

# **A FRAMEWORK FOR THE APPLICATION OF CASE STUDY RESEARCH IN ARCHITECTURAL DESIGN THESES IN NIGERIA**

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## **ABSTRACT**

*The application of case studies in architectural practice and education (teaching), as guide for architectural design is widely understood. However, there appears to be misconceptions and limited understanding of the application of case study approach to theoretical research in architecture. This is of great importance due to the increasing awareness of the role of research in architectural development and the need for more specialization. In order to put this in proper perspective, a review of the concept of case studies was conducted in context with architectural education and practice in Nigeria. The outcome of this is a proposed framework/guide for the application of same in architectural research, especially for postgraduate architectural theses as obtains in most Nigerian universities. The need to approach case studies scientifically in accordance with global practices in here emphasized. The paper therefore recommends that more emphasis be laid on case studies research methodology in order to enhance theoretical research output and contribution to knowledge.*

Keywords: Architectural research, architectural theses, case study, education, framework, practice.

## **INTRODUCTION**

The term ‘case studies’ has attained common usage in the field of architecture that one could innocently assume it to be an architectural term. From the classrooms to the studios; from the undergraduate projects to postgraduate theses, and finally in professional practice. Case studies have become part of the process of arriving at solutions to design problems. In Nigeria’s schools of architecture, many of the theses involves one form of case study or another. However, a look at some of these architectural theses reveals a lot of limited and stereotypical approach to case studies. In these treatise, case studies focused on similar building typologies and archetypes, as guides for the development of proposed schemes. This may be attributed to the fact that the post graduate degree programs of most schools of architecture in Nigeria were still largely design oriented, with emphasis on creativity and the application, rather than creation of knowledge.

With the advent of globalization, the fact that the society is now knowledge-driven, and the challenges of specialization and diversification seems to challenge the architecture profession hence there is an urgent need to revisit methodological issues associated with the postgraduate architectural theses in Nigeria, especially at the Masters level. This will engender better research outcomes and much-needed knowledge for the profession.

Uji (2002) noted that works of architecture cannot be equated with that of the artists or that of disciplines such as engineering. This is because artwork are the outcome of nebulous imaginative processes, while engineering works follow precise, predetermined, systematic and mathematical procedures. Similarly, Abdulkarim (2005) noted that the nature of architecture places it in a zone of convergence of theoretical inquiry and practical reality. The pursuit of theoretical enquiry necessitates a systematic collection, analysis and interpretation of data, while the practicality is hinged on technical knowledge and creativity. This calls for the architectural theses to be approached through a hybrid research methodology, in order to harnesses the advantages of knowledge application and creativity; as well as knowledge creation.

While case studies still remains one of the most viable approaches for architectural theses, it is necessary to deepen the understanding of its applications in architectural research, and a more scientific or systematic approach to its application. This will also enhance the quality of architectural theses, especially with regard to contribution to knowledge. Case study is beyond the documentation of the built environment. It is an empirical inquiry (Yin, 2009), and can lead to the creation of theoretical knowledge. It is therefore important to look at case study research methodology and its role in conducting an architectural theses which meets both professional and theoretical/academic requirements. This will ensure that product of Nigerian schools of architecture can compete with their peers in other parts of the world, and contribute to knowledge

which will benefit the entirety of the architecture profession in Nigeria and beyond. This paper therefore aims at capturing the essence of case studies, placing architectural case studies in context with universal research methodology, and clarifying key issues in the application of case studies in architectural research. It also provides a framework for the conduct of case study based researches for architectural theses in Nigeria and beyond.

### **The Architecture Theses in Nigerian Universities**

The architecture program in Nigerian universities has gone through many phases and assumed variety of nomenclature. This includes the Bachelor of Architecture (BArch)/ Master of Architecture (MArch), Bachelor of Science (BSc)/ Master of Science (MSc), Bachelor of Environmental Science (BES)/ Master of Environmental Science (MES) and Bachelor of Technology (BTech)/ Master of Technology (MTech). Presently, an MSc in architecture is required to directly qualify one for the Nigerian Institute of Architects Professional Practice Examinations (NIAPPE), which is a prerequisite for professional registration with the Architects Registration Council of Nigeria (ARCON). However, in the research/ academic world, and in accordance with the guidelines for postgraduate studies in many Nigerian universities, the award of an MSc suggests that one has undergone some form of scientific research and probably made contributions to knowledge. This appears not to be the case with many of the MSc theses conducted in schools of architecture in Nigeria.

Traditionally, the theoretical background and case studies in the architecture thesis of many Nigerian universities appear to have focused on the review and application of knowledge gathered from literature and case studies to a design solution. In contrast to this, a thesis which aims at contributing to knowledge should focus on the investigation of certain phenomenon or theories. In this light, case studies for such theses should be scientific in collecting, analysing and interpreting

data. A look at these theses shows that they were largely more like architectural design projects, accompanied by design reports. In many cases, there was little evidence of systematic collection or analysis of data, which are the key characteristics of research. The only semblance of data collection in many of these theses were usually mentioned under the term 'case studies'. However, case studies is beyond a mere visit or documentation and discussion of buildings in order to learn from them and apply what is learned in one's design solution.

### **CASE STUDY IN CONTEXT**

Yin (2009) defined case study as an empirical inquiry that investigates a contemporary phenomenon within its real life context using multiple sources of evidence. Other definitions include: A "method for learning about a complex instance, based on a comprehensive understanding of that instance obtained by extensive description and analysis of that instance taken as a whole and in its context (General Accounting Office Program Evaluation and Methodology Division (GAOPEMD), 1990: 15)." These definitions suggests that case study is targeted at a holistic understanding of the case or phenomenon under investigation. This can only be achieved through multiple methods of data collection and triangulation of obtained results.

Case study methodology developed within the social sciences such as psychology, sociology, anthropology and economics, and is now widely applied in practice oriented fields such as environmental studies, social work, education and management science (Johansson, 2010). Veal (2006) noted that a case study may refer to a research method or a unit of analysis, and involves "the study of an example - a case - of the phenomenon being researched" (p.108). However, the concept of 'a case' is not well defined and remains a subject of discussion. Various authors have given definitions of what a case is. The case may be a relatively bounded object or a process; it may be theoretical, empirical, or both (Ragin & Becker, 1992; Osuala, 2005). At a minimum, a

case is a phenomenon specific to time and space (Johansson, 2010). This includes an event, an entity or an individual (Myers, 1997; Yin, 2009). In architectural theses, case study is widely approached as a unit of analysis, while the cases are usually buildings or the built environment. However, application of case study as a research methodology appears to be limited.

Case study approach is characterized by a purposeful selection of the case to study and triangulation, which is normally conducted by means of multiple-methods of data collection (Johansson, 2010). It is expected to capture the complexity of individual cases, and may involve contrasting cases studied in a similar manner (Veal, 2006). These studies may be qualitative or quantitative, or a combination both (Stake, 1995; Osuala, 2005; Yin, 2009).

### **Teaching and Design versus Theoretical Studies**

Case studies are widely applied in architectural education (teaching) and practice. Architecture education involves the use of cases (selected buildings) as guides for learning about building typologies, their design requirements and challenges. Likewise, cases are used as guides in practice. This is because architectural solutions in practice are based on knowledge of a repertoire of cases either from personal experiences or established model cases (Schon, 1991). This acquaints most architects with the study of cases as guides, especially when faced with unfamiliar building typologies and challenging design problems. Harling and Laurier (2010) suggested that the main difference between teaching and research cases was in the nature and mode of data presented. Case study for theoretical research in architecture may require the use of a wider range of data collection and analysis techniques and instruments which were not applicable to teaching cases. Stake (1995) noted that theory could be absent from studies which focus on a describing the case and its issues. This is especially applicable in the field of architecture where most teaching and practice cases were largely based on visual survey. For theoretical and academic case studies, existing theoretical

issues can be used as guides in order to conduct exploratory studies (Yin, 2009). This is also relevant if studies are to contribute to knowledge or develop new theories (Creswell, 1994; Harling & Laurier, 2010).

## **A METHODOLOGY FOR ARCHITECTURAL CASE STUDIES**

### **Case Study Selection (Sampling)**

Veal (2006) noted that case study selection was comparable to sampling in a quantitative research and that cases were usually purposively selected (purposive sampling). This meant that cases were identified for study due to their inherent qualities which were in consonance with the phenomenon under investigation. This may be because they were information-rich, critical, revelatory, unique, representative or extremely atypical (Stake, 1995, Patton, 1990; Osuala, 2005). This is as opposed to representational sample used in statistical investigations (Stake, 1995, Patton, 1990). Case study research may be based on one or more cases. A single case design may be used where the case is critical, unique or typical, or that the study is longitudinal, comparing the case at different points in time (Yin, 2009).

Case studies may be illustrative, exploratory, explanatory, evaluative, critical instance, and cumulative, among others (GAOPMD, 1990; Veal, 2006). For the purpose of this paper, the applications of case studies will be discussed under five categories which this study adjudged as the most relevant to architectural theses. These are: illustrative, exploratory, explanatory, evaluative and critical instance.

### **Illustrative Case Studies**

Veal (2006) described illustrative case studies as those chosen deliberately to increase the likelihood of showing or demonstrating a particular proposition. In such instances, a single case

may be selected as typical examples or multiple cases each representing important variations (GAOPEMD, 1990). In architectural theses, an information-rich typical case can be used to illustrate and investigate an architectural problem, while multiple cases representing different facets of the phenomenon being illustrated is also applicable. Such studies are descriptive in character and primarily describes and maps out the phenomenon under investigation. This approach was used by Nasiri (2007) to examine the sustainable features of the vernacular architecture in the hot-arid regions of the Middle Eastern and North African regions. The case study illustrated the use of passive heating and cooling in Kasbahs, courtyard houses and traditional Iranian houses in the city of Yazd. Similarly, Mingozi and Bottiglioni (2007) conducted a case study of a sustainable residential settlement in Pieve di Cento. The residential settlement in Pieve di Cento was designed according to sustainable principles and revealed a good example of smart use of simple strategies to reach energy efficiency targets both in the hot and cold season.

### **Exploratory Case Studies**

Exploratory case studies were usually undertaken before launching into large-scale investigations. Its function is to develop the evaluation questions, hypotheses, measures, designs, and analytic strategy for a bigger study. Selection of cases for exploratory studies required at least one site that represented each important variation to make a convenience sample acceptable (Veal, 2006; GAOPEMD, 2009).

### **Explanatory Case Studies**

Explanatory case studies may be used to test the applicability of an existing theory (Veal, 2006), or to interconnect previously unknown or unappreciated factors in relevant ways. This may be used where theoretical postulations has never been empirically tested or where it has never been

tested in a particular environment. Lara (2001) in a study titled '*popular modernism: An analysis of the acceptance of modern architecture in 1950s Brazil*' had this as one of the research questions; 'why was modern architecture better received in Brazil than in Europe or the United States?' This question was answered by conducting a case study of Belo Horizonte city, Brazil.

### **Evaluative Case Studies**

Evaluative case studies are used in testing effectiveness of policies or programs in order to suggest modifications and alternatives (Veal, 2006). Selections of cases were not out of convenience and purposive sample may be typical or representative of diversity and best and worst cases. Also, the number of cases depends on program diversity since generalization was usually wanted (GAOPEMD, 2009). One of the popular architectural issues which recently appear to attract large numbers of evaluative studies is the issue of sustainable design. Oluigbo (2010) employed evaluative case studies in a bid to establish the factors which were critical to the sustainable design of tourism facilities in context with the characteristics of North-Western Nigeria.

### **Critical Instance Case Studies**

Critical instance case study is applied in the examination of one, or very few, cases for one of two purposes. The first is the examination of a unique situation of interest, where there was little or no interest in generalizability. The second and rare application is where a highly generalized or universal assertion was being called into question, and needs to be tested through examining one instance. The emphasis is on ruling out alternative causes; report describes instances, presents conclusions about cause, give evidence (GAOPEMD, 2009). An example of this is a research aimed at investigating the causes of failure of a particular project or collapsed buildings.



## **Data Collection**

Some of the defining characteristics of case study methodology are: The use of multiple sources of data in order to capture the complexity of cases, (see Table 1), and the triangulation of this data (Veal, 2006; Yin, 2009; Johansson, 2010). In contrast to these, many architectural researchers equate case studies with visual survey and documentation. Architectural case studies could apply either qualitative or quantitative methods or a combination of both. The combination of both methods will contribute to gaining better understanding of the phenomena under investigation and combine depth with breadth in the outcome thereby increasing the reliability and validity of a study (Hartmann, 1988; Kaplan & Duchon, 1988). Groat and Wang (2002) noted that multi-method approaches in architectural research could combine multiple methods of data collection such as ethnographic, survey, participant design and experimental methods. All these methods of data collection can be integrated in case studies. Case study for architecture theses should therefore begin with possibly a reconnaissance survey, followed by a visual survey/documentation of the physical characteristics of the case. These will satisfy the traditional requirements of architectural theses. In addition to these however, case studies for theoretical research may require the use of general methods of data collection. These include: Observations and participant observations, visual survey and checklists, interviews, questionnaire survey, models and simulation, and scientific measuring instruments among others. This is because, in order to understand the performance of a building's spatial organisation, for instance, data on the spatial organisation itself should be collected through visual survey and documentation (sketches, photographs, charts, etc). This may be adequate for some studies, especially when the study is totally descriptive. But for other studies, it may be necessary to hear from the architect of the building, through interviews,

and also the users, through questionnaire surveys. Some studies may even require simulation or use of other instruments such as luminance metres.

Architectural researchers in Nigeria appear to shy away from questionnaires and interviews in the conduct of case studies. These instruments are useful for the survey of users or consumers of architecture. Possible areas of questionnaire survey in architectural case studies include: attitudes and perceptions, preferences and cognition. Lara (2001) used in-depth interview to sought explanations on why modern architecture was better received in Brazil than in Europe or the United States. For interviews in architecture, respondents may include: Architects and other members of the building industry; the client or owner, the users, and even passive consumers of architecture (passers by who make visual contact with the building).

### **Data Analysis**

According to Veal (2006), all forms of analysis are possible within the context of a case. This analysis may be conducted for individual cases, across cases, or within groups of related cases (Christie *et al*, 2000). Analysis of architectural case study research may be statistical and non-statistical, and include descriptive analysis, visual analysis, comparative analysis, content analysis, and parametric and non-parametric statistical tests. Discussion of case study analysis may be based on pattern matching, logical argumentation/ explanation building and time series analysis among others (Veal, 2006).

Pattern matching relates the features of a case to what might be expected from an existing theory (Veal, 2006). Logical argumentation simply describes making sense of some aspect of the cosmos in a systematically rational manner. Literature, in many fields of study, include works which give logical order to a set of previously desperate factors. Architectural works seem to frame logical conceptual systems, which interconnect previously unknown or unappreciated factors in relevant

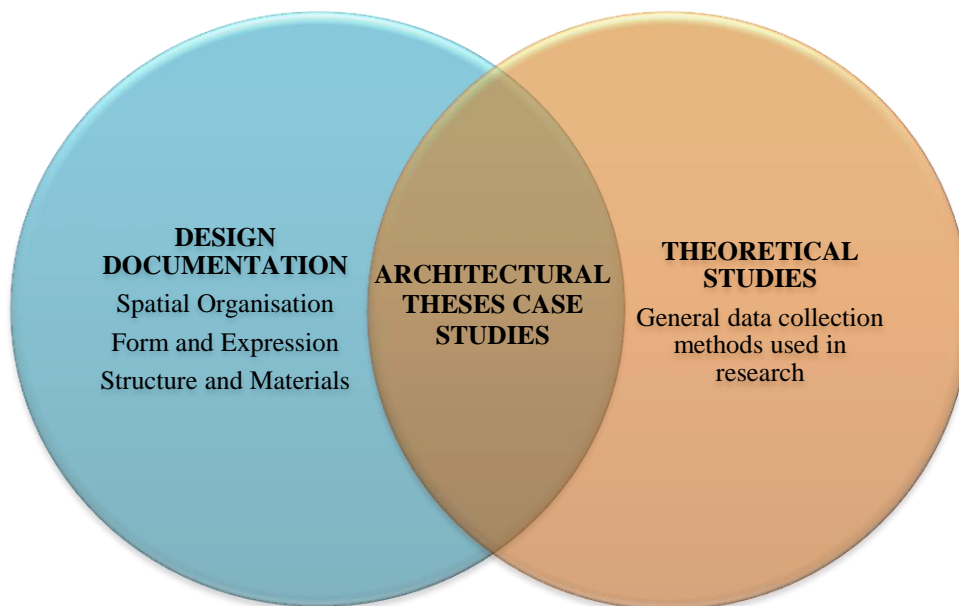
ways. These are examples of logical argumentation. The outcome of logical argumentation is an explanatory system, which if widely accepted will become a way of understanding some aspects of interaction between humans and the built environment, or a normative basis for action in design (Groat & Wang, 2002). Application of this method involves logical or causal explanation of the case study findings by to-and-fro referencing between theories from literature review and obtained data (Veal, 2006). Time series analysis involves the development of explanations based on observation of changes over a period of time (Veal, 2006). Organization of information within each site by time of occurrence, coupled with a systematic analysis of contextual influences on events, permits a non-quantitative time series analysis for case study data. The flow of events over time for each significant actor and for significant points in the series of events forms the organizing framework for data analysis within each site. Such comparisons of when key actions occurred, how well (or poorly) they were carried out, and what influenced both timing and quality of performance can be particularly helpful in case studies of program implementation (GAOPMD, 1990).

### **FRAMEWORK FOR ARCHITECTURAL THESES CASE-STUDY RESEARCH**

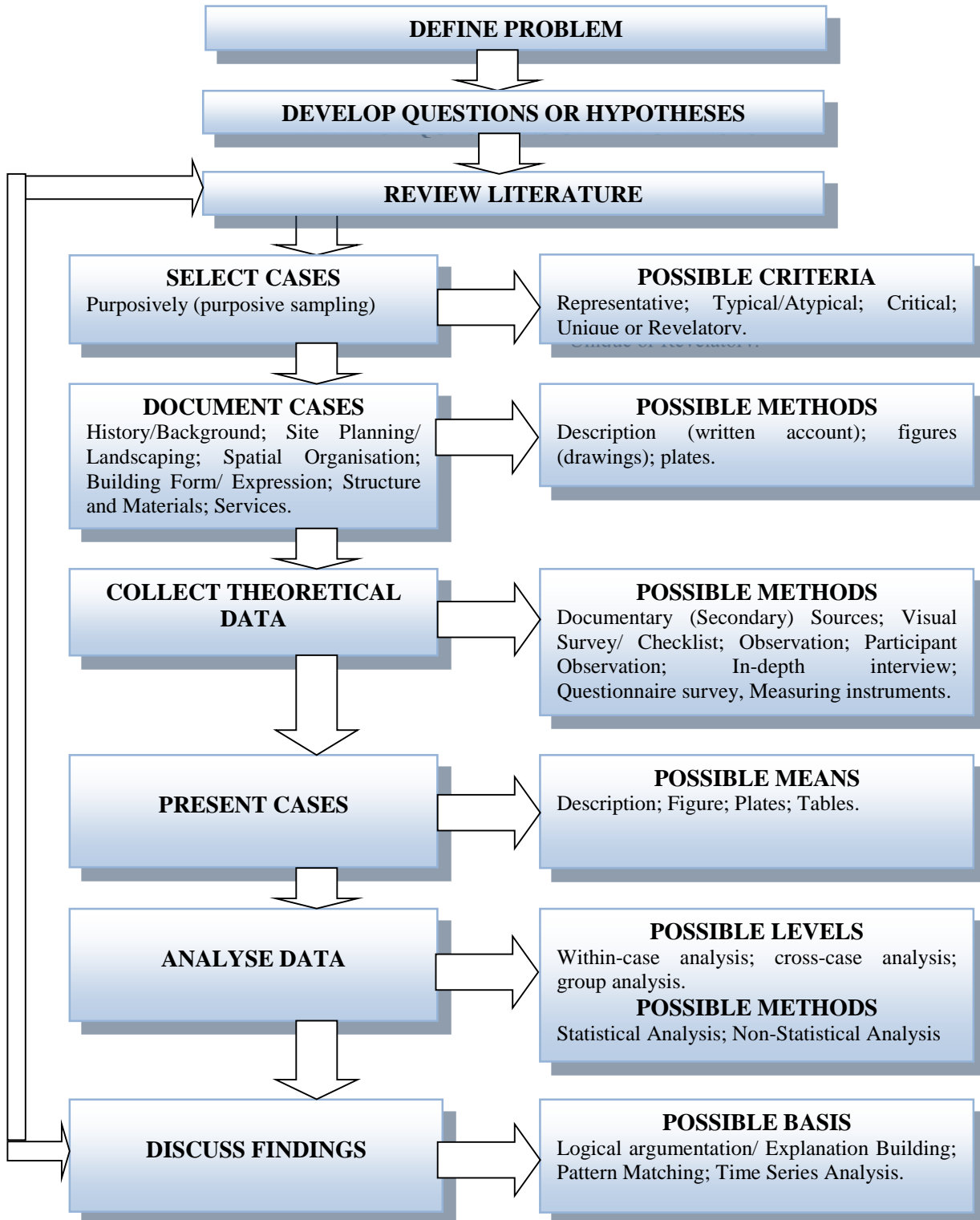
Veal (2006) stated that a survey of 500 visitors to a site or facility could be regarded as a case study. However, to be seen as a case study in its full sense the study should include information on the history and environment of study. A large number of cases in architectural research are usually physical units such as buildings and sections of the built environment. As a result of this, detailed documentation of such cases are required before the application of general data collection techniques. Also, while a number of architectural case studies were aimed at teaching or guiding design, others were practically for theoretical reasons. However, most architecture masters theses (MSc, MTech, March, etc) in Nigeria involves architectural design and at least a pinch of

theoretical enquiry. This necessitates the fusion of requirements for design oriented case studies with that for theoretical case studies (case study methodology). For the design aspect, a cue could be taken from the three basic attributes of architecture in the discussion of the case. These attributes are: Spatial organisation (commodity, function, arrangement); Form and expression (aesthetics, delight), and; Structure and materials (firmness, technology, shelter) (based on Vitruvius, Moore, 1979). Figure 1 illustrates the convergence between requirements for architectural design case studies with that for theoretical research.

This paper proposes a framework that combines design documentation/description with theoretical data collection and analysis. A descriptive account of the cases may be based on the following headings: History and background; site planning and landscaping; spatial organisation of buildings; form and expression; structure and materials; and, building services. This should then be followed by the application of general data collection techniques. Figure 2 below shows a proposed framework for architectural case studies.



**Figure 1:** Convergence of Architectural Design and Knowledge Creating Case Studies.



**Figure 2:** Proposed Framework for Architectural Theses Case Studies

## CONCLUSION AND RECOMMENDATIONS

Case study research methodology in architecture should go beyond the documentation and description of the physical characteristics of the built environment. Architectural case studies can apply general methods and techniques used in research. This is in addition to the documentation of the architectural characteristics of the case. Architectural researchers should therefore embrace this approach and unlock its vast potentials in order to enrich their studies and contribute to existing body of knowledge, rather than focus on the application of knowledge, creativity, and spontaneity. This will however require an increase in research-oriented interactions, and refocusing of post graduate studies in many schools of architecture in Nigeria and beyond.

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