



THE ROLE OF ORGANIC ARCHITECTURE IN ENHANCING HUMAN HEALTH AND WELL-BEING IN A HOSPITALITY ENVIRONMENT

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Abstract

While a growing body of empirical evidence indicates that the separation of human habitation from nature carries measurable costs for physical health, psychological well-being and cognitive function, organic architecture offers a coherent design paradigm that reverses this disconnection. Hotels are an especially consequential setting, since restoration is their declared purpose, occupancy is short, and guests navigate them as strangers. The aim of this study is to enhance human health and well-being in a hospitality environment through the application of organic architectural principles to a 4-star hotel design in Awka, Nigeria. Two objectives guided the work: to identify the core principles of organic architecture that most directly influence health and well-being in hospitality environments; and to develop a health-centred organic design framework for a 4-star hotel in Awka South LGA. The study adopts a qualitative case-study design in two strands: a structured literature review executed across Scopus, Web of Science and Google Scholar, and comparative evaluation of four benchmark 4-star hotels against Terrapin Bright Green's 14 Patterns of Biophilic Design. Findings identify five core organic principles with direct health consequences and four mutually reinforcing pathways through which they act: physical health, by way of indoor air quality, thermal comfort, daylight and incidental movement; psychological restoration, evidenced by increased serenity and reduced physiological stress markers; neuroaesthetic engagement, in which curvilinear form is processed more fluently than rigid geometry; and social and behavioural well-being arising from permeable, landscaped public space. The study concludes that these pathways are interdependent, so integrated rather than piecemeal application is required, and synthesises them into the Awka Earth Lodge framework. It recommends that health be adopted as a primary performance criterion in design briefs, that post-occupancy evaluation be instituted, and that Nigerian curricula incorporate biophilic design and neuroaesthetics.

Keywords: organic architecture; human health; well-being; biophilic design; psychological restoration; neuroaesthetics; hospitality architecture; indoor environmental quality.

1. Introduction

Human beings spend an estimated ninety per cent of their lives inside buildings, and the quality of those interiors exerts a measurable, cumulative effect on physical health, psychological well-being and cognitive performance (Usip et al., 2026; Kellert and Calabrese, 2015). Yet the dominant typologies of the twentieth and early twenty-first centuries sealed curtain-walled towers, mechanically conditioned interiors and placeless corporate forms have severed occupants from the natural systems within which human physiology and cognition evolved (Wilson, 1984; Joye, 2007). The consequences include elevated stress markers, reduced cognitive restoration, declining indoor air quality, circadian disruption and "nature deficit" (Söderlund and Newman, 2015; Al-Hiyari and Al-Hiyari, 2022).

Organic architecture, articulated by Frank Lloyd Wright and elaborated by successive generations of organicist architects, offers a coherent counter-paradigm. Wright's central

claim, that a building should develop "from within outward in harmony with the conditions of its being", is not a stylistic preference but a statement about the relationship between architectural form and human flourishing (Wright, 1954; Han, 2020). The nature invoked in that claim is threefold. It is the nature of the site its topography, climate, vegetation and prevailing winds to which the building conforms rather than resists. It is the nature of the material, used to express rather than disguise its properties, so that timber reads as timber and earth as earth. And it is the nature of the occupant, whose perceptual and physiological systems evolved in natural settings and continue to respond to them long after habitation moved indoors (Kärkkäinen, 2016; Li, 2023). Architecture on this account is not a backdrop to experience but a medium through which occupants are continuously reconnected with nature, and the quality of that reconnection shapes the quality of lived experience.

Hospitality architecture is a particularly consequential arena in which to test this proposition, for three reasons arising from the nature of hospitality itself. First, the hotel is one of very few building types whose declared purpose is restoration: guests arrive depleted by travel, work or displacement and occupy the building precisely in order to recover, so the environment is not a container for the service but part of it. Second, occupancy is short and concentrated, so any restorative effect must be delivered rapidly and passively through ambient air, light, thermal condition, form and view rather than through habituation exactly the response profile the evidence reports, with measurable physiological de-activation within minutes to hours of exposure to nature-integrated settings (Ulrich, 1984; Panagopoulos et al., 2020). Third, the guest is a temporary stranger navigating an unfamiliar plan under mild cognitive load, and organic, curvilinear, legible geometries reduce both that load and the anxiety of disorientation (Vartanian et al., 2013; Xie et al., 2022). No other building type combines a restorative purpose, a short exposure window and an unfamiliar occupant in this way, and it is this combination that makes organic architecture not merely suitable for hospitality but specifically demanded by it.

In Nigeria, however, the hospitality sector has largely followed global trends toward sealed, air-conditioned, internationally standardised typologies that frequently undermine the very restorative experience their guests seek. The mismatch is sharpest in the tropical wet-and-dry belt, where imported envelope models depend on continuous mechanical cooling that an unreliable grid cannot guarantee, so comfort collapses whenever power does (Babalola and Osisami, 2024; Ibrahim et al., 2024). In Awka, this is compounded by sustained high humidity, elevated particulate matter and vehicular emissions (Eguvbe et al., 2024) conditions under which envelope design becomes a direct determinant of the air guests breathe.

Despite a substantial international evidence base linking organic and biophilic environments to occupant health, the systematic integration of organic principles for the explicit purpose of enhancing guest health and well-being remains rare in Nigerian hospitality practice, and no published framework translates that evidence into design decisions for a 4-star hotel in the Awka context (Edim and Inyang, 2023; Akinyemi et al., 2024). This study addresses that gap. The aim of this study is to enhance human health and well-being in a hospitality environment through the application of organic architectural principles to a 4-star hotel design in Awka, Nigeria. To achieve this aim, the study is guided by two objectives:

- i. To identify the core principles of organic architecture that most directly influence human health and well-being in hospitality environments.
- ii. To develop a health-centred organic design framework for a 4-star hotel in Awka South Local Government Area, Nigeria.

2. Literature Review

2.1 Foundational Principles of Organic Architecture

Organic architecture rests on the premise that a building should emerge from its site as an extension of the landscape rather than an imposition upon it (Wright, 1954; Li, 2023). For Wright, form and function are one, and building, furnishings and setting are conceived as a single integrated work whose ethical obligation is to leave the landscape better than it found it (Han, 2020; Sulistyono and Budiman, 2025). Operationally this yields five interrelated principles: deep integration with the landscape; deliberate use of natural and locally sourced materials; seamless interior–exterior transition; incorporation of natural shapes and forms; and sustained attention to human scale (Kärkkäinen, 2016; Li, 2023). Wright's "destruction of the box" - the breaking of enclosed volumes into permeable, flowing space remains central because it delivers spatial delight, sensory openness and environmental exchange simultaneously.

2.2 The Biophilia Hypothesis and Biophilic Design

The affinity of organic architecture with human flourishing finds empirical grounding in the biophilia hypothesis, which holds that human beings possess an innate, evolutionarily shaped inclination to affiliate with life and living systems (Wilson, 1984; Joye, 2007). Kellert and Calabrese (2015) operationalised it into biophilic design, distinguishing direct connections with nature (daylight, ventilation, vegetation, water) from indirect ones such as natural materials, biomorphic form and natural soundscape. Terrapin Bright Green (2014) elaborated this into 14 Patterns grouped as Nature in the Space, Natural Analogues and Nature of the Space, of which Visual Connection with Nature, Thermal and Airflow Variability, Presence of Water, Dynamic and Diffuse Light, Prospect and Refuge carry the strongest documented health effects (Ryan et al., 2014). These patterns form the evaluative instrument used in this study.

2.3 Documented Health Outcomes

Physically, natural ventilation reduces indoor concentrations of volatile organic compounds, carbon dioxide and airborne pathogens, improving respiratory outcomes and lowering the incidence of sick-building complaints (Mohammad and Ahmad, 2016); daylight regulates circadian rhythm, supports melatonin and serotonin production and improves sleep quality (Kellert and Calabrese, 2015; Li, 2023); and passive thermal strategy combined with high-mass walls reduces the physiological load of heat strain and the cardiovascular cost that accompanies it (Babalola and Osisami, 2024; Ibrahim et al., 2024). Psychologically, biophilic integration is associated with a reported 43% increase in serenity and reductions in anxiety and mental fatigue (Akinyemi et al., 2024; Suess et al., 2024), while exposure to nature-integrated settings lowers cortisol, sympathetic activation and blood pressure even briefly (Ulrich, 1984; Panagopoulos et al., 2020). Attention Restoration Theory supplies the mechanism: such settings engage "soft fascination", allowing depleted directed attention to recover (Kaplan and Kaplan, 1989). Neuroaesthetic work adds that curvilinear contour is judged more beautiful and elicits stronger approach responses than rectilinear form (Vartanian et al., 2013), engaging hippocampal grid cells that support navigation and place familiarity (Xie et al., 2022).

2.4 Organic Architecture in Hospitality and the Research Gap

Hospitality-specific studies confirm these effects. Abraham et al. (2023) find that 73.9% of guests read biophilic features as a signal of environmental commitment; Suess et al. (2024) report that high-quality biophilic blending attracts approximately 35% more guests; and Elshaer et al. (2025) show that biophilic design quality significantly predicts guest well-being and revisit intention, with soundscape and materiality contributing independently to sense of place (Spence, 2020). For Nigeria, Edim and Inyang (2023) connect adaptive building form to

indoor air quality in four-star hotels. What is absent is a framework integrating the physical, psychological, neuroaesthetic and social pathways into one set of design decisions for a tropical Nigerian context - the contribution this study makes.

3. Methodology

3.1 Research Design

The study adopts a qualitative case-study design, an approach well established for architectural enquiry where the object of study is the relationship between spatial configuration and human response rather than a measurable dependent variable (Adewumi et al., 2020; Cruz, 2020). No human-subject data were collected; the study reasons from published empirical findings and built precedent, and its outputs are analytical and propositional rather than statistical (Patton, 2015). It proceeds in three phases: a structured literature review, comparative evaluation of four benchmark projects, and translation of the synthesis into a conceptual design framework.

3.2 The Study Area

The study is sited in Awka South Local Government Area, Anambra State, south-eastern Nigeria. Awka South lies between latitudes 6°10'N and 6°15'N and longitudes 7°02'E and 7°07'E and comprises nine communities, of which Awka, the state capital, is the administrative and commercial centre. The terrain rises from about 100 m to over 300 m above sea level across the Awka–Orlu cuesta, giving gently to moderately sloping sites with long views eastward across the escarpment - a topographic condition that favours terraced, stepped building forms and cross-ventilated orientation. The underlying geology is the friable sandy-clay lithology of the Nanka Formation: a substrate that is well drained and readily excavated but highly susceptible to gully erosion and localised subsidence, and which therefore constrains foundation depth, retaining strategy, terracing and site drainage (Njoku et al., 2024). Climatically the area falls within the tropical wet-and-dry (Köppen Aw) zone, with a mean annual temperature of 26.8 °C, relative humidity peaking at 85.77% in September, a wet season from April to October and a harmattan period from December to February (Climate-Data.org, 2021). Prevailing winds are south-westerly and moisture-laden through the wet season and north-easterly and dust-bearing during the harmattan, so that a single fixed opening strategy cannot serve both regimes. Table 1 summarises the variables bearing on passive design. These conditions define a specific problem: sustained high humidity narrows the comfort band and makes air movement, rather than temperature reduction alone, the primary comfort lever; high solar altitude makes horizontal shading and roof performance decisive; and the harmattan introduces a seasonal particulate load that any naturally ventilated envelope must filter rather than simply admit. To these climatic burdens are added anthropogenic ones - vehicular emissions along the Enugu–Onitsha corridor, generator exhaust arising from grid unreliability, and open refuse burning, all of which elevate ambient particulate concentrations across the Awka urban area (Eguvbe et al., 2024). Taken together, these conditions mean that in Awka the building envelope is not a neutral boundary but the principal instrument determining the thermal, respiratory and acoustic environment a guest occupies.

Awka South was selected on three explicit grounds: it is the busiest administrative and commercial node in Anambra State and generates sustained demand for 4-star accommodation; its hotel stock is dominated by sealed, mechanically conditioned blocks exemplifying the typology this study interrogates; and its combination of thermal strain, high humidity and degraded ambient air quality makes it a deliberate stress-test, so that a strategy performing here should transfer readily to less demanding tropical contexts.

Table 1: Climatic variables of Awka South LGA relevant to passive design

Variable	Value	Design implication
Köppen classification	Aw (tropical wet-and-dry)	Passive cooling viable year-round with shading and airflow
Mean annual temperature	26.8 °C	Within adaptive comfort range; humidity is the binding constraint
Peak relative humidity	85.77% (September)	Air movement prioritised over temperature reduction
Wet season	April – October	Deep overhangs; covered but open-sided circulation
Harmattan period	December – February	Seasonal particulate load; filtered intake required
Latitude	6°10'N – 6°15'N	High solar altitude; horizontal shading and roof performance decisive

Source: Compiled from Climate-Data.org (2021) and Njoku et al. (2024).

3.3 Sampling Protocol

Two source streams were purposively sampled. For the *academic literature stream*, search strings combining the terms "organic architecture", "biophilic design", "restorative environment", "neuroaesthetics", "thermal comfort", "hotel" and "hospitality" with Boolean operators were executed across Scopus, Web of Science and Google Scholar. Inclusion criteria were: peer-reviewed journal articles, scholarly books and published academic theses; publication between 2005 and 2025, with three foundational works (Wilson, 1984; Ulrich, 1984; Kaplan and Kaplan, 1989) retained for theoretical primacy; English language; and explicit treatment of at least one of the three theoretical domains; foundational organic theory, empirical environmental psychology, and neuroaesthetic research on spatial geometry.

For the *architectural precedent stream*, four benchmark 4-star facilities were purposively sampled against three criteria: documented use of passive environmental strategy; availability of published architectural documentation; and relevance to tropical or humid-subtropical conditions. The selected precedents - Lagos Marriott Ikeja, Protea Hotel Ikeja, Transcorp Hilton Abuja and Sensa Hotel Bandung (Sari and Sholeh, 2022) span the full range of envelope strategy from fully sealed to fully permeable, allowing the consequences of that range to be compared directly.

3.4 Data Extraction and Analytical Matrix

Extraction followed a four-axis protocol capturing core organic principles, physical health mechanics, restoration pathways, and spatial strategies deployed in the precedents. The material was subjected to thematic content analysis, and each precedent rated against the three pattern groups of Terrapin Bright Green (2014) on a three-point scale (High, Moderate, Low) according to the extent and consistency of pattern deployment. Table 2 reports the results and the transferable lesson from each case.

Table 2: Precedent evaluation matrix against the 14 Patterns of Biophilic Design

Evaluation parameter	Lagos Marriott Ikeja	Transcorp Hilton Abuja	Sensa Hotel Bandung	Protea Hotel Ikeja
Nature in the Space (daylight, airflow, vegetation, water)	Low — sealed envelope, mechanically conditioned throughout	High — central atrium drives stack ventilation and deep daylight	High — open galleries, daylit circulation, cross-ventilated public areas	Moderate — interior courtyard transitions; partial passive cooling
Natural Analogues (biomorphic form, materiality)	Moderate — contemporary finishes, limited biomorphic reference	Moderate — geometric interior patterning at monumental scale	High — butterfly-derived curvilinear morphology	High — regional timber and stone finishes
Nature of the Space (prospect, refuge)	Moderate — controlled sightlines, few refuge conditions	High — multi-level overhead prospect from atrium floor	High — panoramic prospect to surrounding highland landscape	High — shaded low-rise verandahs affording refuge
Dominant structural typology	Sealed multi-storey urban block	Hybrid mega-atrium concrete configuration	Curvilinear organic low-to-mid-rise	Low-rise pavilion layout
Transferable lesson	Demonstrates the comfort and energy limits of the sealed envelope in a tropical climate	Atrium as ventilating "lung", scalable to a 50-room lodge	Curvilinear morphology as combined neuroaesthetic and wayfinding device	Pavilion dispersal and verandah as indoor–outdoor mediator

Source: Authors' analysis, 2026.

3.5 Synthesis and Design Translation

The final phase cross-references the four pathways identified in the literature with the spatial strategies validated in the precedents, isolating parameters that are specific and verifiable rather than speculative (thermal mass delay, curvilinear contour, passive air-exchange configuration and indoor–outdoor circulation ratio) and translates them into the Awka Earth Lodge framework, applied conceptually to a 50-room 4-star facility.

4. Results and Discussion

4.1 Core Principles of Organic Architecture Linked to Health (Objective One)

Analysis identified five core principles with direct implications for occupant health, satisfying the first objective. Site-responsive design and topographic integration orient the building to maximise daylight, prevailing breeze and visual connection to landscape, and are a precondition for every downstream effect. Natural and locally sourced materials expose occupants to tactile, visual and olfactory stimuli (wood grain, earth tone, plant fibre) that activate biophilic responses while lowering volatile organic compound emissions (Kellert and

Calabrese, 2015; Okoye and Okeke, 2019). Seamless spatial flow and indoor–outdoor connectivity dissolve the boundaries of the sealed interior and enable continuous sensory engagement with the surroundings. Natural shapes and forms (curvilinear walls, fractal pattern, biomorphic geometry) engage neuroaesthetic systems that process them fluently (Vartanian et al., 2013; Xie et al., 2022). And consistent human scale keeps volume, proportion and detail calibrated to physiological and psychological need, avoiding the disorientation of over-scaled space.

4.2 Four Pathways of Influence

Pathway one, physical health. Natural ventilation through operable windows, cross-ventilation layouts and stack-effect atria reduces indoor pollutant and pathogen concentrations (Mohammad and Ahmad, 2016); in Awka, where outdoor particulate loading is itself a documented concern (Egube et al., 2024), a filtered passive envelope makes the fabric a health intervention rather than a neutral barrier. Passive thermal strategy delivers comfort without the dry air, noise and duct contamination of mechanical cooling, and stabilised laterite walls provide thermal delays of up to fifteen hours (Babalola and Osisami, 2024; Ibrahim et al., 2024). Daylight regulates circadian rhythm, which matters disproportionately for travellers, and indoor–outdoor continuity routes occupants through shaded walkways rather than enclosed corridors, raising incidental movement (Söderlund and Newman, 2015).

Pathway two, psychological restoration. Biophilically integrated organic space is associated with a 43% increase in reported serenity and reductions in anxiety and mental fatigue relative to sealed-envelope interiors (Akinyemi et al., 2024; Suess et al., 2024), accompanied by lower cortisol, sympathetic activation and blood pressure after brief exposure (Ulrich, 1984; Panagopoulos et al., 2020). Attention Restoration Theory explains why: guests arriving with depleted directed attention encounter an environment offering soft fascination and recover capacity for the following day (Kaplan and Kaplan, 1989).

Pathway three, neuroaesthetic engagement. Curvilinear contour is processed more fluently than rigid geometry, reducing cognitive load and freeing attentional resources for restoration (Vartanian et al., 2013), while hippocampal grid cells engage with organic form in ways that support navigation and deepen place familiarity (Xie et al., 2022). Guests therefore experience an organically designed facility as more coherent, navigable and psychologically secure, reducing the disorientation that attends any unfamiliar interior effects observed across cultural groups and so transferable across diverse guest profiles.

Pathway four, social and behavioural well-being. Open, permeable layouts, landscaped courtyards and gently scaled public space support the relaxed, spontaneous interaction that enclosed facilities suppress (Söderlund and Newman, 2015). Guests linger in a shaded courtyard where they would not in a sealed lobby, forming the ephemeral connections that shape the emotional tone of a stay of particular consequence for those travelling alone. Suess et al. (2024) and Elshaer et al. (2025) document stronger revisit intentions in biophilic hotel environments, a behavioural indicator of well-being satisfaction.

4.3 Integration Across Pathways

The four pathways are mutually reinforcing rather than independent: indoor air quality supports sleep, sleep supports psychological restoration, restoration supports cognitive comfort, and cognitive comfort supports social engagement. Table 3 maps the principal design moves onto pathway and hospitality consequence. The integrated character of organic architecture, its treatment of building, site and occupant as one system is therefore itself the health strategy: no single intervention delivers the full dividend.

Table 3: Mapping organic design principles to biophilic pathway and hospitality outcome

Organic design principle	Biophilic pattern / neuroaesthetic pathway	Documented health outcome	Hospitality metric affected
Curvilinear morphology	Processing fluency; hippocampal grid-cell engagement	Reduced cognitive load; spatial familiarity	Lower transit anxiety; higher serenity scores
Stabilised laterite and thermal mass	Material Connection with Nature; Thermal and Airflow Variability	Circadian stability; passive cooling	Improved sleep quality; reduced HVAC reliance
Indoor–outdoor continuity	Prospect and Refuge; Visual Connection with Nature	Incremental physical activity; soft fascination	Higher lounge dwell time; lower stress markers
Courtyard vegetation and water	Presence of Water; Dynamic and Diffuse Light	Reduced cortisol and sympathetic activation	Higher perceived environmental quality; revisit intention

Source: Authors' analysis, 2026.

5. The Awka Earth Lodge Framework (Objective Two)

The framework synthesises the findings into a conceptual 4-star hotel of not fewer than fifty ensuite rooms, with 20% suites and 25% single rooms, designed explicitly around guest health.

Form and human scale. The Lodge rejects the monolithic block in favour of smaller interconnected modules stepped across the site in a terraced low-rise configuration that follows the cuesta slope and avoids the deep cut-and-fill the Nanka substrate cannot safely accept. Curvilinear walls and flowing roof profiles establish the neuroaesthetically fluent geometries shown to reduce cognitive load, while ceiling heights, openings and corridor widths are calibrated to feel welcoming rather than imposing.

Direct biophilic connections. Large windows and skylights provide daylight; operable louvres give guests control over airflow, light and privacy. Combined cross- and stack-ventilation through a central atrium configured as a solar chimney maintains air quality without continuous mechanical conditioning, with filtered intakes addressing the harmattan particulate load. Vegetation populates courtyards, green walls and planted terraces; water features provide evaporative cooling and the Presence of Water pattern; and every guest room opens onto a private shaded verandah.

Indirect connections and material choice. Finishes, fabrics and decorative elements carry organic curves, fractal patterns and natural textures, with a colour palette drawn from the Awka landscapem- earth reds and laterite ochres, rainforest greens, sky and water blues. Acoustic design attenuates urban noise while preserving natural soundscape (Spence, 2020). Stabilised laterite supplies thermal mass, treated bamboo screens filter light and airflow, and indigenous hardwoods offer warm, absorbent, low-emission surfaces (Okoye and Okeke, 2019).

Spatial continuity. Public circulation unfolds through covered but open-sided walkways traversing landscaped courtyards, encouraging guests to walk rather than ride. Terraces, shaded pavilions and landscaped meeting points are distributed across the site, and the lobby, restaurants and wellness spaces open onto the central courtyard through operable glazed façades.

6. Conclusion and Recommendations

This study set out to enhance human health and well-being in a hospitality environment through the application of organic architectural principles. It established that organic architecture, operationalised through biophilic patterns and a commitment to human scale, site-responsive form and natural materials, acts on occupant health through four mutually reinforcing pathways: physical health, psychological restoration, neuroaesthetic engagement, and social and behavioural well-being. Five core principles were identified as the operative link between paradigm and outcome, satisfying the first objective, and synthesised into the Awka Earth Lodge framework, satisfying the second. Because the pathways are interdependent, the central finding is that piecemeal application will not deliver the reported benefits. The framework is a design proposition rather than an evaluated building, and its projected benefits require empirical confirmation.

The study recommends that health be adopted as a primary performance criterion in hospitality design briefs; that the full range of biophilic patterns be integrated, extending beyond visual greenery to Thermal and Airflow Variability, Presence of Water, Dynamic and Diffuse Light, Prospect and Refuge; that natural ventilation, daylight and indoor-outdoor circulation be prioritised in tropical projects; that natural, low-emission materials be specified; that Nigerian architectural curricula incorporate instruction on built-environment health, biophilic design and neuroaesthetics; and that post-occupancy evaluation protocols using validated instruments for sleep, stress and well-being be instituted so the health case can be tested empirically. Further research should pursue controlled comparison of physiological outcomes between organic and conventional hotel stays.

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