

## ARCHITECTURE OF COURTYARDS IN THE INDIGENOUS RESIDENTIAL AREAS OF NIGERIAN CITIES

Okanlawon, S.A<sup>1</sup>, Odunjo, O. O<sup>2</sup> & Adeboyejo, A. T<sup>3</sup>

<sup>1,2</sup>Research Scholar, Department of Architecture, Ladoke Akintola University of Technology, Ogbomoso, Nigeria

<sup>3</sup>Professor, Department of Urban and Regional Planning, Ladoke Akintola University of Technology, Ogbomoso, Nigeria

### ABSTRACT

This study assessed courtyard architecture in the indigenous residential areas of selected Nigerian cities. Three cities: Zaria, Ibadan and Owerri, representing the three dominant ethnic groups (Hausa, Yoruba and Igbo) respectively in Nigeria were selected by stratification. Nine of the Local Government Areas housing the core residential areas in the cities were randomly selected. Copies of questionnaire administered to randomly-selected household heads in the study area were 730. Architectural parameters such as the shapes and sizes as well as inter-region variations of the courtyards were obtained through observations and field measurements. Cross tabulation with Chi square was used to investigate the significance of variations. Multiple Analyses of Variance (MANOVA) was employed to analyse inter-regional variations in the architecture of the courtyards. Results reveal that 37.6, 34.1 and 28.0 percent of houses respectively in Owerri, Zaria and Ibadan had courtyards which were either rectangular (34.60%), triangular (34.6%), irregular (30.40%) or square (0.30%) in shape. Their sizes were averagely: small  $9\text{m}^2$  (63.70%), medium 9 - 15  $\text{m}^2$  (24.20%) and large  $015\text{m}^2$  (12.10%). The dominance of irregular shaped, medium size courtyards in Zaria; rectangular shaped, large size in Ibadan; and triangular shaped, small size courtyards in Owerri was observed. Results of MANOVA as indicated by Levene's Test of Equality of Variances ( $F=171.749$ ;  $df=5$ ;  $p=0.0000$ ) show that there were significant inter-regional variations in courtyard sizes at  $p<0.05$  confident level. It was concluded that the architecture of the courtyards are as diverse as the three geopolitical zones.

**KEY WORDS:** Architecture, Courtyard, Indigenous Residential Area, Cities, Nigeria

---

### Article History

**Received: 07 Aug 2021 | Revised: 28 Dec 2021 | Accepted: 05 Jan 2022**

---

## 1. INTRODUCTION

Architecture is the art and science of designing (ordering or organising) a building, open space (area), community and other artificial constructions and environment, usually with some regard to aesthetic effect (Dictionary.com 2018). However, architecture of courtyards as used in this study refers to the design characteristics of courtyards. Design has been defined as the effort to generate solutions to problems prior to attempting to implement them (Simon, 1957; Broadbent, 1973, 1990; Mahmoodi, 2001); as the creation of a plan or convention for the construction of an object, system or measurable human interaction (Rundell, 2005). Design characteristics therefore is the quality or feature that something is made or created so that it works in a certain way or has a certain appearance.

Courtyard, a type of open space is a ground space that is not roofed by an architectural structure (Stanley, Stark, Johnson and Smith, 2012); a covered outside space but open to the element at its apex (Abass, Ismail and Solla, 2016); an open room into the heavens, a square or rectangular in sketch and bordered by a group of buildings or most important rooms (Mishra and Ramgopal, 2013). The architectural parameters (design characteristics) such as shapes and sizes of a courtyard is the quality or feature that is typical of the way that the courtyard is made or created so that it works in a certain way or has a certain appearance. In architecture, it is the activity of combining the rational, systematic and objective factors on one hand, and intuitive, imaginative and subjective factors on the other hand, which produces a pleasant setting in the built environment (Uji, 2002).

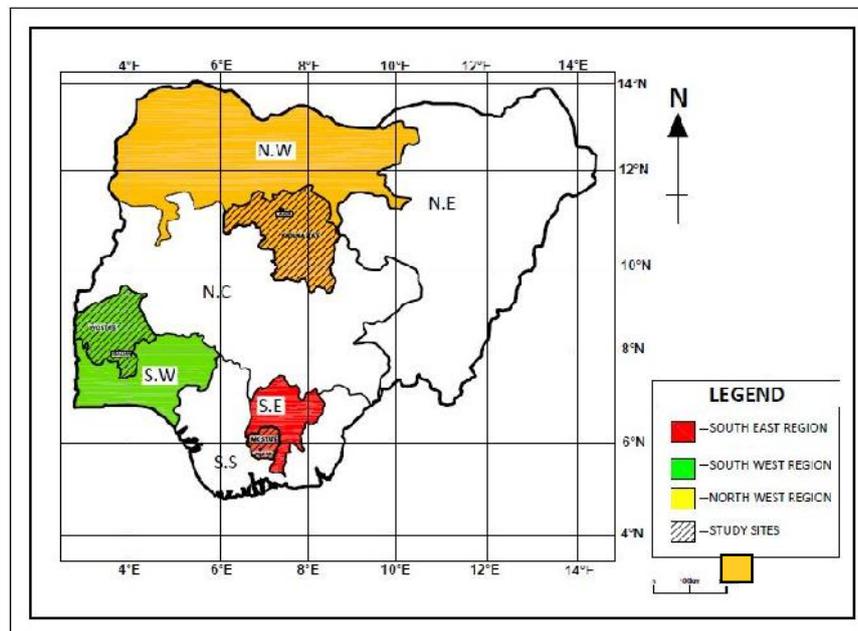
Courtyard has been given considerable research attention in the literature (Reynolds, 2002; Das, 2006; Edward, Sibley, Hakmi, and Land, 2006; Berkovic *et al.*, 2012; Antonio and Carvalho, 2015; Bulus, 2016). Such studies include origin of courtyard (Edward *et al.*, 2006); design requirements for human comfort in buildings (Berkovic, Yezioro and Bitan, 2012); benefits of courtyards (Almhafdy *et al.*, 2013a); courtyard usage and design requirements (Edward *et al.*, 2006; Bulus, 2016); courtyard configuration (form, shape)(Das, 2006; Reynolds, 2002); effect of courtyard form and its impact on the eco-friendly performance in tropical region (Tablada, Blocken, Carmeliet and Troyer, 2005; Aldawoud, 2008) and the effect of courtyard form (shape) on the microclimate in buildings (Ganem, Barea and Llano, 2014; Huang, Niu, and Chung, 2014); and typologies of open spaces (courtyard inclusive) in the indigenous residential areas of Nigerian cities (Okanlawon, 2018). There is however dearth of empirical research on cross cultural dimension of courtyard architecture. Thus, the possibility of influence of geopolitical and cultural factors on architecture of courtyard is the main motivation of the current study.

The literature is replete with empirical studies on the core of Nigerian cities (Onokerhoraye, 1977; Gana, 1996; Afon, 1998, 2005, 2011; Akindele, 2014; Okanlawon, Odunjo, Fadamiro and Adedibu, 2015). Despite comments of professionals, academics and policy makers in respect of this section of cities that is recognized as blighted (Onibokun, 1985; Egunjobi, 1988; Afon, 1998), it is still important for the survival of the majority of urban populace. These city cores in Nigeria harbour the highest proportion of urban population (Egunjobi, 1988). The buildings in the area are closely built and mostly constructed with mud, except where some have been demolished and re-constructed with sandcrete blocks. The buildings are generally land locked (Afon, 1998). It is that socio – cultural and religious part of cities which hosts ceremonies of great importance, both of the permanent inhabitants and those who reside outside the area (Afon, 1998). Professionals, academics, the politicians and even the affluent in our societies still owe greater allegiance to this section of the city as their ancestral origin (Afon, 1998). Studies both in the more developed and less developed nations of the world have shown that inhabitants of the core areas have little or no preference for any locations outside the core and would therefore hardly support any policy action of government or its agencies that would evacuate and relocate them (Marris, 1958; Onibokun, 1985; Egunjobi, 1988, Afon 1998; Kearns and Mason, 2013; Akindele, 2014).

This study therefore investigated the architecture and inter-regional variations of courtyards in the indigenous (core) residential areas across cultures in selected urban centres in Nigeria. This enabled comparative analysis of the underlying mechanisms of courtyard architecture among the urban centres of different cultural settings. In order to effectively carry out the research, the study sought to answer these questions; what are the architecture and the inter-regional variations of courtyards in the indigenous (core) areas of Zaria, Ibadan and Owerri? The study also verified the validity of a null hypothesis which stated that there is no variation in the architecture of courtyards in the study area.

## 2. The Study Area and Sample Sites

The research was conducted in three major cities which are the sites purposively selected from three of the six geo-political zones in Nigeria. The cities are Zaria in Kaduna State from the North Central; Ibadan in Oyo State from the South West; and Owerri in Imo State from the South East (Figure 1). The three selected cities are traditional urban centres with phenomenal growth in population and area extent, increasing level of urbanisation and industrialisation, as well as political and socio-economic prestige. They are capable of reflecting the cultural attributes of the region in which they are located. They also represent the three dominant ethnic groups (Hausa, Yoruba and Igbo) in Nigeria, each with different perspectives on courtyard architecture in the core residential quarters on conceptualised architecture. In terms of size, they are some of the most densely populated with large spatial extent in the country. The cities have very diverse and dispersed core areas, representing the core areas of the three largest ethnic groups in Nigeria.



Source: GIS Laboratory, URP Department, LAUTECH, Ogbomosho (2017).

**Figure 1: Sampled Geo-Political Zones.**

## 3. Data Collection and Analysis

The study utilised predominantly primary data. Google earth and ground trothing were employed in the reconnaissance survey carried out in the study area. From this, 3,650 houses were found among which 730 (20%) houses (92, 210, 428, respectively in Zaria, Owerri and Ibadan) were randomly selected in the communities for survey. Personal observation and field measurements were made of the architectural parameters of the courtyards. Field assistants comprising some architecture students of Ladoke Akintola University of Technology, LAUTECH, Ogbomosho, together with those in the communities who have indigenous knowledge of the area were employed for data collection including the inventory drawings of some typical houses/compounds purposively selected for investigation of courtyards in Ibadan. Some architecture students of Federal University of Technology, Owerri, served as field assistants in Owerri, while a staff in the local government secretariat in Zaria City led the team for data collection in Zaria. The architecture (design characteristics or attributes) of courtyards in houses in the area were measured as ratio data. Descriptive statistical analysis comprising

cross tabulation with chi square was principally used for data analysis. Multiple analyses of variance, a statistical analytical tool with several dependent variables and more than one independent variable was used to test for possible variations in the characteristics of the courtyards. The dependent variable is the incidence of courtyard sizes measured in ratio scale, while the independent variables (factors) are cities and the selected LGAs within cities measured in nominal scale.

#### 4. FINDINGS AND DISCUSSION

Findings from the study are discussed under the various headings. Unless otherwise stated, the tables and figures in this section emanated from the survey of 2017.

##### Architecture of Courtyards in the Study Area

Courtyard architecture (design characteristics) in houses was evaluated and the discussion on them is as follow:

##### Shapes of Courtyards in Houses

Majority (34.6%) of the courtyards in the study area were both rectangular (Figure 2) and triangular (Figure 3) in shapes, closely followed by irregularly shaped courtyards (32.0%), while the least (0.3%) was square shaped one (Table 1). Across the cities, rectangular courtyards were found mostly (61.1%) in Ibadan, corroborating the findings of Adegun *et al.* (2019) in Akure, a medium-sized town in South-West Nigeria also. The next are Owerri (16.8%) in the South-East and Zaria (15.9%) in the North-Central. Among the irregularly shaped courtyards, majority (49.0%) were found in Zaria; the next being Owerri (32.7%) and Ibadan (13.3%). However, among the triangular shaped courtyards, majority (88.7%) of these were found in Owerri; 11.3% in Zaria, while none was found in Ibadan as presented in Table 1. The observed variations in the design/shapes was significant given  $X^2 = 102.057$ ; dof = 6 and  $p = 0.0000$ .

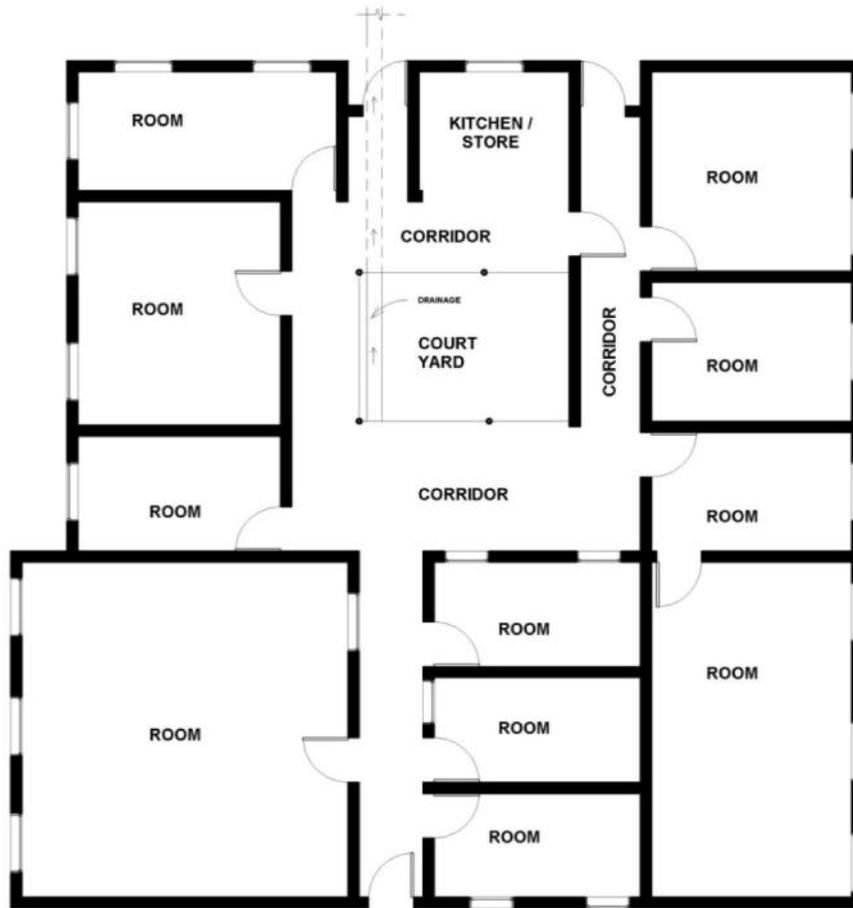
**Table 1: Shapes of Courtyards in Houses Across Cities**

			Shapes of Courtyards in Houses				
			Rectangular	Square	Triangular	Irregular	Total
City	Ibadan	Count	69	1	0	13	83
		% within city	83.1%	1.2%	0.0%	15.7%	100.0%
		% within shape of courtyards	65.1%	100.0%	0.0%	14.0%	27.1%
		% of Total	22.5%	0.3%	0.0%	4.2%	27.1%
	Owerri	Count	19	0	94	32	145
		% within city	13.1%	0.0%	64.8%	22.1%	100.0%
		% within shape of courtyards	17.9%	0.0%	88.7%	34.4%	47.4%
		% of Total	6.2%	0.0%	30.7%	10.5%	47.4%
	Zaria	Count	18	0	12	48	75
		% within city	24.0%	0.0%	16.0%	64.0%	100.0%
		% within shape of courtyards	17.0%	0.0%	11.3%	51.6%	25.5%
		% of Total	5.9%	0.0%	3.9%	15.7%	25.5%
	Total	Count	106	1	106	93	306
		% within city	34.6%	0.3%	34.6%	30.4%	100.0%
		% within shape of courtyards	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	34.6%	0.3%	34.6%	30.4%	100.0%

Source: Authors field survey (2017)  $X^2 = 102.057$ ; dof = 6;  $p = 0.0000$

**(i). Inter-region Variations in Shapes of Courtyards in Houses**

As presented in Table 1 and Table 2, both rectangular (65.1%) and square (100.0%) courtyards were mostly found in Ibadan; Triangular (88.7%) in Owerri and irregular ones (51.6%) in Zaria.



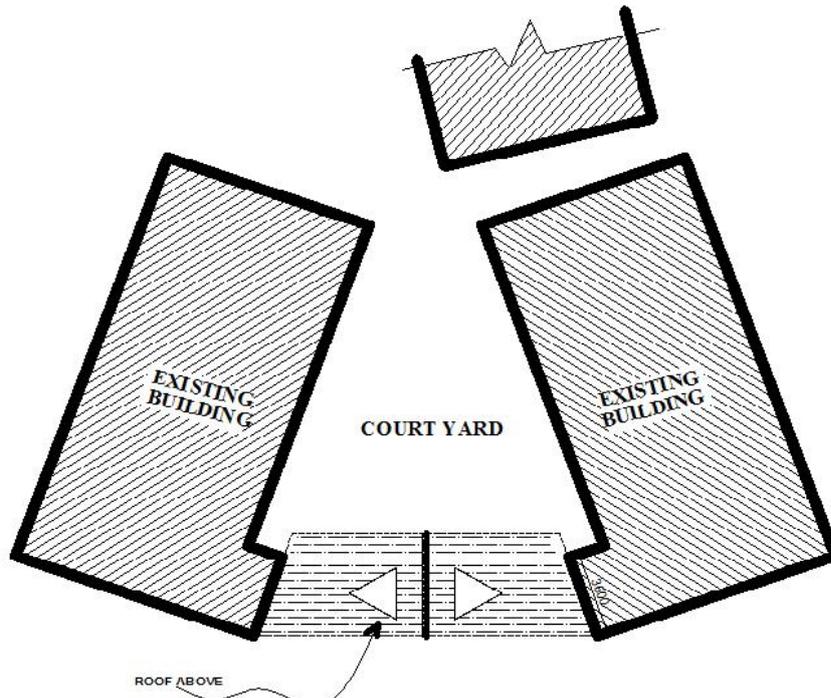
Source: Authors’ Field Work, 2017

**Figure 2: Typical House with a Courtyard in Oje Area, Ibadan**

**Table 2: Inter-Regional Variations of Courtyard Shapes in Houses Across Cities**

Courtyards’ Shapes (%)					Statistics
Cities	Rectangular	Square	Triangular	Irregular	
Ibadan	65.1	100.0	0.0	14.0	X <sup>2</sup> = 102.057 dof = 6 p = 0.0000
Owerri	17.9	0.0	88.7	34.4	
Zaria	17.0	0.0	11.3	51.6	
<b>Total</b>	<b>34.6</b>	<b>0.3</b>	<b>34.6</b>	<b>30.4</b>	

Source: Authors’ Field Survey, 2017



Source: Authors' Field Work, 2017

**Figure 3: Typical Courtyard in Nekede, Owerri.**



Source: Authors' Field Work, 2017

**Plate 1: Approach View of Typical Courtyard (Figure 4.3) in Nekede, Owerri.**



Source: Google Earth Image, 2017

**Figure 4: Typical Courtyard Types in Zaria City**

### **Sizes of Courtyards in Houses**

Courtyards were in various sizes across the cities. These are small courtyards having dimension (sizes) of less than  $9\text{m}^2$ , medium of  $9 - 15\text{m}^2$  and large courtyards of dimension of greater than  $15\text{m}^2$ . More than three-fifths (63.7%) of courtyards in the area were small size ( $< 9\text{m}^2$ ). Across the cities, small size courtyards were mostly found in Owerri (68.7%), while the next are Ibadan (20.0%) and Zaria (11.3%). Among the medium size courtyards ( $9 - 15\text{m}^2$ )(24.2%), most (55.4%) were from Zaria, followed by Ibadan (35.1%) and Owerri (9.5%) whereas, large size courtyards of greater than  $15\text{m}^2$  (12.1%), majority (48.6%) were found in Ibadan, corroborating the findings of Adegun *et al.* (2019) in Akure, a medium-sized town in South-West Nigeria. Next to this were Zaria (40.5%) and Owerri (10.8%) as presented in Table 3. The fact that large size courtyards were found in Ibadan may be due to compound system that is typically used by the Yorubas. Thus, it is concluded that small size courtyards are found in the eastern part of the country, the buildings in Hausa land are characterised by medium size courtyards, while the Yorubas usually have big courtyards in their houses. The observed variations in the dimensions of courtyards in the study area is found significant given  $X^2 = 108.066$  and  $p = 0.0000$ .

**Table 3: Sizes of Courtyards in Houses across Cities**

			Sizes of Courtyards in Houses			Total
			Less than 9m <sup>2</sup> (Small Size)	9-15m <sup>2</sup> (Medium Size)	Above 15m <sup>2</sup> (Large Size)	
City	Ibadan	Count	39	26	18	83
		% within city	47.0%	31.3%	21.7%	100.0%
		% within dimension of Courtyard	20.0%	35.1%	48.6%	27.1%
		% of Total	12.7%	8.5%	5.9%	27.1%
	Owerri	Count	134	7	4	145
		% within city	92.4%	4.8%	2.8%	100.0%
		% within dimension of Courtyard	68.7%	9.5%	10.8%	47.4%
		% of Total	43.0%	2.3%	1.3%	47.4%
	Zaria	Count	22	41	15	78
		% within city	28.2%	52.6%	19.2%	100.0%
		% within dimension of Courtyard	11.3%	55.4%	40.5%	25.5%
		% of Total	7.2%	13.4%	4.9%	25.5%
Total		Count	195	74	37	306
		% within city	63.7%	24.2%	12.1%	100.0%
		% within dimension of Courtyard	100.0%	100.0%	100.0%	100.0%
		% of Total	63.7%	24.2%	12.1%	100.0%

Source: Authors’ Field Survey (2017)  $X^2 = 108.066$ ; dof = 4; p = 0.0000

**(ii). Inter-regional Variations in Sizes of Courtyards in Houses**

The result as presented in Table 3 and Table 4 indicates that there is significant variation in the sizes (dimensions) of courtyards among the three cities (geopolitical regions). The incidence of different sizes of courtyards found within each of the cities/regions differs significantly. For instance, while large size (>15m<sup>2</sup>) courtyards had the highest incidence in Ibadan (48.60%), it was small size (<9m<sup>2</sup>) that ranked highest (68.70%) in Owerri, and Zaria had medium size (9-15m<sup>2</sup>) as the most occurrent (55.40%).

**Table 4: Levene’s Test of Equality of Error Variances for Sizes of Courtyards**

type of open space in your building	F	df1	df2	Sig.
courtyard	171.749	5	52	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Courtyard : Intercept+qa+qb+qa \* qb

Source: Authors’ Computation (2017)

**Uses of Courtyards in Houses**

Uses of Courtyards identified in the study area include domestic (cooking area, parking space, drying and sun baking spot), social need (social ceremonies, family meetings, visitors’ reception area), cultural (ancestral worship and ancestral grave yards), commerce (petty trading, weaving and carving), agro-based activities (animal rearing, gardening/farming), water collection and sanitation (water collection and storage, refuse dumping), recreational (relaxation centre, children playing ground and centre for playing local games such as ayo, draft).

## 5. CONCLUSION

This study has brought to limelight, the inter-regional variations in the architecture of courtyards in the core residential areas in Nigeria. As diverse as the three geopolitical zones (North-West, South-West and South-East) are, so are the occurrences of the architecture of courtyards found to be significantly different. Further investigations revealed that the factors governing the architecture (shapes and sizes) of courtyards include configuration, function and sizes of the houses they serve. Indeed, the variations are the products of the socio-cultural peculiarities of different ethnic groups considered.

## 6. RECOMMENDATIONS

The study recommends that more studies be carried out on the architecture of courtyards in the core residential areas of cities. This will show the socio-cultural peculiarities and other factors that have impacted on the architecture of courtyards in the core of cities. It will also reveal the cause(s) of courtyards' possibility of going extant in the core residential areas of cities: to ensure the preservation of place identity of respective ethnic groups in the study area.

## ACKNOWLEDGEMENT

The contributions of research assistants who administered the questionnaire in all the three study sites (Zaria, Ibadan and Owerri), respondents, as well as reviewers of this article are sincerely appreciated.

## REFERENCES

1. Abass, F., Ismail, L. H., and Solla, M. (2016). *A Review of Courtyard House: History, Evolution, Forms, and Functions*, 11(4), 2557-2563.
2. Adegun, O. B., Adedeji, J. M. and Adedeji, Y. M. D. (2019). *Whither the Courtyards? Understanding disappearance and transformation of Courtyards in residential buildings in Akure, Nigeria. Published Conference Proceedings of 1<sup>st</sup> International Conference on Sustainable Infrastructural Development. IOP Conference Series: Materials, Science and Engineering 640. Doi: 10.1088/1757-899X/640/1/012010*
3. Afon, A. O. (1998). *Perception of Environmental Quality of the Core of Ogbomoso in Oyo State. M. Sc. Thesis submitted to the Department of Urban and Regional Planning, Obafemi Awolowo University, Ile-Ife, Nigeria.*
4. Afon, A. O. (2005). *Solid Waste Management in Selected Cities of Oyo State (Doctoral dissertation). Department Of Urban and Regional Planning, Obafemi Awolowo University. Ile – Ife, Nigeria.*
5. Afon, A.O. (2011). *Residential Differentials in Behaviour and environmental hazards and risks perception in Ile – Ife, Nigeria. Abel Omoniyi Afon and Omotayo Olugbenga Aina (eds): Issues in the Built Environment of Nigeria. Obafemi Awolowo University Press, Ile – Ife, Nigeria. Pp. 52 – 80.*
6. Akindele, O. A. (2014). *Urban Floor Surface Characteristics and the Menace of surface Water Run-off in Akure, Nigeria. Canadian Open Urban and Regional Development Journal, Vol. 1. Pp. 1-12.*
7. Aldawoud, A. (2008). *Thermal performance of courtyard buildings*, 40, 906-910. <http://doi.org/10.1016/j.enbuild.2007.07.007>

8. Almhafdy, A., Ibrahim, N., Ahmad, S. S. and Yahya, J. (2013a). *Analysis of the Courtyard Functions and its Design Variants in the Malaysian Hospitals*. *Procedia – Social and Behavioural Sciences*, 105, 171-182. <http://doi.org/10.1016/j.sbspro.2013.11.018>
9. Antonio, R. and Carvalho, D. De (2015). *Courtyard Housing as a Subtropical Urban Design Model*. Queensland University of Technology.
10. Awotona, A., Mills-Tettey, R. and Ogunshakin, L. (1994). *Multi-habitation and Cultural Structures: Experience from Nigeria*. A book of readings, Department of Architecture, Obafemi Awolowo University, Ile-Ife, Nigeria and CARDO Newcastle, U.K.
11. Berkovic, S., Yezioro, A. and Bitan, A. (2012). *Study of Thermal Comfort in Courtyards in a hot arid climate*. *Solar Energy*, 86(5), 1173-1186. <http://doi.org/10.1016/j.solener.2012.01.010>
12. Bulus, M. (2016). *Evaluation of Courtyard Usage and its Design Requirements in Residential Buildings in Nigerian Hot-Dry Climate*. *International Journal of African Culture and Traditions*. Vol. 4, No. 4; pp. 1-12 ISSN 2056-578X (Online).
13. Broadbent, G. (1973). *Design in Architecture: Architecture and the Human Sciences*. UK: John Wiley and Sons.
14. Broadbent, G. (1990). *Emerging Concepts in Urban Space Design*. : Van Nostrand Reinhold.
15. Das, N. (2006). *Courtyards Houses of Kolkata: Bioclimatic, Typological and Socio-Cultural Study*. A Master of Science in Architecture Thesis, Kansas State University.
16. Dictionary.com (2018). *Unabridged Dictionary*. Random House Inc.
17. Edwards, B., Sibley, M., Hakmi, M. and Land, P. (2006). *Courtyard Housing: Past, Present and Future*. Spon Press.
18. Egunjobi, L. (1988): *Water Resources as a Factor in the Development of the Niger Delta Region*. *The Environmentalist*, Vol. 8, No. 2. Pp. 109-114.
19. Gana, G. N. (1996). *A comparative analysis of development control implementation in Minna and Bida, Niger State*. Ph. D. dissertation submitted to the Department of Geography, University of Ilorin, Nigeria.
20. Ganem, C. Barea G. and Llano, J. F. (2014). *Courtyards as a Passive Strategy in Semi-dry Areas. Assessment of Summer Energy and Thermal Conditions in a Refurbished School Building*. *Renewable Energy*, 69, 437-446. <http://doi.org/10.0106/j.renene.2014.03.065>
21. Huang, Y., Niu, J. and Chung, T. (2014). *Comprehensive Analysis on Thermal and Daylighting Performance of Glazing and Shading Designs on Office Building Envelope in Cooling-dominant Climates*. *Applied Energy*, 134, 215-228. <http://doi.org/10.0106/j.apenergy.2014.07.100>
22. Jiboye, A. D. (2014). *Significance of House-Type as a Determinant of Residential Quality in Osogbo, Southwest Nigeria*. *ELSEVIER Frontier of Architectural Research*, Vol. 3, pp. 20-27. ISSN 2095-2635.

23. Kearns, A. and Mason, P. (2013). *Defining and Measuring Displacement: Is Relocation from Restructured Neighbourhoods Always Unwelcome and Destructive?* *Journal of Housing Studies*, Vol. 28(2). Pp. 177-204. <http://doi.org/10.1080/02673037.2013.767885>
24. Marris, P. (1958). *Widows and their Families* (London, Routledge & Kegan Paul).
25. Mishra, A. K. and Ramgopal, M. (2013). *Field Studies on Human Thermal Comfort: An Overview*. *Building and Environment*, 64, 94-106.
26. Mahmoodi, A. S. M. (2001). *The Design Process in Architecture: A Pedagogic Approach using Interactive Thinking*. Unpublished Ph. D Thesis in Architecture, The University of Leeds, United Kingdom.
27. Okanlawon, S. A. (2018). *Evaluation of Road Utilisation for Holding Social Ceremonies in Indigenous Residential Areas of Ogbomoso, Nigeria*. *LAUTECH Journal of Civil & Environmental Studies*, Vol. 01, Issue 01. Pp. 88-97. ISSN: 2651-5628
28. Okanlawon, S.A, Odunjo, O.O., Fadamiro, J.A. and Adedibu, A.A. (2015): *Perception of Hazards and Risks in Road Utilisation as space for Holding Social Ceremonies in Indigenous Residential Area of Ogbomoso, Nigeria*. Published Conference Proceedings of International Conference on Building, Architecture and Urbanization, held between 15 – 16 June, 2015 in Toronto, Canada.
29. Onibokun, A. G. (1985). *Urbanisation in the emerging nations: a challenge for pragmatic comprehensive regional planning*. In: Onibokun, A.G. (ed), *Housing in Nigeria: A book of Reading*. Nigeria Institute of Social and Economic Research (NISER), Ibadan, 5 – 18.
30. Onokerhoraye, A. G. (1977). *The spatial pattern of residential districts in Benin Nigeria*. *Urban Studies* 14, 201 – 302.
31. Reynolds, J. (2002). *Courtyards: Aesthetic, Social, and Thermal Delight*: Wiley.
32. Rundell, M. (2005). *Macmillan English Dictionary for Advanced Learners, International Student Edition*. Macmillan Publishers Ltd. Oxford OX4 3PP. ISBN 0 333 96675 9
33. Simon, H. A. (1957). *Models of Man*. New York: John Wiley.
34. Stanley, B., Stark, B.L., Johnston, K.L. and Smith, M.E. (2012). *Urban Open Spaces in Historical Perspective: A Transdisciplinary Typology and Analysis*. *Urban Geography*, 33(8), 1089–1117. <http://dx.doi.org/10.2747/0272-3638.33.8.1089>
35. Tablada, A., Blocken, B., Carmeliet, J. and Troyer, F. De. (2005). *The Influence of Courtyard Geometry on Air Flow and Thermal Comfort: CFD and Thermal Comfort Situations*, (November), 13-16.
36. Uji, Z. A. (2002). *Evolution of Design Thoughts*. Paraclete Publishers, Yola, Nigeria. pp. 158.

