THE REPUBLIC OF TURKEY
BAHÇEŞEHİR UNIVERSITY

AN ANALYSIS OF THE TECTONIC QUALITIES IN TRADITIONAL ARCHITECTURE OF KANO

M.S. Thesis

SADIQ.I. YAKASAI

ISTANBUL, 2016

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Istanbul, 2016 Sadiq. I. Yakasai

OZET

GELENEKSEL KANO MİMARİSİNDEKİ

TEKTONİK NİTELİKLERLE İLGİLİ İNCELEME

Sadiq. I. Yakasai

Mimarlik

Danışman: Doçent Dr. Özen Eyüce

Şubat 2016, 51 sayfa

Geleneksel kelimesi, toplumda bir norm olarak kabul edilen ve ana unsurları bir nesilden diğer nesile geçen gerek prosedürel gerekse maddi nesnelere gönderme yapar (Noble, 2009). Bir başka deyişle, geleneksel mimari bölgedeki yerel malzemeler ve teknikler kullanılarak kültüre veya geleneğe uygun olarak uygulanan mimari tipidir. Dünya genelinde her bölge kendisine özgü bir kültüre, iklime, çevre koşullarına ve buna uygun bir mimariye sahiptir.

Önemli nitelikteki özellikleri koruyan tarzda bir mimariyi yaratabilmek için, mimarlar ilgili bölgelerdeki geleneksel mimariyi binaların tasarlandıkları çağdaş ortama karşılık gelecek şekilde yeniden yorumlayan eklektik bir yaklaşım geliştirdiler. Bu yaklaşım, geleneksel tektonik mimari ile çağdaş mimari arasındaki bağlantının çok zayıf olduğu, çağdaş mimari detaylarının yanlış biçimde ifade edildiği Kano-Nijerya'da da dikkati çekiyor. Bu tezin amacı, geleneksel mimaride çağdaş bir şekilde anlamlı bir ifade yaratılması yolunda bir atlama taşı olabilecek yaklaşımları ve geleceğin mimarlarına Kano-Nijerya sınırları içinde orijinallik anlayışı ve çağdaş mimarinin uygun yorumu ve anlatımıyla mimari yaratma yolunda olanak sağlayan mimari ideolojisini araştırmaktır.

Geleneksel mimarinin tektonik niteliklerini araştırmak amacıyla, Karl Bötticher, Gottfried Semper, ve Kenneth Frampton'un kuramları çağdaş mimari tarzının mimari anlatımının anlaşılması ve geleneksel Kano mimarisine uygulanabilecek yaklaşımların nasıl

bulunabileceği konusunda kavramsal bir çerçeve sunmaktadır. Diğer bölgelerde geleneksel mimarilerinin yeniden nasıl yorumlanmış olduğu konusundaki bir inceleme de geleneksel mimarinin uygun anlatımı düşüncesinin çağdaş tarzda nasıl uygulanabileceği hususunda da bir farkındalık yaratmaktadır.
Anahtar kelimeler: Geleneksel mimari, Çağdaş mimari, Kano-Nijerya.

ABSTRACT

AN ANALYSIS OF THE TECTONIC QUALITIES IN

TRADITIONAL ARCHITECTURE OF KANO

Sadiq. I. Yakasai

Architecture

Supervisor: Assoc. Prof. Dr. Özen Eyüce

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The word traditional refers both to procedures and material objects that have become accepted as a norm in a society, and whose elements are passed on from generation to generation (Noble, 2009). That is to say, traditional architecture is a type of architecture that is made in accordance with the culture or tradition using existing local materials and techniques from the region. Across the globe, every region has a specific culture, climate, environmental condition and suitable architecture.

In order to create an architecture which preserves features of significance, architects have developed an approach in reinterpreting the traditional architecture of their respective regions to correspond with the contemporary environment in which the buildings are being designed for. This approach is noticed in Kano-Nigeria where there is a very weak link between the traditional architectural tectonics and contemporary architecture, the contemporary architectural detailing is expressed in a wrong manner. This thesis aims at searching for approaches which could become a stepping stone in the course of creating a meaningful traditional architectural expression in a contemporary manner and an architectural ideology which could enable upcoming architects on the pathway of creating architecture within the confines of Kano-Nigeria with a sense of originality and with appropriate interpretation and expression of contemporary architecture.

In order to explore the tectonic qualities of traditional architecture, the theories of Karl

Bötticher, Gottfried Semper, and Kenneth Frampton provides a conceptual framework for understanding the architectural expression of contemporary architecture and to find how such approaches could be applied to the traditional architecture of Kano. A survey of how other regions have reinterpreted their traditional architecture would also give an awareness on how to apply an idea of the appropriate expression, of the traditional architecture in a contemporary manner.

Keywords: Traditional architecture, Contemporary architecture, Kano-Nigeria

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1. INTRODUCTION

In the requirement for making a suitable shelter, mankind has put in so many efforts in creating structures to specifically adapt to the environmental conditions, all over the world. These changeable responses to environmental conditions are geographical factors, and culture, with the later artistic expressions of distinct regions, gave rise to the term known as ‘traditional vernacular architecture’ as used in contemporary definitions today. To further understand traditional architecture, the past articulation which recommends the deciding elements of traditional architecture are regional forms, materials at a particular place and time reflecting everyday life and experience of people within a culture or region, with the evolution of handcraft passed down from generation to generation. Every one of these elements is what identify the culture of a region.

The term "culture" traces its roots back to German Romanticism and Herder's (H Johann Gottlieb) idea of the ‘Volksgeist’ which means the "spirit" of a people. The term was adapted for anthropological use by a German anthropologist by the name of Adolf Bastian, the term later diffused (via Edward B. Tylor) into British anthropology, and (via Franz Boas) into American anthropology (where it came to define the very subject-matter of anthropology. In anthropology, it is Tylor's definition that is most often cited as classical. Tylor (1871, p.1) states,

> *"Culture, or civilization, taken in its broad, ethnographic sense, is that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society."*

Having a further look into Tylor’s definition, culture could be defined as a way of life in reference to a specified community which has been molded via customs, traditions and historical encounters with other civilizations. Confining the term ‘culture’ in an architectural perspective, we understand it to mean the vernacular or traditional styles expressed in buildings. These are buildings and construction techniques which have been adopted by Indigenous people of different regions of the globe and is a resultant of trying to respond to the needs of an environment and in doing so, creating a sense of a place and an identity for the region's traditional architecture.

Tectonics deals with the product of human artistic skill, not with its utilitarian aspect but solely with that part that reveals a conscious attempt by the artisan to express cosmic laws

and cosmic order when molding a material (Gottfried Semper, 1985). The idea of making an expression through craft was essential, as evidenced in his definition.

Nigeria is situated on the western coast of Africa. It is bordered to the north by Niger, east by Cameroon, to the south by the gulf of the Guinean part of the Atlantic Ocean, and west by Benin. Nigeria consists of multi-ethnic groups, the three significant ethnic groups are the Hausa, Igbo, and Yoruba who are noted for different architecture and culture.[1] Focuses will be made in the Hausa part where Kano is situated.

This thesis makes an in-depth review of an analysis of the tectonic qualities in traditional architecture of Kano. It would give description and survey of the different architectural expressions in traditional architecture within the region and how attainable these expressions could have a meaningful continuation in a contemporary manner. It also takes into view an approach which could become a starting point in the process of creating a relevant architectural expression of contemporary architecture in the region, which could aid upcoming architects in the direction of creating architecture with a sense of originality. In trying to accomplish this objective of a meaningful reinterpretation of traditional architecture of Nigeria-Kano. The historical interpretations of tectonic theories through the relevant literature of Bötticher, Semper and Frampton will be examined to have a better understanding of how contemporary approaches are expressed. The traditional architecture of Kano, and also a survey of how other regions have reinterpreted their traditional architecture would give an awareness on how to apply an idea from traditional architecture.

1.1 SCOPE OF STUDY

This thesis is aimed at showing how contemporary features should be defined as part of architectural expression for a meaningful continuation of the tectonic characteristic in traditional architecture of Kano. By comparing the theories of Bötticher, Semper, and Frampton as to have a better understanding of the importance of tectonics in architecture, it will also look at how other regions have reinterpreted their traditional architecture to adapt to the environment in which structures are designed for.

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[1] Cordelia O. Osasona, *from traditional residential architecture to the vernacular: the Nigerian experience*, p.3-4.

Learning from contemporary approaches to the traditional architecture by focusing on the traditional features, use of local materials, drawing inspiration from cultural ideals and knowledge of contemporary architecture. This research is motivated by the desire to understand the potentials of traditional architectural detailing and their values in an environment.

1.2 METHODOLOGY

This thesis makes use of the qualitative methodology and it has two fold objectives; to understand the importance of tectonics in architecture and development of architectural systems and the traditional architecture of Kano.

The first part is a historical interpretive method through which the relevant literature of tectonics is used. It starts by defining tectonics in architectural discourse and under what circumstances these sorts of approaches to architecture is rendered acceptable or the contrary. In the second part, the qualitative comparative analysis of the tectonic characteristics of Kano architecture is made. Hence, the materials and construction techniques are reviewed to have an understanding of the qualities, as to what they mean in traditional architecture.

A study of already existing buildings outside Nigeria based on the building form, materials, construction techniques and qualities they possess will be necessary to establish the extent.

The first chapter presents an introduction to the study area, the idea of traditional vernacular architecture as used in contemporary definitions today. Also an explanation of the strategies, which were used in the thesis to achieve the goal.

The second chapter will focus on ideologies and theories of tectonics in architectural discourse, under what circumstances these sorts of approach to architecture is rendered acceptable or the contrary.

The third chapter will give a better insight for understanding the northern region and where Kano is located, looking in the diverse aspect of history of how it evolved through history, and evolution of northern architecture is displayed through different trends that influenced the architecture, the first is the influence of Islam and the Islamic forms of architecture which were inherited via North African trend of Architecture and secondly, the trade routes of the Northern Empires of Nigeria which facilitated the introduction of the architectural trend through the influence of trading with people from the Northern parts of African and within

the Empires of the region.

The fourth chapter continues by limiting the parameter of study into some selected buildings that will be used as case study in the region of Kano. By visual analysis, the materials and construction methods will be sighted as to understand the qualities they curtail in traditional architecture of Kano.

The fifty chapter will analyze the contemporary interpretation of Kano architecture by stating why such approaches can be considered successful or not in terms of architectural expressions. Focusing on the traditional and contemporary architecture of the region. Also the findings of the research will be reviewed.

The Sixth chapter Conclusion presents the discussion and results of previous chapters. Focusing on a set of steps that could be implemented in not only correcting the growing present trend in the region. Sighting examples around the world where contemporary architecture has been reinterpreted and also certain features which were incorporated to fit the region's architecture. The factors that contribute to the approach in reinterpreting features that exist in traditional architecture from the examples will be noted. Also in advancing and promoting a positive implementation of such a growing architectural approach to building designs in the region.

2. LITERATURE REVIEW

This chapter consists of reviewing the tectonic theories from nineteenth and twentieth century, and post-modern focusing on. Bötticher, Semper, and Frampton will be examined to have a better understanding of the importance of tectonics in architecture and the development of architectural systems is determined.

2.1 TECTONICS IN ARCHITECTURAL DISCOURSE

The beginning of tectonic culture is absorbed with the inception of the time period in the history of the master builders. This era commences when people situated on sides in 8000BC they started to settle in cities rather than living as nomads. Earlier on every individual was his or her own architect and created the shelter for the night. The new metropolitan condition gave rise to a new distribution of labor. With more established society, it shaped new ways of building techniques because the constructions were expected to be more durable and by that the techniques became more complicated. An artisan that was a class for building experts then developed, tectonics is basic to the name of a professional architect. Which is a narrowing of the Greek word archi that means master and the Greek word tect that means a builder, and is connected to the word tectonic (Frampton, 1995).

In this period the architect created architecture in the building site using existing materials and hands on the site, in a position that if any failure was encountered the blame will be on him during the architectural process. Through trial and error techniques was how the masters learned and taught their apprentice, gradually they developed the ideas. The knowledge of construction, sun movement, how materials responded, space proportions and colors to be used was gradually improved and passed from the masters to the apprentice through generations to architects. Despite the little knowledge, the master builders approach to architecture enabled the development of a building culture in which the understanding of materials and techniques was redefined. A tradition of tectonics emerged.

The industrial revolution- the connotation of tectonic tradition, in the intermediate of the eighteenth century in England and later in other countries, the period of the master builder was to a great extent outplayed. The introduction of machines replaced the physical human strength and animals gave energy to mechanical production where the economic cost of items drop. This led to the abundant of the artisan production and also had an impact on the practice of architecture. Where craft techniques of building on the site had been the standard during

the master builder period, the new methods of production in factories became the new approach in the industrial era.

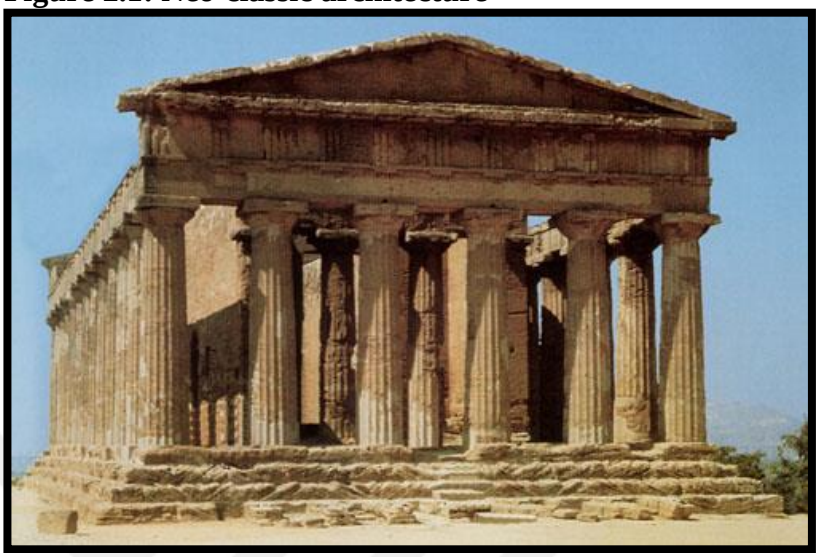
The changes of the architectural production were not only a matter of industrialization but also due to the massive population growth in the nineteenth century and urbanization. That led to the demand for more shelter within a limited time. These temporal expressions also presented a dispute to the tectonic tradition.

The term tectonic has been utilized as a part of the structural interpretation by numerous architects and theoreticians. It has two major interpretations in architecture: the theory of the internal structure of work of art, and the forming and joining of form elements to harmony. Within tectonics, their differences between the understanding of the idea. The different approaches will be examined based on theories of Karl Bötticher (1806-1889), Gottfried Semper (1803-1879) and Kenneth Frampton (1903- date).

Karl Botticher- tectonics is related to the expression and architecture principles. The tectonic evaluation in the mid-nineteenth century can be known as an evolution against the understanding because it attempts to explain architecture and arts. The writings of Botticher can be observed as the response to Georg Wilhelm Friedrich Hegel (1770-1831) a historian thinker of western philosophy. Hegel appreciated the caution of art and architecture as a kind of religion as well and wanted it to disappear in the last stage of progress of the society. Instead, Botticher looked at it at a different point and he said the context of a diverse historicism of the mid-nineteenth century where architects accept diminished architecture to a matter of selecting between neo-classic as shown in figure 0 and Gothic style seen in figure 0 for aesthetic aspiration. Bötticher aim was to move away from the historicism. Accordingly he aimed at focusing on understanding the two styles to find out what made them different, but equally great architectural expressions. He interpreted Greek architecture as an architectural example that reflected the structural understanding of limestone.

The short spans, massive columns, and beams adapted the stone to endure stress, failure and endure pressure. Evenly the Gothic architecture was appropriate to use wood and stone. Greek and Gothic was in this manner no longer a matter of two styles, although displayed how different principles could be mirrored indistinct expressions.

Figure 2.1: Neo-classic architecture



Source: www.utexas.edu

Figure 2.2: Gothic architecture

Source: www.skyscrapercity.com

On the backbone of this examination, Bötticher introduced two approaches to architecture: (Kunstform) art-form and (Kern from) core-form (Bötticher, 1844). The art-form is defined as his visual appearance of the building and what the discourse on style most often be given as an example. While core-form was the recently discovered perspective of how structural principle and materials used contribute to a certain architectural expression. With his relation to the Greek and Gothic architecture styles as initially perceived not only due to the artistic choice, but also as a way of given the feeling of place and time that the architecture

originated. He could disapprove the reduction of architecture to the choice between different styles, Bötticher (1846, p.150)

"All opinions for or against a particular style have referred only to the outer shell, that is, to the scheme of the building's art-forms, which were considered to be identical with the principle of a style. The true essentials have never been seriously considered; the discussion has never actually turned to the principle and material conditions on which each is based."

His understanding of the Greek and Gothic architecture shaped the understanding of architecture as something more than a choice between styles but as something that had its inner logic and knowledge backbone that resulted into development of originals that were adequate for each cultural context, the materials available and the structural principles.

2.2 TECTONICS IN NINETEENTH AND TWENTIETH CENTURY

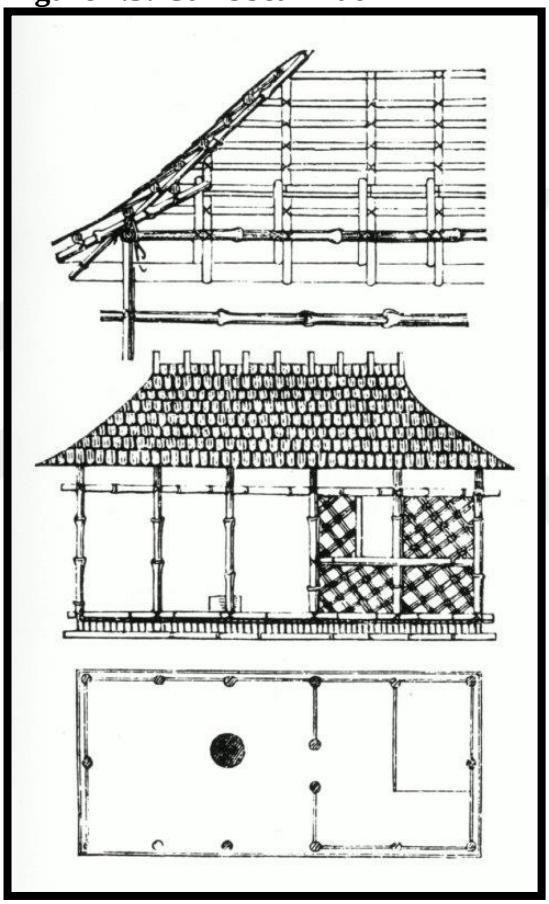
Gottfried Semper- tectonics is related to how different materials are expressed. Where Karl Bötticher connected the structural principle and architectural expressions together, Semper applied the same method with building materials and architectural expressions. Basically, he was influenced by Bötticher approaches of architecture but in a different manner. Semper desired to understand what advanced the buildings approaches as whole, this led him to understand the characteristics of people where he examined the building culture of primitive cultures in order to appreciate what led to different styles.

The anthropology survey was the base for Semper and what led him to find the four elements. He paid more attention to the craft that was used to form the materials, in essence, Semper developed his perception of the four elements by pairing them to an understanding of how they confide on crafts. He explains how the four elements, hearth, roof, enclosure and mound distant from their material. The hearth should be made from earth or clay, roof components of wood, the textile components from strings, and the mound of stone. The techniques of buildings were that of the artisan and were classified into four: ceramics, carpentry (tectonics), weaving and masonry (stereotomy).

Semper tectonics was to show how the expressions of these materials were confined to the materials and techniques- for example, the weaving of threads naturally forms another expression than carving of wood. A roof, in Semper terminology, should not just be understood as a roof, but as a component that was made as a frame constructed by a number of rigid (wooden) elements. The elements can be understood from the Caribbean hut (see

figure 2.3). Here not only the roof but the walls of the hut are constructed from the wooden components. The hearth is the round figure found in the plan and the mound is made smaller, it's made from stone which carry's the wooden columns- rather than been a wall motive, the walls are made from weaving textile surfaces.

Figure 2.3: Caribbean hut



Source: www.pinterest.com

To Semper the four elements were not evenly important, the most important elements were the hearth- the moral element of architecture and the enclosure. The other elements which were the load- carry structure and mound were opposed, only the secondary that dealt to support the primary elements of the architecture. Semper (1851, p.102) states that

"The first sign of human settlement and rest after the hunt, the battle, and wandering in the desert is today, as when the first men lost paradise, the setting up of the fireplace and the lighting of the reviving, warming, and food-preparing flame. Around the hearth the first groups assembled; around it the first alliances formed; around it the first rude religious concepts were put into the customs of a cult. Throughout all phases of society

the hearth formed that sacred focus around which the whole took order and shape. It is the first and most important, the moral element of architecture. Around it were grouped the three other elements: the roof, the enclosure, and the mound, the protecting negations or defenders of the hearth's flame against the three hostile elements of nature."

Then Semper reduced the columns- which most of his generation focused on- to be a supportive structure and he elevated the textiles to be the starting of architecture. Semper (1860, p.254).

"…the beginning of building coincides with the beginning of textiles. The wall is that architectural element that formally represents and makes visible the enclosed space as such, absolutely, as it were, without reference to secondary concepts. …the structure that served to support, to secure, to carry this spatial enclosure was a requirement that had nothing directly to do with space and the division of space. It was foreign to primitive architectural thinking and was in the beginning, not a form-determining element."

The basic difference between Semper and Bötticher, that still represents an interval in tectonic thinking, is where Botticher aims attention at the structural principles as the groundwork of different architectural original examples, Semper concentrated on the techniques to shape materials as well the relation between the four elements of architecture.

2.3 TECTONICS IN POSTMODERNISM

The post-modern approach to architecture conferred much the same direction as the nineteenth century of tectonics. The recently discovered historicism was practiced in a diverse manner that did not reintroduce its origin but reproduced the components as façade decorations that did not have a link to core-form. Frampton (1995, p. 337)

"For all its marginality, tectonic culture still possesses a vestigially resistant core, particularly as this is manifest in its proclivity for the tactile."

Kenneth Frampton explains his own theory from Semper writings, but also, Böttichers ideas can found as well. Frampton uses two approaches- ontology and representation- that echo Böttichers core-form and art-form and also the Semper idea of symbolic and technical visible features of construction. Frampton (1995, p. 16).

"The concept of layered transitional space as it appears in traditional Japanese architecture may be related indirectly to the distinction that Semper draws between the symbolic and technical aspects of construction, a distinction that I have attempted to relate to the representational and ontological aspect of tectonic form: the difference, that is, between the skin that represents the composite character of the construction and the core of the building that is simultaneously both its fundamental structure and its substance. This difference finds a more articulated reflection in the distinction that Semper draws between the ontological nature of the earthwork,

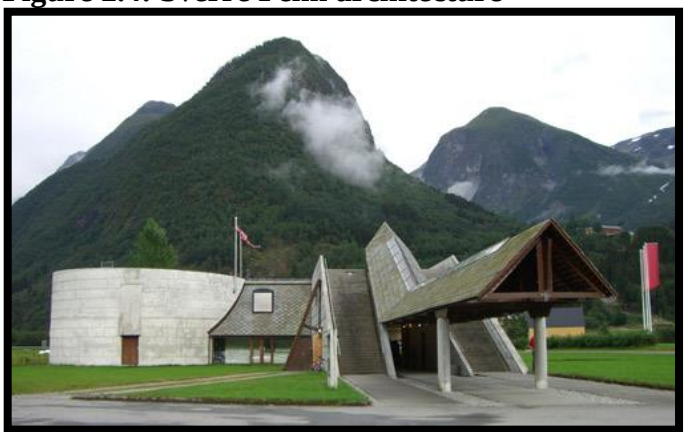
frame, and roof and the more representational, symbolic nature of the hearth and the infill wall. In my view, this dichotomy must be constantly rearticulated in the creation of architectural form, since each building type, technique, topography, and temporal circumstance brings about a different cultural condition."

Frampton through connecting the approaches of ontology and representation to Semper components of architecture indicating how Semper understood the components of the hearth and enclosure as a symbolic form of architecture. For Frampton the enclosure is the form of light infill of a wall, its essence is to represent the sense of nature and the construction. This component's purpose is to be expressive and embellish the understanding of construction. Frampton (1995, p. 7).

"It is characteristic for our secular age that we should overlook the cosmic associations evoked by these dialogically opposed modes of construction; that is to say, the affinity of the frame for the immateriality of sky and the propensity of mass form not only to gravitate toward the earth but also to dissolve in its substance."

To Frampton, a focal point of physical experience in the establishment of architecture is the important approach of elevating a building from the analytical construction to architecture with cultural meaning. Therefore, tectonics for Frampton is the poetics of construction, it is accomplished by a constant act of the relation between the two approaches of representation and ontology with relation to the particular topography, techniques and position of each building. This diction is what leads to a different cultural expression shifting from the Chinese temples with paper to the heavy masonry temples of Mayan Indians. By using local materials and developing local craft traditions, Frampton states that a different local and contemporary architecture can be developed. An example of such architecture is seen in Sverre Fehn's architecture figure 2.4

Figure 2.4: Sverre Fehn architecture



Source: www.flicker.com

In regards to Frampton tectonic approaches, it's not just continuation of t he tectonic tradition of Semper and Bötticher, he is also making it advanced.

The writings of Bötticher, Semper, and Frampton are near in their understanding of what tectonic is in architecture. They distinct though in how to understand tectonics in architecture, where Bötticher points out the representation of the structural organization. Semper pays attention to the materials and techniques while Frampton refrains from referring to one approach but indicates the common figure of the physical experience. To summarize the essential aspects involved in rediscovering entirety / factors of tectonics through architecture, highlighting the essential approaches would be important. These key approaches are what connects the traditional architecture and a contemporary reinterpretation of them, these are:

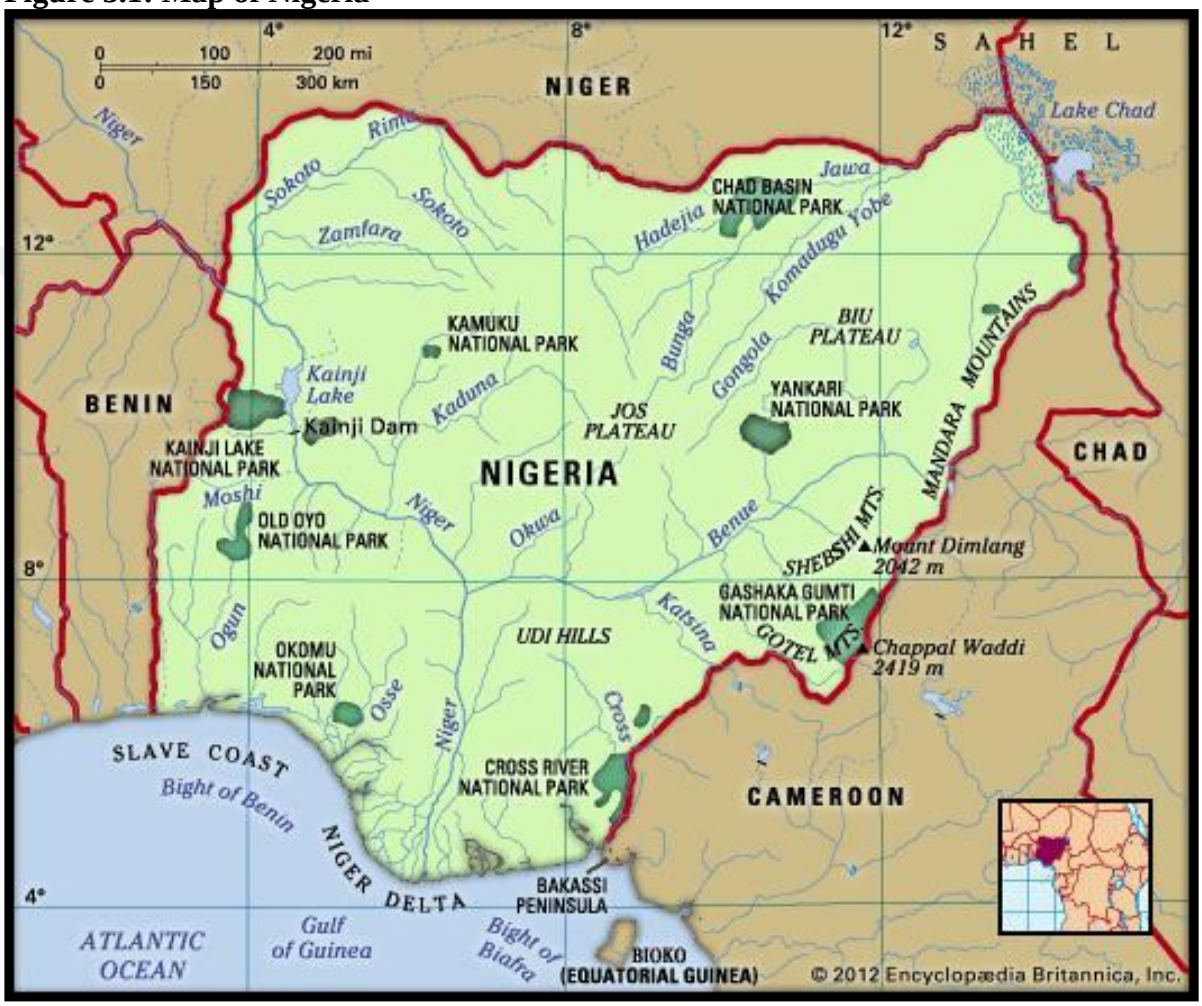
a. Materials and techniques: Semper and Frampton
b. Component and Composition: Semper, Bötticher, and Frampton

Combinations of these factors are repeatedly observed in the theories and examples which reflect the sound knowledge of contemporary architecture.

3. NORTHEN NIGERIA

As the research topic of this thesis is Kano which is located in Nigeria. A brief information about the region will be sighted to understand the significance of Kano in Nigeria.

Figure 3.1: Map of Nigeria



Source: http://www.britannica.com/place/Nigeria

Nigeria is situated on the western coast of Africa. It is bordered to the north by Niger, east by Cameroon, to the south by the gulf of Guinean of the Atlantic Ocean, and west by Benin. Figure 3.1 shows the location of Nigeria.

It consists of multi-ethnic groups, but there are three significant ethnic groups which are the Hausa, Igbo, and Yoruba who are noted for different architecture and culture.[2] Focuses will

[2] Cordelia O. Osasona, *from traditional residential architecture to the vernacular: the Nigerian experience*, p.3-4.

be made in the Hausa[3] groups which means north.

3.1 HISTORICAL BACKGROUND OF THE HAUSA KINGDOMS

The Northern regions are broadly classified under 12 states; these are Sokoto, Zamfara, katsina, Kano, Jigawa, Yobe, Borno, Kebbi, Niger, Kaduna, Bauchi, and Gombe. These states are referred to as "Arewa" by the indigenes of Nigeria which is a word in the predominate language spoken in the region "Hausa" which means North. Map of Nigeria, highlighting Northern Nigeria is shown in figure 3.5.

1. Sokoto
2. Zamfara
3. Kebbi
4. Niger
5. Katsina
6. Kaduna
7. Kano
8. Bauchi
9. Jigawa
10. Yoba
11. Gombe
12. Borno

The first Hausa[4] kingdoms began to emerge from middle ages from the Sahel borders. Eventually by extension through the savannah of northern Nigeria, the adjacent part of Niger. Invasion of immigrants with larger entity crossed to the Hausa lands. Eventually, they were categorized into several states in the myth of origin such as Kano, Katsina, Sokoto, Jigawa, Bauchi, Daura, Zaria etc.

The Hausa historians claim that a man named Bayajidda, was the progenitor of the Hausa.[5] According to the rise of states in Hausa land was evidently connected with the foundation of capital urban communities as focuses of power. They were unique in relation to prior settlements in that they were cosmopolitan, strengthened, and each the seat of a king who was perceived as the unrivaled force all through the encompassing territory.

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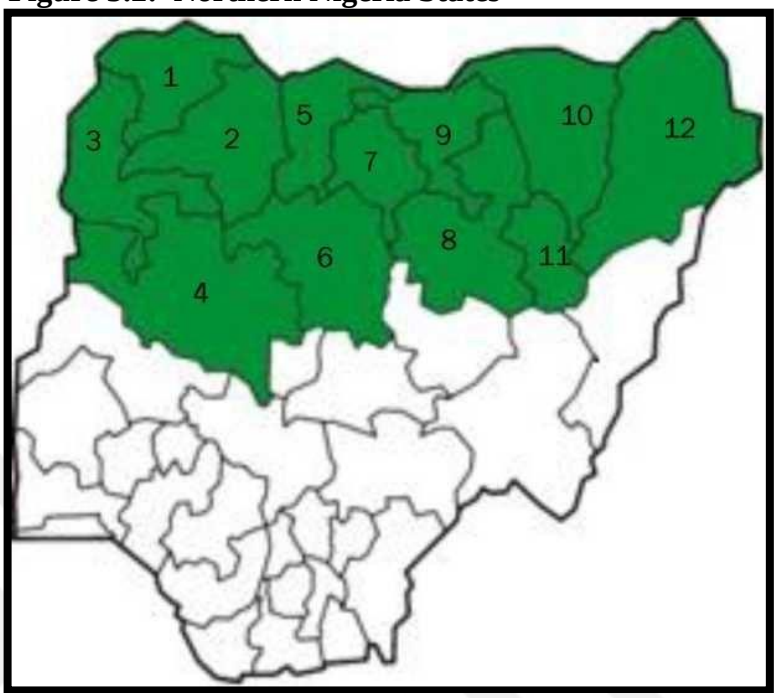
[3] Paul. Newman, *Modern Hausa-English Dictionary / Sabon ƙamus na Hausa zuwa Turanci, (1992) Published by University Press, Ibadan.*

[4] Hausa: Northern Nigeria

[5] Umar.G. K, *Transformation in Hausa traditional residential architecture: case study of some selected parts of Kano metropolis between1950 and 2005*, p.90-91

Figure 3.2: Northern Nigeria States



Source: http://nigeriamasterweb.com/

Before Habe kings ruled over Hausa land, the Fulani assumed control, and by mid-century the Hausa were stratified into three levels: the instinctive Fulani, the selective ruler class commanded by Fulani, and the Habe commoners. The seven Hausa city-states never unified, but they cooperated closely. Kano and Rano developed cotton and created materials, they were likewise known for their profitable and wonderful indigo color, which they utilized both for craftsmanship and for passing on their materials. They exchanged these with the other Hausa states, for example, Zaria, which gave slaves and grain. Katsina and Daura had direct access to the trans-Saharan processions, thus exchanged the items created in Hausa land for foreign goods.[6]

The history of the Hausa land further defined by the spread of Islam Crowder (1962). Brought by merchants and travelers, however, the old traditions of Hausa kingdoms were transformed and a new phase started in terms of architectural representation.

[6] A.R. Mohammed, *Kano Studies: A Bayero University Journal of Savanna and Sudanic Research*, p.7-8

3.2 EVOLUTION OF HAUSA ARCHITECTURE

The traditional architecture in Northern Nigeria is a resultant of two major factors, the first is the influence of Islam and the Islamic forms of architecture which were inherited via North African trend of Architecture and secondly, the trade routes of the Northern Empires of Nigeria which facilitated the introduction of the architectural trend through the influence of trading with people from the Northern parts of African and within the Empires of the region.[7] Northern African trend. Figure 3.2, Figure 3.3, Figure 3.4 show the African trend of architecture.

Figure 3.3: North African trend (Kasbah morocco)

Source: www.dadesexperiencetours.com/

The Hausa settlements can be described as compound structures which had courtyards and separated spaces. The distribution between internal and external spaces of the settlements was underlined through the influence of Hausa Islamic architecture[8], by the seclusion of women and men within the spaces.

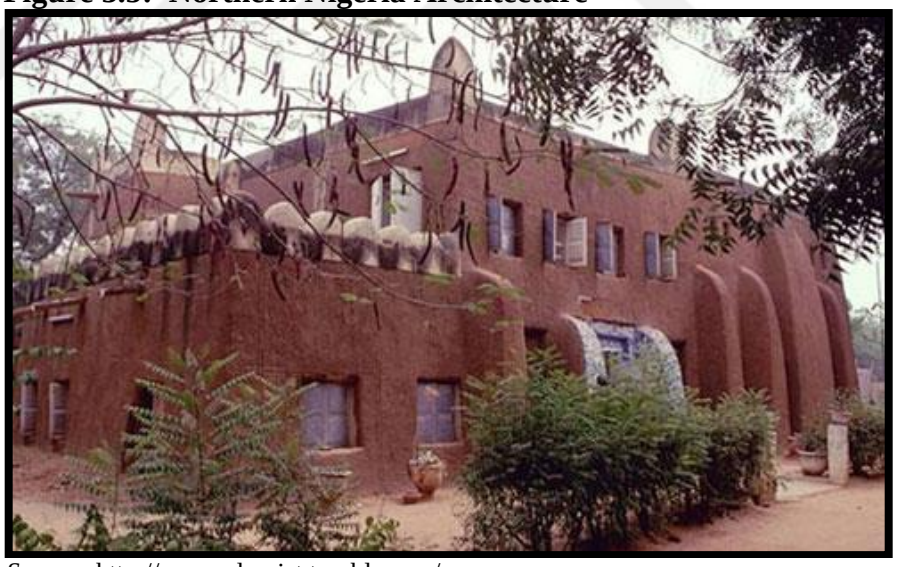
[7] A.R. Mohammed, *op.cit.*,p. 10

[8] Adeyemi, Ekundayo Adeyinka. "*Meaning and Relevance in Nigerian Traditional Architecture: the Dialectics of Growth and Change." Public Lecture Series* 1.21 (2008), p.11

Figure 3.4: Mali Architecture

Source: http://www.learner.org/

Figure 3.5: Northern Nigeria Architecture



Source: http://eyemodernist.tumblr.com/

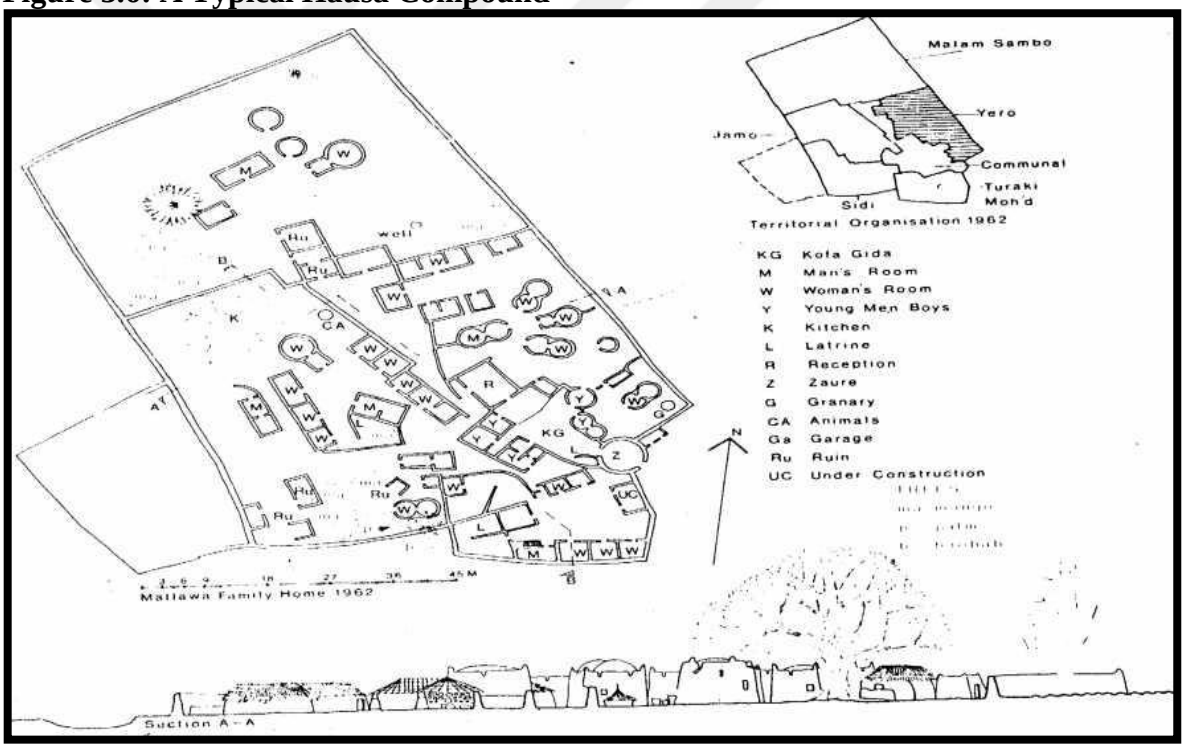
The early house *Gida* [9]consists of round huts with thatched roofs, this could be because of the traditional materials in the Hausa land. Before the arrival of Islam, the main occupation of Hausa habitats was farming, the house had granaries, cylindrical in the form made of mud and stone with thatched roofs.

[9] Aradeon. S. B, *Traditional Hausa mud roofed architecture: A provisional classification of Hausa structural systems and their resultant ceiling patterns*, p.13-16

In addition, the traditional compound structure of Hausa can be described as the compounds that were enlarged from the public and private areas in according to the religious and cultural norms. Usually surrounded by high mud walls. the hierarchy is starting from the '*Zaure*'[10], which could be circular, square or rectangular in shape culminating in the minor, court "*Cikin Gida*".[11] The *Zaure* (Foyer), next to is the forecourt and the guest lodge. The *cikin gida* is the private space which has restrictions.[12] Figure 3.6 shows a typical Hausa compound structure.

The indigenous materials for construction in Hausa area include four major materials in particular: earth, timber, reeds, grasses, and stones[13].

Figure 3.6: A Typical Hausa Compound



Source: Dmochowski.Z, R. (1990) Introduction to Nigerian Architecture Vol. 2

These materials were used for the construction of walls, roofs, and floors. The interior

[10] Zaure: lobby

[11] Martin A. Klein, Suzanne Miers, *Slavery and Colonial Rule in Africa*, p.171

[12] Umar.G. K, *op.cit.*,p. 103

[13] Uzuegbunam. Francis Onyech, *op.cit.*,p. 69

decorations were one of the most striking features of Hausa architecture, and they were described as the motifs which stimulate visitors to want to figure out the techniques and about their origin Sa'ad (1989).

3.3 THE CITY OF KANO

Kano state is located in the North –Western region of Nigeria, West Africa. Katsina borders the state to the Northwest, Jigawa to the Northeast, Bauchi to the Southeast and Kaduna to the Southwest. Kano began as a profound focus in which Tsumburbura[14], the then acclaimed divinity, was housed at the Dala peak under Barbushe. With progressive increment in the populace, different chieftains dwelled at other cautious locales alongside their devotees. Kano turned into an imperative business and assembling focus amid the Bagauda line between 10th and 11th century Sa'ad (1989). Figure 3.7 shows the map of Kano city in Nigeria.

To comprehend the traditional structures of these regions, a comprehension of the connection in which they are incorporated with is required. Settlements in the districts generally were constructed as old city states dating around the mid-fifteenth century, these were the vernacular urban connection. A case of such old urban communities is the city of Kano which is a standout amongst the most referred to samples. These old urban communities were described by having city walls and city entryway doors as seen in figure 3.8. Inside of the city walls, we discover sorts of structures. These were the Emir's royal residence, Marketplace, and private houses[15]. Figure 3.9 shows the old city urban pattern of Kano; showing external walls, street pattern, and entrance lobby. Outside the city walls had living arrangements which were considered as the provincial territories, the structures built contained various family units inside of a compound. The traditional buildings had features in common such as;

a. Constructed using Mud or Adobe (which were the local materials most available)
b. Timber structural framework.
c. Thatch roofs which later on were replaced with flat domed roofs.

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[14] Paul. Newman, *Ibid.*

[15] J. C. Moughtin, *The traditional settlements of the Hausa*, p.29-30

d. High and small external openings on external walls for windows.

Figure 3.7: Location of Kano in Nigeria

Source: www.skyscrapercity.com

Figure 3.8: Kano city panoramic view

Source: oldnaija.wordpress.com

a. Abstract decorative patterns in exterior and interior spaces
b. Courtyards in the middle of the compound.
c. Accommodations surrounding courtyard.
d. Entrance lobby / transitional space between public and private spaces.
e. Entrance lobby leading into the courtyard.

These are the general features common in typical traditional buildings which are found in the mosque, palaces, commercial and residential buildings. Some of these features are more elaborated than others in reference to the building types.

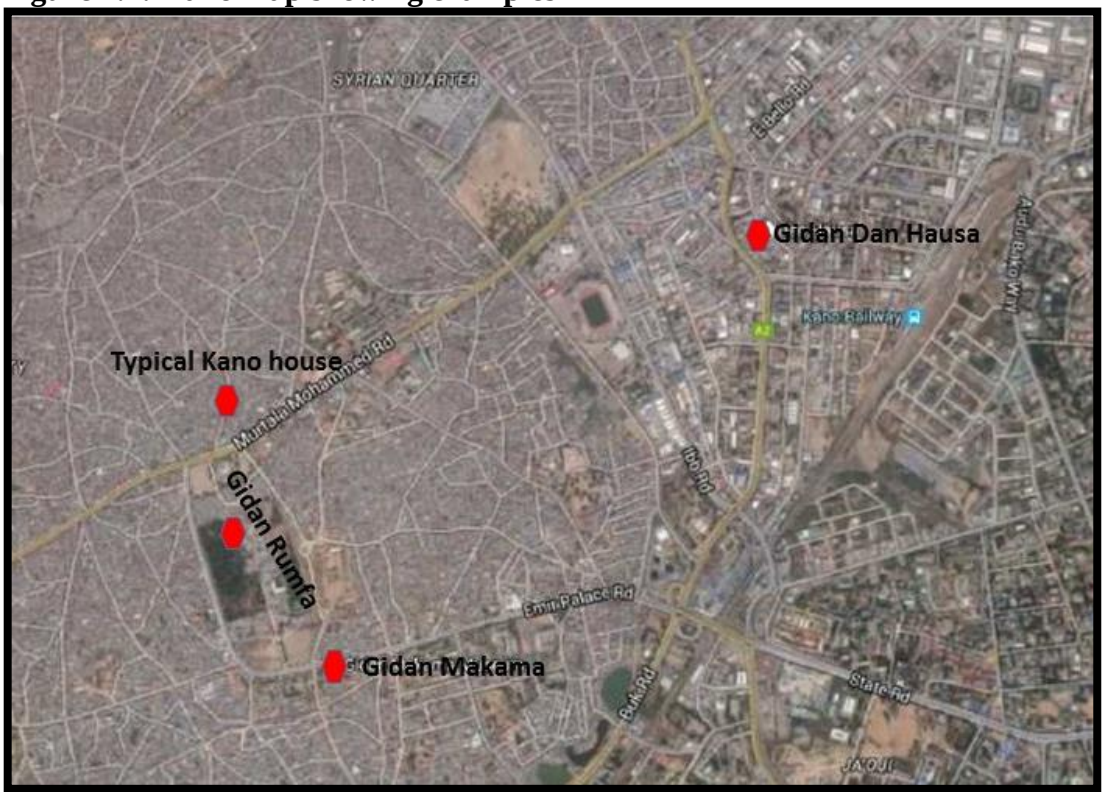
Figure 3.9: Kano city gate entrance

Source: http://nationalmirroronline.net/

4. TRADITIONAL ARCHITECTURE OF KANO

In order to understand the tectonic qualities in traditional architecture of Kano, it is important to study the Hausa architecture with a Typical Kano house, Gidan makama, Gidan rumfa and Gidan dan hausa as examples. Figure 4-1 shows a map of Kano highlighting the examples in red.

Figure 4.1: Kano map showing examples



Source: https://www.google.com/maps/@11.9946825,8.5154343,1558m/data=!3m1!1e3

Kano people like any other ethnic group have over time developed their architecture.It can be said to be a functional, and finds its basis in their culture, social lifestyle, climatic conditions, and the available building materials. The general characteristics will be analyzed based on the materials and construction techniques.

Climatic conditions: The climate of Kano is an important factor that determines what type of design to be hindered, specifically in residential buildings where there's high thermal discomfort level that needs to be eradicated. Kano is mostly hot and dry all round the year with a reasonable amount of rain during the raining season.

Table 4.1: Summary of Climatic Conditions in Kano

Climatic Conditions	Average Measurement
Rainfall	4.10'TRainfall Peak months
Humidity	80% Moisture Content/ Day in wet season
Temperature	33-34 º C /Day
Wind Speed	18mph in 185º in the North Easterly Direction
Sunshine	9hrs/day

Source: Kano Meteorological Agency 2011

4.1 A TYPICAL KANO HOUSE

The first example sighted would be Gida[16] (house) as of Hausa terms. The house is located within the walled city of Kano and is a good example of how elements from the traditional architecture of the region are composed.

Wall system: It is a Load-bearing system that is composed of mud bricks called "Tubali"[17], the base of the walls are thicker and then narrowed towards the top. They are laid in courses until a specific height is achieved (small spaces consist of three tubali wide at the base)[18], then joint with mud mortar. The external surface is then covered with plaster and "makuba"[19].

Roof system: The roof of a typical Kano house is mostly a flat roof. Palm timber "Azara" [20] are arranged side by side across opposite walls which are extended continuously, grass mat "Asabari" [21] is then spread across the azara and mud mortar is then applied. The external surface is finished with a thin layer of waterproof plaster mixed makuba.

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[16] Paul. Newman, *Modern Hausa-English Dictionary / Sabon ƙamus na Hausa zuwa Turanci, (1992) Published by University Press, Ibadan.*
Gida: *house*
[17] Tubali: *A sun-dried ball or brick of clay*
[18] Susan B. Aradeon, *Traditional Hausa mud roofed architecture: a provisional classification of Hausa structural systems and their resultant ceiling patterns,*p.58
[19] Makuba: *locust bean used for making protective plaster*
[20] Azara: *timber from palm tree*
[21] Asabari: *Grass mat used for roof covering*.

Figure 4.2: Typical Kano house

Source: www.suggest-keywords.com

Finishing's: The building is plastered with a locust bean called (makuda) using mud and sand, creating a rough texture on the surface.

4.2 GIDAN RUMFA

Gidan Rumfa (the House of Rumfa) was developed by the creative Sarki Muhammad Rumfa (ruled 1463-1499).the Kano royal residence was developed in the year 1479 to 1482. Gidan Rumfa positions as the biggest traditional royal residence in the sub-Saharan Africa.[22]

As the palace is larger few aspects will be discussed within the framework of traditional architecture of Kano.

Wall system: It is a Load-bearing system that is made of composed mud bricks called "Tubali"[23], the base of the walls are thicker and then narrowed towards the top.

[22] *Aliyu.Salisu .Barau, The Kano Emir's Palace, p.2*

[23] Tubali: *A sun-dried ball or brick of clay*

Figure 4.3: Gidan rumfa mud architecture

Source: http://archnet.org/sites/3778/media_contents/9360

They are laid in courses until a specific height is achieved (large spaces have four or five tubali thick at the base)[24] then joint with mud mortar. The external surface is then covered with mud plaster and "Makuba"[25].

Roof system: In the royal residence two systems are used for the roof, for small spaces the flat roof is used. Palm timber "Azara" [26]are arranged side by side across opposite walls which are extended continuously, "Asabari" [27] grass mat is then spread across the azara and mud mortar is then applied. The external surface is finished with a thin layer of waterproof plaster mixed makuba. Large span spaces mostly have dome roofs, the wooden arches that sprang from the opposite walls support the mud dome as shown in figure 4.4.

"...The arches are to carry the actual load in the first stage of the construction only, then the clay layer takes over. Due to creep phenomenon, a redistribution of internal forces takes place until equilibrium is achieved. After this, the clay layer works as dome structure assisted by the arches. The horizontal forces and the local tensile stresses are taken by the azara rods". Olieskiewicz (1978).

Having a look at Olieskiewicz definition on the how the arches are connected to the mud dome gives further understanding of the dome roof.

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[24] Susan B. Aradeon, *loc.cit*
[25] Makuba: *locust bean used for making protective plaster*
[26] Azara: *timber from palm tree*
[27] Asabari: *Grass mat used for roof covering*.

Figure 4.4: Dome roof

Source: www.der.org/films/tubali.com

Finishing's: The structure was plastered with a locust bean called (makuda) using mud and sand, creating a rough texture on the surface. Also white wash is used in some parts of the façade.

4.3 GIDAN MAKAMA

Gidan Makama is one of the oldest structures of Kano: parts of it date to around 1750 and the site's custom does a reversal considerably encourage. Raised as the city mansion of the makama, one of the most noteworthy dignitaries of the emirate, it is arranged in the corner of the extensive square before the Emir's Palace and at the western end, south side, of the Nassarawa Road.[28]

Wall system: It is a Load-bearing system that is made of composed mud bricks called "Tubali"[29], the base of the walls are thicker and then narrowed towards the top. They are laid in courses until a specific height is achieved (large spaces have four or five tubali thick at the base)[30] then joint with mud mortar. The external surface is then covered with plaster and "Makuba"[31].

Roof system: The roof of the residence is also a flat roof. Palm timber "Azara" [32] are arranged side by side across opposite walls which are extended continuously as shown in figure 4.6, grass mat is then spread across the azara and mud mortar is then applied.

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[28]Dmochowski Z.R**,** *An introduction to Nigerian Traditional Architecture, p.4.5*
[29] Tubali: *A sun-dried ball or brick of clay*
[30] Susan B. Aradeon, *loc.cit*
[31] Makuba: *locust bean used for making protective plaster*
[32] Azara: *timber from palm tree*

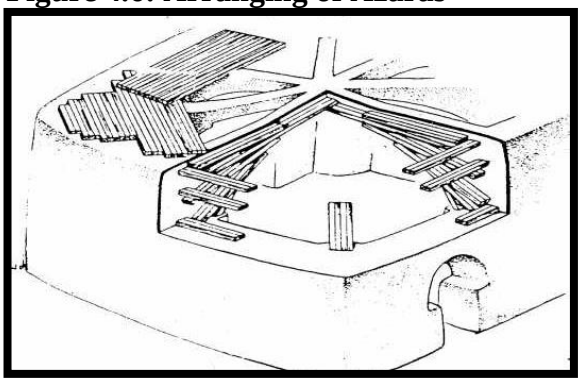
Figure 4.5: Gidan Makama

Source: blog. ng.jovago.com

The external surface is finished with a thin layer of waterproof plaster mixed with makuba.

Finishing's: The building is plastered with a locust bean called "Makuda" using mud and sand, that is splashed on the façade by the hand technique. Also by cutting off the ornament through the wet mud/sand.

Figure 4.6: Arranging of Azaras



Source: Dmochowski.Z, R. (1990) Introduction to Nigerian Architecture Vol. 2

4.4 GIDAN DAN HAUSA

According to some recorded reports the house goes back to more than 250 years prior, it was implicit 1909.Hanns Vischer a British colonial lived there and taught the hausa living arrangement how to talk and compose English, the house was named as Dan hausa due to how well he talked the dialect. According to Yashim (2012).

Figure 4.7: Gidan Dan Hausa

Source: http://www.nairaland.com/wildone1/posts

Wall system: It is a Load-bearing system that is composed of mud bricks called "Tubali"[33], the base of the walls are thicker and then narrowed towards the top. They are laid in courses until a specific height is achieved (large spaces have four or five tubali thick at the base)[34] then joint with mud mortar. The external surface is then covered with plaster and "Makuba"[35].

It also has buttresses that are protruding from the wall as seen in figure 4.8. A buttress "Dogari"[36], is often added to the wall when it begins to crack but is never included in the original design, Daldy (1945) tubali is placed during the foundation stages.by increasing the depth, from base to top by making the lower part wide and gradually it increases towards in the roof level.

Roof system: The building has a flat roof, palm timber "Azara" [37] are arranged side by side

[33] Tubali: *A sun-dried ball or brick of clay*
[34] Susan B. Aradeon, *loc.cit*
[35] Makuba: *locust bean used for making protective plaster*
[36] Dogari: *Buttress*
[37] Azara: *timber from palm tree*

across opposite walls which are extended continuously, grass mat "Asabari" [38] is then spread across the azara and mud mortar is then applied. The external surface is finished with a thin layer of waterproof plaster mixed with makuba.

Figure 4.8: Buttresses of Gidan Dan Hausa

Source: Author

Finishing's: The building is plastered with a locust bean called (makuda) using mud and sand, that is splashed on the façade by the hand technique. Also by cutting off the ornament through the wet mud/sand.

4.5 A SUMMARY OF MATERIALS AND TECHNIQUES USED IN EXAMPLES

Accordingly, The Hausa people in Kano metropolitan have enhanced the neighborhood and traditional on architecture utilizing materials found as a part of their territory, for example, mud, azara, grass mat and so on. In spite of the fact that, the building procedure is rapid; the present framework has given an elevated environment with numerous delightful structures and architectural benefits, utilizing obtained building materials, for example, the followings:[39]

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[38] Asabari: *Grass mat used for roof covering*.

[39] Paul. Newman, *Modern Hausa-English Dictionary / Sabon ƙamus na Hausa zuwa Turanci, (1992) Published by University Press, Ibadan.*

a. Clay.
b. Azara.(palm timber)
c. Tubali and mortar. (sun-dried ball or bricks)
d. whitewash/red earth for finishing's
e. Makuba. (locust bean used for making protective plaster)
f. Asabari. (A mat made chiefly from the grass)

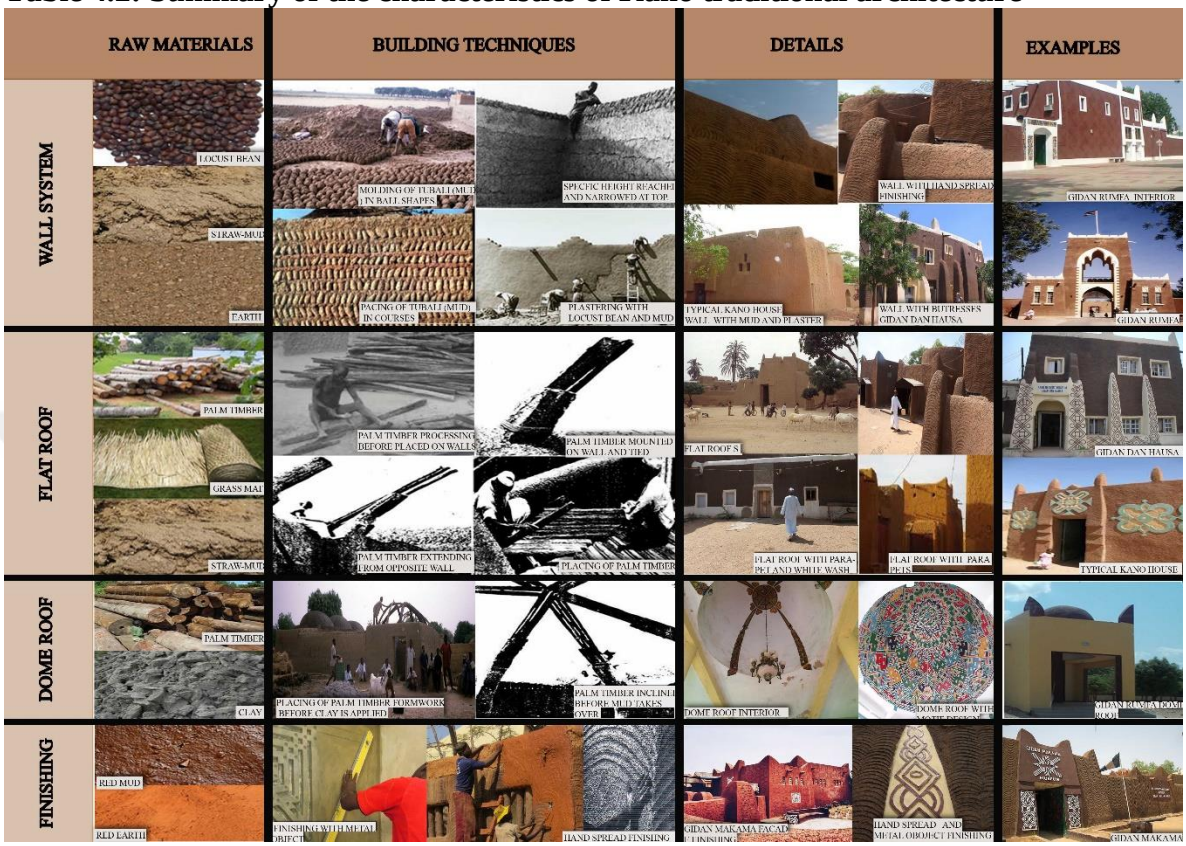
Visuals will be used to express, the wall system, roof system, and interior and exterior covering. Table 2 shows the materials and techniques with reference to the examples of Kano architecture.

g. Wall system: tubali, mud mortar, plaster, and makuba.
h. Roof system: azara, grass mat, mud mortar, and plaster,
i. Dome roof system: azara, clay.
j. Finishing's: sand and mud.

Decorations: This is one the most noticeable features of the traditional architecture, described as external and internal decorations. It celebrates the main entrance which directs you to the interior space, these features are divided into four categories:

k. The molding of the fresh mud plaster in by hand spread
l. Cutting through mud plaster or wet cement
m. Plastering the wall with Makuba (locust bean)

Table 4.2: Summary of the characteristics of Kano traditional architecture



Source: Author

5. CONTEMPORARY INTERPRETATION OF NIGERIA-KANO ARCHITECTURE

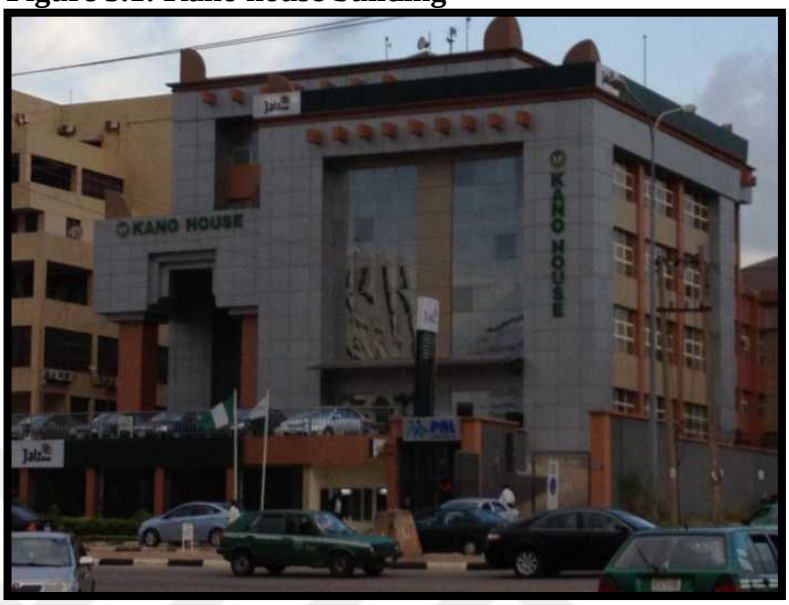
After having an insight of traditional architecture, the importance of tectonics in architecture and development of architectural systems understanding what they hinder. A discussion on how Nigerian Architects have attempted to do the same for the Architecture of Nigeria-Kano is put into consideration. The criteria for arguing the approach adopted by Nigerian architects is set upon the contextual investigations made in the previous sections and the conceivable accomplishments of the buildings.

Architects around the globe have made interesting efforts in attempting to reinterpret the traditional architecture of their respective region to suit the current sensibility. Endeavors have been made in shifting building sorts running from private, business, institutional and recreational structures. These endeavors in Nigeria-Kano have not fulfilled the target they are embarked to serve and have made the epitome of what most contemporary architects worry about, which is endeavors of "rebranding" traditional buildings that bring about disappointment.

To emphasize and support these claims, a study of two building types will be considered. The first will be a commercial building and the second will be a typical approach of residential buildings which have most recently sprang in construction all over the region.

The Kano house is an office building in the capital of Nigeria, Abuja figure 5.1. The building is designed to reinterpret and enhance the traditional architecture of Northern Nigeria, but it seems to be wanting in many aspects. Although the building seems to have a similarity with the traditional architecture, the main features borrowed have no functional purpose and have been wrongly applied to provide aesthetics to the building. The first feature borrowed is the roof drainage outlet figure 5.2 and the pointed edges figure 5.3 on the rooftop.

Figure 5.1: Kano house building



Source: Author

Figure 5.2: Gutter for rain passage

Source: Dr shuiabu architecture of Nigeria

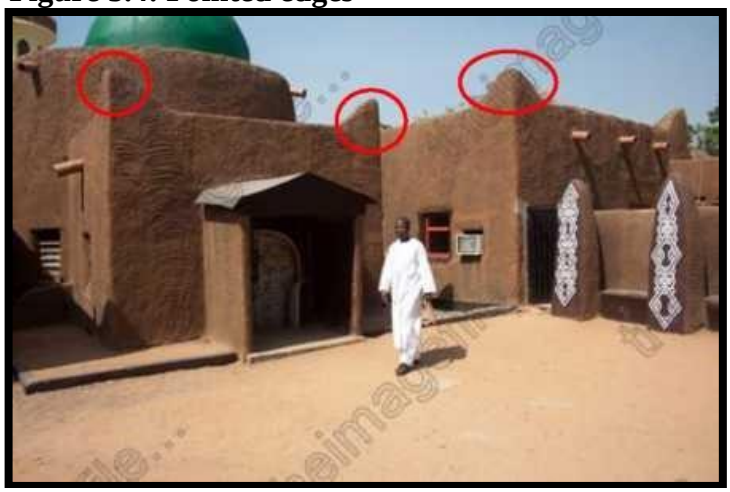
In the attempted reinterpretation of the rooftop waste outlet, the architect appeared to be unaware of what the purpose of the component was. It was utilized as a part of the conventional structures to empty downpour water out of the rooftop tops and after that utilized as an architectural expression on the building façade. The building includes this component with no apparent functional use.

Figure 5.3: Gutter for rain passage

Source: Author

The second component used is the pointed edges as shown in figure 5.4, which serve two purposes in the traditional architecture. For climbing the roof during construction or maintenance which ropes are hitched and also for aesthetics, the master mason considers a building without the pointed edges is like a bull without horns.

Figure 5.4: Pointed edges



Source: http://www.markshenley.co.uk/

These components are the two main components which don't have any reference made to the traditional architecture, they obviously don't fill any functional purpose.

The utilization of materials in the Kano house additionally has no reference made to the traditional local materials used.

Figure 5.5: Pointed edges

Source: Author

The materials of the building are reinforced concrete for the structural system, concrete blocks for external and internal walls, and it is finished utilizing aluminum claddings and paint on cement mortar. This in itself demonstrates no connection in trying to reinterpret the materiality of the traditional architecture. The materials utilized as a part of the traditional architecture were the most locally accessible and filled a practical need also. One of the useful purposes of the mud bricks has been to adjust to the harsh climate of the region. In the traditional structures of the locale, the mud blocks utilized supported as a part of engrossing warmth in the hot atmosphere at the day time and discharging some of it around evening time when the temperature drops. This phenomenon has been observed by people who have encountered entering these structures and could be further inquired about, redeveloped and connected in a contemporary way. It will very much reduce the energy requirement of the building and add to the sustainable feature of buildings in the region.

Thinking back to the Kano house, the materials utilized have far much inclination to retain heat which will be caught in the building and will require a considerable measure of manufactured cooling components to control the interior temperature of the building. This is an exceptionally unsustainable approach particularly for this situation were the target of the building was to reinterpret the traditional style of the locale yet it has failed in reinterpreting the utilization of its materiality or the functions they served.

The illumination of this point can't be affirmed because of the inaccessibility of building

arrangements as drawn by the architect, or the outline reasonable aim. Be that as it may, the need to accept no references had been made to traditional methods in any capacity.

Residential buildings

As of late, there has been a perceptible measure of estate developers and also private property holders who have chosen to embrace the traditional forms of architecture all over Kano-Nigeria. These persons depend on the architects as experts to think of an outline which would restore the traditional architecture in such a way, to the point that it would engage modern requirements. Shockingly, the general approach of the architects has brought about the same architectural mess as found in the Kano house. Despite the fact that one should appreciate the endeavors of architects in attempting and indicating enthusiasm for the traditional architectural design, the way it is being done is inadequate for accomplishing the objectives they are set out for.

Figure 5.6: Rain drainage

Source: Author

Putting the new approach of the residential buildings to the same test as the Kano house, the following can be observed. In the new residential types, we locate the same absence of reinterpreting conceivably favorable elements utilized as a part of the traditional forms. In the structures, one of these elements which are been discovered and significant is the utilization of the courtyard in the traditional building arrangements.

Figure 5.7: Pointed edges

Source: Author

The courtyard helped in making a suitable family recreational space inside of the limitations the home and, in addition, serving in the production of a space that helped to cool the building because of the plants and shrubs planted inside of them, these gave shades and hot air going through them got to be cooler as it went through the building. Alternate elements utilized as a part of the building types are only for aesthetic expansion to it, which served no clear capacity.

In the use of local materials, the acknowledgment of the advantageous use of reinforced concrete for the structure of the buildings, but the use of concrete blocks seems to be a substitute in which the other option stands as a better alternative. The buildings can easily be constructed using mud bricks shown in figure 5.8 which have been redeveloped by many regions in Africa such as South Africa were innovative ways of using mud have been developed. The use of these bricks as part of the building materiality will be of numerous advantages were ever they are possible.

The new residential types have no material likeness of any kind to the traditional architecture. The utilization of mud blocks in an imaginative way ought to be considered as a major aspect of the outline of the building.

Figure 5.8: Mud Brick Hydraulic compressor

Source: http://www.envirogadget.com/

The buildings designed are deprived of having the cultural experiences which used to be present in the traditional forms of architecture. It is a known fact that the mode of living and activities of the building users have drastically changed from the traditional mode of living to the most recent mode of living by the building users. But regardless of these changes, there are aspects which are still vital and which could be integrated into the new building layouts. An example of this cultural experience can be found in relation to how the family unit lived in compounds and buildings were designed in units within the compounds. The compounds were generally inhabited by extended members of the same family in the traditional context and this cultural idea of having social interactions can or should be reintegrated in the new building designs. This feature has been ignored in the building designs because it is referred to as being incompatible with modern day requirements, but the people of the region still have that same connection with the family and a general sense of togetherness within the people in a community.

After analyzing the approaches generally used by architects in Kano- Nigeria in their attempts to reinterpret the traditional forms of buildings, considering the efforts made as having enormous shortcomings in the approach used in trying to fulfill their aimed objectives. To use an analogy, it is like a person presented with a beautifully wrapped gift in a box but on opening the box, it is empty. The buildings are merely cactuses of the traditional architecture

of the regions which enclose no true principle observed by the traditional buildings. By stating all examples of such attempts have not met up with the requirements of embodying the ideology of recreating the traditional architecture of Kano- Nigeria because all examples, researched and observed always seem to have the same shortcomings in one aspect or the other. But like previously stated in the report, some views of the successful attempts are subject to an individual's perception. In my own opinion, the buildings have not been a successful attempt for reasons previously stated.

5.2 FINDINGS OF RESEARCH

The understanding of tectonics in architecture practice created a pathway of underlying the architectural expression in a contemporary manner. Kenneth Frampton uses the term tectonic in his book "Studies in tectonic culture: the Poetics of Construction in Nineteenth and Twentieth Century Architecture," For him, the term tectonic focuses on basic arranging as a kind of the constructional art. However by this, Frampton does not mean just the discovery of the constructional method, but rather he shows its expressive potential. The poetic expression can be figured out accordingly with functional, mechanically brief request; imaginative expression is innate in the specialized procedure. A building for Frampton is an everyday experience: it's a thing rather than a sign.

The writings of Bötticher, Semper, and Frampton are near in their understanding of what tectonics is in architecture. They distinct though in how to understand tectonics in architecture, where Bötticher points out the representation of the structural organization. Semper pays attention to the materials and techniques while Frampton refrains from referring to one approach but indicates the common figure of the physical experience.

The traditional architecture of Kano, commercial or residential buildings are generally made from mud with heavy rigid timber and sun brick. Buildings are to put in order to suit the culture and social structure.

Traditional building materials:

Dmochowski (1990) results indicate that although the simplicity of building materials and tools is observed, the Hausa traditional architecture arrived its final development due to determined human factor. The potentials of a master mason, as well as their regards to the materials, were economical and considerate. He added that traditional building materials are

categorized into three groups namely: rocks and amount of natural dry, fall apart: reduce to pieces, physical deposits of earth, laterite. Secondly trees, paints, shrubs, and their leaves, by product as extracts and lastly the metal along with accessories. The master builders are aware of the various building materials available within their confines, notable the properties of several trees. Also, they are well aware of the properties of building with earth.

The earth for making the sun dried mud bricks, mortar, and plaster.Wood is used for making doors, windows, openings and roofs. The finishings are made with a material called locust bean (makuba) and earth with decorated traditional motifs on the front façade.

Earth/Clay:

Earth dwellings have delighted in a late restoration because of the apparent way of the material; it is inexhaustible, free and found on the site with its look, feel and notice all adding to the feasible picture. Obviously, the practical accreditations of earth building originate from the chance of utilizing a material which is found at the site. This means the earth present nearby is really suitable for building with. Should this not be the situation and earth winds up being foreign made from further regions, the feasible advantages of the framework are extraordinarily disintegrated. It ought to be noticed that earth residences started from dry bone-dry atmospheres where elective materials, for example, timber were hard to come by, and the thick walls gave warm mass, keeping the inside cool amid the day.

Adobe/ Mud brick:

This is produced using sand, dirt, and water, with some sort of stringy or natural material (sticks, straw, compost), which is formed into blocks utilizing edges and dried as a part of the sun. Adobe structures are to a great degree solid and record for a percentage of the most seasoned structures on the planet. In hot atmospheres, thought about to wooden structures, adobe structures offer critical preferences because of their more noteworthy warm mass, however, are known not especially defenseless to seismic harm.

Timber:

In 1990, Dmochowski noted that the best roofing material is obtained from the palm timber (Azara) they are heavy, rigid and unpleasant to termites also resistant against to decay.

Mortar:

It is made traditionally by wetting and trampling of the earth with a mixture of grass, donkey

manure, and stalks. It's then been allowed to mature for three days and water is added every day, then wetted and rolled into short pieces before exclusive handful is thrown to the craftsmen for an appliance onto the wall surface.

Plastering:

This is applied in two coats, firstly the plane mud mortar and secondly the coat of the red earth and sand. Inquire to provide a good surface. The final coat is finished with the locust bean (Makuba) it's a good waterproof plaster.

Mud roofs:

There are basically two types of roofs in Kano traditional architecture, either flat or dome roof form. The flat roof is mainly used for spaces that are not larger than 3x4m. Palm timber (Azara) beams are placed side by side on the opposite wall which stretches inwards, then the roof is covered with the grass mat that's spread on top of the palm timber and then covered with mud mortar of about 5cm-15cm thickness. The outer surface of the roof is then polished or finished with the thin layer of water resistant plaster mixed with makuba (locust bean).

The dome roof is used for larger spaces, wooden arches sprang from the opposite wall until an apex point is achieved and then the grass mat is placed. Clay then takes over or either clay is placed without incorporating the grass mat then the roof is finished with sparkle paint. The drainage outlet is made from metal and placed outwards in order for the walls not to get damaged by rainwater.

Decorations:

This is one the most noticeable features of the traditional architecture, described as external and internal decorations. It celebrates the main entrance which directs you to the interior space, these features are divided into three categories:

a. The molding of the fresh mud plaster in by hand splash
b. Cutting through mud plaster or wet cement
c. Plastering the wall with Makuba (locust bean)

These features of the traditional architectural expression are considered to be a way to demonstrate sociological expressions and social prestige that naturally attracts the mind of visitors to want to understand and speculate about their origin.

Other features:

Pointed edges (Zankwaye) are undeniable features of Kano architecture which are found in different shapes and sizes, they serve two purposes in the traditional architecture. For climbing the roof during construction or maintenance which ropes are hitched and also for aesthetics, the master mason considers a building without the pointed edges is like a bull without horns.

6. CONCLUSION

The traditional Kano architecture is generally a mud architecture, it is a load-bearing construction which consists of thick walls that support the entire structure and the roof system essentially consists of linking shallow domes and flat roofs which the local tensile stresses are taken by the (azara rods) palm timber. The finishing's are made with earth-plastered, which present a monolithic appearance.

The method of textile architecture as Semper proposed is not applicable. The sociological expressions of the decorations of Kano architecture are conscious, in what Frampton calls "tactile quality", a capacity to engage the senses. Also, Böttichers approach of structural principle and architectural expressions that is the structural representation is not applicable.

As previously also stated in the research topic of the thesis, examples of how other regions have reinterpreted their traditional architecture will be sighted to derive approaches that will enable meaningful continuations of contemporary architectural expressions of Kano architecture.

6.1 EXAMPLES OF CONTEMPORARY APPROACHES IN TRADITIONAL ARCHITECTURE

Throughout the world, we find numerous examples of how architects integrate their passion of exploring the traditional architectural realm and contemporary architecture of their time. In trying to find how such approach could be applied to the traditional architecture of Kano, exploring how and why other international regions have reinterpreted their traditional architecture would give an insight on how to draw inspiration from traditional architecture. These examples would be sighted in regions with well-rooted cultures and explanations on what techniques, elements, inspirations or ideas were incorporated in the buildings.

The blue souq

The first example seen would be in the Arab world, in particular, the U.A.E. The building looked into will be the Blue souq in Sharjah by the British architecture Michael Lyell in 1977. The blue souq is the central market in Sharjah and is a good example of how elements from the traditional architecture of the region are put into a modern context.

Figure 5.9: Blue souq

Source: http://www.eu-asien.de/

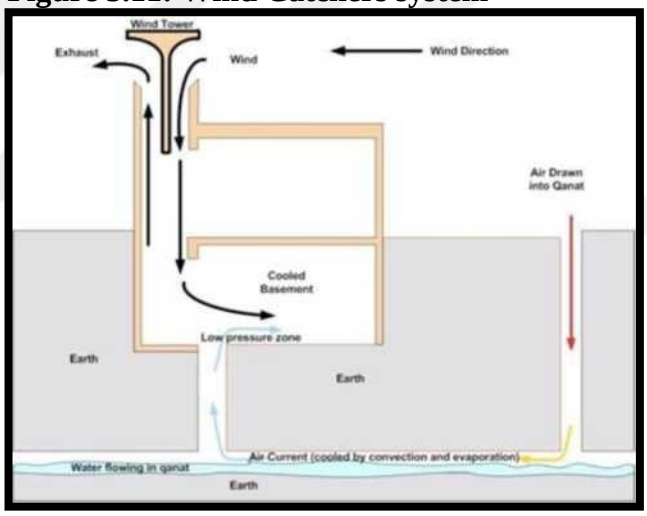
In the blue souq, we find how the traditional components of the Arab building design are incorporated in a contemporary way. The Arab states are especially enamored with holding fast to their cultural backgrounds and encourage the utilization of configuration standards which stick to such. In the blue souq, designer Michael Lyell incorporates two evident components from the traditional architecture of the region which are watched and comprehended at a first glance. These elements are; the traditional wind catchers as seen in figure 5.10. Wind catchers are traditional elements used in the Arab states which served the function of enhancing natural ventilation within the building. This feature was adopted by Lyell for both aesthetic and functional reasons. Figure 5.11 shows how this facilitated the ventilation within the building in the traditional context.

The use of the wind catchers in the building has filled the need of permitting more ventilation to the building and cooling the internal temperature of the building which in turn has very much reduced the need for artificial air conditioning systems and would be considered a very sustainable feature.

Figure 5.10: Traditional wind catchers

Source: http://kavehfarrokh.com/

Figure 5.11: Wind Catchers system



Source: http://www.treehugger.com/

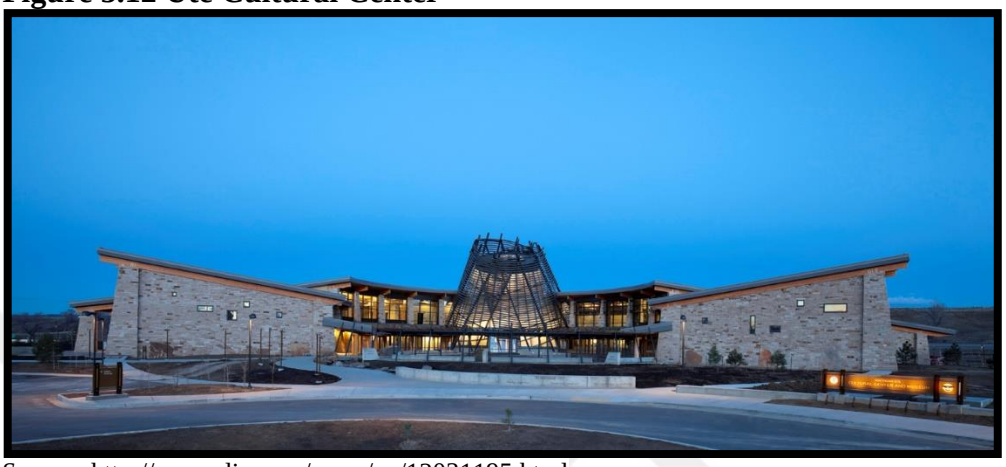
SOUTHERN UTE CULTURAL CENTRE. COLORADO USA.

Designed by architect Johnpaul Jones in 2008, the building was in Jones own words; "a personification of symbolic Tribal activity, a sense of place, the natural environment, Native social customs, and religious beliefs." In the building, we find how Jones incorporates the native sensibility and aesthetics to align with contemporary sensibility and aesthetics. His design is a reconstruction of the Native American culture, a culmination of cosmological concepts and a representation of life via architecture. Figure 5.12 shows the cultural center and tepee in the middle. The building was inspired by the four universes as perceived by the Native American cultures, these are; the Natural, Animal, Spiritual and human worlds. Jones

reflects these in the building design.

The animal world deals with the structure within the animal skeletal system which interprets into the structural system of the building.

Figure 5.12 Ute Cultural Center

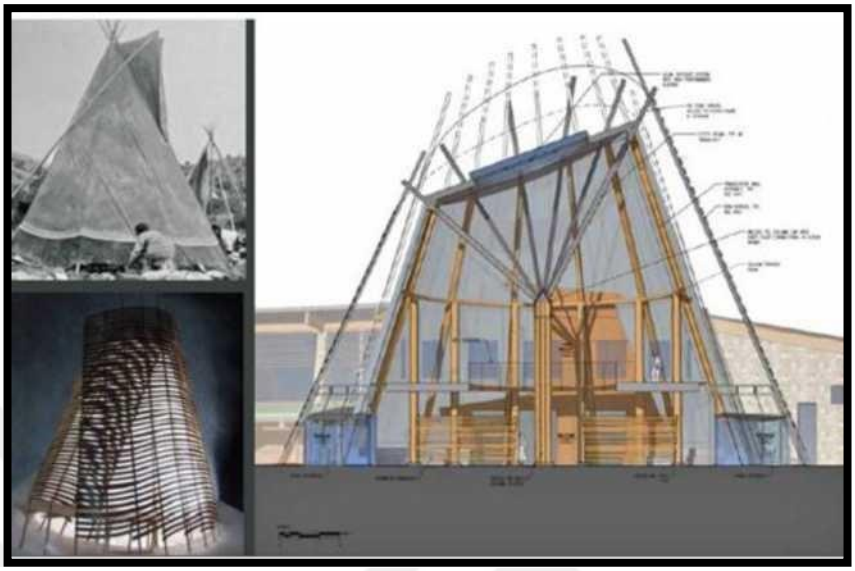


Source: http://www.djc.com/news/co/12031195.html

The design approach was utilizing the idea of a canoe filled to the overflow with the components of the four universes; Natural, Animal, Spiritual and human. In addition, to these standards coordinated into the configuration, Jones consolidates the Native American house the teepee as the heart of the cultural center which respects its guests.

The figure 5.13 shows the traditional ‘tepee’ on the top left a corner of the image, at the bottom left, is the conceptual model design of the ‘tepee’ and the image on the right-hand side is a section of the design drawing of the entrance structure which has been reinvented from the tepee.

Figure 5.13: The Traditional Teepee



Source: http://blogs.uoregon.edu/

GENESIS, SINGAPORE.

Genesis is a building designed by Australian architect Kerry Hill in Singapore. The building incorporates within its design a reflection of Hill's principles which show he's focus of the materiality and transformation of tradition, as he has done in so many resort designs which he and his firm are known for.

Genesis is a reinterpretation of the traditional shop houses of Singapore as shown in figure 5.15. These shophouses are the representation of the cultural trading traditions of the indigenous populace in Singapore. They were traditionally designed to suit the requirements of the native's day to day trading which used to accommodate the functions of residential and commercial purposes. The accommodations were situated on the upper floor of the building while the restaurant and shops of all sorts were located on the street level.

In the design of the Genesis, Hill adapted and enriched many features of the traditional shop house, the 2 most distinctive were;

Figure 5.14: Exterior with bamboo louvers

Source: www.pinterest.com

Figure 5.15: Traditional Shop Houses with wooden louvers

Source: tourment.com

a. The dual functionality of the shop house

b. Wooden louvered windows.

The dual functionality of the shop house.

The traditional shop house was a reinterpretation of the vernacular buildings of the people of

Singapore. The now known traditional shop houses were a part of building type adopted by Sir. Stamford Raffle who was a British colonial officer and known for the Singapore town plan (the Jack plan). The shop houses purposed in the town plan were a reflection of the way of life of the native which supported their trading professions while providing family accommodation within the same unit. In the 'Genesis' this is clearly carried out as an intent to carrying on tradition and enhancement of it, it houses office spaces on the street level and four apartments on the upper two floors.

Wooden louvered windows

The wooden louvered window in the traditional shop houses were used to create a semi-permeable shade with the commercial street in order to create privacy for the residential upper floors. This feature was reinterpreted by Hill with applying the same materiality and intent of creating privacy by using mechanized wooden louvered walls on the street facing facade of the building which echoed the traditional feature in an innovative manner.

Figure 5.16: Wooden louvers

Source: www.pinterest.com

After an insight of how other regions have developed their traditional architecture, highlighting the main approaches in each example would be essential. These key approaches are what connects the traditional architecture and a contemporary reinterpretation of them, these are:

a. Reinterpreting traditional features; such as the wind catchers used in the Blue Souk.
b. Reinterpreting use of local materials; like the wooden louvers of the Genesis used

in the traditional shop houses.

c. Drawing inspiration from cultural ideals: Such as the planning and orientation of the South Ute cultural center.

Combinations of these factors are continuously observed in each example, to achieve a connection to the traditional architecture of a region. Although not in all basics will these three factors are present but a combination of two always is. The optimal approach to reinterpreting traditional expressions of architecture should comprise of all three factors.

After looking at how other regions have reinterpreted their traditional architecture to coincide with the contemporary architecture, it is apparent that many features which existed in the buildings could be of benefits to contemporary buildings via elements: traditional features, use of local materials, and inspiration from cultural ideals which were specifically developed through time to adapt to the region in which they were built. In adapting such an ideology of how other regions have reinterpreted their contemporary architecture, in Kano-Nigeria, it would enable the creation of buildings which would identify the culture of the region to state one of its different numerous advantages, it would create a form of natural architectural identity which has what modern architects refer to having a ‘spirit of time’ and ‘spirit of a place’.

The Government should encourage a number of developments with this approach in building design by allocating development contracts revolving around these principles. It will also have to assist in the research into the traditional building forms and it’s possible reinterpretation, the creation of industries in applying the research outcomes and, of course, the encouragement of educating architects and professionals to follow suit.

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APPENDICES

APP A.1 Interview with Craftsmen's

The making of a traditional structure will be discussed in stages from the materials and techniques used based on information from the craftsmen.

Questions asked from the craftsmen of Kano:

a. What are the materials used for making a wall
b. Where are the materials found and how they are used
c. How is the roofing made and what are the materials used
d. How is the foundation made
e. What type of finishing are used for the exterior and interior
f. What are the Advantages and Disadvantages of the materials and techniques in traditional Architecture

Kano traditional Architecture has put to use locally sourced building materials. The choice of these materials is usually determined by their ability to withstand the weather conditions within the environments where they are to be applied. The use of these materials also depends basically on the type of building structure to be erected.

These materials are usually obtained in their natural state before being processed into useful building materials for construction purposes. Some of these materials are mud (clay) thatch (tall grass), timber (tree branches) and ropes (climber).This material will be explained briefly.

Mud: is used in different forms for foundations, floors and wall construction. It easily obtained and prepared. Sandy clay soil is considered the best since the proportion of sand gives the mud strength while the clay makes it sticky for easy construction. Mud is prepared by digging the soil loosely and then pouring water sufficient enough to make it soft and wet. Figure 0.1 shows how mud is been prepared, dried grasses will then be added so as to increase the strength of the mud. The wet soil is then left undisturbed few days (2-3 days) depending on the rate of construction desired the wet soil is then heaped together and more water will add to it. The soil is puddled by stamping it under the foot until it is made to attain a degree of plasticity.

Figure 0.1: Mud for wall construction

Source: Author

The thatch: Applied mainly for the erection of thatch roofs, the species "Imperata cylindrical" is the most commonly used. It is normally obtained from the farms during the dry season when it is mature enough to be used as thatch, figure 0.2 shows thatch before it's used for covering. In most cases, the thatch is usually brought home and woven centrally into "mats" and then spread out in the sun to dry. When properly dried, it is then rolled up into bundles and loaded on the platform until it time to the roof.

***Timber and tree branches*:** commonly obtained from the forest, timber (or tree branches) are used as rafters in roof construction. They additionally utilized for the development of roundabout ring post and bar to convey the rooftop structure in some lodging structures such a business sector cottages. Be that as it may, the utilization of timber and tree limbs has decreased in inclination to bamboo stalks. This is because of lack of timber of coveted sizes furthermore the trouble of getting segments of fancied lengths.

Figure 0.2: Thatch for roof covering

Source: Author

Ropes and climbers: are used for the purpose of tying the rafters and purlins together. Sometimes they are used to make a tension ring at the apex of the roof which holds the rafters together tightly. These ropes and climbers are obtained from trees on the farm where they are cut and left to dry before being applied construction.

Corn stalks: Corn stalks though not very strong are also used as rafters and purlins in roof construction. They are very light and of reasonable length. They are usually obtained after the harvesting period of grains. Corn stalks are not frequently used extensively due to their strength. They do not last. Where they are applied in roof construction, they are replaced on a yearly basis.

Techniques: are usually carried out in the dry season that starts in October and ends in March of every year. This is the most suitable time for construction as rainfall hardly falls to delay any construction process. The building construction techniques are discussed each stage, one after the other in the procedure in are carried out

Foundation Construction: The site for the construction is cleared and leveled as much as possible. The exact position of the hut is ascertained. A wooden peg is then firmly fixed to

the ground at an assumed center of the hut.

Figure 0.3: Corn stalks at a construction site

Source: author

A rope made equal in length to the desired radius of the hut is tied to the peg at one end and the other end is tied to a man's leg such that the rope is taut. The man then moves around steadily and a perfect circle is drawn with his foot. The setting out is completed as the outline of the plan is drawn. The foundation trench will then be excavated along the circle. The depth of the foundation normally varies with respect to the nature of the soil and also the size of the hut to be constructed. The foundation could be laid either by the building in-place method or by use of bricks. The building in-place method of the foundation is done by filling the circular trench with mud (specially made with stones) until it is about 15 centimeters above the ground level. The laid circular platform is the foundation and is usually allowed to dry properly before construction is continued. Figure 0.4 shows a foundation of wall taking place. However, where bricks are used for foundation, they are laid in courses raised up to about 20 centimeters above the ground level. The wall may then be continued immediately.

Figure 0.4: A man constructing the foundation of a wall

Source: Dmochowski

Wall Construction: Walls are constructed in two ways which are characterized by the type of material and the manner in which it is used in construction. Wall construction is by the use of building in-place method or the use of bricks (either the conical shaped or the rectangle shaped).

The build in-place method of wall construction is the method in which wet earth is carefully prepared and molded into a long yam shape which is placed one on another in courses. Usually, one or two courses are constructed in a day and allowed to dry and blend with the subsequent course before further construction takes place.

The lintel is constructed by the use of flanges of palm timber are bridged across any given opening. The wall is however brought to an end after a few courses above the lintel. The disadvantage of this method of construction is the shrinkage of the wet earth as it dries out and may cause serious cracks especially if the earth was not properly and carefully prepared. It requires special skill and a lot of time is consumed which consequently leads to delay in construction processes. This type of wall is found to be stronger than the brick wall.

Figure 0.5: The erection of the walls of a grainary using the build in-place method

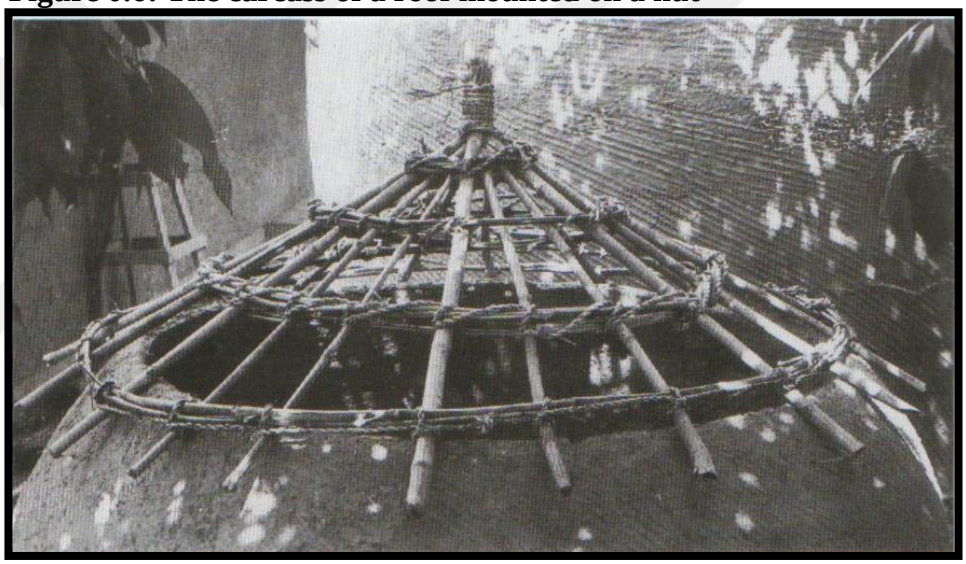
Source: Author

Brick wall construction is the method in which mud bricks are made and then dried so that the greater part of the shrinkage takes place before they are used for the construction. In this type of construction, the stretcher bond is mostly used. This is the method whereby the bricks are laid head to tail and the joint between two bricks in the upper course is placed centrally above an immediate lower course. Mud is used as mortar for the bonding of individual bricks. Lintel construction is similar to that of building in-place method. The construction is completed with two to three courses above the bamboo lintel. The walls are either plastered with red earth or left unplastered.

The Roof: The traditional builders consider the rooftop as the most difficult and remunerating a portion of the building. This is by all accounts legitimized considering their endeavors. The roof construction in most northern settlements is of two systems. Either the roof is constructed on the ground before lifting it up on the structure, or it is constructed on top of the building structure. To start the roof construction, a ring is made using ropes or climbers, then the first set of rafters about six or eight are fixed inside the ring and are opened out at

equal spacing. The rafters are held in this position by ropes and supported by some formwork being fixed at the middle. After these, the purlins are tied to the rafter all round at an interval of 40 - 50 centimeters. As the process continues, more and more rafters will be incorporated to cover the gaps that appear. The purlins which are usually corn stalk or bamboo are tied on both the inside and outside of the roof with the last purlins at the eave. The roof is constructed so that there are deep eaves that overhang the walls. This serves the purpose of protecting the mud wall against the driving rain. Also, a corridor could be created around the circular hut or only at the entrance of the hut.

Figure 0.6: The carcass of a roof mounted on a hut



Source: Dmochowski

The thatch roofing material is normally stacked in groups at the building site prepared for the process. The method of thatching is generally started on the eve of the roof and ends at the apex. An overhang of about 50 cm is normally made so as to avoid leakage during the rainy season. The thatch roof is also built thick enough so as to prevent sun rays and water penetration.

The thatching of the apex of a conical roof is most carefully handled and needs special skills.

Floor construction:

In floor construction, the excavated soil heaped on the floor space of the building during foundation excavation is leveled evenly inside the building. A lot of water is then poured on it and left for some days (about three to four) to dry. The floor will then be beaten with

wooden beaters especially carved for the purpose. The beating and ramming of the floor are mostly done by children to a strong smooth floor.

Earthworm molds obtained from river valleys are grounded (pounded) and then applied on the floor to produce a smooth and dustless floor. The floor will then be rendered with "rnakuba". Makuba[40] is a special liquid made from some particular tree bark and epicarp of locust been fruit. They are boiled together and applied hot on the floor.

This locally made floor usually lasts for a very long time. However, their application is very limited today in most Northern settlements.

Finishing's:

The finishes are mostly made with motif designs and are in categorized into three parts namely:

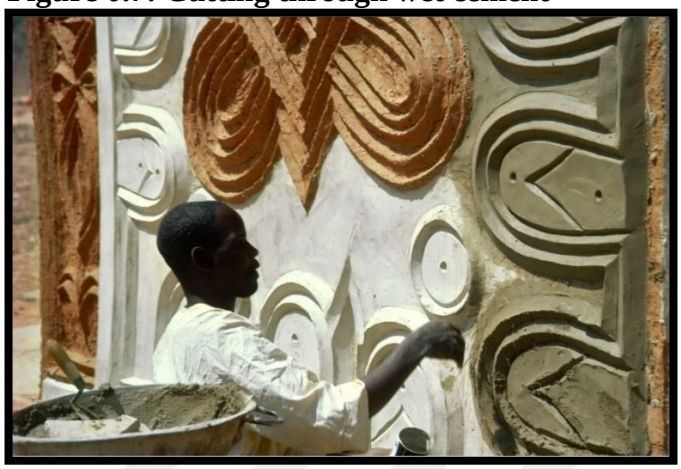
a. The molding of the fresh mud plaster in by hand splash
b. Cutting through mud plaster or wet cement
c. Plastering the wall with Makuba (locust bean)

They are considered to be a way to demonstrate sociological expressions and social prestige that naturally attracts the mind of visitors to want to understand and speculate about their origin. They are mainly made on the vaults, pillars, pinnacles, corridors, interior walls, and around doors and windows. Sometimes the entire front facades are completely decorated with motifs.

The advantages of the traditional materials and techniques are that they are environmentally friendly, easy to work with, often considered healthier that they don't contain toxic chemicals, and sustainable.

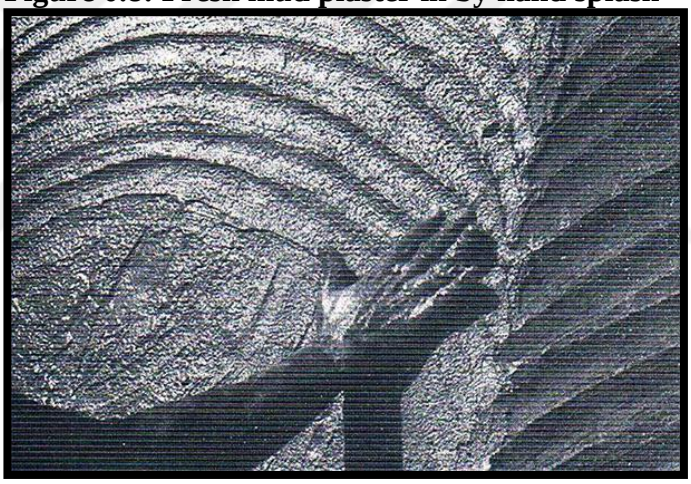
[40] Makuba: loust bean.

Figure 0.7: Cutting through wet cement



Source: https://plus.google.com/108258979865181455717/posts/Pvbpq4K8iEf

Figure 0.8: Fresh mud plaster in by hand splash



Source: http://cyfroteka.pl/catalog/ebooki/89694/125385/ff/101/OEBPS/ch11.html

The disadvantages of the materials and technique are the on-site construction which means the progress and time of work can be delayed by the weather. Materials need to be stored in a right manner in order not to be damaged by the climate conditions.