

An Exploration of Biomorphic Principles in the Urban Resort Hotel, A Case Study of Le Meridien Ibom Hotel and Golf Resort, Akwa-Ibom

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Abstract: *Biomorphism a division of organic architecture and sustainability, concerns itself with the mimicry of an organism be it a plant or animal in form as well as in character. Sustainability on the other hand is generally an intricate idea connecting community, economy, and environment. The aim of this paper is a carefully study of factors of environmental sustainability that safeguard against the deterioration of the ecosystem by creating a habitable and a friendly environment for tourism. This is achieved by proposing an environmentally sustainable building using biomorphic principles which require less energy as well as other environmental destructive elements thereby conserving the natural life cycle. The building and construction industry on the other hand is the highest active contributor to environmental degradation the world faces today, and tourism organizations happen to fall under the category of buildings that has the highest rate of energy and resources consumption of all. At the end of an in-depth research on biomorphism, four principles of environmentally sustainable design were identified sourced from the principles of organic architecture. These are Inspiration, Growth and evolution, Rhythm and repetition, and Flexibility and fluidity. It was these principles and their philosophies that were used as parameters of data collection and assessment on the case studies carried out on both the local and international levels. Findings from the case studies revealed the down side practices on issues like harnessing the site's renewable energy generation sources, overdependence of mechanical systems, limited application of indigenous building materials and design, rain and grey water harvesting, and insignificant use of recyclable energy and materials. However, it has been gathered that there is a fair degree of respect for solar and wind orientation, use of durable long lasting materials and technique, aesthetics and expression, and evident practice of remodeling (recycling) of existing structures.*

Keywords: Sustainability, Plants, Materials and Landscape

BACKGROUND OF TSTUDY

1.1 INTRODUCTION

A resort hotel by character exists purely to serve another attraction which in most cases is a natural feature, thus the reason for its location along a seaside, lake, forest or mountainous areas, which cater to tourists and vacationers, they usually provide all hotel services plus recreational, relaxation and athletic activities. Therefore, by definition, a resort hotel can be described as a tourism building which offers vacation amenities and recreation to tourist and vacationers. This however is not the case in most resort hotels in

Nigeria as a majority of them pay little attention to the main attraction for which it was built. According to the International Hotel and Restaurant Association, (2005), tourism organizations are notorious for erecting buildings such as, airports, hotels and visitor centers, which ruin the beauty and integrity of their surroundings. Therefore, there is the need to apply principles in design that will enhance the quality of service in the tourism industry as well as to maintain if it can't improve the beauty and integrity of its immediate environment and the ecosystem at large.

Frank Lloyd Wright was of the opinion that every building should relate harmoniously to its natural surroundings and that a building should not be a static or boxlike enclosure but a dynamic structure, with open, flowing interior spaces and to achieve this in his design, he used geometric units, or modules, that generated a grid (Redmond, 2009).

Nature refers to the physical phenomena of this physical world and also to life in general. Naturalism on the other hand can be described as the style of art and literature in which things are represented in a real and detailed way and so also the philosophy that rejects justifications not based on natural causes and laws (Wehmeier, 2005).

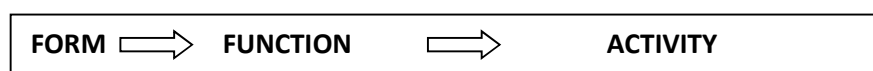


Figure 1.1: Showing the relationship between form, function and activity

Source: Researchers Work

1.2 PROBLEM STATEMENT

Most developing countries put little emphasis on how to improve on the relationship between the building and its immediate environment.

The negligence of tourist organizations and hotel owners who invest heavily to develop their establishment pay less attention to the implication of the impact of their carelessness to the safety of the environment and gradual degradation is on the increase and is becoming very alarming. In Nigeria, the problem of inadequate energy to sufficiently provide for both private and public buildings is on the increase as more organizations are investing in developing public buildings day in and day out, with the aim to meet the continuous and diverse human needs.

This research aims at exploring ways in which the principles of sustainability (biomorphism) can be harnessed to design an intimate building that positively affect the well-being of inhabitants of the immediate environment through careful study of factors that safeguard against the deterioration of the ecosystem and creating a habitable and a friendly environment for tourism.

The objectives of this research thesis are:

- i. To identify the origin and principles of biomorphic sustainable design and how it can be used in the design of resort hotels.
- ii. To identify and outline the difference between resorts, hotels and resort hotels.
- iii. To demonstrate through design the suitability of the application of the principles and features of biomorphic architecture (using a selected organism) in resort hotel design.

1.5 RESEARCH METHODOLOGY

The methodology of research is grouped into three.

Over view of the Study

Government policy documents and considerations for choice of site and location of building will be examined.

Publications on hotels and resorts, architectural magazines, architectural data books (useful for obtaining design guides, functional flows, space requirements), journal articles (mainly on applications of biomorphic principles in architecture), unpublished thesis projects in the research area (to review contributions to this area of research).

i. Case study:

Basically, qualitative research method will be used in the case study, which includes the following methods:

Physical observation: Take a visit of the building and careful observation of its features.

Structured interview: To interview of administrative and technical staff on several aspects of the hotels and resorts to get detailed and precise information on the functionality of such buildings.

ii. Analytical and comparative study:

Comparative analysis of hotel design using the following independent variables:

- i. Major facilities
- ii. Primary means of circulation
- iii. Architectural style and building concept
- iv. Emerging trends
- v. Construction system
- vi. Lighting and ventilation considerations

Dependent variables will be used to discuss the research area – biomorphic principles and strategies and architectural expression. Here the variables that will be used to assess the case studies are:

- i. Inspiration
- ii. Building form and Design Style
- iii. Building relationship to site and landscape
- iv. Building technology
- v. Use of Building materials
- vi. Architectural Expression
- vii. Sustainable processes (Renewable energy systems).

1.8 JUSTIFICATION

Plateau State located within the mountainous regions of the country with a unique and impressive climate and a rich culture provides an impressive investment opportunity for tourism and recreation in the state.

The Rayfield resort is one out of numerous other abandoned tourist sites in which the state government intends to equip with necessary infrastructures in which several proposals have been made to develop such a resort to an international standard.

Over view of the Study

2.1 BIOMORPHISM

The word Biomorphic is derived from two Greek words “*bio-*” meaning nature or the mode of life and “*morphic*” which means to transform from one image to another or something that has a particular form, shape, or structure (Encarta, 2009). It was first introduced as a term used to describe the visual style of the surrealist in the 1930’s. This however is an art movement which began in the 20th century that represents fluidity and transformation or evolution from one state to another, usually governed by processes operating on fundamentals, determining all works in different ways (Encarta, 2009). As described by Synder (1979), biomorphism is the use of living organisms as an inspiration for the design of inanimate objects and the environment. He also added that it does not merely focus on the shapes of living organisms but it also looks at their functional, structural, organisational and behavioral qualities. Examples of these can be seen in how

the structural columns of building where inspired by trees, the eggs' impressive strength has given designers insight into the construction of concrete vaults and arches and how the bee hive has been the inspiration for social housing structures and pre-fabricated building panels (Mandelbrot 1999).

Therefore, the concept behind solar panels of the artificial solar energy collector can also be said to be inspired by the green leaf of the plant which amazingly is an efficient tool which the plant uses to convert solar or sunshine into useful energy for the plant otherwise known as photosynthesis.

2.1.1 Biomorphic Architecture

This refers to the architecture that focuses on the growth processes and movement capabilities associated with living organisms. It has the capacity to grow and change through expansion, multiplication, division, regeneration and off-setting as well as it can be transformed in response to environmental changes and internal demands (Synder and Catanese, 1979).

Egyptian and Ancient Greek civilizations studied natural forms and the human body and abstracted them as geometry. They used the circle, ellipse, triangle, and rectangle to derive harmonious proportions for their shrines and temples as typified in the Pyramids at Gaza and so promote harmony between themselves and their elemental gods and spirits of Earth and cosmos (Pearson, 2001). Fundamental discoveries included geometric relationships such as the Golden Section generator of the logarithmic spiral, a basic curve of life and growth.



Plate 5: The Pyramids at Gaza. Egypt

Source: www.bbc.co.uk/.../images/gal_04_dyn.jpg

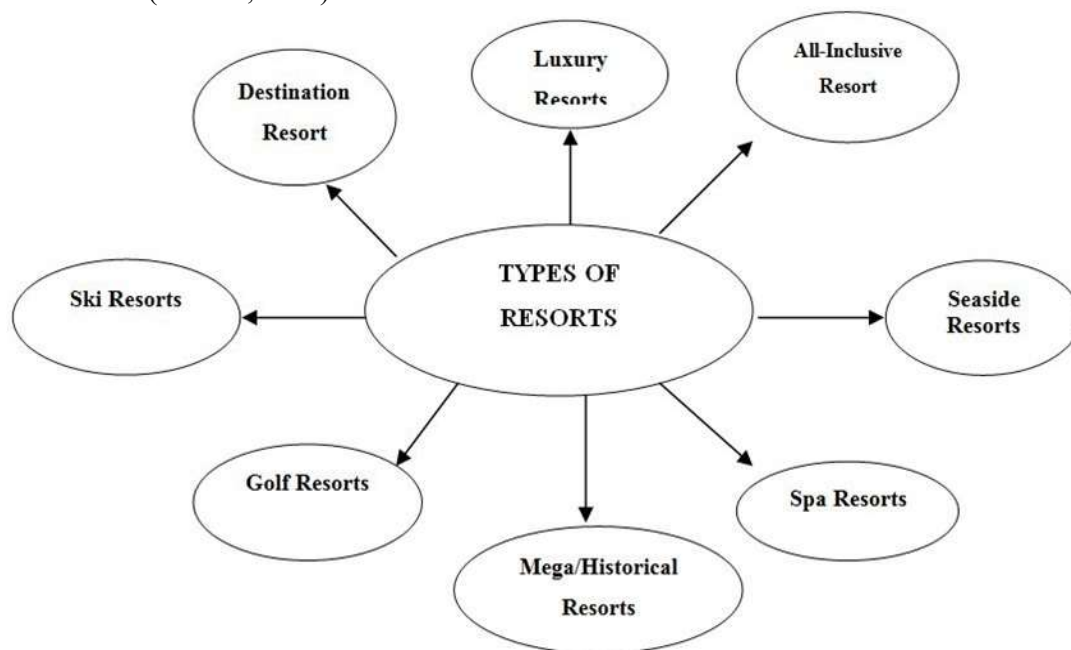
2.5 HOTELS

A hotel can be defined as a building or commercial establishment where people pay for lodging, and where meals and other facilities such as conference rooms are often available to the public (Redmond, 2009).

2.6 TYPES OF HOTELS

2.7 RESORTS AND RESORT HOTELS

As stated in the Encyclopedia Britannica (2010), the resort hotel is a luxury facility that is intended primarily for vacationers and is usually located near special attractions, such as beaches and seashores, scenic or historic areas, ski parks, or spas. They provide all hotel services plus recreational and athletic activities. However, the hotel is frequently a central feature of a resort, such as the Grand Hotel at Mackinac Island, Michigan. Though some resorts operate on a seasonal basis, but with the growing popularity of winter vacations the majority now tries to operate all year-round. The residential hotel is basically an apartment building offering maid service, a dining room, and room meal service. Residential hotels range from the luxurious to the moderately priced. In recent years, the hotel industry has experienced tremendous growth as a result of the increase in tourism in resort areas such as the Caribbean islands, the Mediterranean region, and Hawaii (Encarta, 2009).



METHOD OF STUDY

3.1 INTRODUCTION

This involves the assessment of the accessible approaches used to source information and the study of the proposed building types (hotels, resorts and resort hotels) in relation to how the principles of biomorphism has been used to enhance the construction of buildings in general with specific emphasis to the hotel. Both local and foreign buildings will be studied so as to give a wide range of buildings as there is just a hand full of such found locally.

3.2 CASE STUDIES

The research method adopted in this study is qualitative research method through case studies. It is based on evaluation of design principles that foster biomorphism in the design of resort hotels. The assessment was carried out through visual surveys, observation, and a checklist on the application of the outlined principles of biomorphism for each facility under study.

Case study involves studying a case in relation to the complex dynamics with which it intersects. It was therefore conducted only for specific case with related peculiarities to the subject attitude of this study, through objective method of observation (Groat and Wang, 2002; and Singh, 2006).

3.5 CASE STUDY ONE:

LE MERIDIEN IBOM HOTEL AND GOLF RESORT, AKWA-IBOM

3.5.1 Background

Opened in December, 2007 by the Akwa Ibom state government is located along Nwaniba road, Uruan Akwa - Ibom state, Nigeria. It is managed by the Le Meridian Group, now called Starwood Inc. It is nestled in a palm- tree forest, with efforts made at incorporating it into the rain forest landscape in an ecologically friendly manner. It's a one storey resort hotel with 163 Rooms and 26 suites. The resort is 90 km from the Calabar Airport (about 1 hr 30 minutes')drive) and 160 km from the Port Harcourt Airport (2hr 30 minutes' drive).



Plate 12: western view of the le meridian Ibom hotel and Golf resort

Source: Authors field work, 2011.

3.5.2 Independent Variables

i. Site Planning and Landscaping

The Hotel was designed such that its rooms and suites all with private terraces have a beautiful view of the palm tree forest, and the golf course which has about a 100 hectares of tropical garden, a fitness and health club, outdoor children's and adult pools, two Jacuzzis, 4 standard tennis courts and squash facilities as well as a club house. The inner garden adds to the relaxing atmosphere of the complex with a Gazebo overlooking the virgin palm tree forest. It has an 18 hole golf course with practice pitch integrated into the tropical environment (see plate 22) featuring a golf club house with the panoramic terrace Restaurant and 3 Bars and a Pro Shop. The golf course has a 6.361km walking distance from hole one to eighteen. It has a guest parking lot that can hold up to 100 cars. The hotel also features a landscaped court with walkways between the administrative building and accommodation wing (see plate 30).



Plate 13: the golf course at le meridian Ibom hotel and Golf resort
Source: Authors field work, 2011.



Plate 14: landscaped court adjacent the accommodation block at le meridian
Source: Authors field work, 2011.

ii. Spatial Organisation and Design

The four star resort hotel features a spacious entrance porch and lobby and has all its 163 Rooms and 26 suites with private terraces offering a view of the palm tree forest on one side and the landscaped courtyard on the opposite side. Other facilities at the le meridian hotel include; a block of chalets, 1 Chinese restaurant and 2 bars a Business centre, beauty salon, 3 shops Outdoor swimming pool and Jacuzzi 18- holes golf course with club house, Fitness centre, Sauna, 2 tennis courts, 2 squash courts, a Heliport, 11 meeting rooms, a herbarium and an on-site water treatment plant (see plate 5.18).



Plate 15: on-site water treatment plant at le meridian Ibom hotel
Source: Authors field work, 2011.



Plate 16: swimming pool at le meridian Ibom hotel and Golf resort
Source: Authors field work, 2011.

iii. Structure and Dominant building Materials

The hotel structures are predominantly built with concrete, and has most of its openings glassed including doors with exception of the rooms, suites and chalets. Recyclable building materials such as thastyron rastra panels, steel and aluminum roofing sheets of high durability where used. However, the hotel also has sustainable building elements incorporated in their structures such as photochromic, liquid crystal and suspended particle panels to control solar radiation as well as to convert conductive heat transferred through the building envelope into useful electrical energy.



TABLE 4.2 Assessment of the Application Of Biomorphic Design Principles At Le-Meridien Ibom Hotel, Akwa Ibom

PRINCIPLE	REQUIREMENT	LEVEL OF REFLECTION				REMARK
		Abst	Low	Med	High	
Inspiration	- Use of nature (Living Organisms)	●				
	- Unfolding from the seed within, like an organism.		●			
	- Reflection of local aspect of climate in design			●		
	- Reflection of physical characteristics of the site				●	
Ecological Integrity	- Use of renewable energy	●				
	- Use of daylight			●		
	- Use of natural ventilation			●		
	- Application of new technological trends and		●			

	Choice of building materials					
Building Relationship to Site and Landscape	- Use of reclaimed areas of the site (waste land).		●			
	- Use of pleasant zones for development within site.			●		
	- Minimal pollution and waste accumulation.			●		
	- Minimal paving (direct and easy transportation).		●			
Architectural Expression and Symbolism	- Communicate quality and Meaning.		●			
	- Interpret building techniques and functionality.		●			
	- Architectural style and cultural expression.		●			
	- Initial structural integrity.	●				
Cycle flow of resources	- Respect for Natural Systems.				●	
	- Use of Conservative Resources.		●			
	- Management of resources.			●		
	- Rain and grey water harvesting.				●	
	- Design for thermal comfort.			●		
	- Alternative use of renewable energy sources.	●				

Source: Researchers Findings

CONCLUSION

6.1 SUMMARY OF FINDINGS

This research focuses on how biomorphism a division of organic architecture which is also concerned with environmental sustainability can influence the creation of tourism centres with emphasis on resort hotels. The problem here has been that these organisations responsible for the control and or the development such facilities have ignored and neglected the impact of their huge investments which basically run exclusively on non-renewable, and unsustainable resources in the pursuit of generating energy to run most aspects of the buildings operation which ruin the beauty and integrity of their surroundings. They do not make efforts to explore the potential alternatives the natural environment upon which they are placed in has to offer. The fact has also been established that these facilities could actually take-in from the environment with better sympathy than practiced, posing little or no impairment on it. This is as a result of the fact that, the building industry contributes immensely in the environmental degradation the world faces today.

A review of relevant literature by some prominent writers and proponents of issues related to environmental sustainability has been carried out, this is to culminate the set principles upon which biomorphism as well as sustainability can methodically be pursued to achieve the proposed design. Case studies have been carried out, and analyzed using some specific variables of biomorphic principles. This has clearly shown that the most important aspect of sustainability with regards to resort hotels are stipulated on the outlined principles of biomorphism, with strong cases on issues of energy, and conservation of local resources. The findings from the literature review and the case studies were thus used in generating the design and strategic planning concept for the proposed facility.

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