SELINUS UNIVERSITY
OF SCIENCES AND LITERATURE

THE AIM OF THE STUDY IS TO EXAMINE IMPACT OF SUSTAINABLE HOUSING INFRASTRUCTURE AND ITS EFFECT ON PROPERTY VALUES IN UMUAHIA CAPITAL ABIA STATE, NIGERIA

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CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Real estate infrastructure is the paramount factor for development since real estate development is one of the fastest safest investments in the world as it provides investors a wide range of benefit which includes profit, prestige, collateral for bank facility etc.

Real estate infrastructure is capital intensive in nature, they require considerable amount of capital to install, construct and provide them. Hence, only a very small percentage of the infrastructure is normally provided by individual investors it is therefore vital for investors and the society in general to have basic knowledge on alternative measure to provide some basic infrastructure without a full government intervention.

The huge capital requirement/cost for real estate infrastructure have discourage quite a number of investors, while the bold and un-wavering lot have found wisdom in seeking professional advice and preparation of detailed viability reports in other to maximize opportunity in providing these infrastructure .

The estate surveyor and valuer usually after professional advice to enlightened investors as regards the best investment option in real estate development since the provision of infrastructure will attract higher returns on the investment.

The estate surveyor and valuers champions the business of land acquisition plotting of land development, maintenance and coordinate other maintenance personnel particularly the engineer. It would be an appreciation to land and

landed property if adequate infrastructure is provided. Ozigbo and Ozigbo (2013)

1.2 Statement of Problem

In Umuahia the capital of Abia state recent studies and practical observation has shown that one of the basic and primary challenges facing the study area is housing irrespective of their mode of ownership i.e. private ownership or public ownership. Reason for this is simply because, housing is the most expensive item for families and access to adequate housing will ultimately lead to improvements in health, hygiene, livelihoods, psychological well-being and social interaction of household members thereby encouraging the quality of their human capital and employment capability (Ejenma et al, 2018). Recent research reveals that housing situation in Nigeria put existing housing stock at 23 per 1000 inhabitant. Housing deficit is put at 15 million houses (Mabogunje, 2007; Fumilayo, 2013). While N12 trillion will be required to finance the deficit. This is about 4 times the annual national budget of Nigeria (FHA, 2007). House prices and rents, on the other hand, have grown ahead of general inflation. Making matters worse, the composition of houses for sale and rent on the market has been inexorably shifting towards very expensive house (Nubi, 2008). Furthermore, the genesis of this social impediment can be traced to rural urban migration and massive increase in population are the serious challenges affecting the capacity of government in providing adequate and affordable housing in the developing countries (Yahaya and Ibrahim, 2019). The United

Nations (2014) has projected that by the year 2050 urban population will increase to about 2.5 billion of people with about 90% increase in developing countries like sub-Sahara Africa and Asia because there is poorest region in the world. Consequently, the challenges of housing provision in Nigeria today have become more complicated particularly among the low income groups who have the largest urban population (Federal Republic of Nigeria, 1991). After several effort by the Nigerian government since after independence in 1960 to solved the challenges of housing provision the government fail to meet up with the challenges to provide adequate and affordable housing in the country (Awotona, 1990; Oruwari, 2006). Finally, there are numerous factors that have hindered the success of affordable housing, these ranges from, lack of coordination of public housing agencies, increase in population, high level of poverty, high cost of building construction materials and legislation (Ademiluyi and Raji, 2008). Besides, the study area has experienced poor attitude of housing development, which has affected the socio-urban mentality, psycho-economic reasoning and physio-environmental aesthetics, the resultant effect has hindered developmental growth and eschew environmental sustainability while the value of property is at the receiving end because all the above mention will reflect on property values.

Figure 1.1 housing conditions in Umuahia capital in Abia state

1.3 Scope of the Study

It is opined that no research or study is completely imagined, planned and carried out (Ferman and Levin, 1975). Therefore, this present study covers aspects of sustainable housing, real estate infrastructure, property management, real estate development and real estate property market from an approach of international best practice of real estate management, but with reference to Umuahia capital of Abia state Nigeria as a case study. It centers on sourcing alternatives for providing durable, viable and affordable housing that can meet the increasing demands for housing accommodation for various uses including its advantage cost-in-use maintenance, social orderliness and environmental friendliness. This study analyses Impact of sustainable housing infrastructure and its effect on property values in Umuahia capital Abia state, Nigeria. Therefore this study is a pure approach to sustainable real estate

practice. Chapter three of this present study provides more details of the scope, justification and other situations about the position of Umuahia capital, in and within Abia state Nigeria.

1.4 Aim and Objectives of the Study

The aim of the study is to examine impact of sustainable housing infrastructure and its effect on property values in Umuahia capital Abia state, Nigeria.

1.4.1 Objectives

1.4.2 General Objectives:

This present study, effort is geared and channeled towards achieving the following objectives:

i. To identify the impact of sustainable housing infrastructure and its effect on property values.

ii. To examine the present condition of (SHI) and property values in the study area.

iii. To identify factors that has mitigated constant effort of relevant stakeholder in providing (SHI) for the citizenry.

1.4.3 Specific Objectives:

iv. To determine the relationship between (SHI) and its effect on property value.

v. To formulate a concept that will enhance technicality in making our existing housing a sustainable one.

vi. To carry out a theoretical experiment that will formulate a frame work of solving both housing and property value issues.

vii. To develop a frame work that would be used for construction of sustainable housing infrastructure.

1.5 Relevance of the Study

It is expected that the result of this study, Impact Of Sustainable Housing Infrastructure And Its Effect On Property Values In Umuahia Capital Abia State upon completion will educate all the relevant stake holders in real estate sector, ranging from the government institutions, academic institutions, built environment as a family, financial institutions, real estate investors, real estate surveyors and valuers, land-lords and tenants as every individual must fall to one category or the other, on modern and sustainable approach of; firstly, the study will define the problem, this definition will x-ray the symptoms and the scope and how it has affected property values, it will also explain the cause of the problem as the definition and identification of this problem and its cause will foster critical thinking and collaborative effort among relevant stake holders to the way forward. Secondly, this study will help the government and financial institution in developing alternative polices as a solution since creative problem solving requires a body to explore a full range of viable solution before reaching conclusion. To assemble a variety of solutions from which to choose a final solution, you must: generate as much effective solution as possible, relate each solution to the cause of the problem and merge similar

or related solutions. This will now give birth to implementation of solution which will naturally pave way for the stake holders to contribute to financial, natural and intellectual resources in making sustainable housing infrastructure (SHI) morphology of new urban system. This implementation is going to address the issue of housing shortage and improve rental values of properties in the study area. furthermore, implementation of this research will enhance modern technicality that will bring about housing accommodation that are affordable, durable and viable effective, it will also educate estate surveyors and valuers, the built environment at large on various way of identifying alternative to provide sustainable housing. Thirdly, evaluate the outcome, in simplest terms, evaluation is the monitoring that any given undertaken (project) needs to ensure that milestones are met, cost are contained, and work is completed. The use of feedback mechanisms can be employed to detect the need for midcourse corrections and to ensure that the problem is solved without creating new problems as opined by (Bratton and Gold, 1999; NOUN, 2012). This study aims at suggesting some evaluation mechanism that will help the government in ensuring that its policy on (SHI) are implemented from start to finish and the feedback will be a determining factor on the best approach to employ. Finally, this study will serve as a guide in taping into the goldmine of sustainable housing, this will create homes for the entire Umuahia urban dwellers, and Nigeria at large if extended to other part of the country, it will also create job opportunities to the youth, it will also create market for our

locally sourced building materials, enhance professionalism in the field of built environment and beyond and build our economic strength.

1.6 Research Questions

- What is the present condition and situation facing housing sector in Umuahia capital Abia State?
- What is the Impact of sustainable housing infrastructure and its effect on property values in Umuahia capital Abia state, Nigeria?
- How and what estate management principle can be applied in sustainable housing approach to solve accommodation problem in the study area?
- What is the integration role of various relevant stake holders if the Impact of sustainable housing infrastructure must be applied in solving housing issues?
- How can government policy and regulation frame work make a sustainable impact on sustainable housing infrastructure?

1.7 Exclusions, Limitations, Constraints, Reservation of the Study

The exclusions, reservations, limitations and constraints highlighted in this section actually define the precincts within the context of the present research. These were done with the commitment to addressing the study aim and to achieve the research objectives, and which was in no way doubtful to the stated ingredients above. This

reflects to suggest that the study was really carried out in and within a real world practical built environment.

1.7.1 Exclusions

The present study is based on examining the impact of sustainable housing infrastructure and its effect on property values in Umuahia capital Abia state reason being that housing accommodation in the study area are in shortage of supply. That notwithstanding, this research is concern with the implementation of sustainable approaches and framework that can guarantee the supply of housing without altering its property values in the property market, it centers focus on feasibility and viability appraisal in its entirety. Secondly, to maintain the continuity of inflow of the social, physical and economic, and others accruable benefits/returns from it good existence and appearance in the built environment. . The bye product is not only channel towards appreciating the benefits or return only. As such, the present research excluded the government administrative precedence so as to encourage public private partnership, since the over dependency on government might face some hiccups. Considering the trend on sustainable real estate housing across the globe, exclusion of hash government policies will reveal the exact cause of housing shortage and as well help in identifying other hindrance facing (SHI), with the intention that the outcome will form basis for further research opportunities.

1.7.2 Limitations

This research target only Umuahia capital territory as a unit of study in the study area. It is establish on the basis that the totality of housing accommodation are largely owned by individuals and few by government establishment while small number of

building are owned by cooperate bodies or multi-national agencies. These are those actively involved in urban housing with its peculiar associated problems. The decision was made to only seek participation from those actively involved in the ownership, management and tenancy in the study area as to enhance the research aim of developing the appropriate (SHI) approach. Therefore, this research adopted the single embedded unit of study which studies the property owners, property managers and occupiers in the same manner, drawing the same group of representatives from the personalities (see Tables … and … of Chapter 3, page ….) that have active involvement in the sustainable housing infrastructure. From these groups of representatives, a surfeit of rich qualitative semi-structured interviews and quantitative questionnaire data were generated, but analyzing this large data set required the application of appropriate data analysis techniques and approaches. Therefore, SPSS packages and techniques were used for the questionnaire data which provided plenty of Figures, Tables, numbers and graphs, while, the qualitative semi-structured interviews were analyzed using the relative important index (RII).

1.7.3 Constraints

The rich data from both qualitative and quantitative approaches proved difficult for the researcher to actually distil into the findings of this study. However, it was demonstrated methodically, despite it seeming that the quantitative data obtained and analysed in this work is relatively extensive. Financial constraints was another challenge the study encountered looking at the scope the study covered and running other auxiliary expenditure to ensure that the researcher observe facts and not depending on assumptions. Another major constraint faced in the study was the

availability of time with each participant in the process of collection of the data. This was manifested more on making a second follow-up meeting where most actually failed or became difficult. This work was also constrained by the limited time of three years leave only being granted (including the writing-up years) by the sponsoring body and the researcher's employer. This made the data collection, analysis and writing-up to be as time conscious as possible providing more constraints to the work.

1.7.4 Duration of Study

This study started in in the year two thousand and nineteen (2019) and was completed in the year two thousand and twenty two (2022). Our study passed through some process of time to ascertain the validity of certain variation that might alter the outcome of our findings.

1.7.5 Reservations

This present research recognized doubts on the scarcity of literature regarding robustness within the area of sustainable housing infrastructure (SHI) estates management practice which manifested in the study drawing information with regards to robustness from other related subjects and areas such as project management, architecture, engineering, and environmental/regional planning. Current publications of relevant materials and resources which would enhance the need for sturdiness has been published within the Nigerian government and the world domain on housing maintenance management, however, the likelihood that these resourceful materials could be biased was considered in this study even if the housing sector may be a political sector of the economy that governments and politicians use to score points and influence their governance and citizens welfare from the populace. Whatever the

position is, the research exhibited a dispassionate strategy in a pragmatic approach to ensure and enhance that the degree of reliability, consistency and dependence is assured through properly validating and verifying all claims contained in the diverse sources. The study is focused on the various participating groups perspectives within and outside the real estate investor(owner) real estate surveyor and valuer (manager) real estate occupier (tenant) who are deeply involved in the after construction management of the sustainable housing estates. The researcher's point of view on the issues as a none-civil servant/civil servant from and living in the case study area may sway the interpretation of such data. However, only accidental misinterpretation is tackled through the validation of the study findings using the developed framework by the participants groups to sustain the research reliability.

1.8 STRUCTUREOF THE THESIS

This thesis has been designed in a logical manner based on the objectives of this study which enable the reader to appreciate and comprehend the content and context of each section and chapter. At the same time, two consecutive sections, five chapters and twelve sub-chapters have emerged in this work and each section and chapter is summarized as follows:

Chapter One introduces the overview of the study, including: background of the study; the statement problem; scope of study; aim and objectives of the study; relevance of the study; the research questions; scope and limitations of the study; structure of the thesis; and research conceptual framework/map.

Chapter Two reveals a review of literature on related and relevant studies and resources on the areas of sustainable housing infrastructure centers on property development, building maintenance, management, approaches and associated issues, the estate management principles and methods in practices to housing estates, the relevance of stakeholders in the housing estates and modern practices on sustainable housing in relation to its effect on property values.

Chapter Three This chapter focuses on the study area. It looked at the two local governments that made up Umuahia capital, paying specific attention to their geographical location, climate, housing pattern, demography and economic activities in the study area.

Chapter Four presents research methodologies reviews the various research philosophies, the justification of choice of research rationale and methodology for the study. The pragmatic interpretative research philosophy paradigm was adopted in this study, which allowed both the qualitative (none-mainstream) and quantitative (-mainstream) data collection instruments to be used. It equally introduces the various instruments of data collection and the process of analyzing the generated data which involved SPSS 20 and the relative important index (RII).

Chapter Five presents the analysis, findings and discussions of this research objective 1 and 2, which identified the impact of sustainable housing infrastructure and its effect on property values. And aided in formulating a concept that will enhance technicality in making our existing housing a sustainable one. It also reveals the various factors, barriers, and causes of housing shortage in the study area. Finally our finding reveals

that the current correlation of sustainable housing infrastructure has impact on property values if attended to from a sustainable approach.

Chapter Six summarizes the overall research findings in light of the study aim, objectives and questions identified in the introductory chapter of this present thesis. The chapter also considered: some recommendations; research generalization; overall research conclusions; implications of the research exclusions, restriction, limitations, constraints and reservations; research concluding reflections; and possible suggestion for further study for this present work.

1.9 The Research Framework/Roadmap

This present research study has five implementation phases as specified in figure 1.2 overleaf. The five phases represent a chronologically simplified process for the completion of the research. Within and between phases there was the need for reiteration of elements as the cogency and clarity of the research focus evolved. Elements within phases frequently ran in parallel and consequently require some repetition of earlier elements. This was an important component of the research process, since the aim and objectives become more focused and the researcher's skills and knowledge refined the coherency and consistency of the methodology approaches.

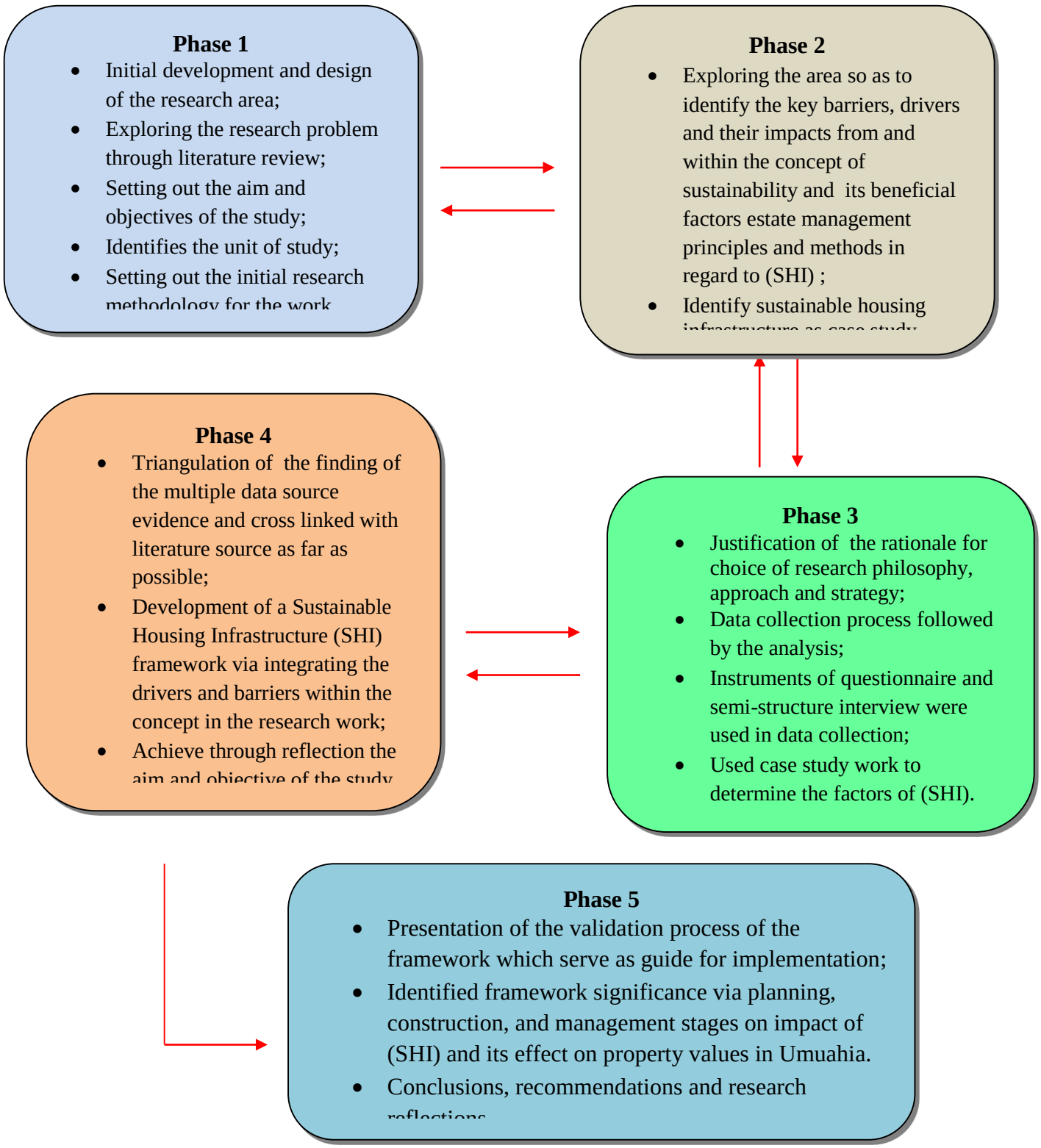

Figure 1.2: the research framework/map

1.10. Summary

This chapter has presented an overall structure of this research study (thesis) such that it includes an introduction and background which elicits the need for sustainable management of the housing estates since housing and all it features are one of the fundamental needs for human life and comfort in the built environment. It also presented such other concerns as: the statement of the problem; the questions the present work seeks to answer; the main aim and objectives of the research; the exclusions, reservations, limitations and constraints of the work; and to specify the precincts and context in which this research work is conducted.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This section emphasizes on recent review and related literature on concepts of sustainable housing infrastructure (SHI) it considers factors that makes-up post-construction stage (planning), construction stage and management stage which are measured in terms of "availability, affordability and durability". It also examines the effects on property values in all categories of urban systems in Nigeria. Again, sustainable housing infrastructure is considered by their features, types, and materials used in constructing them as this factor plays role in determining their property value in property market. That notwithstanding the role of all relevant stake holders in the real estate sector is vital. The role of government will enhance the implementation of the findings in this study, finally, it finalizes by a summary of the findings from the literature review.

2.2 Sustainable Housing Infrastructure Conceptualized

Housing is one of those basic social conditions that determine the quality of life and welfare of people and places. Where homes are located, how well designed and built, and how well they are weaved into the environmental, social, cultural and economic fabric of communities are factors that, in a very real way, influence the daily lives of people, their health, security and wellbeing, and which, given the long life of dwellings as physical structures, affect both the present and future generations. Housing is therefore central to

sustainable development. (Aniebiebasi *et al,* 2018) Housing is also part of the relationships between society and the environment. On the one hand, housing construction and operation consume large amounts of natural resources (land, energy, water, and building materials), while producing waste, air and water pollution.(Masnavi, 2007; Melchert, 2005 ; Onuoha *et al,* 2017) On the other hand, housing itself is exposed to a variety of environmental impacts and hazards, including those associated with natural disasters and climate change. These aspects are also significant considerations for sustainable development (Karshenas, 1994). This complex web of inter-relationships between sustainability and housing is addressed by the policies for sustainable housing. These policies consider a spectrum of underlying conditions to achieve sustainability in housing development (along the four dimensions of sustainability – environmental, social, cultural and economic), such as: impacts on the environment and climate change; durability and resilience of homes; economic activities in housing and their links with the wider economy; cultural and social fabric of communities and impacts of housing on poverty alleviation, social development, and the quality of life. Although sustainable housing is often associated with wealth and affluence, it does not need to be so – genuinely sustainable houses are those that are inclusive and affordable for all (Golubchikov,

2009; Boardman, 2010). Addressing the issue of affordability is, therefore, a necessary condition for transformation towards sustainable housing. And yet affordability is not enough, because the so-called affordable homes cannot be

considered sustainable if they create negative impacts on the environment or social life. The marriage of affordability with other sustainability conditions is a must. In this study, the link between sustainability and affordability is discussed in the unified notion of sustainable housing. Furthermore, while sustainable housing is often considered from a resource-saving (green) perspective, this study advocates a more comprehensive approach – viewing sustainable housing not simply as units or clusters of self-sufficient "green buildings", but as socially-enhancing and environmentally friendly residential practices integrated into the wider urban/settlement systems (Razali *et al*, 2014). This approach is necessitated by the holistic perspective of sustainable development and by the very multi-faceted nature of housing. Sustainable affordable housing in this regard may be considered as extension of the adequate shelter- for-all strategy of the Habitat Agenda (paragraph 60): Adequate shelter means more than a roof over one's head. It also means adequate privacy; adequate space; physical accessibility; adequate security; security of tenure; structural stability and reliability; adequate lighting, heating and ventilation; adequate basic infrastructure, such as water supply, sanitation and waste-management facilities; suitable environmental quality and health-related factors; and adequate and accessible location with regard to work and basic facilities: all of which should be available at an affordable cost.

In any giving developed or developing economy, one of the major challenges is "housing" or "shelter" (Ihuwa, 2015). This problem is linked to the following; population (Igwe et al, 2017; Ayedun and Oluwatobi, 2011) credit

facility (Eziyi et al, 2011; Olotuah, 2000) government policy (Ebenezer et al, 2016; Aniebietabasi and Eugene, 2018; Osubor, 2016).These opinions are all related dimensions pointing to factors that arouse the interest for examining sustainability (Brandon and Lombardi, 2011). However, sustainable housing infrastructure observes certain principles that produce result in all dimensions of sustainability. Hence sustainable development is defining as a behavior that "meet the needs of present without compromising the ability of future generations to meet their own needs" Brundtland (1987). Sustainable housing has the potential to produce good quality housing at a price that is affordable both in the short and long term. Thus, sustainable housing must aim at economic, social and environmental sustainability from planning to implementation phase and at

the same time result in housing that is affordable, accessible and environmentally less damaging (Choguil, 1994) The National Urban Housing and Habitat Policy-2007 intends to promote sustainable development of habitat in India with a view to ensuring equitable supply of land, shelter and services at affordable prices to all sections of society (Vijai and Deep, 2012),(GOI, 2007) Notwithstanding numerous attempts, sustainable housing has remained difficult to define, yet it should be coherent to certain characteristics of sustainable development (Choguil, 2007):

(1) Help for the very poor because they are left with no option other than to destroy their environment,

(2) The idea of self-reliant development, within natural resource constraints,

(3) The idea of cost-effective development, meaning thereby that development should not degrade environmental quality, nor should it reduce productivity in the long run,

(4) The issues of disease control, appropriate technologies, food security, clean water and shelter for all,

(5) The notion that people-centred participatory initiatives are needed; human beings in other words, are the resources in the concept.

From this perspective the sustainable housing policy should incorporate three objectives (Choguil, 2007):

The first of these is that future policies must provide the basis for household improvement.

The second objective of the policies which could result in sustainable housing improvement is concerned with the empowerment of poor people. The third objective of such policies must be to psychologically give the lower segment of the urban society a feeling of self-worth.

Thus, in order to be sustainable, housing initiatives must be economically viable, socially acceptable and affordable, technically feasible and environmentally-friendly.

2.2.1 Sustainable Development Dimensions and Principles in (SHI)

Sustainable development or sustainability as indicated in its definitions above is now classified into four dimensions namely: environmental sustainability, economic sustainability, social sustainability and Cultural Sustainability as shown in Figure 2.1 below. However, Pitts (2004) suggested in his study that

the third dimension is the same as equity and therefore, the dimensions are environmental, economic, equity and cultural sustainability.

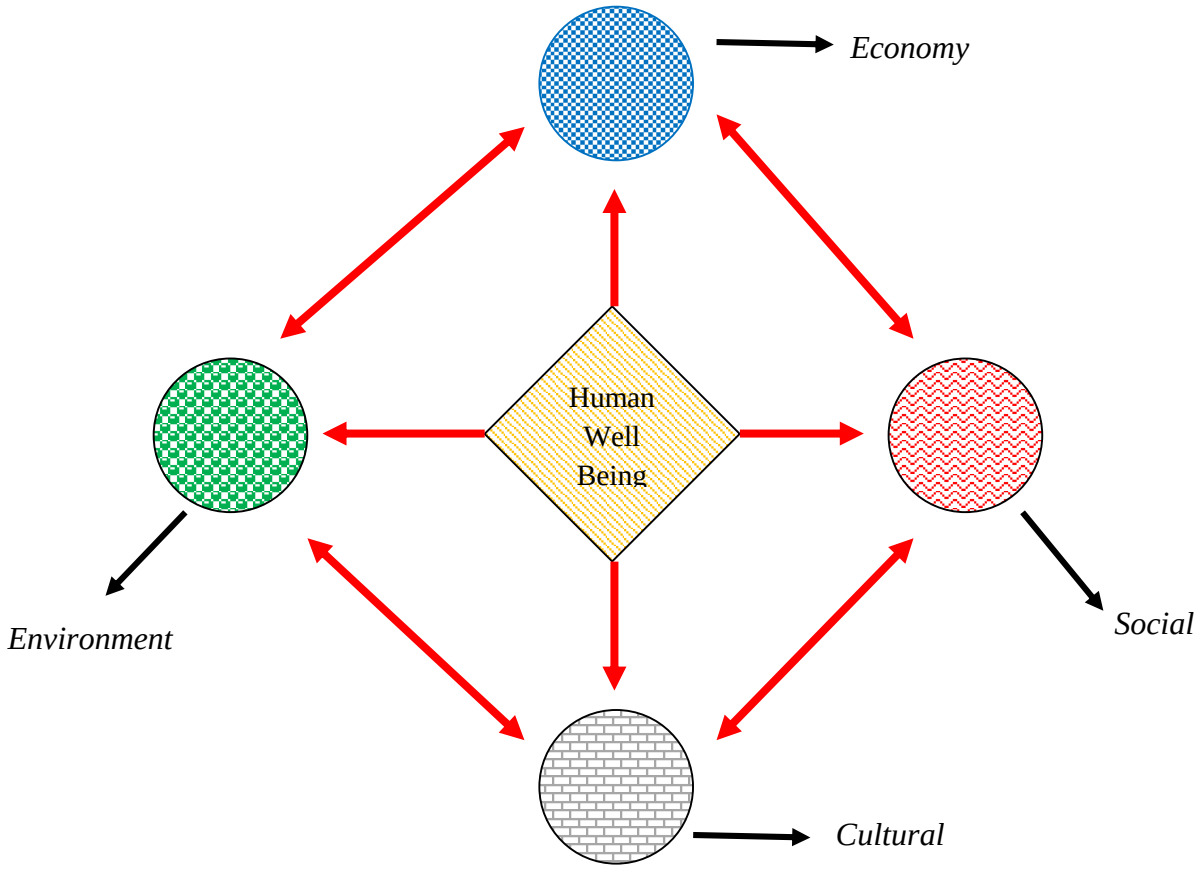

***Figure 2.1 the interactions of the four dimensions with human beings at the center of intersection. Source: (*UN-Habitat, 2012).**

Environmental sustainability dimension: it views and approaches issues such as: ecosystem integrity, carrying capacity and biodiversity. The environmental sustainability of housing is concerned with the impacts of housing on the environment and climate change, as well as the impacts of the environment on housing itself. More specifically, there are three types of the relationships between housing and the environment:

• House building and operation require various environmental resources, such as building materials, water, energy and land;

• Residential activities in human settlements have direct ecological impacts on local areas in terms of air and water pollution, waste and damage of natural ecosystems;

• Homes and their residents are also themselves exposed to varied environmental hazards, which may emerge due to human activities (e.g. air and water pollution, lack of sanitation), due to natural factors (e.g. landslides, vector-borne diseases such as malaria), or due to the combination of natural and human-made factors (e.g. climate change). Thus, housing provides an important means for addressing local and global environmental concerns in relation to public health, energy, water and material efficiency and CO2 emission, waste production and recycling, climate adaptation and environmental hazards mitigation measures. Corresponding strategies for improved environmental sustainability in housing include the following:

• Reduce environmental footprints from housing in terms of energy and associated

GHG emissions, water, land and material use, as well as waste;

• Ensure healthy housing and surrounding living environments (including improved sanitation, public health impact and reduced pollution);

• Strengthen resilience and adaptation (robustness of design, hazards prevention, and greening). The rest of this chapter will review the

following common principles and considerations in respect of environmental footprint and resilience of housing:

• The whole lifecycle of houses;

• Residential densities and urban mobility in neighborhoods;

• Mitigating environmental hazards and improving green spaces;

• Energy and resource efficiencies;

• Sustainable affordable building material and practices;

• Integrating housing into low-carbon community infrastructure.

Economic Sustainability Dimension: it details the scope of economic growth, economic development, economic productivity, and trickle-down in the economic system. Not only that, the economic dimension of housing sustainability emerges from a variety of economic functions and implications that the housing system has, such as:

• Housing and related infrastructure are among the most valuable and lasting human-made capital assets;

• Housing provides the basis for human welfare, labor productivity and mobility;

• Housing is an important part of household expenditures and public expenditure and if unaffordable creates numerous socio-economic problems;

• Housebuilding, housing services and real estate markets are among the key economic and employment activities;

• Housing is a platform for home-based activities and entrepreneurship;

• Housing is part of economic flows of natural resources and energy.

Housing is a productive asset that has important contributions to national welfare and economic development. Moreover, decent affordable housing and related infrastructure are among the key factors that also make local places more attractive, inclusive and competitive and hence are the key to sustainable economic development at the local level too. Indeed, places with housing deprivation have little prospect to attract skilled workers and investments, while places with expensive housing often ends up being surrounded by slums and create serious social tensions and stress and sub-optimal local economies. Yet, all these economic implications of affordable housing remains largely unrecognized in national growth strategies in developing countries. Affordable housing is seen primarily as a social welfare instrument (for alleviating poverty, promoting fairness, and ensuring housing rights), not as a system to advance economic development (Tibaijuka, 2009). While the social welfare imperative is certainly overwhelming, there is still a strong need to articulate affordable housing along the economic sustainability lines as well.

Social Sustainability Dimension: it evaluates in accountability the areas such as stratification identity, empowerment, accessibility, stability, and equity in the social system Emenike and Ezeudu (2020). X-rayed these factors as indicators of: regulations; poverty; quality of environment; equity and ownership; and access to infrastructure, facilities and service as pertinent to housing and its surrounding environment. Furthermore, Social sustainability in housing is about creating affordable, good-quality, inclusive and diverse (mixed-tenure and mixed-income), secure and healthy dwellings, residential

areas and communities, which are well-integrated into the wider socio-spatial systems of which housing is part – urban and national. Cultural sustainability takes into consideration cultural worldviews and values, norms and traditions, as well as lifestyles and behaviors of occupants, communities and society, thus supporting the dignity of communal life. Given the significance of housing for human needs and livelihoods, the social dimension of sustainability remains the key condition – even the focal point – against which the environmental, cultural and economic considerations must be assessed, counterbalanced and developed. However, every effort must be taken to ensure that the social dimension is integrated with the broader conditions for sustainable housing as expressed in the holistic four-dimensional approach

Cultural Sustainability Dimension: Cultural sustainability takes into consideration cultural worldviews and values, norms and traditions, as well as lifestyles and behaviors of occupants, communities and society, thus supporting the dignity of communal life.

The literature review chapter exposes in brief factors that makes up sustainable housing infrastructure in line with parties involve at various levels and their responsibilities. This chapter also highlighted the conceptuality of (SHI), in respect to issues and challenges of housing, of which by the reason of its predicament the need of sustainability approach is been employed.

Finally the dimensions of sustainable development principles in which its proper application and implementation will give birth to sustainable housing infrastructure.

2.2.2 Materialization of Sustainable Development concept

The sustainable development concept starts emerging in the second half of the 1970s because of the economic dichotomy with balance of payment issues resulting from the sudden rise in oil prices, characterized by the general weakness in the economic system mostly in African countries (Franks, 2006; Cusworth and Franks, 1993). There was also a general reduction in the standard of living in the entire economy and severe impacts on the development of projects, and the wider policy-making and planning in the environment (Ihuah, 2007; Franks, 2006). Therefore, in 1972, a conference on the Human Environment was held in Stockholm, Sweden, which was attended by 113 states/countries and with representatives from 19 international organizations. This marked the first ever international conference devoted exclusively to addressing environmental problems with a global strategy. At the conference, 27 experts where able to articulate the relationships between the environment and development indicating that though individual preferences and conflicts exist on the issue they are intrinsically two sides of the same coin (Vogler, 2007). Also, at the conference, the United Nations Environmental Program (UNEP) was created with the mission to provide leadership and encourage partnership, caring for the environment through inspiration, information and enablement. These fostered among nations and people, the desire to improve their quality of life without compromising the ability of the future generations to meet their own quality of life needs. However, the conferences effectiveness was limited because of environmental

protection and development needs, particularly in the third world, where it was seen as competing needs, and would need to be dealt with in a separate, clumsy fashioned manner. The more worrisome feature was to recognize the trade-off between environment and development rather than promoting harmonious linkages between the environment and development (Prizzia, 2007). It was clear that a more integrated perspective that incorporated both the environment and economic development issues was indispensable. Therefore, in 1983, the United Nations general assembly created the World Commission on Environment and Development (WCED) which later was named after the chairman of the commission 'The Bruntland Commission'. Thereafter, in 1987, the commission published their first report entitled 'Our Common Future'; which provided the most significant and generally accepted definition of sustainable development (Vogler, 2007). However, Daly and Cobb (1989) and Timberlake (1989) asserted that the Bruntland Commission's definition of sustainable development was both optimistic and vague; having a purposeful and politically astute component which generated debate of the full spectrum of possible interpretations, and that the claim that we can have economic growth without damaging the environment was a sheer statement of opinion. Nonetheless, Bartlett (2006) asserted that the Commission itself suggested that for the definition to be accepted, the discussion had to be optimistic. Bartlett (2006) therefore further argued that it was necessary to be vague and contradictory as not to appear to be pessimistic. However, in whatever ways the Bruntland's definition of sustainable development is

examined, it remains the hallmark for the concurrent understanding, acceptability, and application of sustainable development or sustainability concepts in the world today.

2.2.3 Vital Sustainability Policy Delivery in (SHI)

The general approach for the realization of the sustainable affordable housing policy is represented in Figure 2.2. Housing practices must be adjusted to achieve multiple benefits across the four sustainability dimensions – to simultaneously improve people's livelihoods, contribute to the economy, and enhance the environment. A crucial aspect is sustainable policy delivery. The latter relies on a strategic vision and supportive institutions, multistakeholder cooperation, and sustainable sources of funding – all underpinned by appropriate regulation and capacity building. The following principles are relevant at all scales of sustainable affordable housing projects and programmes – from the national to community level.

- **Leadership and commitment:**

It is the imperative that sustainable housing initiatives are backed by a clear and strong leadership and political will. When critical changes are to be set in motion, it is especially important that strategic thinking and strong leadership are present. Within government special organizational units should be charged with the responsibility of coordinating sustainable affordable housing initiatives, which will have a sufficient mandate as far as these policies are concerned. It is also important to establish coordination between various relevant authorities. (FMLHUD, 2012; Parry *et al.,* 2001).

- **Institutionalizing sustainable housing:**

For sustainable housing to really become a long-term and sustainable policy, it needs to be fully institutionalized in the relevant government and non-government structures and practices and become independent from changes in government. Sustainable housing ideas should become part of political and policy discourses and the operation of government, non-governmental and private sectors, as well as academia. For this to gradually happen, a national housing strategy and a strong legislative basis need to be introduced, governance structures reformed, and strategic

investment, research and training programmes launched (Ayman, 2010; Fasakin, 1998).

- **Multilateral collaboration:**

Good governance should be underpinned by a clear vision, strategies and action plans, which need to be formulated and implemented by collaboration with multiple stakeholders, including between different levels of government and government departments, private sector, non-government organizations and local community. Wide and open consultations are critical to the development of the sustainable housing strategies and projects. Participation and cooperation can also bring missing technical expertise (Fumilayo and Adetokunbo, 2013; Ayedun and Oluwatobi, 2011).

- **Community participation:**

Local and end-user participation is essential for understanding community needs and

preferences, as well as to learning about the local community's knowledge about climate challenges. Sharing ownership of the project with the local community and end-users better guarantees its viability. Projects should also respect local culture and traditions.

- **Context-specific approaches:**

The challenge of integrating potential competing social, cultural, economic, and environmental considerations in sustainable housing requires cooperation and integration across sectorial and administrative boundaries. This is best achieved by a holistic spatially focused approaches (rather than sectorial), which will seek locally-nuanced solutions, based on specific social and physical contexts. Problems vary from one location to another and so should be responses.

- **Capacity building:**

This involves educating various publics about the multiple benefits of sustainable housing and green building; developing educational programmes for various groups and job markets to acquire necessary skills; accumulating and sharing data bank of best practices; promotion of exemplary projects and case studies.

- **Financial mobilization:**

It is important to mobilize financial resources for the implementation of the sustainable housing policies and projects, including by engaging with public-private partnerships, the private sector, and advocacy with the government organizations.

- **Indigenous low-cost materials and techniques:**

Particular effort needs to identify and, if necessary, restore low-cost sustainable methods for homebuilding, which should be further combined with modern methods to deliver affordable and resilient homes. The development of new materials and technologies should include a strong pro-poor element.

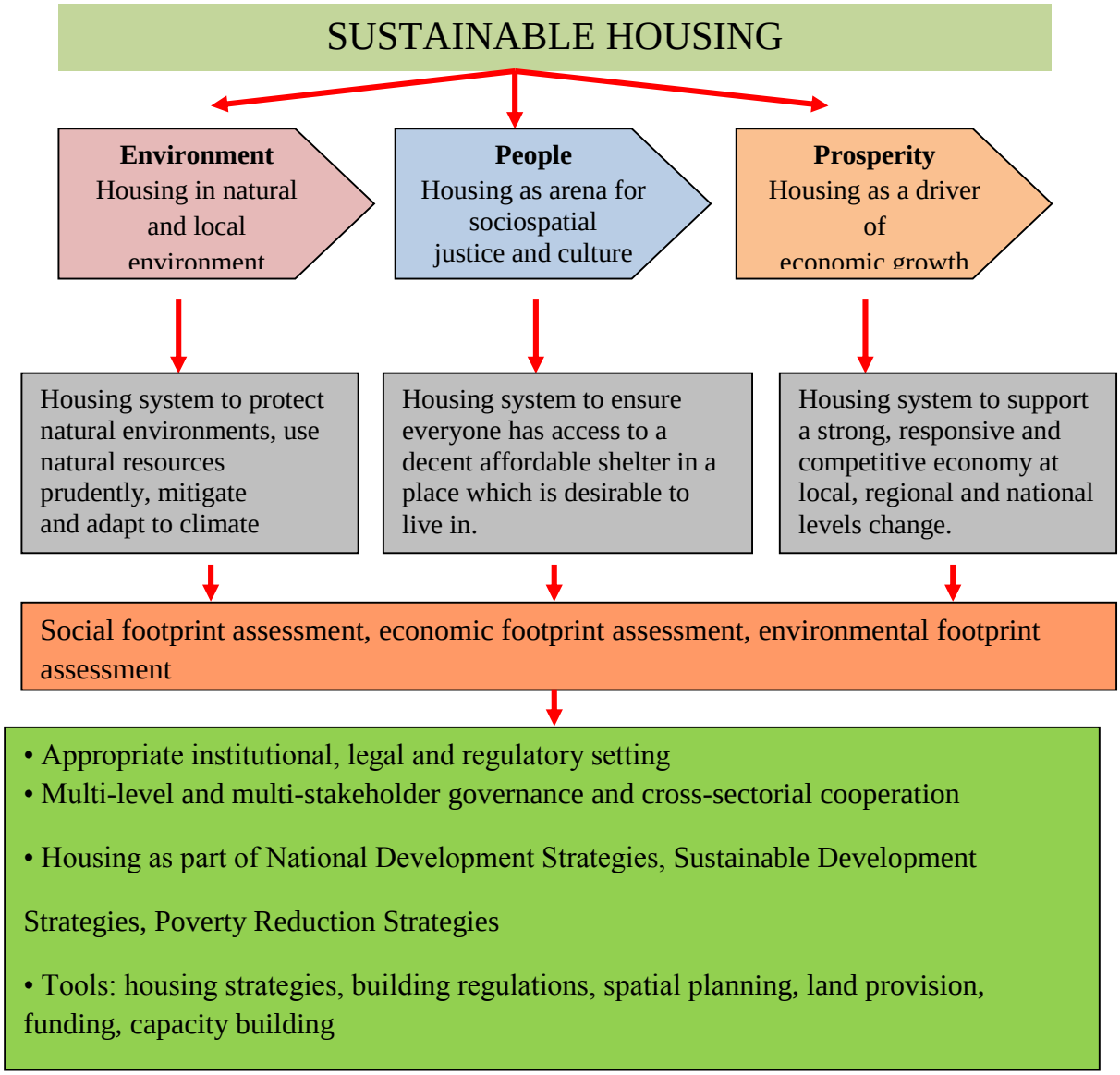

Figure 2.2 Sustainable Housing Policy. Source: (UN-Habitat, 2012).

The purpose of a national sustainable housing strategy should be acreationofan integrated policy framework to guide the country in the development of a sustainable housing sector, while also assisting with the wider ambitions for poverty reduction, socioeconomic development, and dealing with climate change. The strategy needs to integrate housing programmes that already exist in the country with a broader framework aimed at creating a more sustainable and affordable housing sector. The national sustainable housing strategy should:

(1) set out a clear housing vision for the country over a 10-20 year timeframe and key strategic objectives;

(2) be based on a sound evidence base;

(3) set out policies and a detailed action plan to implement the vision and objectives, giving details such as when, how, where and by whom actions will be delivered;

(4) set out the outcomes expected from the delivery of the actions and the indicators that will be used to monitor progress towards them, including quantified targets; and (5) be reasonably concise and accessible to the general public.

2.2.4.1 Sustainable Housing Aiding Framework

The aiding framework in the context of sustainable housing infrastructure is viewed from two approaches that are framework and organizational structures both within and outside the project environment being framework of

sustainable housing infrastructure. The framework its development and implementation are essential to a project sustainability's to which sustainable housing projects are not exception. Housing aiding framework is developed within the context of developing countries where its practiced as new approach, although Egypt and Rwanda is on its way to producing a modern framework for sustainability. An attempt to embrace this modern technicality has started solving housing shortage in Sweden, Dubai, and Norway; this will also help Nigeria if it's practiced in its entirety.

2.2.4.2 Institutional Framework

Sustainable housing infrastructure success starts with well-planned institutional and organizational set-up particularly the pre-construction stage (planning) execution stage (construction proper), and post construction stage (management/ maintenance). Putting this factor in place guarantees the physical, economic, and social status of the estate life-cycle (Onuoha, et al 2017). The institutional framework forms the structure of the entire housing delivery system and the structure within which housing policy is implemented. This greatly influences the success of sustainable housing estate delivery and management and that institutional roles should begin at the initialization stage of the policy development, and be sustained throughout the implementation, coordination, monitoring and evaluation and review stages. From the former and later statements, it is clear that the post-construction management strategies of sustainable housing estates are not yet developed Parry-Jones, *et*

al. (2001), Mudege (1993) and Morgan (1993) stressed that no project development including (public/private) housing estate projects should be implemented in any particular environment without a strategic approach for the post-construction management. This is the management culture practices which keeps the social projects functional, and remains much more significant than the actual housing estate construction management.

2.2.4.3 Regulation/ Legal Framework

Regulatory framework is an abstract framework that controls the practice, process and procedure of sustainable housing in this context it also improves, protects other frameworks. Statutory consideration and application hitherto, will lead to success of (SHI), achieving this will largely be dependent on government rules and regulations which govern or regulate the sustainable housing sector with regards to its construction, installation, ownership and management. Therefore the legal framework is an abstract that has a substantial base for any giving undertaken. (Ogus, 2004), insisted that there is a relationship between legal principles, institutions and economic behavior in all dimension of human environment (Ogus, 1998). Land ownership is according to allocation of rights and obligations in relation to "real" or "immovable" property is protected by the law Chigbo (2013). Although the Land Use Act of 1978 was meant to usher in a new land reform in Nigeria, it soon became a clog in the wheel of development over the years. This was more so because the Military Government which promulgated it also ensured it

was embedded in the Constitution of the country. Thus, any attempt to rectify its inadequacies required a constitutional amendment. There were thus many protests both to have the Act expunged from the Constitution and to amend it in very many substantial way. It took the decision of the then President of the Federation to have land reform as one of the seven point agenda of his administration. In the area of skills, the seven sisters in built environment ranging from estate surveyor, land surveyor, architect, engineer, quantity surveyor, builder and town and regional planner, constitute the basic professionals in construction process and their permission to practice in area of their expertise is regulated by the law at various level. Types and quality of building materials is also guided and regulated by the law under standard organization of Nigeria (SON), the under functioning state of this framework aroused the alarm raised by (Chandra, 2010; Kaleem, *et al.* 2009; Shanmugsundaran and Balakrishan, 2011). Due to bottle neck laws and regulation surrounding housing it has caused more harm than good by discouraging investors making housing deficit to increase as more Nigerians are rendered homeless.

2.2.4.4 Environmental Framework

The sustainability of housing infrastructure in the context of the environment, relates to thing such as the: quality and condition of the (private/public) housing unit or estate, environment; housing design in terms of ventilation, lighting, and building morphology; energy consumption issues; building

design; natural topography of the land; and how the housing estate compacts with the natural land for preservation and optimization (Ibem and Azuh, 2011; Ihuah and Kakulu, 2014). Another unavoidable issue is weather conditions such that it is often responsible for chemical reaction of building materials and other components of the housing estate. For instance, the atmospheric pollution associated with acid rain, causes rapid deterioration of some housing materials (Patton, 1988), and the use of such material again in maintenance work will have an impact on the short-term failure of the housing estate condition.

All of these issues require a specialized and well-experienced maintenance contractor to perform the housing estate maintenance work and management effectively. A good maintenance contractor as opined by (Al-Hazmi,1995) is cherished with the quality of being a confirmed performer, understands and knows the cost implications and what can or cannot be done in any particular scenario, realizing that regulations are built upon past performance.

Even where these issues are considered, the quality of the neighborhood or estate community environment may be poorly habitable, the social housing estate community may not appreciate the estate since the immediate environmental conditions discriminates with the community environment. This may suffice to suggest that aesthetic issues of the social housing estate neighborhood environment are overlooked. Carter *et al.* (1996) argued that the engineers, planners, environmentalists and decision-makers always underestimate these aesthetic issues which may become a basis for rejection or

non-appreciation by the housing estate community, because of the lack of integrating community participation and involvement in the project from the beginning of the design process through project decision-making and into post-construction management.

2.2.4.5 Technological Framework

The United Nations Development Programme (UNDP) and the World Bank (WB) initiatives in the 1970s on global/interregional project laboratory testing and technological development substantiated the fact that technology might no longer be a limiting issue to project sustenance in the rural community (Parry-Jones et. al., 2001). But this notion appears deficient, as most projects failures are associated with a lack of available materials, the poor quality of the materials, human skill and the unplanned maintenance design management (Fonseka and Baumann, 1994).

The technological factors relate to the: building materials availability; local manufacturing capabilities; planned preventive maintenance; housing estate usage; durability; technological transfer; and the uncontrolled rising costs of building materials; (Ibmilua and Ibitoye, 2015). In the FMLHUD (2012. p.63) housing policy, it states that ‘the building materials sub-sector is intricately connected to the process of national industrial development; and the improvement of local capacities is one major way to stem the overdependence on the importation of building materials’. In social housing development and post-construction management, the most frequent problems are increased

construction and labour costs resulting from: increased import duties; lack of consistency of policy formulation and implementation; over-priced contract; over-priced cost of construction; shortages of skilled manpower; and the absence of indigenous technology for the production of building materials (FMLHUD, 2012). Local manufacturing of building materials, particularly in Nigeria, is limited. Such that where available, the quantity, quality and durability of these materials, often poorly manufactured is so constrained to the extent that its use becomes risky to housing provisions. Nevertheless, quality specifications can be put in place and monitored for compliance within the building material production sector as indicated in the Nigerian National Housing Policy, but it is still in its infancy. Despite the flaws, some of the locally manufactured building materials are more costly in certain African countries (for example-Nigeria-Port Harcourt) than the imported ones from the country of production. From this perspective, the provision of (SHI) stock materials and post-construction management will be retard as most projects could not afford to pay in advance for the building materials stock, but Parry-Jones et. al. (2001) opined that better sustenance of projects and the related local benefits can still be achieved when the materials are purchased offshore and delivered through local participation. On the matter of availability of building materials as it relates to social housing estate project sustenance, the problems of inadequate and insufficient infrastructural facilities such as: bad roads, water, sanitation; and power supply remain a serious problem. This is because the quality, availability, procurement and supply of these

infrastructures are challenging, and at most times, the project developers fail to consider the future consequences of these factors to the project sustenance. Baumann (1994) contended that the purchase of materials for a project (including housing estate projects) should be made to be economically feasible and viable. The locally manufactured materials should have a strong linkage to the community market for better contact with the beneficiaries of the project (FMLHUD, 2012; Woodhouse, 1999); and the willingness of the stakeholders to procure the materials should be encouraged (Breslin, 2001). This should be through providing incentives to, and creating, the enabling environment for flow of funds and tax relief, loans at reduced interest rate and encouraging the use of the locally produced material at all tiers of government constructions (FMLHUD, 2012).

Another encouraging step should be to restructure and adequately fund the Nigerian Building and Road Research Institute and the establishment of building materials testing laboratories by either the government or the private sector. Technology transfer in terms of building material production and high maintenance skills is gaining a certain momentum, but a lot more is needed in this aspect. This would afford long-term production and knowledge accumulation that can be transferred to countries of similar environmental, political, social and economic status (Parry-Jones et. al., 2001; Alberts et. al., 1993). However, the level of this technology transfer is something to which attention must be given if the expertise to be transferred matches the desire of the community or intended development. One way of addressing this is by

developing effective manpower training programmes to raise the output of the building industries through: providing, restricting and expanding vocational training centers for the training of personnel; and to provide and upgrade structured training for indigenous contractors and developers through short-term programmes in project management, construction management and building methods.

2.2.4.6 Financial-cum-Economic Framework

The life blood of real estate infrastructure is finance. It requires a bulk capital for its execution. The bulk amount involved makes it difficult, most times synergy, private public partnership (PPP) can be used to provide real estate infrastructure. There are many sources of finance for real estate infrastructure the source could be internal or external. Internal sources are sources by which the developer or group of developers generate funds internally without government intervention for the provision of real estate infrastructure. External sources are finance generated from outside the capital of the developer .the fund is usually disbursed by the government either directly or indirectly.

Source of finance for real estate infrastructure (Emenike, 2019). In the context of sustainable housing infrastructure, the economic/ financial framework should aim for the maximization of the capital value of the construction and minimization of the life cycle process management so as to enhance issues such as: its affordability to the citizens; the tenure options; the aptness of the sustainable housing infrastructure acquisition process; the conformance of the

housing estate design to future uses and needs; and the creation of opportunities like jobs in the built environment. This allows the researcher to deduce that the sustainable housing infrastructure will involve huge capital sums and that the understanding and ability to reduce these costs will strengthen the affordability of housing to the people. This might concur with Harvey and Reed (2004), Parry-Jones *et. al.* (2001), Woodhouse (1999), and Sarkinnen (1994) who all opine that, since the capital costs of projects such as, housing, are huge and the community or individual cannot afford it, the total responsibility should be left for the government, donors or NGOs. However, Parry-Jones *et. al.* (2001) argued that even though such concerns should be carried by the project financier, the social housing estate community, the tenants and the professionals must prove commitment either in-cash or in-kind for the management to be in a sustainable manner. It is through this commitment that housing estate community and all other stakeholders for the sustainable management could have involvement in both the social housing estate design and the organizational capacity to sustain them (Emenike and Ezeudu, 2020). However, an evaluation of a UNCDF project in Guinea Bissau (1996) indicated that the failure, for example of hand pump water projects to sustain the proposed accruable benefits, was the failure to develop an appropriate strategy for operation and maintenance (O&M) cost recovery at the community level which then undermines the project sustenance. Therefore, understanding the true costs of the operation and maintenance of social housing estate projects is of importance, but the project owners, planners and

decision-makers always seem to neglect this aspect, though little documentation exists (Parry-Jones et. al., 2001). However, the costs of operation and maintenance of social housing estates are generally vast, but if a planned preventive maintenance management strategy of the sustainable housing infrastructure is made through the budget at the onset of the housing delivery, then less cost would be incurred in life cycle construction management of the sustainable housing infrastructure.

2.2.4.7 Internal/ External and Trado-cultural Framework

Attempts to conceptualize what a community is in relation to a project has posed many difficulties, discrepancies and ambiguities such that no clear distinction is made about the concept of community. However, engineers perceived a community as a homogenous group of people with like-minds, but this is not always the case as it is always difficult to produce collective community leaders who will maintain the project (Waterkeyn, 1993). Nonetheless, the WHO (1999) defined a community as that made of the people and environment contained as a local, political and administrative cadre. This implies that communities are characterized based on demographic, cultural, social, economic, environmental and infrastructure features as summarised in Table 2.1 below:

Table 2.1 Characteristics of a Community

Demography	***Culture***	***Economy***	***Environment***	***Infrastructure***
Population and age distribution Mobility Useful skill Health Education level Male/Female Distribution	Traditions Ethnicity Social values Religions Food Types, Eating Habits Power structures	Trade Agriculture Investments Industries Wealth	Landforms Geology Waterways Climate Flora Fauna	Communication Transportation Services Community assets Government structures Resource base

Sources: WHO (1999).

In the context above, Parry-Jones *et. al.* (2001) defined a community as group of individuals that come together when they have a common need. From this, it means that the expression of need is central and paramount to sustainable social housing estate projects, such that people can only agree, volunteer, support, involve and participate in a project when the objectives and benefits are clearly identified and made known to them (WSP, 2000b; Cleaver, 1991). However, a community is not an island: social migration; communication; and urban movement; bring social flux which is a poor basis for progress in the development process (Abrams, 1998). Because of the multi-dimensional and changing habits of a community, they must not be underrated in the processes of project implementation and post-construction management.

Community and its social aspects in terms of need and priorities have become the commonest factors why many social-community projects fail or are unable to deliver the benefits intended (Ihuah and Kakulu, 2014). This is because of their belief in the

use of their natural resources such as land and can easily make a U-Turn, ensuring the failure of the project by looting the materials at building or maintenance sites. This is the commonest case of project failure, vandalisation and abandonment as opined by Kadiri, (2004) and particularly in the Niger Delta of Nigeria where most of the area is inhabited by unemployed youths and the associated poverty. As a result, maintenance issues do not become a part of the priorities. Another community factor for social housing failure is the acceptance of the so-called appropriate technology by the community and a problem of community project sustenance occurs when the operation of the social housing estate as designed runs contrary to their traditional housing culture or expectations.

Furthermore, gender diversity, which is on the global agenda, affects social housing estate provision, and a project requires the involvement of all community groups irrespective of their gender in the decision-making and management of the system (El-Gohary *et. al.,* 2006). But, Hoffman (1992) has found that there is still gender discrimination in project post-construction management, for instance, female input or efforts were not rewarded while the males were rewarded for the same service rendered. Also, Cleaver's (1991) study in Zambia confirmed that while women were members of project committees, all the tasks were performed only by men. The implication here is that women should be allowed to fully participate with equal opportunity like every other group in the community.

Also, village level power structures and dichotomies are another problem to the community sustaining social housing estate projects. It is required that every community set-up their own management committee to look after the ongoing

operation and maintenance of their project (Parry-Jones et. al., 2001). Cleaver's (1991) study in Zambia suggested that a new committee set-up is not the case, rather the existing community leaders and at most times the traditional rulers influence the decision-making of the community. Also, UNICEF report that in Nigeria (WELL, 2001) on rural water programmes for example, that the most active group in project and post-construction maintenance management is the Community Development Committee (CDC) that was democratically selected by the community themselves. Whatever the case, the community should be encouraged to build up their own management structure as suggested by Breslin (2001).

Finally, another issue of the community and social aspects is that of ownership. Parry-Jones et. al., (2001) and Cleaver (1991) emphasized that one of the main requirements of community participation in project decision-making and implementation is to stimulate a sense of ownership, which increases the level of maintenance to projects. However, in Zimbabwe for example, the case was different as the community felt that their contribution to the project implementation and post-construction management were a sell-off of their rights to ownership (Parry-Jones et. al., 2001). When the ownership type is limited such that the rights an individual has in the social housing estate, is as a leasehold owner, the resources and other activities of the commitment to keep the property in proper conditions become rarely feasible.

2.2.4.8 Human Resource Management Framework

The sustenance of any given infrastructure will be impossible without human resource. In this context, human resource comprises of the people with assigned roles

and responsibilities for completing a specific task in the area of sustainable housing infrastructure which may require skilled labour, semi- skilled or non-skilled labour at various undertaken (PMBOK, 2016). From the idea conceiving stage to decision stage to planning stage to construction stage down to management and recycling stage all need human resource at one point or the other not only that, human resource management must touch across monitoring and control, planning and execution, evaluation and reporting as a critical factor for tracking the performance of the project to see if the progress is towards achieving the targeted returns or benefits (Ihuah and Kakulu, 2014). According to the Nigerian National Housing Policy (FMLHUD, 2012), monitoring, evaluation and reporting are an integrated process and demands that coordination action by stakeholders in both the public and private sector of the economy is vital in the housing delivery and this can be achieve through human resource management.

2.3.0 Sustainable Housing Infrastructure Theoretical framework and conceptualization

Housing is not only the building block of sustainable communities, it is also about the transformation of communities and creating places where people can continually live and work for present and future generations (Kabir and Bustani, 2012). It is the building or shelter in which people live; and represents one of the most basic human needs with profound impact on: health; social behavior; satisfaction; efficiency; and general welfare of the community (Kadiri, 2004). Housing all over the world has remained an interdependent phenomenon that affects every facet of mankind. Its

importance is so pronounced that it imparts on the social, physical and mental wellbeing of man irrespective of his socio-economic status, color or creed. It represents of the most basic human needs and has no doubt impact on the health, welfare and productivity of the individual. In spite of the importance of housing to mankind, there is however, a universal shortage of needed dwelling units especially in developing countries including Nigeria where population growth and urbanization are rapidly on the increase and where the gap between housing supply and housing demand is so wide (Ayedun and Oluatobi, 2011). For this reason we need to explore the true ideology of (SHI) in relation with the effect to property values in property market.

House building, forming the basic unit of human settlement in the built-up environment is also a crucial component for social development. It plays an important role in achieving sustainable development. The social and cultural factors determine the primary requirements of housing. Financial capacity or affordability to an individual has the immediate effect of transforming this need or requirement into a sound reality. Technology acts as a catalyst to help in realizing this by providing affordable options suiting individual requirements and changing circumstances, along with accomplishing present demands, the needs and wishes of future generations should also be taken into account. The importance of sustainability of housing comes within this context. It embraces four closely inter-dependent aspects: socio- cultural, economy, technology and the environment.

2.3.1 Socio Cultural Necessity

The concept of shelter differs from individual to individual depending on culture, tradition, profession and way of living. The design and materials used for the house should correspond to the user's way of living and local building traditions (Ebsen and Ramboll, 2000). In most communities, houses are treated as part of the identity of the individuals labeling their status. People do not want to live in a house, which stigmatizes them as belonging to a low-income class, even if it is all that is affordable to them. The location and type of houses often reflect social inequalities. This also affects their social relationships, day-to-day living and ultimately the prospects of future generations. Besides being a basic necessity, it is also a source of identity that has a significant effect on the overall psychological wellbeing of the inhabitants. It acts as a matrix that strengthens family and community ties. Different groups of people within the society should be able to participate equally. Socio- cultural sustainability in housing involves several dimensions such as adaptability, equality, integration of amenities and services; self-help housing or beneficiary participation and community involvement. Sustainable housing should respond to the socio-cultural needs and practices of the beneficiary households and communities. It is focused on housing development that promotes social interaction of individuals and cultural enrichment of the community and is aimed to reduce the inequality of housing between social classes (Islam. N, 1996). At the same time it accelerates the improvement in social development, relations and interactions.

2.3.2 Economic Necessity

As improvement and development of society are closely related to economic development, socio-cultural sustainability is closely linked to economic sustainability. Economic growth is the key to provide the means to meet basic needs, to ease poverty and to generate employment, factors that are essential for sustainable development (Veron, R 2001). Even though housing problems arise as a symbol of poverty, mere financial assistance usually does not help the poor in meeting their housing needs. The affordability of a household in any part of the world depends on its command over the various resources required for housing. The command over these resources must be given right priority while planning for any housing development programme. The most important financial resources are the actual and potential savings of the inhabitants. This probably represents between 10 to 15% of all personal incomes (Turner, J, F, C 1976). Housing programmes may be linked to programmes generating employment or income enabling the poor to afford their own houses and maintain them (Bhattacharya, K, P 1994). The housing sector is employment intensive; it generates employment during the construction period and also during its life for proper maintenance providing employment opportunities for skilled as well as unskilled labor (Glaeser, B 1995 and Tiwari, P 2001).

Economic sustainability or affordability of housing should be embedded in an economic development strategy, which strengthens the economic self-reliance of household members. The poor often cannot afford to accept public housing assistance due to the lack of economic sustainability or affordability of the schemes.

2.3.3 Technological Necessity

Conventional building materials are beyond the reach of the majority of the world population due to their poor affordability. Besides the escalation in the cost of building materials, rising environmental concerns due to the extensive exploitation of natural resources connected with general construction and other housing development activities urges the need to search for alternative technological options. Alternative materials, methods and techniques of construction replacing conventional building construction can result in reducing the depletion of natural resources and save energy (Reddy and Jagadish, 2001). Technology can be said to be sustainable only if, it takes advantage of local resources and can be produced

locally using unskilled labor, utilizing already available materials without the need for heavy capital investment. It should benefit as many people as possible and should be flexible and functional also, i.e. adaptable to the changing needs of the community; at the same time it should also be environmental friendly. It must be affordable and workable at community level. Feasibility, functionality, strength, durability and reliability are identified as the basic necessities for technological sustainability.

2.3.4 Environmental Necessity

It is now generally agreed that development in the low-income countries must proceed in parallel with a general global application of new technologies, which are both less resource intensive and less environmentally damaging (Spence and Mulligan, 1995). In order to be sustainable, developments in economy and social changes should be able to sustain ecology and improve potential resources for future generations.

Environmental sustainability in housing can be achieved by addressing resource limits of the environment through efficient consumption of non-renewable resources, minimizing the impact of waste materials and pollution by utilizing appropriate technologies and making use of local work forces. The construction industry is involved in activities, which adversely affect the environment through the over exploitation of non-renewable resources. It utilizes energy for the development or production and transportation of materials and machinery, building and also for maintenance activities. According to the World watch Institute, building construction consumes 40 % of raw stone, gravel and sand, 25 % of virgin wood, 40% of energy and 16% of water used annually worldwide (Dimson, 1996). The processes involved in the provision and use of housing have a significant role in the contribution to solid waste. Household activities also supplement the accumulation of waste further polluting the environment. Reducing material

wastage has several benefits. It reduces global material consumption and in the long term, also the amount of demolition waste. It also reduces construction costs, making houses more affordable. When properly done, recycling waste as building materials is a convenient way to reduce the environmental impact of the construction industry (Agenda 21 for Sustainable construction in developing countries).

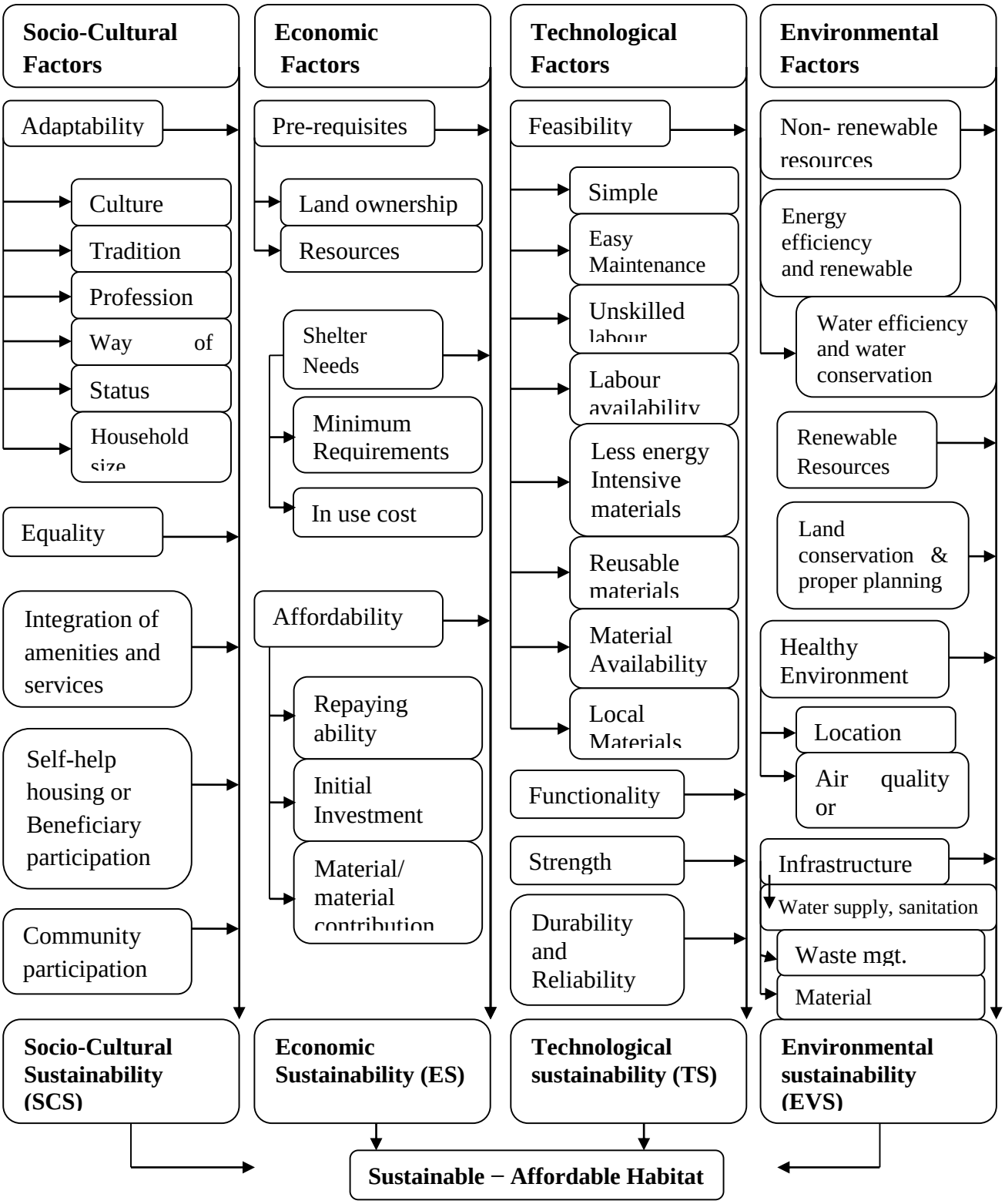

Figure 2.3 Element of sustainable – affordable habitat (source WSBC, 2005)

2.4.1 Sustainable – affordable habitat

for future Sustainable development is often defined as development that meets the needs of the present without compromising the ability of future generations to meet their needs (World Commissions for Environment and Development, 1987:23). 'Meeting the needs of the present' refers to the development aspects of sustainability, which includes economical, social, cultural and political issues. The second phase of the definition 'without compromising the needs of the future' mostly refers to environmental issues (Ebsen and Ramboll, 2000). Human settlements should be planned, developed and improved in a manner that takes full account of sustainable development principles. Sustainable- affordable habitat could be described as a way of developing and maintaining the living environment that support human health (both physical and psychological), satisfying their shelter needs along with protecting and preserving the nature for future generations. The conceptual framework for sustainable- affordable habitat has been formulated to achieve housing development by balancing social progress, enhancing economic growth, propagating innovative technology along with conserving and protecting the environment and natural resources re life and development.

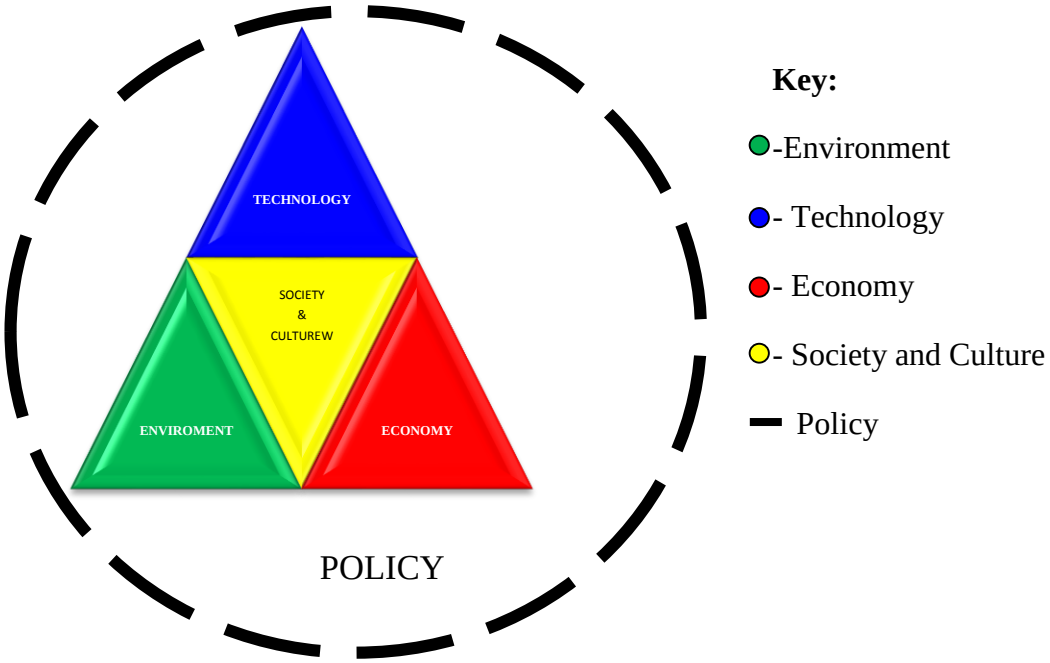

Figure 2.4 Element of sustainable – affordable habitat (source WSBC, 2005)

The figure illustrates the relationship between the four elements of sustainability and urges the need for an effective policy framework. A framework of objectives has to be prepared to determine the requirements and formulate strategies to support social, cultural, economic, technological and environmental sustainability. During the process of economic development three phases in change can be distinguished (but not separated): 'Optimization- improvement- renewal'. In each of these phases specific interactions between 'culture, structure and technology' can be recognized. In the process of sustainable development optimization and improvement with respect to the environment has been practiced and developed in the last decades supported by policy programmes and industrial initiatives (Jansen, 2002). Technological innovations can accelerate or decelerate the process of sustainable development as it can have positive and negative impacts to the environment.

Protecting the environment is a fundamental aspect of sustainable development. It includes the improvement of essential ecological processes, biological diversity and the natural resource base (Veron, 2001). Sustainable housing requires a strong supporting institutional (policy) framework to accelerate and integrate the process of development. At strategic level, sustainable development principles and approaches should be integrated into policy strategies and the planning process.

2.4.2 Strategies for Sustainable – Affordable Habitat

The efficient supply of housing is closely associated with policies, delivery systems in land, infrastructure services, finance, the construction industry and building material supply. The existence of inappropriate regulations and inefficient planning systems can also cause havoc with housing supply for the poor majority. Thus housing policy for people living in poverty has a multi- objective and multi- institutional relevance (UNCHS- GSS 2000). Housing, being a location specific activity, the Government especially local government is considered as the most important actor in the process of housing delivery or rather in facilitating the people to house themselves (Ebsen and Ramboll, 2000). An integrated policy framework is essential to co-ordinate the activities of all the actors to create a 'pull' from the side of beneficiaries rather than a 'push' from the authorities. At strategic level, sustainable development principles and approaches should be integrated into policy strategies and the planning process. An efficient organizational set up is essential during the project implementation and after the project has finished. It is also inevitable for an efficient working of the implementation systems, optimizing limited resources and integrating the various actors to achieve sustainable- affordable housing.

2.4.3 Policy Framework

Figure 2.5 shows the criteria required to formulate implementation strategies for sustainable- affordable habitat. This framework can be considered as a mechanism to achieve the objectives as derived from the analysis using CF1. It identifies four essential strategies to realize sustainable- affordable housing: Policy measures for socio- cultural sustainability (PSC), Policy measures for economic sustainability or Affordability (PES), Policy measures for technological sustainability (PTS), Policy measures for environmental sustainability

(PEVS)

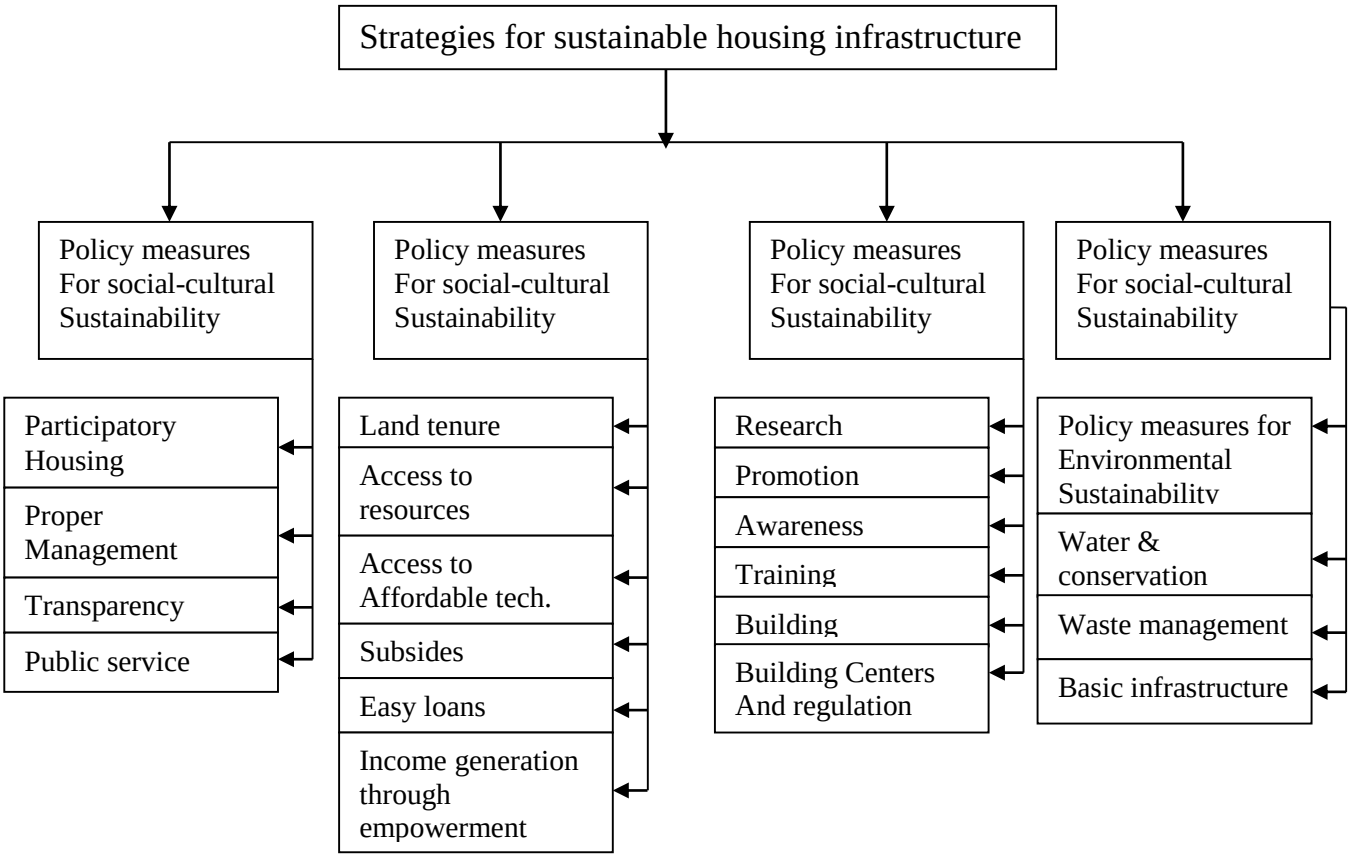

Figure 2.5 Policy Framework for Sustainable – Affordable Habitat

2.4.4 Policy Measures for Socio-Cultural Sustainability (PSS)

Participatory housing, including community building and self-help, proper management and transparency of development programmes can be considered as the basic elements of PSS. It should include strategies to achieve the following criteria:

Housing should fulfill the cultural and traditional requirements of inhabitants and should be flexible enough to meet the varying needs and interests of the inhabitants based on the changes in the ways of living, profession and household size over time.

i. The design, types and building materials used should not stigmatize the inhabitants.

ii. The location of the houses should be such as to facilitate the inhabitants to take part in community activities, improving social relations and intermingling with others.

iii. Housing developments should not cause the segregation of a community based on income,

religion or other social criteria.

iv. Easy access to infrastructure facilities and community services should be ensured.

v. Sustainable housing development should be able to promote self -help housing or involvement of households to develop a sense of ownership or pride among the inhabitants.

vi. Community participation should be ensured to speed up the growth of sustainable residential neighborhoods.

2.4.5 Policy Measures for Economics Sustainability (PES)

Access or command over various resources is an important criterion for affordable housing. Strategies and housing policies should facilitate the provision of easy loans, subsidies and income generating activities, which accelerate the repaying capacity of the households. Policies should be formulated so as to achieve the following objectives:

i. Land ownership, accessibility to resources like materials, labor and infrastructure facilities like transportation, machinery, power etc. should be ensured.

ii. Affordable housing should satisfy the minimum housing requirements.

ii. Ensure to minimize operational and maintenance cost in the long term.

2.4.6 Policy Measures for Technological Sustainability (PTS)

Technology promotion activities, awareness programmes and skill up gradation or training programmes should be promoted through policy initiatives. Building regulations and standards also need important consideration. PTS should include strategies to sustain the following criteria:

i. The technology should be simple enough to work with unskilled labor only requiring easy and inexpensive maintenance.

ii. The use of locally available or locally developed materials, which are cost efficient, abundantly in supply, durable, strong and environment friendly should be promoted.

iii. As far as possible make use of renewable, reusable and recyclable materials.

iv. It should be able to satisfy the needs and requirements of inhabitants. It should be socially acceptable and should also be affordable.

v. Ensure the usage of less energy intensive materials and methods.

vi. It should match the normal construction quality standards.

2.4.7 Policy Measures for Environmental Sustainability (PEVS)

The provision of basic infrastructure facilities, the conservation of natural resources, efficient usage of water and energy are essential for sustainable housing. Policies should be formulated considering the following specifications:

i. Integrate alternate solutions for renewable energy, reuse of water and also proper measures for conservation of resources.

ii. Housing developments should not disturb ecological and environmental balance.

iii. Ensure the provision of a healthy indoor and outdoor environment.

iv. Basic infrastructure facilities such as the provision of drinking water, drainage, sanitation and solid waste management should be ensured as an integral part of housing development.

2.5.1 Sustainable Housing Infrastructure in Umuahia

Since the creation of the state on the 27th August, 1991 by the then former head of state major general Ibrahim Badamesia Babangida, there are certain challenges the state has faced amongst which is shelter (housing). This challenge is aggravated by some externalities and internalities. Externalities like topography of the study area which might discourage the choice of investors when sourcing for land resource for the purpose of housing supply. Concentration of economic activities is another

externality that has strong effect on houses in the study area reason being that houses located along central business district (CBD) attract higher demand and vice versa. Location and accessibility has been one of the major challenge facing housing not only in the study area, but in most of the developing economies of the world especially in Africa, this effect has resulted to underdevelopment and low productivity in real estate sector.

Below are pictograms showing the extent this externality has affected the (SHI).

The picture is a representation of some sustainable housing infrastructural challenge facing Umuahia. This shows the degree of poor drainage system with poor maintenance practice in the study area.

Figure 2.6 Picture Showing the State of Waste Water Drainage System in Umuahia: (Source Feld Survey)

The picture is a representation of some sustainable housing infrastructural challenge facing Umuahia. This shows the degree of environmental degradation and lack of sustainable waste management approach.

Figure 2.7 Picture Showing the degree of environmental pollution in Umuahia: (Source Feld Survey)

The picture is a representation of some sustainable housing infrastructural challenge facing Umuahia. This shows the degree of physical, functional and economic obsolescence that has ravaged the practice of housing and real estate sector in the study area.

Figure 2.8 Picture Showing the degree of environmental pollution in Umuahia: (Source Feld Survey)

The picture is a representation of some sustainable housing infrastructural challenge facing Umuahia. This shows the degree of environmental disaster and resulting from some illegal activities like mining and other event that posed hazard on the environment

Figure 2.9 Picture Showing the degree of environmental pollution in Umuahia: (Source Feld Survey)

While the internalities include building and maintenance cost, government policies regarding land and land tenure systems, modern approaches innovation and technologies etc. Building costs include land acquisition (costs of purchase, titling, registration duties, obtaining planning approval, and any necessary environmental remediation or relocation); utility infrastructure (costs of developing, for example, e.g. water systems, electricity grids, heating and cooling networks, roads, security systems, sanitation systems); and construction costs (including labour and

materials). Since land costs and infrastructure costs are usually a factor of location, developers may account for land acquisition and utility infrastructure costs collectively when comparing locations. In different parts of the world, land costs account for varying proportions of overall costs, depending on factors such as land tenure, titling and allocation arrangements, and the local level of social and economic development. The cost of acquiring land tends to be higher close to urban centers, though increased density offers an opportunity to reduce land consumption per unit and the cost of connecting to existing utility infrastructure is typically lower than in more peripheral areas. The cost of land – highly influenced by planning policy, previous sale value, market dynamics and availability of basic urban infrastructure at the site – often decides whether there is commercial viability for the private sector to build affordable housing. Infrastructure costs vary with the availability of municipal services. Municipal spending on urban services is strongly and non-linearly correlated to population density: A study of about 8,600 municipalities in Brazil, Chile, Ecuador and Mexico revealed that per capita expenditure was lowest when population density is close to 9,000 residents per square kilometer. The vast majority (85%) of the cities studied were below this density level, resulting in a "cost of non-densification" (Libertun, 2018). Utility infrastructure costs are typically lower in urban centers than on the periphery as the essential network infrastructure is already laid out for the city, and expansion may require increased investment with lower margins. Construction costs exhibit strong economies of scale: developers typically save substantially on the costs of labour and materials for housing developments larger than 500 units (Duren, 2017). Construction costs vary

across regions depending on factors such as labour laws, building standards and choice of raw materials. A study covering 30 cities in Africa found that construction costs constitute between 35% and 72% of costs, with land and infrastructure ranging from 11% to 45% (CAHF, 2017). A study of real estate developers in Brazil and Mexico found that approximately one-third of building costs fall under "land and infrastructure" (Duren, 2017). In the highly populated metropolises of India, land costs are typically greater – around 50–60% of the total project costs, compared to 30–40% for construction costs. (IDFC Institute, 2018). Meanwhile, Maintenance costs include repairs to roofing, plumbing, electrics, tiling, repainting or plastering, landscape gardening, etc., and operational costs such as heating, cooling, electricity, water consumption, property tax and insurance. Operational costs can be significantly reduced through measures such as metering in individual apartments, thermostatic valves and heat cost allocators on radiators. Apartment blocks typically require about half as much heating and cooling energy per square meter as detached housing (Litman, 2018), and also tend to have lower maintenance costs. Developing district energy infrastructure could achieve savings from avoiding or deferring investment in individual energy infrastructure and peak power capacity, reducing fossil fuel bills while also generating local tax revenue and creating jobs in the design, construction, operation and maintenance of the shared infrastructure. Smart grids can help address the increase in demand for energy in cities, especially where population growth is particularly high. Housing costs cannot be looked at in isolation from quality of life – housing cannot be considered "affordable" if it is located far from economic opportunities. While the relationship between housing

markets and labour markets needs further study, they clearly are often linked: High crime rates, for example, may both impact on real estate prices and make it difficult to secure a job; job insecurity makes it harder to make ends meet, resulting in less time available to improve living quarters. In the Mexican city of Puebla, for example, households on the periphery spend twice as much cash and three times as much time commuting as those who live centrally (Duren, 2017). When the Iniciamos Tu Casa programme relocated poor inhabitants into new houses outside the city centre and away from livelihood options, many of the homes were abandoned within a year (King, *et al*, 2017).

The same consideration applies to amenities such as education and health services. Plans for affordable housing developments need to account for transit stations and walking/cycling infrastructure: The "20-minute neighborhood" concept aims for every day, non-work needs to be accessible within 20 minutes' walk. Figure 2.10 illustrates the concept envisaged as part of the long-term planning strategy of the Victorian Government in Australia. Well-designed low-income neighborhoods can offer high quality of life. For example, a recent study shows that the Villa 31 transformation project in Buenos Aires, Argentina, outperforms wealthier neighbourhoods of the city in key indicators of urban vibrancy. Even though 37% of the Neighbourhood's 8,000 informal settlements lack a kitchen and over 25% lack proper sanitation facilities, the study found there were more people walking, cycling, socializing, and playing. Villa 31's design of wide parallel streets and narrow alleys allow pedestrians to take short, direct walking routes, and good proximity to the city's main transit hub

makes it easier to access workplaces (Risom & Madriz, 2018). There remains a huge potential for sustainable

construction technologies and practices involving ecological, healthy and safe materials and environmentally friendly techniques – even if there have been a good progress in this regard (following, for example, the Agenda for Sustainable Construction in Developing

Countries; see CIB and UNEP-IETC, 2002). The adaptation of traditional building technologies - which are in harmony with local conditions, affordable, durable, reliable and, importantly, functional for the modern life – is especially important. Finally, Government's drive toward housing for all as contained in the National Housing Policy, which aims to provide affordable housing for all, has so far not been achieved and no serious efforts

are being made toward implementation as it continues to be an illusion and frustration to the larger population (Adejumo, 2008). The failure has been partly attributed to the lack of political will and poor implementation (Adejumo, 2008). From time to time, government often make continuous discrete policy and programme to address housing problems in Nigeria, but there seems to be no review mechanism that reports on the performance of these policies. Such review may necessitate re-appraisal for continuous improvement and lessons learned transferred to other areas. Umuahia is an important mixed urban centre in the Niger Delta area of Nigeria. Its strategic location in this region of Nigeria led to its population growth primarily through immigration from the surrounding rural areas. The rapid urbanization and industrialization growth in Umuahia results in shortage of housing and other related

problems including associated infrastructure. This is recognized in both qualitative and quantitative terms as shortage of low income housing for low income group. The rising cost of available units made it increasingly difficult for low income households to maintain an acceptable standard of living in Umuahia fuelled by the lack of effective government policy to successfully drive the Nigerian housing sector. This study therefore, seeks to investigate impact of sustainable housing infrastructure and its effect on property values in Umuahia capital Abia state.

Figure 2.10 A 20-Minute Neighborhood – The Concept as Envisaged by Plan Melbourne (adapted from Victoria Walks, 2018).

2.5.2 Sustainable Housing Infrastructural Ideology in Real Estate Perspective

This ideology is geared towards generation, use and reuse of natural and renewable resources that are environmental friendly, economical accessible and social satisfying. It touches across green growth, Eco-efficiency, Infrastructure and Sustainable Infrastructural development

Figure 2.11 Sustainable Housing Infrastructural Ideology in Real Estate Perspective (source field survey)

1. Green growth

Green Growth is an approach to pursuing the economic growth necessary for pressure on the environment's limited carrying capacity, by improving the eco-efficiency of the society as a whole (Na and Raksakulthai, 2006). The international financing organizations (World Bank, IMF) have reported Nigeria to be growing macro-economically in the last few years.

However, this pace of economic growth is placing increasing pressure on the ecologicalCarrying capacity of the nation. More worrying is the limited focus of the Nigerian government to sustainable development. Now the challenge for nation is how to progress its economic growth and poverty reduction, while ensuring environmental sustainability. A shift towards environmentally sustainable economic growth or "Green Growth" would be necessary to continue economic growth while maintaining environmental sustainability.

2. Eco-efficiency

Eco-efficiency is achieved by the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life cycle to a level at least in line with the earth's estimated carrying capacity (World Business Council on Sustainable Development,2013). It is often expressed as the creation of more value with fewer resources and less impact, or doing more with less. Many developing countries are now undergoing a process of designing their infrastructure and laying the foundation for their consumption and production patterns and, it is the optimum moment for these countries to apply and integrate ecoefficiency into their

infrastructure development, consumption patterns, and production patterns (Na and Raksakulthai, 2006).

3. Infrastructure

Infrastructure is normally viewed as the physical assets that are defined as fundamental facilities and systems serving country, city, or area, as transportation and communication systems, power plants, and schools (Raksakulthai, 2006; Oyedele, 2012). Infrastructure as a concept of sustainable development advocates the provision of necessary infrastructure as a means of sustaining developmental strives. The development of infrastructure is one of the main drivers of growth in an economy (Adenikinju, 2005). Infrastructure systems such as water supply and sanitation, solid waste and waste water, power, and transport form the backbone of the economy (Familoni, 2000) as they provide social as well as economic benefits to the people.

4. Sustainable infrastructural development

It is admissible that infrastructure could achieve economic and/or social development. Familoni (2000) corroborated this and stated that socio-economic development can be facilitated and accelerated by the presence of social and economic infrastructures. However, the environmental aspects should not be compromised for the sake of the first two objectives.

In order to achieve sustainability, decision makers must inculcate policies on infrastructure development that would conform to environmental protection policies. The infrastructure policies must enable increase in the efficiency of resource use to obtain more from less and reduce waste. This is the advocacy of sustainable infrastructure development, a concept of sustainable development.

2.6 Estate Management Principle Methodologies and Application

The principles and methods adopted for the successful management of any estate such as government estates largely depends on the standpoint and personal qualities of those charged with the responsibilities of managing the housing estate (Banfield and Stapleton, 2005). At the same time, issues such as: the unique characteristics of the housing estate; the resources available; and the understanding of built environment challenges; in the housing estate are significant (Nwanekezie, 1996; Scarrett, 1995; Stapleton, 1994). In this sense, it is opined that the success and sustainability of (SHI) in housing estate benefits and be gauged on these sets of issues. But, some of these issues fall within the sustainability dimensions of social, economic and environmental contentions. In order to draw a link between: sustainability; stakeholder management; and housing maintenance; to estate management principles and methods, it is necessary to understand the meaning of estate management. In this case, the definition of Estate Management will be considered in two contexts: ``Estate''; and ``Management''; and thereafter ``Estate Management''.

2.6.1. Housing Estate Definition

An estate is a large piece of land and its features are owned by a person or group of people or nation (Nwanekezie, 1996). It is also considered as an area of land on which development of a particular kind has taken place. In addition, it means a person or nation's total possession and as such includes: commercial estate; industrial estate; residential estate; etc. Nwanekezie (1996) suggested that an estate is the interest that a person, or a group or a nation holds in land. This suggests that it is a legal entity denoting the character and quality of rights that an owner possesses in an estate rather

than the estate per se (Thorncroft, 1965). However, for the estate management profession purpose, it is regarded as a unit of control defining the degree of interest held on the estate; and the modes of ownership and authority for which the owner has over the estate, such as: a freehold estate; or a leasehold estate; and/or a right of occupancy (Nwanekezie, 1996).

2.6.2. Characteristics of a Housing Estate

Estate as previously defined is an interest in land owned either by an individual or organization. This may suggest that the owner of an interest in a housing estate has a right to control an interest in a way that gives optimal return. But, the management problems and options designed for housing estate continuity is very important to the nature or character of a housing estate. As such, the housing estate characteristics defining the management challenge have a number of context specifics as suggested by Nwanekezie (1996) and is summarized as follows:

2.6.2a. Physical Identity

These are the humanly made and natural improvements such as the location, the size, shape, the geology etc. of the housing estate. In this sense, it could be suggested that, the physical features of housing estate are related to its management problems posed, but the estate management profession, look at the shape and size of the housing estate. The larger the housing estate, the bigger the management related problems, while the smaller the shape and size of a housing estate, the less the associated management challenges (Banfield and Stapleton, 2005).Similarly, it is comparative to understand that the degree to which land in its natural state has been developed also contributes to and forms part of the physical characteristics of the estate. In Umuahia, which

represents the south-eastern geopolitical region of Nigeria, the cost of (SHI) development and management are suspected to outweigh the northern section of Nigeria. This may result because of the differing geological natures of the regions and the market forces of demand and supply created by high taste, high completion and constantly increasing population.

2.6.2b. Economic Character

The economic character of a housing estate can be seen in five ways, though, it is argued as an economic process governed by the principles of management (Nwankenezie, 1996). The housing estate economic character includes: the use or purpose of an estate; for instance, whether the estate is for investment or occupation purposes; the extent to which the estate is developed or undeveloped and can profitably absorb capital investment; the debt-yield capacity of an estate; that is, how much the estate owes or spends and how much it gives to the holder of such estate; the income derived from the estate and the return accruable; and its functional status particularly the physical/functional obsolescence (Nwanekezie, 1996).

2.6.2c. Legal Status Character

This shows and determines the degree, extent and quality of control that an estate owner has on housing estate. A freeholder of an estate for instance has greater rights, control and powers for the management of an estate than a leaseholder, whose rights, control and powers are restricted in some ways in an estate. Also, the legal status determines the position of an estate in the eyes of the law (Nwanekezie, 1996). That is, whether the right and interest can be enforced at law and this would depend on the functioning system of the society.

2.6.2d. Managerial Character

This reference the style of management adopted for managing a particular housing estate (Scarrett, 1995). The management approach assumed could be decentralized or integrated such as: in a case of multiple blocks of flats in a social housing estate in different locations, but integrated into one management direction; or one with decentralized management for each block of flats or location (Nwanekezie, 1996). But, if the decentralization management approach is used, it is predicated that it will give efficient and effective management direction in the social (public) housing estate management (Beardwell and Claydon (2007).

In all, it is acknowledged that the totality of housing estate characteristics represents its total qualities, prestige, achievement and personalities either to the individual, or groups, or organizations or governments (Nwanekezie, 1996). However, as earlier mentioned, how successful or bad a (public) housing estate is managed relies on how much intake of resources it has and on the proper analysis of social, economic, political and environmental challenges by those charged with the management responsibilities (Banfield and Stapleton, 2005). Also, the behavior patterns of the owner on reacting to the levels of risks and the level of absorptions of these risks would help to shape the social housing estate in a better form.

2.6.3. Management Definition Analyzed

This refers to the skill or practice of: controlling; directing; planning; co-ordinating; motivating; forecasting; organizing; and communicating; on various activities targeted to achieve a set goal (Banfield and Stapleton, 2005; Scarrett, 1995; Stapleton, 1994); such as social housing estate management activities or a project activity. Management

could be viewed in different perspectives, but what matters most is the stand-point of the person managing the estate or interest activities (Nwanekezie, 1996). As such, it would entail the use of imagination and judgment by the person in charge to adjust to change and changing situations. This is because the management option adopted for any particular housing estate condition or subject property will differ from others since every housing estate is unique to itself; as well as, on the managerial character of the manager and the resources available to use for the management (Banfield and Stapleton, 2005). The real estate sector such as housing estates often involves charities, service organizations and not-for-profit organizations that share social values focused on democracy, accountability and equity rather than individual self-interest. In this case, Farnham and Horton (1996) claimed that 'management' is the way that private businesses achieve their benefits effectively, but in the social sector 'administration' was a more appropriate term to describe the running of publicly-funded bodies.

2.6.3a. Housing Estate Management Principles

The principles or approach adhered to in the management of an existing or future landed property such as a housing estate will remain synonymous to the general principles of management (Nwanekezie, 1996; Scarrett, 1995). This is indicated and grouped into two processes by Nwanekezie (1996) as ''Thinking'' and ''Doing'' processes as shown in Figure

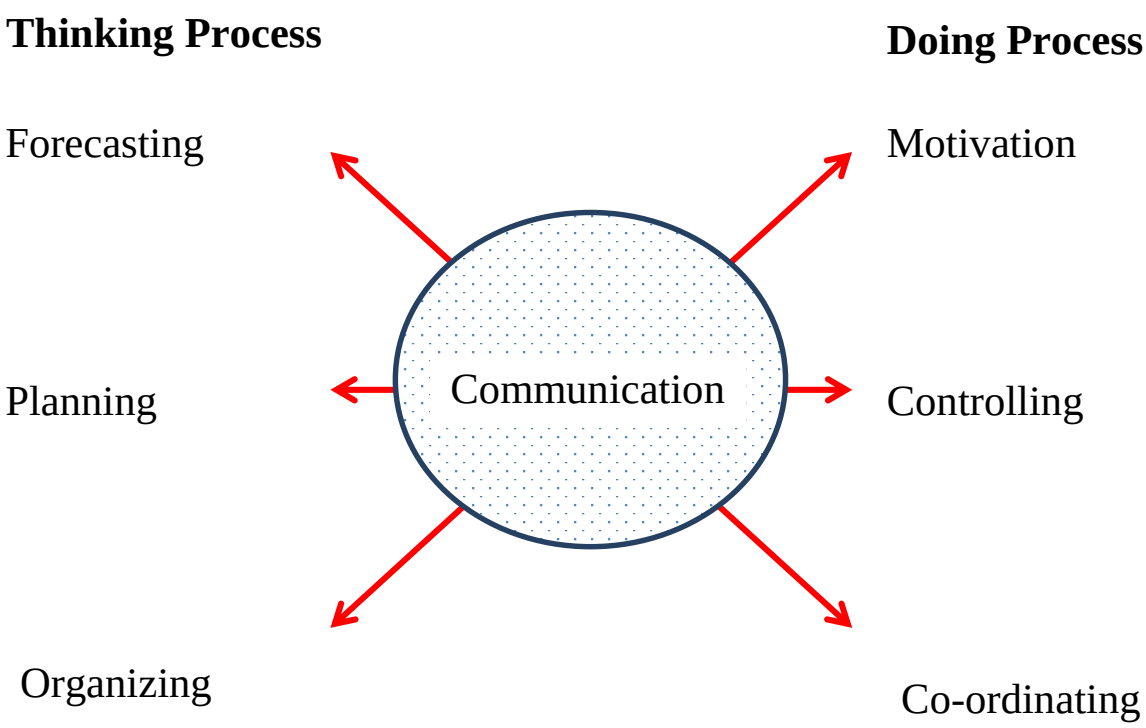

Figure 2.12 Estate Management Principles (Adapted from Nwanekezie, 1996).

Planning is the philosophy which determines what course of action is to be taken to achieve a specific purpose. It therefore entails making available resources within the context of: labour; materials; machines; finance/money; and management expertise (Nwanekezie, 1996) to sustain a purpose.

Forecasting, is concerned in looking into the future of housing estate to be managed and to try to assess the possible trends of events which are likely to pose management challenges; thereafter to proffer steps to adopt as to overturn the difficulties and achieve the objectives as soon as the challenges occur.

Organizing, is concerned with those various stages between the planning for a specific task and implementing that plan to take effect in housing estate management. This is best achieved when all the available resources and materials are within the reach of the management team when required.

Controlling and Directing, emphasizes upon the feasible methods to establish and determine that the management task for the housing estate is carried out according to a plan. This process provides the opportunity to compare the actual work done with the original work planned and then make variations which are noted and analysed for future use.

Co-coordinating is concern on finding an integrating process which ensures that all resources enabling the achievement of every task are involved properly including the housing estate management team.

Motivating, is concerned with encouraging the human resource aspect of the organization to be more dedicated and proactive in performing their tasks. At the same time, Manson (2003) contended that motivation is a principle that continues to hold a very important position in the eyes of scholars. In addition, Beardwell and Claydon (2007) suggested that how motivation is understood and used in the work place is very significant; and it is characterized by a certain level of willingness on the part of the staff to increase their effort, to the extent that this effort also satisfies a predefined need or desire they hold. In this case, the estate manager or the leader of the management team encourages all other team members, as well as, ensuring an enabling environment for work performance. Therefore, staff motivating factors are identified and implemented on each staff for better performance in a given task. To this, Woodruffe (2006) opines that the non-financial factor to staff motivation has

remained more significant in staff performance, such as: advancement; autonomy; civilized treatment; exposure to senior members; and others. In all, Redman and Wilkinson (2006) concluded that staff motivation is extremely important in the management of human, financial and material resources performance.

Communication (at the heart of Figure 2.7), is significant in itself but it is also the bedrock or driver for the other processes. Communication is a means by which management share information with other stakeholders such as face-to-face communication etc. But, Redman and Wilkinson (2006) opine that communication is a weak form of participation. The use of effective communication approaches has increased substantially in recent years (Millward, et. al., 2000), and it is regarded as a precursor to deeper forms of staff participation (Marchington and Wilkinson, 2005). Therefore, for good estate management of housing estate, the adherence to an effective communication approach, in addition to the other principles or processes of management is useful. However, it is assumed that in the sustainable management of housing estates, other issues outside the housing estate characteristics should be analysed and interlocked together using knowledge and experience of how these principles relate to each other; and in this case, monitoring, evaluation and reporting which in Figure 2.12 is not included.

2.6.3b. Housing Estate Management Approaches

Housing estate management in its totality is the control of a housing estate interest having in mind the short and long term objectives of the estate and the reason to keep maintaining the benefits or interest (Banfield and Stapleton, 2005). In this sense, the management approaches, the ability and quality of the decisions taken to manage

housing estates by those trusted with the responsibilities is a critical factor to the overall success of the housing estate together with the benefits expected (Scarrett, 1995). In the management of housing estates, there are basically four methods in use such as: in-house management; management by appointed agent; partnership management; and hierarchical division management (Scarrett, 1995).

The in-house management refers to where an institution employs some person or uses internal staff solely to focus on developing a fast track approach to manage the housing estate business case (Scarrett, 1995). This is often done to minimize the knowledge of the outsider to the activities of the organization and to utilize the practical skills and expertise of the staff. But, the biggest challenge to this approach is that the staff may not have all the skills and expertise on all aspects of the housing estate; and engaging one with such skills and expertise is unlikely to crop up, as it may not be economically viable to the institution (Scarrett, 1995).

For the management by an appointed agent, it refers to where an agent is appointed to advise and manage the services needed to sustain the housing estate and the benefit there from. The advantage of this is that the agent or firm engages in a wide range of housing estate activity related services, such that they have and maintain highly skilled and expert personnel within the management team. Also, because of the wide range of experienced staff, current housing estate management practices are intact and known by the staff; but a major detractor to this approach is that: the cost of the services may be more than when provided by the in-house staff (Scarrett, 1995); the political bottle neck in the top management decision makers (Levainen, 2003); and lack of providing capacity building to the in-house maintenance management staff

(Siltala, 2003). However, Wagenber (2003) opined that total service cost would be reduced and transparent; and flexibility and profitability with this management approach is enhanced.

Regarding partnership or combination of in-house and appointed agent management approaches, it refers to a situation where an agreement or arrangement is made between the in-house estate department and the appointed agent/firm on the range of housing estate management tasks in an almost flawless way to the common interest of the portfolio (Scarrett, 1995). The success of this approach as suggested by Scarrett (1995) requires a particular kind of guideline setting out the responsibilities which ensure the working of both parties together at various levels and intensities. It also requires that no party have total line management of all the housing estate management activities; and as such, a strong commitment is needed based on a proper arrangement that shows the working relationship (Tuomela and Puhto, 2001).

Hierarchical management division refers to a management approach in which the in-house estate management team directs the strategic thrust and limits the appointed firm to carry out specific management tasks in the housing estate maintenance management (Atkin and Brooks, 2000; Scarrett, 1995). In this sense, it needs to provide a contract document which sets out the precise responsibilities of the firms, thereby reducing inconsistency and misunderstanding. One major premise of this is that the in-house estate management department may not have the right staff with the skills and expertise to carry out those tasks.

Having conceptualized ‘estate’ and ‘management’; Estate Management according to Banfield and Stapleton (2005) and Stapleton (1994) is the science of directing, administering, planning, supervising, and coordinating the responsibilities of those who own, lease, finance, occupy or use real estate in order to achieve a predetermined objective, usually the maximization of the use and benefit to be derived there from.

Stapleton (1994) added that it is the means and activity by which land is maintained and controlled, including the study of all matters that affect land as a factor of production, in order to ensure that the best use and benefits is derived there from. The Royal Institution of Chartered Surveyors (RICS, 1974) in their policy review, cited in Banfield (2005, p. 19), defined it as:

all facets of the use, development and management of urban land, including: the sale; purchase; and letting of residential, commercial, industrial estates; management of urban estate; and advice to clients on planning''.

However, this particular definition though noted to be broad never had a general acceptability in the profession (Nwanekezie, 1996). This is predicated to be, because, it did not include an aspect of estate management practice of rural estate management which happens to be the major significant aspect of the profession particularly in third world countries (Nwanekezie, 1996). According to Thorncroft (1965), cited in Banfield (2005, p. 19), estate management is defined:

``*as the direction and supervision of an interest in landed property with the aim of securing the optimum return; this return need not always be financial, but may be in terms of social benefits, status, prestige, political power or some other goals or group of goals''.*

Following these definitions, therefore, the estate management profession encompasses, but is not limited to, the following: institutions involved in economic principles and urban/rural land utilization; patterns of city growth and development; public control over land utilization; property/land administration and valuation; the

functioning of the real estate market; the nature of construction activity; real estate finance; advice on management and development of real estate; advice on mortgage loan and appraisals; and advice on real estate market analysis and brokerage. It also shows that it is not limited to guiding against financial benefits, but of other importance are the social and political benefits, such as in housing estate management. However, Arnison (1988) opined that Thorncroft's (1965) view of estate management is in actual fact material and financial; and it is only anxious with determining worth and benefit in practical ways, and to make decisions concerning change based on reasonable, economic principles. Despite this criticism, Thorncroft's (1965) definition has remained the generally accepted definition in today's estate management literature as it included all aspects of the estate management profession (Banfield, 2005, Stapleton, 1994).

In an attempt to sustainably manage housing estates, apart from the characteristics of the housing estate and other prevailing built environment factors; the nature of the infrastructure will enhance property value, create comfort and lower the risk of negative effect of poor (SHI). In this sense, provision of various systems of sustainable housing infrastructure in Nigeria, but with much more emphasis on the Umuahia is considered in the next section of this study.

2.7 Integration of Sustainable Housing Infrastructure and Property Management

Integration of sustainable housing infrastructure and property management includes identifying, combining, unifying and coordinating the various discipline, theories, methodologies and technologies that enhances real estate practice in all ramifications through unification, consolidation, articulation, and integrative actions that are crucial

to sustainable housing ranging from conceptual stage to real estate project completion, successfully managing the real estate throughout the property lifecycle. This can be achieved through integration of the client, design, construction and management team (Belo and Agbatekwe, 2002).The development process involves an elaborate system of approvals, controls and cross-checks by all manner of governmental bodies. It does not only involve participation by the professionals in the building industry, but also, a variety of outside bodies in various financial and administrative capacities. In view of this, and the complexities of modem building construction methods, there is now a great need for clear lines of communication between all the participants in the process with a focus directed at the main factors underlying the whole process, which is now the economic factor in assessing the nature and need of each participant in the process. Property development, in Nigeria, has always been something of a free-for-all. You may do it yourself, subject or not to planning approval, or use a developer. This is the outcome of the fact that professionals in our property development and construction industry have been unable to secure their positions, vis-a-vis their clients, in the way that lawyers, doctors and accountants have been able to. Clients, in Nigeria are usually convinced that they do not need professionals in property development, in the same way they need lawyers (without whom they may end up in jail), or doctors (life and death concerns), and accountants (tax clearance certificates are needed before one is even 'allowed to die'.

This is further reinforced by the fact that, professionals in the industry, in some cases, do not even understand their own roles let alone understand the roles of other participants. Ask one hundred architects, engineers and quantity surveyors what an

estate surveyor does, ninety-eight of them could likely tell you, 'he lets out houses and collects rents'- Bui then, ask one hundred estate surveyors what their role is in property development, eighty of them would tell you 'we let out and collect rents n properties and those of us in government service allocate land.' Then of course, architects draw plans, build houses, and are experts in building construction. And most Nigerians cannot distinguish between an engineer and a site technician or a labourer especially when they are .Asians, Arabs or Whites.

Why is this so? One needs to consider who is a 'Client' and who is a 'Professional'. As someone once said, clients are simply an assorted collection of men and women seeking advice from a member of one or more of the professions. .And as most of us in the professions must have been taught at one point or the other in our 'trainee' days, a 'Professional' is a person who has achieved a standard of excellence in the performance of his job knows the objective of any property development is to provide accommodation for occupation by the developer as owner-occupier, or for someone else in a way .to be economically beneficial to the developer. In Nigeria, the economic benefits come in different forms, including the egoistic, which is not quantifiable, but present all the same. This main objective varies depending on the client, whose nature in turn determines the nature of the participants in the development process.

The client may be an individual, such as someone desirous of building a house. It may be a group or partnership of people, a corporate body, or local, state or federal governments and their agencies. There will be clients who develop only ones, the ones who do so often, for owner-occupation, for investment purposes, and those who are a combination of the foregoing.

The word, client, is generally used for the person or organization which needs developed property and has, or can acquire the means to effect the development. For government developments, the client is usually a ministry or department though, if we were to say that the ministry of works is carrying out a development on behalf of another ministry and no fees is involved, it tends not to retard the other ministry as a 'client.

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Property Development Companies

The prime objective of a property development coronary is to make direct financial profit from property development. The end-user may be beforehand as when building is pre-let, or may be unknown. Recently there has been an upsurge in the number of property development companies in Nigeria who develop solely for the purpose of selling, either during or after construction.

Owner-Occupiers

The main objective of the o\veneer-occupiers is to develop properties that will be suited to their particular needs. They may require relatively simple developments or specialized ones, such as for industrial or commercial purposes. In most cases, in Nigeria, the owner-occupiers have not come round to comparing cost with value in their efforts to develop properties. Their prime objective so far has been to develop properties in which they can best carry on their business or live. The tendency worldwide, in property development, is to plan in a way that profits will accrue from the use and benefits derived from the occupation of properties, that is the open market value of a completed property development is expected to be higher than the cost. Whatever is the main objective, the efficient control of the property development process should be of utmost importance to the developers, though some risks of development may not be general to all. The owner-occupier does not have to consider the risk of his development being unoccupied. But he faces other factors of risks just like the others, such as those of variations in price and programme control. On the other hand, the risk may even be greater for an owner-occupier, in the sense that the

time taken in arranging and carping out the development and the sequence of events in the process may be more crucial to his occupation than it would be for an investor or speculator.

In Nigeria at the moment, most owner-occupiers, both private individuals and corporate bodies undertake their property developments by themselves. This is mainly due to the fact that the real estate market has still not sufficiently advanced to the stage of priding prospective owner-occupiers with ready-made properties for purchase. The property market in Nigeria, is still mainly a rental one and the proportion of outright sales of developed properties is not yet very significant. Prospective owner-occupiers, therefore, have virtually no alternatives than to undertake their development from scratch. There has been some indications, in recent years, that the trend is beginning to change. But labroid require a major revolution in the property development industry for such a change to be sufficiently widespread to make any significant impact.

Investors

Any property development may rightly be considered as an investment-and investors are therefore motivated mainly by the prospects of financial gains. Such investors may he private individuals, small or large corporate bodies and even governmental organizations. Usually, they develop properties in order to own an asset which would provide a continuous flow of income. For several reasons he\ may be able to accept a low initial return on their investments. They tend to avoid properties that would involve too much management, and often prefer, in some cases, a property that would be let out to no more than a single or few tenants.

They may also develop properties for sale for the purpose of making capita] gain on their investments. They may specialize in certain classes of property, such as residential, commercial or industrial buildings, or operate in a wide range of properties. Their activities ma}' be restricted to certain geographical areas, or they may be nationwide or even international in scope. Whatever form or scope their activities may take, such individuals or organizations; are rightly referred to as 'Investors in Property Development.

There is, at present, in Nigeria, very limited scope for investment in property by means of stocks and shares, because there are very few established property companies quoted on the stock exchange. Some institutional investors are beginning to show interest in property investments, prominent amongst these are banks and insurance companies. These financial institutions, which used to be a source of finance for property development. Have in recent years been taking more active participation, either in the form of equity participation or by single-handedly undertaking the development themselves. Banks, which by law are not allowed to participate directly in property investment, do so through their investment subsidiaries. Other institutional investors include National Provident Fund and the Federal Housing Fund. A common feature amongst the above mentioned investors is that they usually, have large reserves of cash which are available for investments. Property development is certainly one of the most attractive areas for long term investments in Nigeria.

The main distinction between a mere investor in property and a property development company is in their organizational setup. A proper development company, being

primarily concerned with property development and investment usually possesses the proper organization, expertise and outlook in the property business. Whereas a mere investor may or may not have the expertise. The other type of investors that became prominent during Nigeria's boom years were the builders or developers or con tractors-financiers. The builders were generally concerned with executing developments as the contractors. But being so closely linked with the property development industry, the builders sometimes ventured into the property business by taking on the additional risk of acting as developers themselves. This might have arisen out of a desire to diversify their activities into the areas other than construction in order to expand their investment portfolios with a view to augmenting their earnings.

At times too. Builders are compelled to venture into property development simply to create work for themselves and remain in the business. This usually occurs during the slump periods in the construction industry when contractors have to operate below their normal capacities and therefore contend with the high overhead costs. However, for the contractors to operate successfully as the developers, they have to be able to procure the necessary capital to tie down in property development either from their own reserve or through borrowing. They also have to acquire the necessary additional either in-house or through consultants to advise them on the intricacies of the real estate market and operations.

Cappa & D' Alberto, Pic, for example was quite active in property development in Lagos in the late fifties and early sixties as evidenced by the number of estates and house-types that bear their name. During the property boom of the mid-seventies to

the mid eighty as a number of contractors, such as HFP, with necessary reserves of capital, were also able to undertake the contractor-finance arrangements. Thus, they undertook to develop properties for land owners in return for the right to hold such properties rent-free or at reduced rents for a prearranged period of time. They were, in effect engaging in the property development by combining their normal building activities with the speculation in the property market.

Local, State and Federal Governments and their Agencies

The three tiers of government in Nigeria are usually involved in property development for their own use, but lately, they are becoming developers for profit. At the local government level, it appears that property is now a major attraction for raising revenue. Typical of their 'desperation" in this regard is the decision of Eti-Osa Local Government, in Lagos, to develop land reserved for sewage roués into lock - up shops. At state level, property development consists mainly of estate layouts and the provision of its services. For a while now, there has been the practice of setting up state property corporations whose objectives are mainly profit - making. The Lagos State Property Development Corporation, which started out with the objective of slum clearance, is noun one of the biggest property development companies in the country whose main aim is to earn as much as possible for the state government as revenue. The federal government whose original aim of dabbling into proper development was as a matter of public housing policy, is gradually becoming a speculative developer. The various levels of government as well as quasi-governmental organizations constitute the most important single participant in the field of property

development. The traditional role of government in this respect has been to develop properties for use at its various arms and departments, for example, offices, educational institutions, health institutions, as well as staff housing. And these, by themselves, constitute a sizeable proportion of the property development that takes place at any point in time.

In view of this, it would be expected that they understand the development process. This is far from being so, as results of their property development efforts from time to time show, The accountability of these governments to the public, the need to consider the overall desires of the community as well as other public effects, other than monetary gains, and the need to employ very sophisticated techniques of project evaluation, to employ very sophisticated techniques of project evaluation, such as cost-benefit analysis, are factors which are usually ignored. But on the other hand they are very crucial in property developments by these bodies.

Added to this is the fact that, since independence, the government has been showing an increasing interest in the area of public housing. The earliest, of such schemes, were the various JLEDB housing schemes in Surulere, Lagos, undertaken in the late fifties and early sixties to the house those displaced from central Lagos redevelopment scheme. There have been several other similar schemes all over the country under-taken by both the federal and the state governments. Prominent among this to-date is the federal government FESTAC Town scheme in Lagos which provides over ten thousand units of both low, medium and high income housing both for owner-occupation and rental purposes.

Some state governments have undertaken purely commercial property development projects- through their investment corporations. The WEMABOARD estates, for example, owned by the western states of Oyo, Osun, Ogun, Ekiti, and Ondo, have vast property investments, prominent of which are the Cocoa House at Ibadan and the Western House in Lagos. The New Nigerian Development Corporation (NNDC), jointly owned by the northern states, also has substantial commercial property holdings such as the NNDC Office Complex in Kaduna. In fact many of the state housing corporations now find it necessary to diversify into commercial property development in order to remain viable as their housing development activities are not particularly profit oriented. Therefore, they need to be augmented with more pro fit oriented ventures. On the whole, various governmental organizations and institutions account for a very significant proportion of property development that takes place all ever the country. Although the greater part of such development is not undertaken on a commercial basis; it is nevertheless important that the expenditure on them should be judicious. And this can only be achieved if they are guided by similar considerations and parameters that are applied in property development in the private sector. The number of abandoned public projects and Elephants that are strewn across the country attest to the fact that the as not always been the case. Apart from direct participation by the government, property development is highly sensitive to the government t policies. The building industry' can be used as an effective regulator of the national economy. Various economic and industrial policies have impacts on the need for, as well as the nature and pattern of property development in any locality.

The Project Manager

Services in the property development process are provided in different forms in countries throughout the world. But different processes have evolved in each country whereby participants in the building design and construction and others in the process relate in different ways to provide the required properties. In North America and the European Continental Mainland, for instance, the quantity surveyor is virtually unknown. While in Nigeria and in most parts of the commonwealth, he plays a vital Role in the overall effectiveness of a design.

The inter-relationship between the participants and the varying role of each, in particular developments, has thrown up the need for a central focus which is usually now provided by a project manager or principal adviser. Before we consider who he is and what he does, we need to examine how the roles of the others evolved. To understand the roles of the participants and the services they provide in the development process, one has to look at the historical origin of property development- in the UK upon which the Iberian industry relied for initial ideas are examples. Because most buildings in the Middle ages were stone, the master mason was the 'main contractor of his days. He engaged and organized labour and material to construct a building. The building process was very slow, labour, was cheap and materials were limited to timber and stone. The client usually gave an outline upon which construction was based. Sometimes, a surveyor of clerk of works represented the client. The client would pay directly for labour and material in a way which is similar to what is known today as cost reimbursement contract:

This was the common practice till the eighteenth century when a bargain or contract basis appeared. This system agreed on apace for the work before it was carried out. In such contracts, at that time, the master mason provided the services which resembled those of the architects of today. The roaster craftsmen provided the required engineering ski 11s. In the attempt to control the cost of rebuilding, following the great fire of London, the measure and value basis of payment was introduced and with it came the employment of separate measurers. The industrial revolution awakened the interest of the Upper classes in property development on the scale of classical buildings in Greece and Rome. This led to the development of the role of the architect which was to study and specialize in designs as opposed to construction. The tremendous increase in construction brought about by the industrial revolution included not only the civil engineering works which did not require architects, but also the specialist engineering and administration skills. As sanitation, heating ventilation and lighting became necessities in buildings, there was a need to in-crease the knowledge required for their design. And these led to an increase in the specialist engineering consultancies, with the increase in the complexities of construction process, the quantity surveying skills became firmly identified and was provided by separate organizations. Furthermore, specialization in providing design services increased in response to the availability of new building materials and technologies, such as iron, steel, reinforced concrete, sanitation and air-conditioning. Clubs, trade associations and professional societies were set up initially to discuss common problems, but later on, they began to set qualification standards for membership. Gradually they developed into professional institutions which defined their areas of

expertise, thereby creating a public image of which they were and what they did. Virtually all such institutions sought and obtained Royce! Charters, but the education and training standards, and the permission to become a corporate or chartered member of any of them were administered by the institutions themselves. The construction industry itself also began on a 'specialist' course in the nineteenth century in response to the requirement of new knowledge in engineering, such as. In the areas of piling and foundation works, precast reinforced concrete and steel structures etc. The general contractor who used to provide the bulk of labour and material, and directly employed all the building trades that were used from the beginning to completion of a building, soon gave was to specialist companies. Fragmentation is now so much, a part of the construction aspect of the development process that has become necessary and quite essential these days to make someone responsible for making the development succeed.

With the increasing standard of sophistication and complexity of property development, and the ever widening gap between property development and property construction, the property development which for most consultants. The most important decision to be taken in the experience will be whether to develop or not. And sound professional advice from the right source is required in taking this decision. This, together with the diversity of the roles specialist consultants would play in the process of developing a property, has thrown up the need for an experienced overall adviser generally know- as tine principal adviser or project manager, in the early days of his emergence in Nigeria, and probably elsewhere also, he was known as the project coordinator.

In large companies, local state or federal government organizations or their agencies, which are involved in property development, the need for a project manager in deciding whether to develop or not is ever more crucial. In most cases, a client may or may not have problems following what and what not is involved in property development. But in the case of a government or quasi-government set-up, where personnel and executives are moved at random, understanding of what is going on becomes several times more difficult for the client In such a situation, the 'client' or its executives may feel that there is a conspiracy amongst those involved in the development process to take advantages of his ignorance. A competent project manager, if appointed early enough into the process, will be able to show that there is no reason for the client to doubt the commitment and integrity of the participants in the development process. The client must realize that he needs to appoint a project manager at the initiation stage of a property development process, that is, before the appointment of any other participants. He would act as a Watchdog or Super Consultant reporting outside, the roles of all the other consultants. It is important to recognize the fact that the increasing fragmentation of the roles provided by the other participants, especially the specialist consultants in-the design and construction teams, brings about the need for a project manager. The other participants in the development process, such as financiers, have long recognized the need for someone other than the developer himself or his architect, to assure them that

- Their money is safe.
- The property would be completed on time.
- There would be end-users for it.

- It would pay its way.
- Legal and other aspects of the development have been carefully considered, etc.

In other words person to assure them that the development would Industry, what the design and constriction teams are doing this the project manager must understand the language or each participant in the property development industry' and must be able to articulate it to the client and general public.

The project manager provides a vital link between every area of the development process, as well as the essential management skills needed to coordinate the overall process of planning. Design and construction although no one will expect him to be an expert in al I fields, he should have the skills to determine the priorities and control the pace and direction of activities in the development process. He should be able to see the project in its widest context and ensure that the available resources are optimally utilized Many consultants now realize that a good project manager, rather than usurping their roles, can free them from many problems and allow them to concentrate on their areas of specialization. Everyone in our property development industry now recognizes the need for a competent project manager in all forms of property development. But who is the most capable to achieve this role is a current topic of fierce debate amongst professionals in the industry. Needless to say, the debate is dominated by self-centered, egoistic and narrow-minded views, most of which are based on unspeakable ignorance. The project manager of a property development is perhaps best defined by what he is not:

- He is not the contractor's site or contract manager, though contractors do sometimes use the term project manager' to describe their man on the site:
- He is also not the 'project manager'' in charge of the construction stage of the property.

He is not -he person who manages the completed property-that is the property manager.

The project manager of a property development process is the person-responsible for the over-all planning, control and coordination of a development from initiation (o completion. His main aim is to meet a client's requirements, ensuring completion on time, within cost and to the end-user's required standards. While the participant in the design and construction teams works for the client, albeit on a consultancy basis, he is the client's representative, in other words, the client's man appointed to oversee a function that must not be performed by any other party1 in the development process. He is, at it were, the executive client whose sole objective is to rum a concept into reality.

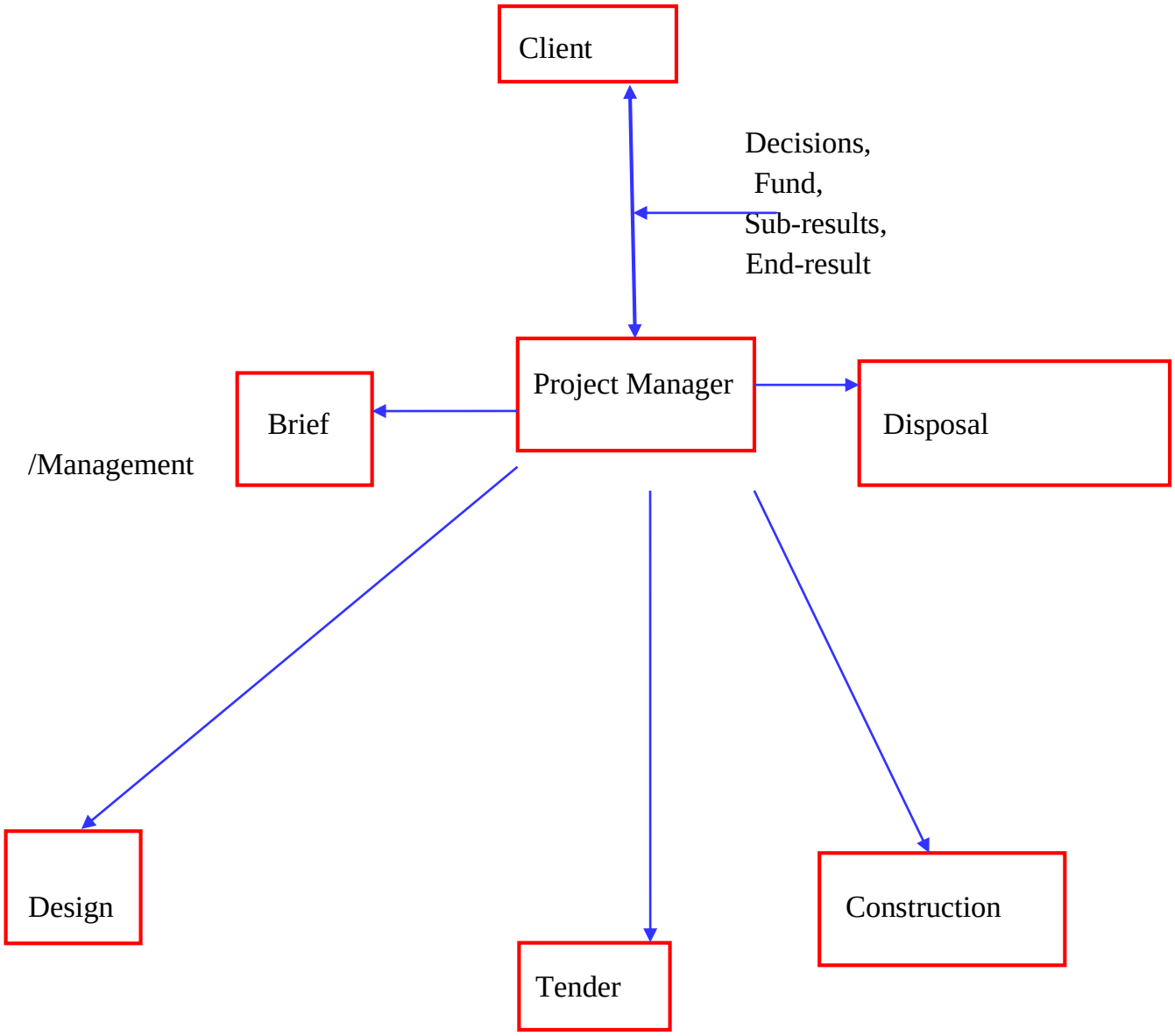


Figure 2.13 The Project Manager (adopted from Belo and Agbatekwe, 2002).

The project manager is expected to lead a property through its development life cycle. In doing this his functions comprise the following amongst others:

1. He gives a definition of the users requirement by identifying the opportunity and potential for the development and providing proof that the Development will be viable, that is, be able to appraise a development opportunity and secure financial

support for it. In fact, it is said that the first stage in a development process is to seek an opportunity for it. While the final air, is 10 maximize its returns.

2. He prepares and implements the development strategy by articulating and preparing briefs for the design team, spelling out space requirements, standard of finishing and facilities to be provided.

3. He examines the market forces from an economic, social and technical background, and in general he should be able to act as the Land Use Economist in the entire development process. He dames on the probable amount and direction of investment in the development, especially with regard to-the floor space and land use.

4. He maintains a time and cost control throughout the entire development process.

5. He advises on the pressure for development by analyzing the gap between the physical arid economic lives of the proposal.

6. He advises and assists in the selection of the participants in the entire development process.

7. He is responsible for the promotion and publicity of the scheme.

The Client Team

The client has the responsibility for defining the property, establishing and providing the necessary- finance and the site, agreeing on the design and construction phase and of course, fulfilling the disposal or management and running of the completed property. This means that his objectives and brief must be represented accurately and clearly. He must maintain strategic knowledge through the entire development process

and make prompt decisions when requested. All these he can easily do with the aid of his professional advisers who, in a development, constitute 'The Client Team'. Depending on the complexity of a development proposal the team would comprise:

Land Surveyor

He ensures a positive identification of the parcel of land on which the development is to be carried out. As land constitutes a major source of wealth in Nigeria, and indeed the basic raw material in property development, the need to properly identify and document this component has made him an essential member of the client team Official land surveys in Nigeria day back to the time of the British acquisition of the protectorates and colonies in West Africa. Subsequent laws over the years established the importance of land records, as well as constituting land surveying into a specialized profession. Land is not homogenous as far as its location and physical, characteristics is concerned. Thus, the land surveyor is able to give a definite and indisputable identification, irrespective of whether the land is under a single or multiple ownership. Besides this, he is essential in any development process to:

- ✓ Secure accurate boundaries needed in writing legal descriptions.
- ✓ Establish definite e quantity of area measurements within a designated legally defined tract of land.
- ✓ Split a track of land into separate units of ownership or subdivide idea a large track into smaller units.

Legal Adviser

Although in theory the client's principal consultants and designers are expected to be conversant with the legal requirements affecting a proposed Development, it is ideal that a legal adviser is involved with the client team from the onset. He would be able to give accurate advice as to the title and any likely constraints on it. Sound legal advice would be needed throughout the development process, starting with the acquisition of the site through to the completion of the leases and the sale transfer document. Ii would also be needed for agreements" covering funding arrangements to be entered into by the client as well as agreements with the contractors and the other consultants.

Financial Adviser

Most proper developments would be undertaken iron: money made available in the form of a loan and interest riles would be very important to every decision taken by the client ream. An accountant, with a sound knowledge of taxation and the effects on loans, and of adjustment to blink rates must take part in the client team us a financial adviser. He would also be expected to provide ad vice on the structure of financing arrangements.

Town Planning Adviser

Town planning is the major regulator of property development and the importance of town planning advice to the client team cannot be over emphasized. The main purpose of town planning is to encourage development and prevent undesirable development though results of developments all over Nigeria do not justify this assertion. But then Nigeria is supposed to be unique. Whether one likes it or not in

spite of the haphazard developments all over the country, there are still town planning laws and regulations on our statute books. The client would be well advised no; to ignore advice from his town planning consultant at every stage in the development process, especially before design briefs are concluded. The client team would need to know of that use, density design standards are required for his intended purpose. A planning consultant is able to supply these and negotiate the most valuable permission for the proposed development especially with laree or sensitive developments.

In general, town planning advice would be crucial in initiating a property development process. Until quite recently, the role of the planning adviser was mainly recognized in the public sector, while the architect assumed it in the private sector. The situation has changed considerably in recent years as there now several well established town planning consultant firms all over Nigeria. Private planning consultants now assist in preparing development proposals, following up the planning application approvals and their negotiations. To this effect, they may be required to prepare what is now referred to as an Environmental Impact Report.

Estate Surveyor

The estate surveyor may be instrumental in initiating the development process and bringing together some of the main participants in the process. He should be the first port of call for anyone thinking of any form of property development. This has not always been the case in Nigeria. But the current failure rate of property development projects, in the country', is beginning to drive home this crucial point. He provides a link between the developer and the end-users especially where development is of a commercial nature. He, therefore, plays a very important role in the development

process and is often involved in every stage of it. He is able to perform his role because of his detailed knowledge of the property market in terms of the demand and the current prices, and his personal contacts with the clients, the end users and financial institutions.

He would be useful on client team to advise on:

- The site identification and acquisition.
- The sourcing of finance for the development.
- The eventual disposal and management.
- The opinion of the value as the development progresses.
- The general state of the property market and the identification ¬opportunities for investment.
- The current user requirements and the preferences to be adopted in the design brief.

End User

The end-users demand for accommodation usually triggers off the development process. "Where they are known as in the case of owner-occupation, or in a pre-let situation, they should be considered as part of the client team and be allowed full participation in the development process, "the end-user's requirement must be identified before development briefs are formalized. The end-users are becoming more and more knowledgeable about their building and space requirements. Their active participation in the client team would likely reduce conflict between the developers and the occupiers on completion.

They are able to make immense contribution in determining the types and the nature of leases, and the tenancies to be adopted in the case of multiple occupations. Their contributions during the development process may also assist in avoiding over specification, there-by reducing costs. In many respects, they are the important party in the development process, but in most cases, they are often neglected. They are usually the ones to maintain the completed development. Although the same organization may be both the client and the end-user, the individuals involved may be different, such as in the case where a client like UB A or the UAC is developing their staff quarters.

The Design Team

In our ordinary day to day lives we all make decisions constantly, decisions on what to wear, eat or whether to work or play whether such decisions affect others or not we may be aware of the responsibility that they throw on us. Design in building is a specialized form of decision making. An essential characteristic of design decisions is that they have far reaching consequences of which the designer must be well aware. For instance, cost limits affect the choice of materials, while cost of materials affects construction methods which in turn will affect the final form of the development.

The design of most property developments is no longer the total responsibility of one single individual but a process which must be carried out by a team of specialists, each of whom has a limited sphere of responsibility and are collectively known as 'the Design Team'. These specialists' team will comprise consultants that offer design and cost control services and are usually independent of any commercial interest in construction or property-development companies- The team, depending on the

complexities of the development will include architects, civil structural, and services engineers, quantity surveyors and cost consultants, landscape architects, interior designers, process and production engineers etc.

Each member of a building design team must be aware of the importance of his own contribution and its influence on the final design, but he must also respect and understand the contribution of others in the team. While each is aware of the logical basis of his own contribution, and can assess how critical or flexible the recommendations based on them can be, they do sometimes fail to appreciate how vital the contributions of others can be and they tend to assume there .sphere is more important than those of others.

For this reason it is essential that the team should have a leader who must be able to consider with respect the ideas of all team's members, and in the last analysis be able to decide where the priorities lie and what compromises ought to be made., A number of different specialists may at various times lay claim to this leadership role, but the core of a development should determine the design team leader. Where in the case of bridges, structure form the core of the design, the civil engineer civil be an appropriate leader. Where a whole district is under consideration for development or may be reasonable to give the leadership role to a town planner. In the case of building designs it is usual to give the leadership role to the architect.

Each building design will determine the diversity of choice from a possible list for the design team, and within the team there are two types of building designers, the principal designer who has the responsibility for the overall design and the specialist designers who will provide expertise re- grading certain aspects of the design. The

architect as the principal designer is the specialist trained to see the total picture his training and education has included sufficient knowledge of the methods and objectives of his colleagues on the team to allow him give proper weight to their contributions. It is probably true that architecture has evolved as a profession to provide someone fitted to undertake the role of principal designer and team leader in a building design team.

The Architect

The architect goes through a length)' training to prepare him for the difficult. challenging and sometimes rewarding task of principal designer. This is based on design exercises so that his is highly skilled in the analysis of design problems and the integration of their solution whether such solutions lie in the economic, technical sociological aesthetic or some other fields as he is trained to see the relationships between these various fields of knowledge.

After his training he must submit himself to a stringent code of conduct which controls the ways in which he can operate professionally in the interests of the client the public and the profession as a whole. The title architect' is protected by law under the Architect Registration Council of Nigeria and only persons appropriately qualified and registered can use it. Most architects practicing in Nigeria also belong to the Nigerian institute of Archi-tects, and are governed by its regulations and code of practice whose main objectives is to promote the standards of professional conduct in the interest of the public.

Generally architects are guided by three main principles:

1. To faithfully earn- out the duties which they undertake, have proper regard for both the interest of their client, the end-user and he public at large, and must act impartial when interpreting the clauses of a contract between their client and the contractor.

2. To avoid actions and situations inconsistent with their professional ob-or likely to raise doubts about then-professional integrity.

3. To reply on their ability and achievement as the basis for advancement, it no offers any financial or other inducement to obtain work.

Specialist Designers

These include Civil and Structural Engineers, Services Engineers, and even-one concerned with specific aspects of architecture, such as landscape, interior and floor planning. Civil and Structural Engineers assist the principal designers on buildings and developments which contain appreciable quantities of structural work such as reinforced concrete, complex steel or foundation which are either complex or abnormal. Generally, in the majority of building designs, the architect may or should be able to play several roles in the design team, but without the structural and services engineers, he cannot achieve a worthwhile design. In Nigeria, architects have been known to ignore this crucial aspect of design with disastrous result - usually blamed on the builder!

While engineers are generally involved without architects in industrial buildings and in purely civil engineering works such as bridges they also provide advice on the structures of buildings designed by architects. They will also design the structural

elements of such buildings, calculating anticipated loads and stresses, and suggesting holy these cm be accommodated in the final building design.

Where property development consists mainly of structural work the civil or structural engineer will be the principal designer The title ‘Engineers’ is protected by law under the Council of Registered Engineers of Nigeria and only those properly qualified and registered can use it. Engineers in Nigeria generally are also members of the Nigerian Society of Engineers which issue code of conduct defining professional responsibilities.

The Structural Engineer

The structural and civil engineer undertake basically the same education, with special emphasis on the understanding of forces and their effects upon materials. Their education will include a rigorous training in the analysis or structures, and a comprehensive understanding of the whole scientific basis of the ways in which materials and structures behave.

The structural engineer is also trained to be able to apply certain well understood formulae to standard cases and more importantly, to be able to look at non-standard cases with understanding. While some structural engineers may specialize in the use and application of one material rather than the other, such as steel concrete or prestressed structures, the underlying principles in each case will be the same and the design team should be able to look to the structural engineer at the initial stages of a building design for an assessment of the implications of the choice of various material and methods.

The Civil Engineer

Though civil engineering is defined as construction of roads, bridges, motorways etc., there is often a certain amount of building work in civil engineering developments, and likewise, many property developments will contain civil engineering work necessitating the need for civil engineers on the design team. As noted above the civil engineer goes through a similar training to that of the structural engineer with special emphasis on the understanding of forces and their effects on the environment.

Service Engineer

These comprise mechanical, electrical and renewable energy engineers who are responsible for environmental control, lighting, air-conditioning, sound modulation, electrical and plumbing installations, waste disposal systems, bio waste and solar energy, mechanical service such as lifts and other means of communications, electrical conductors, acoustic, fire protection, security systems, telecommunications, water supply etc. They are generally members of the Nigerian Society of Engineers which provide a code of conduct defining their professional responsibilities.

The Mechanical Engineer will be mainly concerned with the aspects of building that are best fulfilled by mechanical equipment. In view of his skill to devise or select t suitable equipment for such aspects, he has the additional role of designing distribution services even where no mechanical means are involved. In actual fact it is indeed the diversification of mechanical engineers into the realm of drainage and plumbing design that has earned them the classification of ‘services engineers’.

The training of the mechanical engineer is concerned with the assessment of needs in some areas such as temperature control, calculation of optimum means of satisfying

such needs, and the design of suitable systems to perform the required function. In most cases, they choose the mechanical equipment required from manufactures' ranges instead of designing them from scratch in the case of building designs.

The Renewable Engineer is charged with responsibility of sourcing alternative of power and energy supply that will augment any of the selected alternatives such as bio digester an alternative for cooking gas, solar and wind mill energy, an alternative for supply of electricity. The scope of their work also touches across positioning building structures in a manner that enhance the use of natural technology in generating a desired energy.

The Electrical Engineer will be able to provide expertise on the workings and use of electricity in buildings and therefore will understand the principles of lighting and the levels required for different purposes. In the case of power supply, he must be well aware of safety requirements and optimum loading.

Like the mechanical engineer with whom he is frequently grouped, he may tend to see his own aspects of a building design problem in isolation and will need to understand how his contribution will integrate with those of his colleagues on the design team.

The Quantity Surveyor

The professionally trained quantity surveyor is a sort of oddball on the design team and his position is rather vital in it. He has an unequalled knowledge and understanding of the intricate forces which affect the cost of buildings and this must be invaluable to the design team. He must be on the team so that he can constantly

monitor the economic effect of potential choices because cost must be given adequate weight in arriving at design decisions.

Though the quantity surveyor has a vital contribution to make to the design team that contribution is of a different nature from that of the other members of the team. Whilst the architect or structural engineer actually dictate the design, the quantity surveyor acts as the client's watchdog, in that he must ensure that a strict adherence to overall financial criteria maintained in the design. He is the conscience of the whole design team and ensures that the team does not overlook the financial implications of its ideas.

He gives cost advice and provides cost control services on most large projects. He is an invaluable part of the design team, and prepares a Bill of Quantities based upon the drawings and specifications of other members of the design ream. This bill itemizes the type, form and amount of materials and labour to be used in executing a design. The bill will also define the legal requirements the design and especially, the form of contract to be adopted between the client and the contractor.

At the preliminary stage of the project, the quantity surveyor may be required to provide an initial cost estimate. He may also be required to advise on the cost implications of the specific aspects of the design and specifications and on the merits of alternative forms of construction, and to generally assist the client on cost planning and budgeting for the construction. He may also be required at this stage to prepare a projected cash flow showing the expected rate of disbursement during construction.

If the contract for construction is to be awarded by tender the quantity surveyor will normally be required to scrutinize and analyze the respective tenders and advice on

the cost implications of the various terms included in the tenders. During construction, the quantity surveyor monitors the expenditure to ensure that it is in line with the initial projection. He evaluates the amount of work completed periodically to enable the architect prepare certificates for payment. He advises on the cost implications of any variation to the design or specifications during construction. He also revises the cash flow and eventual cost projection as construction proceeds and on completion he prepares the final account for settlement between the client and the contractor.

Generally most quantity surveyors practicing in Nigeria are governed by the code of conduct issued by the Nigerian Institute of Quantity Surveyors.

Other Specialist Designers

These will include landscape architects, interior designers, graphic designers, space planners, acoustic and production engineers etc. who will be on the team depending on the type and complexities of the development

The Landscape Architect's training is very similar to that of the architect, but with emphasis on the use of paving, boundary structures and plant material. His contribution must be related to the development of the building design at every step.

The Interior Designer must always be regarded as an integral part of the design team though many architects do undertake all work in this area themselves. If a specialist interior designer must be used, probably from a marketing point of view as in the case of hotel developments, it must be a person who has specialized on the basis of at least' some training in architecture, and therefore understands the principles of design as

they are understood by an architect. He should see the interior as an aspect of a whole, and should be brought onto the design team from the initial stages.

The Construction Team

It has been established that there are well over fifty separate occupations associated with the construction aspect of a property development process. Such construction depends on an industry where total reliance is placed on the diverse attitudes, abilities and adaptability of its workers. Not too long ago, these workers were grouped, according to their skills, into trades such as masons, carpenters, plumbers, and electricians. They were employed by a main contractor who was responsible for all work on the site. He also employed a general foreman to co-ordinate the work of all the trades on the site.

These days, most specialist trades are employed as sub-contractors and very few tradesmen are employed directly by the main contractors. Subcontractors are required to provide specialist elements within a building. But the final responsibility for a successful completion of the work rests with the main contractor. It is common these days for the project manager or the principal designer acting on behalf of the project manager, to employ the supplier's force airs specialist materials, components or equipment which are to be used or fixed by the main contractor. In very large projects, it is also becoming common for the large main contractors to constitute themselves into construction manager's co-coordinating the erection of a building, using only the sub-contractors and suppliers. This saves them from employing tradesmen on a

continuous basis especially during long periods when employment cannot be guaranteed.

The selection of the main contractor depends on the size, the complexity and the time within which the project must be completed. The special resources that can be provided by a contractor, with regard to these factors are crucial in selecting a main contractor. In this context, it should be borne in mind that the simple or complex in relation to building is not a question of the size but of the design and the purpose of the building. A bungalow, that is a building on only one floor, is not necessarily a simple building, and a two or determine simple or complex buildings includes general configuration, the amount and the degree of complication of services the building will accommodate, the site characteristics and the complexities of construction methods.

While the design team and the project manager may have preferences with regard to the selection of the main contractor, the construction of a particular project to suit a particular need would be influential in selecting the main contractor. Generally, main contractors come in three groups; a general builder, who usually operates locally on small projects and tends to employ sub-contractors to carry out specialist works on large projects; a general contractor ranging in size from the regional to national arid the multinational organizations, arid capable of carrying out both the building and the civil engineering works of very large sizes; and a design and building company which undertake both the design and the construction of a project. This is usually a specialist in a specific type of building, such as housing. This specialist combines roles of the design team with that of the construction team. The other members of the construction

team include the-project manager (construction), staff of the design team located on the site, such as the project architect, the project engineer, the site foreman, the trades foremen, the tradesmen, the sub-contractors and suppliers, whether nominated or not. Where, as ii is often the case, the client is unable to provide all the material resources needed to earn' out the construction of a development, he employs agents for his purpose. His main objective in this regard being to ensure that the resources are acquired in the most effective way. These agents will include the sub-contractors and the suppliers.

Sub-contractors

Where a main contractor is appointed be the standard approach, that is, after competitive lender based on complete working drawings, he must assume total responsibility for the construction works. 'Where he cannot undertake the complete work with his own labour and resources, he needs sub-contractors. The plumbing and the electrical installations are examples of the services sometimes executed by the sub-contractors. In the case of an "all-in contract, the main contractor handles all the aspects of the work, but the sub-contractors are needed where for one or several reasons, the client decides to award some aspects of the work separately.

The sub-con tractors can be either domestic or nominated. A domestic sub-contractor is one engaged by the main contractor and may be an entity within the main contractor's organization, in which case, he is described as an, in-house sub-contractor. He may be an entirely separate entity engaged by the main contractor for a particular assignment and so he is described as an invited domestic sub-contractor. A

nominated sub-contractor is one appointed directly by the client whether through the tendering process or not. In both cases, the main contractor has the task of entering into a formal contract with the sub-contractor, and ensuring that he completes his work satisfactorily.

Nomination of a sub-contractor gives the client more control over the choice of the materials and components, as well as the quality of the work it can also save costs in time when certain components take a long time to make. A likely disadvantage with the nomination of the sub-contractor is the lack of competition, but this may be overcome if the sub-contractors are nominated through the competitive tendering. The nomination may results unclear responsibilities, and the onus is on all involved to understand their contractual relationships and for the lines of communications to be clearly stated.

There are separate standard forms of contract for the nominated and the non-nominated sub-contractors. The client's nomination of a sub-contractor implies an instruction to the main contractor to enter into a formal contract with the sub-contractor. But as the main contractor is not responsible for any design carried out by the sub-contractor, a special agreement between the client and the nominated sub-contractor may be necessary. In general, the main contractor remains answerable to the client in the event of any default on the part of the sub-contractor. Though this has been the cause of a lot of litigation, it is still the standard practice. The main contractor however has the right to object to the appointment of a sub-contractor as long as the objection is not unreasonable. Similarly a sub-contractor may decline a job offer if he is not prepared to work a particular main contractor.

Suppliers

The case of suppliers is similar to that of the sub-contractors. The main contractor may be required to supply and install the equipment or the machinery as specified by the consultants. In which case he is deed to be the supplier, Generally, most suppliers to a construction are appointed by the main contractor who has the contractual responsibility for obtaining all the necessary materials for the construction. But if the client wants a certain make of product, he may nominate the suppliers principles for the nominated suppliers to the main contractor. Similar principles for the nomination of sub-contractor will then apply. A contractual relationship existing between the supplier and the main contractor makes them answerable to the client for any default on the part of the supplier.

The Disposal, Management and Maintenance Team

An effective management of a completed development is needed to maintain the development-in its best use in view of the complexities of the modem day-landlord-tenant legal, social and economic relationships, and technological development in the building construction methods.

It is now essential in most complex developments to hire an army of skilled workers and technicians to attend to the operation and maintenance of the equipment. The hiring and supervision of these essential personnel as well as purchasing and storing of essential material, now requires managerial skill and ingenuity which the average property owner cannot be expected to possess. The skilled property managers should

be able to do better and more profitably all that the property owner himself cannot do. Furthermore, the absentee owner cannot do without a qualified property manager, and in most of our urban areas today, absentee ownership is becoming the norm rather than the exception.

The property management aims to maintain the investment in the property and its physical aspects to a point of optimum efficiency and economy. While the former aim aims to maintain the former aim covers administrative and executive functions in the fields of economics and finance, the latter aim covers the technological functions principally associated with the construction. Though each aim is carried out by the trained supervisors, both are economically inter-related and are object to unified control under an over-all executive plan. Sound property management begins before the development of the property commences. It is one of its main objectives to measure in advance of any financial commitments, the greatest possible net return which the property will yield under the highest and best land use and over the economic life of the development.

The property manager acts as the owners administrator and assumes all the functions necessary to carry out the owners objectives. His principal management functions include:

- Seeking the most desirable tenants at the best rent possible.
- Collection of rent.
- Responsibility for repairs
- Selection of the labour needed1 for the effective running of the property to ensure habitable conditions.

- Keeping property accounts and rendering periodic reports Most competent estate surveyors are capable of providing the essential property management services and constituting an important pan of the management team.

Maintenance

Every property development needs proper maintenance during its life, and this could be done by the property managers or the occupier or both, depending on the contractual relationship between the owner and the occupier. A maintenance team, comprising of the maintenance surveyors and the skilled building workers takes over on completion to advise the owner and implements regular maintenance to ensure the capital value of the property is kept in balance with its economic value with the proper maintenance, a property continues to function until a development appraisal causes it to remain the same, be adapted, demolished or rebuilt.

The design and the construction method of a development must take into account the effects which time will have on its performance. It is therefore, necessary for the design team to consult with the maintenance team for advice at the design stage, as to what to adopt to ensure a satisfactory performance throughout the entire life of the development.

The maintenance team may not necessarily be involved in the design. but it can use its experience and research to advise a designer or solution to a particular problem. For example, the window cleaning problems of a very tail curtain walled block of offices can be highlighted by me maintenance team at the design stage to enable the special devices to be adopted. Such alert could be raised by the design team without any specialist maintenance team assistance. Ever special device provided must be brought

to the attention of the maintenance team in the form of a manual to be supplied by the design team at the completion of the development.

Disposal

The disposal of a development can be by letting or sale. This should be considered during the initial stages and not just a few weeks before the completion. The disposal will be aimed at the market identified by the market research to be carried out as part of evaluation of the development.

The disposal team usually comprises the estate agents to be selected by the project manager based on his knowledge of such agents in the location of the development. In this regard, it is necessary to emphasize that contrary to popular belief in Nigeria, estate agents are not necessarily estate surveyors. Though some estate surveyors practice estate agency, not all the estate agents are estate surveyor - and not all the estate surveyors practice estate agency.

A disposal strategy must be evolved from the beginning. Unless a development has been pre-let or pre-sold an early decision must be made by the developer/project manager as to the method of disposal.

Facilities Manager

Facilities management started out as property management that is concerned primarily with the management of premises. As the commercial reality and the competitiveness demanded greater efficiency, attention focused on the need to manage not just the buildings but the entire resources used by an organization in tile generation of their wealth.

It is not a new concept but one that has progressed from use by a handful of enlightened companies to become the fastest growing property and resource management sector in the property development industry. It seeks to create a framework that embrace the traditional estate management functions of property maintenance, lighting and air conditioning with the increasingly analytical reviewers of the space occupation and planning, asset registers health and safety registers and the activity flow throughout the premise. Hence the term facilities are used to include all the building, the furnishings the equipment and development available to the workforce while pursuing the business goals.

The success of a facilities manager has been greatly enhanced by the availability of the computer technology which has made handling of data easier. The use of the databases to control the occupational activities of buildings, with its resultant wear and tear, is both reactive and proactive with the later gaining importance. The reactive use allows data on the general performance of buildings to be collected stored and made available for historical analysis that can be used proactively to identify the recurring trends anticipate the problems and eliminate waste.

Softwares based on the computer aided design technology used extensively in the design of buildings nowadays, have been developed into powerful Computer-Aided Facilities Management Systems which provide a useful tool for the Project Manager in preparing the project briefs for buildings. This marriage of facilities management to project management enables the production of increasingly efficient and cost-effective developments.

2.8 Summary of the Chapter

The literature review chapter exposes that provision of sustainable housing infrastructure (SHI) is the only approach in solving housing problems both for the newly built or existing once especially in a remote part of developing capital like Umuahia. The chapter determines and insists that, provision of sustainable housing infrastructure is the heart beat of any giving estate that must serve functionality, durability and economy. There was no strategy or framework that was developed for, the impact of sustainable housing infrastructure in respect to government administration or government owned estate as sole beneficiaries of the approach expressed in this study. Additionally, the chapter reveals that the awareness, understanding the impact and implementing the sustainable dimensions and principles (see Figure 2.1), will be essential and beneficial to both property owners and occupiers. At the same time, this underlined that the other relevant concepts considered in the study; were equally fundamental to the sustainability of development project benefits during and after construction in the built environment. The chapter also indicated that the focal intervention in this chapter was to preserve the environment; the people and their prosperity (see Figure 2.2). Furthermore this chapter outlined various frameworks that are vital in administering sustainable housing infrastructure as a tool for a successful delivery. This is not limited to framework alone, the conceptualization in this study places a necessity that must be enhance through some measurable policies. The present situation in the study area was evaluated base on site visit and direct observation in comparison with what is obtainable in modern sustainable communities. The chapter further discloses

sustainable housing ideology in real estate perspective that grantees a sustainable housing. The methodology and principle application in relation to estate practice and housing was x-rayed, real estate characteristics and management theories and outcome using contemporary paradigms were necessary (see Figure 2.12). This chapter reveals other stake holders in providing (SHI) their roles and responsibility. The chapter also considers the effect coming together as team will always plays a pivotal role in making sustainable housing infrastructure feasible. Assessing and selecting the best alternative to utilize by integration implementation in the provision of (SHI) ranging from pre-construction post-construction stage and management approach for the benefits sustainability was reasonably adopted and evaluated as being critical to this research. Following the literature review analysis, the study is provoked to pursue and investigate the main earlier stated research questions in chapter one (see section 1.6) in order to address the study objectives and attain the research goal/objectives. These are to ensure that both existing and future houses either as single unit or estates is design, built and managed in a sustainable pattern so as to provide dividend of sustainability in Umuahia capital of abia state Nigeria. Especially important is to develop an integration framework that should be adopted and applied in the sustainable housing infrastructure in the study area. Subsequently, since the literature findings above were recognized and subsumed by the study to be largely socio/technical issues, the next chapter presents the methodology of the study which encompassed: the philosophical stance; the strategy/approach; methods of data collection; and the data analytical instruments adopted.

CHAPTER THREE

THE STUDY AREA

3.1 Introduction

This chapter focuses on the study area. It looked at the two local governments that made up Umuahia capital, paying spefiic attention to their geographical location, climate, housing pattern, demography and economic activities in the study area.

3.2 Abia State

Abia state is one of the thirty six states in Nigeria, located in the south-east geo-political zone, it has a total of seventeen local government out of seven hundred and seventy four local government in the country. Abia state was created on the 27th of august in the year 1991 during the government of general Ibrahim babangida. Abia state was created out imo state and the two sister states share boundaries. Abia state known as one of the constituent state of the Niger Delta region. The state has its capital is umuahia while the commercial city of the state is Aba. Abia state is also referred to as God's Own State. The name "**Abia**" is an abbreviation of four of abia state's densely populated regions Aba, Bende, Isiukwuato and Afikpo which is currently located Ebonyi state today. (2021, http://www.abiaen.wikipedia.org). Abia state is also the fifth most industrialized state in the country, and has the 4th highest index of human development in the country, with numerous economic activities and fast growing populations as recorded by the United Nations early 2018. Abia state is an Igbo speaking state and is found under the Igbo ethnic group. The Igbo people, who are one of the indigenous people of the south-eastern part of Nigeria, make up about 95% of the population.

Figure 3.1 Umuahia Capital of Abia State, Source: Field survey (2021)

3.2.1 Geography

Abia state is geographically located within latitude 5° 25’ 0” North, 7° 30’ 0” East which occupies about 6,320 square kilometers, is bounded on the north and northeast by the states of Anambra, Enugu, and Ebonyi. To the west of abia is imo state, to the east and southeast are cross river state and Akwa-ibom state respectively and to the south is rivers state. the southern part of state lies within the riverine part of Nigeria, it is a low-lying tropical rain forest with some oil palm bush, the southern portion gets heavy rainfall of about 2,400 millimeters (94 in) per year and is especially intense between the months of April through to October. The rest of the state is moderately high plain and wooded savanna. The most important river in Abia state is Imo and Aba Rivers which flow into the Atlantic ocean through Akwa-ibom state.

3.2.2 Climate

Umuahia's climate is classified as tropical. During most months of the year, there is significant rainfall in Umuahia. There is only a short dry season. The climate here is classified as Am by the Koppen-Geiger system. In Umuahia, the average annual temperature is 26.0°C. Precipitation here averages 2153mm. Precipitation is the lowest in December, with an average of 15mm. Most Precipitation Falls in September, with an average of 322mm. at an average temperature of 27.5 °C, March is the hottest month of the year. In august, the average temperature is 24.5 °C. It is the lowest average temperature of the whole year.

3.2.3 Demography

According to the results of the world population review 2021, estimated at 2.4 million. In the population in which they are mainly Christian. The state has a landmass of about 6,320 square kilometers. The state has seventeen (17) Local Government Council Areas – Aba North, Aba South, Arochukwu, Bende, Ikwuano, Isiala Ngwa North, Isiala Ngwa South, Isiukwuato, Obi Ngwa, Ohafia, Osisioma Ngwa, Ugwuagbo, Ukwa East, Ukwa West, Umuahia North, Umuahia South, Umu Nneochi. Figure 3.2 shows the map of Abia state with seventeen local government council areas.

Figure 3.2 Map of Abia State, Source www.pubs.sciepub.com

3.2.4 Economy

Crude oil and gas production is a prominent activity, as it contributes over 39% of the state's GDP. However, the indigenous oil companies through the marginal fields programme (MFP) have not found it easy to attract the requisite funding and infrastructural capacity to explore some marginal oilfield which are about 50 in the state.

The manufacturing sector only accounts for 2% of the GDP. The industrial center of the state is in aba, with textile manufacturing, pharmaceuticals, soap, plastics, cement,

footwear, and cosmetics. In addition to the above, Abia State Government has just built a 9,000 capacity multipurpose international conference center in Umuahia. This edifice of international standard was built by Governor T.A Orji to enhance tourism as well as boost the state economy through hosting of major international and local events.

Representing 27% of the GDP, agriculture which employs 70% of the state workforce is the second economic sector of Abia. With its adequate seasonal rainfall, Abia has much arable land that produces yams, maize, potatoes, rice, cashew, rubber, plantains, taro and cassava. Oil palm is the most important cash crop. Mining of solid mineral resources also takes place in some part of Abia state; these resources are used for various purposes such as manufacturing, building materials, engineering construction works etc. example of these mineral resources includes; mountain sands, rocks, organic clay, gypsum, river sand, spring water, iron etc.

Oil and gas exploration edit there are over 100 oil wells and 3 installed flow stations in Abia State. there is also an associated gas plant, Abia/NNPC gas plant. As of 2012, boundary commission said it returned 42 oil wells from neighboring Rivers State to Abia. This would have meant Abia being fourth largest oil-producing state in the country. Oil grant, Shell, holds most of the licenses for wells in the state and has concentrated on the estimated 50 wells that are considered high-yield.

The state produced 36,000 barrels of crude oil per day; “Imoturu produces 23,000 barrels per day and Isili flow station produces over 8,000 barrels per day. Then four oil wells in Izau go to Obigo flow station. About 30 oil wells my village go to Umuri and about 8 oil well from Umurie go to Afam”, lamented Samuel Okezie Nwogu,

chairman of Abia state oil producing development area commission (ASOPADEC). (Wikipedia, 2021).

Figure 3.3 oil producing area in Abia State, Source field survey (2021).

Figure 3.4 oil producing area in Abia State, Source field survey (2021).

CHAPTER FOUR

RESEARCH PHILOSOPHIES AND METHODS

4.1 INTRODUCTION

In this chapter, the research philosophy, approaches, design and methods used for this research study are discussed, as well as identifying and examining the relevant theoretical background as to better understand the various aspects of research methodology. This chapter further introduces the rationale behind the choice of the research philosophy, approach, design, method, and analytical process upon which this study is founded. It also presents that the fieldwork was an exploratory and explanatory multiple embedded case study, which consisted of sixteen (16 Nr) semi-structured interviews and this provided the underpinning for hundred (100 Nr) questionnaires in this study. The detailed justification for this approach is presented below.

4.2. THE RESEARCH PHILOSOPHY

Research methodology is a philosophical stance of worldview that underlies and informs the style of research (Sapsford and Jupp, 2006). In another view, Collis and Hussey (2003) and Creswell (2009) considered research methodology as the overall approach to the design process of conducting research including all phases from the theoretical underpinning to the collection and analysis of data. In this sense, research methodology is all about decision taking through an informed decision on a research problem, as well as, helping to direct to an appropriate method, which sometimes can be messy. Therefore, it could be deduced from the above that the philosophical

worldview of things is vital to the meaning of research methodology. Hence, research philosophy is concerned with the way in which things are viewed in the world (Saunders et. al., 2009; Yin, 2009). It addresses the assumptions that support the research strategy and the methods chosen as part of a research paradigm. In addition, our practical experiences, relationship to knowledge and the process by which they are known and developed in real-life situations (Saunders et. al., 2009) also matters.

Therefore, it helps in clarifying research design, to know which research design will work and which will not, and to identify and even create a design that may be outside the researcher's knowledge supported by past experience (Easterby-Smith et. al., 2003). Understanding research philosophy and agreeing to adapt to a particular perspective for a proper research paradigm is identified as being the first step in setting other research parameters and choices to a study (Kagioglou et.al., 1998). As a result, in discussing the different research philosophies, it is important to have the knowledge that they are led by a set of assumptions which could be ontological or epistemological. They have different assumptions which will influence the way in which the research process is diagnosed and will provide a route to understanding the way to approach research in a field of endeavour (Saunders et. al., 2009). However, many researchers have a preference to understand these complex philosophical perspectives within the context of the two main traditions of research inquiry, generally acknowledged as quantitative and qualitative lines of inquiries (Creswell, 2009; Saunders et. al., 2009; Bryman, 1992). From the above, it is clear that these research methods cannot be understood in isolation from the research philosophical (ontological, epistemological, axiological and pragmatic) stance of the researcher.

Therefore, the four major aspects of thinking about research philosophy as suggested by Creswell (2009), Yin (2009), and Saunders, et. al. (2009) needed to be considered, namely:

4.2.1. Ontology

This questions the assumptions that need to be made about the way in which the world works and concerns itself with the nature of reality (Saunders, et. al., 2009). The ontological assumption in qualitative research views the problem of reality as that constructed by the researcher involved in the research circumstances ‘‘i.e. constructivism’’ (Creswell, 2009). This implies that, the researcher, those individuals being researched and the reader interprets information ‘‘i.e. interpretative’’ (Creswell, 2009) differently. However, in quantitative research, it views realities as ‘objective’ (i.e. objectivism) and it is a study independent of the researcher (Saunders, et. al., 2009). This can be measured by using questionnaires or another instrument and indicates ‘‘positivism’’ (Saunders, et. al., 2009; Creswell, 2009).

4.2.2. Epistemology

This questions the assumptions of what is acceptable as knowledge and that which constitutes an acceptable knowledge in a field of study (Saunders et. al., 2009). It argues that in a qualitative approach, the researcher networks with those they learn from, interviewing or observing participants over a long period of time for a genuine partnership for the study i.e. ‘‘interpretive’’ (Creswell, 2009; Saunders, et. al., 2009). However, in a quantitative approach, it questions the relationship of the researcher to that being researched (Creswell, 2003). It makes it clear that the researcher should

remain distant and independent from that which has been researched, therefore, attempting to control for bias, selecting a systemic sample, and hence, being objective in assessing a situation i.e. ‘‘positivism’’ (Creswell, 2009).

However, in debates about the research process, Saunders, et. al. (2009, p.109) argued that it may be appropriate to start by asking the question ‘do you need to adopt one philosophical

position’ in a study even though ontology and epistemology have a ready for action loop in research. Also, whether it is important to consider the role values play in a researcher within the chosen research paradigm (Saunders, et. al., 2009). The rationale behind this as suggested by Saunders, et. al. (2009), Tashakkori and Teddlie (2003) and Creswell and Plano Clark (2011) is that sitting comfortably in one position or the other is not idealistic as some research questions would require the combination of methods in answering them. Also, epistemology provides the understanding whether the work is influenced by the researcher or not. Therefore, it is in this circumstance that the following section of the study considers axiology, pragmatism and realism as necessary for this research.

4.2.3. Axiology

This philosophical issue questions what role values play in research choices and with value judgments (Saunders, et. al., 2009). It provides that in a qualitative research, the researcher accepts as valid the value-laden nature of the study and enthusiastically reports his or her values and prejudice for, as well as the value of knowledge provided from, the field by the informants (Saunders, et. al., 2009; Creswell, 2003). Hence, the

choice of what to do, and how to do it, are determined by human beliefs and experiences (Easterby-Smith, et. al., 2003). Conversely, in a quantitative paradigm it provides that the researcher's values should be kept out of the study. This implies that the researcher's choice of what to do, and how to do it is determined by objective criteria (Easterby-Smith, et. al., 2003). Finally, it is the philosophical perspective, approach, method and data collection techniques choice that is determined by one's values (Saunders, et. al., 2009).

4.2.4. Pragmatism

This philosophy regards choosing between one position (epistemology, ontology or axiology) and the other as somewhat unrealistic in practice; and it is argued that the most important determinant of which position to adopt are the research questions (Creswell and Plano Clark, 2011; Saunders, et. al., 2009). This is particularly relevant where the research question does not suggest clearly that either a positivist or interpretive philosophy should be adopted in an inquiry, for example, within an epistemological perspective. Therefore, in this philosophical quarrel the use of both qualitative and quantitative methods to resolve a real-life world challenge are commended. However, within the overriding research methodology and philosophy, quantitative and qualitative are the two main traditional methods, but, today the mixed method approach exists, which represent: deductive; inductive; and a mixture of both; respectively (Creswell, 2009). Moreover, the choice of a particular method is influenced by certain factors such as: the topic to be researched; the objectives; and the specific proposed research questions. Creswell (2009) added that other factors

such as: sustaining personal interest; is it publishable in a scholarly journal; and does it develop a new idea in the scholarship literature; are equally important.

A qualitative research approach is an investigation process of a sympathetic study into a social or a human problem, focused on edifying a diverse, holistic depiction, fashioned with words, reporting comprehensive views of informants, and conducted in a normal setting (Creswell, 2009). Therefore, it is described as constructivist or naturalistic or interpretative and utilizes inductive techniques of research study which try to explore a subject when the variables and the theory base are not known (Creswell, 2009).

A quantitative research approach is an investigation into a social or human problem, based on testing a theory composed of variables, measured with numbers, and analysed with numerical procedures. This is to determine whether the prognostic generalizations of the hypothesis hold true (Creswell, 2009). As a result, it is objective leading to positivist and deductive reasoning in a research study (Saunders, et. al., 2009, Yin, 2009).

For the mixed methods approach several definitions exist: it is a research inquiry that employs both qualitative and quantitative approaches in a mixed methods research work for the purposes of breadth and depth of understanding and partnership (Johnson, et. al., 2007). Creswell and Plano Clark, (2011) added that the indispensable premise of mixed method design is that the use of qualitative and quantitative, in rapport, will provide a better understanding of the research problems than the use of either one method alone in a study. This is argued to be one, if not, the most central

premise of the pragmatic philosophical reasoning in research today (Tashakkori and Teddlie, 2003).

The various approaches used in achieving the aim and objectives of the study were the focus of this Chapter. The researcher discusses the research design, study population, the sample frame, sample size and its characteristics, the sampling methods adopted, sources and instruments of data collection, data analysis and presentation. The researcher also explains the use of pilot survey for ascertaining the validity and reliability of data collection instrument (questionnaire).

4.3 Research Design

There are three main categories of research design. These are survey, experimental and *ex post facto* designs. Survey design could be cross-sectional and longitudinal design;

Experimental design could be experimental with control and succession quasi-experimental design, while ex post facto is a one-case design with researchers using symbols in such designs (Asika, 2005). The researcher employed survey method in carrying out the study. This was done to enable the researcher reach all the respondents in the study area. It was used to collect primary data for the study. Both descriptive and exploratory approaches were used for literature review and in gaining information about the study area, while explanatory approach was used in analyzing the data collected.

4.4 Study Population

This research identified four aggregations of study groups for investigation these are professional firms in the built environment, property investors, property owners, and property occupiers all from the study area. These professional firms are legally and professionally qualified to carry out professional services they include; estate surveyors and valuers, architects, town planners, engineers, they are the first group they constitute about (13%). The property investors are those personnel that invest in housing either for occupation, rent, or sales purposes; they belong to the second group they constitute about (17%). p. The next are individuals or group of individuals who build or acquire house or building for no other purpose other than occupying the building themselves of their staff they belong to the third group they constitute about (18%). Finally we have individuals who pay rent or lease occupying buildings they are property occupiers they belong to the fourth group and constitute about (62%).

4.5 Sample Frame

Sample frame refers to the complete list of all units of population under study and

Determines the structure of enquiries (Olaseni, Solola, Laoye and Alade, ed. 2004 and

Aledare, 2004). The sample frame for this study consist of 100 participants were randomly selected from the study area as contained in the list below which comprises the legally qualify professionals, real property investor, real estate owners and property occupiers. The sample frame took consideration for building where the respondent leave in, either as unit housing or housing estates, we also took inventory of their ownership status.

4.6 Sample Size

A sample size comprises the total number of population elements or sampling units that are selected (i.e. sampled) for investigation in a research study (Olatunde-Aremu, 2004).

For the purpose of this study, the 100 participants were randomly selected from the study area as contained in the list below which comprises the legally qualify professionals, real property investor, real estate owners and property occupiers, constitute the sample size for this study.

4.7 Sources and Instrument for Data Collection

Data for this study was generated from two sources: primary and secondary.

4.7.1 Primary Data:

Primary data was collected by the researcher during fieldwork. They usually emanate from direct observation, personal interview, postal surveys, telephone surveys or questionnaires. For the purpose of this study, questionnaires, personal and telephone interviews were used with a view to extracting information about respondents‘ academic and professional qualifications, working experience and status. This is to establish that the respondents‘ opinion can be relied upon. Questions were also asked sustainable housing process, basis and methods adopted for the valuation, the factors considered in choosing the method(s) adopted and the challenges encountered in providing (SHI), all in the bid to achieve the study objectives**.**

4.7.2 The Questionnaire:

The questionnaire was designed to elicit information from the firms directly related to build environment, property investor, property owner and property occupiers. The questionnaire was divided into two sections; Sections A and B. Section "A" covered the personal data of respondents, such as name, sex, academic, status in the firm and professional qualification of respondents with a view to establishing that the right type of respondents were consulted in the conduct of the study. On the other hand, Section "B" contained questions which were structured based on the areas of research interest. Firms directly related to build environment, property investor, property owner and property occupiers were ask about (SHI) and their expressed opinion. the factors considered in choosing the method(s) adopted and the challenges encountered. These questions were asked for the purpose of achieving the study objectives.

4.7.3 Personal and Telephone Interviews:

As a supplement to the use of questionnaires, personal and/or telephone interviews were conducted on. Firms directly related to build environment, property investor, property owner and property occupiers on (SHI). This was done to find out whether the seminar/workshop/training equipped the respondents with the various techniques for (SHI), in general, and (SHI), in particular and also to ascertain the level of awareness of built professional in adopting modern approach in solving sustainable housing infrastructure issues especially the estate surveyors and valuers who act as a chief in the act of having a sustainable accommodation for various purposes.

4.7.4 Secondary Data:

These are data that had been collected and processed into a useable form by other people (authors). For the purpose of this study, such information emanated from sources such as textbooks, professional journals, Internet browsing, professional magazine and newsletters. The Nigerian Institution of Estate Surveyors and Valuers (NIESV), Nigeria Society of Engineers (NSE), Nigeria Institute of Architect (NIA) etc. among other sources. The data collected from textbooks, professional journals, Internet browsing, professional magazine and newsletters were used for literature review while consultation of directory of some professional bodies was used for the determination of the population, sample frame and sample size of the study.

4.8. Data Analysis and Presentation

The data collected in Section "A" (personal data of respondents) of the questionnaire were descriptive in nature hence were analyzed and presented using tools such as frequency distributions and percentages. On the other hand, Section "B" contained quantitative questions set to elicit information on the main thrust of the study and were therefore analyzed and presented using frequency distributions and statistical tools that include relative importance index (RII), Chi Square, Pearson Correlation, t-Test and principal component analysis (PCA). The various methods adopted for data analysis are as explained below:

4.8.1 Frequency Distributions and Percentages

In presenting data generated for the study, frequency distributions and percentages were employed. It shows either the actual number of observations falling in each range or the percentage of observations. Frequency distribution tables can be used for both categorical and numeric variables. Frequency distribution tables were used to summarize the data collected for the study.

4.8.2 Relative Importance Index (RII)

The idea behind the adoption of scaling approaches is borne out of the need that, instead of wanting to establish whether or not a respondent is favourably inclined to an issue can be deduced from the answers given to question(s) in the questionnaires, one can get a measure and a reasonably reliable actual position of the respondent(s) on the attitude continuum with the aid of Relative Importance Index. Under Relative Importance Index measure, variables are to be rated against a scale to assist in assessing the significance of each factor. The scale was then transformed into an index otherwise known as Relative Importance Index (RII) for each factor to determine the ranks of the different factors. The Relative Importance Index (RII) is evaluated using the following expression:

$RII = \Sigma a_i n_i / \Sigma x_j$

Where: i= response category index

x_j= the sum of j factors 1,2,3 …….N

a_i= constant expressing the weight given to the ith response.

n_j= the variable expressing the frequency of the ith

4.8.3 Chi Square

These types of analyses examine variability in two or more distributions of scores to determine whether or not there is any pattern of covariation, or commonality, between the variables. we demonstrated how to use the Crosstabs procedure to examine the relationship between pairs of categorical variables. As part of this procedure, we also discussed how we could use the statistical measure of association, Chi square, to determine whether or not a relationship between two categorical variables is statistically significant.

4.8.4 Pearson Correlation

The Pearson correlation coefficient is a statistic used to determine the degree and direction of relatedness between two continuous variables. The possible values of the correlation coefficient range from -1.00 to +1.00, and the closer the number is to an absolute value of 1.00, the greater the degree of relatedness. As with Chi square, the Pearson correlation coefficient can be tested for statistical significance (using the conventional probability criterion of .05).

4.8.5 t-Test

The t-test is used to determine whether the difference between means of two groups or conditions is due to the independent variable, or if the difference is simply due to chance. Thus, this procedure establishes the probability of the outcome of an experiment, and in doing so enables the researcher to reject or retain the null hypothesis (in this case, Ho is that any observed differences are not significant, but rather, are due to chance). The null hypothesis states that the experimental

manipulation has no effect, therefore the means of the groups will be equal. In this respect, the t-test is an inferential statistic used to test hypotheses. Under ideal conditions, these types of inferential statistics allow the researcher to infer a causal relationship between the independent and dependent variable.

4.8.6 Principal Component Analysis (PCA).

Factor analysis is a statistical method used to describe variability among observed variables in terms of a potentially lower number of unobserved variables called factors. In other words, it is possible, for example, that two or three observed variables together represent another, unobserved variable, and factor analysis searches for these possible combinations. There are two types of factors analysis: exploratory factor analysis (EFA) used to uncover the underlying structure of a relatively large set of variables and confirmatory factor analysis (CFA) that seeks to determine if the number of factors and the loadings of measured (indicator) variables on them conform to what is expected on the basis of pre-established theory. The different methods of extracting the factors from a set of data include principal components analysis (PCA), principal factors analysis (PFA), image factoring analysis (IFA), maximum likelihood factoring, alpha factoring, unweighted least squares and generalized least squares. The most commonly used of these methods is principal component analysis and it is the one adopted in this study. The objectives of PCA are to discover or to reduce the dimensionality of the data set and to identify new meaningful underlying variables. The mathematical technique used in

PCA is called Eigen analysis: where calculation is made for the eigenvalues and eigenvectors of a square symmetric matrix with sums of squares and cross

products. The eigenvector associated with the largest eigenvalue has the same direction as the first principal component. The eigenvector associated with the second largest eigenvalue determines the direction of the second principal component. In this study eigenvalues greater than 1 were required and used to explain the components (factors) that account the variance.

4.9 Treatment of Research Questions and Objectives

For better comprehension of the methods adopted in the collection and treatment of data for each of the objectives set for the study, the following paragraphs present the administration of data gathering instruments, characteristics/nature of data collected and the treatment of the data.

Data Characteristics: The data for this study are both qualitative and quantitative in nature. The qualitative data include the personal characteristics of the respondents and the firms. The quantitative data include those. Firms directly related to build environment, property investor, property owner and property occupiers. As earlier stated the data used for this study was generated through the questionnaire administered on the respondent. Firms directly related to build environment, property investor, property owner and property occupiers residing/ practicing within the study area, while personal/telephone interviews were conducted on. Firms directly related to build environment in the study area.

4.10 Pilot Study

Pilot study was conducted within two weeks interval using ten (10) copies of the questionnaire, administered on Principal Partners of ten (10) Firms directly related to build environment within the study area. This was carried out to test the validity and reliability of the research instrument – questionnaire as well as to ensure the adequacy of the questionnaire or its inadequacy in achieving the objectives of the study so as to make necessary amendments to the questionnaire, before going to the field for final data collection. Some parts of the draft questionnaire were improved, rearranged, and modified in the light of the practical experience gained from the pre-test. It was then finalized and questions were listed in logical sequence, so that the respondents could answer easily.

4.12. Validity Testing

A research design is said to be valid if it enables the researcher to elicit the correct responses from the sample subjects; otherwise, it is a faulty design and may not lead to correct findings (Asika, 2005). The concept of validity of findings is usually applied in two areas of research – validity of findings and validity of measurements. Validity of findings mainly focuses on the adequacy of a research design in eliciting the type of responses that it is designed to generate. If it fails to accomplish this, the designs are faulty and will eventually lead to findings that are not valid. Validity of measurement is the ability of the instrument to measure what it is supposed to measure. This is measured in three ways: content validity, criterion-related validity and construct validity (Last, 2001, Bateman, et al. 2002).

In this study, the validity test was conducted by subjecting the questions in the questionnaire to the opinion of respondent Estate Surveyors and Valuers used for the purpose of the test. The process however revealed that while some of the questions were not necessary, a few important questions germane to the achievement of the study objectives were left out. The necessary corrections were made to ensure that the questions contained in the questionnaire cover all areas of the study that would enable the researcher meet all the research objectives and answer research questions.

4.10 Reliability Testing

Reliability focuses on the consistency between independent measurements of the same phenomenon. It is the stability, dependability, predictability, accuracy or precision of a measuring instrument. Reliability is concerned with the consistency in the results given by the same instrument and this is tested using any of test-re-test technique, multiple (alternate) forms, split-half technique and Cronbach‘s alpha test (Asika, 2005). While carrying out the pilot study, the test-re-test reliability approach was adopted in testing the reliability of the questionnaire. This was accomplished by taking two separate measurements (through administration of questionnaire) of the sample population within a two-week interval. The first measurement was carried out by administering a copy of the questionnaire on each Principal Partner of ten selected firms related to build environment. This was repeated a week later with new copies (10) of the questionnaire, administered on same Principal Partners of firms related to build environment. The result obtained from the second measurement was correlated with the ones obtained from the first measurement. This was carried out to ascertain whether the questionnaire adequately covers the scope of the topic and capable of

providing answers to the research questions. Minor areas that could have made the instrument unreliable were critically reviewed and necessary corrections made before administering the final copies of the questionnaire on the respondents.

CHAPTER FIVE

PRESENTATION AND INTERPRETATION OF DATA

5.1 Introduction

This Chapter presents a comprehensive analysis of data collected from the questionnaire administered on Principal Partners of) Firms directly related to build environment within the study area. The analysis contained in this Chapter has been structured into two sections; preliminary survey details and wetland valuation practice.

5.2 Preliminary Survey Details

Data used for this study was collected between the months of August and October 2021. The various responses were subsequently coded and analysed in between September and October 2021, using Statistical Package for Social Scientists (SPSS version 23.0). The sample size for the study was made up of Principal Partners of Firms directly related to build environment within the study area (Umuahia North and South).

5.2.1 Questionnaire Distribution and Retrieval

In conducting the survey, a total number of 120 questionnaires were administered, out of which 118 questionnaires (98%) were returned and found useful for the study. The analysis of questionnaire distribution and retrieval are contained in Table 5.1.

Table 5.1 Questionnaire Distribution and Retrieval

Location	Questionnaire Distributed	Questionnaire Retrieved	Percentage (%)
Umuahia North/South	120	118	98
total	120	118	100

Source: Author's Field Survey, 2021

Table 5.1 shows the number of questionnaire that was administered and the number of questionnaire that was retrieved. Copies of the questionnaire were distributed to different stakeholders directly or indirectly involve in sustainable housing infrastructure. This ranges from professionals in built environment, landlords, tenant, developers and community owners constitutes the target population. From the turn out, its evidently clear that majority of the people in the study area responded positive seeing the number of questionnaire that was retrieved with 98% of respondent response

5.2.2 Respondents' Gender

The gender of the respondent of any given study illustrates the degree of participation of the genders in the study area especially where all things are equal. In this study our observation found out that men ranked 71 in responding to the questionnaire more than the women who ranked 47. This also reveals that men participate more in sustainable housing than women owning to the fact that owning a house is usually perceived to be the sole responsibility of men in the study area. Reason being that shelter is the second basic need of man.

Table 5.2 Gender of Respondent

S/N	Number of Respondents	Frequency	Percent(%)	Valid Percent	Cumulative Percent
Male	71	6	60.0	60.0	60.0
Female	47	4	40.0	40.0	100.0
Total	118	10	100.0	100.0	

Source: Author's Field Survey, 2021

5.2.3 Respondents' Age Bracket

The table below shows respondents age bracket in which their age bracket speaks more on the level of their participation. From the table it is evidently clear that respondent that falls between age brackets of 20-30 and 51-above years were 12 each while respondent whose age falls between 31-40 and 41-50 were 59 and 35. This means that the age workforce of the respondents falls between 31-50 and as such, validity of their response will form a foundation of our analysis. Furthermore the age bracket of the genders shows that the need for sustainable housing infrastructure is not gender based but a collective need that calls for mutual collaboration between all asunder that calls for innovative attention in the study area.

Table 5.2.1 Age Bracket of Respondents

		Number of Respondents	Frequency	Percent (%)	Valid Percent	Cumulative Percent
Valid	20-30 yrs.	12	1	10.0	10.0	10.0
	31-40 yrs.	59	5	50.0	50.0	60.0
	41-50 yrs.	35	3	30.0	30.0	90.0
	51- above	12	1	10.0	10.0	100.0
	Total	118	10	100.0	100.0	

Source: Author's Field Survey, 2021

Table 5.3 Age Bracket of Respondents (males/females)

Gender of respondent		Number of Respondent	Frequency	Percent(%)	Valid Percent	Cumulative Percent
Male	Valid 31-40 yrs.	24	4	34	34	34
	51-above	12	4	17	17	34
	41-50 yrs.	35	9	49	49	100.0
	Total	71	17	100.0	100.0	
Female	Valid 20-30 yrs.	12	1	26	26	52
	31-40 yrs.	35	6	74	74	100.0
	Total	47	7	100.0	100.0	

Source: Author's Field Survey, 2021

5.2.4 Respondents' Knowledge about Sustainable Housing Infrastructure

Ascertaining the knowledge of the respondent in regards to sustainable housing infrastructure was considered vital in this study. Reason being that some of the respondent does not know what sustainable housing infrastructure is either by context or implied. The research team did well in educating the respondent on sustainable housing infrastructure and its scope, which in return assisted the respondent, helped us to arriving at their various opinions. Table 5.4 shows the level of knowledge about sustainable housing infrastructure of the respondents seeing that those who are knowledgeable (SHI) after our interaction with them were rating (92%) than those

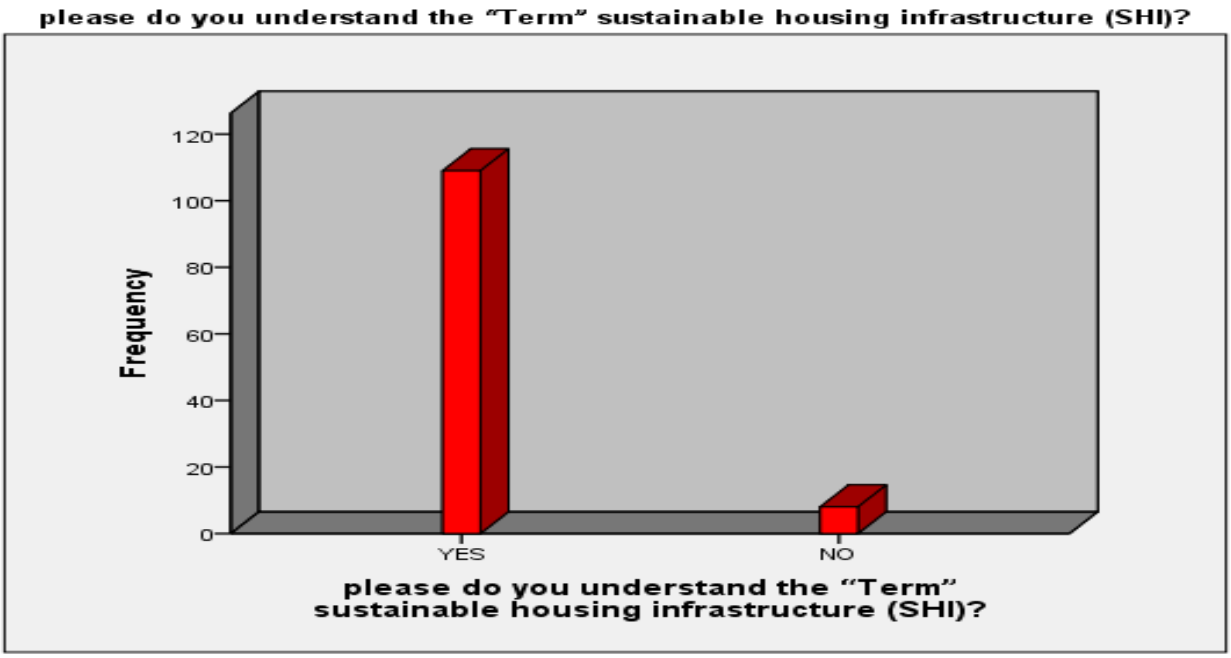
without the knowledge of (SHI) rating (7%). This also encouraged the research team to further enlighten the few respondents that has little or no knowledge about (SHI). Table and the chart are shown in table 5.4 and figure 5.1 below to further strengthen our explanations.

Table 5.4 Respondents' Knowledge about Sustainable Housing Infrastructure

		Frequency	Percent(%)	Valid Percent	Cumulative Percent
Valid	YES	109	91.6	93.2	93.2
	NO	8	6.7	6.8	100.0
	Total	117	98.3	100.0	
Missing	9999	1	.8		
	System	1	.8		
	Total	1	1.7		
Total		118	100.0		

Source: Author's Field Survey, 2021

Figure 5.1 Respondents' Knowledge about Sustainable Housing Infrastructure



Source: Author's Field Survey, 2021

Figure 5.1 displays the number of years the respondents have known about sustainable housing infrastructure. The table indicates that respondents with more than (92 %) have knowledge about sustainable housing infrastructure while (7%) has little or no knowledge about (SHI). Apart from (1%) that was missing, from this analysis it can be deduced that majority of the respondents have knowledge about sustainable housing infrastructure and their opinion of value can be relied upon.

5.2.5 Respondents' Year of Experience about Sustainable Housing Infrastructure

Year of experience in any given endeavor have a significant impact in decision making, as its generally accepted to represent a wealth of knowledge in a particular subject matter. The year of experience of the respondents were investigated upon based on their various responses and remarks is stated below in table 5.5

Table 5.5 Respondents' Year of Experience about Sustainable Housing Infrastructure

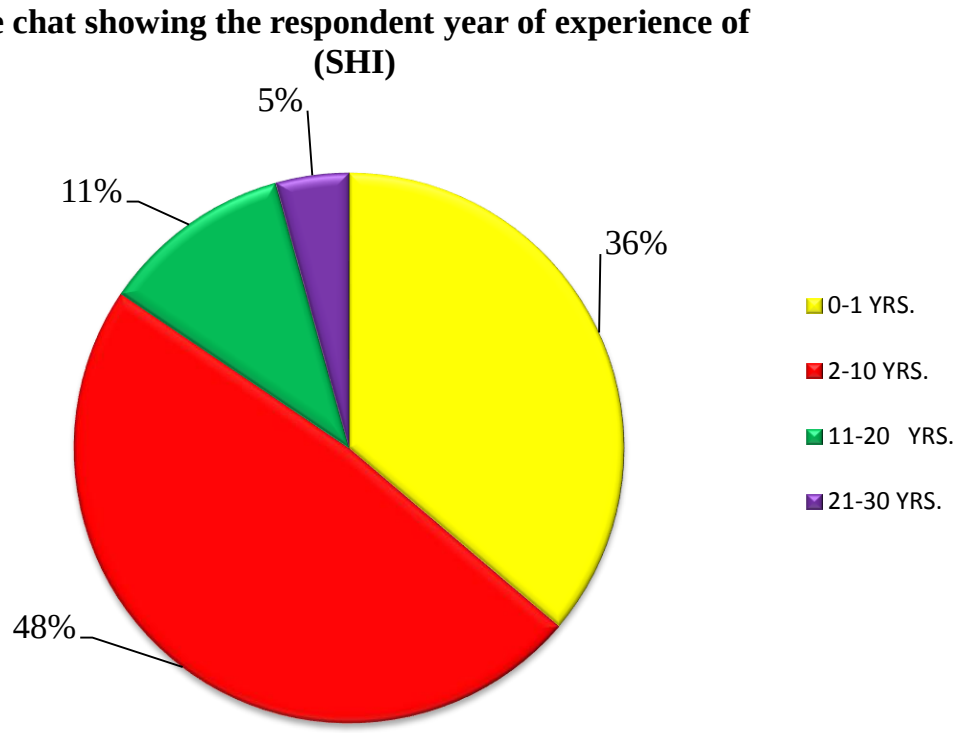
		Frequency	Percent(%)	Valid Percent	Cumulative Percent
Valid	0-1 Years	42	35.3	36.2	36.2
	2-10 Years	56	47.1	48.3	84.5
	11-20 Years	13	10.9	11.2	95.7
	21-30 Years	5	4.2	5.0	100.0
	Total	116	97.5	100.0	
Missing	9999	1	1.7		
	System	1	.8		
	Total	3	2.5		
Total		118	100.0		

Source: Author's Field Survey, 2021

From the table above we observed that majority of the respondent that have longer year experience about (SHI) have seen either a component or whole part of

component that makes up the entire body of sustainable housing infrastructure. From the table above its predictable that the response of the respondents with 2-10 years of experience scored the highest frequency which is 56 this also shows that the respondents has been practicing the use of some component of (SHI) resources example solar kits etc.

Figure 5.2 Respondents' Pie Chart Year of Experience about Sustainable Housin g Infrastructure



Source: Author's Field Survey, 2021

Figure 5.2 reveals that the practice of sustainable housing infrastructure is being accepted universally not only in Umuahia urban areas but also in the rural areas since some rural areas are having urban characteristics hence they are known as nodal region (Umeakuka, 2004) To this effect, respondents with 2-10 years of experience

scored a valid of (48%) while the respondents with 0-1 year scored a valid of (36%) as respondents with 11-20 years and 21-30 years scored (11%) and (5%) respectively.

5.2.6 Respondents' Involvement in Relation with Sustainable Housing Infrastructure

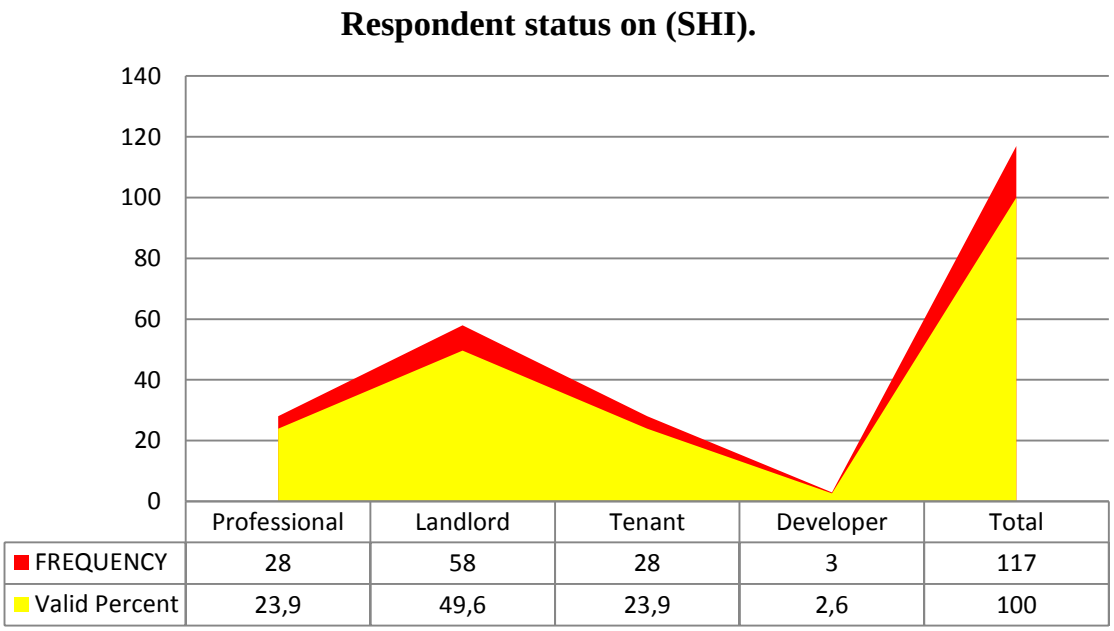
Determining the Involvement of the respondent was an attempt to weigh the benefit and impact of sustainable housing infrastructure so as to know if it strike balance between the various stakeholders and as well to value the degree to which this technicality has been explored within a context of real estate management practice. Furthermore, determining the status will serve as a guide in designing a master plan or framework that will enable access to sustainable housing infrastructure that is affordable, available and durable to first low income earners to high income earners in the study area, extending to neighboring and its environs and beyond. Table 5.6 as illustrated shows most of the respondents are landlord reason being that some majority of the respondents operates from rural areas whereas some are tenant as a result they come from farther distance in Umuahia, they resort to stay close to their occupation place usually along transport terminus according to (Hoyt, 1939) this study also shows that a few number of professionals are participating in built environment in the study with a (24%) and (28F). while developers are least on area diagram this may be as a result of underdevelopment, unstable economic policies and other inherent factors that is mitigating the standard of housing in the study area.

Table 5.6 Respondents' Involvement in with Relation Sustainable Housing Infrastructure

Do you consider yourself directly involve as either professional or beneficiary of sustainable housing infrastructure?					
		Frequency	Percent (%)	Valid Percent	Cumulative Percent
Valid	Professional	28	23.5	23.9	23.9
	Landlord	58	48.7	49.6	73.5
	Tenant	28	23.5	23.9	97.4
	Developer	3	2.5	2.6	100.0
	Total	117	98.3	100.0	
Missing	9999	1	.8		
	System	0	.8		
	Total	1	1.7		
Total		118	100.0		

Source: Author's Field Survey, 2021

Figure 5.3 Respondents' Involvement in Relation with Experience about Sustainable Housing Infrastructure



Source: Author's Field Survey, 2021

5.3. Present Status of Sustainable Housing Infrastructure in Umuahia

The present state of infrastructure supply especially in scope of this study will determine the market value of real property either positively or negatively the term sustainable housing infrastructure touches across so many component of infrastructure such as generating electricity through various means like solar, wind mill, bio-resources energy and appliances with low electric current consumption. Secondly, generation of gas through the conversion of bio-waste resources to gas for domestic purposes like bio-digester. Thirdly, installation of vent fans that naturally cools the house without the use of electricity as alternative to heating ventilation and air conditioning (HVAC). Fourthly, use of waste, crude or traditional raw materials in construction purposes in a refined manner. This does not only cut down cost but term to reduce environmental and ecological degradation, as the cost benefit or advantage will improve the per capital income of the citizens in the study area.

5.3.1 Present Condition and Situation Facing Housing Sector in Umuahia Capital Abia State

Individual‘s view about a thing, at times, determines the value attached to such a thing. In the case of sustainable housing infrastructure, it is not different the respondents perception or opinion about the present state of housing infrastructures in Umuahia might vary based on personal perspective of various respondents. This question was therefore asked so as to help the researcher determine the present state of (SHI) in the study area.

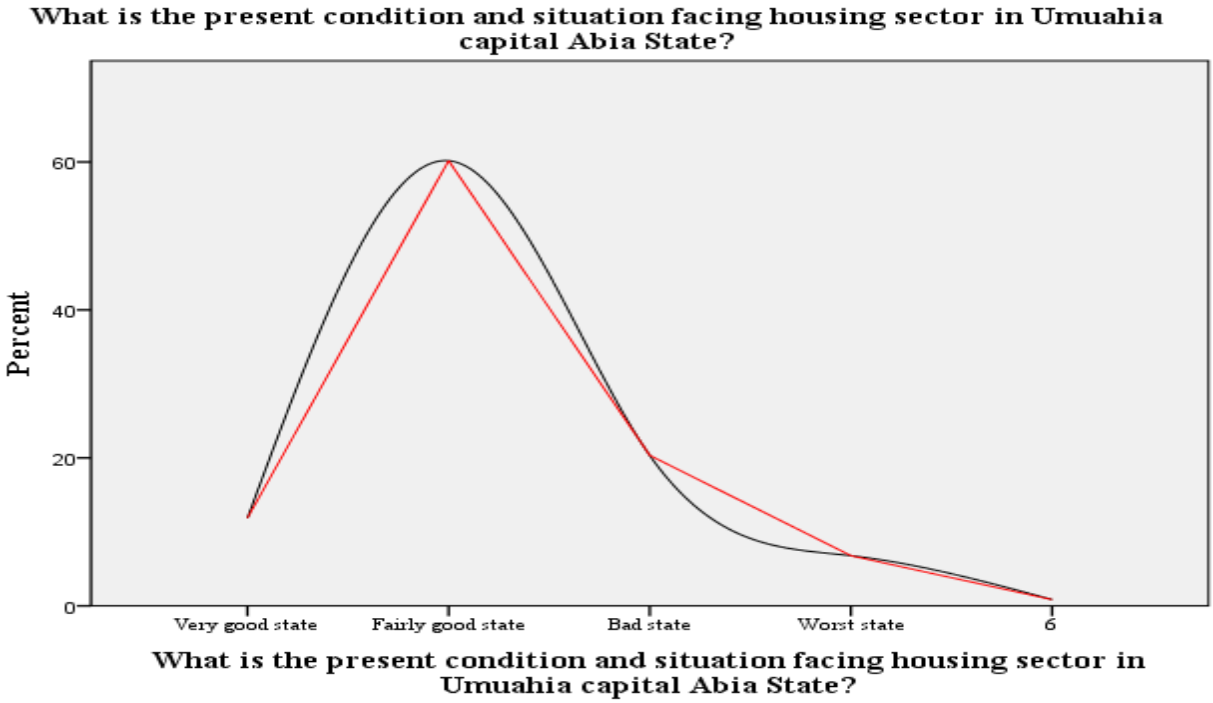
Table 5.7 Respondents' Opinion on the Present Condition and Situation Facing Housing Sector in Umuahia capital Abia State?

What is the present condition and situation facing housing sector in Umuahia capital Abia State?					
		Frequency	Percent (%)	Valid Percent	Cumulative Percent
Valid	Very good state	14	11.8	11.9	11.9
	Fairly good state	71	59.7	60.2	72.0
	Bad state	24	20.2	20.3	92.4
	Worst state	8	6.7	6.8	99.2
	Missing	1	.8	.8	100.0
	Total	118	99.2	100.0	
	System	1	0.8		
Total		119	100.0		

Source: Author's Field Survey, 2021

Table 5.7 reveals that the highest proportions of the respondents described the present condition and situation facing housing in Umuahia capital in a fairly good state (59%), bad state (20%) very good state (12%) and worst state (7%) this position suggest a need for sustainability looking at the opinion of majority with (59%), fairly good as opined by respondent calls for re-diversification of sustainable approach less at any time, population, utility stretch and cost-in-use will start deteriorating their status. On the other hand carrying out a medium term or long run plan on improving or upgrading sustainable housing infrastructure could be a way forward considering sustainability approach.

Figure 5.4 Respondents' Interpolation Line Showing the Present Condition and Situation Facing Housing Sector in Umuahia Capital Abia State?



Source: Author's Field Survey, 2021

Figure 5.4 above illustrates the present condition facing the study area. This calls for improvement especially the housing sector. A careful study at the interpolation line shows that, there is a gradual movement shifting towards the right direction which calls for preventive planning against infrastructural degradation. The researcher believes that resorting to sustainable housing infrastructure is the only hope of preserving the real estate sector in the face of global challenge. This approach will also re-vitalize our environment wellness.

5.3.2 The Level of Supply of Sustainable Housing Infrastructure in Umuahia

The level of consistency or inconsistency has a way of increasing value or decreasing value especially when amenities are limited in supply.

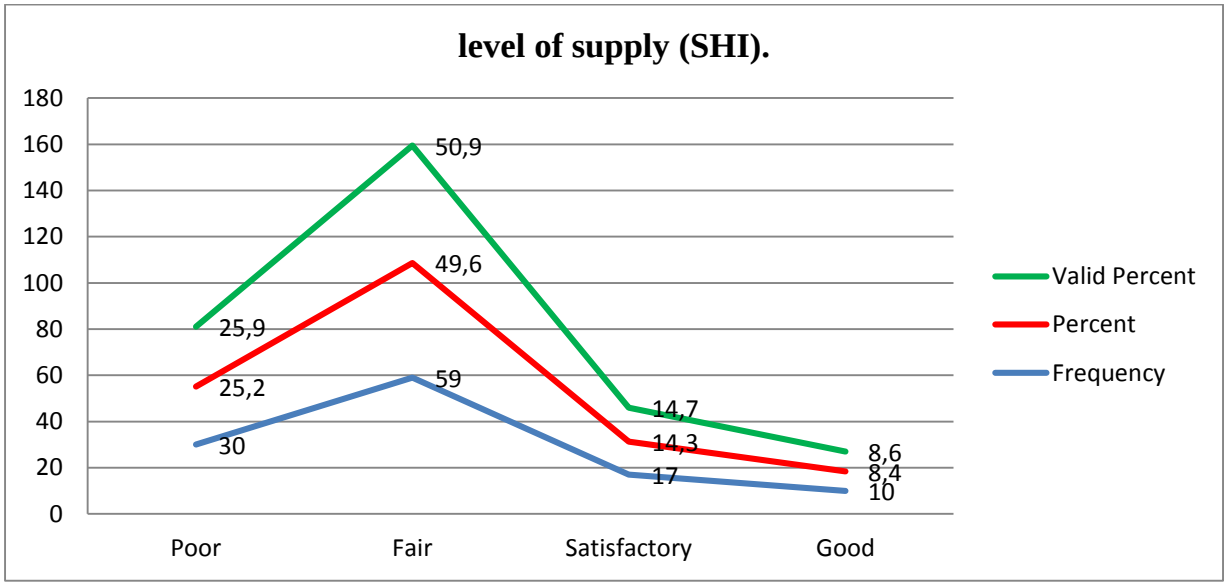
Table 5.7.1 Level of Supply of Sustainable Housing Infrastructure in Umuahia

How would you categorize the level of supply of sustainable housing infrastructure in Umuahia?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	30	25.2	25.9	25.9
	Fair	59	49.6	50.9	76.7
	Satisfactory	17	14.3	14.7	91.4
	Good	10	8.4	8.6	100.0
	Total	116	97.5	100.0	
	Missing	2	1.7		
	System	0	.8		
	Total	2	2.5		
Total		118	100.0		

Source: Author's Field Survey, 2021

Table 5.7 shows the level of supply they receive on housing infrastructure. (50%) attest to the fact that amenities that help the smooth running of an housing fair while (15%) and (7%) opined the level of supply to be good and satisfactory. With this remark, its evidently clear that the fair state of infrastructural supply have a latent effect on property values reason being that true value of real property cannot be ascertained under this circumstance. While stack line analysis display the trend of the contribution of each value over time or ordered category as shown in figure 5.5

Figure 5.5 Level of Supply of Sustainable Housing Infrastructure in Umuahia



Source: Author's Field Survey, 2021

5.3.2 Ownership and Management of Sustainable Housing Infrastructure in Umuahia

Ownership and management of sustainable housing infrastructure is one of the major challenges that the study area has faced in the recent times. This has really been a problem seeing that they are capital intensive not only that, management of some of this asset usually demand a high level of manpower in the area of expatriate. This short coming brought about dependency of government this is further understood in the table below. Table 5.8 show divergent views of the respondents, we observe that both gender had different opinion as to who owns and or builds and manages sustainable housing infrastructure in the study area. We also observe that male gender opinion is that government with the score of (32%) while the female in respondents in their own perspective individual are the major people that own builds and manage.

Table 5.8 Ownership and Management of Sustainable Housing Infrastructure in Umuahia

Gender of respondent		Who owns' and or builds manages sustainable housing infrastructure in Umuahia?			
	Government	Individual	Private public partnership	Total	missing
Male	32	29	4	65	0
Female	12	33	7	53	1
Total	44	62	11	118	1

Source: Author's Field Survey, 2021

Table 5.9 Chi-Square Tests Ownership and Management of Sustainable Housing Infrastructure in Umuahia

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.051[a]	3	.018
Likelihood Ratio	10.684	3	.014
Linear-by-Linear Association	1.279	1	.258
N of Valid Cases	118		

Source: Author's Field Survey, 2021

a. 3 cells (37.5%) have expected count less than 5. The
b. minimum expected count is .45.

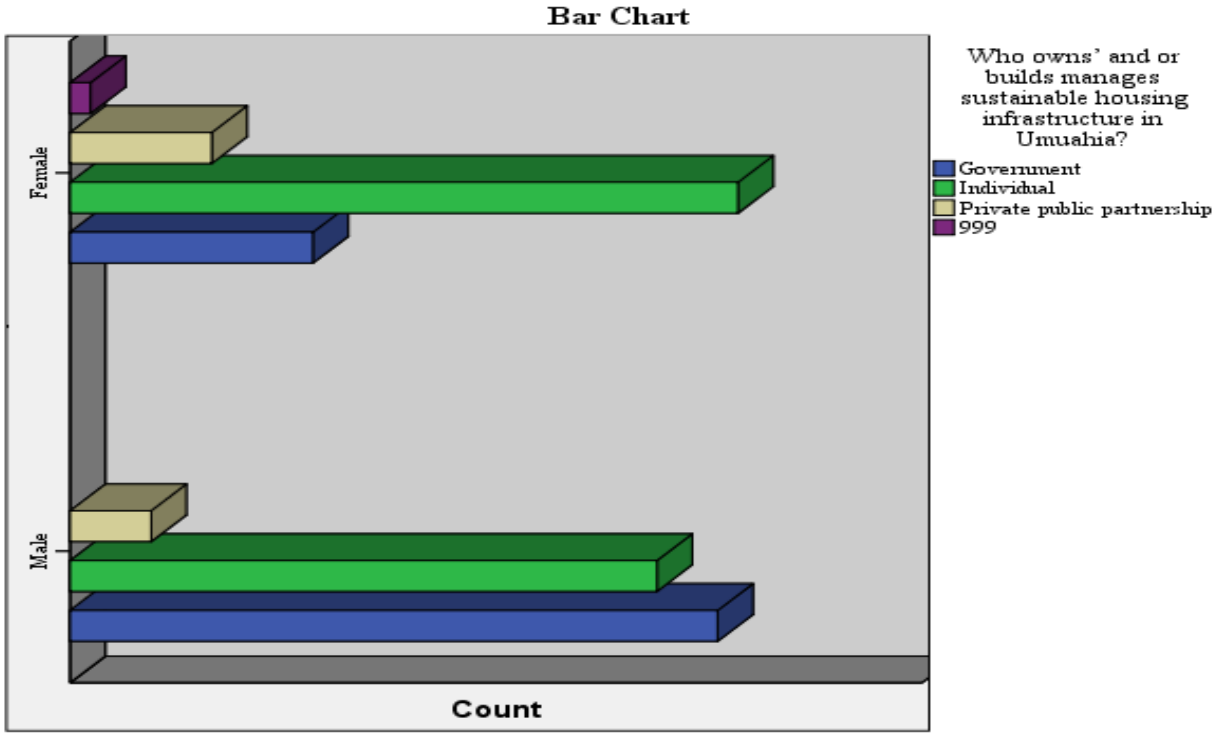
Table 5.10 Symmetric Measures

		Value	Asymptotic Standardized Error[a]	Approximate T[b]	Approximate Significance
Measure of Agreement	Kappa	.196	.075	2.555	.011
N of Valid Cases		118			

Source: Author's Field Survey, 2021

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Figure 5.6 Ownership and Management of Sustainable Housing Infrastructure in Umuahia



Source: Author's Field Survey, 2021

Figure 5.6 shows the various opinion of respondents pointing to intelligence reason being that their exist some element of partnership that has been in existence and call for consolidation. While table 5.10 reveals the level of significance of the Symmetric

Measures 0.11 which illustrates that there is no significance in providing (SHI) either by government or individual if the modality creates a room for mutual benefit of all stakeholders involve.

5.3.3 Appropriate Strategy to Employ in Solving Infrastructural Challenge in Real Estate Sector in Umuahia

There are various method of sourcing sustainable housing infrastructure that requires different strategy either depending on government solely, depending on privatization or partnership the further analysis show the respondents best approach in providing (SHI) running and managing such facility

Table 5.11 Correlations Showing Appropriate Strategy to Employ in Solving Infrastructural Challenge in Real Estate Sector in Umuahia

		What do you consider an appropriate strategy to employ in solving infrastructural challenge in real estate sector in Umuahia?	Identification of respondent
What do you consider an appropriate strategy to employ in solving infrastructural challenge in real estate sector in Umuahia?	Pearson Correlation	1	.012
	Sig. (1-tailed)		.449
	N	117	117
Identification of respondent	Pearson Correlation	.012	1
	Sig. (1-tailed)	.449	
	N	117	118

Source: Author's Field Survey, 2021

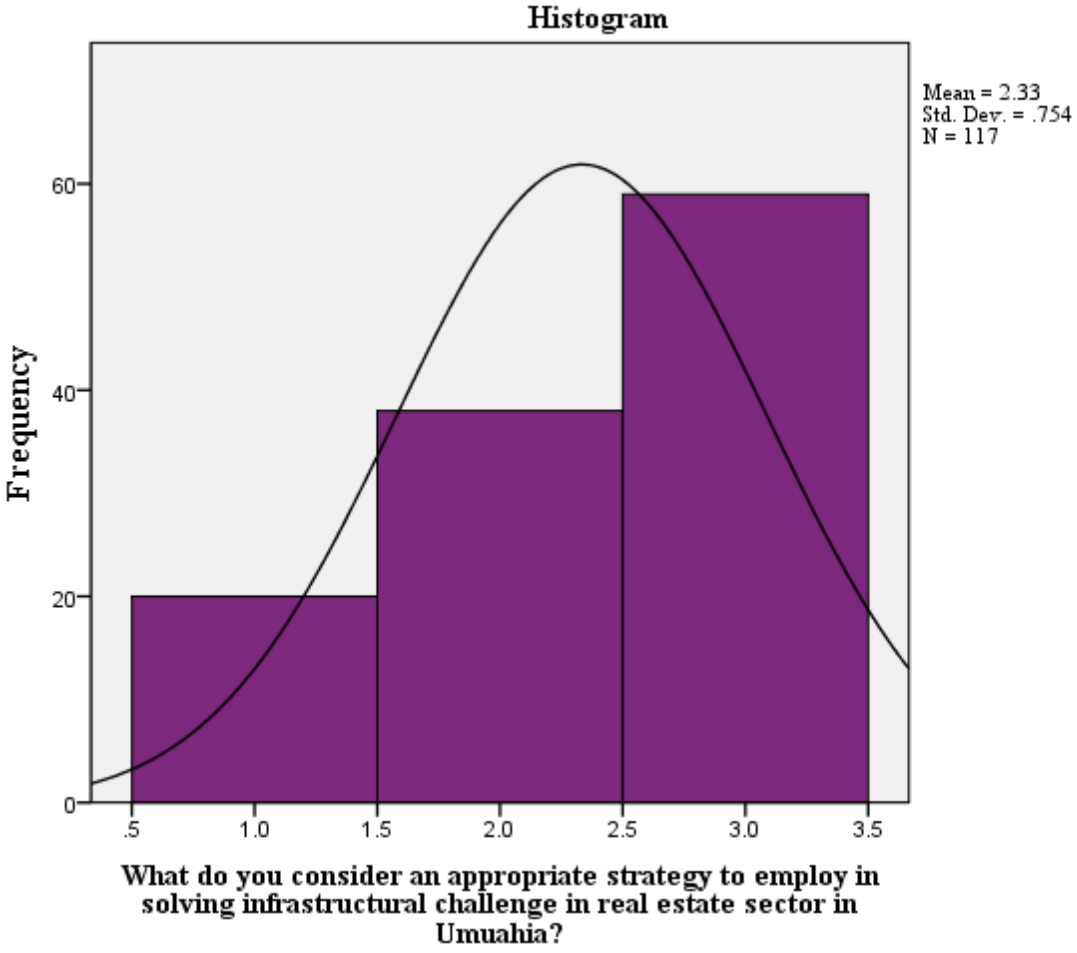
Table 5.11.1 Appropriate Strategy to Employ in Solving Infrastructural Challenge in Real Estate Sector in Umuahia

Table 5.12 What do you consider an appropriate strategy to employ in solving infrastructural challenge in real estate sector in Umuahia?					
		Frequency	Percent	Valid Percent	Cumulative Percent
	sole dependence on government	20	16.8	17.1	17.1
	sole dependence on privatization	38	31.9	32.5	49.6
	Partnership	59	49.6	50.4	100.0
	Total	117	98.3	100.0	
	Missing	1	.8		
	System	1	.8		
	Total	1	1.7		
Total		118	100.0		

Source: Author's Field Survey, 2021

Table 5.11 illustrates as that their exist measure of significance in adopting strategy for solving sustainable infrastructural challenges in the study area. With the approximation of Sig. (1-tailed) 0.449 which is = ≥ 0.5 it shows that employing partnership as a strategy will produce a lasting solution because of the level of significance. Table 5.12 shows that a good number of respondent suggested partnership as a way of providing (SHI) in the study area with the score (50%). The researcher believes that the opinion of the respondent should be relied upon.

Figure 5.7 Histogram Showing an Appropriate Strategy to Employ in Solving Infrastructural Challenge in Real Estate Sector in Umuahia



Source: Author's Field Survey, 2021

Figure 5.7 shows that the mean was 2.33, while the standard deviation was 754 it also reveals that the number of respondent that participated in this study were (117) with (1) missing figure making it a total of 118 respondents. The linear curve shows that there is relationship between some independent variables

5.3.4 Intervention of Federal, State and Local Government in Supply of Housing Infrastructure

Government intervention has been the major source of providing infrastructure, over the years. However, bad leadership negligence to rule of law coupled with global down turn has propel a quest to think outside the box especially in Africa were consumption is greater than production, this inadequacies has called for integration of public private partnership in proving certain amenities to ease the government at the same time offer some basic collective responsibilities. Dependence on the federal, state or local government has really set some communities back ward especially communities that receive little allocation of revenue for its day-to-day routine activity. The in thing recently has been sorting alternatives by way of partnership. The analysis below seeks to evaluate how far dependence on government in the recent time has helped in solving sustainable housing infrastructural problems.

Table 5.12 T-Test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
How would you access the intervention of federal government in supply of housing infrastructure?	118	10.36	91.792	8.450
How would you access the intervention of state government in supply of housing infrastructure?	117	1.74	.948	.088

Source: Author's Field Survey, 2021

Table 5.13 One-Sample Test

	Test Value = 0.5				
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference Lower
How would you access the intervention of federal government in supply of housing infrastructure?	1.167	117	.245	9.864	-6.87
How would you access the intervention of state government in supply of housing infrastructure?	14.185	116	.000	1.244	1.07

Source: Author's Field Survey, 2021

Table 5.14 One-Sample Test

	Test Value = 0.5
	95% Confidence Interval of the Difference
	Upper
How would you access the intervention of federal government in supply of housing infrastructure?	26.60
How would you access the intervention of state government in supply of housing infrastructure?	1.42

Source: Author's Field Survey, 2021

Table 5.15 One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
How would you access the intervention of federal government in supply of housing infrastructure?	118	10.36	91.792	8.450
How would you access the intervention of local government in supply of housing infrastructure?	116	1.78	.979	.091

Source: Author's Field Survey, 2021

Table 5.12-5.15 as shown above respectively, table 5.12 as we saw has a total number of 118 respondents represented in column (N) and 117 as a result of one missing variable while on the second column it scored a mean of (10.36) and (1.74), on the third column is the standard of deviation (91.792) and (0.948) and fifth column is the standard error mean (8.450) and (0.88). this show that dependence on federal government according to opinion of respondents has a higher effect than depending on state looking at the mean= 10.36. table 5.13 shows that there is little or no variation on federal or state government quality of deliver since their significance is Sig. (2-tailed) = 0.245 ≥ 0.5 depending on some internalities but to compare with local government the significance is Sig. (2-tailed) = 0.5 ≥ 0.1439 which means there is a sig. difference.

Table 5.16 One-Sample Test

	Test Value = 0.5				
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference
					Lower
How would you access the intervention of federal government in supply of housing infrastructure?	1.167	117	.245	9.864	-6.87
How would you access the intervention of local government in supply of housing infrastructure?	14.039	115	.000	1.276	1.10

Source: Author's Field Survey, 2021

Table 5.17 One-Sample Test

	Test Value = 0.5
	95% Confidence Interval of the Difference
	Upper
How would you access the intervention of federal government in supply of housing infrastructure?	26.60
How would you access the intervention of local government in supply of housing infrastructure?	1.46

Source: Author's Field Survey, 2021

Table 5.18 One-way ANOVA

				Mean Square	F
How would you access the intervention of federal government in supply of housing infrastructure?	Between Group A	(Combined)		8425.858	.000
		Linear Term	Contrast	6202.252	.
			Deviation	8445.027	.
	Within Groups			.	
	Total				
How would you access the intervention of state government in supply of housing infrastructure?	Between Group B	(Combined)		.899	.000
		Linear Term	Deviation	.906	.
			Weighted	.085	.
	Within Groups			.	
	Total				

Source: Author's Field Survey, 2021

Table 5.18 shows the mean difference between the 2 groups group (A = 8425.858) and group (B= 0.899) to yield (A-B)= (8425.858 — 0.899) = -8424.959 for the mean difference between these two groups. An asterisk next to the Mean Difference flags the pair of group means as significantly different at the .05 level (note that wherever an asterisk appears, the probability is less than .05 in the Sig. column for that particular comparison of two means). Below is the interpretation of these analyses as it would be written in this research report. Dependence on federal government had significantly higher mean in intervening in supply of (SHI) ratings (M= 10.36) than intervention from state government (M=1.74) and intervention from local government (M= 1.28). From the above tables one can deduce that federal government intervention remain the most reliable source of supplying sustainable housing infrastructure. However, state and local government can still emulate from federal

government process, this will go a long way to consolidate the state and local government intervention process.

5.3.5 Sustainable Housing Infrastructure and Its Effect on Property Values in Umuahia Capital Abia State, Nigeria

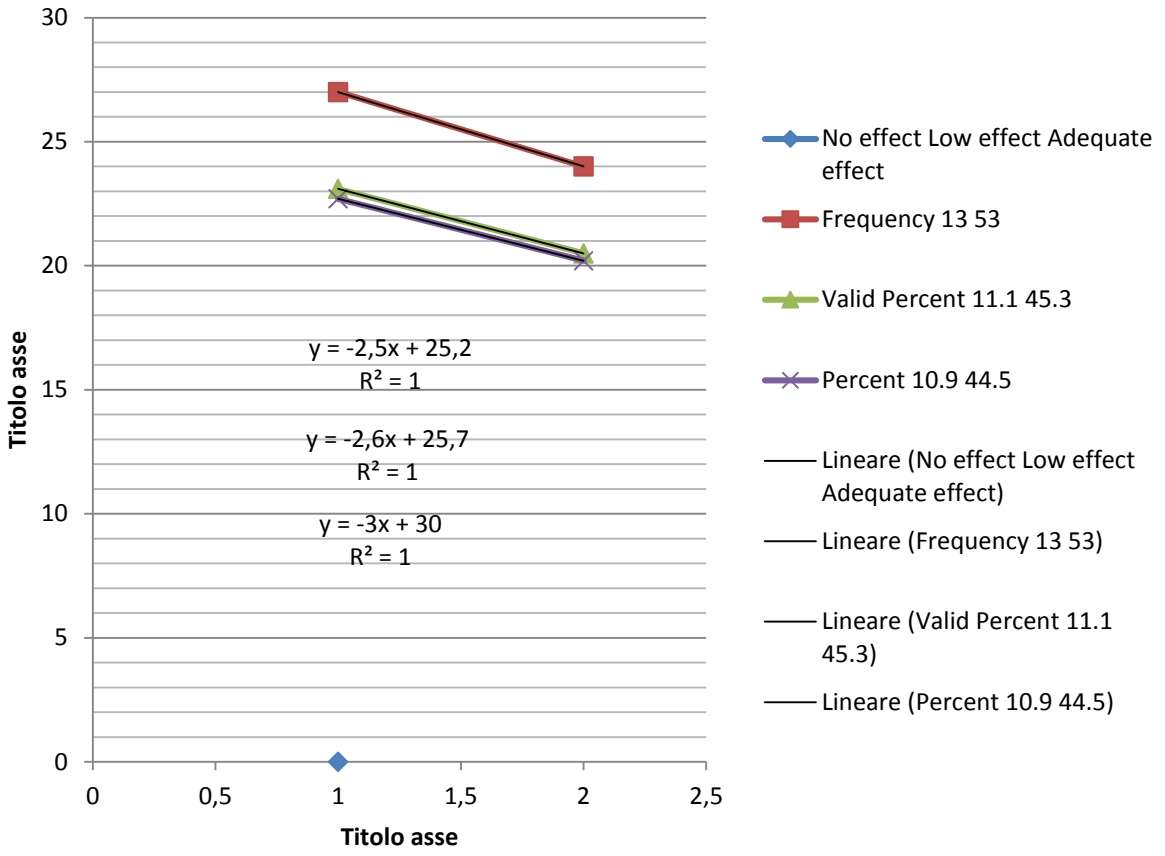
The advent of sustainable housing infrastructure has significantly affected values of real properties in western part of this world. Not only that, invention of (SHI) has impacted the sector positively in area of providing certain facilities that help the smooth running of an estate.

Table 5.18 Sustainable Housing Infrastructure and Its Effect on Property Values in Umuahia Capital Abia State, Nigeria

		Frequency	Percent	Valid Percent	Cumulative Percent
	No effect	13	10.9	11.1	11.1
	High effect	53	44.5	45.3	56.4
	Adequate effect	27	22.7	23.1	79.5
	Low effect	24	20.2	20.5	100.0
	Total	117	98.3	100.0	
	Missing	1	.8		
	System	1	.8		
	Total	1	1.7		
Total		118	100.0		

Source: Author's Field Survey, 2021

Figure 5.8 Stack Line Graph of Sustainable Housing Infrastructure and Its Effect on Property Values in Umuahia Capital Abia State, Nigeria



Source: Author's Field Survey, 2021

Table 5.19 shows that provision of sustainable housing infrastructure is going to have a tangible effect on property values in the study area and its surrounding. The respondent believes that availability of needed facility will attract high effect as ranked (45%) in the table above, not only that neighborhood with facility will always attract investors and other related economic activity like housing estate, shopping malls, industries etc.

5.3.6 Share System of Value Obtained From Provision of Sustainable Housing Infrastructure

The benefit derived from provision of infrastructure some time are shared base on some factors, these factors may range from political, religious, tribalism, social stratification, administration, geography and economical factors respectively. Going by limitations that may affect the share system. The response of the respondent was analyzed as shown in table 5.19

Table 5.19 Share System of Value Obtained From Provision of Sustainable Housing Infrastructure

Shared value system	Frequency	Percent	Valid Percent	Cumulative Percent
No sided beneficial	24	20.2	20.9	20.9
One sided beneficial	61	51.3	53.0	73.9
Mutual sided beneficial	30	25.2	26.1	100.0
Total	115	96.6	100.0	
Missing	3	2.5		
System	0	.8		
Total	4	3.4		
Total	118	100.0		

Source: Author's Field Survey, 2021

Table 5.19 shows that provision of housing infrastructure is one sided beneficial, result upon our finding reveals that provision of sustainable infrastructure was provided at selected areas while some areas are deserted. Some of this area that had some basic infrastructures are government administrative areas, government reserve areas and some places that represent government interest. From the table above respondent that lamented on one sided beneficial this ranked (60%) while those that

said in was mutual beneficial ranked (30%) the reason fort this could also be that the government is working on making it beneficial to all.

5.3.7 Alternatives Measure for Supplying and Solving Housing Problems.

The researcher, in a quest to proffer solution to housing and infrastructural challenges in the study area came up with a question asking his respondent, if providing an alternative measure in supplying and providing sustainable housing infrastructure can solve this problems. Table 5.20 analyzed the response of the respondents

Table 5.20 Does alternative measure in supply of housing Infrastructure a cure to housing problem?

Does alternative measure in supply of housing Infrastructure a cure to housing problem?

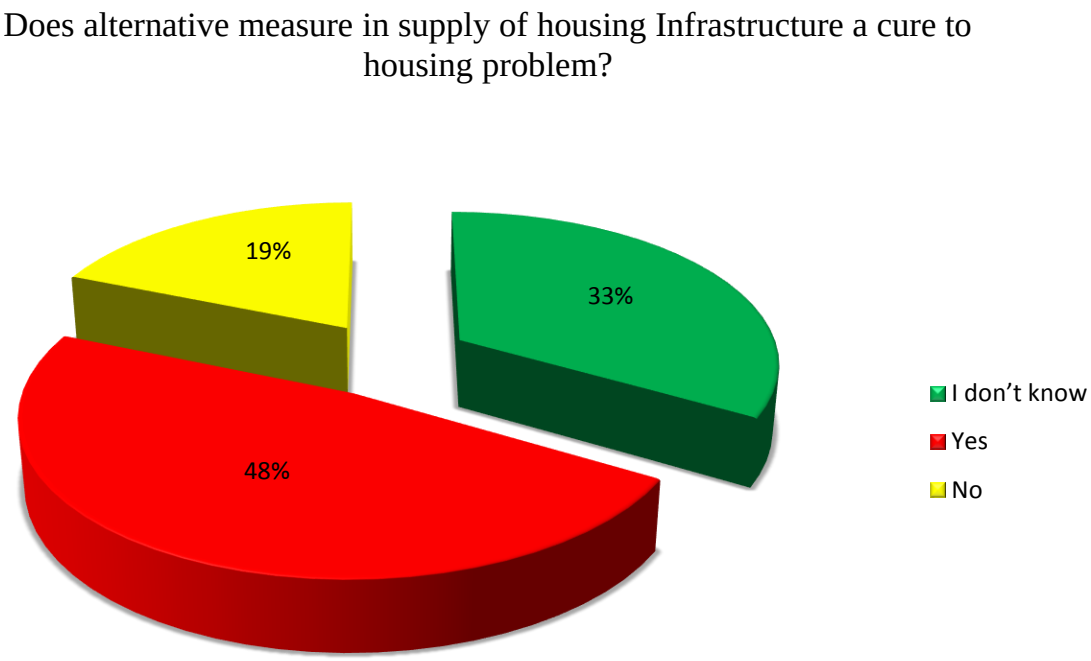
	Frequency	Percent	Valid Percent	Cumulative Percent
I don't know	39	32.8	33.3	33.3
Yes	56	47.1	47.9	81.2
No	22	18.5	18.8	100.0
Total	117	98.3	100.0	
Missing	1	.8		
System	1	.8		
Total	2	1.7		
Total	119	100.0		

Source: Author's Field Survey, 2021

Table 5.20 illustrates various responses of the respondents in to employing alternative measure in providing sustainable housing infrastructure in the study area. From the table (47%) accepted using an alternative measure. While (18.5%) said No and (32%) said they don't know. This agrees with the researchers view in sourcing for alternative in providing sustainable housing infrastructure looking at its promising benefits.

Figure 5.9 captured details of the respondents and translated in pie chart showing various responses. The researcher adopted respondent's decision as a valid opinion for this study. We also discovered that there was a missing variable which show that among the respondents one person omitted this question in the questionnaire

Figure5.9 Does alternative measure in supply of housing Infrastructure a cure to housing problem?



Source: Author's Field Survey, 2021

5.3.8 Assessment of Facilities that Enhances Property Values

Literature shows that housing is nothing without facility that serves as complementary tool that helps in meeting utility. Building without toilet facility, electricity, gas, water supply and ventilation facility. Will suffer neglect if not abandonment, for this reason

the researcher wants to assess respondent's opinion on their various accommodation in respect to sufficient facility dwelling that can enhance property value in the study area. Their responses were analyzed and computed in table 5.21 below.

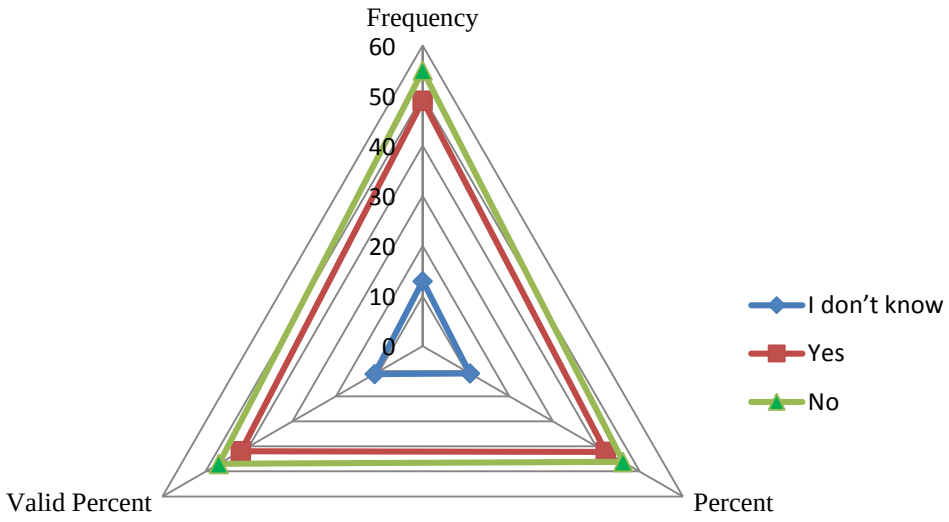
Table 5.21 Does your housing accommodation have a sufficient facility that enhances property values?

	Frequency	Percent	Valid Percent	Cumulative Percent
I don't know	13	10.9	11.1	11.1
Yes	49	41.2	41.9	53.0
No	55	46.2	47.0	100.0
Total	117	98.3	100.0	
Missing	1	.8		
System	0	.8		
Total	1	1.7		
Total	118	100.0		

Source: Author's Field Survey, 2021

Table 5.21 shows that there is infrastructural deficit in the study area based on responses of our respondent. We can see from the table above, the respondents were asked "*does your housing accommodation have a sufficient facility that enhances property values*?" Greater number of the respondent attest to the fact that they lack basic housing infrastructure, cost of installing this facility contributed to not providing it. This challenge was one of the motivations behind this study.

Figure 5.10 Does alternative measure in supply of housing Infrastructure a cure to housing problem?



Source: Author's Field Survey, 2021

Figure5.10 shows the degree of deficit respondents in the study area from the radar markers it is obvious that the state capital has really lacked behind especially in this present era the world is moving to the age of sustainable infrastructural facility. The shortage of facilities will adversely affect property values in the study area, reason being that investors or occupiers will prefer location that have desired facility over location that lacks facilities. Poor state of facility goes a long way to affect property values but also become a catalyst of property deterioration that leads to dilapidation which results to obsolescence and depreciation of real property.

5.3.9 Financial Implication of Installing Basic Housing Infrastructure in Umuahia

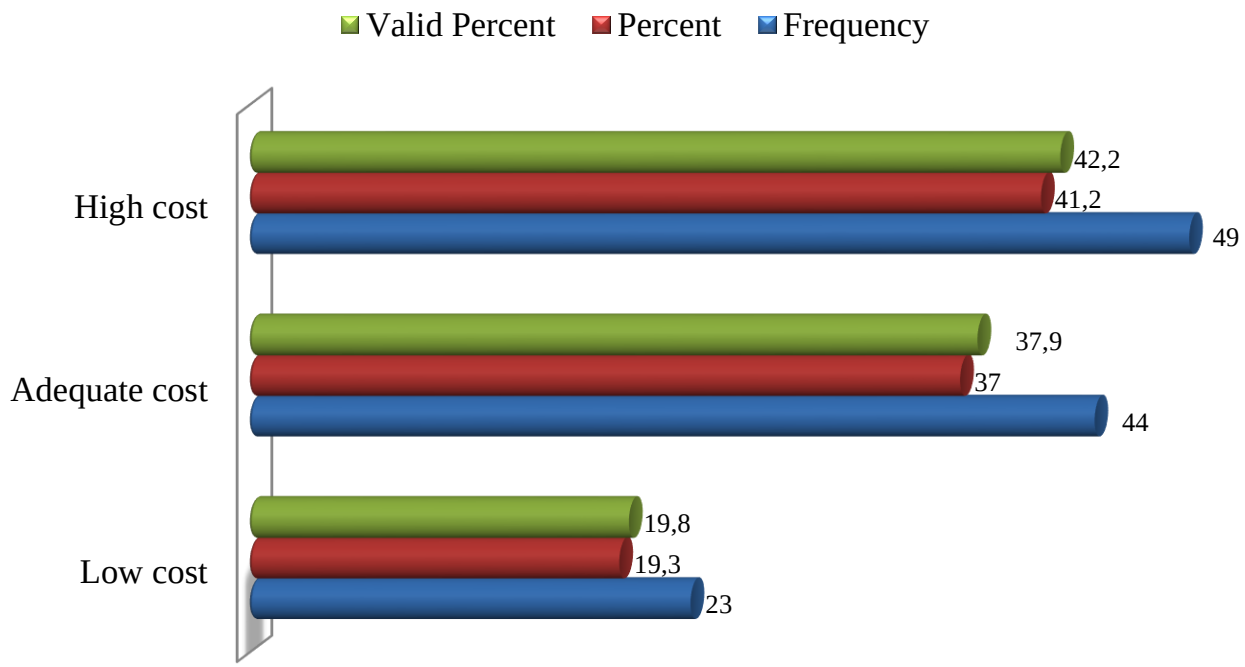
Real estate infrastructure is capital intensive in nature, they require considerable amount of capital to install, construct and provide them. Hence, only a very small percentage of the infrastructure is normally provided by individual investors it is therefore vital for investors and the society in general to have basic knowledge on alternative measure to provide some basic infrastructure without a full government intervention. The huge capital requirement/cost for real estate infrastructure have discourage quite a number of investors, while the bold and un-wavering lot have found wisdom in seeking professional advice and preparation of detailed viability reports in other to maximize opportunity in providing these infrastructure . The estate surveyor and valuer usually after professional advice to enlightened investors as regards the best investment option in real estate development since the provision of infrastructure will attract higher returns on the investment (Emenike, 2019). Table 5.22 illustrates the respondent's opinion with respect to Financial Implication of Installing Basic Housing Infrastructure in Umuahia.

Table 5.21 Financial Implication of Installing Basic Housing Infrastructure in Umuahia

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low cost	23	19.3	19.8	19.8
	Adequate cost	44	37.0	37.9	57.8
	High cost	49	41.2	42.2	100.0
	Total	116	97.5	100.0	
	Missing	2	1.7		
	System	0	.8		
	Total	2	2.5		
Total		118	100.0		

Source: Author's Field Survey, 2021

Figure 5.11 Financial Implication of Installing Basic Housing Infrastructure in Umuahia



Source: Author's Field Survey, 2021

Table 5.22 shows the respondents opinion on the financial implications of providing sustainable housing infrastructure. Respondent who voted high cost scored (49%) while respondents that voted adequate cost ranked (44%) and (23%) of the respondent opinion said the financial implication has a low cost. The researcher adopted the opinion of respondents as a valid document for this study.

5.4. Effect of Poor Sustainable Housing Infrastructure on per Capital income of a Citizen in Umuahia

One veritable parameter of assessment and indicator of status of any spatial, especially urban system is the state of infrastructure. The efficiency of any form of human activity system including an urban area largely depends on the provision of efficient infrastructural facilities and services (Babarinde 1998). Hence the significant of

infrastructure in the proper functioning of an urban area cannot be dismissed. Apart from being a major pointer of environmental quality, urban infrastructure is a critical socio-economic development of any urban area (Okusipe 1999). It places an important and indispensable role in the economic social and environmental aspect of life of an urban setting. It has a manifest impact on the quality of life. It is a back bone of any economy. Below is the response of the respondents

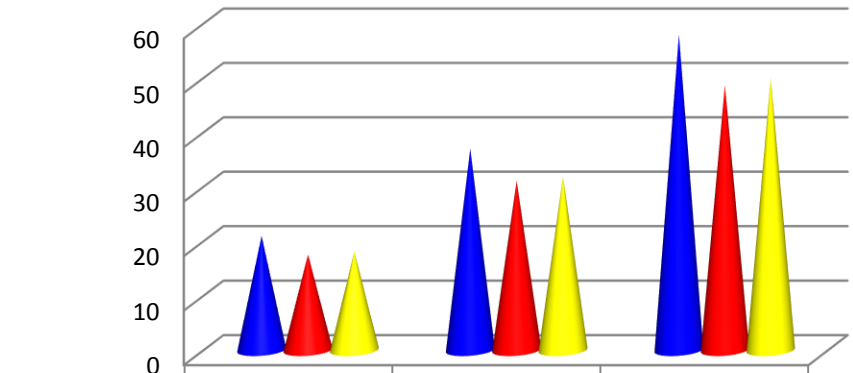
Table 5.22 Effect of Poor Sustainable Housing Infrastructure on Per Capital Income of A Citizen in Umuahia

	Frequency	Percent	Valid Percent	Cumulative Percent
No effect	21	17.6	18.1	18.1
Indirect effect	37	31.1	31.9	50.0
Direct effect	58	48.7	50.0	100.0
Total	116	97.5	100.0	
Missing	2	1.7		
System	0	.8		
Total	2	2.5		
Total	118	100.0		

Source: Author's Field Survey, 2021

Table 5.22 shows that, lack of sustainable housing infrastructure will always affect per capital income of a citizen in the study area. Poor facility will affect both real property owner and property occupier either by increasing the outgoings or by subjecting the property vacant from the table above the respondents asserted that that poor (SHI) will have a direct effect with the per capital income of a citizenry.

Figure 5.12 Effect of Poor Sustainable Housing Infrastructure on Per Capital Income of a Citizen in Umuahia



	No effect	Indirect Effect	Direct effect
Frequency	21	37	58
Percent	17,6	31,1	48,7
Valid Percent	18,1	31,9	50

Source: Author's Field Survey, 2021

Figure 5.12 illustrates the effect of poor sustainable housing infrastructure on per capital of a citizen. From the figure above we can notice that respondent who marked direct effect ranked (58%), respondent who marked indirect effect ranked (37%) and respondent who marked No effect ranked (21%) this then shows that poor (SHI) has direct effect on per capital income based on the respondent opinion.

5.5.Involvement of Stakeholders Including the Residents, Contractors/Professionals, Community, etc., in the Provision of Sustainable Housing Infrastructure

Provision of sustainable housing infrastructure in large scale usually involves coming together of related stakeholders either as associations, cooperative society, or organizations, alternatively there are some infrastructure that require the service of a professional or host community. Integration is a beneficial approach in solving some

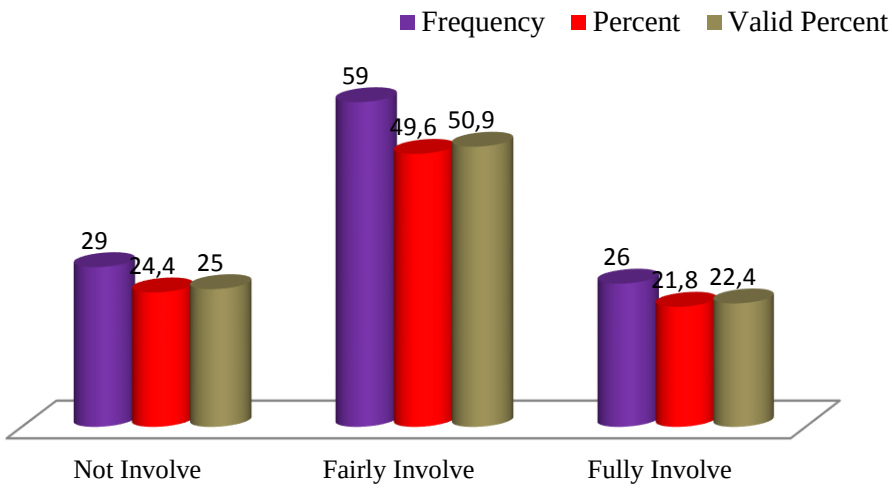
infrastructural challenges. Opinion of respondents was consulted through questionnaire and there responses were analyzed in the table below.

Table 5.22 Involvement of Stakeholders Including the Residents, Contractors/ Professionals, Community, etc., in the Provision of Sustainable Housing Infrastructure

	Frequency	Percent	Valid Percent	Cumulative Percent
Not involve	29	24.4	25.0	25.0
Fairly involve	59	49.6	50.9	75.9
Fully involve	26	21.8	22.4	98.3
Total	116	97.5	100.0	100.0
Missing	2	1.7		
System	0	.8		
Total	2	2.5		
Total	118	100.0		

Source: Author's Field Survey, 2021

Figure 5.13 Involvement of Stakeholders Including the Residents, Contractors/ Professionals, Community, etc., in the Provision of Sustainable Housing Infrastructure



Source: Author's Field Survey, 2021

Figure 5.13 shows a cluster cylinder interpreted the level of integration among the related stakeholder, from their responses respondents that fairly involve ranked (49.6%), not involved ranked (24.4%) and fully involve ranked (21.8%). This means that the degree to which stakeholder are involve is not encouraging. Thereby, making either real property owner or occupier take unprofessional assumptions that affect the culture of sustainability. The role of professional in sustainable housing infrastructure is very vital to practice and application from the above remark the level of related stakeholder participation in the study area proved they are fairly involve based on respondents opinion, this study adopted the findings as a working document for this research. Reason being that we the research team believes based on our field observation that our respondents are sincere and unbiased in their response. Looking at the contemporary issue that is beyond abstract, rather it touches across our lives and environment.

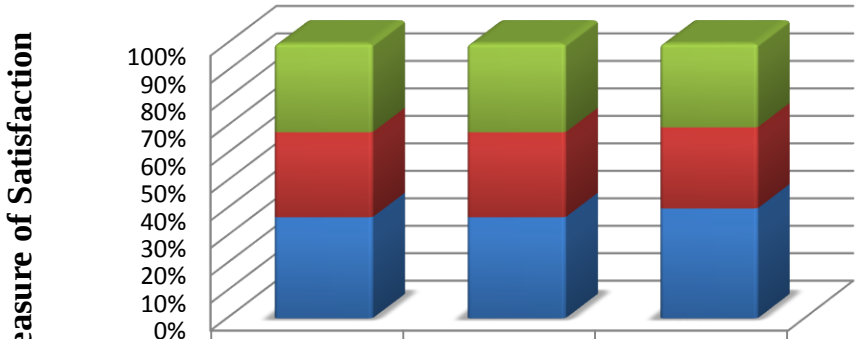
Table 5.23 Assessments of Beneficiaries in Respect to Private Public Partnership

	Frequency	Percent	Valid Percent	Cumulative Percent
Not satisfactory	52	43.7	45.6	45.6
Fairly satisfactory	54	45.4	47.4	93.0
Fully satisfactory	8	5.9	6.1	99.1
		.8	.9	100.0
Total	114	95.8	100.0	
Missing	4	3.4		
System		.8		
Total		4.2		
Total	118	100.0		

Source: Author's Field Survey, 2021

Table 5.23 shows the response of the respondents regarding the degree they participate in ensuring that (SHI) is a collective responsibility of all citizens residing in the study area. This participation might change from one neighborhood to the other. This stage is considered the secondary stage at the primary stage in involves discharge of our civic responsibility like paying our tax, not blocking water canals with refuse dump, vandalizing of existing infrastructure. Adoption and implementation of exploring basic modern technology that help in sustaining the life of an estate. From the above table one can deduce at this point that a good number of persons have said trough their questionnaire either as a personnel in area of sustainable housing infrastructure, (43.7%) that they not satisfy while (45.4%) say they are fairly satisfy. This then means that the participation in Umuahia in respect to public private is fairly satisfactory this says that all hand must be on deck if we must achieve the environ of my of our own.

Figure 5.14 Assessments of Beneficiaries in Respect to Private Public Partnership



	Not Satisfactory	Fairly Satisfactory	Fully Satisfactory
Valid Percent	45,6	47,4	6,1
Percent	43,7	45,4	5,9
Frequency	52	54	8

Source: Author's Field Survey, 2021

Figure 5.14 shows the stack Bar chart that interprets the level of frequency of respondent, the chart above illustrates that Respondents opted for (44, 45 and 6% respectively) in which respondent that scored high had (45.4%) there is a need to for general participation so as to enhance the benefit of sustainable housing infrastructure, especially among the beneficiaries since they are deriving direct or indirect utility. Furthermore, we noticed that neighborhood lacked cell corporations or association that help check the level of participation to ensure that the existing once are preserve while in other location of the study area those association, they are idle watchdog this can also be a reason for loss of interest among beneficiaries reason being that people become serious with an undertaking depending on how serious the undertaking itself is. Finally the quality of service rendered most time becomes an encouraging or discouraging factor. Especially where beneficiaries have reason to assess the level of impact they derive.

Table 5.24 Principal Component Analysis of Beneficiaries of Related Stake Holder Throughout Various Stages of Housing Estate Management

Correlation Matrix

		How would you access the participation of other beneficiaries in respect to public private partnership in providing basic housing infrastructure?	How would you rate the involvement of related stake holders in the below stages of the housing estate management?
Correlation	How would you access the participation of other beneficiaries in respect to public private partnership in providing basic housing infrastructure?	1.000	.274
	How would you rate the involvement of related stake holders in the below stages of the housing estate management?	.274	1.000
Sig. (1-tailed)	How would you access the participation of other beneficiaries in respect to public private partnership in providing basic housing infrastructure?		.002
	How would you rate the involvement of related stake holders in the below stages of the housing estate management?	.002	

Source: Author's Field Survey, 2021

Table 5.24 shows that there exists significant difference in the correlation of the two variable above How would you access the participation of other beneficiaries in respect to public private partnership in providing basic housing infrastructure and How would you rate the involvement of related stake holders in the below stages of the housing estate management from the respondents response this means that participation and involvement of related stake holder is very crucial to development of sustainable housing infrastructure in its scope and dimension looking at the feasible and viable opportunities it offers

Table 5.25 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	7.906
	df	1
	Sig.	.005

Source: Author's Field Survey, 2021

Table 5.25 show the degree of significant difference seeing that both variable has a significant of 0.5≤ at the approximation of 0.7906 chi-square which is interpreted to mean through Kaiser-meyer-olkim sample of adequacy.

Table 5.26 Communalities

	Initial	Extraction
How would you access the participation of other beneficiaries in respect to public private partnership in providing basic housing infrastructure?	1.000	.637
How would you rate the involvement of related stake holders in the below stages of the housing estate management?	1.000	.637

Extraction Method: Principal Component Analysis.

Source: Author's Field Survey, 2021

Table 5.26 shows the degree of extraction of 0.637 from the initial value 1.000 which means the effect of the two various variables above will likely produce the same effect if the level of participations and involvement is not met simultaneously.

Table 5.27 Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.274	63.687	63.687	1.274	63.687	63.687
2	.726	36.313	100.000			

Extraction Method: Principal Component Analysis.

Source: Author's Field Survey, 2021

Table 5.27 shows level of variance amongst the two variable looking at the third column from the right initial eigenvalues below is percentage of variance indicates (64 %) has variable one while variable two has (36%) percent which has a difference of (56%) this also agree with previous table above that there is a great significant difference in outcome of the two variables.

Table 5.28 Component Matrix[a]

	Component
	1
How would you access the participation of other beneficiaries in respect to public private partnership in providing basic housing infrastructure?	.798
How would you rate the involvement of related stake holders in the below stages of the housing estate management?	.798

Source: Author's Field Survey, 2021

Table 5.29 Component Score Coefficient Matrix

	Component
	1
How would you access the participation of other beneficiaries in respect to public private partnership in providing basic housing infrastructure?	.627
How would you rate the involvement of related stake holders in the below stages of the housing estate management?	.627

Source: Author's Field Survey, 2021

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.

5.5.1 The Motive of Stakeholder Whose Sole Responsibility is Providing Housing Infrastructure in Umuahia?

In the recent past privatization of some government establishment has been the in thing reason being that the government is sourcing for best approach in enhancing productivity, for this reason opted to trust some establishment in the hands in private investors with the aim they will run and manage those establishment for the good of the public. However our current experience is labeling the theory an *"act of rubbing the poor to enrich the rich"* looking at some housing infrastructure like electricity that was formerly known as National Electricity Power Authority (NEPA) later was renamed to Power Holding Company Nigeria (PHCN) and now privatized to various investors across various geopolitical zones to run and manage them under the supervision of government. The outcome of this scenario has metamorphosed into profit maximization venture which has turned the motive of providers of housing infrastructure into profit oriented undertaking. The table below shows the respondents opinion on motive of stakeholder whose sole responsibility of providing

housing infrastructure. the response of various respondents were translated in the table below, while the statistical analysis proceeded after the table using clustered horizontal cylinder to further illustrates the respondents opinion as earlier mention above. This study considered the opinion of the respondents as a foundation tool for decision and analysis.

Table 5.30 Motive of Stakeholder whose Sole Responsibility is Providing Housing Infrastructure in Umuahia

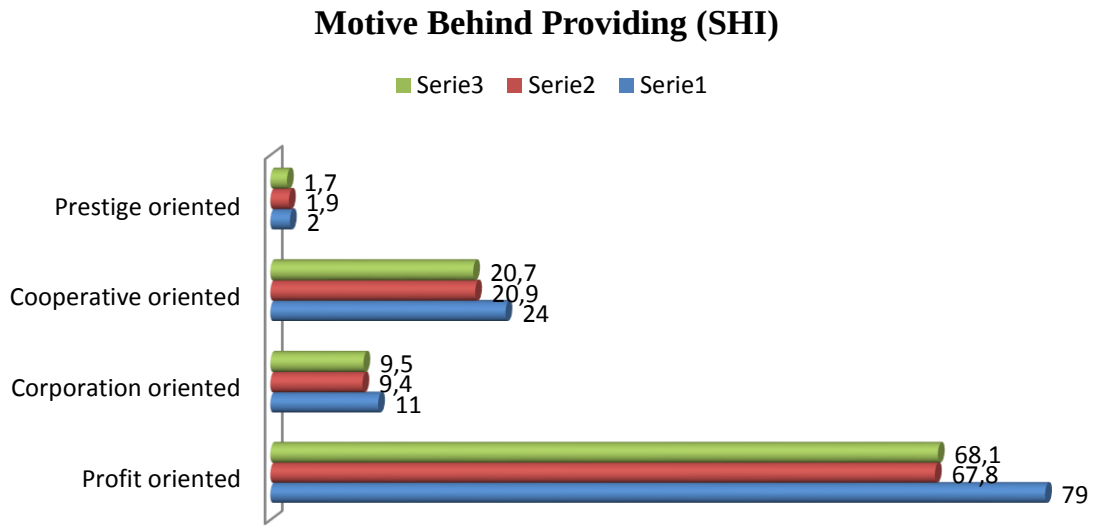
	Frequency	Percent	Valid Percent	Cumulative Percent
Profit oriented	79	66.4	68.1	68.1
Corporation oriented	11	9.2	9.5	77.6
Cooperative oriented	24	20.2	20.7	98.3
Prestige oriented	2	1.7	1.7	100.0
Total	116	97.5	100.0	
Missing	2	1.7		
Sum	0	2.5		
Total	118	100.0		

Source: Author's Field Survey, 2021

Table 5.30 shows the frequencies of the respondents opinion, from the table it's obvious that the motive of some housing infrastructure providers are profit oriented as the table pointed out, one can readily observe that those who rated profit oriented was (66.4%) with a valid percent of (68.1%). this then means that any sector that has been privatized in the study area will experienced a similar fate be it security, environmental sanitation agency etc. this will pose a great challenge in the near

future as the creation of this privatize ideology exist in form of indirect monopoly thereby compelling citizens to buy service at the terms of the seller under duress. This ideology will continue to rape perfect market and assassinate free market competition, on the long run affects sustainability objectives.

Figure 5.15 What do you consider the motive of stakeholder whose sole responsibility is providing housing infrastructure in Umuahia



Source: Author's Field Survey, 2021

Figure 5.16 show a clustered horizontal cylinder chart showing frequency, percent and valid percent of respondent's response meaning that the ratio at which profit oriented dominates the motive of sustainable housing infrastructure is 1:3, the next in hierarchy is cooperative oriented which means that under a structured framework, cooperative entities can strive in some extent while the likes of corporation is gradually going into oblivion. Cooperative entities exist as alternative under certain conditions this conditions include their mission and objective, secondly, what they share in common in respect to interest examples; clubs, town union, associations, and

forums etc. this is gradually dominating the infrastructure sector because it serves as a shortest route to solving infrastructural challenge at the grass route this challenge include security network, housing provision, micro electricity supply etc.

5.5.2 Assessing the Degree of Involvement of Related stake Holders in the below Stages of the Housing Estate Management

Degree of participation or involvement amongst related stakeholders in stages of housing estate management helps in ascertaining process and procedure that guarantees orderliness throughout the life cycle of real property base on client objective, reason being that so many building experience some defect on the long run which leads to deterioration, dilapidation and finally real estate obsolescence physically, socially or economically. Evaluations through stages of housing estate management places check were necessary against such. The table below is relative important index (RII) of how respondents view the participation base on the stages throughout real estate life cycle.

Table 5.31 How Would You rate the Involvement of Related Stake Holders in the Below Stages of the Housing Estate Management

	Frequency	Percent (%)	Valid Percent	Cumulative Percent
Planning stage	53	44.5	50.0	50.0
Implementing stage	22	18.5	20.8	70.8
Construction stage	23	19.3	21.7	92.5
Management stage	7	5.9	6.6	99.1
Evaluation stage	1	.8	.9	
Missing value	12	11.0		
Total	118	100.0	100.0	100.0

Source: Author's Field Survey, 2021

Table 5.31 shows the level at which sustainable housing infrastructure strives are dependent on some factors in which the process of housing estate management process plays vital role. From the table above planning was rated stage (44.5%), implementing stage (18.5%), construction stage (19.3%) management stage (5.8%) and evaluation stage (0.8%) respectively. While the missing value is 11.0. The ranking was done using the Likert Scale 1 to 7 i.e. 7= Government, 6= Developers, 5= Landlord, 4= Tenant, 3= Community, 2= Professionals, 1= missing values. The result of the ranking is contained in Table 5.32.

Table 5.31 Stages of Housing Estate Management Process

SHEMP	Government 7	Developers 6	Landlord 5	Tenant 4	Community 3	Professionals 2	Missing 1
Planning stage	53 a,n= 371	4 a,n= 24	8 a,n= 40	12 a,n= 48	9 a,n= 27	20 a,n= 40	12 a,n= 12
Implementing stage	22 a,n= 154	15 a,n= 90	21 a,n= 105	31 a,n= 124	8 a,n= 24	9 a,n= 18	12 a,n= 12
Construction stage	23 a,n= 161	25 a,n= 150	13 a,n= 65	21 a,n= 84	17 a,n= 51	7 a,n= 14	12 a,n= 12
Management stage	7 a,n= 49	25 a,n= 150	17 a,n= 85	20 a,n= 80	16 a,n= 64	21 a,n= 42	12 a,n= 12
Evaluation stage	1 a,n= 7	2 a,n= 8	21 a,n= 105	11 a,n= 44	18 a,n= 54	53 a,n= 106	12 a,n= 12

Source: Author's Field Survey, 2021

Table 5.32 Ranking Stages of the Housing Estate Management Process

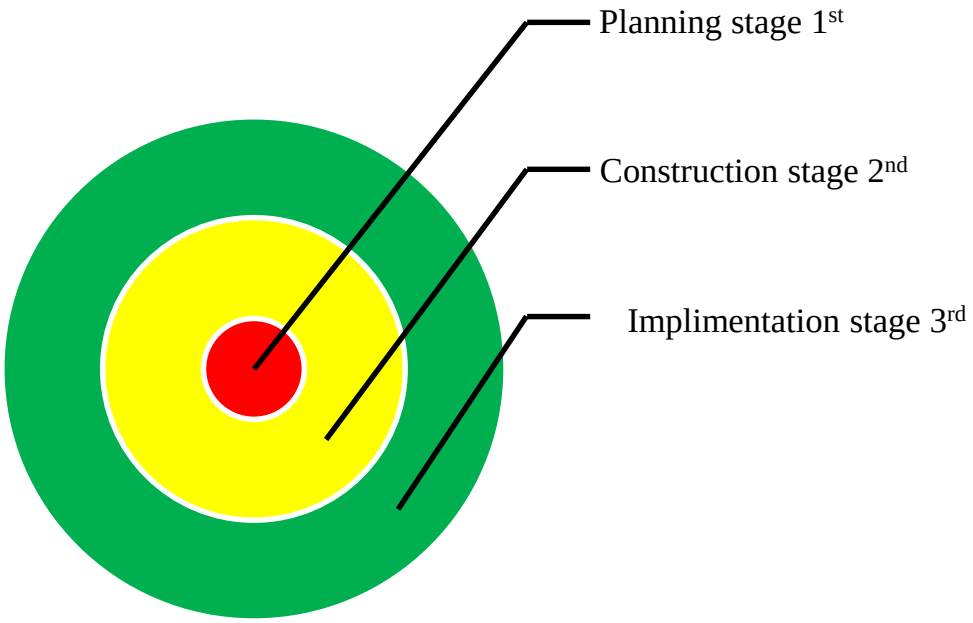
SHEMP	TOTAL	RII	RANKING
Planning stage	118 562	4.76	1ST
Implementing stage	118 527	4.47	3RD
Construction stage	118 537	4.55	2ND
Management stage	118 482	4.08	4TH
Evaluation stage	118 336	2.84	5TH

Source: Author's Field Survey, 2021

Table 5.30 and 5.31 shows the relative importance index as it reveals that housing estate management process is not strictly followed base on the observation of our respondents, property owners and investors carry out some basic planning process because they want government approval, but once such is granted, their implementation system is usually poor due to the fact that many developers trivialize the need for getting the right people who are professionally certified to handle their jobs especially in the built environment. The study also observe that construction is usually prioritize rather than implementing the planned document, this has always

affected the practice of sustainable housing infrastructure reason being that the aspect of management and evaluation is not put into consideration at all, thereby giving room to deterioration that leads to dilapidation and finally graduates to real estate obsolesce

Figure 5.16 Stages of Housing Estate Management Process



Source: Author's Field Survey, 2021

Table 5.17 shows RII ranking based on respondents opinion, from the above figure it's evidently clear that planning stage ranked first on the list with an RII of (4.76) this is because most real estate investors or property owners are circumstantially compelled to apply for approval before any construction undertaking coupled with the consequences of not following the due process of obtaining approval prior to any construction development. The planning stage seems to be excitement or zeal stage and as such many investors pay attention to details but as the journey to achieve desired goal the excitement begins to sublime.

The next on the list is the construction stage it ranked second on the list with RII of (4.55) this also reveals that construction proper is giving more attention to more than implementation stage. Furthermore, implementation and construction are two different things the later means a useful piece of equipment, regulation, tools that aids carrying out a task (process) while the former communicates building of something, especially a structure like house, road or bridge (activity) base on the scope of this study. Construction was considered second because people consider it as the most important process in housing estate management process. The third on RII ranking is implementation stage with (4.47). From table 5.32 implementation touches across various preparation stages example observing regulations assembling of professionals and resources. Proper implementation aids successful delivery under effective planning. This will now tailor construction, management and evaluation stages on the long run.

The fourth on the list is management with RII of (4.08). Management in this regard goes beyond the act of controlling; directing; planning; co-coordinating; motivating; forecasting; organizing; and communicating; on various activities targeted to achieve a set goal but critical thinking and application process as stated in figure 2.12 above.

Evaluation being the fifth with RII of (2.84) reveals that determination of both worth, cost, and value is not in the priority of property owners in the study area based on opinion rather, emphasis are channeled towards building new house with little or no maintenance culture for the existing ones the role of implementation, management and evaluation is under explored. Planning and construction where Stages of Housing Estate Management Process mostly employed in the study area.

5.5.3 Assessment the Integration role of Professionals and Various Relevant Stakeholders if the Impact of Sustainable Housing Infrastructure must be Applied in Solving Housing Issues at a Cost Effective Manner

The general motive behind sustainable housing infrastructure is to provide amenities that help the smooth running of an "estate" in such a way that is cost effective, socially accepted and environmentally friendly. To achieve this feet integration among parties involve from decision to build till management and recycling of real estate life stakeholders must work in collaboration to achieve this common objective. From the table below, principle component analysis was used to ascertain if there is significance in the impact of integration amongst professional. Secondly, to ascertain the significance of integration on cost of building such structures, maintenance and management otherwise known as cost-in-use.

Table 5.33 Assessment Integration Role of Professionals and Various Relevant Stakeholders if the Impact of Sustainable Housing Infrastructure Must be Applied in Solving Housing Issues at a Cost Effective Manner

Table 5.33 Descriptive Statistics

	Mean	Std. Deviation[a]	Analysis N[a]	Missing N
How would you rate the involvement of related stake holders in the below stages of the housing estate management?	1.88	.984	116	10
How would you access the integration role of various relevant stakeholders if the Impact of sustainable housing infrastructure must be applied in solving housing issues?	2.40	.928	116	2

Source: Author's Field Survey, 2021

Table 5.33 shows the difference in mean of the variable with (0.52) and standard deviation of (0.052) this simply means that there is a degree of significance in impact of collaboration amongst related stakeholders than working in isolation to achieve sustainable environment both in content and application

a. For each variable, missing values are replaced with the variable mean.

Table 5.34 Correlation Matrix[a]

		How would you rate the involvement of related stake holders in the below stages of the housing estate management?	How would you access the integration role of various relevant stakeholders if the Impact of sustainable housing infrastructure must be applied in solving housing issues?
Correlation	How would you rate the involvement of related stake holders in the below stages of the housing estate management?	1.000	.360
	How would you access the integration role of various relevant stakeholders if the Impact of sustainable housing infrastructure must be applied in solving housing issues?	.360	1.000
Sig. (1-tailed)	How would you rate the involvement of related stake holders in the below stages of the housing estate management?		.000
	How would you access the integration role of various relevant stakeholders if the Impact of sustainable housing infrastructure must be applied in solving housing issues?	.000	

Source: Author's Field Survey, 2021

Table 5.34 shows that mutual relationship exist between variables in context, from analysis above correlation matrix we observe that correlation and significance difference exhibits an osculation relationship which means that integration of related stakeholders has influence on sustainable hosing infrastructure.

a. Determinant = .871

Table 5.35 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	13.923
	df	1
	Sig.	.000

Source: Author's Field Survey, 2021

Table 5.35 shows Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity, it scored (13.92) of approximate chi-square with a significant different of (1.0) this shows that sustainable housing infrastructure has no significant with cost but has direct effect with collaboration that creates needed alternatives that in reverse reaction save cost, gains acceptability and environmental friendliness simultaneously.

Table 5.36 Component Matrix[a]

	Component
	1
How would you rate the involvement of related stake holders in the below stages of the housing estate management?	.825
How would you access the integration role of various relevant stakeholders if the Impact of sustainable housing infrastructure must be applied in solving housing issues?	.825

Source: Author's Field Survey, 2021

Extraction Method: Principal Component Analysis.[a]
a. 1 components extracted.

Table 5.37 Communalities

	Extraction
How would you rate the involvement of related stake holders in the below stages of the housing estate management?	.680
How would you access the integration role of various relevant stakeholders if the Impact of sustainable housing infrastructure must be applied in solving housing issues?	.680

Source: Author's Field Survey, 2021

Table 5.36 and 5.37 shows that both component matrix and communalities Has equal effect based on component matrix with the score of (0.825) while their communalities scored (0.680) this shows that symbiosis relationship is required for administering sustainable infrastructure in the study area. While table 5.38 show the level of variance with a cumulative of (67.984).

Table 5.38 Total Variance Explained

	Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %
1	1.360	67.984	67.984

Source: Author's Field Survey, 202

5.5.4 Basic Infrastructure that can Solve Housing Problem and Improve Property Values in Umuahia

In this section we used relative important index (RII) to ascertain basic infrastructure that can solve housing problem and improve property values in Umuahia. Our respondents did their best to arrive at various conclusions based on their direct observation, from analysis below ranking was made based on response of the respondent. The researcher used the opinion of respondents as a valid document for decision for this study. The ranking was done using the Likert Scale 1 to 4 i.e. 1= Has no effect, 2= Has low effect, 3= Medium effect, 4= High effect. The result of the ranking is contained in Table 5.39.

Table 5.38 Basic Infrastructure that can Solve Housing Problem and Improve Property Values in Umuahia

Infrastructure	Has no effect	Has low effect	Medium effect	High effect
Access Road	46(39%)	31(26%)	22(19%)	19(16%)
Government policies	30(25%)	34(29%)	21(18%)	33(28%)
Low Cost Building Aids	24(20%)	25(21%)	13(11%)	56(47%)
Electricity	45(38%)	28(24%)	31(26%)	14(12%)
Sustainable technology	4(4%)	13(11%)	17(14%)	84(71%)

Source: Author's Field Survey, 2021

A look at the table 5.38 reveals that sustainable technology (71%), low cost building aids (47%) and government policies (28%) are the prominent service that are presently needed in the study area in solving housing issues and improving property values in real estate sector. The presence of other factors is also needed nevertheless, providing the basic once as opined by respondents will tend to solve others as mentioned above naturally. Sustainable technology, low cost building aids and government policies are very fundamental to growth and implementation of sustainable housing infrastructure especially in this present era that technology and sustainability is taking the lead.

Table 5.39 Ranking of Basic Infrastructure that can Solve Housing Problem and Improve Property Values in Umuahia

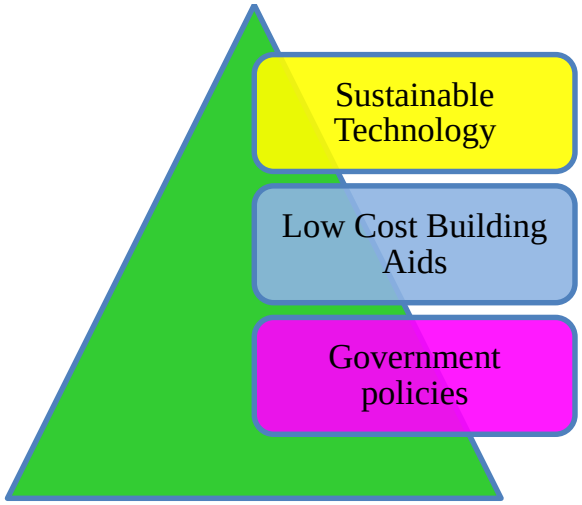
Infrastructure	Has no effect 1	Has low effect 2	Has medium effect 3	Has high effect 4	Total	RII	Ranking
Access Road	46 a,n= 46	31 a,n= 62	22 a,n= 44	19 a,n= 76	118 228	1.93	5TH
Government policies	30 a,n= 30	34 a,n= 64	21 a,n= 63	33 a,n= 132	118 289	2.45	3RD
Low Cost Building Aids	24 a,n= 24	25 a,n= 50	13 a,n= 39	56 a,n= 224	118 337	2.85	2ND
Electricity	45 a,n= 45	28 a,n= 56	31 a,n= 93	14 a,n= 56	118 250	2.12	4TH
Sustainable technology	4 a,n= 4	13 a,n= 36	17 a,n= 51	84 a,n= 336	118 427	3.61	1ST

Source: Author's Field Survey, 2021

Table 5.38 shows relative important index of basic infrastructure that can solve housing problem and improve property values in Umuahia, the table above illustrates that so many factors can solve housing problem and as well improve property values in the study area. Based on respondents opinion sustainable technology ranked first on the list with (RII= 3.61) while the second on the list is low cost building aids with (RII= 2.85), on third and fourth ranking on the list is government policies and

electricity with (RII= 2.45, RII= 2.12) while access road ranked fifth with (RII=1.93). Looking at ranking analysis above, basic priority based on respondents' opinion shows that sustainable technology, low cost building aids and government policies are considered to be key priority factor to put in place to solving housing problem and improve property values in the study area.

Figure 5.17 Pyramid List of Basic Infrastructure That can Solve Housing Problem and Improve Property Values in Umuahia.



Source: Author's Field Survey, 2021

5.5.5 Role of Government and its Policies, Regulation and Framework in Supplying Sustainable Housing Infrastructure Appraisal Review

Literature has shown that we the Africans are left behind in terms sustainable infrastructure looking at government policies regulation and framework, the level of implementation has not impacted as supposed according to opinion made by our respondents. The table below elucidates more on the current status sustainable housing infrastructure in Umuahia

Table 5.40 Factor Analysis Role of Government and its Policies, Regulation and Framework in Supplying Sustainable Housing Infrastructure Appraisal Review

Descriptive Statistics

	Mean	Std. Deviation[a]	Analysis N[a]	Missing N
Does government policy and regulation frame work have impact on sustainable housing infrastructure?	2.88	3.071	113	0
How will you access the role of government in the provision and supply of housing infrastructure in the past?	2.06	.994	113	0

Source: Author's Field Survey, 2021

A close study from table 5.40 reveals that notwithstanding that missing values are replaced with the variable mean. A close look at the mean shows that variation between the missing values has a significance of (0.82) while standard deviation has a difference of (2.077), this then means that, government policy have great impact on sutainable housing infrastructure not only on policy making but on entire process of (SHI).

Table 5.41 Correlation Matrix

		Does government policy and regulation frame work have impact on sustainable housing infrastructure?	How will you access the role of government in the provision and supply of housing infrastructure in the past?
Correlation	Does government policy and regulation frame work have impact on sustainable housing infrastructure?	1.000	.161
	How will you access the role of government in the provision and supply of housing infrastructure in the past?	.161	1.000
Sig. (1-tailed)	Does government policy and regulation frame work have impact on sustainable housing infrastructure?		.045
	How will you access the role of government in the provision and supply of housing infrastructure in the past?	.045	

Source: Author's Field Survey, 2021

Table 5.41 shows that, using the conventional probability criterion of (05). Indicates that relationship exist between government regulation and the impact derived from (SHI) supply reason being that positive policy will lead to positive impact and vice versa. The study area being predominantly occupied with civil servants, traders and farmers makes dependency on government to be on the high side with little concentration on alternative source. This has a significant effect with the Covariance Matrix[a] which has a determinant of Determinant = 9.070.

Table 5.42. KMO and Bartlett's Test[a]

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	2.886
	df	1
	Sig.	.089

Source: Author's Field Survey, 2021

Table 5.42. Above shows Kaiser-Meyer-Olkin Measure of Sampling Adequacy (0.50) and Bartlett's Test of Sphericity (2.886) with difference 0f (1.0) and significance of (0.89) this by implication reveals that Approx. Chi-Square with (2.886) is an indication based on previous performance though average performance based on correlations.

Table 5.43 Communalities

	Raw		Rescaled	
	Initial	Extraction	Initial	Extraction
Does government policy and regulation frame work have impact on sustainable housing infrastructure?	9.431	9.428	1.000	1.000
How will you access the role of government in the provision and supply of housing infrastructure in the past?	.987	.032	1.000	.032

Source: Author's Field Survey, 2021

Extraction Method: Principal Component Analysis shows that a rescaled initial analysis interprets that government policy is the major determinant of success of (SHI) both in the past and present reason being that government should be the chief initiator as cited in chapter two of this study above.

Table 5.44 Total Variance Explained

		Initial Eigenvalues[a]			Extraction Sums of Squared Loadings		
	Component	Total	% of Variance	Cumulative %	Total	% of Variance	
Raw	1	9.459	90.796	90.796	9.459	90.796	
	2	.959	9.204	100.000			
Rescaled	1	9.459	90.796	90.796	1.032	51.580	
	2	.959	9.204	100.000			

Source: Author's Field Survey, 2021

Table 5.45 Total Variance Explained

	Component	Extraction Sums of Squared Loadings[a]
		Cumulative %
Raw	1	90.796
	2	
Rescaled	1	51.580
	2	

Source: Author's Field Survey, 2021

Extraction Method: Principal Component Analysis shows Extraction Sums of Squared Loadings[a] this interprets that, at raw component it has the value of (90.796) at the rescaled value it has value of (51.580). Looking at various output of the analysis as shown in table 5.44. And table 5.45. There was some level under performance in the recent past as to compare with future opportunities.

Table 5.46 Component Matrix[a]

	Raw	Rescaled
	Component	Component
	1	1
Does government policy and regulation frame work have impact on sustainable housing infrastructure?	3.070	1.000
How will you access the role of government in the provision and supply of housing infrastructure in the past?	.178	.179

Source: Author's Field Survey, 2021

Table 5.46. Shows Component Matrix[a] of raw component with the value of (0.178) and rescaled with value (0.179) with a variation of (-0.001) which shows that there is no significance between government policies and regulation in comparison to level of impact since there is poor implementation according to respondents opinion opcit table 5.46. this also reveals that, at the initial extraction both variables exhibit isotope value of (1.0) this means that to a certain degree other factors cannot strive without an efficient policy regulation and frame work based on respondents findings which the study upheld as a valid tool for decision making in this study.

5.5.6 Prediction of Sustainable Housing Infrastructure in a Enabling Environment Created by the Government

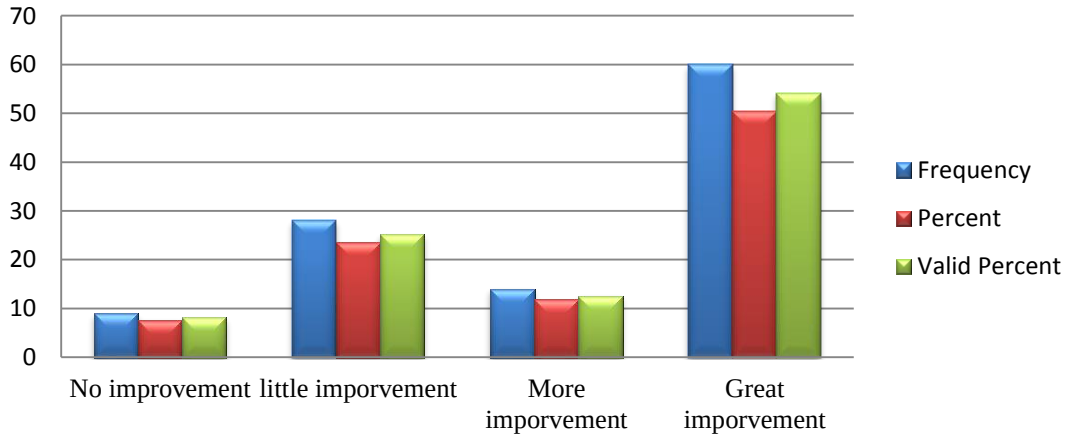
The basis of sustainable housing infrastructure is to provide hosing that is cost effective, environmentally friendly and socially acceptable; it was targeted at environment, people and prosperity. In attempt to establish theory, principle and application that grantees success in supplying (SHI) in which the objective of this study is to source for a lasting solution to housing. The response to this question is as analyzed in table 5.47.

Table 5.47 What will be your prediction if the government creates an enabling environment for sustainable housing infrastructure

	Frequency	Percent	Valid Percent	Cumulative Percent
No improvement	9	7.6	8.1	8.1
Little Improvement	28	23.5	25.2	33.3
More Improvement	14	11.8	12.6	45.9
Great Improvement	60	50.4	54.1	100.0
Sum	111	93.3	100.0	
Missing value	7	5.9		
		.8		
		6.7		
Total	118	100.0		

Source: Author's Field Survey, 2021

Figure 5.18 What will be your prediction if the government creates an enabling environment for sustainable housing infrastructure



Source: Author's Field Survey, 2021

Table 5.47. and figure 5.19. Reveals that majority of the respondent are of the opinion that creation of enabling environment by the government will greatly improve sustainable housing infrastructure. Table reveals those respondents whose prediction indicated that creation of enabling environment will have great improvement ranked a frequency of (60) and (50.4%), this also reflected in the figure above, this improvement is linked to other latent benefits other than providing shelter for man.

5.5.7 Privatization of Infrastructure Companies for Competitive Market and Delivery Strategy

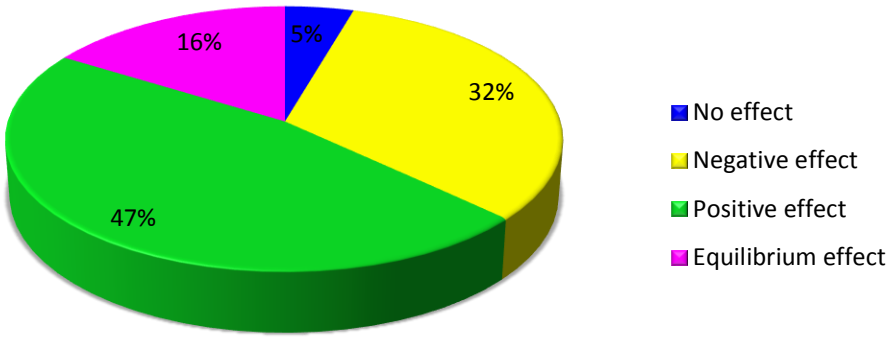
Permission that allows individual or group of individual to own, run and manage corporation with the sole aim of rendering services to the public while they remain accountable to the government is referred to as privatization. The major challenge faced by running privatization is that, monopoly and privatization terms to corrupt the original objective which is to create perfect market and quality delivery. This study conducted a question in respect to respondents view on privatization, below is the response of the respondent as analyze in table 5.48. Below.

Table 5.48 How would you categorize privatization of infrastructure companies for a competitive reason help the real estate sector

	Frequency	Percent	Valid Percent	Cumulative Percent
No effect	5	4.2	4.5	4.5
Negative effect	36	30.3	32.4	36.9
Positive effect	52	43.7	46.8	83.8
Equilibrium effect	18	15.1	16.2	100.0
Total	111	93.3	100.0	
Missing	7	5.9		
		.8		
		6.7		
Total	118	100.0		

Source: Author's Field Survey, 2021

Figure 5.19 How you would categorize privatization of infrastructure companies for a competitive reason help the real estate sector



Source: Author's Field Survey, 2021

Table 5.48. And figure 5.20. Reveals that the number of respondent opined that privatization has no effect ranked (5%), respondent who consider privatization will have negative effect ranked (32%), other respondents were of the opinion that it will have equilibrium effect this ranked (16%) while (47%) are of the opinion that privatization will yield positive effect, from the pie chart in three dimension, this also mean if properly harness will revitalize true sustainability in real estate housing sector.

5.6.1 Outcome of Mutual Collaboration between the Government, Related Stakeholders and the Wayward

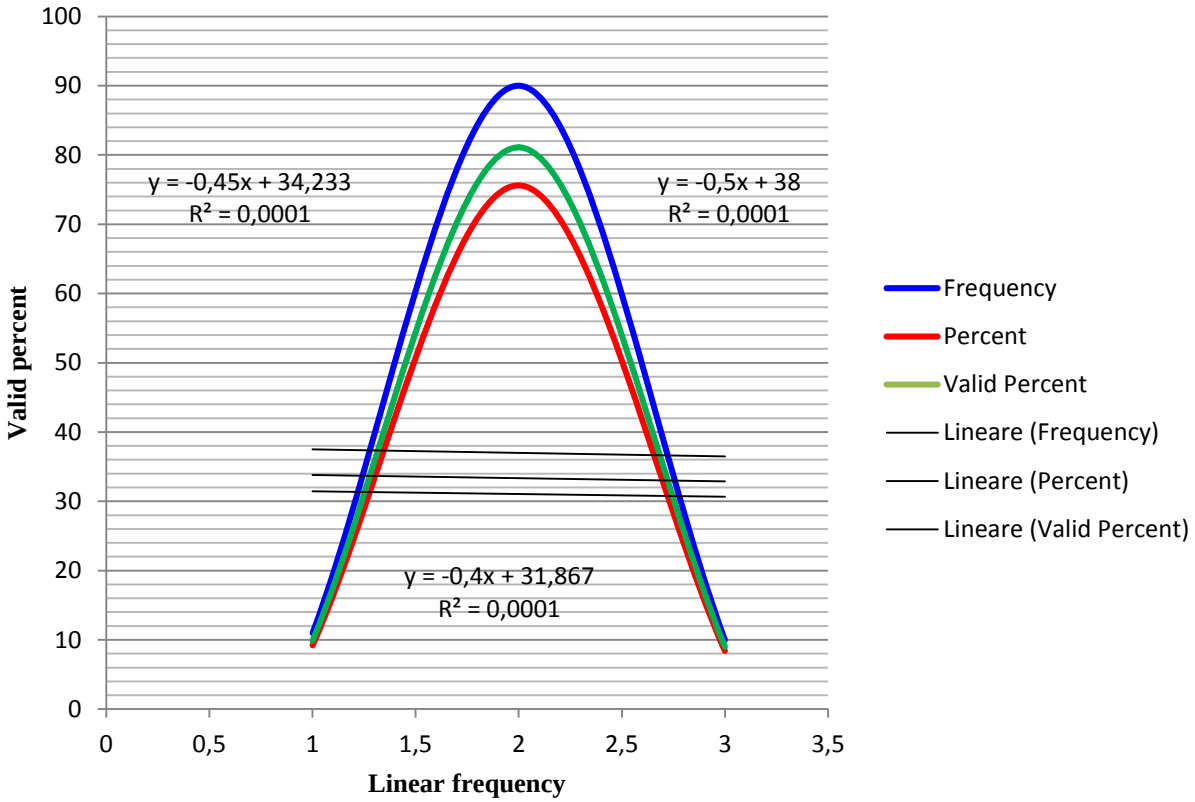
One of the basic expectations of this study is to foster relationship that comes with mutual partnership amongst government and related stakeholder with formulation of framework that will usher a master blue print that will solve housing problems and other related benefit, for this reason, question was channeled towards respondents perspective on the researchers ideology on mutual collaboration . Below is the analysis of respondents' opinion as explained in the table 5.49.

Table 5.49 Do you think mutual collaboration between the government and related stake holders will produce a way-forward in solving housing infrastructure issues

	Frequency	Percent	Valid Percent	Cumulative Percent
I don't know	11	9.2	9.9	9.9
Yes	90	75.6	81.1	91.0
No	10	8.4	9.0	100.0
Total	111	93.3	100.0	
Missing	7	5.9		
		.8		
		6.7		
Total	118	100.0		

Source: Author's Field Survey, 2021

Figure 5.20 line graph of Outcome within Mutual Collaboration between the Government, Related Stakeholders and the Wayward



Source: Author's Field Survey, 2021

Table 5.49. And figure 5.21. Shows that respondents with being indifferent they opined “I don’t know they ranked (9.9%) valid percent, respondents that opined No for an answer ranked a valid percent of (9.0%) while those that opined Yes that mutual collaboration between government and related stakeholder will go a long way in solving housing problem ranked (81.1%) this indicates that the coming together of various stakeholder involve with the government will birth a new and sustainable approach in not only solving housing problems but revitalizing the existing once and enhancing property values in the study area. Figure 5.21shows the linear graph of table 5.49 also agree with the interpretation in Table 5.49. Above.

CAPTER SIX

SUMMARY, RECOMMENDATION AND CONCLUSION

6.1 Introduction

While a comprehensive analysis of data with the aid of appropriate statistical tools and techniques as well as its interpretation was undertaken in Chapter Five, this Chapter focuses on providing a closing summary of the research, followed by recommendations and concluding remarks. Attempt is also made at identifying opportunities for further research in the area sustainable housing infrastructure.

6.2 Condensability of Findings

This study examined sustainable housing infrastructure, level of its application and its impact on property values in Umuahia. Current trends and global demand for redeeming preserving and protecting our environment against hazard caused by human activity deliberately or unknowingly, aroused the quest for sourcing alternative through sustainability approach. Deductions made from data analysis were based on the objectives set for achieving the aim of the study. Major highlights of the results obtained from the analysis are as follows:

1. Gender of the respondents shows that men participated more than the women counterpart seen that men were (71) and women (47) respectively. Their age bracket also indicates that (90%) of the respondents are within the range of (21-50) years which means they belong to work force in the study area, most of these respondents are professionals, civil servants, traders and entrepreneurs.
2. From review literature, the study identified the four basic dimensions of sustainable housing infrastructure and its benefits were implied to ascertain the

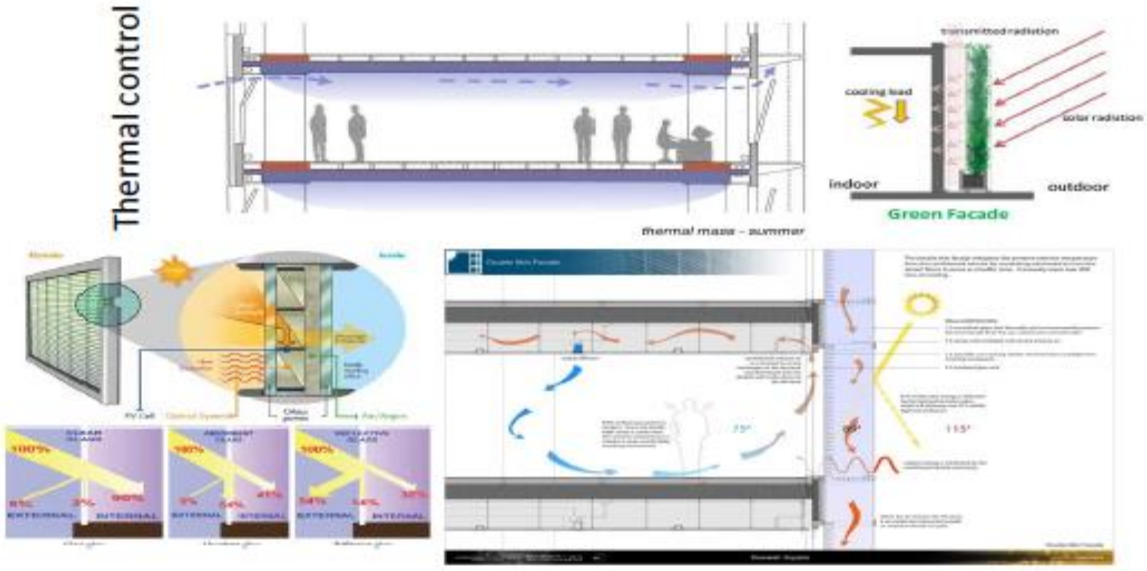
knowledge of respondents. However, the study shows that a good number of respondents are knowledgeable about sustainable housing infrastructure with a positive response of (91.6%) though the scope and degree might not be ascertain, the researcher was encourage with the degree of their response. (See table 5.4)

3. Considering respondents year of experience, (47.1%) had experience ranging from (2-10) years which is less than pass mark of (50%) reason being that sustainable housing infrastructure has not gained its full ground in the study area. The pie chart in figure 5.2 indicates that efforts should be intensified in providing sustainable housing infrastructure that improves the real estate sector like bio-digester, solar electricity and natural (HVAC) systems, etc.
4. Looking at involvement of respondents in relation with sustainable housing infrastructure in the study area, the study revealed that majority of the respondents were landlords they ranked (48.7%) this means that most of the respondents are indigenes of Umuahia while others are immigrants who secured portion of land and built there houses some migrate from sub-urban areas. Professionals and tenant ranked second on the list with equal score of (28%). This shows that landlords are more responsive to this study which is an indication that finding recommendation of the study is beneficial to property owners as well as related stakeholder in the built environment.
5. The present situation of sustainable housing infrastructure in Umuahia reveals that, attention needs to be channeled towards facilities that help the smooth running of housing at smaller unit or larger unit as housing estate. Table 5.7

revealed that the present situation of housing in Umuahia is at fairly good state. This calls for strategic preventing planning and implementation. From figure 5.4 it's obvious that the state of (SHI) will be diminishing toward it breaking point which will lead to entire urban renewal, the recommendation of this study will proffer lasting solution.

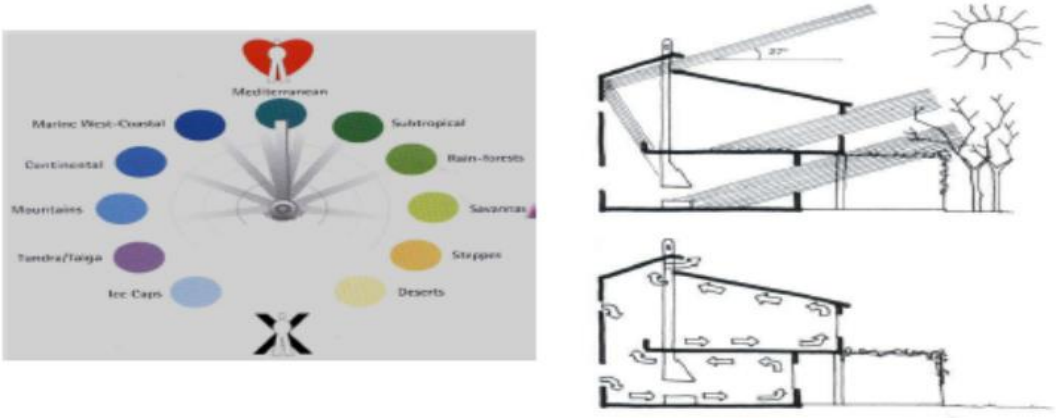
6. Level of supply of sustainable housing infrastructure in Umuahia is neither satisfactory nor in good state, table 5.7 reveals that the level of sustainable housing infrastructure is at a fair state. This is because both the government and property owners are not enlightened on the modern trend in (SHI), others are limited to the most prevalent ounces like solar system. drawing lessons from our African counterpart countries like Ghana, south Africa and Rwanda they make use of bio digester, wind mill cooling system, while advance countries like china, India and japan uses align prison light transfer etc. below is a relative paradigm of sustainable facilities

Figure 6.1 Sustainable Housing Facilities



Source: Author's Field Survey, 2021

Figure 6.2 Sustainable Lighting and Cooling System

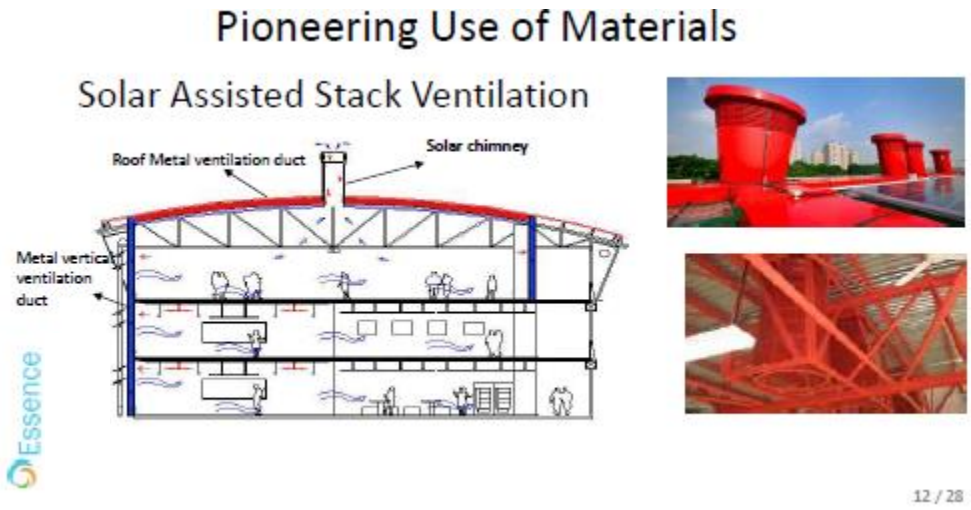


Source: Author's Field Survey, 2021

Figure 6.3 Sustainable Lighting and Cooling System with Solar

Source: Author's Field Survey, 2021

Figure 6.4 Sustainable Cooling and ventilation System with solar



Source: Author's Field Survey, 2021

Above is a pictorial diagram of some sustainable facilities used in other semi-advanced and advanced countries. This facilities uses little amount of energy hence they are powered by solar energy system this reduces the emission of carbon in the atmosphere.

7. Ownership and management of sustainable housing infrastructure is the underlying factor that determines the success of any giving infrastructure management. Findings in this study reveals that ownership and management of most of infrastructure in the study area are owned and manage by the government as a public corporation the study also discover that this management is carried out on large scale.
8. Strategies employed in solving infrastructural challenge in real estate sector based on findings of this study suggested partnership between government and public for the benefit of all that notwithstanding, the intervention of federal state and local government has been the traditional or conventional routes to supplying infrastructure in the recent past. The study made an attempt to educate beneficiaries as waiting on government may slow or hinder development.
9. Property values are determined by so many factors one of this factors is the availability of sustainable infrastructure in area related otherwise known as sustainable housing infrastructure. The study found that the absence of (SHI) is amongst the primary factor affecting the value of residential property in the study area. Our respondents opined that the absence of (SHI) has high effect on property value (see table 5.18).

10. Share value system is another challenge facing massive infrastructure supply going by how it is presently, our study found out, that share value system is one sided, reason being that some of these facilities cannot serve the whole targeted population at the same time for that singular reason concentration is targeted to area with high priority than area with less priority secondly, this facilities were not designed to serve a disintegrated unit.

Among other findings from the study are the ones considered below:

1 Based on our findings, alternative measures in providing and supplying these infrastructure is a way forward looking at table 5.20 majority of the respondents are of the opinion that sourcing of close alternative is the best approach, they also insisted that this approach serve as a lasting solution to infrastructural challenge in the study area. (See figure 5.9).

2 It was gathered based on our findings that majority of respondents in their various building accommodation lacked one facility or the other. Table 5.21 show that (46.2%) of the respondent opined that they lack some essential facilities, our finding also discovered that these amenities ranges from electric supply, poor road network, poor water supply, lack of quality drain and drainage system (see figure 1.1,2.6,2.7) etc. in a bid to ascertain what it takes to put this inadequacy in place we also discover that those conventional facilities are capital intensive this made it uneasy for individuals to provide such facilities as all hope and dependence is on the government to provide such facilities.

3 This study discovered the negative effect of poor hosing infrastructure especially during convid-19 pandemic, many people that reside in areas that are infrastructural depraved surfed a lot due to restricted movement, we noticed upon site investigation that high cost of transportation and cost of accessing water supply in the study are has a link with poor infrastructure. Figure 5.12 illustrates the degree to which poor housing infrastructure has direct effect on the per capital income of the citizen in the study area.

4 In an attempt to ascertain the degree to which relevant stakeholder are involve ranging from contractors to professionals and communities in providing (SHI) we discovered that (49.6%) of the respondents opined that stakeholder are fairly involve. This is also another factor that has slowed the acceptance of (SHI) in the study area according to researcher.

5 This study, based on our findings measured the level of satisfaction beneficiaries obtain from private public partnership from table 5.23 (45.4%) majority of the respondents are of the opinion that they derive fairly satisfaction reason been that this approach has not been fully harnessed to a point where the level of satisfaction will exceed average.

6 Appraising the motive behind stakeholders whose sole responsibility is to providing (SHI), this study reveals that most infrastructure providers are profit oriented. From table 5.30 our respondents scored profit oriented purposes (66.4%). However we also discovered base on further research, that proper planning implementation and review evaluation will eliminate monopoly and improve quality efficient delivery.

7 Participation of related stakeholder based on housing estate management process revealed that participation of the stakeholder ranked (44.5%) and first in RII, this shows that once a housing project passes planning and approval stage property owners neglect other stages of housing estate management process. This in the opinion of the researcher is one of the factors that affect property values, reason being that a professional is an expert that knows the technical know-how.

8 The study established that integration role of professionals and various relevant stakeholders have a significant impact in solving housing issues at a cost effective manner. The variance of (0.52) and difference significant of 1.00 which indicates a significant impact. Furthermore, the study discovered that the basic infrastructure that has potency of solving housing problem as well as improving property value in Umuahia based of RII ranking which ranked the following; sustainable technology (RII3.61), low cost building (2.85) and government policies(2.45). Looking at ranking analysis above, basic priority based on respondents' opinion shows that sustainable technology; low cost building aids and government policies are considered to be key priority factor to put in place to solving housing problem and improve property values in the study area.

9 The role of government and its policies were found to have a significant impact based on PCA the value of significant impact is (0.045) this shows that government policies is the bedrock for implementing sustainable housing infrastructure, with the prediction of great improvement if government creates

an enabling environment for sustainable housing infrastructure. table 5.47 shows that the respondent response scored (50.4%) which indicates that the role of government in formulating policies and creating enabling environment play a pivotal role in promoting sustainable housing infrastructure in the study area.

10 Privatization of sustainable housing infrastructure under a planned administructure will have a positive effect in the sense that it will creates a competitive market among the key players in infrastructure markets thereby encouraging innovation and creativity among infrastructure providers. Looking at table 5.48 majority of respondents insisted that a planned privatization or private public partnership can have a positive impact on real estate sector while the outcome of mutual collaboration between the government and related stakeholder will produce a tremendous result table 5.49 reveals that mutual collaboration will yield a positive result as an alternative for the way forward.

6.3 Recommendation

In relation with the findings that sustainable housing infrastructure provides a range of valuable insight and opportunity looking as its functions features and applicability. (SHI) is the only approach in redeeming and reducing global warming through sustainable approach. The following recommendations are hereby put forward for consideration.

I. All related stakeholders in the built environment including financial institutions should incorporate women into having access to acquiring land and building their various sustainable houses and other sustainable hosing infrastructure since the challenge of housing and infrastructure is becoming a universal challenge. Secondly both the government and related stakeholder should educate and sensitize the public on the need and opportunities imbedded in sustainable development practice especially as it concern housing and infrastructure.

II. Related stakeholders especially our professionals should updated our research on sustainable trends and inculcate it in our designs, plans, and maintenance strategy, sustainable facilities like bio-digesters, thermal control, solar energy systems, sustainable lighting and cooling (HVAC) system as illustrated in figure 6.2, 6.3 and 6.3 respectively. The introduction of this low consumption facilities will start gaining acceptance over time hence they a proven reliable. Landlord alike tenant should all participate in providing sustainable infrastructure; this has a way of promoting the status of urban life to both parties.

III. The government should start planning for sustainable housing and urban infrastructure, seeing that the state of infrastructure have stated to decline so as to prevent dilapidation which will lead to deterioration and finally obsolescence that will now call for emergence urban renewal. Again government through its agency should take advantage of the findings of this study by switching to sustainable housing infrastructure

practice so as to upgrade the state of infrastructure in the study area from fairly satisfactory to fully satisfactory.

IV. Ownership and management should be map out, disintegrate and privatize by a way of creating competitive market example the waste management should be sub-contracted to refuse collectors at a collection fee, company with better policy will strive. This should be repeated in other forms of housing infrastructure that can be disintegrated sub-contracting companies will be compel to deliver, because their success depends on their quality service. This approach now refers us to private public partnership (PPP) with government intervention at the federal state and local government will be an alternative to the long awaited re-structuring.

V. Practicing professional should lead a campaign on sensitizing the public on current innovation and technology. Recent innovations has made accessing some of this facilities easy example there so many company that customize solar system based on specification and cost as well, the same thing is applicable to bio-digester and heating and cooling system. To this end it will reduce the one sided share value system and awake the consciousness of the infrastructure providers to deliver on cost time and quality effectiveness.

VI. Professionals and related stakeholders in built environment and beyond in the study area should champion explorative research in sourcing for alternatives of solving sustainable housing infrastructure issues as

waiting or casting blame on government does not guarantee any speed intervention while the inhabitant in the study area suffers it indefinitely. Forming smaller co-operatives on neighborhood basis for the purpose of providing basic essential sustainable infrastructure like security, small scale electricity, water supply and sanitation etc. this can be achieve through landlord or tenant associations. The ideology behind this approach is that it enhances property value on the long run.

VII. Government should map out strategies to maintain build and rehabilitate existing infrastructure and strive to install some basic sustainable housing infrastructure reason being that the productivity of any given human resource capital is incomplete without housing. While on the other hand the general public in the study area should involve professional during housing development for proper guide as government checkmate housing from developing stage till management stag.

VIII. Government should create a frame work that will regulate and control both quality of service rendered and it associated cost this will help every stakeholder on the long run. However profit maximization will be moderated if the government set a framework that regulate all parties involve.

IX. Professionals should organize their standard of practice in such a way it will obtain statutory backing this will help the government which in turn will foster integration among professional in the built environment this

will arouse demand among property investor to consult appropriate professional throughout stage of housing estate management process.

X. Government should come up with policies that create enabling environment and encourage sustainable housing infrastructure through their policies, as well as privatize some sectors through disintegration that will help sub-agency serve a particular neighborhood under their supervision this will rejuvenate real estate/ housing sector.

7.4 Opportunities for Further Studies

This study is undoubtedly a pioneering work in sustainable housing infrastructure practice in Umuahia and Nigeria at large. There is need to carry out more research in other area that further foster and improve sustainable housing infrastructure practice in Nigeria seeing that this study is multidisciplinary field of study. This will ascertain the general application of findings of the present effort. There are other areas (management of sustainable housing infrastructure, property right protecting sustainable housing infrastructure and valuation for sustainable housing infrastructure etc.) and other areas this study did not touch and which could constitute good research opportunities for other researchers.

6.5 Concluding Remarks

The study examined impact of sustainable housing infrastructure and its effect on property values in Umuahia capital Abia state, Nigeria. The study showed that there seems to be low application of sustainable housing infrastructure in the study area this has generally contributed to factors affecting property values in the study area, in this digital era modern innovation and technology has made real estate and construction

practice complex. These calls for sourcing innovative alternative in sustaining both the physical functional social, economic and legal status of an estate to remain in a sustainable manner the findings in this study would be of immense use to various policy and decision makers in and outside government in their individual or collective actions at enhancing sustainability approach nationwide. It is believed that the framework and the recommendations given in this study will be found helpful in planning, developing and managing housing estate in this technological age as real estate is nothing without sustainable infrastructure.

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APPENDIX I

Appendix A: Sample of Semi-Structured Interview Questions

Impact of Sustainable Housing Infrastructure and Its Effect on Property Values in Umuahia Capital Abia State, Nigeria.

Background information:

Section A: Respondent Demography.

QA.1. what is your Gender?

QA.2. To what age group do you belong?

QA.3. please do you understand the "Term" sustainable housing infrastructure (SHI)?

QA.4. What level of experience do you have in sustainable housing infrastructure?

QA.5. Do you consider yourself directly involve as either professional or beneficiary of sustainable housing infrastructure?

MAIN INTERVIEW QUESTIONS

Section B: Status of Sustainable Housing Infrastructure

QB.6. What is the present condition and situation facing housing sector in Umuahia capital Abia State?

QB.7. How would you categorize the level of supply of sustainable housing infrastructure in Umuahia?

QB.8. Who owns' and or builds manages sustainable housing infrastructure in Umuahia?

QB.9. What do you consider an appropriate strategy to employ in solving infrastructural challenge in real estate sector in Umuahia?

QB.10. How would you access the intervention of federal government in supply of housing infrastructure?

QB.11. How would you access the intervention of state government in supply of housing infrastructure?

QB.12. How would you access the intervention of local government in supply of housing infrastructure?

Section C: Impact of Sustainable Housing Infrastructure

QC.13. Does the provision of sustainable housing infrastructure have any effect on property values in Umuahia capital Abia state, Nigeria?

QC.14. How does the value obtained from the provision of sustainable housing infrastructure been shared?

QC.15. Does alternative measure in supply of housing Infrastructure a cure to housing problem?

QC.16. Does your housing accommodation have a sufficient facility that enhances property values?

QC.17. What is the financial implication of installing basic housing infrastructure in Umuahia?

QC.18. How would you rate the effect of poor sustainable housing infrastructure on per capital income of a citizen in Umuahia?

Section D: Application of Estate Management Principles

QD.19. Do you involve stakeholders including the residents, contractors/professionals, community, etc., in the provision of sustainable housing infrastructure?

QD.20. How would you assess the participation of other beneficiaries in respect to public private partnership in providing basic housing infrastructure?

QD.21. What do you consider the motive of stakeholder whose sole responsibility is providing housing infrastructure in Umuahia?

QD.22. How would you rate the involvement of related stake holders in the below stages of the housing estate management?

Section E: Professionals Integration in Solving (SHI) Issues

QE.23. How would you access the integration role of various relevant stakeholders if the Impact of sustainable housing infrastructure must be applied in solving housing issues?

QE.24. Do you consider professional integration will influence the cost of accessing housing infrastructure?

QE.25. What do you consider the basic infrastructure that can solve housing problem and improve property values in Umuahia?

Section F: Government Policies in Sustainable Housing Infrastructure

QF.26. Does government policy and regulation frame work have impact on sustainable housing infrastructure?

QF.27. How will you access the role of government in the provision and supply of housing infrastructure in the past?

QF.28. What will be your prediction if the government create an enabling environment for sustainable housing infrastructure?

QF.29. How would you categorize privatization of infrastructure companies for a competitive reason help the real estate sector

QF.30. Do you think mutual collaboration between the government and related stake holders will produce a way-forward in solving housing infrastructure issues?

QF.31. Above all, please briefly adds any comments or suggestions about the issues that arose in this research study that will help in solving housing issues in a sustainable manner.

APPENDIX II

Sample of Self-Delivery and Collection Questionnaire

Instruction: Please, kindly read this questions and tick /answer as appropriate, using the scale 1-5 (1= Lowest & 5 = Highest).

Section A: Respondent Demography.

QA.1. what is your Gender?

Male ☐ Female ☐

QA.2. To what age group do you belong?

21-30 ☐ 31-40 ☐ 41-50 ☐ 51-60 ☐ Over 60 ☐

QA.3. please do you understand the "Term" sustainable housing infrastructure (SHI)?

Yes ☐ No ☐

QA.4. What level of experience do you have in sustainable housing infrastructure?

Less than 1 year ☐ 1-10 years ☐ 11-20 years ☐ 21-30 years ☐ over 31 years ☐

QA.5. Do you consider yourself directly involve as either professional or beneficiary of sustainable housing infrastructure?

Professional ☐ Landlord ☐ Tenant ☐ Community ☐ Developer ☐

Section B: Status of Sustainable Housing Infrastructure

QB.6. What is the present condition and situation facing housing sector in Umuahia capital Abia State?

Very good state ☐ Fairly good state ☐ Bad state ☐ Worst state ☐

QB.7. How would you categorize the level of supply of sustainable housing infrastructure in Umuahia?

Poor ☐ Fair ☐ Satisfactory ☐ Good ☐ Excellent ☐

QB.8. Who owns' and or builds manages sustainable housing infrastructure in Umuahia?

Government Individual Community ☐ Private public partnership ☐

QB.9. What do you consider an appropriate strategy to employ in solving infrastructural challenge in real estate sector in Umuahia?

Sole dependence on government Sole dependence on ☐rivatization partnership

QB.10. How would you access the intervention of federal government in supply of housing infrastructure?

Poor Fair Satisfactory Good Excellent

QB.11. How would you access the intervention of state government in supply of housing infrastructure?

Poor ☐ Fair ☐ Satisfactory ☐ Good ☐ Excellent ☐

QB.12. How would you access the intervention of local government in supply of housing infrastructure?

Poor ☐ Fair ☐ Satisfactory ☐ Good ☐ Excellent ☐

Section C: Impact of sustainable housing infrastructure

QC.13. Does the provision of sustainable housing infrastructure have any effect on property values in Umuahia capital Abia state, Nigeria?

No effect ☐ Low effect ☐ Adequate effect ☐ High effect ☐

QC.14. How does the value obtained from the provision of sustainable housing infrastructure been shared?

No sided beneficial ☐ One sided beneficial ☐ Mutually beneficial ☐

QC.15. Does alternative measure in supply of housing Infrastructure a cure to housing problem?

I don't know Yes ☐ No ☐

QC.16. Does your housing accommodation have a sufficient facility that enhances property values?

I don't know Yes ☐ No ☐

QC.17. What is the financial implication of installing basic housing infrastructure in Umuahia?

Low cost ☐ Adequate cost ☐ High cost ☐

QC.18. How would you rate the effect of poor sustainable housing infrastructure on per capital income of a citizen in Umuahia?

No effect Indirect effect ☐ Direct effect ☐

Section D: Application of estate management principles

QD.19. Do you involve stakeholders including the residents, contractors/professionals, community, etc., in the provision of sustainable housing infrastructure?

Not involve ☐ Fairly involve ☐ Fully involve ☐

QD.20. How would you assess the participation of other beneficiaries in respect to public private partnership in providing basic housing infrastructure?

Not satisfactory ☐ Fairly satisfactory ☐ Fully satisfactory ☐

QD.21. What do you consider the motive of stakeholder whose sole responsibility is providing housing infrastructure in Umuahia?

Profit oriented ☐ Corporation oriented ☐ Cooperative oriente ☐ Prestige ☐ oriented

QD.22. How would you rate the involvement of related stake holders in the below stages of the housing estate management?

	Planning stage				**Implementing stage**				**Construction stage**				**Management stage**				**Evaluation stage**			
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Stakeholders																				
Government																				
Professionals																				
Community																				
tenant																				
landlord																				
developers																				

<u>Section E: Professionals integration in solving (SHI) Issues</u>

QE.23. How would you access the integration role of various relevant stakeholders if the Impact of sustainable housing infrastructure must be applied in solving housing issues?

Poor ☐ Fair ☐ Good ☐ Better ☐ Best ☐

QE.24. Do you consider professional integration will influence the cost of accessing housing infrastructure?

No effect ☐ Low effect ☐ Adequate effect ☐ High effect ☐

QE.25. What do you consider the basic infrastructure that can solve housing problem and improve property values in Umuahia?

Infrastructure	Has no effect	Has low effect	Medium effect	High effect
Access road				
Electricity supply				
Low cost building aids				
Government policies				
Sustainable technology				

Section F: Government Policies in Sustainable Housing Infrastructure

QF.26. Does government policy and regulation frame work have impact on sustainable housing infrastructure?

No effect ☐ Indirect effect ☐ Direct effect ☐ Full effect ☐

QF.27. How will you access the role of government in the provision and supply of housing infrastructure in the past?

Very poor ☐ Poor ☐ Good ☐ Better ☐ Best ☐

QF.28. What will be your prediction if the government create an enabling environment for sustainable housing infrastructure?

No improvement ☐ Little improvement ☐ More improvement ☐ Great improvement ☐

QF.29. How would you categorize privatization of infrastructure companies for a competitive reason help the real estate sector

No effect ☐ negative effect ☐ positive effect ☐ equilibrium effect ☐

QF.30. Do you think mutual collaboration between the government and related stake holders will produce a way-forward in solving housing infrastructure issues?

I do not know Yes ☐ No ☐

QF.31. Above all, please briefly adds any comments or suggestions about the issues that arose in this research study that will help in solving housing issues in a sustainable manner.

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Thanks For your participation

APPENDIX III: QUESTIONNAIRE ON SUSTAINABLE HOUSING INFRASTRUCTURE

School of the built environment,

Selinus University of Science and

Department of Estate Management

Bologna, Italy,

15th October, 2021.

Dear Sir/Madam

Re: Impact of Sustainable Housing Infrastructure and its Effect on Property Values in Umuahia Capital Abia State, Nigeria.

I am a PhD student at the Selinus University of Science and Literature and I am currently conducting a questionnaire to validate a research framework titled as above.

This questionnaire aims to gather your responses which will help the researcher to validate the framework that will subsequently be applied for the effective provision, installation and management of sustainable housing and providing the needed infrastructure. this cannot be effectively developed without your participation; therefore, you are requested to complete this questionnaire. This questionnaire is estimated to take about 10 minutes to complete.

In order to protect your confidentiality, privacy, dignity and anonymity, your answers will be attached with a unique code that will only be understood and accessed by the researcher. This will be stored in password-protected files in a password-protected

computer that only the researcher has access to. Finally, any data provided by you will be destroyed once the degree is achieved. The project has ethical approval for the study protocol from the Selinus University of Science and Literature, which provides further assurance.

If you have further questions about your participation, please contact me or my supervisor through the postgraduate school using the details below.

Thanks and yours sincerely as you assist in this regard,

Mr. Emenike Kingsley Chikwuado

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