Expression of Culture through Architecture: Insights from the Mbari Houses of Imo State, Nigeria

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Abstract

Often culture and identity are expressed through architecture. In fact, architecture as tangible material culture, represents and communicates the cultural themes of a community. Mbari houses that have existed in Nigeria before the twentieth century comprises sculptures and architectural components relevant to understand certain aspects of cultural identity. In this context, this study examines the historic Mbari houses in the Imo state of Nigeria and how their architecture expresses culture.

The research employed a mixed method approach. The qualitative and quantitative techniques of data collection involved archival research and case studies. Archival data such as literature, photographs and records were obtained from the Enugu and Ibadan National Archives in Nigeria. Case study involved observations, and semi-structured interviews with stakeholders, along with storytelling through unstructured interviews with elders within the research community. An in-depth case study of an existing Mbari house at Umunakara - Imerienwe, Ngor-Okpala local government area in Imo State, Nigeria, was carried out through a visual and measured survey involving sketches. Since Mbari houses are largely extinct, typical and critical sampling criteria were adopted, based on availability of a possibly unimpaired archetypal model within any community in the 'Mbari-building' region. A chain-referral technique for snowball sampling was used in locating the community. The only existing and suitable model found in the Umunakara community was chosen as the Case Study. Logical argumentation was applied as an analytical strategy by identifying and examining the architectural components, while utilizing mathematical-cultural techniques to explain relationships between culture and the Mbari house.

The results revealed that the central chamber of a Mbari house, is an architectural depiction of cultural relevance in the community. The basic geometric forms used as components and motifs of the central chamber express cultural meanings unique to the 'mbari-building' communities. The study further illustrates how elements of culture and identity, are structurally represented in a Mbari house.

Keywords: Mbari House, Architecture, Culture and Identity, Community, Nigeria

Introduction

Mbari houses embody a system of communication, illustrated as architectural and artistic components that are deeply rooted in the culture of a people. These unique elements of the structure have been described by Cole (1982) as a 'cultural telegraph', that extensively communicates the culture of the old Owerri Province, in Eastern Nigeria. However, the breadth and depth of cultural significance within this architectural form, have not been adequately examined or understood. This paper examines the architectural components of an Mbari house and their cultural relevance. It particularly studies an existing Mbari house at Umunakara – Imerienwe community in Ngor-Okpala, Imo State, Nigeria. Mbari houses are architectural monuments dedicated to the principal deities of some Igbo communities in eastern Nigeria. Particularly Ala – the goddess of earth and fertility, and Amadioha – the god of thunder, or other specific gods of these communities (Cole, 1969,1982, 1988), (Dmochowski, 1990), (Basden, 1912). These monuments contain a sculptural tableau that depict the lifestyle of people in the given community (Cole, 1969), (Obichere, 1973). Inferences drawn from initial reports reveal that Mbari houses were quite elaborate in its architectural and cultural influences in the early 1900s. Such descriptive accounts given by Whitehouse (1904) and Basden (1912), suggest that the erection of Mbari houses and its corresponding sociocultural activities precede the twentieth century. The aim of this study is to establish a direct relationship between Mbari Architecture and cultural relevance within 'Mbari-building' communities. Its objectives are:

- To identify typical Mbari house models at different eras,
- To analyze the basic architectural composition of an Mbari house,
- To examine how the central chamber of an Mbari house depicts cultural relevance.

Theoretical Framework

Understanding cultural relevance in Mbari architecture requires basic comprehension of the factors that qualify Mbari monuments as architecture. Many authors have summarized the fundamentals of architecture as; Form, Space, Humans and Human Experience. This highlight 'space, form and culture' as determinants of 'architecture'. Ching (2023) explains how architecture responds to a given set of sociocultural or environmental conditions that determine its function. These conditions are systematically designed into geometric forms and spatial layouts of structures, using proportions in nature (Imaah, 2010). Rapoport (1969, 1990, 2003), further explains how architecture, form and culture create a mutual interplay, that enables understanding of social values. Furthermore, the basic principles of Enironment-Behaviour Studies (EBS) proposes a triad relationship between people, culture and environment (Rapoport 1969, 1976, 2019), in a way that highlights architecture as a vernacular and tangible product. Therefore Mbari monuments as material culture, should satisfy the basic concept and attributes of vernacular architeture, in order to become expressive of culture and identity. This research utilizes the Polythetic Classifications of Vernacular Design Attributes put forward by Rapoport (1990), in analysing Mbari architecture. The framework classifies vernacular architecuture into process and product attributes that can be used in determining how indigeneous an architectural object is. The application of this framework, helps in understanding the role Mbari houses play in culture and identity. The table below presents the Polythetic Framework proposed by Raporport (1990).

Table 1: Polythetic Classification of Vernacular Design Attributes
Source: Rapoport, 1990

S/N	**a) Process Characteristics** **b) Product Characteristics**
1	a) Identity of Designers b) Degree of Cultural and Place – Specificity
2	a) Intention and Purpose of Designers b) Specific Model, Plan Forms, Morphology, Shapes, Transitions

3	a) Degree of Anonymity of Designers b) Nature of Relationship among Elements and the Nature of Underlying Rules
4	a) Reliance on a Model with Variations b) Presence of Specific Formal Qualities
5	a) Presence of a Single Model or Many Models b) Use of Specific Materials, Textures, Colours, etc
6	a) Extent of Sharing of Model b) Nature of Relation to Landscape, Site, Geomorphology, etc
7	a) Nature and Schemata Underlying the Model b) Effectiveness of Response to Climate
8	a) Consistency of Use of Single (Same) Model for different Parts of the House -Settlement System b) Efficiency in Use of Resources
9	a) Types of Relationship among Models in Different Types of Environments b) Complexity of Largest Scale Due to Place Specificity
10	a) Specifics of Choice Model of Design b) Complexity at Other Scales Due to Use of a Single Model with Variations
11	a) Congruence of Choice Model and its Choice Criteria with Shared Ideals of Users b) Clarity, Legibility and Comprehensibility of the Environment Due to the Order Expressed by the Model Used
12	a) Degree of Congruence and Nature of the Relation between Environment and Culture/Lifestyle b) Open-Endedness Allowing Additive, Subtractive and Other Changes
13	a) Use of Implicit/Unwritten vs Explicit/Legalistic Design Criteria b) Presence of 'Stable Equilibrium' (vs the 'Unstable Equilibrium' of High Style)
14	a) Degree of Self-Consciousness / Unself-Consciousness of the Design Process b) Complexity Due to Variations Overtime (Changes to Model not of Model)
15	a) Degree of Constancy / Invariance vs Change / Originality (and Speed of Change Overtime) of the Basic Method b) Open-Endedness Regarding Activities
16	a) Form of Temporal Change b) Degree of Multi-sensory Qualities of Environment (Large Range of Non-Visual Qualities)
17	a) Extent of Sharing of Knowledge about Design and Construction b) Degree of Differentiation of Settings
18	a) Not Applicable b) Effectiveness of Environment as a Setting for Lifestyle and Activity Systems and Other Aspects of Culture
19	a) Not Applicable b) Ability of Settings to Communicate Effectively to Users
20	a) Not Applicable b) Relative Importance of Fixed-Feature Element vs Semi-Fixed Feature Element

Mbari Monuments as Vernacular Architecture

In order to streamline vernacular factors at play in Mbari architecture, a specific but holistic definition of the term 'Vernacular Architecture' is required in a way that relates its architectural components to the defining clauses. This strategy creates a connection between 'space, form and culture'. The basic components of an Mbari house can be analyzed using established determinants of vernacular architecture. These determinants consider sociocultural, religious and environmental themes of the subject, as factors that influence design and space. Sarr (2020) explains that architecture becomes all-encompassing when it is related to society, climate, culture, humans and its geographical location. Denyer (1978) also highlights how African architecture expresses cultural identity. However, none of these vernacular factors is independently broad or narrow enough to become the singular basis for analyzing architecture (Meuser & Dalbai, 2021) (Sarr, 2020). Therefore, the architectural components of an Mbari house can be examined in parts to understand how its composition, space and material are significant to sociocultural practices and values. This is because an Mbari house derives form and meaning from society and culture.

Several authors have defined vernacular architecture largely as indigenous science (or building practice) of a people within a local or domestic environment per time (Guillaud, 2014),

(Rapoport , 1969), (Brunskill, 1983). However, the definition utilized in this research was fully captured by Oliver (1997) and Nabakov (1999) as: An organized collection of 'cultural data', that consists of subsistent shelter and settlement practices and types; existing since the earliest possible time; erected by ordinary people within local societies; using available and organic materials in their immediate environment, in order to resist and adapt to imminent climatic conditions. This definition highlights eight (8) basic factors that constitute vernacular architecture. These factors are outlined below with their corresponding sub-definitions:

- Organized collection of Cultural Data – Cultural relevance
- Subsistent Shelter and Settlement Practices and Types –
  a. Locally utilized by the Indigenes
  b. Local Construction Techniques.
- Earliest Possible Time – Time (Degree of timelessness of structure, methods or function)
- Erected by Ordinary People - Local Builders
- Using Available and Organic Materials in their Immediate Environment – Local Materials
- In order to Resist and Adapt to imminent Climatic Conditions
  a. Environmental Adaptation
  b. Sustainability.

Table 2: Basic Vernacular Factors and their Corresponding Sub-Definitions
Source: Author, 2024

	Defining Clause		**Vernacular Factor**
A	Organized collection of Cultural Data	1	Cultural relevance
B	Subsistent Shelter and Settlement Practices and Types	2 3	Locally Utilized Local Construction Techniques
C	Earliest Possible Time	4	Time / Era
D	Erected by Ordinary People -	5	Local Builders
E	Using Available and Organic Materials in their Immediate Environment	6	Local Materials
F	In order to Resist and Adapt to imminent Climatic Conditions	7 8	Environmental Adaptation Sustainability

These vernacular factors are relevant for the analysis of Mbari architectural components in relation to cultural relevance, as it provides a link between cultural identity and architecture.

Low (2016) describes space as an element that is both relational and culturally constructed. This concept from cultural symbolism is relevant even for vernacular designs like Mbari houses, which represent the sociocultural values of the past generations within a community. In addition to representing past ethos through a sculptural tableau, it also shows the relationality of culture and space through its architectural composition. According to Low (2016), the relational concept of space encompasses; materiality (Material object and environment), social structure, and symbolic interpretations. This implies that space is constructed and understood when social experience and material things interact, highlighting 'symbolism' as a tool for conveying meaning in architecture. Similarly, Dudek (2021) explains that sociocultural factors affect creation of spaces and objects in the built environment, creating a relational dependence between culture and materiality. Lefebvre (1974) also presents the concept of 'production of space' as; perceived, conceived and lived spaces. The 'lived' spaces consist of representational space – which encompasses; subjective experiences of space, significance of space such as symbolism and meanings, the emotions generated or triggered by

space, and the individuals using or experiencing the space. These 'Symbolic' factors enable the definition of a 'lived space' as a social space. Therefore, this research explores the extents of architectural space in an Mbari house, beyond the voided boundaries where sculptural elements are kept. It interprets the structural components bounding the space as part of space and symbolism. Consequently, it analyzes the boundaries created by these structural components, to determine how they are culturally relevant. The theoretical concepts applied in this research are hinged on the notion that 'architecture is readable' and legibly communicates sociocultural values and nuances through its built form (Brisibe, 2016). This paper examines Mbari houses purely as architecture, particularly analyzing its architectural components in relation to cultural relevance.

Literature Review

Among the various forms of creativity and art, Architecture remains the most firmly connected to human behaviour, as it constantly reflects the dynamics of human activities (Dmochowski, 1990). As an expression of culture, architecture is crucial to cultural identity as it provides symbolic connections and correlations between lifestyle, people, environment and social values within a given settlement (Denyer, 1978) (Rapoport, 1976). According to Mueser (2021), living entails human activities that are expressed in everyday life, and subsequently involves defined and planned spaces. This statement creates a link between culture and the vernacular settlement within which a particular culture-set is expressed. It also introduces planned spaces like architectural concepts as a tool through which culture finds expression. Architectural structures in Sub-Saharan Africa often emanate from the need to live and build with simple, available and affordable materials that satisfy local contexts (Meuser, 2021). Therefore, adequate architectural concepts and philosophies in Africa require an understanding of sociocultural and historical contexts. Senghor (1956) describes African cultures as 'the architecture of being' – an internal sociocultural dynamic that produces form while expressing itself through material means like; colours, lines, volumes, sculpture, painting poetry, music and dance. Asides creating a metaphoric connection between architecture and culture, this definition describes how architecture expresses cultural identity within Africa settlements. It also establishes a fundamental connection between architecture, sculpture and painting, which Imaah (2010) already identifies as the three basic categories of visual art.

In Nigeria, separate vernacular settlements that make up social complexes like; geopolitical regions or communities, are often multi-lingual or multi-ethnic (Gandonu, 1978) (Agwuele, 2018) This creates sociocultural and religious nuances that are intricately connected to lifestyle, thereby influencing perception of space and architecture. Anthropologists, art historians and other researchers with keen interest in various cultures, explore the material culture of these multiethnic communities in order to understand similarities and differences that exist. The diverse expressions of culture within the Mbari house as art and architecture combined, makes it suitable for a wide of range of research.

The numerous and extensive study carried out by Cole (1969, 1982, 1988) describes Mbari houses as colorful structures that are built as offerings to the gods of the community, engendering elaborate rituals and festivals at its completion. These works highlight Mbari houses as architectural monument where gods, humans, animals and things reside and engage in tableaux that communicate a people's lifestyle (Cole, 1982). It further describes the type of construction materials used, the sociocultural activities accompanying the erection and completion of an Mbari house, as well as the largely subjective meanings derived from sociocultural and religious processes involved in Mbari house project. Despite being a detailed account of ethnographic research conducted overtime, these works mainly interpret cultural identity of 'mbari-building' communities through meanings drawn from the sculptural tableaux and not the architectural structure holistically. Dmochowski (1990) explores the role of architecture in material culture and highlights Mbari houses as a type of Nigerian traditional architecture. Although the study illustrates various Mbari houses in sketches and discusses aspects of building ornamentation, religion and meanings, it does not translate sociocultural and religious meanings into architectural components. However, Dmochowski (1990)

establishes the basis on which this research further explores Mbari houses as vernacular architecture by defining the architectural composition of an Mbari house. Whitehouse (1904) provided the first written report, documenting an Mbari house and its corresponding festivals, while highlighting the role of women in the construction and sociocultural festivities. The report described the Mbari process as an elaborate festival and presented photographs of an Mbari sculptural tableau. Although it mentions the cultural festivities involved, this account is not comprehensive enough to independently explain the cultural significance or architecture of Mbari houses. Previous research on the subject of Mbari, have concentrated on interpreting cultural identity through the sculptural themes and sociocultural festivals related to Mbari houses. This research views the elements (structure, sculptures and ornamentations) of an Mbari house as a composite form that embodies the sociocultural activities in mbari-building communities. The architectural composition equally enables a holistic study of the structure in order to adequately understand and interpret the diverse expressions of culture within the Mbari house.

Research Methods

A mixed method approach that combines quantitative and qualitative research methods was utilized for data collection and analysis, as it adequately examines historical narratives and other available data, as well as evaluation of measurable objects. It equally allows necessary consideration for subjective sociocultural values and interpretations regarding the subject of Mbari houses. The research methods applied for data collection are: Case Study and Archival Research (literature survey).

Archival research for this study involved visit to two national archives in Nigeria; national archives Enugu and national archives Ibadan for literature survey. Other literary works from secondary sources were also utilized. It involved sorting through intelligence reports, native court proceedings, location maps, statistical and historical records available in documents and archives, to enable understanding of precedents, history and social life of people within the study area. Archival and published documents on the subject, were reviewed and compared with each other to establish and validate basic historical facts.

The strategies adopted for archival field work are: Read vs Measure, Objects vs Relations.

1. Read Vs Measure: requires reading through large content of archival materials to gain insight, make discoveries and informed judgement about the character of historical events and processes regarding the Mbari houses (through note taking, understanding and comparing meanings of common words used throughout similar contents and context).

2. Objects Vs Relations: insights into the relationships and distinctions that exist between objects and layouts within and around the Mbari house, between sociocultural activities and the spatial components. It is relevant because, this study requires an understanding of objects, spatial layouts and orientations, to explain patterns, characteristics and common behaviours of the objects and the people

The use of case study research method enabled proper documentation of the Mbari house sample located at umunakara in Imerienwe community. It was suitably applied to studying and surveying the physical elements and architectural composition of the structure. Visual documentation was done using digital camera and aerial drone for recording the building. The actual dimensions of the structure were done using measuring tape and sketch pad for drawing and recording the dimensions. Field notes were also used for documenting answers to random questions and insights gathered through observation. While Williams (2015) explains that Architecture and Mathematics have shared connections across era and culture, to enable environmental development. Likewise, Sarvimaki (2017) considers surveys and pattern-matching logic as essential to case study research in architecture. Therefore, this study utilized logical argumentation; specifically the mathematical-cultural technique, for comparative analysis between cultural relevance and architectural components.

Case study also involved gathering of data from stakeholders through focus group discussions. The group was made up of members of the elders' forum, youth and women. Three session were conducted for this research. The discussions provided insight into various view points across age group, gender and religion. A brief survey was conducted by distributing questionnaires within the focus group in order to gain more insight about the people and the community. Semi-structured interviews were conducted with two elders of the community chosen by the elders' forum. The interview sessions involved questions about sociocultural practices, history and Mbari houses. Another interview was granted candidly Data gathering techniques used include; audio and visual recordings for capturing conversations and photographs. Fieldnotes for documenting observations made during the discussions and interviews.

Purposive Sampling Technique

A selection criterion was required in order to choose a suitable model of the structure for case study. The following considerations informed the choice sampling method applied: availability of an Mbari model in the study location; good physical condition of the sighted model(s); existence of a sociocultural community around the chosen model(s), sufficient access to the model(s) to ensure adequate survey. Typical and Critical Case Sampling Techniques were suitably applied in choosing the case study model.

1. Typical case sampling: Mbari house models usually possess similar physical attributes (Domochowski, 1990). Therefore, finding an Mbari house with typical features of the model, in good condition was essential.
2. Critical case sampling: Mbari houses are obsolete and largely extinct (Cole, 1988 & Ogbechie, 2005). This posed the challenge of finding an existing model for the study. Therefore, availability of a model was a major criterion for selecting an Mbari house for this study.

Snowball Sampling Technique

A chain referral technique was used to determine the possible locations where Mbari houses may still exist. This research applied random enquiries through phone calls to people with basic knowledge on the subject, in order to get a lead on communities where Mbari houses may still exist. A pilot study was conducted, after a suitable model was located at Umunakara community in Imerienwe, Ngor Okpala Local Government Area of Imo State, Nigeria.

Questionnaire for Data Collection

Semi-Structured Questionnaires: For this research, a semi-structured questionnaire format was applied and thirty-five (35) questionnaires were administered. However, the access and decisions were largely determined in agreement with the elder's forum who decided that the questionnaires should be given to people based on the following criteria: literacy, social group – gender, age and knowledge on the subject. Therefore, only seventeen questionnaires were distributed and returned to the researcher with responses. The questionnaires were used in collecting data regarding sociocultural values and social constructs.

Methodology Applied for Data Analysis

Logical Argumentation provides valid connections between seemingly disconnected factors in research especially in architecture (Vaux, 2020). It can be applied in establishing connections between intangible human phenomena or feelings, and the material forms and spaces that enable these reactions or responses, in a manner that connects form and space to intangible expressions of human culture and activities (Vaux, 2020). Understanding and interpreting logical narratives within the context, themes, valid discourses and the subjective position of the researcher, informed by this study, remains relevant to the conclusions derived from this research. Mathematical-cultural technique for analyzing architectural and cultural settings as well as social constructs were applied to this investigation. Interpreting the data collected requires discursive and mathematical strategies for presentation and analysis in this

study. Samples of the Mbari house plans gotten from secondary sources were used for spatial and comparative mathematical analysis to determine relationships existing between architectural form and culture This technique allowed the making of logical deductions through calculations. It also provided clarity and validity to the complex data gathered from the Mbari house case study. Logical argumentation is relevant in the analysis and evaluation of data with specialized areas of study (Walton, 2013) like in architectural research where critical questions can be used to provide explanations to processes.

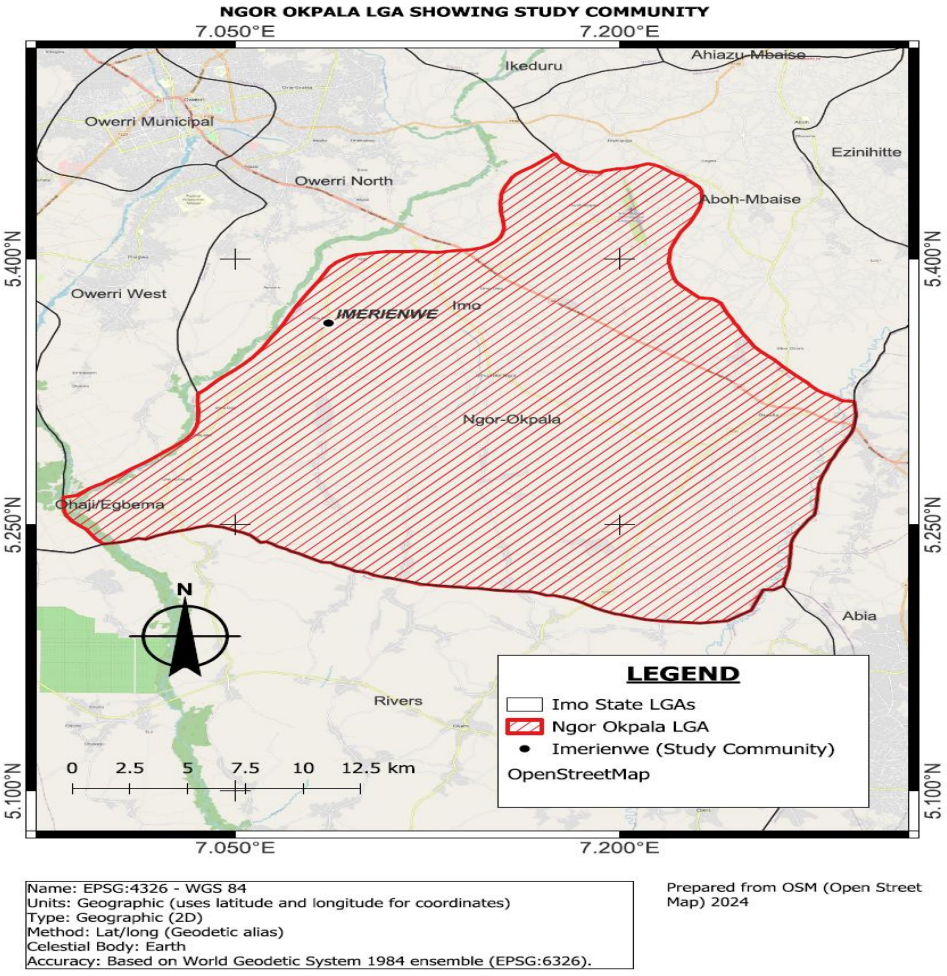


Fig. 1: Map of Ngor Okpala Showing Imerienwe Community
Source: GIS Lab, Department of Urban and Regional Planning, Rivers State university, Port Harcourt, 2024

Findings: Building Survey Report

This study is conducted at umunakara village in Imerienwe community of Ngor Okpala Local Government in Imo State, Nigeria. It concentrated on gathering information about the architectural elements of the Mbari house. The Mbari house studied was erected in the 1970s. the walls are made of a mixture of clay, laterite and material from termite mound. The roof is built from corrugated zinc metal and the sculptures are made of clay. Various colours are still visible on the walls and sculptures despite the dilapidating state of the structure. Most of the sculptures in the Mbari are now covered in termite mounds that have grown over time. Geometric patterns and circular relief patterns are used on the walls of the structure as decorative elements.

Fig. 2: Common Geometric Patterns and Circular Relief Patterns on Central Chamber Walls
Source: Author, 2024

Fig. 3: Sculptures Covered in termite Mounds
Source: Author, 2024

The Mbari house is a square shaped structure with a central chamber and a pitched roof, supported by four columns that stand at each edge of the building. The sculptures within the structure are distributed arbitrarily around the space with some placed on stepped buttresses against the central chamber walls and others standing on the floor or roof members. The Mbari house measures 4.8meters x 4.8meters and it is 0.6 meter above the natural ground level. The roof eave overhangs 1.0m from the columns, casting reasonable shadow on the interior spaces of the structure. The columns are 2.4m in height while the total height of the structure is 4.8m from the roof ridge to the base of the building.

Fig. 4: South Elevation of Mbari house at Umunakara.
Source: Author, 2024

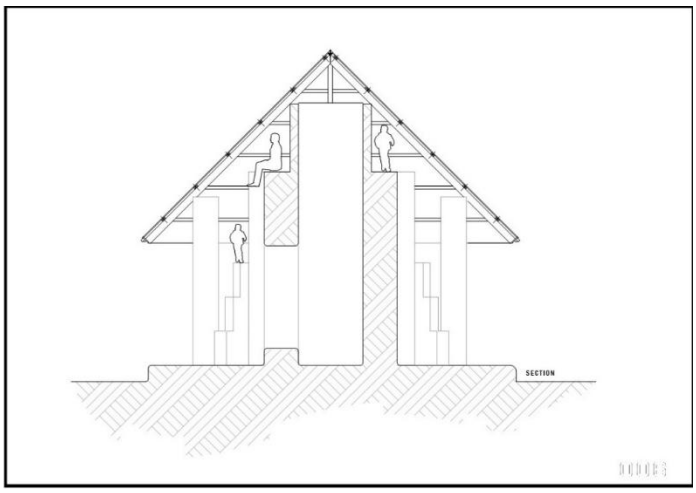


Fig. 5: Section through Mbari House at Umunakara
Source: Author, 2024

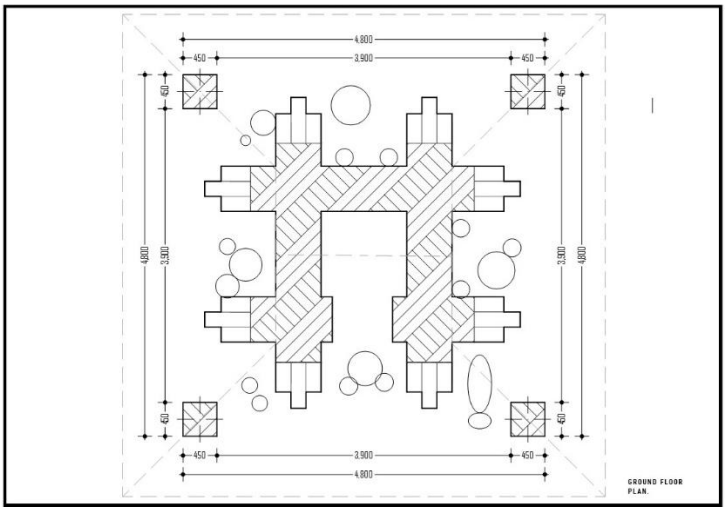


Fig. 6: Sketch of Floor Plan at Mbari House at Umunakara
Source: Author, 2024

Fig. 7: East Elevation Showing Roof, Columns and Walls
Source: Author, 2024

Fig. 8: South-East Elevation Showing Roof, Columns and Walls
Source: Author, 2024

The only existing mbari house located in the study area occupies a strategic position at the corner of a T-junction. The building was surveyed as much as access was granted to do so, and in line with the first objective of this research, which is to; Identify typical Mbari house models at different eras. An in-depth case study analysis allows detailed research into contextual phenomena (Sarvimaki, 2017). Therefore, the one mbari house model found during the pilot study at Umunakara community was documented. Other mbari house models used for this study were gotten from existing documents and they were equally presented and analysed. Umunakara is one of the kindreds within Imerienwe in Ngor okpala. It is a community that is well known for its cultural heritage, especially as regards Mbari houses. This community had once had a number of Mbari houses in existence and it was once featured in BBC Igbo for its Mbari houses. Dmochowski (1990) had illustrated in detail, using picture images and texts, some of the Mbari houses in the Ngor Okpala communities including the one at Umunakara which was visited during this study. The Mbari at Umunakara is presently the only one still in existence in the entire Imerienwe community.

Meeting Proceedings

There was a systematic approach to everything that was done during the meeting right from the introduction of elders to the speeches that were presented.

The Secretary of the Obiriobi (Elder's Forum) – ensured that all the elders sat at the same side of the Obi (where the meeting took place) while the research team sat on the opposite side. There was a central table demarcating the research team from the Obiriobi (elders' forum). Introductory statements and welcome address were given by the secretary of the elders' forum and the study team.

Seventeen copies of the questionnaire booklet were administered to elders, youth and women. The elders helped in determining who could answer the questions based on age; gender, level of education and knowledge of local culture and Mbari. Focus group discussions were held the relevant stakeholders before proceeding to visit the Mbari site.

The focus group discussion allowed participants express diverse viewpoints that are relevant to the study. Each person among elders had something valuable to communicate regarding the Mbari culture. By the end of the meeting, we had a total of about nineteen elders, eight community youth members and three women from the family.

The elders called on a High Chief (Nze), to give details of what the Mbari represents to the people of the community. His presentation highlighted the materials used in the construction of the Umunakara Mbari house, the cultural significance of Mbari sculptures, the valuable cultural history represented by the Mbari house, and how Umunakara community has remained true to its cultural heritage despite Eurocentric influences.

Interviews with the Elders

The interview conducted with a group of elders did not require any formal introductory pleasantries as we had previously met during the focus group discussions. The elders in the 'Custodians' family, granted a corporate interview with regard to questions pertaining to the community. The questions were asked generally and the elders decided which of them would answer each question that was asked. One of the elders is considered as the archivist of the family, as he had access to several audio and video recordings from the Umunakara cultural festival called Ndiche – which still holds similarities with the Mbari festivals of ancient times. He had also documented and published the first edition of a book titled – 'NDICHE: Our Cultural Heritage', which contained the history of the Ndiche culture, the components of the festival, its significance, a list of the Ndiche custodians since 1901 and photographs of some elders of their community who had been Custodians previously but have passed on. This information helped in understanding sociocultural activities and precedents.

Table 3: Questions and Common Responses from the Interview with the Elders
Source: Author, 2024

S/N	Questions (Q)	Responses (R)
1	What is an Mbari house?	It is a cultural monument that represents the lifestyle, culture and religious beliefs of our people.
2	Explain Ndiche Festival	It is a cultural festival to celebrate the Umunakara culture and traditions of our fore-fathers.
3	Does it have any relationship with the Mbari	The mbari is an ancient practice in our community, where we dedicate a gift to the gods of our land for fertility and progress. The Ndiche festival is not the same as the ancient mbari festival. The Mbari festival is no longer held in our community but the Ndiche festival also upholds the cultural values that our people represent, which is also signified in the mbari.
4	What does the mbari signify?	The mbari house is self-explanatory. It captures our everyday life of the people within our society. It is like and exhibition hall for all our lifestyle activities like; people in conflict over farmlands, local fashion trends, our gods, traditional paganism.
5	Does this mean that mbari houses differ based on community?	Different mbari have different cultural history. The story behind the art works in every mbari may be different but the

S/N	Questions (Q)	Responses (R)
		gods, the symbols and sculptures, underlying principles of mbari house construction, reasons for the erection of an mbari remain similar.
6	Why are mbari houses no longer popular in these communities?	It is due to the condemnation of anything that doesn't represent Christianity. Civilization and development came with Christianity and as the people embraced this new religion, they abandoned native customs and traditional practices that were not necessarily evil but did not conform to the ways of the new religion. People started clearing and destroying their cultural history not out of respect for Christianity but out of ignorance.
7	Is the essence of Mbari house still significant to the community in present times?	Yes, it is. We do not have newly erected mbari houses in recent times but the cultural and social values that are captured in mbari houses, customs and rituals still remain in our communities.

Table 4: Results from Questionnaire – Demographic Parameters
Source: Author, 2024

S/N	Gender	Age	Religion	Marital Status	Occupation
1	Male	80+	Christian	Married	Farmer
2	Male	61 - 79	Christian	Married	Farmer/ Carpenter
3	Male	61 - 79	Christian	Married	Farmer
4	Female	41 - 60	Christian	Married	Farmer
5	Male	41 - 60	Christian	Married	Sociologist
6	Male	61 - 79	Christian	Married	Farmer
7	Male	80+	Christian	Married	Farmer
8	Male	41 - 60	Christian	Married	Geoscientist
9	Male	41 - 60	Christian	Married	Graphic Artist
10	Male	00 - 40	Christian	Single	Engineer
11	Male	61 - 79	Christian	Married	Farmer/ Carpenter
12	Male	41 - 60	Christian	Married	Farmer
13	Female	61 - 79	Christian	Separated	Farmer
14	Female	41 - 60	Christian	Married	Trader
15	Male	80+	Christian	Married	Mechanic
16	Female	61 - 79	Christian	Married	Farmer
17	Male	61 - 79	Christian	Married	Retired Principal

Table 5: Questions on Sociocultural Practices and Common Responses
Source: Author, 2024

S/N	Questions (Q)	Answers (R)			
1	Rate your knowledge of cultural history about this community	Poor	Average	Good	Excellent
2	What do you like most about this community?	Respect for elders Cultural respect			
3	Common Hobbies	Broom Making Social life Watching Movies Football			
4	Cultural festivals Observed	Ndiche Festival New Yam Festival			
5	What social classifications exist	Elders Nzes Chiefs Men Youth, Women Girls			
6	What leadership system exists	Community based leadership: Nchiala Obiliobi			
7	Prevalent Kingship selection criteria	Rotational Selection			
8	What corresponding rituals or procedure exist for Ndiche festival	Week of Peace 2-weeks Iku Ekwe Announcing the festival date			
9	Do restrictions on social interactions exist	Restrictions based on sexual orientation Restrictions based on personal habits			
10	Give example	Girls are not allowed to go out at night Girls are restrained from having interactions with boys Married women are prohibited from social interactions with men			
11	What type of information is known about Mbari houses in this community	History Legends Myths Folklores			
12	What best describes an Mbari house	A Museum			

These questions were formulated based on issues discussed by other authors and clarifications that were required as regards aspects of sociocultural activities.

Findings: Literature Survey

The findings from the archival data was gathered from physical visits to the national archives at Ibadan and Enugu States in Nigeria. Dmochowski (1990) and Cole (1982), Talbot (19270 also provided model illustrations used in this study.

Fig. 9: South/West Elevation of an Mbari House at Amafor, Imerienwe
Source: Talbot, 1927

Fig. 10: Mbari House
Source: Dmochowski (1990)

Fig. 11: Mbari House
Source: Dmochowski (1990)

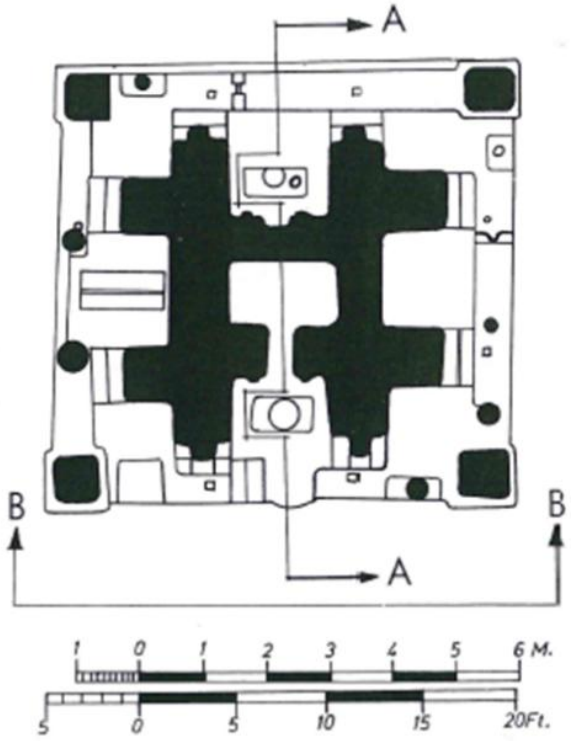


Fig. 12: Plan of Owerri, Amafor Okama Mbari House
Source: Dmochowski, 1990

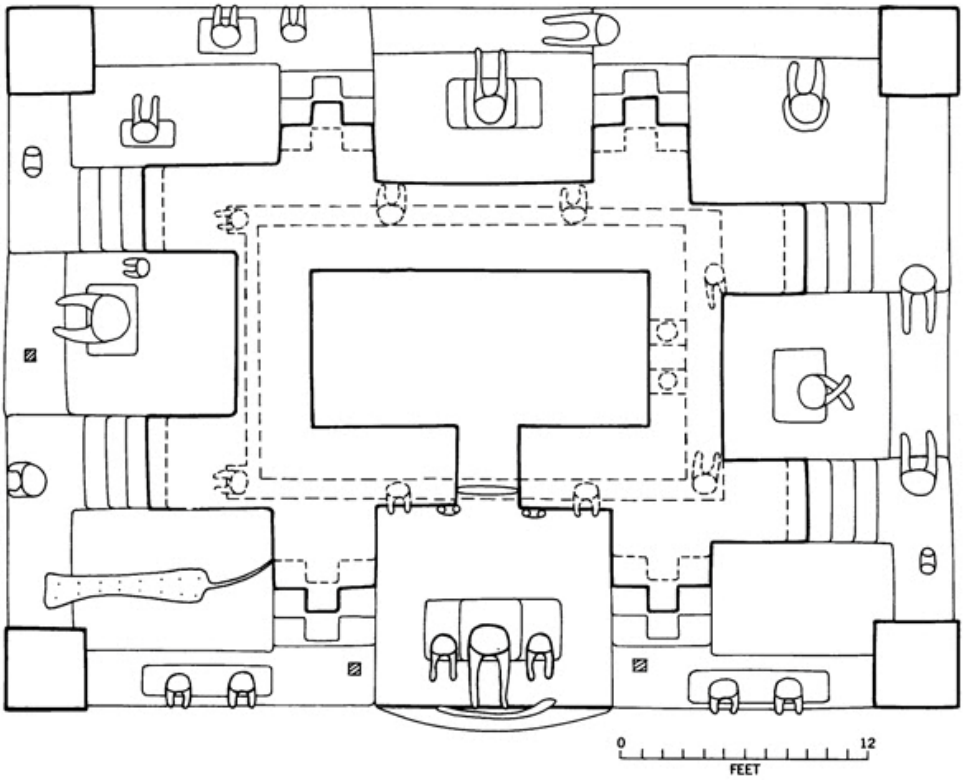


Fig. 13: Plan of Mbari House at Ndiama Obube
Source: Cole,1982

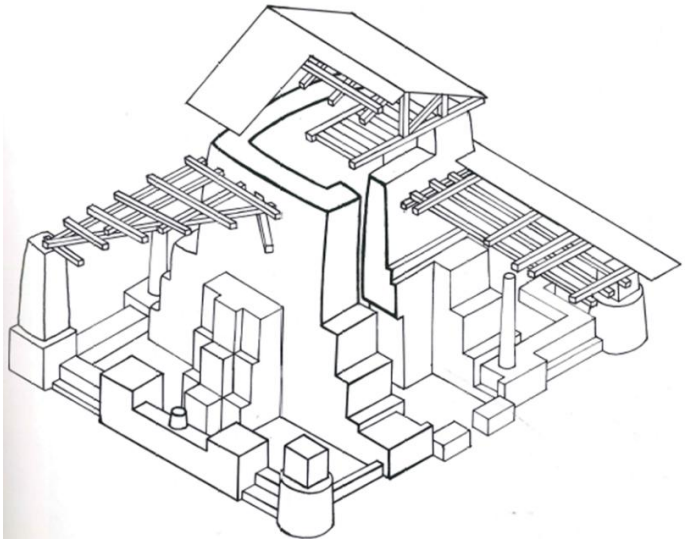


Fig. 14: Isometric View of Owerri Amafor Okama Mbari House
Source: Dmochowski, 1990

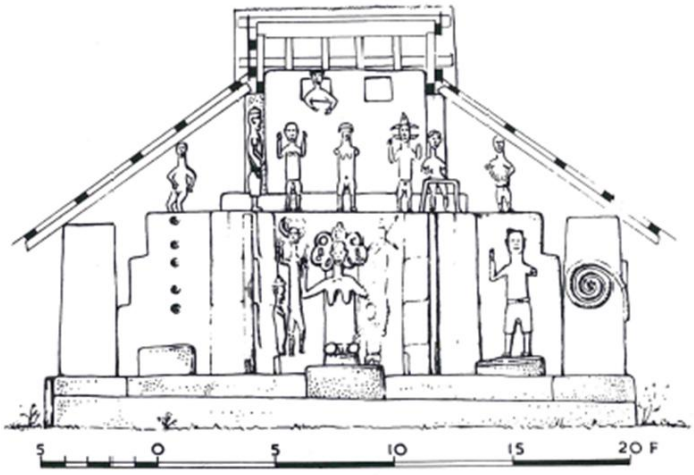


Fig. 15: Section through the Mbari House at Owerri Amafor Okama,
Source: Dmochowski, 1990

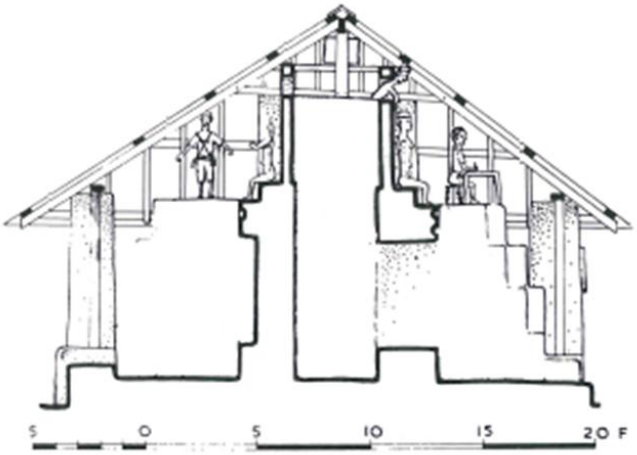


Fig. 16: Section of Owerri Amafor Okama Mbari House
Source: Dmochowski, 1990

The table below gives details of typical Mbari houses and their architectural composition at different eras. This table was taken from a recent study carried out by the researcher, on typical Mbari houses that existed at different periods in time. The study categorized typical models into three periods as follows: 1900s to 1920s, 1930s to 1950s, 1960s to 1980s.

Table 6: Typical Mbari house models at different eras
Typical Models of Mbari Houses at different era.
Source: Author

Mbari House	Form	Central Mass	Roof Type	Geometric Forms	Decoration
Umunakara (1950s)	Square	Present	Single Pitched	Polygons, hastate, Trifoliate, circle	Ornamentations and sculptures
Obokwe (1920s/ 1930s)	Square	Present	Double Pitched	Polygons, hastate, Trifoliate, circle	ornamentations and sculptures
Imerienwe (1930s/ 1940s)	Square	Present	Single Pitched	Polygons, hastate, Trifoliate, circle	Ornamentations and sculptures
Owerri (Unknown)	(Unknown)	Present	Double Pitched	Polygons, hastate, Trifoliate, circle	Ornamentations and sculptures
Nnorie (1960s)	Square	Present	Single Pitched	Polygons, hastate, Trifoliate, circle	Ornamentations and sculptures
Afoukwu (unknown)	Square	Present	Pitched	Polygons, hastate, Trifoliate, circle	Ornamentations and sculptures
Ndiama Obube (1920s/1930s)	Rectangle	Present	Pitched	Polygons, hastate, Trifoliate, circle	Ornamentations and sculptures
Amafor Okama (1930s/1940s)	Square	Present	Pitched	Polygons, hastate, Trifoliate, circle	Ornamentation and sculptures
Umuofeke Agwa (Unknown)	Square	Present	Pitched	Polygons, hastate, Trifoliate, circle	Ornamentations and sculptures

The table above is a compilation from various Mbari house models illustrated in literary works by Dmochowski (1990), Cole (1982), Talbot (1927) and from the case study conducted at Umunakara community.

Based on the typical models identifies from archival data and case study conducted. An illustration of a typical Mbari house model is given below. It outlines the predominant architectural form of an Mbari house floor, columns, central chamber, stepped buttresses on the central chamber walls and the roof. Sculptures within the structure have been intentionally omitted as various communities may present sculptures based on their unique religious and sociocultural activities.

Researcher's Illustration of a Typical Mbari House Based on the Models Gotten from Case Study and Archival research.

Fig. 17: South/East Elevation of a typical Mbari house model
Source: Author, 2024

Fig. 18: South or North Elevation of a typical Mbari house model
Source: Author, 2024

Fig. 19: East or West Elevation of a typical Mbari house model
Source: Author, 2024

Fig. 20: Typical Buttresses on the central chamber of an illustrated model
Source: Author, 2024

Objective 2: Analyze the basic architectural composition of an Mbari house

Basic Architectural Elements

The structural elements of an Mbari house are usually same across all Mbari structures. The basic arrangement of the base, central cell (central chamber) and pillars, form an enclosed square or rectangular unit beneath a hipped roof structure and a flat ground surface (Cole, 1982). The architectural composition of the Mbari may differ in size and complexity based on period of construction and the sociocultural trends of that era but the structural elements largely remain the same; a square or rectangular mass, bounded on the ground by a flat earth surface and at the top by a pitched roof structure. The basic structural components of an mbari house are: a) Substructure and Floor, b) Pillars and Columns, c) Hipped Roof, d) Central cell or central chamber.

The entire structure is elevated in way that the floor on which the structures rest, is at a minimum of 600mm from the natural ground level. The entire building is made of earthen materials, Cole (1982) describes the earthen walls as a mixture of clay and mud.

Substructure and Floor

A typical Mbari house stands on a square base (Dmochowski, 1990). It is usually raised at about 600 to 1200mm above the natural ground level. The floor surface is basically made of earthen material and without any inorganic layer of floor finish. The Mbari at Umunakara is elevated to a height of 1000mm above the natural ground level. Over time floor finish materials used in mbari houses have evolved from organic materials like sand, mud and red-brown mineral stones (Ajirija), to include cemented floors.

Pillars and Columns

Mbari houses are enclosed at its four corners by four main pillars which hold up the roof structure (Cole, 1982), (Dmochowski, 1990). The pillars of later Mbari houses were usually square or rectangular in shape but circular pillars were also used in its earlier design and construction. Depending on the chosen design of these pillars, its sections could appear to be; trapezoidal, hexagonal or octagonal in shape. Columns of smaller sections are often placed intermittently between pillars in large mbari houses. The columns and pillars are built around wooden posts which act as structural members (Dmochowski, 1990). These wooden members project upwards to the roof and act as support to the roof members. The wall plates and tie beams of the roof structure are supported by the central chamber, the columns and pillars.

Central Chamber (Central cell or Core)

There is always a central cell at the core of an Mbari house. It basically defines the extent of the interior space. Various paintings, ornamentations and sculptures are usually displayed on it. It occupies about one-quarter to one-third of the ground floor area. It is centrally located in the interior space and supported by about two (2) buttresses on each of the four (4) sides. It is a central wall that goes all the way to the roof of the building, bordering a hollow space. The wall is a vertical mass with stepped buttresses. It retains the same shape as the floor plan of its model; either a rectangle or a square. All four sides of the chamber are supported by two vertical units of three-stepped buttresses, leaning parallel to each other. Sculptures are displayed on the steps of the buttresses and the walls are decorated with motif patterns.

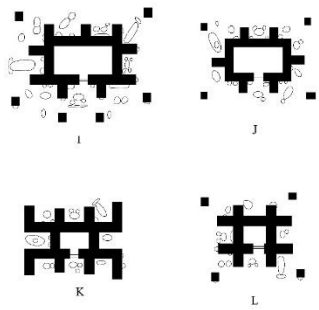


Fig. 21: Illustration of various types of Central Cell with Buttresses
Source: Cole, 1982

Roof

The roof of the Mbari at Umunakara is made of corrugated zinc. It is relatively in good condition except for corrosion, due to prolonged exposure to weather. It is a pitched roof with eaves that overhang at least 1000mm from the columns at the four edges of the building. Many Mbari houses are have an additional layer of roof gable, forming a loft layer where sculptural elements can also be displayed. The roof framing is typical to regular timber roof frames for small and medium size structures consists of; wall plates, tie beams, rafters, struts, kingposts and purlins to carry the thatch roof covering (Cole, 1988), (Dmochowski, 1990). The eaves overhang is designed to cast sufficient shade on the base. The roof eave of the Mbari at Umunakara overhangs at 1200mm, thereby shading the interior of the structure from direct sunlight and keeping the interior elements considerably protected from weather effects. Prior to the mid twentieth century, many mbari roofs were covered with thatch made from palm fronds while the surfaces of the four sloping sides of the roof, as well as the ridges were slightly concave to, allow for easy water run-off (Dmochowski, 1990).The detailed section and elevation of an Mbari house provided by Dmochowski (1990) share similarities with the section produced from the case study model.

Based on the analysis of the Mbari house architectural models, the architectural components and their functional values are represented in the table below.

Table 7: Functional Values of Basic Mbari Architectural Componnets
Source: Author, 2024

Element	Attributes			
	Location	**Function**	**Form(s) / Layout(s)**	**Material(s)**
Floor	Structural base of the Building	Carries weight of the entire structure	Square	Mud, clay and organic Materials
Pillars and Columns	Four corners of the building and intermittent sides	Structural stability and decoration	Square and Circular	Mud, clay, wood, ceramic plates for ornamentation
Roof	Top most element of the building	Exterior: Weather shield and Loft for display	Pyramidal / pitched roof	Thatch roof made from palm leaf mats.
Central Structural Cell	Centre space of building interior	Structural mass for display, structural stability and interior backdrop	Square	Mud, clay and ceramic plates for ornamnettaion
Wall Buttresses	Central cell, pillars and columns	Aesthetics, decoration and display	Square/ rectangular	Mud and Clay
Roof Loft	Roof interior space	Aeration, display and structural stability	Frame forms a Pyramidal shape	Wood, mud and clay for sculptures on display

Table 8: Analysis of Common Elements in a Standard Mbari House
Source: Author

Element	Form Shape	Dimension	No. of Types	Function	Section
Central Cell/Chamber	Square	¼ or 1/3 of structure, 4m to 6m high	4	Structural support, Sculptural Display, Wall surfaces for Decoration, Loft Base / shaft for more sculptural display	Inner Part
Buttresses	Separate steps form cubes or cuboids depending on its basic shape (Square or rectangle)	Raked / Stepped projections of up to 900mm tapering towards Central chamber	4 - 8 on a cell	Support / reinforcement for central chamber walls for	Inner Part
Pillars (Structural Columns)	Varies in shape but mostly Polygonal or circular	0.09 – 0.36sqm/ 0.2m – 0.4m Ø	About 9	Structural Support for the roof and the entire structure, Surfaces are used for ornamentation, Pillar designs carry cultural or religious meanings	Outer Part
Columns (Aesthetic Columns)	Varies in shape but usually circular or polygonal	30%- 50% smaller in diameter / area than the pillars	About 6	Often decorative members (or as additional structural support in large mbari houses).	Outer Part
Roof	Pyramidal/ Hipped / Pitched (often with a loft for sculptural display at upper pitch level)	About the height of mud structure (i.e 4-6m depending on size of building)	2	Covering the structure from elements of the weather, for sculptural display, eave overhangs about 900mm or more shading interior parts from weather and creating visual illusions.	Outer Part

Summary of the Objective 2: Analysis

1) Mbari houses were predominantly square-shaped in plan and form, with pitched roof of single or double layer.
2) Mbari houses consist of two basic parts: an outer and an inner section. The outer part is made of up four structural columns, an open patio and the roof (oftentimes a double-pitched roof). While the inner part comprises of a central cell supported by stepped buttresses and (in most cases) a loft for sculptural display.

Objective 3: Analyse cultural relevance as an architectural component in the Mbari

Having established that Mbari houses are a type of vernacular architecture with basic architectural components and spaces inspired by sociocultural activities. It is important to analyze the Mbari house as vernacular architecture in order to determine the relationship between its core components and sociocultural themes. This will require and analysis of the definition of vernacular architecture using the definition given by Oliver (1997) and Nabakov (1999) and the Polythethic Classifications of Vernacular Design Attributes outlined in the theoretical framework of this study (See. Table 1 & Table 2 above).

Recall that Oliver (1997) defines vernacular architecture as an organized but informal collection of 'cultural data' that consists of subsistent shelter and settlement practices and types; existing since the earliest possible time; erected by ordinary people within local societies; using available and organic materials in their immediate environment in order to resist and adapt to imminent climatic conditions. Eight (8) values are derived from this definition to be the basic indicators of vernacular architecture. These values are then adapted to Rapoport's (1990) polythetic classification of vernacular design attributes into process and product values.
The eight values highlighted are; Cultural Relevance; Local Materials; Local Construction techniques; Ancient but Timeless; Locally utilized by indigenes; Environmental Adaptation; Sustainability; Local Builders. These factors will be further categorized into Process and Product Attributes in order to analyze it using Rapoport's categorization system.

The seventeen process and twenty product characteristics outlined by Rapoport (1990) are suitably applied in this analysis to determine the vernacular factors depicted in Mbari architectural composition. The table below shows the relationship between the vernacular factors in Mbari architecture and the Polythetic Attributes.

Analytical Model Adopted: Polythetic Model for classifying vernacular design attributes (Rapoport, 1990). Rapoport outlines twenty general attributes of vernacular design. These attributes will be analyzed in line with the given definition by Oliver (1997), to determine if Mbari structures satisfy the established features of vernacular architecture. The vernacular factors identified under theoretical framework are classified here, under product and process attributes. Process attributes indicate functions that are relevant under the mbari project development process. This will majorly be sociocultural activities and the construction requirements. Attributes classified as Product are those that indicate the output or the object. The table below shows vernacular factors that are relevant under the each set of attributes.

Table 9: Process and Product Attributes of an Mbari House
Source: Author

S/N	Process Attributes of an Mbari house	Product Attributes of an Mbari house	Description
1	Cultural relevance	Cultural relevance	Sociocultural activities, construction materials, techniques and the object itself highlight the relevance of culture.
2	Local material	-	Materials are only used during the construction process. A complete Mbari house (the product) does not require application of materials.
3	Local construction technique	-	Construction techniques are applied during the construction process. It is not required after the product (the Mbari house) is completed.
4	-	Ancient but timeless	This attribute evaluates the product (the Mbari house) after completion.
5	-	Locally utilized by indigenes	This attribute considers the functionality of the product after completion
6	-	Environmental adaption	Evaluates the adaption of the Mbari house to climatic conditions and developmental changes in the environment.
7	Sustainability	Sustainability	Ascertains that the available materials, construction processes and the completed structure are renewable and sustainable
8	Local builders	-	Determines that local craftsmen are predominantly utilised for the constriction process

The table below outlines suitable attributes of the Product and Process categories that are suitable for each vernacular factor. It considers each listed attributed as having the value of 1 (one). The integer 1 (one) allows the summation of all attributes under a vernacular factor.

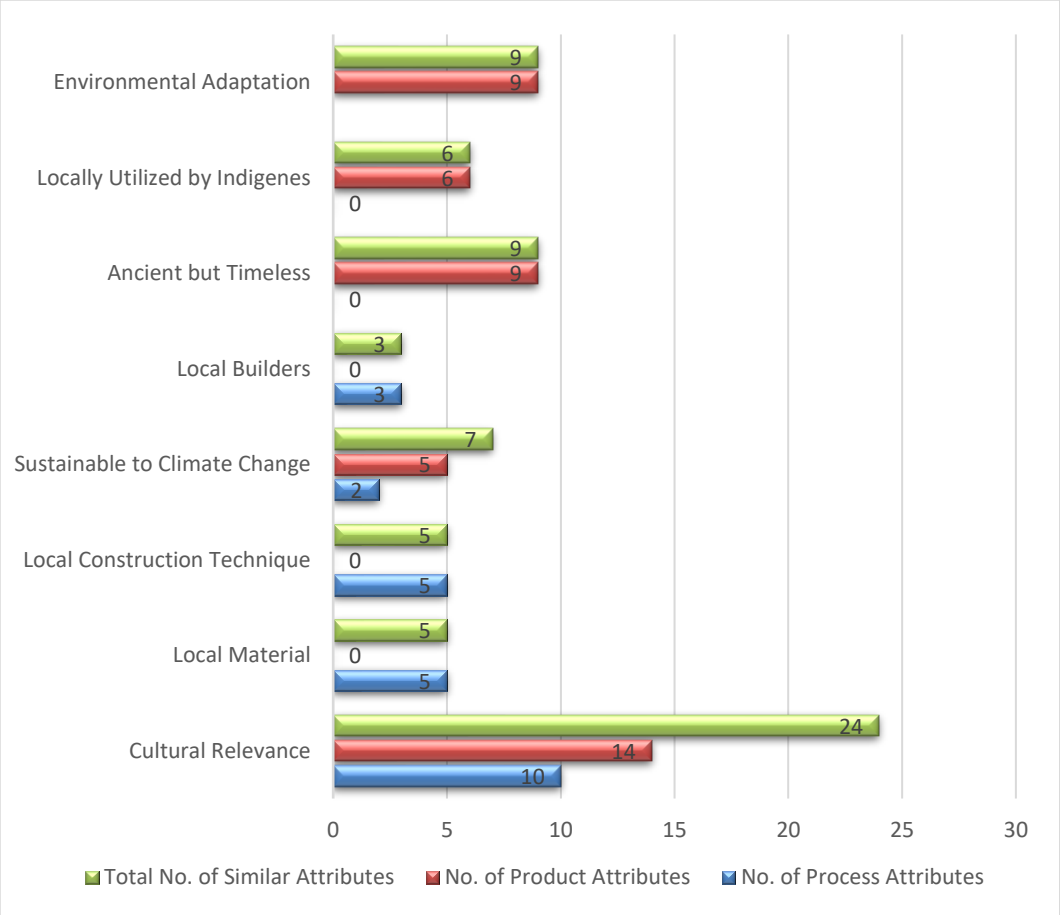
Table 10: Process Classification based on Rapoport's Polythetic Attributes
Source: Author

Vernacular Factors / (Summation Value)	Process Attributes
Cultural Relevance (10)	1) Intention and purpose of Designers 2) Types of relationships among models in different types of environments 3) Specifics of choice model of design 4) Congruence of choice model and its Choice criteria with shared ideals of users 5) Degree of congruence and nature of the relation between environment and Culture/lifestyle 6) Use of implicit/unwritten vs. Explicit/ Legalistic design criteria 7) Degree of self-consciousness/unintentionality of the design process 8) Form of temporal change 9) Extent of sharing of knowledge about design and construction 10) Presence of a single model or many models
Local Material (5)	1) Degree of constancy/invariance vs. change/originality (and speed of change over time) of the basic method 2) Use of implicit/unwritten vs. Explicit/ Legalistic design criteria 3) Nature of schemata underlying the model 4) Form of temporal change 5) Extent of sharing of model
Local Construction Technique (5)	1) Consistency/use of same model for different parts of the house-settlement system 2) Types of relationships among models in different types of environments 3) Use of implicit/unwritten vs. Explicit/ Legalistic design criteria 4) Degree of constancy/invariance vs. change/originality (and speed of change over time) of the basic method 5) Form of temporal change
Sustainability (2)	1) Reliance on a model with Variations 2) Degree of self-consciousness/unintentionality of the design process
Local Builders (3)	1) Degree of anonymity of Designers 2) Identity of designers 3) Extent of sharing of knowledge about design and construction
Total No. of Process Attributes	**25 Process Attributes in Total**

Table 11: Product Classification based on Rapoport's Polythetic Attributes
Source: Author

Vernacular Factors	Product Attributes
Cultural Relevance (14)	1) Degree of cultural and Place-specificity 2) Specific model, plan forms, morphology, shapes, transitions 3) Nature of relationship among Elements and the nature of underlying rules 4) Presence of specific formal qualities 5) Use of specific materials, textures, colours, etc 6) Complexity at largest scale due to place specificity 7) Complexity at other scales due to use of a Single model with variations 8) Clarity, legibility and comprehensibility of the environment due to the order expressed by the model used 9) Presence of 'stable equilibrium' (vs. the 'unstable equilibrium' of high style) 10) Complexity due to variations over time (changes to model not of model) 11) Open-endedness regarding activities 12) Degree of multisensory qualities of environment (large range of non-visual Qualities) 13) Degree of differentiation of settings 14) Relative importance of fixed-feature element Vs. semi-fixed feature element
Time / Era (9)	1) Degree of cultural and Place-specificity 2) 3Specific model, plan forms, morphology, shapes, transitions 3) Nature of relationship among Elements and the nature of underlying rules 4) Use of specific materials, textures, colours, etc 5) Complexity at other scales due to use of a Single model with variations 6) Open-endedness allowing additive, subtractive and other changes 7) Complexity due to variations over time (changes to model not of model) 8) Effectiveness of environment as a setting for Lifestyle and activity systems and other aspects of culture 9) Ability of settings to communicate Effectively to users
Locally Utilized (6)	1) Consistency/use of same model for different parts of the house-settlement system 2) Efficiency in use of resources 3) Complexity at largest scale due to place specificity 4) Open-endedness regarding activities 5) Ability of settings to communicate Effectively to users 6) Relative importance of fixed-feature element Vs. semi-fixed feature element
Environmental Adaptation (9)	1) Degree of cultural and Place-specificity 2) Specific model, plan forms, morphology, shapes, transitions 3) Use of specific materials, textures, colours, etc 4) Nature of relation to landscape, Site, geomorphology, etc 5) Effectiveness of response to climate 6) Clarity, legibility and comprehensibility of the environment due to the order expressed by the model used 7) Open-endedness allowing additive, subtractive and other changes 8) Degree of multisensory qualities of environment (large range of non-visual Qualities) 9) Relative importance of fixed-feature element Vs. semi-fixed feature element
Sustainability (5)	1) Nature of relationship among Elements and the nature of underlying rules 2) Presence of specific formal qualities 3) Nature of relation to landscape, Site, geomorphology, etc 4) Effectiveness of response to climate 5) Presence of 'stable equilibrium' (vs. the 'unstable equilibrium' of high style)
Total	**43 Product Attributes in Total**

Table 12: Comparative Analysis of Mbari Vernacular Factors & Polythetic Attributes
Source: Author



Mathematical-Cultural Analysis of Central Cell and Cultural Relevance

The Central Cell of an Mbari house is erected with stable forms characterized by; Symmetry and balance, using rectangle and squares for its basic form composition. It occupies about one-third of the total area of the structure (Cole,1982).

In order to analyse cultural relevance as a structural component of the mbari house, this study uses a Mathematical-Cultural technique for logical analysis. This technique has been considered as a relevant strategy for architectural research (Mirjani, 2011), especially in evaluating and interpreting relationships between sociocultural data and architectural or formal values.

The mathematical formulae generally applied here are: Pythagorean theorem ($a^2 + b^2 = c^2$), Unit Conversions, Area of Square Polygon ($A = s^2$)

1) Using Cole's Illustration Plan of Mbari at Ndiama Obube (Cole, 1982) – See Fig. 10

a) Find the Total Floor Area of Mbari at Ndiama Obube
Total Area of Square ($A = s^2$) = 12ft by 12ft (Convert to meters using 0.3m as approximate value)
Conversion Analysis = 12ft x 0.3 = 3.6m
Total Area in meters = 3.6 x 3.6 = 12.96sqm
b) Find the Average Area of the Central Cell
Average area of Central Cell = {1/3 of Total Area} (Cole, 1982)
Analytical Calculation = {1/3 of 12.96sqm} = 1/3 x 12.96 = 4.32sqm
Average area of Central Cell = 4.32sqm

2) Using the Mbari House Model at Umunakara (Author, 2024)

a) Find the Total Floor Area of Mbari at Umunakara
Total Area of Square ($A = s^2$) = 4.8m by 4.8m = 23.04sqm
b) Find the Average Area of the Central Cell
Average area of Central Cell = {1/3 of Total Area}
Analytical Calculation = {1/3 of 23.04sqm} = 1/3 x 23.04 = 7.68sqm
Average area of Central Cell = 7.68sqm
N/B: Both Models used show that Area of Central cell = 1/3 of Total Mbari House Floor Area.

3) Relationship between the Central Cell and Cultural Relevance

Recall: Value of Similar Attributes for Cultural Relevance = 24 (See Table 7)
Recall: Average area of Central Cell (at Ndiama Obube Mbari) = 4.32sqm = {1/3 of total structural area}
Recall: Average area of Central Cell (at Umunakara Mbari) = 7.68sqm = {1/3 of total structural area}
Note: The following analysis will work with approximate range of values.
a) Total No. of Attributes (See Tables: 5, 6, 7) = 68 Attributes
Recall Total No. of Process Attributes = 25
Recall Total No. of Product Attributes = 43
Therefore total no. of vernacular attributes represented in Mbari house = 68
Since the Central Cell of an Mbari house represents 1/3 of the Total Floor Area:
Find Value of 1/3 of All Vernacular Attributes: 68 x 1/3 = 22.6 Approx. 23
The Mbari Vernacular Factor with the closest Value to 23 is Cultural Relevance.
Because, Cultural Relevance carries the Value of 24 Polythetic Attributes (See Table 7)
Therefore 23 is Approximately 24
b) Relationship: 1/3 of the Mbari house area = Value of Central Cell Area
24 Polythetic Attributes = 1/3 of Total Vernacular Attributes = Value of Cultural Relevance
c) Deduction: Area of Central Cell (Central Chamber) = 1/3 of Mbari House Floor Area
Value of Cultural Relevance = 1/3 of Mbari House Vernacular Characteristics
d) This mathematical analysis provides a directly proportional relationship between:
The Mbari House Central Cell (Central Chamber) & Cultural Relevance of an Mbari House
Therefore, the Central Cell is considered an Architectural depiction of Cultural Relevance as a focal factor of the Mbari phenomenon.

Outcome of the Analysis of Central Cell and Cultural Relevance

1) Culture is central to the significance of Mbari houses
2) The central cell (chamber) is a symbolic representation of cultural relevance in Mbari houses
3) The Value of the central chamber is usually about 1/3 of the total area of an Mbari house
4) The central chamber is usually erected with standard geometrical forms; Rectangle or Square, to depict stability, symmetry and balance both culturally and structurally.

Relationship between Geometric Forms of the Central Cell and the Cultural Values

Since spaces within communities are basically socially constructed (Lefevbre, 1974) (Löw, 2016) (Hillier, 1989), there are basic form compositions and geometric patterns used within such spaces, to represent communal values. Proportion is fundamental to architecture (Rose, 1867), (Imaah,2010), (Frings, 2002). Therefore, architectural compositions are often based on theories of proportion that equally define the aesthetic value of the form. Laws of proportion and nature like; The Golden Ratio is visible in architecture, and it has a relationship with the social environment (Imaah,2010) (Suppes, 1991) (Elam, 2001) (Frings, 2002). This

analysis attempts to show the consistent use of basic geometric forms in the Mbari house especially in the design of the central cell, and as a way of representing an intentional communication of cultural values.

Analysis:

Still using Cole's Floor Plan illustration of the Mbari at Ndiama Obube (1982) – See Fig. 10.
Recall: Total Area of Ndiama Obube Mbari House = 3.6 x 3.6 = 12.96sqm
Recall: Area of its Central Cell = 4.32sqm
Assumptions made for this analysis are based on Cole (1982), Dmochowski (1990) as follows:
1) A square-shaped Mbari house will most likely retain a square-shaped central chamber for balance and symmetry
2) Assumed dimensions of central chamber based on previous analysis above = 2.078 (length) x 2.078m (width) = 4.32sqm. This is equal to the linear values of 4.32sqm.
2.078m x 2.078m = 4.32sqm: 4.32sqm = 1/3 of 12.96sqm = Value of the above central cell
3) Assumed height of central chamber wall based on previous analysis above = 3.6m

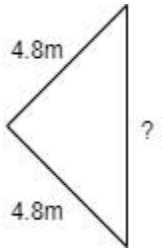
Analytical Basis:

This analysis is based on principles of geometric construction of squares. According to Imaah (2010), the measurements based on rotations of irrational squares forms a widely applied ratios as follows: {1 : √2} {2 : √2}, {4 : √2}, {(√5-1) : (√5+1)}.

Analysis using Geometric Construction of Squares:

a) Using the Mbari House at Umunakara.

This Analysis will work with measurement values gotten from the case study;
Dimensions of Mbari at Umunakara: Length = 4.8m, Width = 4.8m, Height = 4.8m
Therefore, Value of each Side: 4.8m
Find Value of Diagonal =?
Where Sides A and B are equal to (=) 4.8m each



Using Pythagorean Theorem = $a^2 + b^2 = c^2$
Where 'a' and 'b' are the values of the sides and 'c' is the value of the diagonal
Therefore, $4.8^2 + 4.8^2 = 46.08$
Find $c^2 = \sqrt{46.08} = 6.78$m
Therefore, for a given Side Value of 4.8m the corresponding Diagonal Value = 6.78m

Convert to ratio to determine if it corresponds with any of the given ratios outlined by Imaah (2010).
Side = 4.8m; Height = 6.78m:
Side-Value: Height Value Ratio = (4.8): (6.78) = 1: √2 = 1:1.4.
This corresponds with the first ratio outlined by Imaah (2010).
(4.8): (6.78) = (1: √2) = (1:1.4)

b) Using the Mbari at Ndiama Obube

Consider another Square Mbari house at Nidama Obube (Cole,1982)
Value of Side = 3.6m; Value of Diagonal =?
Find Value of Diagonal using Pythagorean Theorem = $a^2 + b^2 = c^2$
Where 'a' and 'b' are the values of the sides and 'c' is the value of the diagonal
Therefore, $3.6^2 + 3.6^2 = 12.96 + 12.96 = 25.92$
Find $c^2 = \sqrt{25.92} = 5.09$m
Therefore, for a given Side-Value of 3.6m, the corresponding Diagonal-Value = 5.09m
Convert to ratio to determine if it corresponds with any of the ratios outlined by Imaah (2010).
Side-Value = 3.6m; Height-Value = 5.09m:
Side: Height ratio = (3.6) :(5.09) = 1: $\sqrt{2}$ = 1:1.4, i.e (3.6): (5.09) = (1: $\sqrt{2}$) = (1:1.4)

Discussion of the Findings

The use of squares in the construction of Mbari Houses follows predetermined geometric construction methods. The basis for square proportions used extensively in Mbari house corresponds with the principles of the Golden Section outlined by (Imaah,2010), which states that; the ratio of the side of a square to its diagonal and its consequent serialization as: 1: $\sqrt{2}$; 2: $\sqrt{2}$, 4: $\sqrt{2}$, ($\sqrt{5}$-1): ($\sqrt{5}$+1); forms a basis of proportional systems. Cole (1982) and Dmochowski (1990) presented findings that suggest standards and systems of proportion and geometry may have been used in Mbari house construction even before 1904 (when the first Mbari house was documented). Therefore, Mbari houses presumably followed a standard system of design and construction engendered by the need to produce structures that depicted cultural values and relevance. This study suggests that square forms allowed more accuracy of construction process in the late nineteenth and early twentieth centuries.

Since the architectural composition of an Mbari house is similar to that of a basic architectural building, having; a floor, walls, columns, roof and internal spaces. Mbari houses and other components within it make up an architectural ensemble that should be viewed as architecture. Similar to other buildings that accommodate furniture, appliances and activities, sculptures within the Mbari house are integral elements of the architectural composition.

Data presented in this study shows that Mbari houses have similar models that can be grouped as a style of vernacular architecture in the area. It typically utilizes similar motifs and circular relief patterns on the walls and columns of the building symbolically and aesthetically. There are similarities between the models illustrated by Talbot (1927) from the early 1900s to the models presented by Cole (1982, 1988) and Dmochowski (1990). The architectural components of these models are also similar and same principle of proportion are applied as shown in the analysis of geometric constriction of squares above. This study set out to examine how cultural relevance was depicted in the Architecture of Mbari houses. It specifically analysed cultural relevance as an architectural component in the Mbari house. The analyses done above present findings as follows:

- **Typical Model**: The first objective of this study was to identify and analyse typical Mbari house models. This study revealed that Mbari house models were typically square or rectangular in plan and form, with pitched roofs. It shows that there are variations to building materials depending on era but the structural layout remained consistent.
- **Architectural Composition**: The second objective examined the basic architectural composition of an Mbari house in order to identify the elements that make up the structure. It detailed specific elements like the central cell, pillars and columns, examining the peculiarities of each section.

Relationship between the Central chamber and Cultural relevance: The third objective examined how cultural relevance is depicted as an architectural component in the Mbari house. This was carried out by analysing the central chamber of two Mbari houses; Mbari house at Umunakara (the case study model), and Mbari at Ndiama Obube (Cole, 1982).

It was discovered that the central chamber is an architectural representation of cultural relevance.

Vernacular factors and Cultural values: This study also analysed vernacular attributes of Mbari houses using the polythetic attributes put forward by Rapoport (1990). Mathematical formulae were used in ascertaining how the central chamber represented cultural relevance. The summary of this analysis showed that cultural relevance (as a vernacular factor in the Mbari house), had the highest value of sociocultural themes. Using Mathematical analysis, further studies can investigate the values of other elements in the Mbari architectural composition like; the pillars, the roof, floor and buttresses. This will validate the establishment of the methods applied here as a framework for analysing vernacular and historical buildings. Especially when investigating sociocultural themes in the architectural form and space.

Conclusion

The objectives of this study were to identify typical Mbari house models at different eras, analyse the basic architectural composition of an Mbari house, and examine how the central chamber of an Mbari house depicts culture. This study achieved its objectives by establishing that a Mbari house is a type of vernacular architecture found in some communities in Ngor Okpala, Imo State. It has a typical design style and architectural composition. The structure satisfies basic factors evaluated through polythetic attributes of vernacular architecture. These vernacular factors are: cultural relevance, use of local materials, use of local construction techniques, timelessness of the structure, local utilization of structure, environmental adaptation, sustainability and employment of local craftsmen.

This study proposes that cultural relevance is the major vernacular factor in the Mbari house and this is represented structurally by the central chamber of the Mbari house. Through mathematical formulae, it is shown that the central chamber occupies one-third of the Mbari house and this value is directly proportional to the value of cultural relevance in the vernacular attributes table. The specific polythetic attributes that make up cultural relevance are listed as follows:

Table 13: Vernacular Attributes of Cultural Relevance in an Mbari House
Source: Author

Factor	Product Attributes	Process Attributes
Cultural Relevance	1) Intention and purpose of Designers 2) Types of relationships among models in different types of environments 3) Specifics of choice model of design 4) Congruence of choice model and its Choice criteria with shared ideals of users 5) Degree of congruence and nature of the relation between environment and Culture/lifestyle 6) Use of implicit/unwritten vs. Explicit/ Legalistic design criteria 7) Degree of self-consciousness/unintentionality of the design process 8) Form of temporal change 9) Extent of sharing of knowledge about design and construction 10) Presence of a single model or many models	1) Degree of cultural and Place-specificity 2) Specific model, plan forms, morphology, shapes, transitions 3) Nature of relationship among Elements and the nature of underlying rules 4) Presence of specific formal qualities 5) Use of specific materials, textures, colours, etc 6) Complexity at largest scale due to place specificity 7) Complexity at other scales due to use of a Single model with variations 8) Clarity, legibility and comprehensibility of the environment due to the order expressed by the model used 9) Presence of 'stable equilibrium' (vs. the 'unstable equilibrium' of high style) 10) Complexity due to variations over time (changes to model not of model) 11) Open-endedness regarding activities 12) Degree of multisensory qualities of environment (large range of non-visual Qualities) 13) Degree of differentiation of settings 14) Relative importance of fixed-feature element Vs. semi-fixed feature element

Limitations of the Study

Access to architectural sketches of Mbari house floor plans would have helped this study to better understand and interpret typical. However, this study depended on pictures from archival documents and floor plan sketches used by previous researchers in analysing placement of sculptures and deities. Although this study presents a valid technique for analysing cultural and architectural relationships, the available information from the case study and literature survey does not present sufficient data for further analysis of other architectural components of the structure. For instance, the columns can be analysed using the same strategies applied in the analysis of the central chamber, to determine if it corresponds with other vernacular factors like use of local material or sustainability.

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