

**Flexibility of Dwelling Units in Multifamily Housing-
The case of NHC Ubungu and Garden Flats in Dar es Salaam**

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ABSTRACT

Flexibility in dwelling units allows for easy and economical physical change and adaptation of spaces for the changing circumstances and needs of the dwellers over the life of the dwelling. However, the knowledge on how dwelling units in multi-family housing respond physically and programmatically to the changing spatial needs of dwellers is still limited.

This paper examines the potential and capacity for the dwelling units in multifamily housing in Tanzania to respond to various spatial needs of dwellers over time. Various spatial needs of people and aspects of flexibility as applied to housing were analysed; with particular reference to Ubungu and Garden Flats developed by the National Housing Corporation (NHC) in Dar es Salaam. The study employed an empirical investigation in which information on changing spatial needs of dwellers and how various aspects of flexibility apply in multifamily housing was sought in the two housing schemes. Data collection methods included literature review, observation, Focus Group Discussion and in-depth interviews.

It was established that the design of housing schemes in Tanzania does not take into account flexibility as the overall idea of accommodating the dynamic spatial changes of dwellers. The paper, therefore, recommends design approaches that can be used to achieve flexibility at minimum inconvenience and budget in this type of dwelling units.

Keywords: Flexibility, dwelling, spatial changes,

1.0 INTRODUCTION

Flexibility of dwelling units is by no means a novel concept, as it emerged during the development of mass housing in Europe following the World War I in 1920s. Housing crisis after the first World War led to production of mass housing to as much of the population as was possible; but adopting limited space standards of housing that could serve in an adequate and efficient way (Schneider and Till, 2007). Thus, the concept of flexibility mirrored even in the housing crisis situation since the limited space available had to be utilized in a flexible manner as possible.

In Tanzania, there has been a rapid process of population growth and urbanization for several years as has been the case in the rest of the world. The city of Dar es Salaam, which is a commercial capital, has experienced continuous population growth recording 5.6 percent average annual population growth rate between 2002-2012 to

become the most densely populated region in Eastern Africa with nearly 4.4 million people (URT, 2013). As a result, a housing shortage problem emerged attracting attention of the government. Several government schemes geared towards rapid affordable housing production involving various real estate agencies such as the National Housing Corporation, Pension and Insurance Funds as well the Private Sector have been implemented over the last 50 years. In turn, these housing development schemes do not seem to have reflected the fact that different tenants have different choice and lifestyle, and their needs within dwellings after some years will constitute new conditions for their well-being.

There are certain factors of people in dwellings that are inevitable and often dynamic, changing with time. These include demographic change (in number, sex and age of family members) and change in lifestyle of tenants. It is these factors that prompt occupants to make some alterations in their

existing dwellings, which often happen haphazardly and may inconvenience others, indicating that they were not thought about during the design process. Hence occupants have no choice apart from adapting to the unsatisfactory physical conditions in a way of responding to the dynamism of the family. From literature, it has not been established and documented adequately on how dwelling units in multifamily housing in Tanzania respond physically and programmatically to these changing factors among dwellers. It is against this background therefore that this paper seeks to reveal the potential and capacity of the multifamily dwelling units in Tanzania to respond to these changing factors of dwellers over time. Various spatial needs of people that occur over time in their dwellings as well as aspects of flexibility as applied to the dwellings in multi-family housing were studied and examined.

2.0 The concept of flexibility in housing

In terms of architecture, “flexibility” has been defined and explained in different ways. It refers to the idea of accommodating change over time. In relation to housing, flexible housing corresponds to:

“...housing that can adapt to the changing needs of users...” (Till & Schneider, 2005: 287).

Flexibility as accommodating change in housing, addresses a number of issues related to the current and future needs of the users. Firstly, it offers variety in the architectural layout of the units. Secondly, it includes adjustability and adaptability of housing units over time. And finally, it allows buildings to accommodate new functions (Ibid).

Galfetti (2003) names two kinds of flexibility: “initial flexibility” and “permanent flexibility,” the former meaning the in-built opportunity for choice by offering typological variety for diverse users prior to occupation, and the later as the capability of fulfilling the changing wishes and demands of users over time. The possible future changes in needs and demands can be estimated from variations in demographic composition in families against the fixed design parameters; and practical changes

referring to ageing and being less physically able (Maccreanor, 1998 in Albostan, 2009: pg. 10).

Till and Schneider (2005) add on the likely future changes as the potential to incorporate new technologies over time possible functional transformations of the unit or building from residential to something else.

Change in demographic composition of families raises concerns and the need for flexible housing as opposed to rigid or static housing with fixed design parameters (Albostan, 2009; Scheider & Till, 2005).

Flexibility in housing is also explained as one of the features of “*Lifetime Homes*” that came about in Britain on a concern about the quality of British housing and in particular how inaccessible and inconvenient many houses were for large segments of the population¹. Lifetime homes have certain design features that ensure a new house or flat will meet the needs of most households, where the accent is on accessibility and design features that make the home flexible enough to meet whatever comes along in life - from demographic change to temporary or permanent disability to old age.

Habraken (2008) argues that ‘culture’ is another agent of housing transformation in addition to demographics and economy. By culture here it means expressing ones values in the environment; that is the act of personalization.

‘Flexibility’, on the other hand, is defined as suitability for ‘different physical arrangements’ (Groák, 1992 in Albostan, 2009: 10), which can be applicable for not only the interior environments but also for the exterior adjustments.

Consistent with Groák, Schneider & Till observe that;

“...Flexibility is achieved by altering the physical fabric of building: by joining together rooms or units, by extending them, or through

¹ www.lifetimehomes.org.uk, visited on 14/12/2014

sliding or folding walls and furniture..."
(Schneider & Till, 2007: 5).

Another viewpoint of flexibility in housing considers flexible housing as "houses that are capable of proposing different solutions for diverse uses with no certain 'single solution' but most appropriate solution" Hertzberger, 1991 in Albostan, 2009:14). Hertzberger introduces the term 'polyvalent organization' whereby the dimensions of rooms are appropriate for different functions, and they are considered as multifunctional (Albostan, 2009). Therefore a dwelling that can be occupied, without modification, by different family structures such as a family with two children or three or four singles can be described as highly *polyvalent* (ibid.).

Accordingly, it can be seen that flexibility is a response to factors that range from changing circumstances such as demographic composition, practical changes required by an occupant's loss of abilities to do certain things mostly because of aging or physical disability, and personalization of one's physical environment. These factors, in relation to flexibility are further discussed under three possible scenarios: (i) Demographic Changes (ii) Practical Changes and (iii) Personalization.

2.1 Flexibility due to Demographic Changes

Change in demographic composition makes higher demands such as the need for more square meters of living space than before. This leads to adaptations like changing in size and position of spaces, division of spaces, using spaces multi-functionally and addition to the unit either vertically or horizontally. These adaptations, in turn, are influenced by various factors namely the number of available façade planes of housing unit, the geometry of its plan and its building structure (Moharram, 1980).

2.1 Flexibility due to Practical Changes

Practical changes refer to an occupant's loss of abilities mostly because of aging or physical disability. These changes call for addition or

installation of special permanent features that would enhance comfort in space (Canada Mortgage and Housing Corporation, 2010.)

The extent to which practical changes can be made to a housing unit may indicate the level of flexibility that the unit offers.

2.3 Flexibility due to Personalization

Another important factor that calls for flexibility of a housing unit is the need for personalization. In personalizing a place, users are both confirming their tastes and values to themselves, and communicating them to others (Bently, *et al.* 1985). Dwellers can practice personalization in various building elements such as internal and external wall surfaces; as well as at physical gaps in boundaries such thresholds, porches and windows (ibid).

Flexibility of these building elements to allow for such personalisation is enhanced if their design aspects like materials and size are thought about during design.

From the foregoing, it can be seen that flexibility in housing can be interpreted in many ways. Flexibility does not only reflect the future scenarios for adaptability after occupying a dwelling, but also opportunity for choice by diverse users through provision of typological variety of dwelling units prior to occupation (preliminary flexibility). In terms of accommodating whatever comes in life, flexibility does not only mean spatial adaptability or change in response to that, but it also implies design of permanent spatial features that will accommodate those needs.

In view of the discussed concepts of flexibility in housing, this study sought to investigate (i) how spaces are adaptable or reconfigurable – multifunctional and divisible/joinable, the possibility of addition to a unit either upwards or outwards, (ii) the extent to which a unit can be personalised/customized according to desires and tastes, and (iii) how a unit meets the needs of people of different ages and physical abilities over time.

3.0 Methodology

The research was conducted in Dar es Salaam, the largest city in Tanzania, which faces housing crisis due to rapid population growth. Case study research strategy was used for empirical investigation in the two selected National Housing Corporation schemes, taking into account that the Corporation is the main public real estate agency in Tanzania. Ubungo and Garden Flats housing schemes were selected due to the fact that they are among the oldest in Dar es Salaam. Through the case studies, it was possible to understand the general changing needs of dwellers in time and analyse the various approaches they use to accommodate their needs and the level of their achievements. The current blocks of flats at the Ubungo scheme were also studied to glean the extent designers considered the concept of flexibility in the design process.

Multiple data collection tools were employed including archival/documentary analysis, observation, in-depth interviews, Focus Group Discussions and literature review through which various themes were generated which assisted the empirical investigation. Data collected was analysed and presented in photographic impressions and corresponding texts.

4.0 Findings

Spatial needs of Dwellers over time

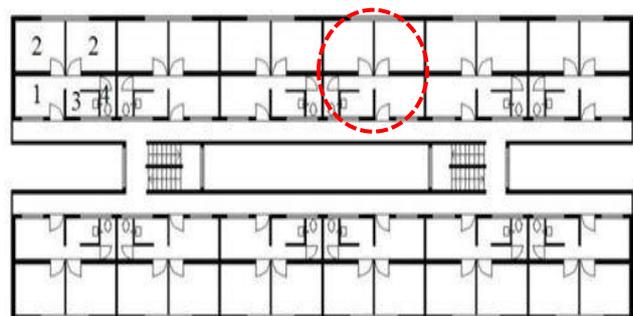
In the studied schemes, the most common reason for changing spatial needs over time in a dwelling was demographic change. This happened as a result of increase in number of children and in response to the needs of extended families, which makes spaces insufficient in terms of size and number. Other common needs included customization of one's dwelling to exercise choice and desire, and the practical changes as a result of situations like the onset of losing one's ability to do certain things due to ageing or physical disability. There were also cases like needing to work near home, whereby dwellers practice retail activities and sewing clothes.

Aspects of flexibility

Multi-use of spaces: At unit level, there were rooms that were functionally reallocated but which tended to be inappropriate for the new use, since they lacked privacy. For example 16 of the interviewed families had changed the living room into a bedroom and vice versa, as the initial living room (Figure 1 and Figure 2) was too small to accommodate all the necessary furniture for all family members. One dweller argues:

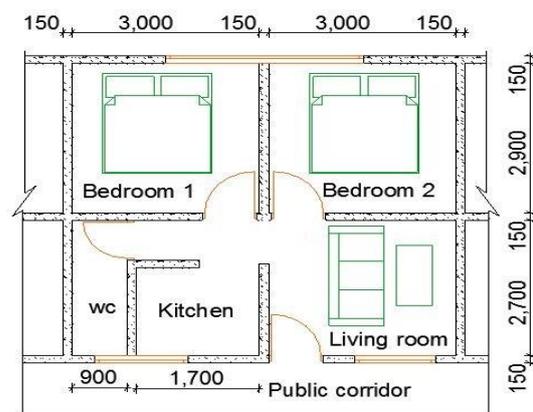
"...The newly created bedroom (Figure 3) lacks privacy contrary to when it was a living room because its window faces the common passing corridor. People tend to peep through and hence privacy is interrupted..." (Interview with a tenant at Ubungo flats, on 05/12/14)

Figure 1: Initial spatial layout of the block at Ubungo. The units are arranged along the common corridors. See Figure 2 for the detail of the circled unit



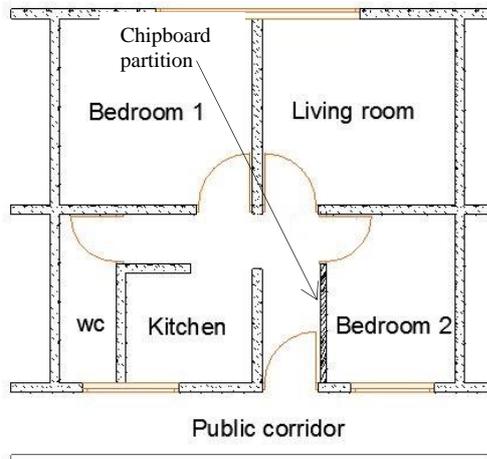
Source: Mbisso (2005)

Figure 2: The detailed unit at Ubungo NHC blocks



Source: Fieldwork, 2014

Figure 3: Space relocation where uses for a living room and bedroom 2 are interchanged



Source: Fieldwork, 2014

The same was seen in the use of space outside ones' dwelling for cooking and washing mainly because the indoor space was no longer enough due to family expansion. A resident at Block D of Ubungo flats affirms:

"...My family expanded and spaces within my unit could not be enough anymore. I wish I could use this space outside my domain for activities such as laundry as the bathroom is too small and it is combined with a toilet. I even desire cooking or resting in this space, but the space is a communal passageway hence constraints these functions in terms of size and privacy. (Interview conducted at block D on 05/12/14)

But all these functions take place with difficulties, due to the fact that the space is a public corridor and not wide enough to accommodate all functions at a time except for units located at the end corners as illustrated in Figure 4 whereby children are using the space for playing.

Figure 4: Children playing at the corridor in one of the corner units at Ubungo NHC



Source: Fieldwork, 2014

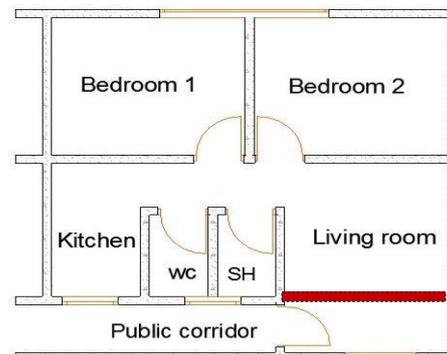
Space division:

In the studied dwellings, spaces like the living room and the bedrooms could not be divided to form other rooms when needed to because they are too small and with one window only.

Joining of spaces:

Attempts to join spaces (see, for example, spaces illustrated by Figure 5) and therefore create large rooms in the studied dwellings have not been realized since possible partitions of spaces are load bearing. As a result, dwellers tend to demolish them to join or extend their interior spaces (Figure 6), resulting into structural damage of the building.

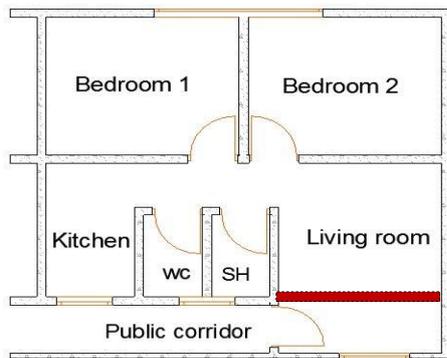
Figure 5: Layout of a flat at Ubungo NHC flats, Block D



Source: Fieldwork, 2014

Figure 6 below is a sketch showing remodeling of a flat at Ubungo NHC Block D. A wall initially separating the living room and the public corridor was demolished and the corridor balustrade wall vertically extended to act as the outer wall of the living room

Figure 6: Re-modelling of NHC Ubungo Block D



Source: Fieldwork, 2014

Extensions of units:

Most of the families extend their units horizontally to cater for family growth. But the problem with the extensions is that they tend to block some sewage systems, and result also to congestion and overcrowding in the housing area, covering the areas for parking and open spaces, meaning that the extended area was not intended to be built in future. The Estate Manager at the National Housing Corporation in Garden Flats laments:

“...we usually get difficulties in tracing pipes for maintenance as they become covered by extensions. Extensions also disturb the structure and general outlook of the blocks. The scheme also becomes congested and overcrowded after the extensions...”(Interview conducted on 31/12/2014)

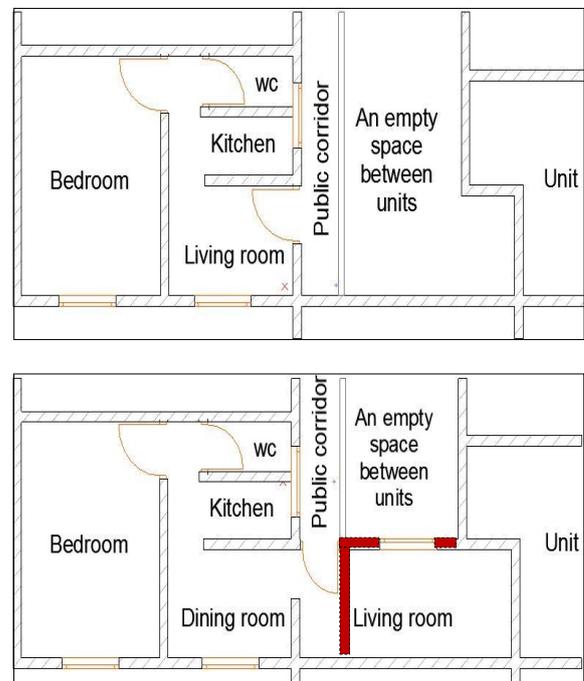
Another problem with the extensions is that, the new-formed spaces are in some point inappropriate for use as habitable areas. A husband and a wife who are also tenants at the Garden Flats confirm:

“...We had a one bedroom apartment at first, but after we got kids of different sex we had to think of an alternative for additional room. We

had to extend our unit to form another living room, which was also used, as a bedroom at night (Figure 7). But the main challenge we get is that the new living room lacks enough light and ventilation since it is blocked by other units in all of its three parts...” (Interview conducted on 14/12/14)

Figure 7 shows the initial layout of the unit (top sketch) and the remodelling done at the bottom sketch where the unit is extended to form another room

Figure 7: Pre-and Post Remodelling of Units



Source: Fieldwork, 2014

Personalisation

In most of the dwellings, for example, dwellers had changed the color scheme of the interior walls to their own desires. But the main challenge they face on changing the color scheme was mismatch with the original paint as summed up by one of the respondents:

“...I did not like the blue colour which I found in this dwelling, I always prefer cream. But it was very expensive to change it since it was dark,

unlike if it were lighter. These people should consider this aspect when designing for the mass since our preferences differ..." (Interview with a dweller in his flat at Ubungo, on 20/12/2014)

Dwellers also portray their economic status and personality by applying materials that are considered of higher standards such as aluminum frames and glazing to their windows. This disrupts the visual balance of the blocks as people keep different windows of different materials on the same façade, which results to chaotic appearance of the blocks (Figure 8).

Figure 8: Housing blocks in Garden Flats with variety of windows on the facades



Source: Fieldwork, 2014

Others communicate their tastes and culture by ornamenting the floor outside at or near their entrance doors and by displaying flowers and plants through hanging them on ceilings or placing them along the corridors or on top of the short walls that enclose the corridors and stairs. As a result these walls tend to rot due to water that sweeps from the plant pots. Figure 9 shows display of flowerpots on a balcony and the resulting discoloration of the adjacent walls due to water seepage from the pots.

Figure 9: Flower Pots on Public Balconies
Note the watermarks on the wall in the first photo



Source: Fieldwork, 2014

Ageing and Physical Disability Needs

As it has been discussed previously, a flexible housing will have permanent spatial features and will be able to be adapted to fit people with agility and mobility disability. As observed in both schemes, features such as ramps, elevators and wide circulation galleries were not considered in design for these circumstances, even the potential for installation of an elevator. Dwellers who encounter these situations use impoverished means for circulating vertically like being carried on chairs. It is also a challenge circulating in the public corridors and within the units as they are often congested as illustrated in Figure 10.

Figure 10: Congestion at the public corridor at Ubungo NHC flats



Source: Fieldwork, 2014

It was however observed that walls as built in the case study areas could easily accommodate grab bars since they are of concrete material.

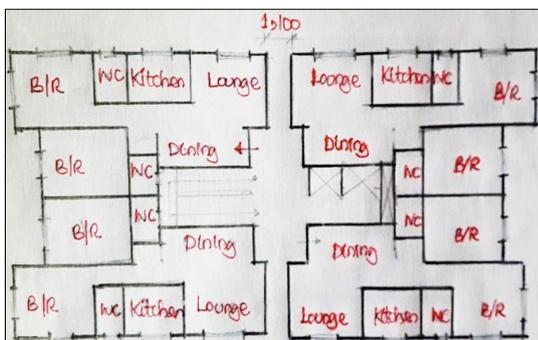
Designers Perception of Flexibility Concepts in the Case Study Areas

In a discussion with NHC designers on concept of flexibility in the multi-family housing estates in the two case studies, it was clear that the designers did not perceive the problems as resulting from lack of flexible design. They concede the cause of the problems like congestion and overcrowding, destruction of blocks structurally and other inconveniences to be from the user and not the design. One of the architects elaborated this in the following words:

“...we normally consider needs that any user will prefer, like electricity and water (amenities); I think when one’s family has expanded it is better to move to another place than to overcrowd in the same area...”(a discussion held on 20/12/2014)

Within the case study, there are new blocks of flats that were built recently. When examined for flexibility, it was observed that within a unit, space like the living room and one of the bedrooms have external window on one side of the façade only, and the windows in the other bedroom are not strategically positioned. Moreover, the same spaces appear insufficient in terms of size. All these factors limit the possibility of room division, and multipurpose use of spaces.

Figure 11: Unit Floor Plan- the new Ubungu flats



Source: Fieldwork, 2014

Looking at Figure 11, space like the dining area cannot be adapted for other function like a bedroom, in case of a future need for it does not have a window, hence cannot function as a habitable room. Some features for the old and disabled have been considered as there is a space left for future installation of a lift when needed.

5.0 DISCUSSION

According to Moharram (1980), it was discussed that adaptations like changing in size and position of spaces, division and multiuse of spaces are influenced by various factors like the number of available façade planes of housing unit, the geometry of its plan and its building structure. As for the studied dwellings in this research, it was seen that apart from geometry of the space, there are other factors like privacy that could influence its multi-functionality. The same applies to the division of spaces whereby factors such as the size of the space and the openings’ number are also the determinants.

Regarding the issue of property extension, it was seen that successful horizontal extension is a function of not only availability of space, but also other factors such as the layout and position of services and the organisation of other units in that particular block.

6. CONCLUSION

On the basis of discussion above, it can be concluded that the design of housing in Tanzania does not take into account the concept of flexibility as the overall idea of meeting different lifestyles of dwellers and whatever comes along in life - from personalization to demographic change to temporary or permanent disability to old age. Dwellers have been transforming their spaces in various ways to meet various needs but most of the attempts prove failure of the design to allow for change with convenience.

Also, as per observations, the need for physical alterations becomes critical in one and two

bedrooms units size. The three bedroom unit size, which according to other context is always expected to allow for division to form two units; this does not seem to be practical in the Tanzanian context. People always receive relatives in their homes and they live in extended families, hence they tend to remain with the same unit size.

Also it has been seen that, it is a challenge to achieve flexibility in multi-family housing regarding aspects like multi-use of space, space division/joining and extensions, unlike in single-family housing due to the fact that most of the times, in the design of multi-family housing, privacy is compromised. Most of the designs consist of several units along a public corridor; a factor that hinders some flexibility aspects due to lack of privacy.

Looking also at the current designs of the National Housing Corporation, still there is insufficient knowledge among designers concerning the concept of flexibility in housing. Thus, flexibility of multi-family dwelling units can be attained through combination of numerous factors as already discussed.

Aspects that bring about change outside a block/building like extension of units, changing colour of external walls of individual units, and changing the window types is also a challenge in multi-family housing different from the single-family because people have different taste and values. So, if applied to the external environment, it may result to disruption in the general appearance of the block, as they will be applied differently.

Accordingly, the initial design would leave room for space customization and various adaptations and in the building elements as whole. For example, allowance for diverse spatial restructuring can be easy when the space outside one's unit (porch) is separate from the public circulation; the windows of habitable rooms are not facing the public circulation; the size of rooms is ample and the structural system is not rigid.

REFERENCES

- Albostan, D. (2009), "Flexibility" in multi residential housing projects: three innovative cases from Turkey". A Master Thesis in Architecture, the Graduate School of Natural and Applied Sciences of Middle East Technical University.
- Bentley, I., Alcock, A., Murrain, P., McGlynn, S. & Smith, G. (1985), *Responsive Environment: A Manual for Designers*, London: The Architectural Press Ltd.
- Canada Mortgage and Housing Corporation, (2010). *About Your House: Accessible Housing by Design—House Designs and Floor Plans*.
- Galfetti, G. G. (2003). Introduction Pisos Piloto. In B. Leupen, & J. Leupen, *Dwelling: Architecture and Modernity* (pp. 87-102). Delft: Tu Delft, Faculteit Bouwkunde.
- Habraken, N. J. (2008). Design for Flexibility, *Building Research & Information*. 36:3, 290 - 296.
- Mbisso, D. (2005), "Modern architecture and present-day urban realities in Dar es salaam, Tanzania": A Study of Ubungo and Ilala National Housing Corporation Schemes. Master thesis in human settlements, Post Graduate Centre Human Settlement, Katholieke Universiteit, Leuven
- Moharram, L. (1980), "A method for evaluating the flexibility of floor plans in multi-story housing", University of Pennsylvania.
- Rabeneck, A., Sheppard, D., & Town, P. (1974). Housing: Flexibility/Adaptability? *Architectural Design*, 44, 76-90.
- Schneider, T., & Till, J. (2007). *Flexible Housing* Architectural Press
- Schneider, T., & Till, J. (2005). Flexible Housing: Opportunities and Limits. *Architectural Research Quarterly*, 9(2), 157-166
- Till, J., & Schneider, T. (2005). Flexible Housing: The Means to the end. *Architectural Research Quarterly*, 9 (3/4), 287-296.
- United Republic of Tanzania. (2013). *2012 Population and Housing Census*. Dar es Salaam: National Bureau of Statistics.