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Examining Human Perception on Building Forms and Elements in the Design of an International Conference Centre, Kaduna, Nigeria

Zainab Shuaib[2], Arc Williams A. Idakwoji, Ph.D[1] & Joseph Audu[3]

Department of Architecture, Faculty of Architecture, Bingham University Karu, Nasarawa State.
Corresponding authors: zainabshuaib630@gmail.com
idakwoji.williams@binghamuni.edu.ng

ABSTRACT

This study examines the role of human perception in shaping architectural forms and elements for the design of an international conference centre in Kaduna, Nigeria. Kaduna city, despite its strategic location and role as a hub for governmental, academic, and international engagements, lacks a purpose-built conference facility capable of hosting large gathering people for large-scale global events. The study adopted survey research design methodology. The population of the study comprise 63 firms located in Kaduna, further extracted from the 190 firms in the North Central zone which was earlier extracted from the 840 architectural firms listed in the 2012 Architects Registration Council of Nigeria, ARCON Register. A sample of 54 built environment professionals for the questionnaire and 3 for the interview schedule were deployed for the data using purposive sampling. Findings emphasize that user-friendly forms, cultural responsiveness, and integration of technology-driven design principles and elements are critical to enhancing both functionality, user experience and satisfaction. The study contributes design recommendations for a sustainable, contextually relevant international conference centre in Kaduna, positioning it as a global destination for academic, cultural, social, political and professional gatherings.

Keywords: *Architecture, Building forms, elements, Conference centre, Social, Cultural, political, Human perception.*

INTRODUCTION

Buildings serve as essential shelters for human activities, reflecting advancements in construction techniques, material use, and architectural innovation (Oseghale *et al.,* 2015; Haruna *et al.,* 2018). When appropriately designed, buildings not only fulfill functional needs but also enhance user satisfaction (Ghorbanzadeh, 2017). Among these structures, conference centres occupy a unique role as dedicated spaces for meetings, dialogue, and knowledge exchange. Conferences defined as formal gatherings where individuals or groups convene to deliberate on issues of common interest (Merriam-Webster, 2022) demand purpose-built facilities to support meaningful interaction and collaborative problem-solving (Martins & Dimkpa, 2023).

As posited by Ching (2014), the success of a conference facility depends on the thoughtful integration of architectural forms and elements that enhance spatial experience, technological adaptability, and user comfort. Beyond functionality, Gonzalez and Navarro (2020) emphasize that conference centres must provide clarity of circulation, acoustic performance, and cultural sensitivity, especially in diverse regions such as Kaduna. Human perception plays a vital role in evaluating these design attributes, as it shapes how users interpret and interact with built environments (Ejeh *et al.,* 2016; Ikpe *et al.,* 2016).

Kaduna, a prominent administrative and commercial hub in Northern Nigeria, is strategically located and accessible (Salihu *et al.,* 2019). Despite hosting numerous government institutions and

international events, the absence of a dedicated international conference centre restricts its competitiveness as a global meeting destination. Addressing this gap requires a design that integrates human perception into the planning and articulation of building forms and elements, ensuring functional efficiency, cultural identity, and user satisfaction. Consequently, the objectives are to:

(1) Identify architectural forms and elements perceived as user-friendly in a conference facility,
(2) Assess users' perceptions of building forms and elements in selected conference centres within close proximity,
(3) Examine the impact of architectural forms and elements on user satisfaction in conference facilities.

Statement of the Problem

Although Kaduna hosts national and international events, it lacks a purpose-built conference facility capable of meeting global standards. Existing facilities are either undersized, technologically inadequate, or not designed with user perception in mind. As highlighted by Adamu *et al.,* (2020), public buildings require adherence to established design standards and user-centered approaches. Without incorporating human perception into the design process, conference centres risk being functionally deficient, underutilized, or culturally irrelevant. Thus, there is a need for a design framework that prioritizes user experience, contextual identity, and technological adaptability in the development of an international conference.

LITERATURE REVIEW

Building Forms and Elements in Architectural Design

Building form encompasses the overall shape, massing, and volume of a structure, defining its identity and influencing spatial organization, circulation, and environmental performance (Ching, 2014). Architectural elements walls, roofs, facades, openings, and columns collectively shape aesthetic, functional, and symbolic qualities. In Nigeria, examples such as the monumental National Theatre Lagos or climate-responsive shaded colonnades illustrate how form and elements can enhance both perception and functionality (Uji, 2009). Conference centres also demonstrate diversity in form: the Abuja ICC emphasizes monumental symmetry, the Akwa Ibom ICC employs sweeping roof curves, while the Obasanjo Library Conference Centre integrates culturally inspired motifs (Plates i, ii & iii a-b).

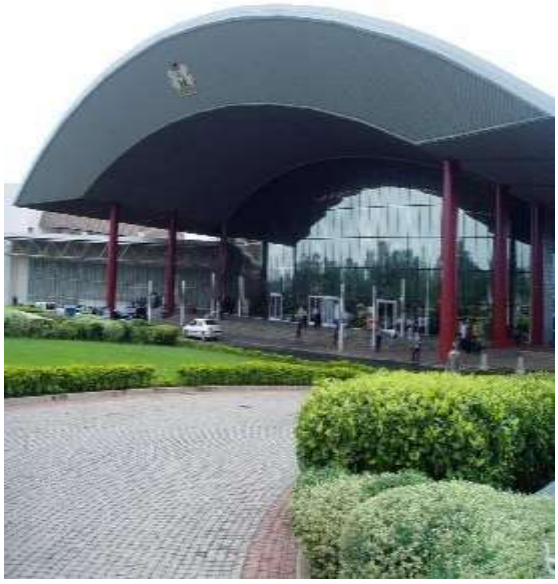

Plate i: *International Conference Centre, Abuja.*

Plate ii: *Akwa Ibom International Conference*

Plate iii a.

Plate iii b:
Plates iii a and b*: Olusegun Obasanjo Presidential Library and Conference Centre Source: Retrieved from https://oopl.org.ng*

Perceptions of Building Forms and Elements

The Perceptions of building forms and elements are shaped by visual appeal, functional efficiency, and cultural relevance. Studies has shown that users value clarity in spatial organization, intuitive circulation, and comfortable environmental conditions such as lighting, ventilation, and acoustics as indicators of good design (Oluigbo, 2011). Formally, buildings that incorporate recognizable geometry, expressive facades, and symbolic elements tend to enhance user satisfaction and place identity. In the Nigerian context, the fusion of modern design with traditional motifs in public buildings often enhances cultural connection and user engagement (Uji, 2009). These perceptions are essential in evaluating how conference centres meet user expectations and functional demands.

Impact on User Experience and Satisfaction

Architectural form and elements directly influence comfort, navigation, and emotional response. Spatial clarity, environmental quality, and culturally grounded symbolism contribute to usability and user attachment (Ching, 2014; Uji, 2009). In conference facilities, these aspects foster participation and overall well-being, highlighting the value of context-sensitive design.

Theoretical Framework

According to Goyol, (2019) a theoretical framework is a structure that guides research by relying on a formal theory. This study adopts the *Gestalt Theory of Perception***,** which explains how users perceive built forms as unified wholes through principles like similarity, proximity, and symmetry, alongside *Environmental Perception Theory***,** which underscores the psychological and cultural responses to architectural space. Together, these frameworks provide a lens to assess how forms and elements shape user experiences in conference centres. It enables the architect to create spaces that align with natural human perceptual tendencies, ensuring clarity, usability, and visual harmony.

METHODOLOGY

This section describes the methodology used in this study. It describes the study location, the study area and methods chosen for this study.

The Study Area: Kaduna City

Kaduna City is located in the northern part of Nigeria (Figure 1). It is the third most populous state in Nigeria, with a population of 6,066,562 in 2009. It was established as the capital city of Northern Nigeria in 1917 after earlier searches for a suitable administrative capital in Lokoja, Jebba and Zungeru. Some of the legacies of northern Nigeria in Kaduna include Lugard Hall, Arewa House, Ahmadu Bello University, Hamdala Hotel, Gamji Park and the Lugard House, State Secretariat Complex, Railway station and the Customary Court. Many northern elites live in Kaduna (Qurix *et al.,* 2024).

As posited by Adamu *et al.,* (2022) Kaduna has grown into an important industrial center, second only to Kano in commercial significance. Over the years, the city has experienced waves of immigration, serving as the capital under different political structures: The defunct Northern Nigerian Protectorate (1917-1957), the Northern Nigerian Regional Government (1957-1967), the North-Central State (1967-1975), the old Kaduna State (1975-1987), and now the modern Kaduna State (1987 to date).

Figure 1: *Map of Kaduna State, Nigeria*
Source: Adopted from Qurix et al., (2024)

Research Design

This study employed a mixed-methods approach, integrating both qualitative and quantitative strategies to achieve its objectives. A case study design was adopted to provide in-depth insights into the unique characteristics of building forms and elements as applied to international conference centres.

Data Sources

Primary data were obtained through structured questionnaires, direct observations, and detailed case studies of selected conference facilities. While the Secondary data were obtained were sourced from journals, books, academic theses, institutional reports, professional handbooks, and reputable online databases. These provided theoretical grounding and contextual relevance for interpreting the findings.

Population and Sample

The target population comprised construction industry professionals (architects and engineers) practicing in Kaduna metropolis. According to the Architects Registration Council of Nigeria (ARCON, 2012),of the 840 registered architectural firms nationwide, 190 are in the North Central Zone, with 63 located in Kaduna (Ola-Adisa *et al.,* 2019; Qurix *et al.,* 2024). This served as a reliable

framework for identifying qualified respondents, with considerations given to gender, professional experience, and projects completed within the last 15 years.

Sample Size

The sample size for this study was calculated using the Taro Yamane's formula (1967) for sample size was used. The formula is expressed below:

$$n = N / [1 + N (e) ^2] \quad \text{Equation 1}$$

Where:

n = sample size N = population size (63)

e = margin of error (typically 0.05 for 95% confidence level)

$$n = 63 / [1 + 63(0.05) ^2]$$

$$n = 63 / [1 + 63(0.0025)] \; n = 63 / (1 + 0.1575) \; n = 63 / 1.1575 \approx 54.43$$

Thus, a sample size of 54 respondents was deemed appropriate.

Sampling Technique

A combination of purposive, convenience, and snowball sampling was employed. Purposive sampling ensured the selection of professionals and case study buildings directly relevant to the research focus. Convenience sampling facilitated the distribution of questionnaire. Additionally, snowball sampling was employed to reach a broader network of respondents through referrals from initial participants, particularly in identifying more users and event professionals with relevant experience.

RESULTS AND DISCUSSION

Sample Characteristics

Fifty-four professionals participated (Table 1). The age profile was evenly split between 26–40 and 41–60 years (50% each), with males comprising 61.1%. Most were married (75.9%), held tertiary education (85.2%), and reported 1–5 years (55.6%) or 6–10 years (37.0%) of practice. This points to an informed, practice-engaged cohort, strengthening the credibility of perceptions reported.

Table 1: Sample Characteristics of the respondents (n=54)

S/No	Characteristics	Form	Frequency (F)	Percentage (%)
1	**Sex**	Female	21	38.9
		Male	33	61.1
		Total	**54**	**100**
2	**Age group (years)**	36 - 40	27	50
		41 - 60	27	50
		Total	**54**	**100**
3	**Marital Status**	Married	41	75.9
		Single	9	16.7
		Widow	4	7.4
		Widower	0	0
		Total	**54**	**100**
4	**Years Served**	1 - 5	30	55.6
		6 - 10	20	37 0
		11 - 20	4	7.4
		21 above	0	0
		Total	**54**	**100**
5	**Education**	Secondary	3	5.6
		Tertiary	46	85.2
		Vocation	5	9.3
		Total	**54**	**100**

Source: Field survey, 2025.

Objective 1: Architectural forms and elements perceived as user-friendly

Table 2 reveals majority of users agree that the building includes architectural elements such as arches, domes, and columns, with 37% strongly agreeing and 35.2% agreeing. This reflects the presence of deliberate stylistic choices that go beyond mere utility. These elements are often tied to cultural expression and are effective in reinforcing symbolic or historical value within a community space. Nevertheless, the 14.8% undecided group suggests that while these elements may exist, they might not be prominent or explained well enough to all users. Furthermore, 13% disagreed or strongly disagreed, indicating that some may find the architectural vocabulary lacking in diversity or application. The data recommends emphasizing or even curating interpretive information to increase user awareness and appreciation of design elements.

Table 2: Architectural forms and elements on user satisfaction in conference facilities

Architectural forms and elements on user satisfaction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	5.6	5.6	5.6
	2	4	7.4	7.4	13.0

3	8	14.8	14.8	27.8
4	19	35.2	35.2	63.0
5	20	37.0	37.0	100.0
Total	54	100.0	100.0	

Source: Field survey, 2025.

Objective 2: Users' perceptions of forms and elements in existing centres Perceived identity was high: 70.4% agreed/strongly agreed that design elements contribute to the facility's distinct character, and 74.1% reported strong first impressions (entrance sequence, lobby cues, façade expression). By contrast, perceptions of the material palette were less conclusive (≈37% positive; ≈39% neutral; ≈24% negative), implying that while form and entry experience succeed, some finishes read as too industrial or insufficiently warm/contextual for a broad user base (Table 3-6).

Table 3: Materials used to enhance the building's aesthetic appeal

Materials aesthetic materials

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	7	13.0	13.0	13.0
	2	6	11.1	11.1	24.1
	3	21	38.9	38.9	63.0
	4	20	37.0	37.0	100.0
	Total	54	100.0	100.0	

Source: Field survey, 2025.

Table 4: Window and door arrangement

Window and Door Arrangement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	5.6	5.6	5.6
	2	3	5.6	5.6	11.1
	3	7	13.0	13.0	24.1
	4	15	27.8	27.8	51.9

	5	26	48.1	48.1	100.0
	Total	54	100.0	100.0	

Source: Field Survey, 2025

Table 5: Interior Finishes

Interior Finishes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	5.6	5.6	5.6
	2	6	11.1	11.1	16.7
	3	10	18.5	18.5	35.2
	4	14	25.9	25.9	61.1
	5	21	38.9	38.9	100.0
	Total	54	100.0	100.0	

Source: Field survey, 2025

Table 6: Contribution to identity

Contribution to Identity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	4	7.4	7.4	7.4
	2	5	9.3	9.3	16.7
	3	7	13.0	13.0	29.6
	4	23	42.6	42.6	72.2
	5	15	27.8	27.8	100.0
Total		54	100.0	100.0	

Source: Field survey, 2025.

Objective 3: Impact of forms and elements on user satisfaction

Results indicate clear functional and experiential gains linked to form and spatial organization. Inclusiveness of spatial layout recorded 74.1% positive ratings, and interaction among attendees 68.5%**,** pointing to effective circulation, foyers, and informal meeting zones. Audience engagement

associated with space form achieved 59.2% positive responses good, but with room for improvement in tiering, sightlines, and acoustics. Finishes' contribution to comfort/ambience scored 59.2% positive, and comfort during lengthy sessions 62.9%**,** highlighting the importance of ergonomic seating, thermal control, and glare management. Crucially, respondents linked architecture to event outcomes**:** 77.7% agreed it enhances event quality, while overall satisfaction with architectural quality reached 79.6%**,** evidencing strong alignment between design decisions and perceived performance (Table 7-11)

Table 7: Inclusiveness of Spatial Organization

Inclusiveness of Spatial Organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	8	14.8	14.8	14.8
	3	6	11.1	11.1	25.9
	4	19	35.2	35.2	61.1
	5	21	38.9	38.9	100.0
	Total	54	100.0	100.0	

Source: Field survey, 2025

Table 8: Interaction among attendees

Interaction among attendees

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	5	9.3	9.3	9.3
	3	12	22.2	22.2	31.5
	4	13	24.1	24.1	55.6
	5	24	44.4	44.4	100.0
	Total	54	100.0	100.0	

Source: Field survey, 2025.

Table 9: Comfort and ambiance via finishes **Comfort and ambiance via finishes**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	3.7	3.7	3.7
	2	6	11.1	11.1	14.8
	3	14	25.9	25.9	40.7
	4	16	29.6	29.6	70.4
	5	16	29.6	29.6	100.0
	Total	54	100.0	100.0	

Source: Field survey, 2025

Table 10: Comfort during lengthy sessions

Comfort during lengthy sessions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	5.6	5.6	5.6
	2	7	13.0	13.0	18.5
	3	10	18.5	18.5	37.0
	4	10	18.5	18.5	55.6
	5	24	44.4	44.4	100.0
	Total	54	100.0	100.0	

Source: Field survey, 2025

Table 11: Impact on event quality

Impact on Event Quality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	3.7	3.7	3.7
	2	6	11.1	11.1	14.8
	3	4	7.4	7.4	22.2

4		20	37.0	37.0	59.3
	5	22	40.7	40.7	100.0
	Total	54	100.0	100.0	

Source: Field survey, 2025

Discussion

Taken together, the findings show that legible form**,** passive environmental strategies (daylight/ventilation), and inclusive spatial organization drive satisfaction in conference settings. High first-impression and identity scores suggest that coherent massing and façade articulation resonate with users, consistent with the study's theoretical lens: Gestalt principles (clarity, figure-ground, symmetry) and environmental perception (cultural fit, comfort cues) help users quickly read and value the environment. The comparatively mixed response to materials indicates a gap between formal clarity and tactile/affective quality an opportunity to recalibrate textures, warmth, and local references without compromising durability.

Objective 4: Implications for Design

Evidence-based priorities for an International Conference Centre in Kaduna include:

i. Form & Wayfinding: clear massing, intuitive circulation loops, and reinforced entry sequences for strong first impressions and spatial legibility.
ii. Environmental Performance: window/door strategies for cross-ventilation and daylight; options for glare/acoustic control; shading devices tuned to local climate.
iii. Inclusive Planning: barrier-free routes, equitable seating/view lines, generous foyers, and distributed breakout areas to support interaction.
iv. Comfort for Duration: ergonomic seating, controllable lighting and temperature, acoustic treatments targeting speech intelligibility.
v. Materials & Identity: warmer, context-responsive finishes and locally inflected motifs/artwork to deepen cultural resonance and reduce neutrality/negatives seen in material perceptions.

Discussion of Findings

This study examined how users perceive architectural forms and elements in the design of international conference centres in Kaduna, focusing on functionality, comfort, accessibility, and aesthetics. The findings demonstrate that user satisfaction is largely influenced by spatial clarity, environmental responsiveness, and culturally sensitive design solutions. These insights affirm that building performance must extend beyond technical and structural considerations to incorporate the lived experiences of users, reinforcing the value of human-centred architecture in public facilities.

The research contributes a contextual framework that integrates user feedback with sustainable architectural practices. Environmentally responsive elements such as natural lighting, crossventilation, and shaded courtyards emerged as critical to comfort and energy efficiency, while culturally grounded materials and forms enhanced contextual relevance and identity. Furthermore, the study underscores the importance of engaging stakeholders, including users and facility managers, in the design process to ensure inclusivity, usability, and long-term acceptance.

CONCLUSION

In advancing knowledge, this work provides empirical evidence on user-centred design for conference facilities in the Nigerian context, contributing to the broader discourse on sustainable and inclusive public architecture in sub-Saharan Africa. It also highlights future research pathways, including longitudinal studies on the performance of user-preferred design elements and comparative evaluations between urban and rural facilities. By bridging technical design standards with user

perceptions, the study establishes a practical and theoretical basis for designing international conference centres that are functional, sustainable, and socially relevant.

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