.

3.4.3 Method of Analysis

Housing is considered as part of built environment, whereas the culture of its inhabitants as behaviour in tune with Rapoport's theory of environmental behaviour relations (EBR) (Rapoport, 2000). The bedrock of the theory seeks relating components of the built environment with attributes of culture in housing research. This study adopted cultural expressions that included values, lifestyle, family structure, identity and domestic chores (activities).

Consequently, for precision and feasibility the outlined components of culture were adopted and related with space organisation as an attribute of housing in examining socio- cultural effect in transforming public housing from planned to unplanned layouts towards achieving housing satisfaction.

Table 1. Variables definition in the analysis of socio-cultural characteristics

Variable	Operational definition
Outcome variable Dependent attribute	
User satisfaction in transformed housing units	
Antecedents independent predictors	
Socio-cultural attributes	Socio-cultural characteristics that account for transformation towards user satisfaction.
1. Social activities	Common family activities that require functional space; Children's play, visitors' accommodation, gatherings & relaxation areas.
2. Family structure	Family organisation; Resident relation, marriages, child adoption, gender privacy, adolescent children segregation & period of residency.
3. Family values	Basic norms with respect to; Neighbourhood interaction, domestic activity distribution & domestic servants' accommodation.
4. Family life style	Communal relationships with neighbours, outdoor relaxation, change in economic status & keeping pets or domestic animals.
5. Social identity	Identifying with ethnic background; reflecting ethnic space use, familial meetings, family status reflections, ethnic identity & previous public housing experience.
Time variant covariates	
Age of building	Estates occupied 5-50years.
Duration of residency	Period that household have lived in the housing unit.
Family size	Number of family members at the time of survey.

4. Results and Findings

4.1 Univariate Analysis

Demographic analyses of family size and residency duration presented in Figures 2 and 3 respectively show that family size and the period of stay are strongly significant in justifying spatial transformation in achieving user satisfaction. It is observed that about 51% of the respondents surveyed have a family size greater than ten (10) members. Although the family size at the point of occupation was not examined there is the tendency that household sizes upon occupation are small. However, the current size is not consistent with expected occupancy rate of the initial public housing design that comprised of 1, 2, and 3 bedrooms. This change in family size is accounted for by marriages, childbirth, resident relations, children's growth into adolescence and domestic servants living within the residential unit. This outcome defines the family distribution which may have accounted for the need for spatial transformation of initial design layout. Moreover, the target group who are low income earners are characterised with large nuclear and sometimes extended families (Maina, 2013).

Likewise, 66% of the studied population has lived beyond five (5) years in their houses at the time of survey. Most likely, this outcome is an indication that tenure ownership may have encouraged the gradual spatial transformation of housing units to its present state. The outcome of both factors is not inconsistent with findings of previous related studies (Seek, 1983; Tipple, 2000). Seek (1983) observed family life cycle to have combined significantly socio-cultural characteristics of household with progressive changes at different life cycle stages and consequent space demand corresponding with number of years of occupancy. Tipple (2000) found association between household size and structure which entailed the demand for increase in housing space through transformation process in developing countries.

4.2 SEM Multivariate Analysis

4.2.1 Exploratory Factor Analysis (EFA)

In the first instance, item scaling was conducted via reliability analysis and Cronbach's Alpha of .873 was achieved and presented in table 2. The figure is above the threshold of 0.70 recommended by Nunnally (Nunnally, 1994) an indication of sufficient reliability of the instrument used. This was followed by descriptive factor analysis with Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity to examine the strength of the variable items in the instrument having grouped them into factors guided by previous studies. A total of 32 questionnaire items with demographic items were used for the study. The Likert scale items were grouped into five (5) factors of social activities with 8 items, family structure with 6 items, family values with 7 items, family lifestyle with 5 items and social identity with 6 items. Items that exhibited factor loadings less than 0.40 (Table 4) were considered weak for the construct and thereby excluded from further analysis. The final composite model exhibited good model fit, with the normed chi square of x2=2.266 (Bagozzi & Yi, 1988; Klem, 2000). The goodness of fit index GFI recorded is 0.850 within the recommended value of ≥0.8 (Chau & Hu, 2001), comparative fit index CFI is 0.782, and Root mean square error equals 0.068 (Steiger & Lind, 1980), also within acceptable limit (ibid).

4.2.2 Confirmatory Factor Analysis (CFA)

Secondly, 29 items with loading ≥ 0.40 were considered for confirmatory factor analysis in order to develop the socio-cultural construct of user satisfaction in housing transformation. All the socio-cultural factors were further subjected to confirmatory factor analysis. However, factors that do not show unique manifestation of single factor were considered weak and analysed at a composite scale. Thus, the CFA model first considered the factors of social activities and family structure which exhibited single factor manifestation with high factor loadings; then the factors of family value, family lifestyle and social identity which did not exhibit single factor manifestation; but rather indicated a composite factors manifestation. Therefore, the assumption that family values, family lifestyle and social identity can distinctively influence users' preference in predicting socio-cultural attribute was considered weak. Consequently, the final model that evolved from the confirmatory factor analysis is a composite of five factors of social activity with 8 items, family structure with 5 items, family values with 3 items, family lifestyle with 5 items and Social identity with 5 items. Furthermore, two composite were developed from the confirmatory factor analysis. They include the tangible composite with social activities and family structure as component factors; and the intangible composite which has family values, family lifestyle and social identity as component factors. Fig 3 shows proposed socio-cultural structural model of user satisfaction in housing transformation.

4.3 Correlation Analysis of Factors

The strength of association among the five factors was examined using correlation analysis and presented in table 5. The result shows a notably high relationship between the tangible factors of social activities and family structure. Similarly, each of these tangible factors exhibited exceptionally strong association with family lifestyle-an intangible factor. The least association is observed between family structure and social identity. However, with the path coefficients ≥ 0.2 all factors exhibit strong significance (Cohen, 1992a, 1992b) and are positively correlated. In effect, the significant association between social activities and family structure implies that household composition with the nature and types of household activities are strongly related. The implication is that spatial provisions should accommodate these social activities in order to achieve user satisfaction. Equally, family lifestyle is significantly related to both social activities and family structure which means family distribution and activities are dependent on the lifestyle adopted by the household. Hence family lifestyle is seen in household activities and structure. In contrast however, social identity and family values have less impact on family structure, thus requiring less priority in spatial consideration. The statistical analysis also shows significant association of social activities to social identity and family values indicating that household activities reflect values and identity. Therefore activity spaces echo household values and cultural identity.

In view of the foregoing analysis, household structure and activities represents a strong predictor of user satisfaction of transformed public housing. Their tangible attribute qualifies their reflection in spatial configurations. However, the time variant in the changes, which requires a two stage analysis, was not within the focus of this study. But it suffices to acknowledge that the transformed layout which was informed by the household structure and activities at the time of survey is inconsistent with the initial design layout.

Therefore developers and designers ought to consider indigenous and changing patterns of household structure and activities in the housing layout and housing consumption of public housing residents. Equally, policies on land allocation and design of public housing units should include provision for future spatial changes, so that in the event of transformation, there would not be restrictions to spatial extensions which usually lead to densification as observed in the study areas.

4.4 Regression Analysis

Remarkably, regression weights are within the range of model fit while the regression analysis shows high significance at <.01 levels for both observed item variables and factors. Also, the critical ratio value greater than 1.96 which was achieved for variables suggests a significant relationship for further examination. This indicates an acceptable equation appropriate for user satisfaction via the transformation phenomenon. However, this was achieved after Ramsea reset test was performed and 3 item variables whose measurement error had multiple modification recommendation were eliminated. This is because there is no strong theoretical back up for the suggested modifications. In effect, all hypothesized paths were accepted fit and presented in Table 6.

5. Discussion

Findings indicate that social activities matter in housing satisfaction. As expected, accommodating overnight guests and social gatherings are significant variables. This is in line with the custom of honouring guests that is common among the northerners, where close family guests and social events are preferred to be hosted within dwelling units and considered as household activities. Therefore designing for this category would require provision of space for these activities.

On the effects of family structure in determining user transformation towards user satisfaction, children's growth into adolescent, welcoming new members through marriages and adoption, residing family relations may have accounted for visual and physical privacy needs which resulted into housing transformation in acquiring additional space towards achieving satisfaction. This confirms the findings by both Seek (1983) and Tipple (2000) who found change in household demography with rise in the number of adults to be the reason for more space and privacy requirements in public housing transformation.

Family norms of living with domestic servants and interacting with neighbours particularly among the female folks may have informal spatial transformation. Household problems and experiences are commonly shared among neighbours from were beneficial outcomes are imitated. In the same vain, family lifestyle is sometimes influenced by the neighbourhood characteristics; for instance outdoor relaxation and living with domestic animals are common lifestyle practices across the region.

Changes in economic status of the family, particularly that of the house head, often manifest in additional responsibility such as additional marriages, employing domestic servants and adopting children which in turn lead to additional functional space requirements such as additional living spaces, which were not of priority

earlier, suddenly become necessary for spatial transformation.

Although guest reception reflects cultural identity in African tradition, hosting of kinsmen and spatial arrangement in tune with cultural background is found to be important with transformers. In contrast however, reflecting cultural status of family, such as royalty and chieftaincy may not have influenced transformation as it is less significant. Similarly, most respondents were not influenced by previous knowledge of public housing as a good number of them were having their first experiences living in public housing.

The result from demographic analysis also revealed that public housing units with initial design of 1, 2 and 3 bedrooms would certainly require spatial modification in meeting with the changing occupancy rate. Moreover, a greater percentage of respondents were occupying their houses on tenure ownership with residency beyond 6 years, which meant that over time, changing needs were translated into spatial changes in achieving satisfaction. Similarly, comparing the family size with the significant values recorded with the family structure supported the argument that family structure is influenced by family size. Even though the majority of the households were nuclear families, residents' relations and additional marriages caused an increase in the number of children, calling for additional spaces.

6. Conclusion

Overall, various socio-cultural determinants indicate that tangible socio-cultural factors of social activities and family structure are significant factors of user satisfaction in public housing transformation. This outcome might have resulted due to a direct link between spaces and activities with the tangible factors. Both family structures and social activities are significantly influenced by the lifestyle of the household in guiding the pattern of housing adjustment

In view of the findings, the provision of public housing and its gradual transformation should be accounted for by developers at the design stage. Then ranking factors with consideration of the characteristics and peculiarity of socio-cultural elements of the households require objective consideration of user's experiences in choice and households preferences in realizing spatial changes to their homes. Consequently, their curiosity and impetus in relating house design with family's socio-cultural needs; as well as meeting lifetime goals are critical to their housing satisfaction, and should be considered by prospective public housing designers. In doing this, a review of socio-cultural needs of prospective users' is important. This will guide developers both in form and arrangement of activity spaces. In addition, cultural indices are progressive just as houses are dynamic, therefore, there is necessity to determine short term and long term influences on socio-cultural components.

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References

Abu-Ghazzeh, T. M. (1999). Housi ng layout, social interaction, and the place of contact in Abu-Nuseir, Jordan. *Journal of Environmental Psychology, 19*(1), 41-73. http://dx.doi.org/10.1006/jevp.1998.0106

Anderson, J. C., & Gerbing, D. W. (1992). Assumptions and comparative strengths of the two-step approach comment on Fornell and Yi. *Sociological Methods & Research, 20*(3), 321-333. http://dx.doi.org/10.1177/0049124192020003002

Ayoola, A., & Amole, D. (2014). The value of housing among the Poor in Ilesa, Osun State Nigeria. *Architecture Research 2014, 4*(1A), 45-54.

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of marketing science, 16*(1), 74-94. http://dx.doi.org/10.1007/BF02723327

Barnett, L. A. (1991). The playful child: Measurement of a disposition to play. *Play & Culture, 4*(1), 51-74.

Bartlett, J. E., Kotrlik, J. W., & Higgins, C. C. (2001). Organizational research: Determining appropriate sample size in survey research appropriate sample size in survey research. *Information Technology, Learning, And Performance Journal, 19*(1), 43.

Chau, P. Y., & Hu, P. J. H. (2001). Information technology acceptance by individual professionals: A model comparison approach. *Decision Sciences, 32*(4), 699-719. http://dx.doi.org/10.1111/j.1540-5915.2001.tb00978.x

Clapham, D., Franklin, B., & Saugères, L. (2000). Housing management: The social construction of an

occupational role. *Housing, theory and society, 17*(2), 68-82. http://dx.doi.org/10.1080/14036090045774 0

Cohen, J. (1992a). A power primer. *Psychological bulletin, 112*(1), 155. http://dx.doi.org/10.1037/0033-2909.112.1.155

Cohen, J. (1992b). Statistical power analysis. *Current directions in psychological science, 1*(3), 98-101. http://dx.doi.org/10.1111/1467-8721.ep10768783

Durowoju, S. (2006). Affordable and functional housing in a developing economy: A case study of Nigeria. *Journal of Land Use and Development Studies, 15*(2), 23-28.

Dwyurek, O., & Turker, O. O. (2007). Learning from traditional built environment of Cyprus: Re-interpretation of the contextual values. *Building and Environment, 42*(9), 3384-3392. http://dx.doi.org/10.1016/j.buildenv.2006.08.007

Elsinga, M., & Hoekstra, J. (2005). Homeownership and housing satisfaction. *Journal of Housing and the Built Environment, 20*(4), 401-424. http://dx.doi.org/10.1007/s10901-005-9023-4

Franklin, B. (2006). *Housing Transformation: Shaping the Space of Twenty First century living*. London; New York: Routledge.

Gotham, K. F. (2003). Toward an understanding of the spatiality of urban poverty: The urban poor as spatial actors. *International Journal of Urban and Regional Research, 27*(3), 723-737. http://dx.doi.org/10.1111/1468-2427.00478

Habraken, N. J. (1975). *Supports: An Alternative to Mass Housing*. London: Architectural Press.

Ibem, E. O., & Amole, D. (2013). Residential satisfaction in public core housing in Abeokuta, Ogun State, Nigeria. *Social Indicators Research, 113*(1), 563-581. http://dx.doi.org/10.1007/s11205-012-0111-z

Ibem, E. O., Aduwo, E. B., & Uwakonye, O. (2012). Adequacy of incremental construction strategy for housing low-income urban residents in Ogun State, Nigeria. *Built Environment Project and Asset Management, 2*(2), 182-194. http://dx.doi.org/10.1108/20441241211280918

Ibem, E. O., Anosike, M. N., & Azuh, D. E. (2011). Challenges in public housing provision in the post-independence era in Nigeria. *International Journal of Human Sciences, 8*(2), 421-443.

Ikejiofor, U. (1999). The God that Failed: A Critique of Public Housingin Nigeria, 1975-1995. *Habitat International, 23*(2), 177-188. http://dx.doi.org/10.1016/S0197-3975(98)00042-3

Jaiyeoba, B., & Aklanoglu, F. (2012). Socio-economic Issues in 'Socially Produced' Low Income Housing: Theory and Case study in Nigeria. *Procedia-Social and Behavioral Sciences, 50*, 855-864. http://dx.doi.org/10.1016/j.sbspro.2012.08.087

Jiboye, A. (2004). The socio-cultural responsiveness of household size on housing quality in Osogbo, Nigeria. *Anthropologist, 6*(3), 169-174.

Jiboye, A. D. (2011a). Achieving sustainable housing development in Nigeria: A Critical challenge to governance. *International Journal of Humanities and social science, 1*(9), 121-127.

Jiboye, A. D. (2011b). Urbanization challenges and housing delivery in Nigeria: The need for an effective Policy framework for Sustainable Development. *International Review of Social Sciences and Humanities, 2*(1), 176-185.

Jiboye, D. (2010). Evaluating Users' Household-Size and Housing Quality in Osogbo, Nigeria. *Ethiopian Journal of Environmental Studies and Management, 3*(2), 77-85. http://dx.doi.org/10.4314/ejesm.v3i2.59825

Kaitilla, S. (1993). Satisfaction with Public Housing in Papua New Guinea The Case of West Taraka Housing Scheme. *Environment and Behavior, 25*(3), 514-545. http://dx.doi.org/10.1177/0013916593253005

Khan, T. H. (2014a). *Houses in Transformation Search for the Implicit Reasons*. Cham Heidelberg New York Dordrecht London: Springer. http://dx.doi.org/10.1007/978-3-319-02672-5

Khan, T. H. (2014b). *Living with transformation: Self-built housing in the city of Dhaka*. Cham Heidelberg New York Dordrecht London: Springer. http://dx.doi.org/10.1007/978-3-319-00720-5

Klem, L. (2000). *Structural equation modeling*. In L. G. Grimm (Ed.), *Reading and understanding MORE multivariate statistics* (pp. 227-260). Jonh Willey & Sons, New York: Wiley-Interscience, Publication.

Maina, J. J. (2013). Uncomfortable prototypes: Rethinking socio-cultural factors for the design of public housing

in Billiri, north east Nigeria. *Frontiers of Architectural Research, 2*(3), 310-321. http://dx.doi.org/10.1016/j.foar.2013.04.004

Mohit, M. A., Ibrahim, M., & Rashid, Y. R. (2010). Assessment of residential satisfaction in newly designed public low-cost housing in Kuala Lumpur, Malaysia. *Habitat International, 34*(1), 18-27. http://dx.doi.org/10.1016/j.habitatint.2009.04.002

Mulder, C. H., & Lauster, N. T. (2010). Housing and family: An introduction. *Housing Studies, 25*(4), 433-440. http://dx.doi.org/10.1080/02673031003771109

Mustapha, A. R. (2006). *Ethnic structure, inequality and governance of the public sector in Nigeria.* United Nations Research Institute for Social Development.

Nunnally, J. C. (1994). *Bernstein: Psychometric theory*. McGraw-Hill, New York.

Odediran, S., Morakinyo, K., & Adeyinka, B. (2013). An Assessment of Facilities and Materials Specification and Residential buildings in Nigeria. *Journal of Building Performance, 4*(1), 52-58.

Ogu, V. I., & Ogbuozobe, J. E. (2001). Housing policy in Nigeria: Towards enablement of private housing development. *Habitat International, 25*(4), 473-492. http://dx.doi.org/10.1016/S0197-3975(01)00018-2

Olotuah, A. O., & Bobadoye, S. A. (2011). Sustainable housing provision for the urban poor: A review of public sector intervention in Nigeria. *The Built & Human Environment Review, 2*, 51-63.

Olowoyo, S. A., & Khan, T. H. (2012). Effect of culture on Urban Housing Non-Occupancy: A case Study in Ondo, Nigeria. *British Journal of Humanities and Social Sciences, 7*(2), 50-63.

Rapoport, A. (1969). *House form and culture.* Englewood cliffs: Prentice-hall.

Rapoport, A. (2000). Theory, culture and housing. *Housing, theory and society, 17*(4), 145-165. http://dx.doi.org/10.1080/14036090300108573

Regnier, V. (2003). *Design for assisted living: Guidelines for housing the physically and mentally frail*. John Wiley & Sons.

Rikko, L., & Gwatau, D. (2011). The Nigerian architecture: The trend in housing development. *Journal of Geography and Regional Planning, 4*(5), 273-278.

Salleh, A. G. (2008). Neighborhood factors in private low-cost housing in Malaysia. *Habitat International, 32*(4), 485-493. http://dx.doi.org/10.1016/j.habitatint.2008.01.002

Seek, N. (1983). Adjusting housing consumption: improve or move. *Urban Studies, 20*(4), 455-469. http://dx.doi.org/10.1080/00420988320080811

Steiger, J. H., & Lind, J. C. (1980). *Statistically based tests for the number of common factors*. Proceedings of the 1980 annual meeting of the Psychometric Society, Iowa City, IA.

Tipple, G. (2000). *Extending Themselves: User Initiated Transformations of Government-built Housing in Developing Countries*. Liverpool University Press. http://dx.doi.org/10.5949/upo9781846313097

Ukoha, O. M., & Beamish, J. O. (1997). Assessment of residents' satisfaction with public housing in Abuja, Nigeria. *Habitat International, 21*(4), 445-460. http://dx.doi.org/10.1016/S0197-3975(97)00017-9

Appendix A

Statistical results

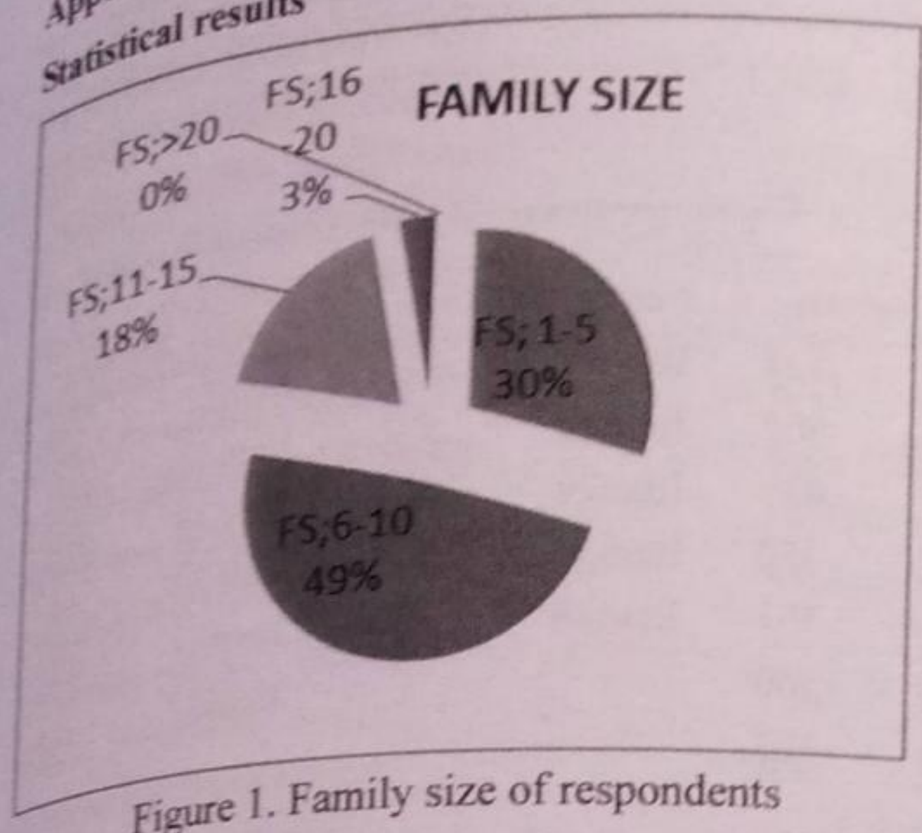

Figure 1. Family size of respondents

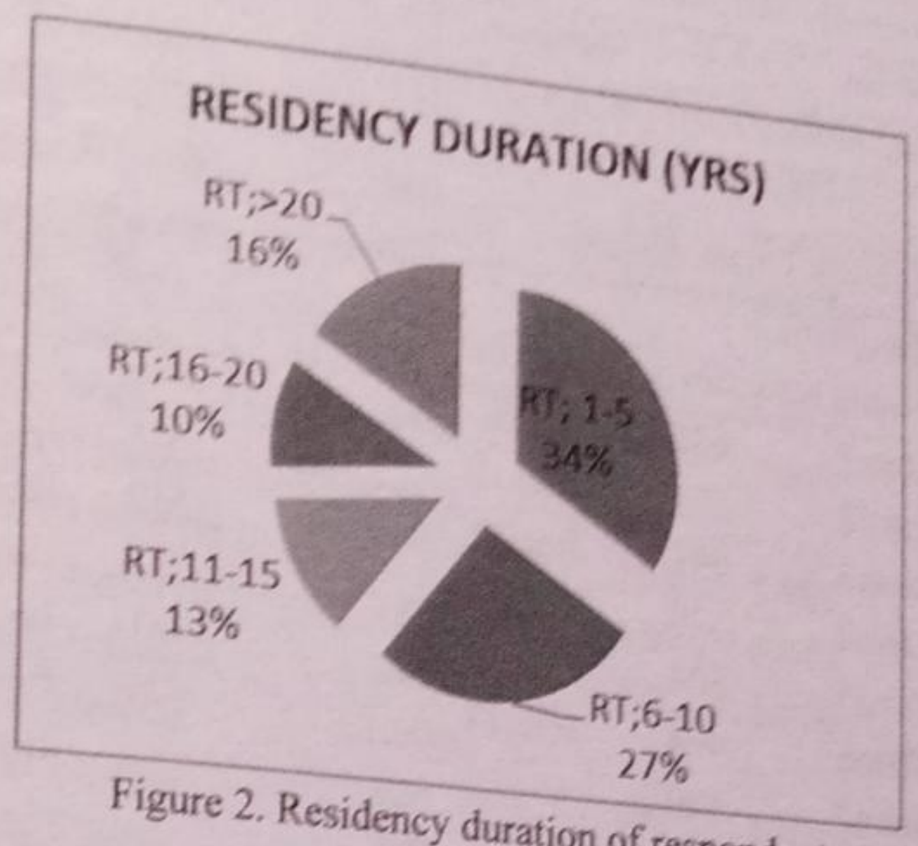

Figure 2. Residency duration of respondents

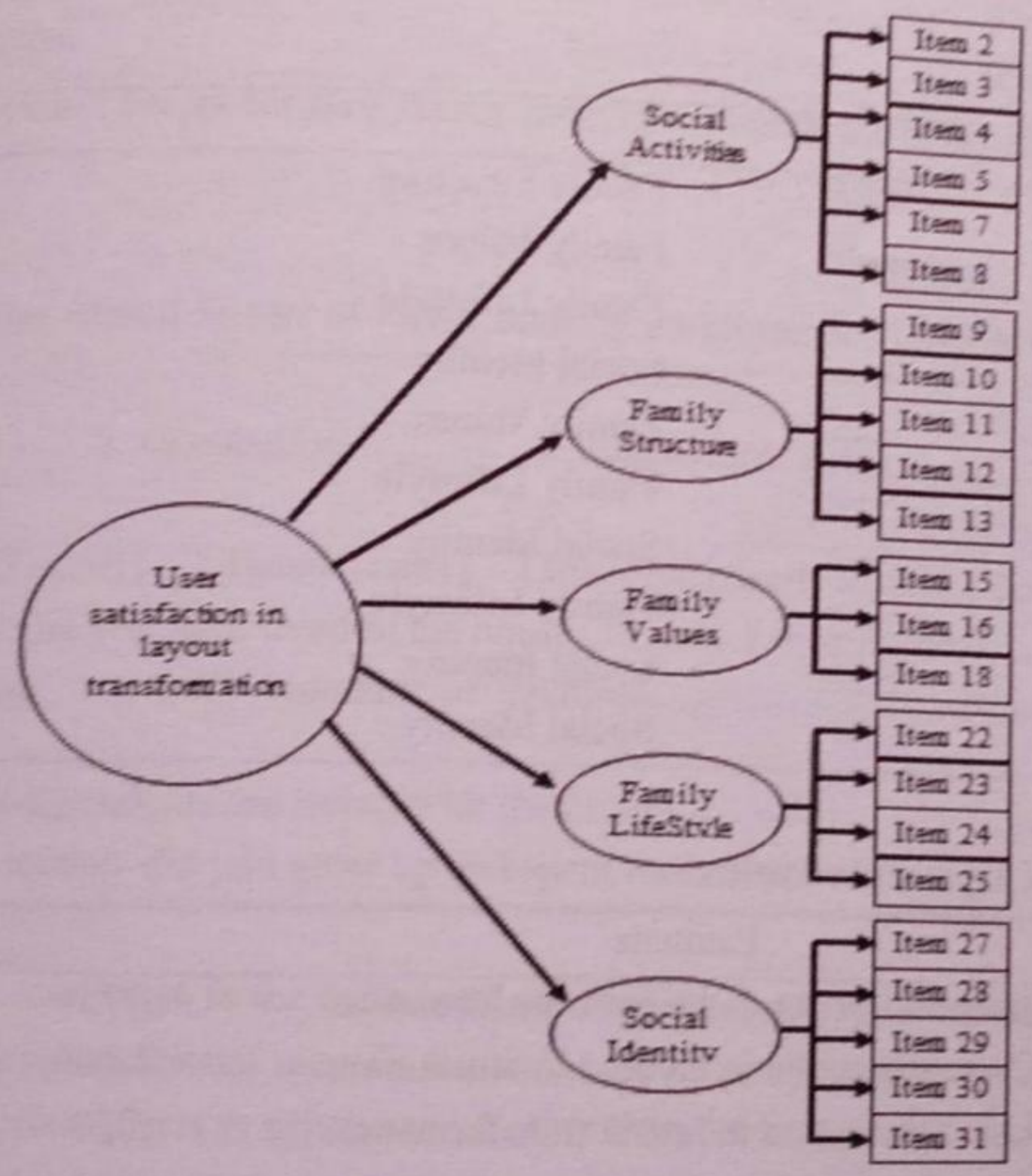

Figure 3. Proposed Socio-Culture composite model of user satisfaction in public housing transformation

Table 2. Reliability statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.873	.873	32

Table 3. Scale statistics

Mean	Variance	Std. Deviation	N of Items
84.21	318.732	17.853	32

Table 4. Factor analysis

Tangibles				Intangibles					
Social activities		Family structure		Family values		Family lifestyle		Family Identity	
Item1	.635	Item9	.616	Item15	.524	Item22	.627	Item27	.750
Item2	.557	Item10	.583	Item16	.507	Item23	.532	Item28	.692
Item3	.541	Item11	.549	Item17	.458	Item24	.510	Item29	.626
Item4	.529	Item12	.537	Item18	.450	Item25	.509	Item30	.498
Item5	.504	Item13	.481	Item19	.361	Item26	.460	Item31	.481
Item6	.464	Item14	.424	Item20	.260			Item32	.418
Item7	.440			Item21	.193				
Item8	.429								

Table 5. Correlation analysis

Correlation between factors			Estimate
Social Activities	<-->	Family Structure	.820
Social Activities	<-->	Family Values	.798
Social Activities	<-->	Family Lifestyle	.855
Social Activities	<-->	Social Identity	.645
Family Structure	<-->	Family Values	.508
Family Structure	<-->	Family Lifestyle	.863
Family Structure	<-->	Social Identity	.420
Family Values	<-->	Family Lifestyle	.774
Family Values	<-->	Social Identity	.607
Family Lifestyle	<-->	Social Identity	.684

Table 6. Regression analysis of hypothesised paths

Hypothesized paths		Estimate		S.E.	Z-Value.
Family Structure	<---	User satisfaction in layout transformation	.772	.132	5.864
Social Activities	<---	User satisfaction in layout transformation	1.000		
Family Values	<---	User satisfaction in layout transformation	.750	.146	5.151
Family Lifestyle	<---	User satisfaction in layout transformation	.895	.145	6.183
Social Identity	<---	User satisfaction in layout transformation	.925	.146	6.342

Notes. $p<0.01$, significant

Table 7. Regression analysis

Variable Items	Factors		Estimate	S.E.	Z-Value.
Children Play Area	<---	Social Activities	1.000		
Overnight Visitors	<---	Social Activities	.979	.142	6.880
Social gathering	<---	Social Activities	.844	.131	6.434
Overstretched Facility	<---	Social Activities	.679	.133	5.108
Female indoor relaxation	<---	Social Activities	.846	.134	6.299

Variable Items	Factors		Estimate	S.E.	Z-Value.
Resident Family relations	<---	Family Structure	1.000		
New family members	<---	Family Structure	1.370	.218	6.298
Physical & visual privacy	<---	Family Structure	.701	.130	5.381
Children growth to adolescent	<---	Family Structure	.800	.133	6.023
Length of Family Residency	<---	Family Structure	.803	.140	5.713
House help accommodation	<---	Family Values	1.000		
Interaction with neighbours	<---	Family Values	1.066	.201	5.312
Domestic activity spaces	<---	Family Values	.802	.172	4.648
Neighbourhood social blend	<---	Family Lifestyle	1.000		
Status elevation	<---	Family Lifestyle	.879	.150	5.880
Outdoor relaxation areas	<---	Family Lifestyle	1.031	.150	6.882
Domestic animals rearing	<---	Family Lifestyle	1.109	.172	6.466
Ethnic reflection	<---	Social Identity	1.000		
Hosting tribesmen guest	<---	Social Identity	.926	.092	10.033
Family status reflection	<---	Social Identity	.570	.087	6.532
Ethnic identity	<---	Social Identity	.927	.095	9.779
Public housing prior experience	<---	Social Identity	.514	.083	6.213
Male out door relaxation	<---	Social Activities	.933	.138	6.781

Notes. $p<0.01$, significant, except for New family members where $p=0.078$ not significant

Appendix B

Questionnaire: Socio-Cultural factors of Public housing transformation towards user satisfaction

Socio-demographic

1. Place of origin…….. 2. Occupation…… 3. Employment status…… 4. Age……

5. House tenure-ship

Owner occupier (purchased) [ ] Tenant (rent) [ ] Inherited (family asset) [ ] others specify…

6. Indicate the no of years you have lived in the house……7. Family size……

8. Number of wives……9. Number of children…… 10. Number of relatives living with you……

11. How many elderly dependents are living with the family……

12. Which part of the country did you grow up and spent most of your life……..

Family Values

1. You accommodate house helps in the compound for cooking & general cleaning services.
2. Preparation of meals by traditional utensils required outdoor cooking spaces attach to kitchen.
3. Female members receive guests in private room other than the living room.
4. Interaction with neighbours guided adjustments to outdoor areas.
5. Internal privacy was a pre-determinant to the spatial changes made in the house.
6. Toilet facilities were separated between children & adults in the house.
7. The need for family domestic chores & services' spaces led to the provision of outdoor spaces.

Family lifestyle

8. Accommodating pets/domestic animals in the house influenced changes made.
9. Modifications were made in defining an outdoor relaxation space.
10. Future plan for a polygamous family influenced changes made to the house.
11. Elevation in status and occupation had effect on changes made to the house.
12. Adjustments were made to fit socially with the pattern of housing in the neighbourhood.

Social activities

13. Absence of children play area outside the compound influenced outdoor changes.

14. Accommodating overnight relation led to providing additional spaces.
15. Courtyard was introduced for social gatherings and events.
16. Occasional outdoor cooking necessitated redefining cooking space around the courtyard.
17. Summer season influenced provision of outdoor functional spaces.
18. Existing toilet, kitchen and laundry facilities became overstretched and needed additions.
19. Accommodating visitors and friends led to the provision of additional spaces.
20. Space requirement for family study area influenced changes made.

Family Structure

21. There was need for additional accommodation to suite changed household structure.
22. New spaces were created to accommodate family relations living with the nuclear family.
23. Gender physical & visual privacy of family members motivated redistribution of spaces.
24. The family's polygamous structure led to providing accommodation for new members.
25. Children's growth into adolescents and the desire for separate rooms informed adjustments.
26. Length of residency influence the phases of changes embarked upon.

Social Identity

27. Adjustments were made to reflect my ethnic origin in the house.
28. Hosting ethnic events & entertaining community tribesmen informed changes made.
29. House layout was improved in order to reflect the family's occupation and status.
30. Some elements and spaces in the house were desired to portray your ethnic identity.
31. The changes effected are similar with what is obtainable in the neighbourhood.
32. Prior knowledge of background culture informed permanent modifications to the house.

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Design Implications: Impact of Socio-Physical Setting on Public Housing Transformation in Nigeria

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Abstract

Scholars claim physical surroundings as concrete manifest of space organisation. Its arrangement delineates spatial relationship of social activities' network within housing units. Yet, housing challenges in Nigerian cities portray minimal sensitivity to socio-physical attributes impacting public housing adjustments. Focusing on users' adjustments experience and emphasising on socio-physical environmental impact, public housing dwellers were examined to ascertain the socio-physical impact on housing adjustments initiatives. A survey with 276 households conducted in ten public housings in northern states of Nigeria, evaluated users' experience on socio-physical model of housing adjustment. Features of Building attributes; Neighbourhood influence; Technology; Plot size and Quality of urban living

1. Introduction

Spatial arrangement of buildings cannot be isolated from the impact of physical environment. However, the relationship between the duos is reinforced by the social atmosphere underlying its existence. This is in agreement with the paradigm of environmental determinism, which acknowledges physical environment to effect users' behaviour (Vischer, 2008). Thus, contextually; public housing domain as a physical entity significantly responds to social adjustments in fulfilling both functionality role and satisfying users' desire. Additionally, earlier studies have associated the ineffectiveness witnessed in Nigerian physical development to financial incapability, weak organisational structure and poor public enlightenment (Alabi, 2010). Conversely, it has also been faced with distortion due to unguided housing adjustment in bid of culture inclusion by residents. Consequently, unrestrained developmental schemes are common and continue to exist (Chokor, 2005) with fresh cases springing up around new estates. These impacts on the physical environment in most situations are devoid of professional guidance. Remarkably, these actions are viewed as violations, and little research exists in addressing the potentials of housing adjustment trends as it impacts on the physical environment. In view of these, factors of Plot size (PS), Building attributes (BA), Quality of urban living (QAUL), Technology (T) and Neighbourhood influence (NI) having being derived from background studies was used in examining the significance of socio-physical attributes of users' experience in public housing adjustment.

Researchers have asserted that housing adjustment promotes housing satisfaction not only by facilitating the inclusion of occupants' culture, but also by incorporating their changing limitless needs and desires. This is because housing adjustment remains inevitable as the needs and desires which are basic to households' existence remain dynamic (Seek, 1983). According to the disequilibrium model of (Clark and Ledwith, 2005) on residential mobility, households continue to stabilise their housing demand with available options. Although he argued in favour of housing mobility for alternative options, existing choice could be housing adjustment, which is often preferred by most residents (Seek, 1983). Thus, the ability to retain stability and regain equilibrium after the shift by demographic and socio-economic forces drives the motivation in housing adjustment choices (Khan, 2014b). Therefore, housing adjustment in public housings is more likely to be critical as initial designs are usually devoid of the occupants' involvement and are homogenous. Household structure and socio economic factors differ and changes, suggesting dynamism in living and most often reflected in built spaces. Giving the impossibility of retaining homogenous units' design of public housing beyond its occupation, developers have to rethink design strategy in order to meet with future homeowners' challenges. In particular, is the need to check unguided adjustments that distort physical organization and promote unhygienic environment which negates the essence of public housing initiatives (Ademiluyi, 2010).

Although, previous researchers (Daramola, 2006; Ikejiofor, 1999) have claim the need to re-assess the socio-physical environment of public housing in Nigeria, little empirical research on underlying socio-physical factors that influence public housing adjustment motives exist. The impact of socio-physical factors in the adjustment choice making by public housing residents in northern states of Nigeria is therefore crucial and explored by this

study. Statistical analysis of Likert scaled survey questionnaire adopted in obtaining users' experience of adjustment choice making, focusing on socio-physical attributes revealed significant manifestations. The outcome reflects technology as most significant factor influencing choice making. Similarly, inadequate habitable rooms, social ties with peers and previous urban living experiences are most significant attributes that underlie homeowners' decision in housing adjustment. These findings imply that developers have to consider the natural dynamics of public housing to homeowners and facilitate guided forecast of future adjustments at the inception of design process and also, direct regulatory agencies in policy formulation.

2. Background

2.1 Impact of socio-physical setting

Socio-physical setting could be described as tangible context where social activities are accommodated. Successful configurations are achieved through effective and efficient integration of social and physical phenomena which increases user satisfaction. Thus, housing features and physical environment account for higher user satisfaction (Türkoğlu, 1997). Because, they unite activities with spaces defining patterns and facilitating human existence. The persistence of indigenous social patterns on homogenous physical setting such as public housing is re-orienting the meaning and ideals of public housing in the Nigerian context. As a result, social activities are identified to exist outside spaces designed for them or outside the entire initial configuration (Rosow, 1961). Moreover, scholars have argued on the understanding that function dictate space use, likewise inversely space dictates what function to accommodate. The latter is a complex concept that deviates from identifying spaces by the function they host. While the first concept is common with modern designs the second is imbedded in indigenous housing planning. However, inherent in architectural forms, social meanings are significant in shaping the physical environment (Hillier et al., 1984). Hence, the use of space is realistically predestined and distinctly distinguished among people due to cultural diversity (Harvey, 2010). There by, enabling the understanding of groups of people with their ways of living. Therefore, space is actively connected to social life, and is a factor of human existence as conceived in social theory (Hillier, 2008). For instance, house type offers stable physical setting that fits social life, metaphorically described as gloves fit hands and the most widely shared experience in a culture (Habraken, 1988). Then social behaviour exhibited by space can only be comprehended principally by the value of its potential to act in space as a phenomenon (Hillier, 2008). As a result, spatial organisation, spatial elements and how spaces relate to one another are powerful approach of distinguishing housing typology other than by functionality (Habraken, 1988). In effect, meaningful understanding of cross-cultural physical and social relationship is required (Harvey, 2010). Public housing adjustment phenomenon offers potential platform in understanding cross-cultural physical and social association.

2.2 Public housing transformation

This phenomenon constitutes changes imposed on initial units' layout of homogenous neighbourhood's residential houses converting it into transformed heterogeneous units. In

effect, public housing efficacy is enhanced which in turn facilitates homeowners' benefit in public housing adjustments exercise (Seek, 1983). Impliedly, housing satisfaction could be derived with increase in the value of housing performance while housing shock and housing stress are addressed. Specifically, is the fulfilment of lifelong aspirations which varies with households irrespective of their lifecycle (Khan, 2014a) making housing adjustment inevitable and part of life process. Thus, houses are viewed more as living entities than physical behavioural patterns (Khan, 2014b). However, while housing transformers target the fulfilment of socio-spatial pattern and benefiting from the potentials in housing adjustment, regulating authorities are hostile in responding to their attitudes (Tipple, 1996). Their actions are viewed merely as contravening existing regulations. Conversely, the motivational persistence of homeowners could be associated with irresistible benefits achieved through housing transformation that may be harnessed as potentials in the process of sustainable housing provision. For instance, relieving homeowners of housing shock due to increased household size or housing stress as a result of changing space needs improves liveability. These are benefits in housing consumption that cannot be ignored, because both shock and stress often result from changing family structure which influences housing adjustment (Tipple, 2000). Again, in maximizing homeowners' benefit the social phenomenon of housing adjustment and the physical setting adjusted requires adequate comprehension. Thus, both the initial design and the transformed layout represent the path that provides the adjustment transition hence an impact on initial design layout.

2.3 Design inferences

Housing design and size are established to be significant in influencing housing satisfaction (Türkoğlu, 1997). Standardised homogenous designs as in mass housing units and neighbourhoods restricts liveability, with contrast between "specific spaces" designed for "specific purposes" and non-conformity of usage (Rosow, 1961). The stance in modern perception of designing space for the function it holds contrasts with indigenous insight where spaces are identified with name and not by function (Habraken, 1998). Usually such spaces accommodate series of activities.

Recent trends in public housing transformation arouse the need for harmonising the two standpoints in order to sustain housing delivery among the lower class. Under these circumstances, linking space configuration with social meanings analysed via grounded and natural visions should develop inventive values of several insights (Bafna, 2012). Because, previous users' experience coded as the spatial reasoning in transforming the built environment consist of the spatial knowledge that guides spatial decisions (Harvey, 2010). Therefore, developing spatial knowledge from users' experiences determines the concept of association between space configuration and social meaning in future housing design. In effect, conflicts in emerging spaces and social activities are identified and resolved. Research has recognised the critical role of design expectation (Zinas and Jusan, 2012) as motivators of homeowners in housing adjustment. Hence, the study proposes Building attribute, Plot size, Neighbourhood features, Quality of Urban Standards and Technology as salient attributes in explaining socio-physical motivation of homeowners in public housing adjustment.

Previous studies such as (Khan, 2014a; Seek, 1983; Tipple, 2000) have adopted conceptual, qualitative and statistical approaches to evaluate housing adjustment phenomenon, in addition to identifying physical features as vital determinants in housing adjustment that defines the nature of improvements. This study however, contributes to the advancements of public housing adjustment by first concurrently examining the effect of both latent factors and measurement attributes. Second, proposing a composite model that combines latent factors to illustrate the relationship between the constructs and establishing factors that most significantly influence homeowners' decision.

2.4 Research model and hypothesis

The study developed a research model by relating factors of socio-physical attributes of public housing adjustment in a composite analysis. The research model fig 1 was achieved after subjecting variables of the constructs to psychometric analysis and model fitness was achieved.

2.5 Socio-Physical determinants

Urban spatial paradigm desires spatial quality for the low income dwellers (Makachia, 2011). The value associated with reflecting the paradigm in providing housing for low and medium income class are most often challenging. Housing in its spatial organisation is fundamental to the physical system around it (Habraken, 1988). Accordingly, the physical features of an environment have significant impact on users' perception and connection with space (Harvey, 2010). Previously, Türkoğlu (1997), examined the effect of neighbourhood features on residents' satisfaction with positive impact. Also, building attributes in public housing should consider underlying diversity in culture, changing family structure and socio-economic status of users (Ukoha and Beamish, 1997). Since, spatial changes of Nigerian architecture are attributed to civilization, cultural infiltration and technological advancement due to social changes; by shift in community and family values to western ways of life (Rikko and Gwatau, 2011). Then, space organisation often mismatch with users' activities in public housing design but only satisfy immediate needs, as a result users embark on rapid transformation in accordance with their lifestyle and preferences (Wong, 2010).

Kaya (2004) highlighted sequentially, previous works that established communication gap between users, designers and building owners at inception. He recognised while suggesting systematic research on the needs of end-users. Similarly, Arimah (1992) recognised room size and plot size as attributes of housing demand in Nigeria. Land for homeowners to construct their houses is not easily accessible, (Arimah, 1997), although large areas of land are subdivided into plots sizes and sold to prospective developers. In contrast initial public housing constructions favour some homeowners as they benefit more un-built area around their acquired unit in public housing setting. A disparity that is reflected in the nature and scale of changes embarked upon by homeowners. Equally, existing empirical research suggests that neighbourhood environment significantly influence family characteristics and wellbeing (Ellen and Turner, 1997; Ukoha and Beamish, 1997). Also, Rent and Rent (1978) found neighbourhood physical and social setting significant in low income housing satisfaction. Hence, the following hypothetical paths are proposed in establishing

socio-physical composite model that influences homeowners' adjustment decisions.

H1= BA-SPE; Building attribute positively influence homeowners decision on housing adjustment

H2= PS-SPE; Plot size positively influence homeowners decision on housing adjustment

H3= NF-SPE; Neighbourhood features positively influence homeowners' decision on housing adjustment

H4= QULS-SPE; Quality of urban living standard positively influence homeowners decision on housing adjustment

H5= T-SPE Technological advancement positively influence homeowners decision on housing adjustment

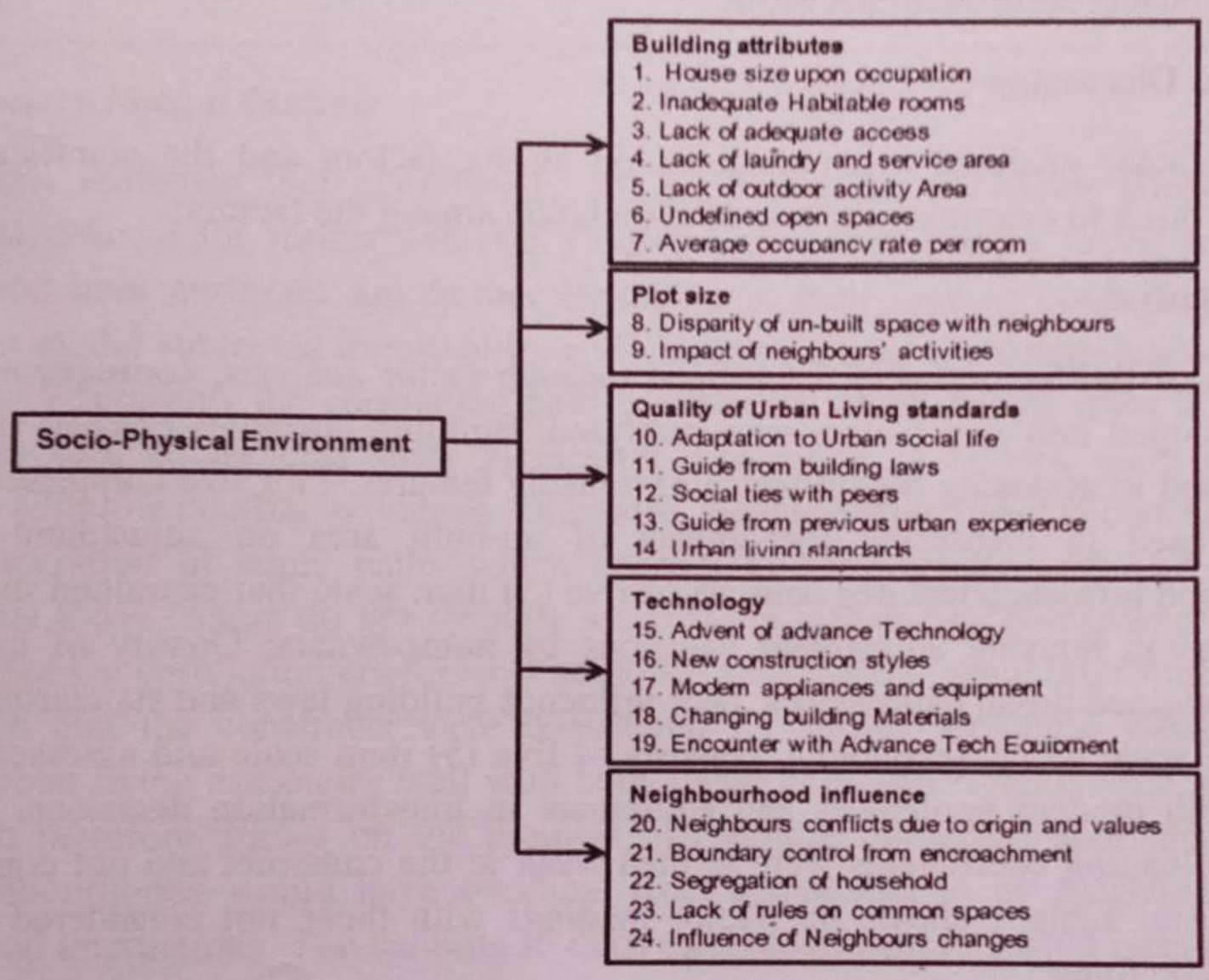

Figure 1. Proposed Socio-physical environment composite structural model

3. Method

Factors established from previous researches were adapted in developing the instrument for the study. Consequently, survey questionnaire with structured 5 point Likert scale questions (with scaling range from strongly agree to strongly disagree) were used to examine homeowners experience in public housing adjustment. Stratified conditional sample was adopted in selecting housing estates across the region for the study. Purposively, 10 samples of housing estates across northern states of Nigeria are chosen for survey in assessing the phenomena. The selection criteria considered the age of the estate which should range between three (3) and fifty (50) years of existence, multi-ethnic community, located in the

state capitals for equal scaling and presently occupied on owner occupier basis. A total 276 questionnaire forms returned from hand delivery representing about 93% of surveyed respondents; and meeting the sample size requirement for SEM analysis (Hair Jr et al., 2010) were used for analysis after eliminating those wrongly filled and those with incomplete information.

To explore the significance of the phenomenal construct of socio-physical attribute in housing adjustment choices, series of psychometric analysis are conducted. First, factor analysis was conducted in order to identify the significance of the multiple item attributes used in measuring the factors in construct after establishing these factors from background studies. Second, confirmatory factor analysis was performed in order to establish the strength and association of the factors constituting the construct in the phenomenal relationship. Finally, regression analysis was conducted to ascertain the level and strength of the factors in influencing housing adjustment decisions.

4. Result and Discussion

Exploratory factor analysis was conducted on strong factors and the significant factors correlated in order to determine the rate of association among the factors;

4.1 Factor Analysis

The strength of the factors were determined through factor analysis, consequently 28 item attributes grouped into five factors were analysed. Building attributes consists of eight (8) item scale used in assessing the influence of housing features; Plot size comprise of five (5) item scale used in measuring the impact of un-built area on adjustment decisions; Neighbourhood influence/features consists of five (5) item scale that examined the influence of neighbours in housing adjustment decisions by homeowners; Quality of urban living standards examined urban experiences, peer influence building laws and standardization with five (5) item scale while Technology consists of five (5) item scale and assessed residents' encounter with modern appliances and equipment in transformation decisions. Items with value ≤ 0.39 loading coefficients were termed weak in the construct and not considered for further analysis. Table 1 shows the factor loadings with those not considered for further analysis in italic fonts.

Table 1. Exploratory Factor Analysis (EFA) of Socio-Physical Environmental

Building attribute		Plot size		Neighbourhood features		Quality of Urban standards		Technology	
Item 1	.647	Item 9	.596	Item 14	.696	Item 19	.691	Item 24	.728
Item 2	.635	Item 10	.573	Item 15	.691	Item 20	.597	Item 25	.698
Item 3	.603	Item 11	.446	Item 16	.530	Item 21	.574	Item 26	.646
Item 4	.580	*Item 12*	.342	Item 17	.496	Item 22	.499	Item 27	.572
Item 5	.564	*Item 13*	.331	Item 18	.474	Item 23	.463	Item 28	.571
Item 6	.482								
Item 7	.472								
Item 8	.041								

4.2 Confirmatory Factor Analysis

Next, 25 item attributes that manifested ≥.40 coefficient in the factor constructs were considered significant for further analysis. Consequently, confirmatory factor analysis was conducted and item attributes are further examined in their loading coefficient, with the measurement model subjected to reliability and validity analysis the determination of model fitness. Table 2, presents the correlation path coefficients which ranges from 0.29 to 0.74. Although the path coefficients show significant association of factors, there are weaker associations with low coefficient values. Therefore, the correlation result shows the tendency of weak association of some paths which appears to have weak coefficient values, an indication that those factors do not strongly associate in influencing homeowners' decision. However, since the correlation coefficients are lower than 0.85 in value discriminant validity was achieved and the constructs were considered for further structural model analysis. Quality of urban living associates well with both Technology and Neighbourhood influence. The research therefore argues on the premise that similar home use appliances common among neighbourhoods would have overtime been acquainted to by households through neighbourhood interactions. The benefits so derived then influences spatial changes by other users in order to attain the same status level in the society.

Table 2. Correlations Analysis

Correlated Paths[3]	relationship	Estimate
Building Attribute	Quality of Urban Living	,286
Building Attribute	Technology	,302
Building Attribute	Neighbourhood Influence	,411
Plot Size	Quality of Urban Living	,434
Plot Size	Technology	,565
Plot Size	Neighbourhood Influence	,531
Quality of Urban Living	Technology	,738
Quality of Urban Living	Neighbourhood Influence	,629
Building Attribute	Plot Size	,323
Technology	Neighbourhood Influence	,495

4.3 The Structural Model

The Structural model fitness was achieved with normed X2 equals 2.38 (X2 =588.75,df =247) which falls within the threshold of 3 suggested by (Bagozzi and Yi, 1988) indicating a perfect fit. The goodness of fit indices also exhibited good fit for the structural model with GFI of 0.81, while the comparative fix index CFI is 0.81. Both are within the suggested margin of 0.8 (Browne and Cudeck, 1992; Chau and Hu, 2001). In addition, the root mean square error of approximation RMSEA = 0.070, below the threshold of 0.08 suggested by (Browne and Cudeck, 1992; Steiger and Lind, 1980) and indicating a good fit. Consequently, the structural model exhibited fairly good fit with the sample data considering the given parameters particularly with the consideration of at least a fit index from each category of absolute, incremental and parsimonious fit indexes (Hair Jr et al., 1995; Holmes-Smith et al., 2006).

4.4 Regression Analysis

The significance of the social physical environment in influencing users' public housing adjustment was examined with five latent constructs as indicated on the model (see fig 1). The regression weight indicates coefficient loadings >0.5 thus considered good indicators (Pedhazur and Schmelkin, 1991) while the p-values shows all attributes to be significantly different from zero at the 0.01 level (two tailed) thus, supporting the hypothesis H1-H5 of the factors being positively significant in influencing homeowners adjustment decisions. The quest for additional habitable rooms appears most significant feature considered in building attributes. This suggests that the available rooms in public housings are not in consonant with the family structure, therefore increasing the occupancy rate which in turn builds up overcrowding. Social ties with peers and long bonding with the urban environment demonstrates how acculturation has significantly influence the transformation drive. Above all, the values indicated from the result that generally changing social atmosphere around the physical environment has had impact on public housing dwellers adjustment decisions.

Table 3. Regression Analysis of factors

Hypothesized paths			Estimate	S.E.	Z-Value
Building Attribute	<---	Socio Physical Environment	1.000	Reference point	
Plot Size	<---	Socio Physical Environment	1.801	.415	4.340
Quality of Urban Living	<---	Socio Physical Environment	1.621	.357	4.538
Technology	<---	Socio Physical Environment	2.001	.428	4.678
Neighbourhood Influence	<---	Socio Physical Environment	1.796	.404	4.446

Note: p-value is highly significant at 0.01 (two-tailed) for all co-efficient

Table 4. Regression Analysis of items

Regression relations of item with factors			Estimate	S.E.	Z-Value
House size upon occupation	<---	Building Attribute	1.000	Reference point	
Inadequate Habitable rooms	<---	Building Attribute	1.050	.121	8.678
Lack of adequate access	<---	Building Attribute	.972	.118	8.212
Lack of laundry and service area	<---	Building Attribute	.805	.110	7.295
Lack of outdoor activity area	<---	Building Attribute	.819	.109	7.546
Undefined open spaces	<---	Building Attribute	.693	.103	6.747
Average occupancy rate per room	<---	Building Attribute	.711	.111	6.391
Disparity of un-built space with neighbours	<---	Plot Size	1.000	Reference point	
Impact of neighbours activities	<---	Plot Size	.617	.117	5.258
Adaptation to Urban social life	<---	Quality of Urban Living	1.000	Reference point	
Guide from building laws	<---	Quality of Urban Living	.905	.132	6.835
Social ties with peers	<---	Quality of Urban Living	1.157	.140	8.261
Guide from previous Urban experience	<---	Quality of Urban Living	1.026	.142	7.229
Urban living standards	<---	Quality of Urban Living	.668	.117	5.734
Advent of advance Technology	<---	Technology	1.000	Reference point	
New construction styles	<---	Technology	.827	.082	10.039

Modern appliances and equipment	<---	Technology	.803	.084	9.517
Changing building Materials	<---	Technology	.766	.089	8.566
Encounter with Advance Tech Equipment	<---	Technology	.805	.095	8.487
Neighbours conflicts due to origin and values	<---	Neighbourhood Influence	1.000	Reference point	
Boundary control from encroachment	<---	Neighbourhood Influence	.996	.121	8.213
Segregation of household	<---	Neighbourhood Influence	.719	.099	7.268
No rules on shared spaces	<---	Neighbourhood Influence	.680	.097	6.998
Influence of Neighbour	<---	Neighbourhood Influence	.775	.111	7.016

Note: p-value is highly significant at 0.01 (two-tailed) for all co-efficient

5. Findings

Results from the study indicate that advancement in technology significantly influences homeowners' adjustment decision. This can be attributed to their long-time contact with the urban environment which is reflected in their social ties with peers and established urban experience. Additionally, technology exhibited being most significant attribute in the decision to adjust existing public housing. This finding is in consistence with (Cowan, 1976) who asserted the influence of technology in re-shaping household activities through social changes of the 20th century.

In contrast however, building attributes indicated inadequate habitable spaces for family members. Households are thereby motivated by the inadequacy of rooms to reciprocate with conversions and creating new habitable spaces in meeting with the new demand. The study also found emulation of peers and colleagues to be strongly associated with the impetus to adjust housing to a desired quality of urban living standard. This implies benefiting from other peoples' practices, which they have tested and found to be valuable. Additionally, cumulative previous urban living experiences on the quality of urban standards may have significant impact on homeowners' decision. The result also indicates that long link with the urban environment gradually changes the needs and desires of public housing residents. Consequently, the need arises for a re-think in the physical form of public housing units in Nigeria.

6. Conclusion

Motivated by the need for a paradigm in Public housing design in Nigeria, this study sought to find out design implications in public housing transformation by examining the impact of socio-physical environment on public housing adjustment in Nigeria. The outcome shows that homeowners housing adjustment decisions are significantly impacted by socio-physical environmental factors. Technology has overriding significance to influence, while available un-built spaces enabled the creation of additional habitable spaces to meet changing spatial

needs. However, disparity in plot size determined the extent and scale of additional spaces introduced. Yet, little is observed of the potentials in this trend and utilising transformation benefits for subsequent public housing initiatives.

Also, since little exist on conclusive practical path of operating the benefits of empirical studies on housing transformation of public housing design. This study proposes the considerations of design inferences to be adopted in public housing design. First, as established, developers have to consider prevailing average household occupancy rate in initial design with priority given to size and number of habitable spaces. Second, evolving household appliances and equipment should be considered in determining spatial provision of activity spaces, with flexibility of use rather customize space utilization.

Finally, while this study focuses on examining the latent variables measuring them from the theoretical and statistical frameworks, there is need for detail practical study of the elements that comprise these attributes to ascertain the relative dimension of the components in the factors and by extension socio-physical environment that motivate homeowners which should be considered in the initial design. Further test of the research measurement model with different samples will validate the findings for optimal generalization.

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References

Ademiluyi, I. (2010). Public housing delivery strategies in Nigeria: A historical perspective of policies and programmes. *Journal of Sustainable Development in Africa, 12*(6), 153-161

Alabi, M. O. (2010). Prioritizing factors of failure in controlling physical development in Nigerian cities. *Journal of Sustainable Development in Africa, 12*(2), 215-231.

Arimah, B. C. (1992). An empirical analysis of the demand for housing attributes in a third world city. *Land Economics, 68*(4). http://dx.doi.org/10.2307/3146694

Arimah, B. C. (1997). The determinants of housing tenure choice in Ibadan, Nigeria. *Urban Studies, 34*(1), 105-124. http://dx.doi.org/10.1080/0042098976294

Bafna, S. (2012). The imaginative function of architecture: A clarification of some conceptual issues. *Proceedings of the 2012 Proceedings of the Eighth International Space Syntax Symposium*, Santiago de Chile: PUC, 8117.8111-8117.8119.

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the academy of marketing science, 16*(1), 74-94. http://dx.doi.org/10.1007/BF02723327

Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods & Research, 21*(2), 230-258. http://dx.doi.org/10.1177/0049124192021002005

Chau, P. Y., & Hu, P. J. H. (2001). Information technology acceptance by individual

professionals: A model comparison approach. *Decision Sciences, 32*(4), 699-719. http://dx.doi.org/10.1111/j.1540-5915.2001.tb00978.x

Chokor, B. A. (2005). Changing urban housing form and organization in Nigeria: lessons for community planning. *Planning Perspectives, 20*(1), 69-96. http://dx.doi.org/10.1080/02665430420003005 46

Clark, W. A., & Ledwith, V. (2005). Mobility, housing stress and neighbourhood contexts: Evidence from Los Angeles.

Cowan, R. S. (1976). The' industrial revolution 'in the home: Household technology and social change in the 20th century. *Technology and Culture, 17*(1), 1-23. http://dx.doi.org/10.2307/3103251

Daramola, S. (2006). Affordable and functional housing in a developing economy: A case study of Nigeria. *Journal of Land Use and Development Studies, 15*(2), 23-28.

Ellen, I. G., & Turner, M. A. (1997). Does neighbourhood matter? Assessing recent evidence. *Housing Policy Debate, 8*(4), 833-866. http://dx.doi.org/10.1080/10511482.1997.9521280

Habraken, N. J. (1998). Type of Social Agreement. *Proceedings of the 1998 Asian Congress of Architects Seoul.* 1988. Collection of ACA–3, Conference Proceedings, Seoul, 1-18.

Hair Jr, J. F., Anderson, R. E., Tatham, R. L., & William, C. (1995). Black (1995), *Multivariate data analysis with readings*. Prentice Hall. New Jersey, USA. pp. 14, 130-133.

Hair Jr, J. F., William, B. C., Barry, B. J., & Rolph, A. E. (2010). *Multivariate Data Analysis.* Uppersaddle River, New Jersey: Pearson Education International

Harvey, D. C. (2010). The space for culture and cognition. *Poetics, 38*(2), 185-204. http://dx.doi.org/10.1016/j.poetic.2009.11.009

Hillier, B. (2008). Space and spatiality: what the built environment needs from social theory. *Building Research & Information, 36*(3), 216-230.

Hillier, B., Hanson, J., & Peponis, J. (1984). What do we mean by building function? http://dx.doi.org/10.1080/096132108019280 73

Holmes-Smith, P., Coote, L., & Cunnigham, E. (2006). *Structural Equation Modelling: From the Fundamental to Advance Topics.* Melbourne: Streams.

Ikejiofor, U. (1999). The God that Failed: A Critique of Public Housing in Nigeria, 1975–1995. *Habitat International, 23*(2), 177-188. http://dx.doi.org/10.1016/S0197-3975(98)00042-3

Kaya, S. (2004). Relating building attributes to end user's needs: "the owners-designers-end users" equation. *Facilities, 22*(9/10), 247-252. http://dx.doi.org/10.1108/02632770410555968

Khan, T. H. (2014a). *Houses in Transformation Search for the Implicit Reasons, 1.* Cham Heidelberg New York Dordrecht London: Springer.

Khan, T. H. (2014b). *Living with transformation: Self-built housing in the city of Dhaka*, 1, Cham Heidelberg New York Dordrecht London: Springer

Makachia, P. A. (2011). Evolution of urban housing strategies and dweller-initiated transformations in Nairobi. City, *Culture and Society, 2*(4), 219-234. http://dx.doi.org/10.1016/j.ccs.2011.11.001

Rent, G. S., & Rent, C. S. (1978). Low-income housing factors related to residential satisfaction. *Environment and Behaviour, 10*(4), 459-488. http://dx.doi.org/10.1177/001391657801000401

Rikko, L., & Gwatau, D. (2011). The Nigerian architecture: The trend in housing development. *Journal of Geography and Regional Planning, 4*(5), 273-278.

Rosow, I. (1961). The social effects of the physical environment. *Journal of the American Institute of Planners, 27*(2), 127-133. http://dx.doi.org/10.1080/01944366108978442

Seek, N. (1983). Adjusting housing consumption: improve or move. *Urban Studies, 20*(4), 455-469. http://dx.doi.org/10.1080/00420988320080811

Steiger, J. H., & Lind, J. C. (1980). Statistically based tests for the number of common factors. *Proceedings of the 1980 annual meeting of the Psychometric Society*, Iowa City, IA,

Tipple, A. G. (1996). Housing extensions as sustainable development. *Habitat International, 20*(3), 367-376. http://dx.doi.org/10.1016/0197-3975(96)00014-8

Tipple, G. (2000). *Extending Themselves: User Initiated Transformations of Government-built Housing in Developing Countries*. Liverpool University Press. http://dx.doi.org/10.5949/UPO9781846313097

Türkoğlu, H. D. (1997). Residents' satisfaction of housing environments: the case of Istanbul, Turkey. *Landscape and Urban Planning, 39*(1), 55-67. http://dx.doi.org/10.1016/S0169-2046(97)00040-6

Ukoha, O. M., & Beamish, J. O. (1997). Assessment of residents' satisfaction with public housing in Abuja, Nigeria. *Habitat International, 21*(4), 445-460. http://dx.doi.org/10.1016/S0197-3975(97)00017-9

Vischer, J. C. (2008). Towards a user-centred theory of the built environment. *Building Research & Information, 36*(3), 231-240. http://dx.doi.org/10.1080/09613210801936472

Wong, J. F. (2010). Factors affecting open building implementation in high density mass housing design in Hong Kong. *Habitat International, 34*(2), 174-182. http://dx.doi.org/10.1016/j.habitatint.2009.09.001

Zinas, B. Z., & Jusan, M. B. M. (2012). Housing Choice and Preference: Theory and Measurement. *Procedia - Social and Behavioural Sciences, 49*(1), 282-292. http://dx.doi.org/10.1016/j.sbspro.2012.07.026

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