Forms and Elements of Recent Ethno-Acculturation Preferences of Yoruba Architecture in Southwest Nigeria; A Case Study of Abeokuta Historic City Core

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Forms and Elements of Recent Ethno-Acculturation Preferences of Yoruba Architecture in Southwest Nigeria; A Case Study of Abeokuta Historic City Core

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Abstract

The evolution of indigenous architecture for any social culture is usually sectionalised into thresholds of different but succinct architectural styles. The continued survival of any indigenous style is the ability to accommodate changes in components while preserving the culture of the people. The postmodern and contemporary architectural styles are the most recent defined patterns that have been assimilated into the Yoruba areas of Southwest Nigeria. Existing literature on Yoruba architecture have not addressed the delineation of the current threshold of the indigenous style. In a bid to address this problem, this research set out to define the current outlook of the Yoruba indigenous architecture through the forms and elements that have been acculturised from the foreign styles. This was achieved by locating the study in a historic city centre where the social culture is preserved in the community and the buildings. Urban upgrades carried out in the area stimulated the renovation and fresh construction of buildings where they occurred in the otherwise sedentary community. The older buildings in the sedentary parts of the study area and the newer structures in the upgraded areas provided two different thresholds in the architectural evolution for comparison of the constituents of the building patterns. After defining the study area, building counts were

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carried out to determine numbers in the upgraded and sedentary areas. This helped to calculate the sample sizes for direct observation guided by a schedule. Questionnaire was administered to evaluate residents' opinions on the subject. Descriptive statistics were used to identify the trends in typologies and preferences while existing literature was used to explain the chronology of styles and the architectural evolution of the area. The research identified the current natures of the forms and elements being adopted in the area and the reasons for their adoption. It concluded that the forms have been modified to suit the social culture and the climate.
Keywords: acculturation; architectural styles; indigenous architecture; social culture.

Introduction

Descriptive essays that have been published about traditional Yoruba architecture dwelt on the configurations, massing of the basic units and materials that were used to achieve the forms (Opoko et al., 2016; Olaniyi & Adebisi, 202; Osasona, 2007). The morphology of the architecture from the traditional patterns have been treated as vernacularisation processes (Auwalu, 2019). This approach has limited the exposition of the patterns to the vernacular styles because literature on contemporary Yoruba architecture is not common. This trend persists despite new architectural styles that are evolving in the area. When architecture is place-specific, the explanation is usually correlated to the cultural dispositions of the people (Gonsalves, 2020). Within the new styles in ethnic Yoruba areas of Southwest Nigeria, are building patterns that are fully acculturised and can be described as indigenous (Adenaike & Opoko, 2020). The architecture of the Yoruba can be traced from the traditional styles through a stage of vernacular traditions which signified the acculturation of materials and building processes from other cultures to the international style which was popular in Western societies was also acculturised in Yoruba structures in the middle of the twentieth century (Prucnal-Ogunsote, 2002). Contemporary styles up to the postmodern are also being adapted to suit the culture and architectonics that are required in the area (Teriba, 2018). While acculturation is used to refer to adoption of resident values by immigrant population (Hashemi et al., 2019). "ethno-acculturation" is the assimilation of the mannerisms, customs and values of a foreign culture by a resident indigenous group. The spatial organization of initial Yoruba settlers was centered around courtyards using various arrangements of the bush house modules. The introduction of the courtyard system led to a deeper correlation between the constructed forms of the Yoruba people of Southwest Nigeria as settled community inhabitants. Family compounds in small towns were planned around a central court or town square. In the end, the Yoruba cities in the old Southwest of Nigeria had hierarchies and series of courtyard systems radiating around a central structure that may be a market or a palace of a monarch. This introverted series of spatial organization and by extension the architecture gradually became more extroverted as the social culture evolved. The courtyard concept was over time increasingly diminished as the culture of introversion receded (Markus, 2016; Jolaoso & Bello, 2019). Architecture itself comprises the philosophy, history, structural configuration, spatial organisation, geometries and materials that are deployed to achieve identified building patterns. While the philosophy informs all other aspects of the architecture (Eilouti, 2018) the geometries and the materials remain the most visible. They are also easily assessed and less subjective in evaluation. Building forms in architecture represent the individual and collective geometries of the major aspects of a building found in the floor plan, the roof, the superstructure in elevation, projections from the main body of the building and may include voids and recesses in all the aspects mentioned while building elements in this research are components of the buildings that are designed to perform specific functions which cannot be further broken down without altering the functionality intended for the whole. In this research, building forms and elements will refer to only those that are present in the elevations of the buildings and can be physically observed from the street views. This research has identified those forms and elements in the current building patterns that suit the local culture and climate and are preferred by the residents as they

evolve the indigenous architecture in the study area. The research is underpinned by the theory of biological progression or functional determinism in architectural building morphology. The theory insists that "form follows function" which was the gospel of the modernists in architecture ((Alihodzic et al., 2014; Alasmar, 2019) The function of building parts and geometry must support the local culture in indigenous architecture (Adenaike et al., 2022).

The term "traditional architecture", sometimes called primitive architecture (Gonsalves, 2020) refers to the spatial organisational patterns and buildings with materials that can be identified with a particular social culture in their original forms. It is evolved organically by the resident population and is devoid of external socio-cultural influences. Subtle changes in the assignment of materials and progression from simple to more complex forms within the same concept can be accommodated within the nomenclature. Once the architecture starts to witness the adoption of patterns, materials and craftsmanship from other cultures, the forms are likely to change. The architecture that develops from such cross-cultural relationships is referred to as vernacular architecture (Brown & Maudlin, 2011; Zhao & Greenop, 2019). Within the vernacular architecture, the spatial organization and building patterns are also tailored to support the social culture of the indigenous population. All the evolutionary thresholds that are attained in the architecture from the traditional to the vernacular and beyond, that can be linked to the cultural identity of the indigenous population and are place specific to the evolving social culture are referred to as indigenous architecture.

In the course of most building morphological discourses, attempts are usually made to define architectural styles and typologies which are tied to formal representations and aesthetics of a movement that can be cultural or philosophical (Nooraddin, 2012). Such classifications have their origins in indigenous, vernacular, classical and contemporary typologies (Relph, 2016; Oliver, 2020). Descriptive publications on the architecture of Nigeria are eclectic in their disposition (Rikko & Gwatau, 2011; Adeyemi, 2008; Arebanifo, 2017) because the traditional and vernacular styles of the area are always at the core of the discourses. The subsequent and contemporary styles are hardly mentioned within the ambit of the indigenous styles. Studies on the definitions and efforts to typify the contemporary styles within academia are also far apart. If the building compositions as a whole cannot be used to define the evolving patterns in the new age, efforts can be made to use individual forms and elements in the buildings as variables to establish correlations and salient similarities in the architecture. Some of the buildings being erected in the area show strong physical attributes with the established indigenous architecture of the past and can still be termed as indigenous in their outlook because the forms and elements of such buildings appear as progressions from the vernacular styles. Progression identifies the general direction in architectural evolution and building morphology. Organic progression (Borges, 2001; Giorgi & Matracchi, 2017; Andrés & Pozuelo, 2009), the Darwinian evolutionary progression (Steadman, 2016), the ecological progression (Lewis, 2019) and the biological progression otherwise referred to as functional determinism (Melis & Pievani, 2022; Pont, 2005) are definitive sequences that describe architectural evolution. The discourse on progression is always underpinned with philosophy and socio-cultural implications of the evolving forms and elements. In indigenous architecture, progression is used to explain the socio-cultural changes in the society on the building morphology. The change from traditional construction procedures to the vernacular tradition in sedentary societies is reflected in the buildings that are erected at the different epochs while the contemporary building patterns have their progression rooted in their changing socio-economic inclinations. Forms and elements of extraneous origins are often assimilated into indigenous architecture through ethno-acculturation (Hidayat et al., 2020) which is a merging of the existing indigenous components with the foreign ones to achieve the socio-cultural and architectonic functions that are required for the socio-spatial environment. While the vernacu-

larisation processes import skills and materials from foreign cultures, ethno-acculturation uses the available technology and may substitute some materials to achieve forms and elements that are better suited to the context in terms of functionality and delight.

Methodology

Having identified the problem, the research started with a literature review of Yoruba architecture and documented the stages of evolution and the features of the different styles. A confirmation study of the presence of the different stages of the evolution of the styles was carried out in different locations to determine where the case study will be located. Abeokuta in Southwest Nigeria was selected because of the urban fabric of the area and the rapid expansion with urban upgrades since the late 1990s. Armchair studies were undertaken to determine the aspects of the architecture that can easily be isolated and subjected to analysis which resulted in choosing the architectural forms, materials and elements. A decision was made to subsume the materials within the elements for ease of analysis since materials tend to transcend the different architectural styles within the morphology making the identification of thresholds less defined. A pilot study was then carried out to confirm the appropriateness of the city for the research. The overview survey of the area confirmed that the newer buildings in the area are located along the major roads that have been upgraded while the rest of the area is in a sedentary existence. The aggregation of the buildings from different epochs in specific sections of the city makes it easier to focus investigative efforts for the different building patterns on easily delineated neighbourhoods. The research subsequently progressed to the level of field observations, interviews and questionnaire surveys. The information and data collected from the field studies were documented, organised and subjected to analysis. In this study, only the forms that can be visually acquired from the street vista were considered. The study population consists of all the buildings in the historic core area of Abeokuta with fifteen neighbourhoods which are Ijaye-Kukudi, Ikija, Idomopa, Itoku, Saje, IkerekuAregba, Ilawo, Ijeun, Ake, Ilagun, Erunbe-Aregba, Aregba-Kemta, Ikeredu-Idan and Ilawo. The total number of buildings in the delineated area is 20,746 (twenty thousand, seven hundred and forty-six). The upgraded areas in the city core with renovated and newer buildings have an outlook that makes them a better reference point for comparisons between the older forms and elements and the new ones while the rest of the area is sedentary with old buildings and very few renovations. The total count of buildings along the streets that have witnessed urban renewal was 1,335 (one thousand, three hundred and thirty-five). Using Slovin's formula for sample space calculation for indeterminate outcomes with a 0.05 error margin, 308 buildings were calculated as the sample size for the investigation.

A systematic sampling technique was deployed to cover the whole upgraded area by visiting every fourth building for spot assessment based on an observation schedule and to administer questionnaire to the patrons of the buildings or their representatives. 299 questionnaire responses were successfully returned for coding and analysis. The questionnaire among other enquiries sought to find out if the respondents agreed that the building forms and elements have changed since the upgrades in the area. The responses from the field survey questionnaire on perception of changes in forms and elements were analysed and coded as follows; 1 is strongly disagree; 2 is disagree; 3 is undecided; 4 is agree; and 5 is strongly agree. Since the data is non-parametric, Wilcoxon Signed Rank Test was used to analye the results. The test returned a significance of 0.000 for the summation of building forms and 0.037 for the summation of the building elements confirming that residents accept that the forms and elements had changed at 95% confidence level. The test is necessary to underpin the whole research which is based an a hypothesis that the urban upgrades brought about changes in the affected areas.

Direct observations using a schedule were also carried out for in-depth assessment of the forms and elements of the buildings in both sections of the study area to compare the rates of occurrences of the different categories within the forms and elements that were identi-

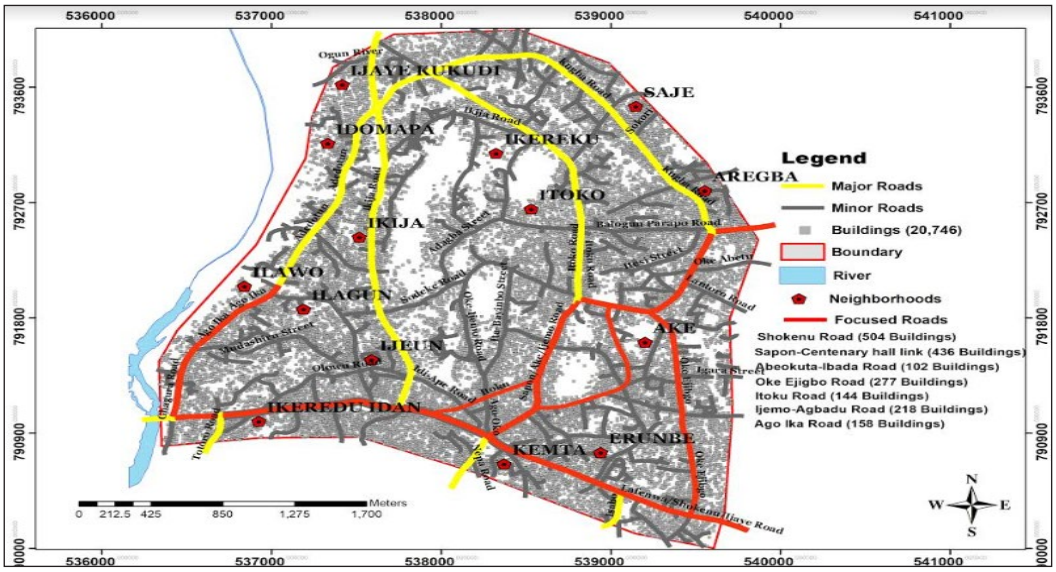

Fig. 1

Map of study area showing the major roads with upgrades

fied for the research. Since the research is a case study, there is a need to attain very high levels of confidence in the sample size adopted. In essence, a higher level of confidence can be placed on the data generated if the sample size is very high (Kane, 2019). Confidence levels of ninety-five percent (95%) and above are generally acceptable for most research works. The sample size is based on calculations using the simple formula for finite populations used by Adenaike (2023) and remains relevant. This is indicated in equation (1).

$$n = \frac{N}{1+ \alpha^2 N} \quad (1)$$

In the equation, n refers to the sample size, *N* refers to the population size and α represents the level of significance. Using the formula, the number of buildings to be observed in the upgraded areas is 606.4 (six hundred and six point four). The figure is about forty-six percent of the target population. This was rounded up to 610 (six hundred and ten). This implies that every other building along the upgraded major roads will be examined for effects of recent urban upgrades, using systematic sampling. In the same light, 1,050.9 (one thousand and fifty point nine) buildings will have to be investigated in the sedentary areas for evidence of changes without the incidence of direct urban upgrade programmes around them during the study period. The figure was approximated to 1,051 (one thousand and fifty-one). A systematic sampling method was adopted. The areas directly behind the upgraded roads were concentrated upon. Since it amounted to an approximate ratio of about 3:5 of areas in upgraded areas to sedentary areas in the investigation samples, for every three buildings investigated in the upgraded areas, five buildings were investigated in the sedentary areas directly behind the upgraded areas as a stratified sampling initiative. In the systematic sampling, every nineteenth (19^{th}) building along the streets was investigated until the number was achieved. There was however random sampling in areas where the streets were not defined to make up the figure especially in the sedentary areas. The elemental approach to building analysis was used to determine the forms and elements that were subjected to evaluation. For the building forms, the following aspects of individual and collective geometries were assessed; building shape; symmetry in buildings and components; door sizes and shapes; window sizes and shapes; building size; opening ornamentation and roof shapes. For the building elements the following components and their material assignments were also assessed; wall finishing materials; door finishing materials; eaves and external ceiling materials; roof finishing

materials; entrance area delineation and window finishing materials. An observation checklist (Table 1) was generated with the forms and elements listed and other relevant data that could give more credence to the study.

Table 1
Observation checklist for evidence of alterations in buildings and conditions of forms and elements

S/N	Variable	Categories
1	Building number	Not categorised
2	Building type	[i] Residential. [ii] Commercial. [iii] Mixed – use. [iv] Indeterminate
3	Number of floors	[i] One floor. [ii] Two floors. [iii] Multi-storey.
4	Architectural style	[i] Indigenous. [ii] Vernacular. [iii] Post Vernacular/Brazilian. [iv] International. [v] Adapted international. [vi] Postmodern. [vii] Adapted postmodern. [viii] Contemporary. [ix] Adapted contemporary. [x] Indeterminate.
5	Evidence of alteration	[i] Unaltered. [ii] Recently renovated. [iii] New. [iv] Reconstructed.
6	Building shape	[1] Rectilinear. [ii] Non – Rectilinear
7	Evidence of symmetry in front elevation	[i] Symmetrical. [ii] Asymmetrical
8	Door sizes in front of building (door width)	[i] 0.70m – 0.89m. [ii] 0.90m – 1.19m. [iii] 1.20m – 1.80m. [iv] Above 1.80m
9	Window sizes (width).	[i] 0.60m – 0.89m. [ii] 0.90m – 1.19m. [iii] 1.20m – 1.49m. [iv] 1.50m – 1.80m. [v] Above 1.80m
10	Prominence of ornamentations	[i] Present. [ii] Absent
11	Additive and subtractive forms	[i] Additive forms are present. [ii] Subtractive forms are present. [iii] Both additive and subtractive forms are present. [iv] No extraneous form is present.
12	Roof shape	[i] Mono-pitched. [ii] Flat. [iii] Double-pitched.
13	Wall finishing material	[i] No finish. [ii] Plaster on mud walls. [iii] Plaster on concrete. [iv] Others.
14	Door finishing material	[i] Wood. [ii] Steel. [iii] Others
15	Window finishing material	[i] Wood. [ii] Aluminum frames with glass. [iii] Steel frames with glass. [iv] Others.
16	Eaves finishing material	[i] Wood. [ii] Asbestos. [iii] Steel. [iv] Others
17	Roof finishing material	[i] Corrugated iron. [ii] Asbestos. [iii] Aluminum. [iv] Others.
18	Entrance area delineation	[i] No delineation. [ii] Recessed Porch. [iii] Porch with canopy.

Field survey results

While the sedentary sections of the city core had the older buildings which were of the traditional and vernacular styles, the upgraded sections had more contemporary buildings. The observation guide provided data and assessments that were used to compare the forms and elements for the investigation. The numerical data obtained from the spot observations of the selected buildings in the sedentary and upgraded sections of the study area are presented in Tables 2 and 3. The categories can be accessed from the observation checklist which in Table 1. The columns numbered i-x are the individual categories identified in the buildings during the survey. Their frequencies and percentages are indicated in the tables

Table 2

Numerical data from observation of buildings in the sedentary sections

SN	Variables Categories	i	ii	iii	iv	v	vi	vii	viii	ix	x
1	Building type	Freq 736	85	214	16						
		%age 70.03	8.09	20.36	1.52						
2	Number of floors	Freq 806	239	6							
		%age 76.69	22.74	0.57							
3	Architectural style	Freq 92	422	490	3	13	7	2	3	1	19
		%age 8.75	40.15	46.62	0.29	1.24	0.67	0.19	0.29	0.1	1.81
4	Evidence of alteration	Freq 825	226	0	0						
		%age 78.50	21.50	0.00	0.00						
5	Building shape	Freq 987	64								
		%age 93.91	6.09								
6	Symmetry in front elevation	Freq 492	559								
		%age 46.81	53.19								
7	Door width sizes	Freq 214	813	17	7						
		%age 20.36	77.35	1.62	0.67						
8	Window width sizes	Freq 537	189	202	91	32					
		%age 51.09	17.98	19.22	8.66	3.04					
9	Ornamentation	Freq 293	758								
		%age 27.88	72.12								
10	Additive/ subtractive forms	Freq 147	506	322	76						
		%age 13.99	48.14	30.64	7.23						
11	Roof shape	Freq 44	11	996							
		%age 4.19	1.05	94.77							
12	Wall finishing material	Freq 19	493	533	6						
		%age 1.81	46.91	50.71	0.57						
13	Door finishing material	Freq 972	61	18							
		%age 92.48	5.80	1.71							
14	Window finishing material	Freq 289	651	87	24						
		%age 27.50	61.94	8.28	2.28						
15	Eaves finishing material	Freq 559	474	2	16						
		%age 53.19	45.10	0.19	1.52						
16	Roof finishing material	Freq 782	203	66	0						
		%age 74.41	19.31	6.28	0.00						
17	Entrance area delineation	Freq 357	499	195							
		%age 33.97	47.48	18.55							

Table 3
Numerical data from observation of buildings in the upgraded sections

SN	Variables Categories	i	ii	iii	iv	v	vi	vii	viii	ix	x
1	Building type	Freq 234	210	86	80						
		%age 38.36	34.43	14.10	13.11						
2	Number of floors	Freq 78	430	102							
		%age 12.79	70.49	16.72							
3	Architectural style	Freq 14	55s	103	7	101	11	177	18	55	69
		%age 2.29	9.01	16.88	1.14	16.56	1.80	29.01	2.95	9.02	11.31
4	Evidence of alteration	Freq 118	404	21	67						
		%age 19.34	66.23	3.44	10.98						
5	Building shape	Freq 544	66								
		%age 89.18	10.82								
6	Symmetry in front elevation	Freq 92	518								
		%age 15.08	84.92								
7	Door width sizes	Freq 116	381	77	36						
		%age 19.02	62.46	12.62	5.90						
8	Window width sizes	Freq 11	141	283	132	43					
		%age 1.80	23.11	46.39	21.64	7.05					
9	Ornamentation in openings	Freq 6	604								
		%age 0.98	99.02								
10	Additive/ subtractive forms	Freq 335	79	183	13						
		%age 54.92	12.95	30.00	2.13						
11	Roof shape	Freq 33	16	561							
		%age 0.05	2.62	91.97							
12	Wall finishing material	Freq 0	19	588	3						
		%age 0.00	3.11	96.39	0.49						
13	Door finishing material	Freq 388	186	36							
		%age 63.61	30.49	5.90							
14	Window finishing material	Freq 9	557	44	0						
		%age 1.48	91.31	7.21	0.00						
15	Eaves finishing material	Freq 103	468	0	39						
		%age 16.89	76.72	0.00	6.39						
16	Roof finishing materials	Freq 318	159	128	5						
		%age 52.13	26.07	20.98	0.82						
17	Entrance area delineation	Freq 26	162	422							
		%age 4.26	26.56	69.18							

The respondents were asked to determine what factors could have led to the adoption of the current building forms and elements. The summary of responses is presented in Table 4.

Table 4

Factors responsible for the adoption of current building forms

Variable	Mode	Categories	Frequency	Percentage
Building Shape	Increased Functionality	Increased Affordability	22.000	7.383
		Increased Functionality	137.000	45.973
		Increased Utility	31.000	10.403
		No Idea	52.000	17.450
		Other Reason	56.000	18.792
Building Symmetry	Increased Affordability	No Idea	55.000	18.456
		Increased Functionality	63.000	21.141
		Increased Affordability	92.000	30.872
		Increased Utility	41.000	13.758
		Other Reason	47.000	15.772
Door Sizes	Increased Functionality	No Idea	53.000	17.785
		Increased Functionality	86.000	28.859
		Increased Affordability	69.000	23.154
		Increased Utility	55.000	18.456
		Other Reason	35.000	11.745
Window Sizes	Increased Functionality	No Idea	53.000	17.785
		Increased Functionality	101.000	28.859
		Increased Affordability	71.000	23.154
		Increased Utility	59.000	18.456
		Other Reason	14.000	11.745
Building Size	Increased Functionality	No Idea	53.000	17.785
		Increased Functionality	101.000	33.893
		Increased Affordability	71.000	23.826
		Increased Utility	59.000	19.799
		Other Reason	14.000	4.698
Opening Ornamentation	Increased Utility	No Idea	53.000	17.785
		Increased Functionality	58.000	19.463
		Increased Affordability	59.000	19.799
		Increased Utility	79.000	26.510
		Other Reason	49.000	16.443
Roof Shape	Increased Functionality	No Idea	46.000	15.436
		Increased Functionality	140.000	46.980
		Increased Affordability	34.000	11.409
		Increased Utility	57.000	19.128
		Other Reason	21.000	7.047
Wall Finishing Materials	Increased Functionality	No Idea	46.000	15.436
		Increased Functionality	124.000	41.611
		Increased Affordability	53.000	17.785
		Increased Utility	47.000	15.772
		Other Reason	28.000	9.396

Variable	Mode	Categories	Frequency	Percentage
Roof Finishing Materials	Increased Functionality	No Idea	53.000	17.785
		Increased Functionality	104.000	34.899
		Increased Affordability	64.000	21.477
		Increased Utility	56.000	18.792
		Other Reason	21.000	7.047
Ceiling Structure	Increased Functionality	No Idea	68.000	22.819
		Increased Functionality	99.000	33.221
		Increased Affordability	65.000	21.812
		Increased Utility	59.000	19.799
		Other Reason	7.000	2.349
Entrance Delineation	Increased Functionality	No Idea	46.000	15.436
		Increased Functionality	85.000	28.523
		Increased Affordability	66.000	22.148
		Increased Utility	65.000	21.812
		Other Reason	36.000	12.081
Door Finishing Materials	Increased Functionality	No Idea	55.000	18.456
		Increased Functionality	94.000	31.544
		Increased Affordability	43.000	14.430
		Increased Utility	57.000	19.128
		Other Reason	49.000	16.443
Window Finishing Materials	Increased Utility	No Idea	46.000	15.436
		Increased Functionality	64.000	21.477
		Increased Affordability	78.000	26.174
		Increased Utility	88.000	29.530
		Other Reason	22.000	7.383

Discussion

The forms and elements of the new structures are good reference points to identify the current architectural ethno-acculturation preferences of the population. While the upgraded sections of the study area spot many new and renovated buildings, the rest of the city core retain their sedentary outlook with structures that have survived with few renovations for upwards of eighty years. The changes in the forms and elements that were used to assess the ethno-acculturation are derived from Tables 1 and 2 as percentages in occurrences from the sedentary sections of the city core to the upgraded sections of the city core and presented as tables of changes of the forms and elements.

For the building shapes, the derived figures are presented in Table 5. It can be observed that the rectilinear buildings reduced while the non-rectilinear buildings increased which is an indication that the population is gradually moving away from building houses that are rectangular to other shapes. In like manner, Table 5 also indicates that the asymmetrical shape, larger door and window sizes, removal of ornamentation, extraneous forms, double-pitched roofs, rendered block walls, steel doors, aluminium framed glass windows, asbestos external ceilings, long span aluminium roofing cover and covered entrance porches are preferred by the residents.

Table 5

Percentage changes in building forms and elements in the study area

Variable	Categories	Sedentary (%)	Upgraded (%)	Percentage (%) difference
Building shape	Rectilinear	93.9	89.1	-4.8
	Non-rectilinear	6.1	10.9	4.8
Symmetry	Symmetrical	70.03	15.08	-54.95
	Asymmetrical	8.08	84.12	76.04
Door sizes	0.7m-0.89m	20.36	19.01	-1.35
	0.9m-1.19m	77.35	62.46	-14.89
	1.2m-1.80m	1.62	2.79	1.17
	Above 1.80m	0.67	5.90	5.23
Window sizes	0.6m-0.89m	51.09	1.80	-49.29
	0.9m-1.19m	17.98	23.11	5.13
	1.2m-1.49m	19.22	46.39	27.17
	1.50m-1.80m	8.66	21.62	12.96
	Above 1.80m	3.04	7.02	3.98
Ornamentation	Present	70.03	0.98	-69.05
	Absent	8.08	99.02	90.94
Extraneous forms	Additive present	13.98	54.92	40.94
	Subtractive present	48.14	12.95	-35.19
	Both present	30.64	30.00	-0.64
	No extraneous forms	7.23	2.13	-5.1
Roof forms	Mono-pitched	4.19	5.41	1.22
	Flat	1.05	1.52	0.47
	Double-pitched	94.77	91.97	-2.8
Wall finishes	No finish	1.81	0	-1.81
	Rendered mud wall	46.91	3.11	-43.8
	Rendered block wall	50.71	96.39	45.68
	Others	0.57	0.49	-0.08
Door finish	Wood	92.48	63.61	-28.87
	Steel	5.80	30.49	24.69
	others	1.71	5.90	4.19
Window finishes finishes	Wood	27.47	1.48	-25.99
	Alum. / glass	61.94	91.31	29.37
	Steel/ glass	8.28	7.21	-1.07
	Others	2.28	0	-2.28
External ceiling	Wood	53.19	16.89	-36.3
	Asbestos	45.10	76.72	31.62
	Steel	0.19	0	-0.19
	Others	1.52	6.39	4.87
Roof finishes	Corrugated iron	74.41	53.19	-22.28
	Asbestos	19.31	26.07	6.76
	Aluminium	6.28	20.98	14.7
	Others	0	1.52	1.52
Entrance delineation	No delineation	33.97	4.26	-29.71
	Recessed porch	47.48	26.56	-20.92
	Porch with canopy	18.55	69.18	50.63

Table 6
Descriptive statistics for percentage changes in variable occurrences

Variables	Total change	Number of categories	Mean	Variance	Standard deviation
Building shape	9.6	2	4.8	0	0
Symmetry	130.99	2	65.495	111.197	10.545
Door sizes	22.64	4	5.66	31.03	5.57
Window sizes	98.53	5	19.71	16.95	16.95
Ornamentation	159.99	2	80.00	119.79	10.95
Extraneous form	81.88	4	20.47	316.29	17.78
Roof forms	4.49	3	1.50	0.94	0.97
Wall finishes	92.27	4	23.07	470.23	21.68
Door finishes	57.75	3	19.25	110.31	10.75
Window finishes	58.71	4	14.68	170.68	13.06
External ceiling	72.98	4	18.25	252.44	15.89
Roof finishes	44.56	4	11.14	65.62	8.1
Entrance delineation	101.26	3	33.73	155.29	12.46

Having computed the changes in the percentages of the categories within the different forms and elements of the buildings, the clusters of the categories for the different variables were examined for levels of variance from the norm to determine which forms and elements are being altered more significantly. The forms that are altered are discussed for the motives behind the alterations and new outlook in the indigenous architecture.

The values represent changes in the building morphology between 2009 and 2019 when the data were obtained. The urban renewal efforts in the selected locations stimulated the development of new structures and renovations along the path of preferences that alter the indigenous architecture of the otherwise sedentary continuum. A general overview and cursory look into the mean values of the change in percentages of the different forms and elements indicate that the roof forms have the least value for the average changes in percentage occurrence while the presence of ornamentation and symmetry in the front elevations showed very high values of percentage changes.

Building shape: the building shape at the recent level of the vernacular architecture attained in the study area was the basic rectangular form for the superstructure (Adepeju & Oluwole, 2013). The data shows a marked departure from the rectilinear forms and gravitation towards more complex forms in the new dispensation. In essence, the non-rectilinear building shape is being adopted in the study area in the indigenous morphology.

Symmetry in Buildings: with an average percentage change of 65.5% in the mean occurrence in favour of asymmetrical buildings in the area, the morphology is tending away from the simple symmetrical structures of the past.

Door sizes: the study was designed to be unobtrusive. The widths of the front door sizes only were taken in the selected buildings during the field investigations. The general trend is in favour of the wider doors. While the rates of occurrences reduced in the doors of 0.7m to 1.19m width, the larger doors showed marked increases in their percentage occurrences.

Window sizes: the emerging trend in the building morphology is the adoption of windows above 0.9m wide. A drop from 51.09% to 1.80% in occurrence of the small window size while the other window sizes are increasing indicates that traditional architectural building exposition of having small windows of about 0.6m x 0.6m with increment during the vernacular and subsequent epochs has given way to wider windows especially in the 1.2m to 1.49m range.

Use of Ornamentation: the use of decorative motifs has become obsolete in the study area. There's only a 0.08% occurrence in the newly developed area at the time of the observation survey. Only the very old buildings that have been unaltered have ornamentation in their elevations.

Extraneous forms: the use of extraneous forms in the elevations shows a remarkable increase especially in the additive forms. The extrapolation of the figures gives a total of 84.92% occurrence in the new areas for the additive forms (summation of additive only and both forms present). This is an indication that the indigenous population prefers more complex elevations in their buildings. The plain surfaces that are characteristic of the elevations of the earliest buildings of the traditional architecture do not fit into the evolving morphology.

Roof forms: the double-pitched roof dominates the building landscape with over 90% occurrence before the urban renewal efforts and after the alterations that resulted from upgrading the area. This form is well suited for the climate and the resident population is comfortable with the technology involved. This threshold had heen attained since the era of vernacular architecture.

Wall finishes: The rendered block wall dominates the built environment as wall finish in all instances with over 90% occurrence in the upgraded areas. The tendency to explore other finishes like aluminium and synthetic materials is yet to take a foothold in the area.

Door finishes: the materials used for finishing the front doors are divided between timber and steel. The use of glass doors shows an increase but the percentage occurrence is still low and cannot be said to be representative of the current threshold of the indigenous building morphology. The use of steel shows a marked increase in the level of occurrence while wooden doors are decreasing.

Window finishes: the aluminium framed glass windows have permeated the front elevations of the buildings in the upgraded areas with a 91% occurrence. Although the steel-framed glass windows show a very minimal decrease in occurrence, it is not being adopted in the evolving building morphology.

External ceiling: asbestos sheeting is the dominant material used for the external ceilings and the occurrence has increased from what obtains in the sedentary areas. Other materials like polyvinyl chloride sheets are increasing also but still have a low level of occurrence.

Roof finishes: while the corrugated iron sheeting still dominates the rooftops, there is a rapid increase in the use of aluminium sheets. Asbestos sheets are also showing increases in their occurrence level. The threshold of the roofing material deployment in the indigenous building morphology is a mix of the three roofing finishes. The corrugated iron sheeting had dominated the landscape before the urban renewal efforts.

Entrance delineation: the use of canopies and other forms of roofing to define the vestibules is more widespread and increasing in occurrence in the study area with a 70% presence in the upgraded areas during the study.

New forms and elements of indigenous building morphology in the study area

Having conducted field studies on the changes that are taking place in the building patterns of the historical city core of Abeokuta, it is pertinent to limit the outcomes to those that affect the indigenous building morphology. The import of this position is the sifting of the results to be able to identify those results that align with the objectives of the study. At the end of the exercise, a conceptual image of the new threshold of the indigenous building morphology can be achieved in individual parts for future references

Basic shapes, forms and sizes of buildings

The threshold of the building geometry for the indigenous building morphology before the urban upgrades was fairly regular and decipherable (Adepeju, 2016). This is reflected in the state of the

buildings in the areas without upgrades. The few buildings with Afro-Brazilian inclinations have additive elements like balconies and verandahs. The subtractive elements in the basic forms of the building pattern are few and the tendency to integrate additive and subtractive elements into the building pattern is low. For the majority of the structures, the flat wall surface is only punctuated by the fenestration and the frontal doors, even for buildings with upper floors. The buildings that have subtractive elements in their elevations are more inclined to the postmodern building styles than the indigenous styles that are very common in the study area. If the sedentary areas are to be considered, the cuboid plan that is projected directly to the roof level dominate the area. Different stages of indigenous building styles from the traditional designs to different levels of vernacular patterns exist together in the study area. The variations in the vernacular patterns are visible in the increasing sizes of the buildings and workmanship. The basic shapes hardly changed through the years. The renovations and newly constructed buildings in the upgraded areas tend to continue the trend in the indigenous building pattern when it comes to building sizes. The increment that is gradual as seen in the vernacular styles has continued. They still exist as single-storey buildings. The bungalows exist only in renovations. The slight increases in the building sizes can be attributed to the limitation in property sizes brought about through years of fragmentation of family holds. Buildings that are very close to each other cannot appreciably increase horizontally unless they are joined together. The structures that were increased vertically beyond the first suspended floor are completely different in characters from the indigenous buildings that were investigated. They do not possess overt traits of the ethno-acculturated buildings of the study area and therefore, cannot be lumped together with them as indigenous architecture.

In the aspect of the basic shapes, the rising demand for building use change from residential to commercial use has brought about the inclusion of additive elements to the indigenous style in the area. The proliferation of commercial uses has also increased the demand for display areas in the building frontages. The display areas are simply added as protrusions to the existing buildings thereby altering the basic shapes of the buildings.

The new and renovated structures also have some subtractive forms in their frontages, mostly for display. Indigenous architecture in the study area is not synonymous with commercial buildings. Commercial activities like clothes dyeing, food selling and petty trading are carried out in the porches, frontages, between the buildings and the courtyards. Having commercial activities fully integrated into the main building is a new phase in the building morphology. The subtractive elements are more common in the new buildings. They have the benefit of direct integration into the new developments. Additive and subtractive elements in basic rectilinear building forms of indigenous building morphology are acceptable as ethno-acculturated, once other individual forms and elements that give the character of ethno-acculturation of the buildings are present. Additive and subtractive elements that alter the basic shapes are easy to integrate. In the recently upgraded areas, the newly renovated houses interspace the older vernacular structures with all the attributes of the new building patterns especially addition and change of use.

Materials, shapes and sizes of windows

The square-shaped small windows of the traditional architecture were true to the available technology and met the socio-cultural demands of their era. Although the rectilinear shape of the buildings has been retained to a large extent, sizes have been altered. From the square shape that was characteristic of the traditional farmhouse, increment to rectangular forms with more spread in ground surface area covered by the buildings has continued. The upper limit for the windows in the new houses remains the structural lintel. The commercial buildings have even wider and lower windows to give more vista for displays. The geometries of contemporary windows in the area are determined by the designers and reflect the basic functions. The issue of regularity in sizes stopped with the buildings of the late vernacular era. Modular designs and dimensional co-

ordination which were popular in the era of modern architecture (Poon, 2020) had direct influences on the vernacular building patterns of the study area during the period. The integration of much larger and sometimes small window sizes rather than standard sizes into the indigenous building morphology is well accommodated as the culture of the resident population has become more extroverted.

The materials for framing and panelling of windows have also evolved from an all-wood structure to composite assemblies of glass, aluminium and steel. The most common materials being adopted for windows in the upgraded areas are glass panelling with aluminium for frames. Modern architecture favoured the extensive use of glazing with metal frames. Curtain walls are also common in buildings of contemporary and postmodern styles. The level of occurrence of extensive curtain walling for buildings in the study area is limited and such structures were not observed in the sedentary sections of the city core visited during the study. The upgraded areas had a few of them in the highbrow sections. Buildings with larger curtain walling do not fit into the indigenous architectural building morphology. They appear to follow the stereotypes of the postmodern and modern styles. The indigenous buildings within the upgraded areas typically have windows constructed with aluminium frames and glass panels. The frames come in different colours while the glass panels are tinted and sometimes plain.

The indigenous building morphology is less dependent on the window materials. The socio-cultural implications of window materials only affect the panelling. The wooden panel shuts out the light from the rooms while the glass panel admits light into the rooms. The extroversion of the late vernacular culture integrated the use of glass panels for windows into the indigenous buildings. The traditional buildings and early vernacular structures used materials that shut out the light from the rooms (Shitta-Bey, 2014). The new materials have carried on the indigenous building morphology alongside the foreign styles in the upgraded areas

Roofing materials and shapes

The roof ends along the streets are mostly gabled. There are a considerable number of hipped roofs among the structures of the late vernacular designs. The majority of the buildings are covered with corrugated iron sheets. The rusty aerial view is a result of decades of using corrugated iron sheets as the roofing material. The new buildings especially in the renovated sections of the city core have coated aluminium roofing sheets. The different colours of aluminium roofing can be seen lining the major dual carriageways interspersed with rusty corrugated iron roofing. Aluminium is more durable and attractive but the cost of the material is elusive for most of the residents. Some of the roof sheeting being replaced in the sedentary sections are done with corrugated iron sheets.

Apart from the aesthetics and durability, the use of aluminium sheeting does not alter the ethnocentricity of the indigenous building pattern. Although the migration from the use of thatch as a roofing material has given the latitude to reduce the depth of the loft of the roof, the indigenous population have not adopted shallow lofts or flat roofs that came with the modern architectural style. The high-pitched roofs without parapets still symbolize the indigenous roofing pattern, irrespective of the finish.

Fig. 2

Use of modern finishing materials on vernacularised roof forms in new buildings

Roof geometry is very important in identifying the indigenous style. At the beginning of the traditional styles

of the study area, the superstructure of the buildings which were farmhouses and the roofs had the same depth. With the international style, an attempt was made to de-emphasize the roof volume by making them shallow since the flat roof did not blend enough within the environment. In recent times, roof forms in the study area have gone eclectic with deeper lofts and volumes With time, the rusty aerial view of the city core will likely change to that of more durable materials as roof covering. The convenience and overall cost implications of replacing old roofing sheets must also be considered.

Eaves and external ceilings

The traditional building pattern didn't project the roofing beyond the limits of the external walls due to technological limitations. The wooden trusses that supported the thatch did not have cantilever bearers as they were let into and terminated at the wall head. This meant the roof finishing material beyond the wall had to bear its weight. The limitations of the technology for the traditional construction methods were overcome during the vernacular era. The deep eaves that gave shading in the courtyards were not required outside the building. The external eaves in the late vernacular era were standardized and constantly erected at 600mm deep. This was during the era of extreme modular coordination of modern architectural building patterns. The morphology of the indigenous building pattern has however had to contend with more external functions and activities in the evolving culture. The use of wall finish materials like paint and wall tiles need protection from the elements which can be achieved with deeper eaves. The recent urban upgrades have affected the evolution of the deeper eaves in two directions. There are buildings of contemporary patterns in the upgraded sections of the core without eaves. Such buildings have parapet walls. There are also buildings with eaves that are more defined than the ones in the vernacular building patterns. They use more modern materials for the ceiling finish and most of the eaves are more than 600mm deep.

Entrance design

In antiquity, entrances were only designed for monumentality in the study area. Influencing cultures and building styles like the Afro-Brazilian, introduced the concept of porches and entranceways into the vernacular styles. In the late vernacular morphology, the entrance which had become a vestibule for the building led through a door to the central corridor which had replaced the courtyard of the traditional style. Recent renovations have tried to apply the postmodern columns and embellishments to better define the entrance with visible results in buildings within the sedentary areas. The coming of urban upgrades has taken the morphology in a completely different direction. Rather than organise the entrance into a defined space, more of the buildings have extensive entrances that serve more as shop fronts and display areas. The buildings that are not typified among the indigenous buildings in the upgraded areas also lack well-defined entrances. Continuous rows of offices and shops obliterate the real entrances into most of the buildings.

Reasons for adopting new forms and elements

From Table 4, the major factors responsible for the adoption of the new forms and elements integrated into the indigenous architecture were extracted and itemised in Table 7 with the preferred forms and elements that define the new architecture. Affordability indicates the purchasing power of the populace. Increased affordability means the people have more resources to pay for more expensive but desirable options. Increased functionality represents the ability of the entity to deliver more in terms of architectonics and user requirements. Increased utility means the component is more versatile.

Functionality which is the major reason for adopting or retaining the forms and elements is dependent on the social culture to support the changing demands of the users and architectonics to respond to the climatic requirements of the locality. Increased utility is also related to the users' needs which has relationship with the social culture when it is not personalised. Where archi-

tecture is directly informed by functionality and utility, that architecture is responding to the users' needs which include their social culture and their architectonic demands. In instances where the aspects of the architecture are from foreign cultures but altered to suit the needs of the resident population, they can be regarded as acculturised and blended into the indigenous architecture.

Table 7
Preferred forms and elements and reasons for their adoption

Variables	Preferred categories	Reasons for adoption
Building shape	Non-rectilinear	Functionality
Building symmetry	Asymmetrical	Affordability
Door width	1.2m-1.8m	Functionality
Window width	1.2m-1.49m	Functionality
Ornamentation	No decoration	Utility
Roof shape	Double-pitched	Functionality
Wall finish	Rendered block wall	Functionality
Roofing materials	Aluminium	Functionality
External ceiling	Asbestos	Functionality
Entrance delineation	Porch with canopy	Functionality
Door materials	Steel	Functionality
Window materials	Glass with aluminium frames	Utility

Implications of the social culture on the emerging architecture

The culture of the Yoruba with respect to their buildings started from very deep introversion where the traditional buildings had small rooms with small windows. The dark enclosure enhanced closeness within the family that opens to outer rooms before courtyards. These hierarchies of introverted spaces and courtyard systems have evolved into more extroverted and larger spaces as the culture eevolved. The building shapes and sizes that are occurring in Abeokuta after the upgrades have been adduced to better functionality from analysis of respondents opinion to the survey questionnaire. While postmodern architecture is synonymous with very large buildings with complex shapes as seen in deconstruction and hi-tech variants of the style, the buildings in the study area that exhibit postmodern architecture only lean towards neoclassicism. Their sizes cannot be termed as very large because most of them hardly go beyond one suspended floor and are less than 12m in width. The resident social culture has no use for large residential buildings. The designers also follow the users' needs in the new buildings which evolve into shapes that go beyond the basic rectilinear shapes of the past. The larger and more complex shaped buildings are still able to support the culture of more extroversion. The buildings also retain single front entrances which lead to internal public spaces. The bedrooms remain deeper within the buildings. The roofs retain the traditional double pitches with hips and gables that have changed very little in many generations. The need to function properly in the tropical climate is paramount for the roof designs. The foreign styles like the flat roofs of the international style and use of contemporary materials like concrete has not been integrated into the local building patterns. All foreign input into roof designs have been acculturised to suit the local technology and climate. Sizes of doors and windows have increased with the blending of cultural needs with modern life. The needs for better movement, circulation and cross ventilation make changing the sizes of the openings inevitable within the changing social culture. The family closeness that persists within the culture is however not violated. The openings are covered with blinds to ensure privacy and larger sizes of doors and windows beyond 1.8m wide are not encouraged except in the fully commercialized buildings. The use of ornamentation and motifs was common in all aspects of the social culture especially the buildings and furniture. The culture has however outgrown the disposition as the production and maintenance of the items of art are not appreciated in the faster lifestyle being assimilated from foreign cultures. The international style which was acculturised after the vernacular styles encouraged plain surfaces. Materials that are being used as finishes for doors, windows, walls and

roofs are acculturised to fit into the programme of the local climate and functionality except where the costs are prohibitive. Local availability dictates how well any material for building will be absorbed into the culture of the people. Finishing materials like glass, aluminium and steel are readily available and lend themselves to local fabrication by artisans within the community. They are thus fully integrated into the indigenous practices. The adoption of additive and subtractive forms for commerce into the frontal spaces of the buildings is a development from the deep-rooted trading culture of the indigenes. Integration of commercial spaces especially shops into buildings is an adoption that came into the culture with the international style and rapid urbanisation. Traditional Yoruba buildings were purely residential and trading was done in the communal markets or by porting the wares around the neighbourhoods. The convenience of having oulets for their wares in the buildings is now fully acculturised. The new buildings and renovations are all commercialised along the major roads with more shops within the enclosed neighbourhoods.

Conclusion

The forms and elements of Yoruba architecture have evolved from buildings that had just a single room to more complex forms that dominate the urban spaces like that of Abeokuta historic core. The evolving culture that these entities support are the driving forces for the changes. The social culture of the people has also been assimilating ideas from foreign cultures in the globalisation trends that have enveloped world development. The forms and elements that are being introduced from foreign architectural building patterns needed to be indigenised to suit the cultural and climatic environment. The acculturisation of the took the following forms; moving from strictly rectilinear to more complex house shapes without symmetry which may suit more complex social demands rather than following tradition; increasing the sizes of openings for more efficient indoor climate, extroversion for continuity with the external environment in the changing social culture; less emphasis on ornamentation which is an indicaton of the changing cultural values where ornamentation was important to delineate social status of house owners and building use; adoption of modern materials like glass, aluminium and steel for durability and to support the changing socio-cultural demands. The adoption of the variants of the foreign forms and elements also tend to alter the social culture towards more globalized dispositiions. The guild system for the fabrication and installation of the building materials is a visible part of the social culture which has evolved to suit the new entrants from time to time. This research has established the nature of the current threshold in the architecture of the Yoruba of Southwest Nigeria by identifying the elevational constituents. The full composition in archetypal explanation as it obtains for the old building patterns is very challenging to decipher in the new dispensation. Modern designers have the benefit of instant and seamless information access from every location in the world. The concept of the urban ensemble that encouraged similarity in patterns and sense of identity in buildings of the same period or philosophy is not patronised by contemporary designers. This disposition encourages unique buildings. The identified forms and elements of the current indigenous architecture of the Yoruba are better rallying points for describing the current style having been ethno-acculturised within the continuum. They give the new identity of the current indigenous architecture that can be further researched and evaluated.

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