

**AN EVALUATION OF SPACE PLANNING TOWARDS HABITABLE
HOUSE DESIGN FOR LOW-INCOME GROUP IN MUKALLA AND
SHIBAM, YEMEN**

BY

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PENILAIAN HABITABILITI RUANG REKABENTUK RUMAH KEDIAMAN BERKOS RENDAH DI MUKALLA DAN SHIBAM, YEMEN

ABSTRAK

Tujuan kajian ini adalah untuk menilai habitabiliti rekabentuk perancangan ruang rumah, berasaskan skala tahap kepuasan untuk golongan berpendapatan rendah di Mukalla dan Shibam, Yemen. Fokus Kajian ini adalah rekabentuk ruang bagi golongan berpendapatan rendah di Mukalla moden, dan menggunakan rekabentuk ruang rumah tradisional di Shibam sebagai model rujukan kajian kerana pengiktirafan oleh UNESCO disenaraikan sebagai salah satu Tapak Warisan Sedunia. Kajian bermula dengan menakrifkan definisi bagi rekabentuk rumah, dan habitabiliti. kajian mendapati terdapat lima kategori utama yang menakrifkan rekabentuk rumah dan habitabiliti iaitu perancangan fungsi ruang rumah, elemen ruang dalaman, keselesaan ruang dalaman, servis ruang rumah, dan aktiviti sosio-budaya dalam rumah. Seterusnya kajian menggunakan kaedah analisis kualitatif dan kuantitatif daripada bancian yang dibuat berasaskan lima faktor tersebut. Perbandingan dilakukan dengan menggunakan kaedah "triangulation". Kajian mendapati responden-responden daripada perumahan moden di Mukalla mempunyai tahap kepuasan yang sederhana terhadap rekabentuk rumah di tempat tersebut. Kajian ini juga mendapati rekabentuk rumah tradisional di Shibam boleh digunakan sebagai model rujukan tentang reka bentuk rumah di Negeri Hadhramot, Yemen.. Akhirnya, kajian ini mencadangkan beberapa garispanduan mengenai rekabentuk habitabiliti ruang rumah untuk golongan berpendapatan rendah di Hadhramout, Yemen pada masa akan datang..

AN EVALUATION OF SPACE PLANNING TOWARDS HABITABLE HOUSE DESIGN FOR LOW-INCOME GROUP IN MUKALLA AND SHIBAM, YEMEN

ABSTRACT

The aim of this research is to evaluate the house design and its habitable the level of satisfaction of the low-income group in Mukalla and Shibam, Yemen. The study focuses on the house design of the low-income group of Modern Mukalla, and uses the traditional house design in Shibam as the reference model because of its UNESCO's recognition listed under World Heritage Site. The study commences with the definitions of house, house design and habitability. The study finds that space planning and function, interior elements house-unit, interior house comfort level, interior house services, and indoor socio-cultural actives are important categories for definition of the house design and its habitability. It proceeds to provide qualitative and quantitative analyses of the data of these five categories as the check-list factors. A comparison of the responses under these five categories is made for Mukalla and Shibam. The outcome of the above steps is then subjected to a further analysis using triangulation method. The study finds that the respondents who live at modern houses are slightly satisfied with their house design in Modern Mukalla. It also observes that the house design in Shibam can serve as reference model of habitable house design for Hadhramout region, Yemen. The study finally provides several useful guidelines of habitable house design for the low-income group in Hadhramout region, Yemen.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This thesis studies the low-income housing development in modern Mukalla, Yemen today. In particular it will look at the problem of inhabitable living conditions due to inappropriate house design, UN-HABITAT (2002). This issue has always been underestimated by both the architects and the house builders due to the influence of modern styles, Damluji (1992:10). There has been a proposal by the United Nations (1977) that housing should be integrated with the functions of the interior house design for a habitable living condition. This aspect is as important as the quality of the materials that have been used towards its development. Al-bed and Mustapha (1996) have argued that architects should focus on house designs that are based on the traditional Yemeni houses. They further assert that when designing houses for the habitation of the low-income groups, such a focus could serve as a guiding policy towards appropriate house design. Also they suggest that strict adherence to such a policy-guideline would certainly makes the finished houses not only friendly to the environment but are also able to sustain the local needs and traditions. Benton and Benton (1975:111) have mentioned the importance of this point.

1.2 Statement of the Problems

The study concerns with the problems of modern houses for the low-income groups in modern Mukalla, Yemen. To assess the adequacy of the house design of the modern houses for the low-income groups in Mukalla, the study will use the house

designs of the traditional houses in Shibam as reference points or known habitable model.

With respect to suitable house design for human habitation in general, the United Nations has suggested the idea of an “adequate” standard for house design, (United Nation 1977: 9). Taking the United Nation’s suggestion into account, it would be interesting to find out if the house design in the modern houses for the low-income groups in modern Mukalla, Yemen (mentioned above) meet or come any where close to the United Nation’s adequate standard of houses for human habitation. Outwardly, the situation seems to be a far cry and far between from the perception of the United Nation’s standard of adequacy. It is in the light such doubt and scepticism that the study of the low-cost houses in modern Mukalla which has been embarked upon here finds its justification. Hence, this study will focus on the house design development for the low-income groups in the city of Mukalla, Yemen.

Over the years many modern houses have been developed in Mukalla. These houses are to provide sufficient houses for the low-income groups. Since Yemen’s independence in 1967 such development of modern houses has been part of the Yemen’s national programme to tackle the shortage of houses among the low-income groups, Master plan of Mukalla (1982). In such development, often and times the houses have been developed and completed in haste as well as in large numbers. Consequently strict compliance to the building rules and to the building bye-laws has often been seen to be compromised. Also the quality of the living conditions of the populace may have suffered. Many issues relating to the adequacy of standard of the house design have (a) been raised such as those in and (b) below:

- (a) Compromising the provision of habitable living conditions in house design;
- (b) Compromising the adequate house design standards that are necessary to be observed in the development of good low-income house design.

The city of Shibam in Yemen, on the other hand, is one of the cities in the world that has been recognised as a World Heritage site and placed under the UNESCO World Heritage lists since 1982 for its uniqueness in context of preservation and restoration of the city, Lewcock (1986:9). Here the nature of the houses are characteristically traditional in that they are made up of mid-and high-rise mud brick houses which for generations have created habitable living conditions for their residents. Also, the housing units are traditionally and normally dwelled by households with extended family members. They are from their parent's, son's, daughter's family units. This tradition has been widely practised in Shibam, Yemen especially among the low and middle income families, UN-HABITAT (2002). Also here the traditional architecture has been sustained. Such sustenance has been seen to permit the development of the local culture, the religious values and the promotion of the regional identity of the region. Considering these, a study on the traditional space planning design of the mid-rise (from 3 storeys to maximum of 8 storeys) traditional houses in Shibam is deemed important as well. Such a study of the traditional houses in Shibam will serve as reference points (or guide lines) in the sense that the houses in the traditional city of Shibam, Yemen, will serve as a model of the development of the houses (apartments and flats) in modern Mukalla. In particular it will look at the houses of the low-income groups. In so doing, it shall study the factors that are necessary for the creation of habitable living conditions. Also it will formulate the appropriate research findings and contributions for future references.

Also in the light of the above, it is indicated here that Shibam and Mukalla rather than any other twin cities like Aden and Sana'a have been deliberately chosen. The choice of Shibam (a traditional city) is related to the listing of Shibam city by UNESCO as a World Heritage site due to its architectural uniqueness. The architectural uniqueness of Shibam as a traditional city stands alone above the other traditional cities in Yemen. Also it is here that the local culture, the religious values and the regional identity of the Yemenis have been able to grow and flourish naturally. As for Mukalla, the choice is related to the development of the houses for the low-income groups. That is, since Yemen's independence in 1967, Mukalla has been one of the several cities in this country that has been subjected to tremendous housing developments especially for the low-income groups, UN-HABITAT (2002). Consequently in modern Mukalla one now sees a combination of both the modern and the traditional houses. Another dimension that supports the choice of Shibam and Mukalla as the cities to be studied is the fact both cities are from a common region in Hadhramout Governorate. On the other hand, if two cities from different regions were chosen there could be too many external variables (such as the geographical terrain) that may come into play but may not be able to be controlled. Thus the choice of Mukalla and Shibam as the locations of the study is considered appropriate.

It is noted here that the above problems faced by Yemen seems to be similar in nature to the situation found in the United Kingdom after World War II; there, the quality of the living conditions also has suffered tremendously due to the country's pursuit to meet sufficient housing supply, West and Emmitt (2003).

1.3 Previous Related Research Studies

Many similar studies have been carried out by several researchers related to the house design in Yemen. Some of them are listed and briefly described in 1.3.1 through 1.3.7 below:

1.3.1 Al-Abed Study (1996)

Al-Abed (1996) studies the housing provision and satisfaction in Yemen's capital, Sana'a. It is a prospective and evaluative study of two aspects of housing problems: (a) the urban housing schemes that have been conducted in Sana'a in last two decades, and (b) the built environment pattern of the low-income housing schemes. The study shows that the location of the internal spaces has to be taken into consideration when designing new projects. And also it implies that in the planning of the low-income houses, a core houses scheme is recommended. This is so because it allows the extended family to add additional space to the existing house as the family grows.

1.3.2 Al-Gupaty Study (2002)

Al-Gupaty (2002) has conducted a study entitled *Spontaneous Settlements Phenomena and Urban Development Internal Contrasts in Yemen Cities*. The aim of this study is to identify the potential problems areas for which different planning answers are needed by describing the living standards in the urban quarters. Essential conclusions are formulated to improve the quality of life in the quarters. Such formulation can give positive results only when they get strong support from the representatives of the government, from the town planners and if they are accepted by the residents.

1.3.3 Al-Hazmi Study (2004)

Al-Hazmi (2004) has conducted a study of the development of the residential environment in Aden, Yemen especially of the middle and the lower income groups. The aim of the study is to get to know Aden housing environments by analyzing data from three different periods: (a) the colonial period, (b) after independence, (c) after united Yemen. The study reveals that there is a shortage of houses for the low-income groups, and suggests improving the housing needs in Yemen, particularly in the city of Aden.

1.3.4 Al-Shebani and Al-Madhagi Study (2000)

Al-Shebani and Al-Madhagi (2000) studies the space organization in Yemeni clay buildings. It is to investigate the allocation of space and its composition in such buildings. The study observes that mud could be utilized as a main and secondary building material in most regions in Yemen.

1.3.5 Al-Muqatri Study (2000)

Al-Muqatri (2000) studies the layout, the planning and the design of the clay buildings in Yemeni hill slopes and amphitheatres. He observes that these constructions combine basic types and secondary kinds of house design, in which some of them include both the modern designs as well as the traditional ones.

1.3.6 Djebrani and Al-bed Study (2000)

Djebrani and Al-bed (2000) have conducted a study of low-income public housing in Yemen. The study identifies the level of satisfaction among the residents in the low-income public housing in Yemen and partially in the city of Sana'a, Yemen.

1.3.7 Haglan Study (2002)

Haglan's (2002) studies show that Yemeni traditional architecture has been sustained, and also mentions that such situation has changed in Yemen due to the political, social, and economic developments following the 1962 revolution, and as a consequence of the shifts in Yemen's policies to open its door to the outside world. From thence on, the construction sectors in Yemen have flourished; and since the seventies of the last century many houses in the cities and the countryside have been built.

1.4 Research Questions

The study will be guided by the following research questions in (a-e) below:

- a. What is the definition of the house design and the factors which contribute to habitable house design?
- b. How do the factors of house design in the traditional houses in Shibam serve as references to habitability and level of satisfaction of the modern house design in Mukalla?
- c. What are the levels of habitable living conditions for the house designs in modern Mukalla as perceived by the residents who live in the low-income houses in Mukalla?
- d. What are the proper guidelines of habitable house design that will contribute to habitability and level of satisfaction of the low-income residents of the modern houses (apartments and flats) in Mukalla?

- e. Why are the spatial design and the layouts of the modern houses of the low-income residents in Mukalla considered inappropriate and inadequate to meet the changing contemporary needs?

1.5 The Objectives of the Study

The objectives of this study are as in (a-c) below:

- a. To understand the definitions of house design and to include the factors which contribute to habitability in the house design.
- b. To identify and to analyse the factors of house design in the traditional houses in Shibam that serve as reference of habitability to the modern houses in Mukalla;
- c. To identify the findings and provide the proper guidelines of habitable house designs that will contribute to habitability and the level of satisfaction of the low-income residents of the modern houses in Mukalla.

1.6 Research Hypothesis

This study attempts to meet the above objectives with the aids of the following hypothesis:

The level of habitability in house design in the modern low-income residential houses in Mukalla today is not satisfactory as compared to the traditional house in Mukalla, and the house design in Shibam can be used as reference points of habitable house design.

1.7 The Sources of the Data

There are two types of data which are: (a) the secondary data and (b) the primary data.

a. The secondary data are of two types as in (i) and (ii) below:

- i. The first data are those that have been collected through the available text references and informal verbal information (interviews without survey) from the local authorities and the officers who work at other related institutions in Shibam and Mukalla in Hadhramout region; for example from The Ministry of Public Works and Highways (2004). The data have been obtained from the related officers and the local authorities, the department's libraries/resource centre (article, internets and journals), private housing agencies, the Ministry's reports and statistics of materials related to the topic. The data are information that is related to the topic of the study. They have been collected from many sources by a series of interview in Mukalla and Shibam as follows: indirect interviews with the officers of the local authorities, the Ministry of Housing and the Private Housing Agencies. Documents and texts are from the libraries, the Ministry of Housing and the Private Housing Agencies. These text references are in the form of articles in journals, reports, statistical information on materials related to the topic of study and the internets. Most of these data will be presented in Chapters 2, 4 and 5.
- ii. The second data are information collected from personal site observations and noted by the researcher during the site study visits as in chapter 4 and 5.

b. The analysis of the data that have been obtained by the researcher *via* questionnaires that have been administered to a total of 300 respondents in Mukalla

(Modern and Old). These data have been analysed in chapter 6 and the graphic data (synthesis) are included in Appendices of this thesis.

1.8 The Scope of the Study

This study encompasses the following: a) a study of house design in the city of Modern and Old Mukalla (for the survey see appendix 2A) and (b) a study of the house designs in the traditional city of Shibam in Yemen. The layout of the house design in Shibam will serve as the reference model, while the survey in Modern Mukalla shall be the main focus. With respect to the houses in Mukalla, this study limits itself to the study of the comparisons of the house design between the traditional and modern layouts.

1.9 Structure of the Thesis

This represents the overall structure of the research design. It encompasses the theoretical framework which is underpinning the study, the formulation of the hypothesis, the research questions, the objectives, the review of the relevant literature, the composition of the methodology, the nature of the analyses (qualitative and quantitative) describing the type of the study, the nature of the study, data analysis, the research findings and finally the conclusion. This involves three major parts of investigation as follows:

1. Part one: Review of Research

This part will cover the following discussions:

- Definitions of house design.
- Definitions of habitable house design.
- Theoretical factors in house design.

2. Part Two: Research Survey

This part will cover the following investigations:

- Preparing two methods of data collection to investigate the factors of house design;
- Preparing the sample of questionnaires to investigate the answers from the viewpoints of the respondents;
- Conducting the field survey in the city of Mukalla.
- Studying the house designs of the traditional and the modern houses in Mukalla;
- Studying the house design of the traditional houses in Shibam as the reference model;
- Making analysis of the data obtained from the survey;
- Identifying all the findings.

3. Part three: Conclusions and Recommendations

This part will cover the following discussions:

- To assess how the research questions have been answered;
- To estimate how the objectives have been met;
- To present the specific and the holistic findings;
- To assess the contribution;
- To make recommendations on future research on related topics.

Diagrammatically, the structure of the thesis is as depicted in the figure below:

Structure of Thesis

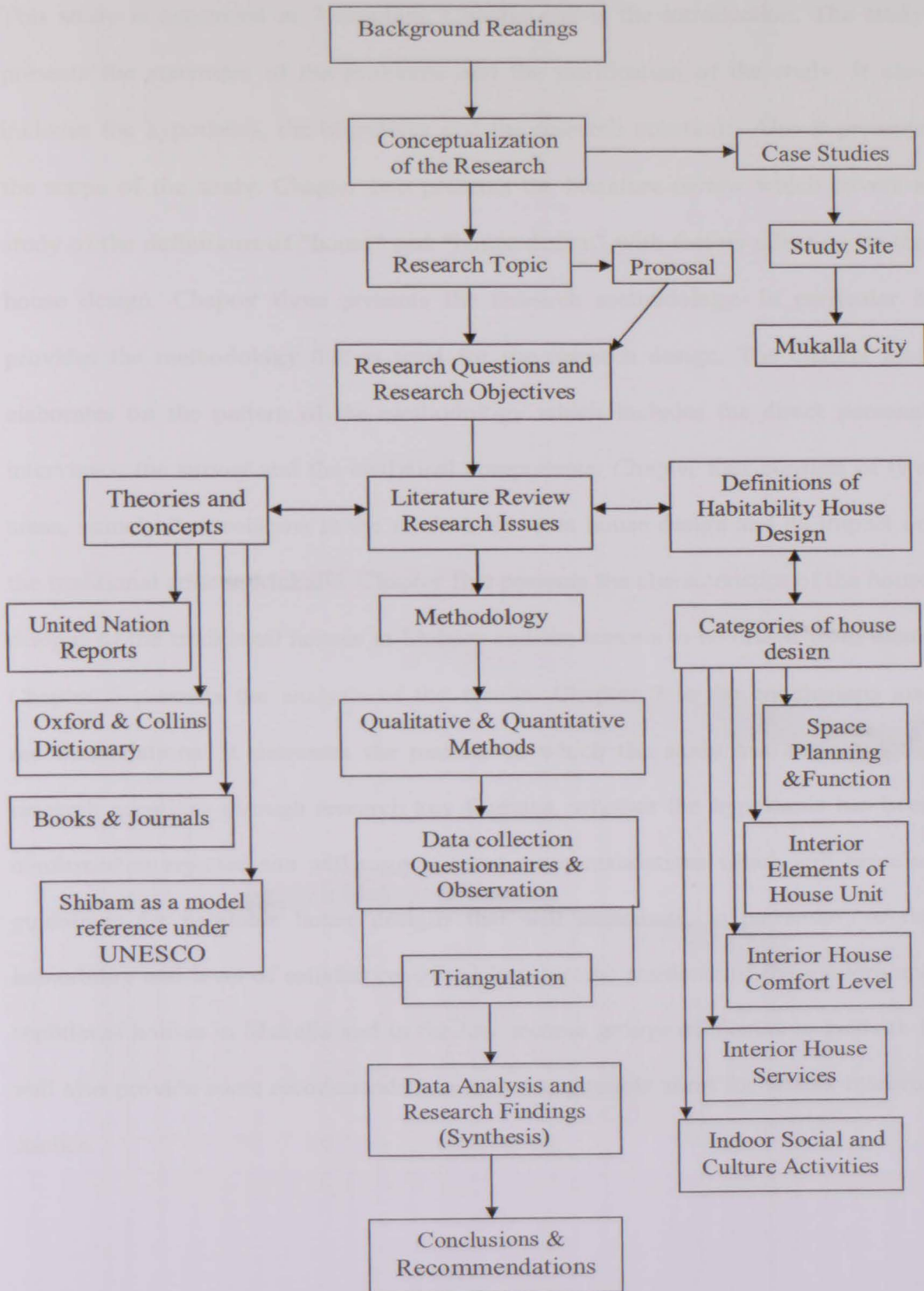


Figure 1.1: Structure of Thesis

1.10 Organisation of the Chapters

This study is organized in 7 chapters. Chapter one is the introduction. The study presents the statement of the problems and the justification of the study. It also includes the hypothesis, the objectives and the research questions. Also it presents the scope of the study. Chapter two presents the literature review which covers a study of the definitions of "house" and "house design" with factors affecting on the house design. Chapter three presents the research methodology. In particular it provides the methodology that is used for the research design. The chapter also elaborates on the pattern of the methodology which includes the direct personal interviews, the survey and the analytical components. Chapter four consists of two areas, namely the problems in the modern low-cost house design and its impact on the traditional zone in Mukalla. Chapter five presents the characteristics of the house designs of the traditional houses in Shibam and the lessons to be drawn from them. Chapter 6 presents the analysis of the results. Chapter 7 is the conclusions and recommendations. It discusses the manner in which the study has answered the research questions through research key findings, whether the hypothesis has been confirmed or rejected and will suggest some recommendations which will serve as guidelines for habitable house designs that will contribute, in particular, to the habitability and level of satisfaction of the low-income residents of the modern and traditional houses in Mukalla and to the low income groups of Yemen in general. It will also provide some recommendations of other possible areas for further research studies.

CHAPTER TWO

LITERATURE REVIEW OF THEORETICAL FACTORS ON HOUSE DESIGN FOR LOW-INCOME GROUP

2.1 Introduction

This chapter presents a literature review on past studies that are related to the topic of this study. It contains some of the main concepts and the definitions of the terminological terms used in the study. The definitions will serve as a guide to the concept of house and house design.

2.2 Definition of House Design

This section presents the various definitions of the terminological terms used in this study. The expression 'House Design' comprises two words, namely 'House' and 'House Design' whose meanings are discussed in subsections 2.2.1 and 2.2.2 respectively.

2.2.1 House

Al-Balabki (1987: 860) the Arabic dictionary *Al-Munjid* states that a house (*al-sakan*) means a place, "...to settle down, relax, become calm, calm down, reside in a place, and house unit." Allen (1987: 355-356) the *Oxford Dictionary* indicates that a house is defined as "...a building for human habitation." It covers the "...dwelling of houses as a provision of shelter or lodging.' The United Nations (United Nations, 1977: 4) defines a house as not simply as shelter but also as a mean of the creation of communities considering the functions a house has to perform. The United Nations' report explains further that a house should cover two major functions. First, the

interior, which provides a place for meeting of the households and second for the health and enjoyment which enriches the lives of the community. The World Health Organization's report 961 points out that a house is a residential environment, neighbourhood, micro-district or the physical structure that human beings use for shelter and the environment of that structure; these include all the services provided such as the facilities, the equipments and other implements needed for the physical and mental health and social well-being of the family and the individual occupant, United Nations Reports (1977: 55). In this sense, a house is seen as a collection of facilities that provides an intensive service in a physical location.

The United Nations' Reports (1977) contend further that the term house refers to two important aspects, namely the static and the dynamic aspects. The former refers to the shelter itself. The latter refers to the changing needs of the users' life cycle, and the ability and willingness of the owner to invest in the house when his/her socio-economic factors change. The report further notes that the meaning of the term house varies with different social, economic and family conditions. From the residents' perspectives, a house links the family to the environment. This concept covers the residential environment which includes (i) the physical structure that a group of people or family uses as a shelter, and (ii) all the necessary services and the facilities required for the physical and the social well-being of the family as a whole, United Nations Reports (1977:4). Pashlar (1980:42-81) considers a house as the man's first world. In addition, he suggests that it is a body and a soul for the residents. He further suggests that in the house, existence has a value and life will have a new beginning. Also he notes that a house is a place where emotions and love meet, a place for adaptation and imagination; when we leave it we still remember events that have taken place in it as the house is the entity that provides a spatial protection to

man. He further notes that the memory of a house is not restricted to the furniture in it, but extends to other issues such as emotions and expressions.

2.2.2 House Design

By house design it means the quality of the house in terms of the organization and the allocation of space areas relative to the key functions that a household requires which are space planning and function, interior house elements, interior house comfort level, interior house services, indoor social and cultural activities. Such a layout always sets to measure the quality of a house. It has been suggested in Caudill (1978) that an adequate layout always takes care of both the current and the future needs; and such needs may be evaluated on the basis of quality rather than cost, size, light and building that make up the physical environment the residents interact with. Therefore, space in house design that man creates should meet a kind of needs, and the design adequacy calls for the ability of the designer to put all the required elements within a defined and clear relationships.

Schultz (1993:16-25) indicates that the philosophical concepts of house design are based on a fact that everything in this world is located in a space where it can react with the surroundings to prove that it exists. He adds that in this context, no one can separate the human being from his surroundings, and no human being is isolated from the privacy (spatial boundary). In addition, he notes that a theory has been established in constructing a relationship between man and place, then the relationship between boundary and functional spaces. For him such a relationship is obvious in the milieu of spatial settlement which is an absolute fact for human being's existence.

The United Nations' Reports (1977:11) notes that a house design is considered to provide for the economic needs of an individual or family when used as a place for economic activities. The reports further observe that adequacy of the dwelling has direct impact on aspects related to the human being such as worker productivity and family stability.

Turner (1972) suggests that a house design should be seen as an interaction between the house actors, their activities and the products (services) of their activities within the given context. Here the products include the dwelling itself, the utilities (services) and the spatial level of satisfaction that the actors derive from their activities. Turner further suggests that a house encompasses a shelter and a place for dwelling, which provides natural protection, and gives comfort and hygiene for the occupiers. In another words, he suggests that a house design is more than a mere shelter, but that opinion is somewhat subjective. Finally he contends that the most important characteristic of a house is its functional aspect, namely it must be able to fulfil the needs of its occupiers.

2.2.3 Concept of Human Needs in House Design

Hans (1972) mentions that house needs can be seen from many different perspectives. He notes that these different perspectives come about because of the differences in defining the housing problems and who defines it. Also according to Hans:

"The problem of housing appears quite different when seen from the national and aggregate level by a public policy maker or a large commercial developer than it does from the perspective of a low-income dweller. At the national level, massive housing deficits are most apparent and solutions, which combine speed, economies of scale, and industrialization, seem perfectly appropriate. From the user's point of view, on the other hand, primary considerations are availability (low rent or price level), quality, location in relation to

jobs, good schools, transportation, and sufficient control over one's living space to make a personalised home." Hans (1972:73).

The concept of house planning standards (HPS) whose specifications serve as yardsticks for the qualitative and quantitative levels of housing needs has been noted by Al-Issawi (1996:32). We may say that HPS does not only specify the types of housing units to be built, but also specify the number of housing units that may be built as per the national income and any other revenues, Naser (1997:13). The aim of HPS is to provide houses of acceptable quantity and quality that fulfils the needs of families of different social levels as per their financial abilities. In another words, facilitating for the low-income families to own comfortable houses within their financial capabilities, Basic Human Needs in the Arab World (1997:35). Therefore, the criteria are the outcome of certain specifications approved by an authoritative body, Al-Hamdan (1999:16).

Doxiadis (1968) observes that one of the most crucial functions of houses is to provide human needs. For him, "needs" means some types of requirements, which means that needs in human conceptual analysis is subjective and states as follows:

"... everybody has a subjective meaning for his own needs or for the needs of mankind, and that there is no accepted system of values which allows us to measure, compare, and to judge these needs...Needs vary enormously with time, locally, conditions, etc., and that even for the same person, they change continuously." Doxiadis (1968: 319).

Doxiadis also contends that because human needs are subjective in nature, it can be classified in a number of ways. One is the basic or the 'objective measurable needs'. According to Doxiadis (1968:319) such basic needs do not change. These include the very basic ones like the need for a certain number of calories per day, the need for a

certain cubic meters of oxygen per hour, the need for some specific kilos of water per day and a certain minimum spatial need. Second is the 'subjective needs.' Doxiadis notes that these types of needs are perceived by people as they involve the question of human needs. However, he adds that such a question cannot be answered in a uniform way primarily because of the variability of human perception and behaviour.

Doxiadis (1968) further suggests that needs can be classified into two levels, namely the primary needs which include the need for a minimum amount of food, and the next level which are the secondary needs and tertiary needs. He considers the two latter ones are compositely less important. Such needs include the need for production and the preservation of food. All these needs are interrelated towards the level of satisfaction of man's physical and social needs, Doxiadis (1968: 320). In this respect, Marslow (1948) observes of the existence of a hierarchy of needs ranging from the basic physiological needs like food and shelter to the more complex needs-satisfaction of self-realization. According to Dioxides (1968), needs also have a positive relation to functions. For this reason, he notes that needs can be best understood through the functions created. For example, the need for food and clothing brings about the creation of the function of gathering and foodstuffs production, the need for movement creates the transportation function, and the need for shelter is housing.

He adds that the needs of satisfaction and the operation of functions depend on the existing conditions such as natural, human etc. and the possibilities they portray. Hence, he suggests that the relationship between the needs and the functions to the conditions and the possibilities is not a uni-directional concept but a bi-directional one, Dioxides (1968: 320). He further shows that house design level of satisfaction is due to the fulfilment of needs satisfaction. These studies also have shown that dissatisfaction

occurs when needs remain unfulfilled. Also, in houses, the fulfilment of needs can be explained from the view that provision for individual needs is an important function of a dwelling. On this point, Doxiadis (1968: 323) refers to those needs as the "...biological, physiological or sensory in nature and can be divided in relation to the aspects of the whole human being, that is the body, senses, mind and soul." In addition, he opines that there exist the social needs represented in the relationships of the human being with other members of the society. In particular, the needs for a place to live, like that of food, are universal and basic. That is, regardless of the living standard, people especially the poor, struggle to find level of satisfaction by all means.

On needs, Lazenby (1977:46) suggests that they can come about as a consequence of certain internal or external problems to man; for example, in housing, these problems can be analyzed by looking at the various environments, which affect man and his everyday life, including the physical, the socio-cultural, the psychological as well as the physiological environmental factors. As for Soen (1979:132), he emphasizes the fact that the system of the occupant needs comprises a hierarchy of priorities starting with the need for shelter and security on top of the list and ending with the aesthetic needs as the least important and to which most occupants will pay attention only after all their other needs have been met.

2.3 Definition of Habitability

Landau., et al. (1988:1453) the *Chambers English Dictionary* defines the term *habitable* as '...appropriate, proper, and fit'. Habitability therefore, can be defined as the state of being habitable, appropriate, or proper. Habitability, however, is relative term. In the context of a house, its habitability can be viewed in terms of its

fulfilment to certain needs. Habitability or appropriateness is said to exist when needs are being fulfilled, or there is a match between what is needed and what is being supplied by a house, and inhabitability arises when there is a mismatch between the two. Habitable house plays a vital role in fulfilling the key functions that a household require. Plans must be set to measure the quality of house design that may be achieved by using quality indicator system allowing future or current house layout to be evaluated based on quality rather than cost, site, size, light, and building that make up the physical environment they interact with, Caudill (1978).

Soen (1979) deals with the concept of habitability in house design from the point of view of the relationships between the occupants' needs and the dwelling level of satisfaction. He points out that the quality of house design is not static, but rather it varies as a function of the prevailing circumstances. He also highlights that a series of factors such as engineering, social, behavioural and others influence the housing quality. He adds that 'the stage in the life cycle' and 'the lifestyle' is the key factors behind the basic needs of the occupants. Also he notes that the occupant's level of satisfaction and his habitability with his housing depend to a large extent on the key question of whether the dwelling unit meets his needs. In addition, lifestyle is highly dependent on a series of factors including culture, socio-economic status and the character of the family.

Onibokun (1973a) suggests that the habitability of house design refers to a perception evokes from the relationships of five interactive systems, namely the inhabitant's subsystem, the socio-economic system, the cultural and religious subsystem, the suitability subsystem as well as the needs of management subsystem. These five sub-systems are related to one another. And closely related to these is the

notion of the adequacy of habitability of house design itself. It means the organization and the allocation of the internal space, the structural quality and the household facilities as they will affect the extent to which residents are satisfied with their units, Smith (1976), Denton (1969), Onibokun (1973a). In these studies, any reference to habitability of house-design and adequacy of habitability means the sum total of those mentioned in this sub-section. Onibokun (1973b) explains that a house unit is only one part of a house habitability system. More so, a house unit is part of the environment and the environment would have influence either negatively or positively on the inhabitants' state of mind and on their residential level of satisfaction towards a particular house. For Onibokun (1974), assessing habitability means evaluating the level of satisfaction of a tenant living in a particular housing unit, which is part of a housing project located within a particular community under a type of institutional management. Housing habitability systems normally involves four interacting subsystems: the tenant's subsystem, the dwelling subsystem, the environment subsystem and the management subsystem.

Onibokun's (1974:123 and 190) notes that a house is deemed to be appropriate for habitation when it gives level of satisfaction to the inhabitants. According to him, such as level of satisfaction, comforts and suitability can be derived from a combination of a number of factors operating collaboratively between one and the others; they are: (a) taking notice of the interior elements of the house unit itself, (b) the organization of the interior space, (c) the location of the houses in terms of the social, cultural, economic and religious needs, (d) the inhabitants' perception on the house services. He also points out that the residents' level of satisfaction over their

houses and the habitability of the houses may be measured from the responses of the residents on several aspects of the houses which he termed as "attributes".

Level of satisfaction to identify the needs of house design have been the subject of many studies in America and Britain; for example in America there have been studies on planned residential areas, Lansing et al. (1970); public houses, Mullins and Robb (1977), Onibokun (1976), Pacione (1982); new towns Zehner (1977); non-metropolitan areas, Marans & Wellman (1978); and residential neighbourhoods in large cities, Miller et al. (1980); as well as nationwide studies in the United States of America, Marans (1979) and Marans and Rogers (1975). In Britain, there have been similar studies such as Abrams (1973), and Hall (1976). These studies provide further insights into the relationships between house design and the level of satisfaction of the people, and certain models have been developed to explain the phenomenon.

2.4 Habitable Low-Income in House Design

The United Nations' Reports (1977:1) stress the importance of habitable house for low-income family; and the reports have discussed the topic in seminars on social perspectives since 1957. In its seminar in 1975 in Denmark, the United Nations' view is expressed in the following excerpt:

If housing programmers are to reach a large number of low-income people...emphasis must be given to affordable, improvable shelter instead of high standard housing outside, the economic reach of the majority of the population. Housing standards, therefore, instead of reflecting models in industrialized nations, should be guided by a nation's own climatic, economic, technical, and social circumstances. United Nations (1977: 3).

The quotation suggests the strategy that should be adopted by the governments of the developing countries whenever they try to provide habitable houses especially the low-income group for their population.

In the United Nations' 1975 seminar in Denmark it was highlighted that in general the developments of plans of many countries do provide social goals in their housing policies. It also holds that this is usually aimed at making available "adequate" or "standard" houses design for the entire population. As a universal definition is impossible to have, it is generally agreed that houses are considered "good" if they satisfy the residents' needs at a given time of development, United Nations Reports (1977:9). The reports also view that "adequate" or "good" houses are those that are not overcrowded. Also the reports mention that density, the number of persons per room is used to identify the measurement; however, the tools used to measure substandard and overcrowding vary from one country to another.

Apart from the United Nations' Reports (1977), individual researchers have also explained the concept of the suitability of houses design for example, Onibokun (1974), Michelson (1970), Philips (1967), Gans (1962) and Raven (1967). In general, they explain the suitability of houses *via* the idea of "habitability" which means "suitable for living". Also they agree that houses are for people and they should be considered more than just mere shelters. For most of these writers, the adequacy or suitability of a house lies in the eyes of the occupiers. Torres (2004:7) notes a habitable space can be designed in many forms, without large budgets. Ingenious solutions that address cost effectiveness in terms of design or financial considerations can generate highly attractive results.

2.5 Definition of Habitable House Design in the Study

Based on the studies on definition of house design in the previous section, the study defines a house design as an object containing 5 important categories as in (a) through (e) below: