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FLEXIBLE HOUSING; A SOLUTION TO HOUSING PROBLEMS IN NIGERIA

ABSTRACT

A building must change and adapt, this is none negotiable. The trend has been that the residents of houses are deprived the right to modify their living environment. Housing in Nigeria has long been targeted at creating static entities that doesn't allow for change. Beyond their design phase, buildings do not change except there is a need to resolve construction problems. The housing schemes thus far have concentrated on producing prototypes all around the country that completely suppresses individuality. In fact when there is a change in need of the occupants, the most common solution has been to move them to other housing units. The existing housing designs in Nigeria cannot adapt to societal changes and this causes management problems. Also, the end users of the buildings are not involved in the early design stage. Their preferences, their culture and their way of life aren't considered at all. The end users are unknown during the process of decisions which leads to the production of dwellings. They are represented in an abstract way when design discussions go on. We stand to reason therefore that nothing reaches the designers from the end users in terms of information needed for effective designing. Since the land is so valuable in Nigeria, the architects pay most of his attention on the dimension of the units. They don't give much attention to the relationship between human beings and his spatial environment. The room is merely a box for the occupant to fend for himself as good as he can. The substandard spatial quality not only causes physical discomfort, but also leads to psychological stress and family conflict. Therefore, the situation in which users have to adapt to their apartment has to change to the situation where an apartment has to adapt to the constantly changing needs of the users. The favoured solution is to allow conversion within the existing flat rather than a move to another apartment. Flexibility in both planning strategy and housing design is essential to adapt different needs and unpredictable future trends. The public housing design should become a more democratic process and architects should treat people being housed as clients and let them voice their opinions and become involved in the process of planning and design.. The economic condition of Nigeria is not in a desirable state. As its population increases its GDP reduces. Therefore, it should be that the nation would endeavor to cut cost at all cost. The cost of building new buildings in the future to meet with the future needs would be avoided if flexibility is at the back of the mind of the designers. Also, if the building envelope is to be tampered with at all, the cost will not have much negative effect on the nation's economy. Also, the more money is saved, the more capital there is to provide more flexible houses so that housing can be available for all. Therefore this study explores the role of flexibility in housing, explaining the 'how' and the 'why' of flexible housing. It also discusses how flexibility grants

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the opportunity to the architect to produce creative options that will respond to changing demands of the users during occupancy both for the present and for the future.

***KEYWORDS**: Flexible Housing, Solution, Housing, Problems.*

INTRODUCTION

Housing is the residential environment, neighborhood, micro-district or the physical structure that mankind uses for shelter and the environs of that structure, including all necessary services, facilities, equipment and devices needed for the physical health and social well-being of the family and the individual (UN-HABITAT,2006). The desire for adequate and affordable housing emanates from the need for security, safety and proper socio-economic status of individuals and communities. Housing portrays the character and personality of its occupants and as such, it should be aimed at meeting the individual needs of the people. The Nigerian government, both present and past have tried to provide houses to meet with the continuous population growth of the country but this has been highly ineffective. Housing problem in Nigeria is on the increase despite different programs and strategies implemented by both the public and private sector. Even though the housing problem is multi-faceted, the fact can't be denied that the concept of flexibility in the production of housing in Nigeria has been highly ignored. Houses have been built to be a static figure that doesn't allow for change. The same housing patterns have been used as a mass housing strategy to solve the housing problem in Nigeria.

However, the users of these buildings are never constant forever. Even the individual needs of the occupants change with time because of some unavoidable factors, therefore, the production of houses has to follow suit. With global communities and worldwide infrastructure, this present era is that of impermanence and transition. Considerations should be given to human psychology when providing houses for human beings. It is only natural for a person to change his/her mind or have a different taste with time. Man and his dwellings are capable of transformation. The trend however has been that when building houses, there is little consideration of the potential future uses beyond that present construction project. Thus, when a need for change arises, it is either the amendment required is done with great cost and time or a new structure is erected.

The demographic changes experienced in Nigeria also have some consequences. As the population keeps increasing, there isn't enough housing provision for all or for at least the working class correspondent with the population increase. The government intervention has been to produce mass housing in different regions of Nigeria without considering the users' preferences. The increase in population contributes to the diversity of household needs and expectations of housing. A large percentage of the mass housing schemes are generic within the estates and differences only show in terms of aesthetics value when compared with other estates. Nigeria is made up of people of different cultures and beliefs. Therefore the way of life, cultural preferences, privacy needs are all different. It is therefore logical to conclude

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that if some of these factors are to be addressed by the architect then the houses in mass housing schemes in Nigeria should not be the same. The problem of providing generic houses has contributed to the rate of housing modification witnessed in the Nigerian housing scheme. Despite these modifications architects working on mass housing schemes have continued the same trend.

The majority of buildings are designed and constructed to suit a particular purpose at certain time, with relatively little thought for their future use or adaptation. "Time" as a design consideration suggests buildings are dynamic systems that require a capacity to accommodate change spatially and functionally through life (Till 2009, Venturi and Brown 2004, Douglas 2006). It is only rational therefore to introduce a housing scheme that will cater for the provision of housing that suits the needs of the users both for the present and for the future. Thus, flexible housing is that "which can adapt to the changing needs of users" (Till & Schneider, 2005). The aim of this paper therefore is to discuss the ways in which this design concept can be adapted to the housing situation in Nigeria.

This research seeks to assessed Flexible Housing; a Solution to Housing Problems in Nigeria

The specific objectives are to:

i. assess the nature of the Nigerian housing problem.
ii. examine the merits and pitfalls of the present Nigerian mass housing scheme.
iii. highlight the possible solution to present housing problem in Nigeria

These issues engender three important Research Questions (RQ):

RQ1- What is the nature of the Nigerian housing problem.?

RQ2- What is the merits and pitfalls of the present Nigerian mass housing scheme?

RQ3- What are the possible solution to present housing problem in Nigeria?

These relationships were based on the statistical test of this null hypotheses (H0) as follows:

H01 - There is no significant housing problem in Nigeria.

. H02 - There is no significant merits and pitfalls of the present Nigerian mass housing scheme

H03 – Flexible housing is not the solution to the present housing problem in Nigeria

LITERATURE REVIEW

Housing can't be easily defined; there is more to it than the physical structure. Although the two terms-housing and home- seem interchangeable, housing tends to refer to the physical aspect while home refers more to the psychological aspect (Vliet, 1998). There is no generally acceptable definition of housing; housing is a multi-faceted subject that has received much attention in the academic community, as well as in the public and private sectors. Housing is a complex and interdependent issue of physical, psychological, social, economic and political importance. Housing is not only shelter, but part of the fabric of neighborhood life and of whole social milieu; it also touches upon the many facets of industrialization, economic activities and developments (Abrams, 1964). It could also be defined as a residential environment which man uses as shelter and as the environ of the structure needed or designed for man's physical and mental health as well as his social well-being.

Generally, the tendency has been to equate the term shelter with housing. However housing is more than shelter, the mere physical dwelling. It comprises of the interior space equipment and furnishing and the immediate neighborhood or community. Although the house or physical dwelling has largely been the fulcrum of focus, housing

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is inclusive of other elements of residential environment such as neighborhood, neighbors and the large urban community. Thus it could be viewed from different perspectives such as the physical perspective referring to installations and services and the social perspective referring to the social network. In civilized societies, it is the inherent right of every family to live in a decent home and in a desirable community where all necessary infrastructures are provided. However, bulk of the residents of the developing countries live in communities termed as slums and squatter settlements; places that are not befitting for an average human being. But the reason for this seems to be that everyone wants to live in a decent environment but not everyone can afford the cost or the rent of a decent housing.

It can then be inferred that housing isn't just a commodity, but could be described as a bundle of goods and services that facilitates and enhances good living; a key to neighborhood quality. Housing is conceptualized as a multidimensional package of goods and services, extending beyond shelter itself. Consequently, environmental amenities such as waste disposal, water supply, neighborhood roads and social infrastructures (such as education, health and recreation) are all part of the package of services designed together to make up housing.

Housing can also be viewed as both a process and a product. When viewed as a product, it refers to the plan or lay-out, and the complete structure while as a process; it is more than the construction or the product itself. Here, it refers to the different elements involved in bringing the house into being which includes material procuring, financing, planning and development control and maintenance.

2.1 Flexible housing

Flexibility refers to the idea of accommodating change over time. Flexible housing refers to "a house that can adapt to the changing needs of the users" (Till and Schneider, 2005). Fixed arrangements imply boundaries and inhibit spontaneous adaptations to new forms while flexible arrangements help reduce boundaries and accommodate the changing needs of the users. Flexible housing is an architectural proposal imagined and coordinated at different scales ranging from individual rooms to the larger urban scales. The flexible housing plan is a call to think of residential buildings as assets that are readily alterable with components capable of shifting (Inani, 2010). Flexible housing can be discussed both from the users' perspectives and in terms of innovative construction and design under the following themes:

Structural system.

Service spaces

Architectural layout including different configurations of units and spatial organization

Furnishing for flexible use. (Schneider & Till, 2005a,2005b,2007)

The structural system talks about including flexibility in the structure of the building such that the structural system doesn't need to be too affected when there is a need for change. Services and their routes should also be made as flexible as possible so that they can respond to change when needed. The architectural layout simply talks about design techniques of avoiding rigidity. It simply deals with logical arrangement of spaces to accommodate future change. The last point talks about the use of furniture that can accommodate change. Most times, flexible furniture are only used to save space so that the space saved can serve other functions.

The terms flexibility and adaptability are related but they still do have a slight difference. Flexibility is related to the construction technique and the position of service spaces in housing design, whereas adaptability points to the

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architectural layout of the housing design (Rabeneck, Sheppard and Town, 1973). Flexibility is the capability of "different physical arrangements" and adaptability is the capability of adjustments and changes for "different social uses" (Groák, 1992). Flexibility is accommodating change in housing, addressing a number of issues related with 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. In order to provide flexibility, architects should consider the possible future needs of users during the design process (Schneider & Till, 2005a, 2005b, 2007). Flexibility can be defined as the capacity of buildings to accommodate physical changes due to changing circumstances. Below in table1 is a summary of the definitions of adaptability and flexibility.

Other terms related in definition to flexibility are:

Active – An active building component will give a set reaction on a specific change; the action must be undertaken by the user or environment. An example of active components is a light switch. The building component responds on an action of the environment/ users with a specific reaction. Active adaptation requires electricity.

Dynamic – Dynamic architecture has the possibility to give different output on a certain input. The action-reaction relation is not a closed relation (Stamm, 2003). More possibilities and settings are possible within one system (Rutten & Trum, 2000). These possibilities are bordered and set in advanced. The dynamic adaptation computer technology has been in use in housing since around 1980 (Giddens, 1990).

Interactive – A step is taken further with interactive architecture in which the building component has the ability to have a two way conversation with the users and/or its environment. A dialogue is set up between the user and system. An integrated system is needed for interactive relations (Stamm, 2003).

Intelligent – Intelligent architecture means the adjustment or transformation of the building component is selected by the system as a reaction on the external stimuli (Mollaert & Hebbelinck, 2000 and Block & van Mele, 2003). The building can take its own conclusions for certain situation. Reactions on re-appearing situations will not logically lead to the same change or adaptation. The system has the ability to learn from its environment or users preferences.

Smart – Smart architectural components have the ability of self-initiative. The smart system is completely integrated in the life and behavior of the users and environment. The system is self-learning and would design itself (Vincent, 2001). Smart systems are pervasive systems with knowledge of Ambient Intelligence and should lead to systems which fully collaborate but have also the possibility to take over task when other systems drop out. Ambient Intelligence should anticipate on the users desires or environment without conscious meditation (Collier et al., 2003). Ambient Intelligence should be an open tool, could be customized by the user, and could learn itself. Smart architecture will mean that ubiquitous computing will lead to digital relationships. These relationships should be parallel to human interaction, based on emotion and intuitive. To create smart adaptability new techniques need to evolve that are not yet available.

However, all of these definitions are only describing the extremes of flexibility but reference should still be made to them. They are not directly related to housing but they are the various ideas that people have used to described flexibility.

2.2 Why flexible housing?

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When building a new house many people anticipate spending a number of years, if not decades, living in their home. Others may conceive of a shorter stay. Whatever the intention, any new home is likely to have to accommodate changing needs over its lifetime. It is possible for households to become smaller or larger as time rolls by and as such, the house must be able to accommodate this change. With the increasing use of internet technology, official works, bank transactions, buying and selling etc. can be done without leaving one's house. The house is increasingly becoming a mixed-use entity such that a single space may act at different times as a home office, a family study or a bedroom. Therefore, the house should be flexible enough to accommodate these changes (Cornbill, 2008).

Household needs vary over time in relation to physical capabilities. Everyone can expect to experience temporary or permanent variations in their physical capabilities in their lifetime due to injury, illness or age (Friedman, 2002). It is more likely that every home will be required to respond to the needs of a person with a physical limitation whether they are primary residents or visitors (Cornbill, 2008). For those with limited mobility, reduced vision or other disability, the ability to perform common tasks such as carrying goods into the house, cooking a meal, using the bathroom or accessing items from high shelves may be unnecessarily limited by the physical design of that house.

Housing is volatile, subject to changes, and if it is not able to respond to these changes it becomes at best unsatisfactory, at worst obsolescent. Yet, despite the fact that buildings are inevitably dynamic, they are too often framed in a box both physically and intellectually. Therefore, buildings are to cater for the needs of the future. For example, a UK government report states that a new house built today in the UK need to last around 1,200 years and must be designed in a way to still be functional and relevant for those periods of years (Priemus, 1993). This makes us understand that housing isn't just a disposable commodity. It has a very strong impact on the economy and physical structure of a nation. Yet with all these facts, the mindset behind housing provision remains short term, with no plan for the accommodation of future needs. The reason for this isn't far-fetched. The case is such that the demand for housing is far greater than the supply required. This puts pressure on the government to build just to meet the present, pressing need of the people. This therefore gives rise to an ad-hoc approach that is void of insight about very important but salient issues like flexibility.

Lack of investment in research and development has resulted in a building industry that is unable to keep abreast of innovation in processes and technology or to cater for long term needs. As time rolls by, technologies get outdated and must be replaced. A simple example is the updating of single pane windows to double pane windows to reduce their energy loss. Quite simply, construction technologies changes to adapt to the current trend. Buildings that fail to stay up to date become less desirable. In addition to the lack of desirability, the building becomes more costly to maintain and use. Without the investment of time and money on the part of the owner, the building can quickly become dilapidated. The present trend has been that the designs made by architects are always aimed at satisfying the client that wants to build. Normally a good architect will propose a design creating efficient use of space that encourages productivity for that specific client. But only rarely in the lifespan of a building is a programmed space used exclusively by those who the building was designed for. Each user of the building interacts with it in a different way. Therefore, buildings should be designed such that they can accommodate the peculiarities of both the present and the future users.

2.2.1 Motivations of flexibility approaches

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In general, there are six motivations for flexible design in architecture. These motivations vary in different countries and they result in the different characteristics of flexible building. The first motivation is enhancing the efficiency of limited space. After the First World War, flexible housing was motivated by social and economic forces. During this period, European countries were faced with an unprecedented demand for urban housing, particularly for the working classes. The notion of flexibility was introduced to help in the efficient use of space when larger spaces were neither available nor affordable (Schneider and Till, 2007).

The second motivation is economical consideration. In certain circumstances, flexibility is the result of economical consideration. Owing to the rapid inflation and wide income differentials, ownership was beyond the reach of most people. Owners would extend their spaces when considered economically feasible. Therefore, flexibility came to play because it was thought to be economically profiting (Zhijie, 2010). The third motivation is modernity. This motivation aims to provide large spaces (for example Mies van der Rohe's Universal Space) to accommodate various modern living patterns. In the early decades of the last century, flexibility became one of the many tools in architecture's alliance with the forces of modernity (Schneider and Till, 2007). Flexibility became essential to allowing architects to reinvent traditional living patterns. The philosophy behind the notion of flexibility is that the requirements of modern life are also complex and changeable (Schneider and Till, 2007).

The fourth motivation is user participation, user choice, and interior variability. This motivation concentrates on the problems of the unified housing development process and the unified housing types. In this regard, flexibility is not merely an abstract concept but an inherent part of the social context. Housing is not merely a technical solution but a means to an end, namely, the empowerment of the user in terms of the design and inhabitation of their dwelling. Emphasis must be placed on the personalization of the home and on personal choice in the private domain (Habraken, 1961). Habraken criticized the standard mass houses that tended to treat dwellers as standard consumers, and the uniformity in the appearance of mass housing.

The fifth motivation is accommodate future uncertainty in function, such as change of family size. This motivation aims to achieve large functional capacity by providing changeability or adaptability (Zhijie, 2010). The motivation to adapt to future changes using built-in flexibility also emerged. Designs and constructions without long-term considerations were criticized. We are to "design form to be an open-ended and dynamic fabric, and designing space or form with built-in capacity to accommodate more than one program of functions over time" (Kendall and Teicher, 2000).

The sixth motivation is to adapt to the upgrading of building facilities. This motivation concentrates on the obsolescence of building equipment, components, and products, and is driven by technical influences, particularly by the adoption of industrialized solutions for housing provision (Zhijie, 2010). The use of standardized components should make room for adaptation over time, with the possibility of elements being replaced or added with minimum fuss (Schneider and Till, 2007).

The last two motivations, adapting to future functional uncertainty and adapting to the upgrading of building facilities, are directly related to sustainability and housing obsolescence. The motivation of user participation also provides opportunities to minimize building obsolescence (Zhijie, 2010).

2.3 Relevance of flexibility to housing provision

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A vigorous and buoyant housing sector is an indication of a strong programme of national investment and is indeed the foundation of and the first step to future economic growth and social development. The housing sector is therefore a major factor in the nation's gross domestic product (GDP) (Ajanlekoko, 2001). A nation that has its housing sector going well is on its way up the economic ladder. Nigeria doesn't have a strong economy yet and there are still a lot of challenges in the provision of adequate housing.

The main challenge of housing provision in Nigeria has been the lack of financial ability to meet the housing needs of the people. It is only rational therefore to seek a method of housing provision that will save cost as much as possible and still meet these needs without necessarily reducing the standard of living of the people. This is where the concept of flexibility comes in. A flexible house is designed such that a space can be used for different purposes. For example, the dining room in most houses has been more or less useless because not everyone uses the dining. Even those who do use it don't sit there for lengthy periods, they only eat there. The space can be made flexible so that it can double as part of the living room. Circulation spaces would reduce and the overall cost of production will also reduce.

When a building can't accommodate the changing needs of the users, it becomes useless. Those who have the financial ability build new ones that will meet there present needs while those who doesn't have to continually live in discomfort. When there is need for change to the building fabric, it normally involves a lot of demolition and this procures additional cost. The cost of demolition and production of new buildings would greatly reduce if the buildings are flexible. Flexibility also helps reduce the cost of maintenance (Schmidt III, R., Austin, S., & Brown, D, 2009).

In a nation with so much economic instability like Nigeria, prices of construction materials may rise at any time. Therefore, a system of construction that will be time efficient such as flexibility should be most preferable. The mass housing provision in Nigeria take so long a time to accomplish that the price of materials keeps on increasing. The capital for this project isn't even enough and yet the prices keep on increasing. This would easily be avoided if the production of flexible houses is employed.

Therefore, flexible housing saves cost and the money saved if employed could be used for the production of more housing units. This becomes a cycle and within a short number of years, the housing situation would be better. The GDP of the country will also increase thereby improving the economy of the country. The cost of production of these housing units reduces and this makes it more affordable for the low-income earners. The issue of housing quality is also dealt with because flexible housing allows the users of the building to arrange their homes according to their taste. The mass housing provision will therefore be more effective if the houses produced are flexible.

The mass houses provided in Nigeria overtime have been the same all around the country. The design used in the south is the same seen in the east. And one gets to ask the question-is the way of life of the people the same? Do they have the same preferences? Do they have the same weather conditions? People are peculiar in themselves and this should reflect in the type of houses that are provided for them. However, it is challenging to consider these factors especially because of the financial burden that comes along with it. Therefore, the obvious alternative is build universal (flexible) houses that will allow the users to customize their houses to fit their own taste.

2.4 History of flexible housing

The idea of flexible housing emerged early in the century as part of the modern movement by architects such as Le Corbusier, Mies Van Der Rohe and N.J Habraken. The idea is due to evolution of the technology in separating the

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fixed structures and flexible elements. By different strategies, such as folding furniture (Fig 2.3) and sliding partition, they allowed for the functional overlapping of spaces and freedom in room layout. The steel-skeleton construction with movable walls between load bearing columns designed by Mies Van Der Rohe for the Weissenhofsiedlung exhibition in Stuttgart was the starting point of flexible housing in Europe. It allowed users to arrange their flat after the basic envelope was completed (Chan, 2000).

During the sixties, flexibility was offered as a kind of universal solution, which most architects of that time actively promoted. It was a valid sociological response to the new spirit of freedom. In the 90's, flexibility has been proposed again as an effective instrument in solving the diverse housing demands in the fast changing society. But it was carried out in a more soft or realistic approach and shifted from the idea of structural flexibility to functional adaptability. "Form follows function" was interpreted as a form following several functions. The idea was to simplify the space so as to accommodate several functions without change of the form itself. This was represented by the evolution of the "Open Plan theories". Flexibility was thus restricted to apartment size: rooms of neutral character were assigned to different apartments and several apartments were combined. The sizes and forms were changed to a limited extent by means of movable inserts. Different types of residential buildings and different types of apartment units were put together to increase the adaptability of the building (Chan, 2000).

2.5 Different flexibility concepts

The idea of flexibility is one that architects can find troubling, as it requires them to relinquish some control of their design to the unknown. Conversely, prescriptive design is the direct opposite of flexibility, assigning specific functions to parts of a building in an attempt to fulfill a brief. It would be hard to shake off the effects of prescriptive design as its ideology is so widespread. However, there are good selections of theorists who are very openly against prescriptive design. Under this segment is an exploration of the different concepts of flexibility.

2.5.1 Hard, soft and non-flexibility concepts

Whenever 'flexible architecture' is mentioned, to most it will conjure images of moveable partitions and foldable furniture alone. However, the Rietveld's Schröder Family House gives an example of a flexible house that is different in concept when compared to the general conception about flexible architecture. This family home has been renovated and reworked through decades of varying use (Rolfe, 2012). The differences between these two instances are clear, but both represent 'flexibility' to some extent. These examples symbolize what Jeremy Till defines as hard and soft flexibility, respectively.

The distinction between these two terms is simple, but crucial. Hard flexibility describes a building with physically moving parts, designed to be changed at will by the occupant to suit their needs. Soft flexibility, on the other hand, is achieved by creating a versatile space with the ability to house many diverse activities over its lifetime. Hard flexibility is the more popular of the two – 'there is a direct, almost simplistic, conviction that flexibility in architecture is best delivered through actual physical change' – but arguably soft flexibility provides opportunity for much greater longevity (Rolfe, 2012).

Another concept is the non-flexibility concept. A non-flexible space is not necessarily one which is not adaptable at all – as history shows that almost anywhere can be adapted – but rather a space which was not intentionally designed with flexibility in mind.

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Both the hard and soft systems empower the user by allowing them to adapt – unlike most houses, which can be very difficult to alter (Till and Schneider, 2007). . However, soft flexibility is much less reliant on technology or specific design to succeed. Unlike hard flexibility, it depends upon common sense, freedom and more universal design principles like slack space and indeterminacy. While hard flexibility intends to provide more options for the user than a non-flexible house, those options are still limited to what has been designed in place. The limitations still exist; they are merely drawn from a larger pool. Soft flexibility, on the other hand, provides a conceptually indefinite pool of possibilities to choose from, as very little internal framework is used (Till and Schneider, 2007).

3.0 FINDINGS

Different studies have revealed the potential savings to government if flexible housing standards are applied to house construction (Hill, 1999). The main economic savings identified include:

- Potential savings in major adaptations costs by providing for such changes in the upfront design of the property.
- Reduced need to move into residential care
- Reduced cost of rehousing
- Reduced government administration costs
- Savings in home care costs for elderly and people with a disability
- Savings in health care costs
- Savings in reduced falls at home

These savings have to be weighed against the added cost of implementing such adaptable housing standards universally. The studies have also taken into account the fact that even if all new stock is designed to be flexible, it will take over 50 years for this new stock to filter through as the majority of dwelling stock (Hill, 1999). Given these assumptions, the studies estimates that over the next 30 years the potential savings to Government are as follows:

Most of these savings means are however not relevant to the present Nigerian housing situation because all the costs incurred by the Australian government in table 4.2 are not part of the housing costs incurred by the Nigerian government. However, the costs of rehousing and administration by the government will help reduce the housing cost incurred by the Nigerian government. This aids the financial capacity to build more buildings for general public and thereby give the housing problem in Nigeria a facelift. As the demand gradually equals the supply of houses, the houses also become more affordable to the low income earners.

4.0 CONCLUSION.

The main scope of flexibility and the related concepts of adaptability and typological variety in the housing context were presented throughout the study. The study proposed that housing should offer a typological variety before occupancy, called “initial flexibility”, and provide opportunity to users to make changes and adaptations in their houses according to their changing wishes and needs over time, called “permanent flexibility”. The study also discusses existing literature on the reason, the nature and the methodology behind flexibility as a concept. For this purpose, the study highlights the importance of working out design strategies and methods that help to achieve flexibility in housing design.

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The study was aimed at revealing some design approaches and three examples indicating the current state of flexible design were analyzed. Flexibility in the design of residential architecture is achieved with the integration of "long-term" consideration in the design of domestic units. This study, in this respect, looked into three housing projects; Eryaman 3rd stage blocks designed by Ahmet Gülgönen, another group of blocks within the same stage designed by Tuncay Çavdar and System III designed by Kaufmann and Ruf. The discussion was based on how the design and planning of both the residential blocks and the units considered flexibility under four themes: structural system, service spaces, architectural layout and furnishing for flexible use.

The study deals with the relevance of the cases studied to the housing situation in Nigeria by examining the cost analysis of these buildings and the climatic implication of the cases studied if adopted in Nigeria. It also talked about the merits and demerits of the cases studied as it relates to the housing situation in Nigeria.

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