

CHAPTER TWO

2.1 Introduction.

This chapter conducts a thorough evaluation of existing research on traditional and modern construction practices, sustainability, and architectural adaptations in Lagos, Nigeria, and other similar settings. The purpose of this review is to explore the benefits and problems of combining traditional and modern techniques, as well as to investigate the cultural importance and sustainability of these approaches.

2.2 LITERATURE REVIEW

Lagos's architecture is a diverse blend of various types, styles, and eras. Structures can have tropical modern architecture, traditional vernacular architecture, or a combination of both. Buildings with European architectural styles are as old as the seventeenth century. Although found throughout the city, Portuguese architectural elements were brought by returned slaves from Brazil and the Caribbean and are most noticeable in areas like Lagos Island, Surulere, and Yaba Municipalities [Guardian (2017)]. Colonial-style architecture was very popular during the Lagos Colony.

Owing to the city of Lagos's explosive expansion and its restricted land supply, haphazard, disorganized patterns of development have produced unsustainable growth that has varied effects on the local population and environment. Agamah, F. U. (2018). The building of skyscrapers started in the 1960s. International developers and private equity firms have constructed several office and mixed-use buildings. Up until now, modern architecture has been in a constant state of development. [Arslanoğlu, U. (2019).

Pre-colonial Lagos, originally called "Eko" (also known as "Warcamp") by its Bini and later Awori colonists, was predominantly composed of the Yoruba's signature rectangular houses with central inner courtyards and, in well-planned areas, pot-sherd tiled pavements. The king's palace had a slightly different design, with carved pillars and a network of interconnected impluvia. The existence of circular, hip-roofed houses along the coast was indicative of earlier Benin influence. As was common in Africa at the time, both groups of colonists made extensive use of fractals in their architectural designs.

The dramatic, irreversible alteration of 'indigenous' Lagosian architecture was largely caused by the arrival of colonialism in the 1800s. The construction of the C.M.S. building in Badagry by European missionaries and the English Crown's desire for low-cost colonialism in humid, tropical West Africa set the precedent for the mass importation of low-cost building materials, particularly corrugated iron sheeting and cement.

Even today, the building industry is still dominated by these two materials. The standard colonial-issue tropical houses with deep verandahs, overhanging eaves, and classical forms were introduced, especially in planned European quarters like the central areas of Yaba, Surulere, and Lagos Island, because adobe structures were out of the question from the British perspective. Osasona, C. O. (2007) presented the social context of decoration in Nigerian vernacular architecture, and also in 2015, Osasona published heritage architecture as domestic space, a tale of three buildings in Ile-Ife, Nigeria.

Hardy, M. (Ed.). (2008) revisited the Venice charter of modernism, conservation, and tradition in the 21st Century. Osasona *et al.*, (2011) obtained the renewal of Ile Akogun in Ile-Ife, Nigeria, a paradigm for the conservation of Yoruba iconic architecture. Dayaratne, R. (2010) established earth architecture for contemporary urban living prospects and potentials in open houses. Fadli, F., & Sibley, M. (2009), introduced sustainability lessons from traditional buildings in North Africa. Buitenhuis *et al.*, (2010) showcased open design-based strategies to enhance appropriate technology development.

2.2.1 Urban Renewal and Sustainable Housing

Urban rehabilitation efforts in Lagos have significantly influenced the city's architectural landscape. Afinowi, T. A. (2018) emphasizes the necessity of sustainable housing through urban regeneration, arguing that modern techniques must incorporate both traditional practices and technological innovations to satisfy the city's expanding demands. Similarly, Ilesanmi, A. O. (2010) analyzes urban sustainability in Lagos, concentrating on the problems and opportunities brought forth by rapid urbanization.

These publications emphasize the importance of using a comprehensive strategy that takes into account cultural, environmental, and economic considerations. Fadli, F., & Sibley, M. (2009) investigate traditional public bathhouses in North Africa to glean sustainability principles. They focus on how historical structures use natural ventilation, thermal mass, and other passive design methods that might be adapted to modern buildings. The study emphasizes the value of learning from historic architecture in order to improve the sustainability of current projects.

Afinowi, T. A. (2018) studies Lagos' urban regeneration efforts and their effects on housing sustainability. The study underlines the importance of combining traditional building practices with new construction approaches to meet the housing shortage. It explores different urban redevelopment programs and how effective they are at providing long-term housing options. The study indicates that a balanced strategy that incorporates both traditional and modern methodologies is required for long-term sustainability in Lagos' housing industry.

Aliyu, A. A., & Ismail, A. S. (2021) examines the hurdles to the implementation of sustainable design principles in Nigerian residential buildings. The study, which is based on interviews with architects and building owners, finds that lack of awareness, cost implications, and regulatory limits are major problems. The study proposes further education on sustainable practices, as well as the incorporation of traditional building styles that embrace sustainability by default.

Dayaratne, R. (2010) discusses the potential of earth architecture for contemporary urban living. The study argues that traditional earth-building techniques, which are sustainable and cost-effective, can be adapted to modern urban contexts. By incorporating these methods, cities like Lagos can achieve more sustainable and resilient urban environments.

2.2.3 Traditional Architectural Practices:

Traditional building practices in Lagos have evolved over generations, relying on locally obtained materials and indigenous construction techniques. Mud bricks, bamboo, and thatch are common building materials that provide natural insulation and ventilation. These materials are not only environmentally friendly, but also culturally significant, reflecting the region's rich history and inventiveness.

Traditional architecture approaches in Nigeria are rich in cultural heritage and sustainability concepts. Osasona, C. O. (2015) investigates legacy architecture as home space, shedding light on the social and cultural settings of traditional Nigerian structures. Correia, Dipasquale, and Mecca (2014) examine the application of vernacular knowledge to sustainable architecture, emphasizing the importance of traditional techniques in current sustainable design. These findings highlight the ability of traditional architecture to inform current methods, particularly in non-engineered building designs.

Chahanjiri et al. (2014) describe a model tourist town with neo-vernacular building technologies. Their research shows how traditional materials and construction methods can be modified to fit current requirements while protecting cultural heritage. The project demonstrates how traditional and modern architectural components can coexist while encouraging sustainability and cultural tourism. Akinosun and Olojede (2022) examine the challenges of urban service delivery in Ife East, focusing on infrastructure, housing, and public services.

Their findings highlight the inadequacies in current service delivery systems and suggest that incorporating traditional building methods could improve infrastructure resilience. They argue for a more integrated approach that combines local practices with modern technology to enhance urban living conditions. Akin, A. O., Oguntola, B. K., Alabi, F. M., Odetoye, A. S., & Bello, M. K. (2022) investigates the architectural alteration of Lagos' skyline, prompted by the construction of high-rise residential complexes.

This study focuses on the change from conventional low-rise buildings to modern skyscrapers, which is being driven by urbanization and economic expansion. The study underlines the importance of balancing this progress with sustainable practices, arguing that traditional ways should not be disregarded in the pursuit of modernization. Mud bricks are sun-dried dirt, water, and straw mixtures. They provide good thermal mass, keeping interiors cool in hot weather and warm in cold weather. Dayaratne, R. (2010).

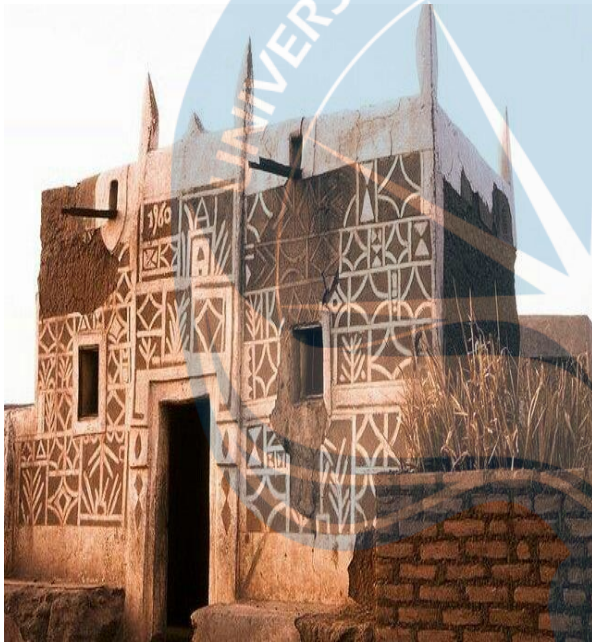
Bamboo: Bamboo is valued for its strength, flexibility, and sustainability. It is widely used in structural frameworks and roofing. Auwalu, F. K., & Dickson, P. D. (2019).

Thatch: Thatch roofing, formed from dried palm leaves or grasses, is lightweight and offers natural ventilation and insulation Sen, J. N. (2020).

Several studies have demonstrated the benefits of conventional building materials. For example, Osasona (2015) highlights the thermal efficiency and minimal environmental effect of mud bricks and thatch. Dayaratne (2003) investigates the sustainability potential of earth building, emphasizing the advantages of using mud bricks and bamboo in modern urban environments.

Tables and Figures 1. Importance of Vernacular construction materials

Material	Environmental Impact	Cultural Significance
Mud Bricks	Low carbon footprint, natural insulation	High, traditional craftsmanship
Reinforced Concrete	High carbon footprint, durable	Low, modern construction methods
Bamboo	Renewable, low carbon footprint	High, traditional craftsmanship
Steel Frameworks	High carbon footprint, durable	Low, modern construction methods



Source:Google- Traditional home in Lagos with mud brick walls



Traditional home in Lagos with aluminum flat sheet roof



Traditional home in Lagos with mud brick walls, back view opening



Side view of traditional home



Traditional home in Lagos with mud brick walls with wrap clothes used as door covering



Traditional home in Lagos with mud brick walls with aluminum sheet as door

Traditional home in Lagos with mud brick walls



Traditional home in Lagos with mud brick walls with aluminum roof sheet



Traditional home in Lagos with mud brick walls



Traditional home in Lagos with mud brick walls and aluminum sheet as door covering



Thresh ceiling of a Lagos traditional mud house



Thresh ceiling of a traditional mud house



A thatched roof traditional house in a rural area of Lagos.



Source: Springerlink

Source: Springerlink

Image 3: A bamboo framework used in a traditional house structure.

2.2.2 Modern Innovations in Architectural Design

Modern architectural designs in Lagos use modern materials and technologies to improve structural integrity, longevity, and comfort. These designs frequently prioritize efficiency and beauty, utilizing materials such as reinforced concrete, steel, and glass. Akin (2016) describes how growing residential skyscrapers have transformed Lagos' cityscape. Wu (2022) emphasizes the advantages of modular buildings and the circular nature of modern materials.

The incorporation of new innovations, such as modular construction and ecologically sustainable design processes, is critical for developing robust and adaptive building practices. Reinforced concrete provides exceptional strength and endurance, making it ideal for multi-story buildings and complicated constructions (Akin, 2016). Steel is used for its flexibility and strength, allowing for unique architectural forms and vast spans (Fadli & Sibley, 2009). Glass improves natural illumination and provides modern aesthetics; commonly utilized in façades and huge windows (Wu, 2022).

Wu (2022) and Amasuomo (2021) discuss the challenges and opportunities of implementing current advances in building design. Wu (2022) examines the circularity of modular units, whereas Amasuomo (2021) cites challenges to the use of sustainable design principles in residential buildings. These studies demonstrate the problems and benefits of using modern technology into Nigerian building techniques. Amasuomo (2021) examines the hurdles to the implementation of sustainable design principles in Nigerian residential buildings. The study, which is based on interviews with architects and building owners, finds that lack of awareness, cost implications, and regulatory limits are major problems. The study proposes further education on sustainable practices, as well as the incorporation of traditional building styles that embrace sustainability by default.



Source: Arcdaily- A modern residential building in Lagos with reinforced concrete.



Source: Google- modern residential building in Lagos showcasing the use of reinforced concrete for enhanced structural integrity and durability

2.2.3 Integrating Tradition and Modernity through Case Studies

Several case studies show how to successfully integrate traditional and modern building processes, resulting in hybrid architectural solutions that reconcile cultural heritage with contemporary necessities.

Case Study 1: Residential Development in Ikoyi

The incorporation of mud bricks into modern concrete constructions.

Bamboo is used for roofing with solar panels placed.

Correia, Dipasquale, and Mecca (2014) reported positive community response on its aesthetic appeal and sustainability.

Case Study 2: Cultural Center in Lagos

Several case studies provide realistic examples of architectural adaptations that incorporate both traditional and modern components. Chahanjiri et al. (2014) describe a model tourist town on Qeshm Island that uses neo-vernacular building technologies. This case study shows how ancient building techniques can be updated to meet modern needs while preserving cultural integrity. Similarly, Fadli and Sibley (2009) examine the sustainability lessons learned from historic public bathhouses in North Africa, emphasizing the potential for transferring these ideas to modern architectural projects.

The incorporation of traditional Yoruba architectural components with modern sustainable technologies. It has courtyards, mudbrick walls, and bamboo roofing. Installation of solar panels and rainwater collection systems (Hegazi, Shalaby, & Mohamed, 2021). Correia, Dipasquale, and Mecca (2014) conduct a thorough examination of incorporating vernacular knowledge into sustainable building. Hegazi, Shalaby, and Mohamed (2021) provide a case study of adaptive reuse in Cairo, demonstrating how traditional methods can be integrated with modern advances to improve energy efficiency and thermal comfort.

Buitenhuis et al. (2010) address the role of open design techniques in accelerating the development of relevant technology. They contend that ancient building practices, which are fundamentally open and community-based, might benefit from contemporary open design concepts. This approach has the potential to generate innovative solutions that are both sustainable and culturally appropriate, paving the way for the integration of traditional and modern practices.



Source: Arcdaily

residential project in Ikoyi, integrating traditional mud bricks and modern concrete structures.



Source: Arcdaily

A religious center in Lagos, showcasing the integration of traditional architectural elements with modern sustainable technologies.

2.2.4 Sustainable and Cultural Preservation Theories Edward T. White's "Ordering Systems"

The blending of traditional and modern building processes is consistent with several philosophies of sustainability and cultural preservation. Edward T. White's "Ordering Systems"

dives into spatial organization and design ideas that promote environmentally and culturally sensitive architecture.

Sustainability Theory: Promotes the use of renewable and locally obtained materials while lowering environmental impact and increasing energy efficiency (Fadli & Sibley, 2009).

Cultural Preservation Theory: emphasizes the necessity of preserving cultural heritage through architecture, ensuring that traditional building processes and designs are preserved and modified for modern usage (Osasona 2015).

Fadli and Sibley (2009) consider sustainability lessons from traditional North African buildings, and Osasona (2015) investigates heritage architecture as a household space in Nigeria. Edward T. White's "Ordering Systems" (1995) offers a fundamental paradigm for comprehending spatial organization and cultural integration in architectural design.

Table 2.1: Comparative Analysis of Environmental Impact of Traditional vs. Modern Materials

Material	Source	Environmental Impact	Lifespan	Sustainability	Cultural Significance
Mud Bricks	Local, natural	Low carbon footprint, biodegradable	Moderate	High, renewable	High, traditional craftsmanship
Bamboo	Renewable, local	Low carbon footprint, fast-growing	Moderate to high	High, renewable	High, traditional craftsmanship
Thatch	Local, natural	Low carbon footprint, biodegradable	Low	High, renewable	High, traditional craftsmanship
Reinforced Concrete	Industrial, global	High carbon footprint, energy-intensive	High	Low, non-renewable	Low, modern construction
Steel	Industrial, global	High carbon footprint, recyclable	High	Moderate, recyclable	Low, modern construction
Glass	Industrial, global	High energy for production, recyclable	High	Moderate, recyclable	Low, modern construction

Thermal Performance of Building Materials: The above table illustrates how various construction materials (mud bricks, bamboo, thatch, reinforced concrete, steel, and glass)

affect a structure's thermal performance. Mud bricks and thatch give better natural insulation than reinforced concrete and glass.

Energy Efficiency of Various Building Materials: The table below compares the energy efficiency of different building materials. Traditional materials, such as mud bricks and bamboo, have been shown to be more energy-efficient due to their low production energy and natural insulating properties, whereas modern materials, such as concrete and glass, require more production energy but can be used in designs that improve overall building energy efficiency.

Table 2.2: Comparison of Thermal Performance and Energy Efficiency

Material	Thermal Performance	Energy Efficiency	Production Energy	Usage Energy
Mud Bricks	High natural insulation	High, due to thermal mass	Low	Low
Bamboo	Moderate insulation	High, due to renewable sourcing	Low	Low
Thatch	High natural ventilation	High, due to renewable sourcing	Low	Low
Reinforced Concrete	Low insulation without aid	Moderate, dependent on design	High	Moderate to high
Steel	Low insulation	Moderate, due to strength and recyclability	High	Moderate
Glass	Low insulation	Low, depends on additional insulation	High	High, if not treated or insulated

The environmental impact, thermal efficiency, and energy efficiency of conventional and contemporary building materials are contrasted in this table. This article highlights the potential advantages of fusing cutting-edge technology with conventional building materials and methods to produce ecologically and culturally significant construction projects.

2.2.5 Gaps in the Literature Analysis

Despite the increased interest in sustainable design, present research has substantial limitations, notably in terms of integrating traditional and modern methods in Lagos. Key gaps include:

Lack of Systematic Documentation: There is insufficient documentation on ancient building processes and their use in current circumstances.

Limited Case Studies: Few thorough case studies of successful hybrid architecture projects exist (Conejos, Langston, & Smith, 2011).

Socioeconomic Factors: The impact of socioeconomic factors on the adoption of traditional and modern building practices has not been fully examined (Amasuomo, 2021).

Environmental evaluations: More extensive environmental impact evaluations that compare historic and modern materials and procedures are required (Wu, 2022).

Conejos, Langston, & Smith (2011) emphasize the significance of adaptive reuse options for historic structures, whereas Amasuomo (2021) outlines impediments to the implementation of sustainable design methodologies.

2.2.6 Adaptive Reuse and Heritage Conservation

Adaptive reuse solutions provide a way to preserve heritage while meeting contemporary needs. Conejos, Langston, and Smith (2011) explore the application of adaptive reuse options for historic structures, with a focus on energy efficiency and thermal comfort. Hegazi, Shalaby, and Mohamed (2021) present a case study from Cairo that demonstrates how adaptive reuse can improve the sustainability and usefulness of old buildings.

These studies highlight the need of adaptive reuse in non-engineered building designs in Lagos, where many structures have historical and cultural significance. Conejos et al. (2011) study the adaptive reuse of historic structures, stressing energy efficiency and thermal comfort. Their research focuses on successful case studies in which traditional construction materials and techniques have been maintained and incorporated into contemporary designs. They claim that adaptive reuse not only protects cultural assets but also promotes sustainability by minimizing the demand for new construction materials.

The Guardian's (2017) article examines notable architectural landmarks in Lagos, stressing their historical and cultural significance. The article calls for the preservation and adaption of historic buildings, claiming that they provide unique insights and benefits that modern architecture frequently ignores. This viewpoint promotes the use of old practices in modern urban planning.

Correia et al. (2014) compile research on the application of vernacular knowledge to sustainable building. The book highlights that ancient construction approaches teach essential insights about sustainability that modern architecture might apply. The authors demonstrate how the ideas of vernacular architecture can be integrated into contemporary design to improve environmental and cultural sustainability through a series of case studies.

2.2.7 Challenges and Opportunities in Lagos.

Lagos, as a fast-expanding megacity, presents distinct problems and opportunities for blending traditional and modern building approaches. The literature discusses different facets of this integration, including urban service delivery (Akinosun & Olojede, 2022) and the transformation of informal communities (Nguluma, 2003). Udeh and Okeke's (2018) work on urban regeneration focuses on eradicating urban deterioration, highlighting the complex

dynamics of architectural adaptation in Lagos. These studies, taken together, provide a detailed knowledge of the elements that influence building design in cities.

Modernizing vernacular dwellings in Lagos has a number of problems, including socioeconomic inequality, poor infrastructure, and legal limits (Nguluma 2003). Multidisciplinary collaborations among architects, urban planners, legislators, and inhabitants are required to handle these issues and capitalize on traditional architecture's opportunities (Rane, 2023). Case studies demonstrate the effective conversion of traditional dwellings into modern residences, shedding light on future adaptive reuse initiatives and heritage conservation efforts (Conejos et al., 2011).

The incorporation of traditional techniques and technological innovations into non-engineered building designs in Lagos, Nigeria, is critical for creating sustainable, resilient, and culturally relevant urban spaces. The studied literature emphasizes the importance of a comprehensive approach that takes into account cultural heritage, sustainability, and modern technology breakthroughs. Drawing on a variety of research, this overview highlights the possibility for innovative architectural adaptations that respect and enhance Lagos' rich cultural context.

Modernizing vernacular homes could have many benefits, but there are a lot of challenges to overcome, including socioeconomic inequality, inadequate infrastructure, and legal constraints [Nguluma (2003)]. Researchers have identified the need for multidisciplinary collaborations between architects, urban planners, lawmakers, and residents to address these challenges and take advantage of the opportunities presented by traditional architecture [Rane (2023)]. Future adaptive reuse projects and heritage conservation efforts in Lagos can benefit greatly from case studies that show how vernacular houses can be successfully transformed into modern residences [Conejos et al., (2011)].

2.3 Comprehensive Evaluation of Integration Methods:

Gap: Many studies did not offer a thorough examination of how customary activities and architectural features might be incorporated into contemporary residences.

My Research will close this gap by looking into particular architectural details, cutting-edge construction methods, and design elements that incorporate successful integration of traditional and modern practices

2.3.1 Case Studies with Practical Illustrations:

Gap: Many studies lacked thorough case studies or practical examples of how to successfully combine old and new methods.

My Study: Provide thorough case studies of accomplished projects in Lagos that showcase the precise techniques employed and the results of the successful fusion of traditional and modern architectural approaches.

2.3.2 TRANSFORMATION OF VERNACULAR HOUSES

"Vernacular architecture" refers to the traditional building methods that have emerged in a certain location while taking into account the local resources, environment, and culture.

Olaniyan, O. R., & Adegoroye, A. (2024). According to Rapoport, Lagos, Nigerian vernacular homes are characterized by their organic shapes, natural materials, and carefully planned interior spaces that take cues from the surrounding environment and cultural traditions. Pişkin, N. (2019).

Studies have revealed a wide range of Lagos vernacular house types, such as adobe buildings, courtyard houses, and bungalow-style homes, as Okpako (2022) demonstrated. Vernacular architecture is modified to meet the needs of contemporary living, technical breakthroughs, and changing aesthetic preferences to create modern homes. [Chahanjiri *et al.*, 2014]. Prior studies have investigated the socio-cultural, economic, and environmental elements influencing the evolution of traditional homes in urbanizing areas such as Lagos [Ilesanmi, 2010].

Mehdizadeh (2023) investigates the applications of virtual reality (VR) in architectural design alterations. The study demonstrates how virtual reality (VR) may help architects integrate traditional and modern architectural features by allowing them to envision and edit designs in a virtual environment. This technology can help to preserve cultural heritage while combining current advancements.

2.3.4 ARCHITECTURAL HERITAGE PRESERVATION

Preserving architectural legacy, which includes traditional buildings, is essential for maintaining cultural identity, promoting sustainable development, and building community resilience. [Dipasquale *et al.*, (2014)]. According to Adeyemi and Ogunbayo (2018), scholars have emphasized the need to preserve vernacular architecture to protect cultural legacies and promote knowledge transfer between generations. However, because vernacular homes are regularly neglected or demolished in favor of more modern structures, Lagos's rapid modernization and urbanization pose serious threats to their preservation Afinowi (2018).

Ilesanmi (2010) explores the problems and prospects for urban sustainability in Lagos. The study emphasizes the importance of traditional building approaches for improving environmental and social sustainability. It advocates for incorporating historical techniques into contemporary urban planning to address challenges such as housing shortages, environmental deterioration, and social injustice.

Hardy (2008) revisits the Venice Charter, focusing on the balance between modernism, conservation, and tradition. The study contends that conserving traditional building practices is critical to cultural continuity and sustainability. Hardy proposes that modern design use these approaches to create more culturally and environmentally resilient structures.

2.4 SUSTAINABLE DEVELOPMENT AND ADAPTIVE REUSE

According to Amasuomo (2021), adaptive reuse of vernacular houses presents opportunities for sustainable development because it preserves embodied energy, reduces waste, and uses resources sparingly. To increase the operational efficiency of traditional structures while

maintaining their cultural and historical significance, researchers have looked into creative ways to modify and repurpose them [Hegazi *et al.*, (2021)].

According to Okoye and Ngwu (2021), adaptive reuse projects in Lagos have shown how conventional building methods can be combined with contemporary design ideas to produce spaces that are both culturally and environmentally sensitive. Hegazi *et al.* (2021) investigate adaptive reuse techniques for historic structures, with an emphasis on energy efficiency and thermal comfort. They present case examples in which old materials and processes were successfully blended into modern improvements, so improving both sustainability and cultural heritage. This study emphasizes the feasibility of merging old and innovative architectural approaches.

2.5 The role of architects in community engagement

Architects play an important role in bridging the divide between traditional and modern architectural methods in Lagos. They encourage and conserve traditional building practices while pushing the limits of innovation and experimentation (Akinosun & Olojede, 2022). Engaging with local communities and learning their customs and cultural practices is critical for developing designs that reflect cultural identity while also meeting inhabitants' needs (Mehdizadeh, 2023).

Interviews with architects and homeowners show that combining traditional materials, forms, and cultural components with modern technologies and facilities results in a harmonious blend of old and new (Wu, 2022). This strategy maintains cultural history while also promoting sustainability, improving the general quality of life in Lagos.

2.6 Comparison of Traditional and Contemporary Housing Design in Lagos.

Lagos' architectural landscape is a rich tapestry of history and modernity. The city's home styles are a unique combination of cultural history and technological progress. This section compares traditional and contemporary home designs in Lagos, depending on a variety of studies and theories, including Edward T. White's "Ordering Systems" for insights into spatial organization.

Traditional Housing Designs.

Olagunju (2014) describes traditional Lagos housing as primarily reliant on indigenous building methods and organic materials that are well adapted to the local environment and cultural activities. These designs often contain open courtyards, covered verandas, and interconnecting spaces that allow for natural circulation and cooling.

Materials and Construction: Thatch, bamboo, and mud bricks are among the locally derived materials used in traditional dwellings. In addition to being environmentally friendly, these materials have good thermal mass, which helps keep houses warm in the winter and cool in the summer Olagunju, (2014).

Spatial Organization: The way traditional residences are arranged spatially frequently includes central courtyards that are used for cooking, socializing, and other everyday tasks. By encouraging natural airflow, this arrangement lessens the requirement for artificial cooling systems Qureshi *et al.*, (2022).

Cultural Aspects: The customs and traditions of the local populace are fundamental to the traditional housing designs. They frequently include significant architectural features that honor the history and identity of the neighborhood.

Osasona (2015) and Rapoport (1992) both emphasize the value of traditional architecture in preserving both environmental sustainability and cultural continuity. These studies highlight the use of locally sourced and ecologically friendly materials in traditional designs that are tailored to the local climate.

Modern House Designs

On the other hand, the utilization of contemporary materials and technologies characterizes Lagos' contemporary house designs. These plans combine cutting-edge architectural concepts with the goal of addressing the problems associated with urbanization and contemporary living requirements.

Materials and Construction: Steel, glass, and reinforced concrete are frequently used in Lagos's modern architecture. In comparison to conventional materials, these materials offer better structural integrity and durability, but they also have a bigger environmental impact (Lewandowska et al., 2017).

Space Organization: Open-plan layouts, modular kitchens, and multipurpose living areas are examples of characteristics seen in contemporary designs that emphasize effective use of available space. These components are made to be as comfortable and functional as possible (Immerwahr, 2007).

Eco-friendly Features: In order to ensure sustainability, modern designs also use eco-friendly materials and technologies, such as rainwater collection systems, solar panels, and energy-efficient appliances (Lewandowska et al., 2017).

Akin (2016) talks about how contemporary residential towers with cutting-edge materials and design features are changing Lagos's skyline. Wu (2022) emphasizes the advantages of modular building and the circular nature of contemporary materials, highlighting their significance in the creation of sustainable urban landscapes.

2.6.1 Combining Modern and Traditional Designs

The goal of hybrid architectural designs is to combine the best aspects of modern and old methods. These designs seek to satisfy contemporary needs for functionality and sustainability while also protecting cultural history.

Case Studies: Examples include cultural institutions that incorporate traditional Yoruba components with contemporary sustainable technologies, and residential projects that blend concrete and mud bricks (Correia, Dipasquale, & Mecca, 2014; Hegazi, Shalaby, & Mohamed, 2021).

Hegazi, Shalaby, and Mohamed (2021) and Correia, Dipasquale, and Mecca (2014) offer thorough examinations of initiatives that effectively combine conventional and modern

methods. These studies show that a balance between modern innovation and cultural preservation can be achieved using hybrid designs.

2.7 Principles of Design and Spatial Organization

The book "Ordering Systems" by Edward T. White provides insightful information about the spatial organization and design concepts that guide both traditional and modern home designs. In architectural design, White highlights the significance of spatial efficiency, environmental adaptability, and cultural relevance.

2.7.1 Spatial Efficiency: Though they approach the task differently, Lagos' traditional and modern architecture both seek to maximize the amount of space that is accessible. While modern dwellings prioritize modular and multipurpose spaces, traditional residences make use of open courtyards and interconnected spaces (White, 1995).

2.7.2 Environmental Adaptation: By using materials and layouts that encourage ventilation and cooling, traditional designs are organically adjusted to the local climate. Modern designs use cutting-edge materials and technology to adapt to their surroundings (Fadli & Sibley, 2009).

2.7.3 Cultural Relevance: In both kinds of designs, preserving cultural relevance is essential. While contemporary dwellings include cultural components through modern interpretations and design advancements, traditional homes reflect local customs and legacy Osasona, (2015).

Table 2.3: Comparison of Traditional and Contemporary Housing Designs

Aspect	Traditional Housing	Contemporary Housing
Materials	Mud bricks, bamboo, thatch	Reinforced concrete, steel, glass
Construction Techniques	Handcrafted, community-based	Industrial, technology-driven
Thermal Performance	High natural insulation	Dependent on additional insulation
Energy Efficiency	Naturally efficient	Incorporates eco-friendly technologies
Spatial Organization	Open courtyards, interconnected spaces	Modular, multipurpose living areas
Cultural Elements	Symbolic architecture, reflects community heritage	Modern interpretations of cultural elements
Environmental Impact	Low carbon footprint	Higher carbon footprint, mitigated by technology

Energy Efficiency of Various Building Materials: The table above compares the energy efficiency of various building materials. Even though they need more energy to produce,

contemporary materials like glass and concrete can be incorporated in designs that increase a building's overall energy efficiency. Traditional materials with low production energy and inherent insulating qualities, such as bamboo and mud bricks, have been demonstrated to be more energy efficient.

Contemporary Housing Designs in Lagos.



Source: Google Traditional house with brick wall



Source: Google Traditional Housing Designs

in Lagos

2.8 Figurative Comparative Analysis with Edward T. White Principles

Using the concepts from Edward T. White's "Ordering Systems," we will perform a figurative comparative study of traditional and modern housing styles in Lagos in this part. In order to create architectural solutions that are both sustainable and culturally suitable, White's philosophies center on spatial efficiency, environmental adaptation, and cultural relevance.

Spatial Efficiency

Traditional Housing Designs

Principle: Open courtyards with connected rooms maximize space utilization.

Analysis: By using central courtyards for cooking, socializing, and ventilation, traditional housing in Lagos enhances spatial efficiency. The layout is more efficient and compact because there is less need for separate rooms due to the interconnected spaces (Olagunju, 2014; Qureshi et al., 2022).

Contemporary Housing Designs

Principle: Multifunctional and modular living spaces.

Analysis: To maximize functionality, modern homes place a strong emphasis on modularity and multipurpose rooms. Flexible space utilization is made possible by open-plan designs, which suit contemporary demands such as home offices and leisure spaces (Lewandowska et al., 2017; Immerwahr, 2007).

Figurative Comparison

Traditional: Makes effective use of common areas and courtyards for living in community.

Modern: Makes use of modular designs for adaptable, individualized application.

Environmental Adaptation

Traditional Housing Designs

The idea is to use passive cooling methods and natural materials to adjust to the local environment.

Analysis: Natural ventilation and insulation are provided by the materials used in traditional dwellings, such as thatch, bamboo, and mud bricks. By preserving a steady interior temperature, these materials lessen the requirement for artificial heating and cooling (Olagunju, 2014; Rapoport, 1992).

Principle: The use of environmentally friendly technology and materials.

Analysis: Modern homes use modern materials such as reinforced concrete and glass, as well as technologies like solar panels and energy-saving appliances. These advances enhance the building's environmental performance, although they frequently necessitate additional resources and energy (Akin, 2016; Wu, 2022).

Figurative Comparison

Traditional: Depends on passive techniques and natural materials for environmental adaption.

Contemporary: Uses modern technology and materials to achieve environmental efficiency.

Cultural Relevance

Traditional Housing Designs

Principle: Reflecting cultural identity through architectural components and spatial organisation.

Analysis: Traditional dwellings use symbolic architectural elements and spatial configurations to reflect the community's tradition and customs. These designs encourage a sense of community and cultural continuity (Osasona, 2015; Qureshi et al., 2022).

Contemporary Housing Designs

Principle: Including current interpretations of cultural components.

Analysis: Contemporary designs in Lagos combine creative architectural concepts with cultural elements. This strategy ensures that modern dwellings retain local traditions and values while incorporating new forms and technologies (Lewandowska et al., 2017; Immerwahr, 2007).

Figurative Comparison

Traditional: Cultural legacy is directly reflected in design and materials.

Contemporary: Integrates cultural themes into modern designs, achieving a balance between tradition and innovation.

Table 2.4: Comparison of Traditional and Contemporary Housing Designs Based on White's Principles.

Principle	Traditional Housing	Contemporary Housing
Spatial Efficiency	Central courtyards	Interconnected rooms Modular designs, multipurpose spaces
Environmental Adaptation	Natural materials, passive cooling	Advanced materials, eco-friendly technologies
Cultural Relevance	Reflects community heritage and customs	Integrates cultural elements with modern innovations

2.8.1. Floor plan of engineered houses in Lagos.

- **Open Floor Plans:**

1. The layout promotes social interaction and enhances the flow of movement within the house.
2. Walls are minimized or eliminated to allow for flexible use of space and improved natural light penetration.

- **Integration of Indoor and Outdoor Spaces**

Integration may be achieved using large windows, sliding glass doors, and outdoor living areas such as patios, terraces, or balconies.

- **Use of Contemporary Building Materials**

Use of contemporary building materials such as concrete, steel, and glass, which offer durability, structural integrity, and aesthetic appeal. These materials allow for innovative design solutions, sleek finishes, and architectural flexibility.

2.8.2 Floor plan of a non-engineered house in Lagos

- **Central Courtyard:**

1. It functions as an outdoor living space for social gatherings, domestic activities, and ventilation
2. It often provides access to various parts of the house and serves as a source of natural light and ventilation.

- **Multiple Rooms Around the Courtyard**

1. It serves various functions such as living quarters, kitchen, storage areas, and sometimes livestock housing.
2. The arrangement of rooms facilitates natural airflow and encourages communal living.

- **Separate Living Spaces:**

1. separate living spaces are allocated for different family members based on age, gender, and social status.
2. layout may include separate sleeping quarters, cooking areas, and gathering spaces for extended family members.

- **Use of Local Materials**

1. They rely heavily on locally available materials such as mud bricks, thatch roofing, bamboo, and timber.
2. These materials are sustainable, cost-effective, and well-suited to the local climate.
3. Mud bricks, for example, offer thermal insulation and regulate indoor temperatures, while thatch roofing provides protection from the sun and rain.

Table 2.5.1 Comparative analysis of traditional and modern houses in Lagos, Nigeria,

1. Function Analysis of Traditional Houses vs. Modern Houses

Aspect	Traditional Houses	Modern Houses
--------	--------------------	---------------

Cooking Area	Separate, often outdoor kitchens	Indoor kitchens with modern appliances
Living Spaces	Multi-functional spaces, often communal	Designated living rooms, more privacy
Sleeping Areas	Often shared sleeping quarters	Individual bedrooms
Storage	Limited, using local materials and spaces	Built-in closets and storage spaces
Sanitation Facilities	Often outside the main house	Indoor bathrooms with modern plumbing
Social Gathering Areas	Central courtyards or open communal areas	Living rooms or designated social spaces

Table 2.5.2. Private and Public Space Analysis

Aspect	Traditional Houses	Modern Houses
Private Spaces	Limited privacy, shared rooms	Clearly defined private spaces (bedrooms, bathrooms)
Public Spaces	Central courtyard or open areas for socializing	Separate living rooms, dining rooms
Transition Spaces	Gradual transition between public and private areas	Distinct separation between public and private areas

Table 2.5.3. Usage Analysis Based on Gender

Aspect	Traditional Houses	Modern Houses
Kitchen	Predominantly used by women	Predominantly used by women, but more gender-neutral

Living Areas	Shared by all, gender-neutral	Shared by all, gender-neutral
Sleeping Areas	Often segregated by gender	Generally, gender-neutral, more individual spaces
Social Areas	Men often gather in communal spaces	Gender-neutral, family-oriented

Table 2.5.4. House Quality Analysis Based on Access to Fresh Air and Natural Lighting

Aspect	Traditional Houses	Modern Houses
Fresh Air	Natural ventilation through open designs	Often reliant on mechanical ventilation
Natural Lighting	Ample natural light through open courtyards, windows	Mixed, some designs focus on natural light, others use artificial lighting

2.9.1 CONTRIBUTION OF ARCHITECTS

In Lagos, architects play a crucial role in bridging the gap between traditional architectural practices and contemporary architectural trends, claim Akinosun and Olojede (2022). According to Wu, T. (2022), they support the development of unique home designs that respect cultural heritage while effectively meeting modern needs. Architects guide their clients through the intricacies of architectural projects from the conception stage to the execution stage.

Mehdizadeh (2023) claims that architects achieve this by applying their technical know-how and aesthetic sensibility. Nonetheless, some homes might decide against hiring architects because they would rather use more conventional building techniques or because they are concerned about the associated costs. Architects provide their professional expertise and experience to ensure structural integrity, adherence to regulations, and visual appeal Akinosun (2022). Wu (2022), stated that this choice could have an impact on the durability and strength of their buildings, so it is important to consider all of the possible outcomes.

2.9.2 PERCEPTION OF ARCHITECTURAL SERVICES

The attitude Lagosians have toward the use of architectural services has a big impact on design decisions. Although some locals believe that hiring architects for their housing developments is needless or excessively expensive, others recognize the benefits of having architects on staff due to their knowledge of design, structural integrity, and legal compliance. According to Akinosun and Olojede (2022), some locals might decide against hiring architects

because of financial limitations or a preference for traditional building methods that don't call for outside help.

Public perceptions, however, may gradually change as more people become aware of the advantages of working with a professional architect, such as creative design solutions and effective project management. Small architecture firms must understand how Lagos residents feel about using their services in order to tailor their offerings and communication strategies to their clientele's needs and preferences Yan, B., Mai, F., Wu, C., Chen, R., & Li, X. (2024).

2.9.3 COMPARISON OF RESEARCH PAPERS

A comparison of research papers on traditional and modern innovations in non-engineered building designs. To conduct a detailed study, I evaluated 20 publications on merging traditional methods and current technologies in non-engineered building designs, with a special emphasis on Lagos, Nigeria. Here's a comparison of locus, focus, approach, and results.

Title	Author s	Ye ar	Journal	Locu s	Focus	Method	Results	Differen ces	Gap Filled
Sustainabl e Housing Through Urban Renewal in Contempo rary Lagos	Afinowi, T. A.	20 18	Doctoral dissertat ion	Lago s, Nigeri a	Urban renewal and housing	Case studies, surveys	Improved housing through renewal projects	Focus on urban renewal rather than tradition al and modern integrati on	Addresse s urban renewal, not specific to traditional practices
An Assessme nt of Urban Service Delivery in Ife East Local Governme nt Area of Osun State, Nigeria	Akinosu n, F. O., & Olojede , O. A.	20 22	Revista Română de Geograf ie Politică	Osun State, Nigeri a	Urban service delivery	Surveys, statistical analysis	Identified service delivery gaps	Focus on service delivery, not building designs	Service delivery in urban areas
Barriers to the Adoption of Environme ntally	Amasuo mo, T.	20 21	Doctoral dissertat ion	Nigeri a	Sustain able design adoptio n	Interview s, surveys	Identified barriers to sustainab le design adoption	Focus on barriers rather than	Barriers to sustainabl e practices

Title	Authors	Year	Journal	Locations	Focus	Method	Results	Differences	Gap Filled
Sustainable Design Methods in Residential Buildings								integration	
Open design-based strategies to enhance appropriate technology development	Buitenhuis, A. J., Zelenika, I., and Pearce, J. M.	2010	NCIIA Conference	General	Appropriate technology	Design-based strategies	Enhanced technology development	Focus on technology development, not building designs	Appropriate technology enhancement
Improving the implementation of adaptive reuse strategies for historic buildings	Conejos, S., Langston, C. A., & Smith, J.	2011	SAVE Heritage Conference	General	Adaptive reuse	Case studies	Improved reuse strategies for historic buildings	Focus on reuse, not traditional-modern integration	Adaptive reuse in historic buildings
Versus: heritage for tomorrow: vernacular knowledge for sustainable architecture	Correia, M., Dipasquale, L., & Mecca, S.	2014	Firenze University Press	General	Sustainable architecture	Literature review	Emphasized vernacular knowledge for sustainability	Broad focus on vernacular knowledge	Vernacular knowledge in sustainability
Developing Neo-Vernacular Building Technologies to Integrate Natural and Built	Chahanjiri, J. G., et al.	2014	Research Journal of Recent Sciences	Qeshm Island	Neo-vernacular technologies	Design and implementation	Model for tourist village	Specific to tourist village, not urban areas	Neo-vernacular technologies in tourism

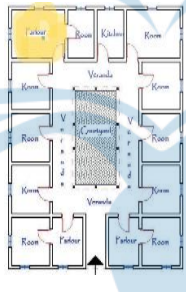
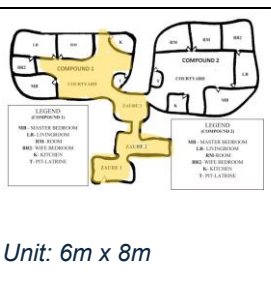
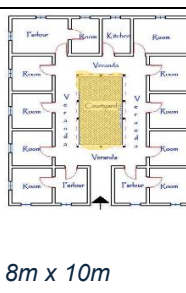
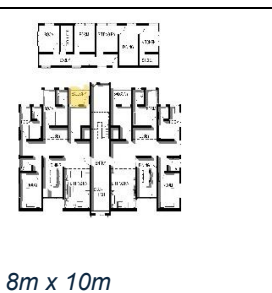
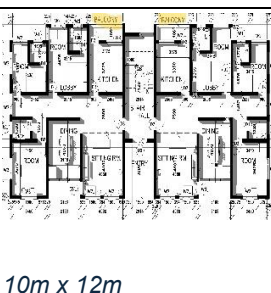
Title	Author s	Ye ar	Journal	Locu s	Focus	Method	Results	Differen ces	Gap Filled
Environme nts									
Sustainabi lity lessons from traditional buildings in north Africa	Fadli, F., & Sibley, M.	20 09	CIB Confere nce	North Africa	Sustain ability in tradition al building s	Case studies	Identified sustainab ility lessons	Focus on public bathhou ses, not residenti al	Lessons from public bathhou ses
Adaptive reuse decisions for historic buildings about energy efficiency and thermal comfort	Hegazi, Y. S., et al.	20 21	Sustain ability	Cairo Citad el, Egypt	Adaptiv e reuse, energy efficienc y	Case study	Improved energy efficiency and comfort	Specific to historic building s	Energy efficiency in historic buildings
Urban sustainabil ity in the context of Lagos megacity	Ilesanmi, A. O.	20 10	General	Lago s, Nigeri a	Urban sustaina bility	Literature review	Identified sustainab ility challenge s	Broad urban sustaina bility focus	Sustainab ility in megacitie s
Measuring the circularity of modular units in modular constructi on projects	Wu, T.	20 22	General	Gene ral	Modular construc tion	Circularit y measure ment	Evaluated modular unit circularity	Focus on modular construc tion	Circularity in modular constructi on
Beyond blueprints: Navigating Architectural Transform ations in virtual reality.	Mehdizadeh, M.	20 23	Doctoral dissertat ion	Gene ral	Virtual reality in architect ure	VR- based design	Transfor mation in VR environm ents	Focus on VR, not physical building s	VR in architectu ral design

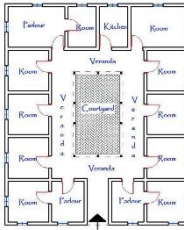
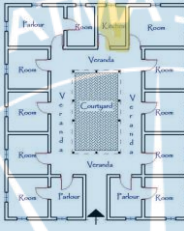
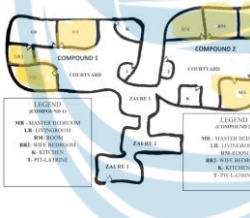
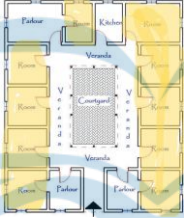
Title	Author s	Ye ar	Journal	Locu s	Focus	Method	Results	Differen ces	Gap Filled
Housing themselves: Transformations, modernisation and spatial qualities in informal settlements in Dar es Salaam	Ngulum a, H.	2003	Doctoral dissertation	Dar es Salaam, Tanzania	Informal settlements	Ethnographic study	Documented housing transformations	Focus on informal settlements	Transformations in informal housing
Traditional preservation practices	No, S., & Never, A. O. O. R.	2017	UGC Conference	General	Preservation practices	Case studies	Documented traditional preservation	Focus on preservation, not modern integration	Preservation practices
Resilient architecture; a design approach to counter-terrorism in the building for the safety of occupants	Okeke, F. O., et al.	2019	IOP Conference Series	General	Resilient architecture	Design approach	Improved building resilience	Focus on counter-terrorism	Resilience in architecture
Assessing the adequacy and sustainability performance of multi-family residential buildings in Anambra State, Nigeria	Okoye, P. U., & Ngwu, C.	2021	Regional Sustainability	Anambra State, Nigeria	Sustainability in residential buildings	Surveys, analysis	Evaluate sustainability performance	Focus on sustainability performance	Sustainability in multi-family buildings

Title	Author s	Ye ar	Journal	Locu s	Focus	Method	Results	Differen ces	Gap Filled
Catholic Church Architecture in Ibadan, Nigeria after Vatican II: Lessons for Modern Church Designers	Okpako, J.	2022	Journal of Asian and African Studies	Ibadan, Nigeria	Church architecture	Case studies	Lessons for modern church design	Focus on church architecture	Church design post-Vatican II
The Development of a framework for sustainable housing delivery in Lagos, Nigeria	Olagunju, O. A.	2014	General	Lagos, Nigeria	Sustainable housing	Framework development	Proposed housing framework	Focus on housing delivery	Sustainable housing framework
Heritage architecture as domestic space: A tale of three buildings in Ile-Ife, Nigeria	Osasonwa, C. O.	2015	International Journal of Sustainable Development and Planning	Ile-Ife, Nigeria	Heritage architecture	Case studies	Documented heritage domestic spaces	Focus on heritage architecture	Domestic heritage architecture
Investigating Sustainability of the Traditional Courtyard Houses Using Deep Beauty Framework	Qureshi, R. A., et al.	2022	Sustainability	General	Traditional courtyard houses	Deep Beauty framework	Evaluated sustainability of courtyard houses	Specific to courtyard houses	Sustainability of courtyard houses

Title	Authors	Year	Journal	Locations	Focus	Method	Results	Differences	Gap Filled
Urban regeneration eradicating urban decay for improved human settlement	Udeh, C. A., & Okeke, F. O.	2018	J. of Envir. Mgt & Safety	General	Urban regeneration	Case studies	Improved human settlement	Focus on urban regeneration	Urban decay and regeneration

2.9.4 Analysis of room name and floor plan vernacular house in table form,

Room name	Floor plan A	Floor plan B	Floor plan C	Floor plan D
living room	 4.5m x 4.5m	 5.5m x 5m	 4.5m x 5m	 5.5m x 5.5m
courtyard	 Unit: 6m x 8m	 8m x 10m	 8m x 10m	 10m x 12m

Toilet and bathroom	 2m x 2.5m	 Outside: 2.5m x 3m	 2.5m x 3m	 3m x 3.5m
Kitchen	 3m x 3.5m	 3m x 4m	 3.5m x 4m	 4m x 4.5m
Bedroom	 3m x 3.5m	 3.5m x 4m	 4m x 4m	 4.5m x 5m

2.9.4a Comparing the floor plans by unit measurement

Unit	Plan 1	Plan 2	Plan 3	Plan 4
Living room	4.5m x 4.5m	5.5m x 5m	4.5m x 5m	5.5m x 5.5m
Courtyard	6m x 8m	8m x 10m	8m x 10m	10m x 12m
Toilet/Bathroom	2m x 2.5m	2.5m x 3m	2.5m x 3m	3m x 3.5m

Kitchen	3m x 3.5m	3m x 4m	3.5m x 4m	4m x 4.5m
Bedroom	3m x 3.5m	3.5m x 4m	4m x 4m	4.5m x 5m

This table provides a side-by-side comparison of each unit (Living room, Courtyard, Toilet and Bathroom, Kitchen, and Bedroom) across the different plans on section 2.9.4.

2.9.5 Figurative Analysis for a Lagos Vernacular House

Daily Activity Schedule

Time	Activity	Room / Space used
07:00 - 09:00	Morning Routine	Courtyard, Kitchen
09:00 - 12:00	Daily Chores	Courtyard, Rooms
12:00 - 14:00	Lunch	Courtyard
14:00 - 17:00	Rest/Work	Bedrooms, Courtyard
17:00 - 19:00	Evening Routine	Kitchen, Courtyard
19:00 - 21:00	Dinner	Courtyard
21:00 - 23:00	Leisure/Study	Living Room
23:00 - 07:00	Sleeping	Bedrooms

2.9.6 Figurative Analysis Based on the Floor Plan

Room Name	Activities	Windows	Ventilation
Courtyard	Socializing, Cooking, Eating, Chores	Yes	Natural

Bedroom	Sleeping, Studying, Resting	Yes	Natural
Living room	Leisure, family gatherings, Studying	Yes	Natural
Kitchen	Cooking Yes	Yes	Natural
Storage room	Storing food and household items	Yes	Natural
Bathroom	Bathing, Personal hygiene	Yes	Natural

Detailed Sample Analysis for a Lagos Vernacular House

1. Morning Routine (07:00 - 09:00)

- **Courtyard:** Used for early morning activities such as sweeping and preparing the house for the day.
- **Kitchen:** Used for cooking breakfast.

2. Daily Chores (09:00 - 12:00)

- **Courtyard:** Activities such as washing clothes, cleaning the house, and other household chores.
- **Rooms:** Bedrooms and other rooms are cleaned and organized.

3. Lunch (12:00 - 14:00)

- **Courtyard:** Family gathers to eat lunch.

4. Rest/Work (14:00 - 17:00)

- **Bedrooms:** Used for resting, napping, or personal work.
- **Courtyard:** Some might engage in light activities or continue with chores.

5. Evening Routine (17:00 - 19:00)

- **Kitchen:** Preparation of dinner.

- **Courtyard:** Social interactions and evening chores.

6. Dinner (19:00 - 21:00)

- **Courtyard:** Dinner is usually eaten here.

7. Leisure/Study (21:00 - 23:00)

- **Living Room:** Used for leisure activities such as storytelling, watching TV, or studying.

8. Sleeping (23:00 - 07:00)

- **Bedrooms:** Used for sleeping through the night.

Availability of Windows and Ventilation

1. Courtyard

- **Windows:** Open-air space, hence, not applicable.
- **Ventilation:** Excellent natural ventilation.

2. Bedroom

- **Windows:** Typically, one or two windows for light and air.
- **Ventilation:** Natural ventilation through windows and sometimes through small vents in the walls.

3. Living Room

- **Windows:** Usually has several windows.
- **Ventilation:** Good natural ventilation.

4. Kitchen

- **Windows:** At least one window to allow smoke and odors to escape.
- **Ventilation:** Natural ventilation aided by windows and sometimes additional vents.

5. Storage Room

- **Windows:** Often none, to maintain a stable environment for stored items.
- **Ventilation:** Limited, sometimes small vents to prevent dampness.

6. Bathroom

- **Windows:** Small windows or high vents for privacy and ventilation.
- **Ventilation:** Natural ventilation through windows or vents.



The kitchen area located outside the building, mostly at the back of the house.



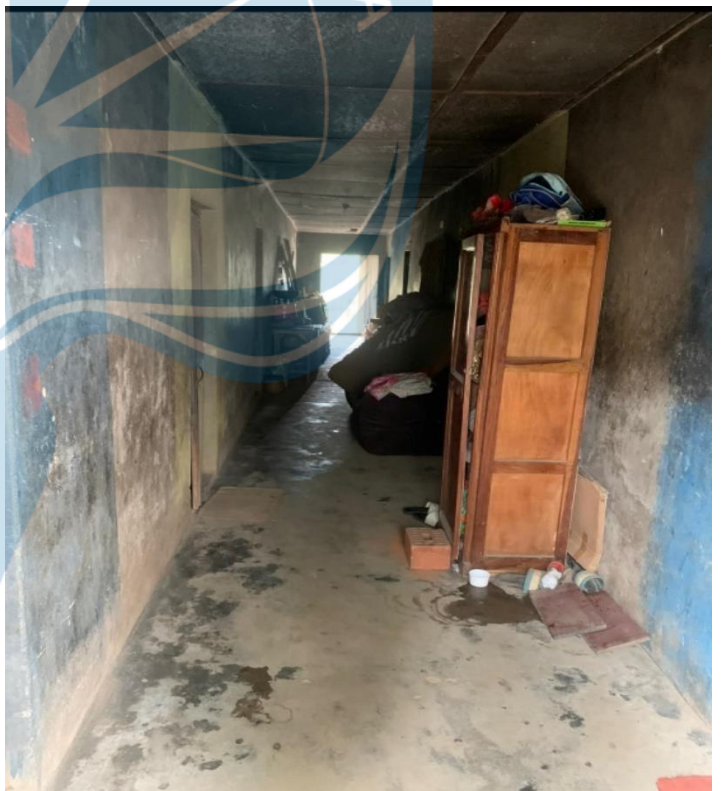
Central Hallway that leads to all other spaces



Side view of hybrid traditional house: modern windows and roof



More images of the hallway also used as store



More images of the hallway



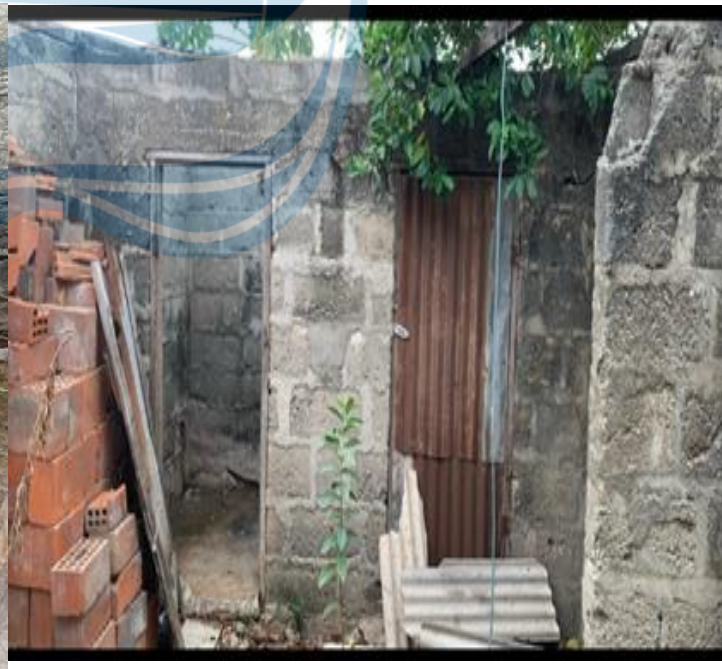
More image of the hallway



Toilet usually located at the back of the house



bBathroom, usually located outside of the house



Front view of bathroom and toilet, located outside the house, usually at the back of the house