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# BUILDING WITH THE RHYTHM OF NATURE: ECOLOGICAL AND SENSORY ARCHITECTURE APPROACH THROUGH THE UNITY OF HOME AND GARDEN

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**Abstract**

Architecture is not merely a construction discipline, but a spatial expression of the human-nature relationship. This relationship, while functional, also encompasses a multilayered world of meaning, transforming architecture into an ontological medium. In this study, the house-garden relationship is considered not just as a matter of physical adjacency, but as two architecturally integrated components on existential, ecological, and cognitive levels. Inspired by Frank Lloyd Wright's philosophy of integration with nature, this approach presents a holistic design paradigm that perceives architecture as a part of nature, dissolves the boundaries between interior and exterior space, and fosters a sensory connection between the individual and their environment. The article evaluates the house-garden integrity through various lenses such as architectural form, fractal aesthetics, soil health, water cycles, microclimatic effects, computational landscape techniques, and philosophical meaning-making. Through contemporary approaches such as biophilic design and responsive surface systems, the forward-looking dimension of organic architecture beyond its historical context is also emphasized. Ultimately, organic architecture is proposed not merely as a nature-compatible structural aesthetic, but as a way of life that invites users to connect with their environment and inner self.

**Keywords:** Organic architecture, biophilic design, fractal aesthetics, ecological landscape, computational design

## *DOĞANIN RİTMİYLE İNŞA ETMEK: EV-BAHÇE BÜTÜNLÜĞÜ ÜZERİNDEN EKOLOJİK VE DUYUSAL MİMARLIK YAKLAŞIMI*

***Özet***

*Mimarlık, salt bir yapı disiplini değil, aynı zamanda insan-doğa ilişkisinin mekânsal ifadesidir. Bu ilişki işlevsel olduğu kadar çok katmanlı bir anlam dünyasını kapsayarak mimariyi ontolojik bir araca dönüştürmektedir. Bu çalışmada, ev-bahçe ilişkisi fiziksel bitişkiliğin ötesinde varoluşsal, ekolojik ve bilişsel olarak bütünleşik iki mimari bileşen olarak ele alınmaktadır. Frank Lloyd Wright'ın doğayla bütünleşik yapı felsefesinden yola çıkan bu yaklaşım, mimariyi doğanın bir parçası olarak gören, iç ve dış mekân arasındaki sınırları ortadan kaldıran ve bireyin çevresiyle duyusal bir bağ kurmasını sağlayan bütüncül bir tasarım paradigması sunmaktadır. Makale, ev-bahçe bütünlüğünü mimari biçim, fraktal estetik, toprak sağlığı, su döngüsü, mikroiklim etkisi, hesaplamalı peyzaj teknikleri ve felsefi anlam üretimi gibi farklı başlıklarda değerlendirmektedir. Biyofilik tasarım ve duyarlı yüzey sistemleri gibi çağdaş yaklaşımlar aracılığıyla, organik mimarlığın sadece geçmişe değil, aynı zamanda teknoloji destekli bir geleceğe açılan yönü de vurgulanmaktadır. Sonuç olarak organik mimarlık, doğayla uyumlu bir yapısal estetikten öte kullanıcıyı, çevresiyle ve kendi iç dünyasıyla bağ kurmaya çağıran bir yaşam biçimi olarak önerilmektedir.*

***Anahtar sözcükler**: Organik mimarlık, biyofilik tasarım, fraktal estetik, ekolojik peyzaj, hesaplamalı tasarım*

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## 1. Introduction

Since the early twentieth century, the nature-detached character of modern architecture has prompted critical responses, most notably Frank Lloyd Wright's philosophy of organic architecture. For Wright, buildings are not merely shelters but expressions of humanity's bond with nature, harmoniously shaped by topography, light, natural materials, and living systems (Wright, 1954). Organic architecture emphasizes structural, aesthetic, and ethical principles drawn from nature, including the use of natural materials, interior–exterior continuity, environmental sensitivity, and balance through fractal patterns (Salingaros, 2013; Harris, 2012). Within this framework, the house and garden are understood as a unified whole, where the garden extends the home and embodies life's rhythm with nature.

The traditional house-garden relationship in Anatolia, particularly in the courtyard house types of Diyarbakır, Van, Mardin, Şanlıurfa, and their surroundings, embodies not only ecological functions (food production, shading, microclimatic balance) but also carries meanings related to the preservation of privacy, the regulation of social interactions, and the continuity of cultural rituals. This condition represents a local reflection of Norberg-Schulz's (1980) concept of the genius loci and Rapoport's (1969) emphasis on cultural adaptation. From the perspective of Lynch's (1960) approach to spatial legibility, these gardens function as spaces of belonging that reinforce both individual and collective memory. Therefore, the house-garden unity of organic architecture is not limited to modern sustainability principles but, when combined with local cultural continuity, offers a much stronger theoretical and practical framework.

Today, this perspective is being further developed through frameworks such as biophilic design, computational landscape architecture, sustainable design, and fractal aesthetics (Beatley, 2011; Rossi and Buratti, 2018). The increasing awareness of environmental concerns such as carbon emissions, microclimate regulation, and human health necessitates a reevaluation of the ways we relate to nature through architecture. The reflections of this approach can also be observed in contemporary architectural practices that integrate ecological, biophilic, symbolic, and responsive design principles (Figure 1).


*Figure 1. Contemporary architectural practices reflecting ecological, biophilic, symbolic, and responsive design principles: (a) Bosco Verticale (archdaily.com/, 2014), (b) Al Bahar Towers (re-thinkingthefuture.com/, 2024), (c) Maggie's Centres (theguardian.com/, 2017), and (d) Sancaklar Mosque (arkitera.com,2017).*

Especially in urban contexts, alienation from nature contributes to psychological distress, attention fatigue, and social detachment (Kaplan and Kaplan, 1989; Ulrich, 1984). Architectural approaches that consider the home and the garden as the inner and outer dimensions of a living organism serve not only physical needs but also support emotional and cognitive well-being.

The classical theoretical perspectives, recent works by contemporary architects such as Neri Oxman, Kengo Kuma, and Toyo Ito, highlight how organic principles are being reinterpreted in 21st-century design. Oxman's explorations in material ecology (Oxman, 2020), Kuma's integration of natural patterns and tactile materiality (Kuma, 2021), and Ito's fluid spatial concepts (Ito, 2022) demonstrate that the

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themes addressed in this study are strongly connected to ongoing architectural practice. These contemporary approaches provide a broader and more up-to-date framework for situating the house-garden unity within organic architecture.

Recent studies further demonstrate the relevance of integrating ecology, architecture, and computational design in creating ecologically sound buildings (Weisser et al., 2023), as well as exploring the embodied nature of architectural experience within the field of neuro-architecture (Wang et al., 2022). These contemporary approaches directly intersect with the framework of organic architecture addressed in this study and reinforce the contribution of the research by situating it within the most up-to-date architectural discourse.

This study aims to examine the unity of house and garden within the framework of organic architecture, adopting a multilayered perspective that integrates architectural, ecological, sensory, and philosophical dimensions. In this respect, the research employs a descriptive analysis method, in which theoretical texts are systematically reviewed, categorized through thematic coding, and interpreted comparatively.

## 2. Materials and Methods

This research was designed as a qualitative study using descriptive analysis to examine the unity of house and garden within the framework of organic architecture. The method involves classifying theoretical texts through thematic coding, interpreting relationships among codes via comparative analysis, and deriving new propositions from this process (Ültay et al., 2021). The dataset encompasses key theoretical works in organic architecture, biophilic design, fractal aesthetics, ecological landscaping, phenomenology, and biomimetic design. Foundational perspectives such as Frank Lloyd Wright's organic architecture, Nikos Salingaros's fractal theory, James Harris's fractal aesthetics, Timothy Beatley's biophilic vision, and Gaston Bachelard's poetic space are complemented by recent biomimetic and computational design studies, enabling the house-garden relationship to be evaluated holistically across ecological, sensory, cognitive, philosophical, and technological dimensions.

The analysis proceeded in three interconnected stages (Figure 2). First, the selected texts were thematically coded and organized into code families such as ECO-Ecological Continuity, STR-Fractal Structure, BIO-Biophilic Interaction, PER-Spatial Permeability, PSY-Psychological Restoration, SYM-Symbolic Space, COM-Computational Morphologies, RES-Responsive Systems, and EMO-Emotional Interfaces. In this way, concepts that are often discussed separately in the literature were reorganized within a single integrated framework. Second, a comparative interpretation was carried out across these codes, identifying intersections among sub-themes and producing a total of twenty-five intermediate propositions (P1-P25). These propositions clarified, for example, how spatial permeability reinforces biophilic contact, how fractal patterns generate cognitive resonance, how soil management contributes to ecological continuity, and how symbolic elements foster existential awareness.

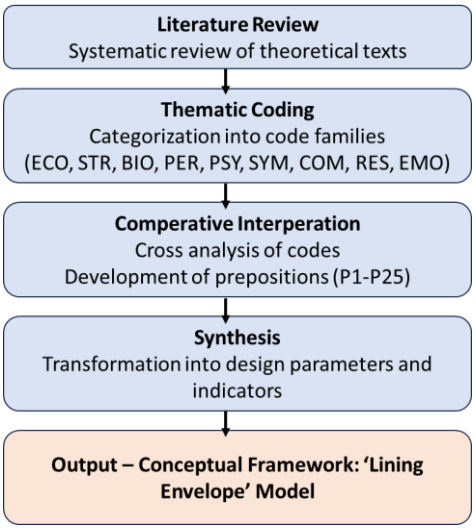


*Figure 2. Methodological flow of descriptive analysis*

The study synthesized literature insights into original design parameters such as the Multisensory Parameter, Soil Continuity Model, Wisdom-Patience Parameter, and Computational Morphology Parameter presented as “Section Conclusions” at the end of each thematic subsection. This methodological approach makes the distinction between compilation and originality explicit while ensuring reproducibility, transparency, and coherence, ultimately framing house-garden unity in organic architecture as measurable design criteria across ecological, sensory, cognitive, philosophical, and technological dimensions.

## 3. Findings

### *3.1. Foundations of the Philosophy of Organic Architecture*

Organic architecture is not merely a stylistic trend, but a philosophical approach that redefines the human–nature relationship by conceiving buildings as integral parts of the environment, shaped by natural rhythms and ecological ethics (Wright, 1954). This foundation extends beyond Frank Lloyd Wright’s vision, drawing on Nikos Salingaros’s epistemological theory, James Harris’s fractal aesthetics, Timothy Beatley’s biophilic urbanism, and Gaston Bachelard’s philosophy of space, all of which enrich its multilayered structure.

#### *3.1.1. Frank Lloyd Wright’s Principles of Organic Design*

Frank Lloyd Wright’s understanding of architecture is not about imitating nature, but about creating a living space that becomes intertwined with it, an extension of the earth itself. According to him, a building “should appear to grow naturally from the site, as if it had emerged from it” (Wright, 1939). This vision is grounded in three core architectural principles: integration with the site, harmony with function, and connection with spirit.

Wright's (1954) principles of organic architecture can be summarized as follows:

- Integration with Nature: The location, orientation, volume, and material of the structure should be arranged according to the characteristics of the natural environment.
- Respect for the Nature of the Materials: Wood should remain true to its nature, stone should appear natural, and the inherent character of materials should not be concealed.
- Continuity between Interior and Exterior Spaces: Life within the building should open up to nature; elements such as windows, courtyards, and terraces should ensure spatial permeability.
- Human Scale and Rhythm: Spaces should be designed in accordance with human emotional and physical dimensions, shaped by natural rhythms and proportions.

These principles were brought to life in Wright’s iconic works such as Fallingwater (1935) and Taliesin West (1937), where nature permeates the architecture and the house seems to breathe together with the garden (Levine, 1996).

#### *3.1.2. Nikos Salingaros: Epistemology and Architectural Structure*

Nikos Salingaros does not view organic architecture as a random imitation of nature, but rather as a structural expression grounded in knowledge systems. According to him, natural systems contain multilayered, fractal structures that resonate with the human brain by evoking familiarity, safety, and aesthetic satisfaction (Salingaros, 2006). When architectural designs incorporate such multilayered structures, people are more likely to experience a sense of calm and establish long-term connections with these spaces.

Salingaros identifies four core principles:

- Fractal Geometry: Patterns that repeat from small to large scales, as seen in nature, should be employed.

- Hierarchical Structure: Elements within the design should maintain a coherent top-down relationship with the overall form.
- Information Density: A space should not be overly simplified; it should invite discovery through detail and layered complexity.
- Human-Body Resonance: Proportions and surfaces should harmonize with the scale and perception of the human body.

These principles emphasize that organic architecture is not merely about looking like nature but about transforming the operational logic of nature into architectural knowledge.

*3.1.3. James Harris: Fractal Aesthetics and the Architectural Experience*

James Harris (2012) argues that fractal patterns found in nature have positive effects on human perception. He suggests that when people encounter fractal structures, they are better able to focus, experience a sense of inner peace, and establish cognitive resonance with their spatial environment. Thus, architecture that incorporates fractal and recursive patterns, similar to those found in nature, becomes not only aesthetically pleasing but also neurobiologically supportive of human well-being.

Fractal aesthetics are especially applicable in garden design. Elements such as the branching of trees, the curvature of pathways, and the arrangement of stones all reflect the logic of fractal structures and evoke a calming effect. Through this aesthetic approach, gardens become not just beautiful but psychologically restorative spaces.

*3.1.4. Timothy Beatley: Biophilic Cities and Emotional Bonds with Nature*

Timothy Beatley (2011) expands the concept of organic architecture to the urban scale with his idea of "biophilic cities." According to him, human beings are biologically predisposed to live in connection with nature. Urban planning and architectural design should be aligned with this intrinsic need; nature should not be restricted to parks but integrated into all aspects of daily life. The core principles of biophilic design include:

- Natural light and ventilation
- Visual connections to nature (e.g., vegetation, water, landscape)
- Multisensory variety (e.g., sound, scent, texture)
- Visibility of seasonal change

These principles can be most effectively applied in the transitional zones between house and garden. Designing the garden as an emotionally resonant space enhances the biophilic quality of indoor living.

*3.1.5. Gaston Bachelard: The Poetics of Space*

Gaston Bachelard's (1994) theory of poetic space contributes a philosophical dimension to organic architecture. According to Bachelard, the home is not merely a physical shelter; it is the first place where imagination and memory are rooted. It is a vessel of dreams, safety, and deep personal meaning. In this context, the garden represents a space of emotional continuity, a realm where one encounters time, seasons, and nature in a sustained, reflective way.

Time spent in the garden aligns one's inner rhythms with the cyclical movements of the natural world. This alignment creates not just a spatial harmony, but an existential sense of peace.

*3.1.6. Section Conclusion*

**Methodological mapping and coding:** The theoretical approaches discussed in this section (Wright, Salingaros, Harris, Beatley, Bachelard) were reclassified after systematic review under the following thematic code families:

- ECO: Ecological Integration (Wright: site/orientation, material authenticity),

- STR: Structural/Fractal Organization (Salingaros: fractal hierarchy, information density),
- BIO: Biophilic Interaction (Beatley: light, air, visual/auditory/olfactory contact with nature),
- PER: Spatial Continuity/Permeability (Wright: interior-exterior continuity),
- PHI: Phenomenological/Poetic Experience (Bachelard: memory, stillness, rhythm of time).

The coding process involved extracting operational expressions from each source (e.g., "interior-exterior permeability," "fractal repetition," "visibility of seasonality"), testing them for conceptual equivalence, and clustering recurring motifs based on code frequency and co-occurrence intersections.

**Comparative textual interpretation-provisional propositions:** Cross-analysis among the code clusters produced the following propositional set (P):

- P1 (PER↔BIO): As interior–exterior permeability increases, biophilic indicators (natural light, visual flora, breeze, sound) are reinforced; the house–garden relationship becomes a sensory continuum.
- P2 (STR↔BIO): Fractal/hierarchical organization enhances the cognitive legibility of biophilic contact (wayfinding ease, concentration, visual calmness).
- P3 (ECO↔PER): Site orientation and material authenticity generate a microclimatic buffer in house–garden transition zones, which renders permeability functional.
- P4 (PHI↔BIO/STR): Making seasonality visible and recognizing fractal rhythms creates a phenomenological bridge between the rhythm of time and cognitive tranquility.

Traceability, reliability, and limitations. During coding, a codebook/memos were created, ensuring decision logic was traceable. Given the single-researcher setting, peer debriefing/evidence chain and theoretical triangulation (different sources pointing to the same motif) were employed. Findings are textual/theoretical in nature; they do not claim experimental or numerical measurement but provide an operational framework for design application.

**Resulting contribution:** The theoretical foundation in Section 3.1, aligned with the methodology, has:

1. Consolidated house–garden unity within a single integrated model across the ECO/STR/BIO/PER/PHI axes;
2. Transformed this model into a parameter–indicator set, producing a design evaluation rubric;
3. Provided a synthesis matrix that informs subsequent findings and recommendations (e.g., Sections 3.2-3.4).

Thus, the study moves beyond a literature summary, presenting a multilayered evaluation framework that operationalizes house–garden unity within organic architecture and makes it applicable to architectural practice.

### *3.2. The House-Garden Unity: A Biophilic and Fractal Perspective*

In architectural planning, the house-garden relationship is often seen as functional or formal, yet organic architecture treats them as interconnected parts of a single living organism, extensions of human life shaped by psychological, ecological, and sensory principles. Contemporary theories such as biophilic design and fractal aesthetics support this view (Harris, 2012; Beatley, 2011), highlighting how integration fosters sensory experience, cognitive resonance with nature, therapeutic value, and architectural, landscape, and user-centered benefits.

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*3.2.1. The Biophilic Design Approach and the House–Garden Transition*

In developing the concept of the biophilic city, Timothy Beatley (2011) emphasizes that architectural systems enhancing contact with nature provide not only environmental but also emotional and cognitive benefits. According to this approach, individuals who maintain regular contact with nature become more productive, happier, and psychologically balanced. The connection between the house and the garden, as proposed by biophilic design principles, should be established through the following elements:

- Visual Continuity: Openings, windows, and glass walls that provide an uninterrupted visual connection from the interior to the natural surroundings.
- Physical Transition: Terraces, courtyards, indoor gardens, and verandas that ensure a soft, fluid transition between interior and exterior spaces.
- Sensory Richness: The incorporation of natural multisensory experiences into the interior, such as wind from the garden, birdsong, floral scents, and the rustling of leaves.
- Rhythmic Living Spaces: The observability of seasonal changes in the garden and the integration of this natural rhythm into everyday domestic life.

These components eliminate the rigid boundaries between the house and the garden, forming a permeable “living envelope.” A glass door opening into the garden becomes not just a passage but a portal into a living, breathing connection with nature.

*3.2.2. Fractal Aesthetics: Bringing Nature’s Rhythms into Space*

James Harris (2012) and Nikos Salingaros (2006) have demonstrated that the use of fractal patterns in architectural space creates feelings of familiarity, calm, and psychological comfort in the human brain (Figure 3). Fractal design is characterized by multilayered systems in which small-scale elements echo the forms of medium and large-scale structures through consistent patterns. In this context, the following garden elements embody fractal aesthetics:

- Branching tree forms
- Spiral arrangements of leaves
- Repeating curves in pathways
- Layered groupings of plant species
- Asymmetric yet balanced arrangements of stones

For instance, a path leading from the house into the garden that incorporates small turns and subtle shifts in light every 3 to 5 meters mimics the cognitive and aesthetic experience of a woodland trail. This does more than facilitate a physical transition; it also generates a mental process of calming and grounding (Salingaros, 2006).

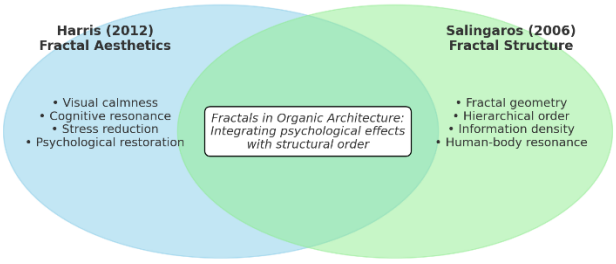


*Figure 3. Comparative framework of Harris and Salingaros on fractal aesthetics*

*3.2.3. Fractal–Biophilic Integration: Creating Spaces Aligned with Human Nature*

When combined, fractal aesthetics and biophilic design contribute positively to human health, cognitive performance, and attention span. Ulrich (1984) scientifically demonstrated that post-operative patients recovered more quickly in rooms with views of nature. Likewise, Kaplan and Kaplan (1989) showed that spending time in natural environments reduces mental fatigue and improves concentration.

These findings support the idea that spaces designed according to both fractal and biophilic principles do not merely imitate nature, but align with the deep biological and psychological needs of human beings. When architectural and landscape design integrates

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these approaches, it leads to spaces that are both aesthetically fulfilling and neurologically restorative.

In this integrated approach, every architectural element between the house and the garden should carry a trace of nature and appeal to the human body and mind.

### *3.2.4. Spatial Healing: The Therapeutic Role of the Garden*

Gardens are not merely spaces of physical contact with nature; they are also places for confronting time, death, and transformation. The cycle of seasons, the blooming and withering of flowers, the falling of leaves, and the rebirth of the soil, these phenomena foster awareness and acceptance in one's relationship with life (Bachelard, 1994; Young, 2013).

The spatial permeability established between the building and the garden enables these emotional transitions. For instance, viewing a courtyard that receives the first light of morning from one's bedroom, or stepping directly into a vegetable patch from the kitchen, allows the user to engage sensorially and rhythmically with nature.

### *3.2.5 Section Conclusion*

**Methodological grounding:** In this section, the sub-themes of biophilic design and fractal aesthetics were classified through thematic coding within the descriptive analysis method and reorganized under the code families: PER-Spatial Permeability, BIO-Biophilic Interaction, STR-Fractal Order, and HEA-Spatial Healing. This differentiation of codes demonstrates how biophilic and fractal approaches, often discussed separately in the literature, form points of intersection within the framework of house-garden unity.

**Comparative interpretation:** The comparative analysis conducted among the sub-themes revealed the relationship between spatial continuity and sensory richness. These findings, reinforced by the literature, produced new provisional propositions:

- P5 (PER↔BIO): Increasing visual and physical permeability not only strengthens spatial unity but also reinforces the continuity of biophilic contact, cognitively deepening the user experience.
- P6 (STR↔BIO): Integrating fractal patterns into landscape components, combined with the biophilic contact provided by design, generates feelings of familiarity and cognitive relaxation.
- P7 (HEA↔BIO/STR): Fractal–biophilic integration transforms space from a purely aesthetic entity into a therapeutic environment.

Synthesis and application outputs. This comparative interpretation has enabled house–garden unity to be conceptualized not merely as visual or functional continuity, but as a three-layered parameter set:

- Cognitive resonance: Supporting wayfinding, focus, and mental tranquility through fractal repetitions.
- Multisensory continuity: Transferring multi-sensory inputs such as wind, birdsong, and seasonal light into the interior.
- Spatial healing: Generating awareness and acceptance through seasonal cycles and transformations in the garden.

**Resulting contribution:** Methodologically aligned, this section synthesizes biophilic and fractal approaches previously discussed in separate strands of literature into a unified model. The study offers an original framework that explains house–garden unity at both sensory and cognitive levels, transforming the space into a restorative "living envelope." In doing so, the findings move beyond a purely theoretical summary and produce concrete outputs that can be applied as operational

design parameters in the context of organic architecture.

### *3.3. The Role of the Garden in Ecological Architecture*

Today, architecture is increasingly seen not just as space production but as a responsible relationship with the environment, requiring a regenerative approach that contributes to natural cycles (McHarg, 1992). Organic architecture embodies this vision by treating the building as a living system integrated with nature, with the garden serving as a key zone where soil quality, natural light, water management, and microclimate regulation converge.

#### *3.3.1. Soil: A Living Structural Component*

In architectural contexts, soil is often seen merely as a foundation, yet in organic architecture, it is regarded as a living component of the ecosystem and an active medium of interaction. As emphasized by J.D. van Mansvelt and M.J. van der Lubbe (1999), soil not only sustains plant growth but also regulates water cycles, stores carbon, and supports microbial diversity. Practices such as composting, mulching, and green manuring enhance water retention, increase organic matter, and strengthen ecological resilience. Garrett, Ferguson, and Amaranthus (2012) further note that healthy soil stabilizes temperature, prevents erosion, and fosters biodiversity, functioning as a silent engineering layer that maintains the building's environmental balance.

#### *3.3.2. Light: Lighting in Harmony with Natural Rhythm*

While traditional architecture is mostly concerned with letting light into the building, organic architecture considers the circulation of light both indoors and outdoors. Factors such as the placement of plants in the garden, the shading capacity of trees, and the slope of the topography affect both the capacity of the house to receive natural light and the microclimate of the outdoor space (McHarg, 1992). Through properly oriented plant groups:

- In summer, excess light is filtered and coolness is ensured.
- In winter, deciduous species bring the sun indoors.
- Spatial awareness is increased through the play of light at different times of the day.

In this context, the garden becomes a system where light is used as a means of control, both increasing energy efficiency and supporting biological rhythm. Shading elements provide not only visual comfort but also heat gain/heat loss control (Roesler, 2022).

#### *3.3.3. Water: Management as a Circular Resource*

Organic architecture views water as a cyclical resource, making collection, filtration, and reuse integral to design. Practices such as rainwater harvesting, permeable surfaces, vegetative filtration, natural ponds, and gray water reuse not only conserve water but also support surrounding hydrological cycles. Beyond ecology, the sound and movement of water provide psychological calm and sensory enrichment (Garrett et al., 2012; Young, 2013).

#### *3.3.4. Climate: The Role of the Garden in Microclimate Regulation*

Gardens act as microclimate regulators that improve buildings' environmental comfort by using trees, shrubs, and thermally responsive surfaces like stone to balance indoor temperatures. As Beatley (2011) notes, these biophilic design elements enhance health, reduce energy use, and improve quality of life. Tree shade can significantly lower surface temperatures, garden humidity helps maintain indoor air quality, and plant transpiration cools the environment, creating a passive climate control layer that reduces energy demand, minimizes carbon emissions, and supports healthier living.

*3.3.5. Section Conclusion*

**Methodological grounding:** In this section, the sub-themes of soil, water, climate, and microclimatic regulators were systematically classified under the code families ECO-Ecological Continuity, SOI-Soil Life Cycle, HYD-Water Cycle, and CLI-Microclimatic Regulation within the descriptive analysis framework. During the coding process, the intersection points among soil management (compost, mulch, microbial balance), water cycle (rainwater harvesting, permeable surfaces), and microclimatic contributions (shading, transpiration, humidity balance), which are often treated separately in the literature, were identified.

**Comparative interpretation:** The cross-analysis of codes revealed that the ecological functions of the garden extend beyond the structural shell, assuming the role of a "living engineering layer." From this analysis, the following propositions were developed:

- P8 (SOI↔ECO): Soil should not be regarded merely as a supporting surface, but as an active ecosystem element that stores carbon, retains water, and enhances biodiversity, providing ecological continuity to the house-garden unity.
- P9 (HYD↔CLI): The cyclical management of water in the garden (rainwater harvesting, greywater use, permeable surfaces) combined with plant transpiration generates a passive climatic buffer effect that reduces the building's energy demand.
- P10 (SOI↔CLI): The use of compost, mulch, and microbial balance increases the soil's capacity for thermal and moisture regulation, directly contributing to the building's microclimatic comfort.

Synthesis and application outputs. Based on these propositions, the ecological role of the garden is positioned not merely as landscape decoration, but as a performance component of the building itself. The findings yielded three applicable design parameters unique to this study:

1. Soil Management Parameter: Incorporating compost and mulch practices into the architectural design process, enhancing carbon storage and biodiversity.
2. Water Cycle Parameter: Designing permeable surfaces and rainwater systems as indicators of the building's hydrological sustainability.
3. Microclimatic Parameter: Integrating planting and shading arrangements as natural climate control strategies to reduce energy consumption.

**Resulting contribution:** Through systematic classification and comparative interpretation, this section positions the garden not merely as an aesthetic landscape element but as an active subsystem of ecological architecture. The original contribution of the study lies in defining the garden as an ecological interface operating within the soil-water-climate triad and transforming this function into measurable design parameters within the architectural process. In doing so, ecological functions that are fragmented in the literature are synthesized here into a holistic building-garden-environment cycle.

*3.4. Environmental Continuity in the Organic Garden*

In ecological architecture, soil is not just a building surface but the basis of carbon cycles, water systems, and biological life. Organic landscape design treats it as a living system that reduces environmental impacts and supports sustainability. Practices such as composting, mulching, and biologically active soil management enhance the garden's ecological functions and strengthen the building's integration with nature (Garrett et al., 2012). This section examines these methods in terms of their

functions, sustainability contributions, and architectural implications.

*3.4.1. Compost: A Cyclical Nutrient Source that Revitalizes Soil*

Composting is an eco-conscious method by which plant-based and organic waste materials are biologically decomposed into humus-rich soil conditioners. Based on natural processes, composting closes the nutrient loop and ensures a sustainable form of waste management (Garrett et al., 2012). In organic gardens, composting:

- Increases the organic matter content of the soil.
- Revitalizes microbial activity.
- Provides slow-release plant nutrients.
- Enhances water retention capacity.
- Stabilizes soil against erosion.

These outcomes support the healthy development of surrounding vegetation. Moreover, integrating household organic waste such as vegetable peels, tea leaves, and coffee grounds into composting systems establishes a circular relationship between the home and the garden.

*3.4.2. Mulch: The Protective Layer of the Soil*

Mulch refers to organic or mineral-based materials applied over the soil surface. Organic mulching using natural substances such as bark, straw, leaves, or grass clippings helps retain soil moisture and nourishes the soil as it decomposes over time (Mansvelt and van der Lubbe, 1999). The key benefits of mulch include:

- Reducing water evaporation and thus lowering irrigation needs.
- Regulating soil surface temperatures.
- Suppressing weed growth and decreasing reliance on chemical herbicides.
- Acting as a barrier against wind and rain erosion.
- Supporting subsurface biological activity (e.g., worms, fungi, bacteria).

Mulch also serves an aesthetic function in landscape design. Dark colored mulch placed under plant beds enhances the visibility of plant forms and visually complements wooden architectural materials. In this sense, mulch is both a functional and formal design tool.

*3.4.3. Soil Life: Microbial Balance and Ecosystem Health*

Soil is a complex ecosystem that hosts millions of living organisms. Mycorrhizal fungi, bacteria, actinomycetes, nematodes, and earthworms collectively sustain both the biodiversity and functionality of this system (Garrett et al., 2012). In organic gardens, soil life plays a crucial role in maintaining natural balance, especially in the absence of pesticides and synthetic fertilizers. Living soil offers the following benefits:

- Establishes symbiotic relationships with plant roots to facilitate nutrient uptake
- Enhances soil permeability and water infiltration
- Produces biological adhesives (e.g., glomalin) that bind soil particles
- Competes naturally with disease-causing pathogens

In architectural terms, this vitality not only supports landscape health but also enhances the environmental resilience of the built environment. For example, permeable surfaces and infiltration-friendly pavements improve rainwater absorption while creating hospitable conditions for soil microorganisms.

*3.4.4. The Building-Garden-Soil Triangle: A Cyclical Ecological Unity*

In an organic garden, compost, mulch, and soil life form a three-layered environmental system that works in harmony. The sustainability of this system is based on a circular design model that enables the return of biological waste from the building to the garden and the benefits of the garden to flow back into the building.

The contributions of this model to architectural design include:

- Reduction of waste generation
- Decrease in water and energy demands
- Enhancement of local biodiversity
- Formation of a localized microclimate
- Strengthening of ecological awareness and connection to nature

Moreover, these practices transform the user from a passive consumer into an active and regenerative participant. A person who composts kitchen scraps or protects soil with mulch becomes engaged in a reciprocal relationship with the living environment.

*3.4.5. Section Conclusion*

**Methodological grounding:** In this section, the subtopics of compost, mulch, and soil biology were thematically coded within the descriptive analysis and classified under the code families CYC-Cyclical Nutrient Management, PRT-Protective Layers, and BIO-Soil Biology. During the coding process, concepts that are typically discussed in the context of agriculture and landscape were reinterpreted as architectural design parameters for house-garden unity within the framework of organic architecture.

**Comparative interpretation:** Cross-comparison of the codes demonstrated that soil management provides not only environmental sustainability but also architectural continuity. From this analysis, the following propositions were derived:

- P11 (CYC↔ECO): Compost applications recycle organic waste from the building back into the garden, establishing a waste-nutrient cycle within the house-garden relationship.
- P12 (PRT↔CLI): The use of mulch reduces water evaporation while supporting microclimatic balance, transforming the garden surface into a natural climate-regulating layer.
- P13 (BIO↔ECO): The activity of soil microorganisms enhances carbon sequestration and water permeability, thus providing biological continuity for the house-garden unity.

**Synthesis and application outputs:** The comparative analysis shows that soil-based processes in the garden can be integrated into architectural design through a three-layered ecological continuity model:

1. Material Cycle Layer (CYC): Composting household organic waste and reintegrating it into the garden, defined as a design criterion that reduces waste production and increases biomass capacity.
2. Protective Layer (PRT): Mulch surfaces functioning both aesthetically and microclimatically, contributing to the soil–plant–building relationship in a twofold manner.
3. Living Layer (BIO): Soil biology creates a living ecosystem matrix around the building through permeable surface designs and ecological landscaping techniques.

**Resulting contribution:** Methodologically aligned, this section unifies the fragmented discussions of compost, mulch, and microbial balance found in the literature under a single “soil continuity model.” The original contribution of the study is to redefine the garden not merely as a vegetative landscape area but as an ecological system operating through soil cycles, and to transform these cycles into operational design parameters. In this way, the environmental continuity of the house–garden relationship is not presented as a mere theoretical proposition but as an applicable ecological strategy set within architectural design processes.

*3.5. Sensory and Cognitive Integration*

A core principle of organic architecture is creating not only physical but also emotional and

cognitive continuity between humans and nature. Designing the house and garden as a unified whole fosters this relationship, while its real strength lies in sensory resonance and psychological balance. By integrating nature's sounds, textures, rhythms, and colors, organic design deepens human connection with the environment (Ulrich, 1984; Kaplan & Kaplan, 1989). This section examines how sensory experience is shaped, how cognitive engagement with nature supports well-being, and how the garden serves as a psychological space for personal transformation.

### *3.5.1. Connecting with Nature through the Senses*

The human brain perceives environmental signals such as light, sound, scent, wind, and temperature as evolutionarily familiar and comforting (Salingaros, 2006). Therefore, architectural spaces that engage with nature should be not only functional but also sensorially enriching. In organic gardens, sensory elements are carefully curated to include:

- Visual stimuli: Color transitions, varied textures, dynamic patterns of natural light
- Auditory elements: Birdsongs, rustling leaves, the sound of water
- Tactile experiences: Wooden surfaces, stone pathways, contact with leaves
- Olfactory contributions: Floral fragrances, damp earth, plant aromas
- Thermal awareness: Variations in shade and sunlight, the coolness of soil

Design strategies such as large windows, operable doors, courtyards, and permeable façades allow these sensory inputs to penetrate indoor spaces. As a result, individuals remain in contact with the outside world even when inside.

### *3.5.2. The Biophilic Effect: Psychological Benefits of Nature Exposure*

Timothy Beatley's theory of biophilic design suggests that individuals with regular exposure to nature experience lower stress levels, stronger immune systems, and greater life satisfaction (Beatley, 2011). In his seminal study, Roger Ulrich (1984) demonstrated that patients with views of nature recovered more quickly after surgery and required less pain medication.

Similarly, Kaplan and Kaplan (1989) showed that natural environments support attention restoration, reduce mental fatigue, and enhance one's ability to concentrate. According to these findings, the sensory continuity established between house and garden is not merely a design preference; it is a psychological necessity.

### *3.5.3. Cognitive Resonance through Fractal Aesthetics*

James Harris (2012) argues that fractal patterns are not only visually pleasing but also generate mental coherence and cognitive tranquility. Natural fractal sequences such as the branching of trees, the curves of rivers, and the veining of leaves create a sense of familiarity and rhythmic alignment within the human brain. In organic gardens, these patterns can be recreated through plant arrangements, stone placements, and curved pathways.

Similarly, Salingaros (2006) emphasizes that the presence of fractal patterns in architectural spaces enhances the brain's perception of being in a natural setting and reduces stress hormone levels. When a garden is designed with this in mind, it becomes not just a green area surrounding a building but a space for mental restoration.

### *3.5.4. The Garden as a Psychological and Symbolic Space*

Gaston Bachelard (1994) describes the house as a mirror of the inner world and the garden as a poetic space linking it to the outer world. As a silent witness to time, seasons, birth, and death, the garden symbolizes life's impermanence and becomes a place of psychological awareness and existential

acceptance (Young, 2013). When permeability between house and garden is achieved, everyday experiences of morning light, contact with soil, or watching leaves in the wind become part of the architectural experience, deepening one's bond with nature and life itself.

*3.5.5. Section Conclusion*

**Methodological grounding:** In this section, sensory perceptions (visual, auditory, tactile, olfactory, and thermal), biophilic effect, fractal cognitive resonance, and the symbolic/psychological functions of the garden were structured into the code families SEN-Multisensory Perception, COG-Cognitive Resonance, PSY-Psychological Restoration, and SYM-Symbolic Space within the descriptive analysis. During the coding process, approaches that are often discussed separately in the literature biophilic experience (Beatley, 2011), fractal perception (Harris, 2012), cognitive restoration (Kaplan & Kaplan, 1989; Ulrich, 1984), and poetic space (Bachelard, 1994), were reorganized as a sensory-cognitive integration model in the context of house-garden unity.

Comparative interpretation. The cross-analysis of codes demonstrated that the house-garden relationship is not only a matter of physical continuity but also functions as a "psychological interface" operating within the user's mind and senses. From this analysis, the following propositions were derived:

- P14 (SEN↔BIO): Transferring multisensory stimuli (light, sound, scent, texture) into the interior maintains continuous contact with nature and reinforces the biophilic effect.
- P15 (COG↔STR): Fractal patterns produce cognitive resonance and mental calmness; this becomes more evident through elements such as pathways, plant groupings, and stone arrangements.
- P16 (PSY↔SEN/COG): When sensory richness and cognitive resonance combine, the garden generates a restorative effect for users, reducing stress and enhancing concentration.
- P17 (SYM↔PSY): The symbolic meanings of the garden (seasonal cycles, falling leaves, play of shadows) foster existential awareness and support psychological acceptance.

**Synthesis and application outputs:** The results of the analysis show that house–garden unity can be integrated into design at the sensory and cognitive level through three core parameters:

1. Multisensory Parameter (SEN): Planning visual, auditory, olfactory, and tactile elements to ensure interior–exterior continuity (e.g., transferring garden sounds indoors, visibility of seasonal light).
2. Cognitive Resonance Parameter (COG): Applying fractal patterns (pathway curves, plant layering) to create mental coherence and facilitate orientation.
3. Psychological Restoration Parameter (PSY/SYM): Emphasizing the restorative role of the garden (shade, sound of water, visibility of seasonal change) at a symbolic level within design.

**Resulting contribution:** Methodologically aligned, this section synthesizes sensory, cognitive, and psychological approaches previously considered separately in the literature into a unified "sensory-cognitive framework." The original contribution of the study is to redefine house-garden unity not only as a spatial condition but as a multisensory-cognitive field of experience, and to transform this into measurable design parameters (sensory richness, cognitive resonance, psychological restoration). In this way, the garden is re-conceptualized within organic architecture as a restorative ecological interface operating in the triangle of user-space-nature.

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*3.6. Philosophical Depth*

Architecture is not merely the construction of space; it is a stage where existential experiences unfold. In this context, the garden is far more than an aesthetic element; it is a symbolic arena in which the individual engages with nature, time, life, and death. Especially in the organic architectural tradition, the meaning of the garden is deeply intertwined with one's spiritual and intellectual depth. The garden reveals the cycles of nature while simultaneously confronting the individual with transformation and transience (Bachelard, 1994).

This section explores the philosophical significance of the garden along three axes: temporal awareness, the cultivation of wisdom, and a receptive attitude toward life.

*3.6.1. The Rhythm of Time in the Garden: Seasons, Change, and Process*

Time in the garden is not measured by the clock, but by seasons, light, growth, and decay. A falling leaf, a blooming flower, and the scent of the earth after rain all invite a processual experience of time. This temporal awareness is slow, cyclical, and deeply reflective, in stark contrast to the accelerated tempo of digital modern life (Young, 2013).

Gaston Bachelard (1994) described the garden as "a place where dream time is preserved." For him, the garden holds memories of childhood, dreams of the future, and quiet communion with the present. In the garden, time is not merely passing; it is felt, lived, and reinterpreted. This experience seeps into the interior through the permeability between house and garden.

*3.6.2. The Wisdom of the Garden: Observation, Patience, and Renewal*

Time spent in the garden initiates not only a physical but also a mental and emotional process. Acts such as planting, tending, pruning, waiting, and restarting cultivate virtues associated with wisdom: patience, attention, care, and simplicity (Levine, 1996). Witnessing seasonal cycles instills a sense that everything is temporary yet nothing is ever truly lost.

In Japanese gardening, this view is encapsulated in the concept of wabi-sabi, the beauty of impermanence, imperfection, and simplicity. Similarly, the Islamic garden tradition embodies a vision of paradise, lending ontological depth to the space (Rossi and Buratti, 2018). In this sense, the organic garden becomes a site of internal education, an arena where the individual, synchronized with universal cycles, reflects not only on nature but also on their own inner nature.

*3.6.3. Acceptance and Trust: The Art of Living in Harmony with Nature*

The garden also contains death, decay, and disappearance. This reality transforms one's attitude toward life. Living in accordance with nature's rhythms without trying to control them offers a counterpoint to the modern obsession with mastery and perfection (Beatley, 2011). A storm, an unexpected drought, or a flower that never blooms teaches us to accept uncertainty and relinquish control.

This acceptance nurtures not only openness to external changes but also sensitivity to internal transformation, aging, loss, and personal evolution. In this light, the garden becomes a space of spiritual patience and surrender.

*3.6.4. Designing the Garden as a Vessel of Wisdom*

In organic architecture, the philosophical significance of the garden requires more than aesthetic organization; it calls for a space imbued with layers of meaning. A courtyard where shadows fall, a tree framed by a veranda, a pathway bordered by water, and timeworn stones all contribute to turning the garden into a "dwelling of wisdom" (Harris, 2012). When such philosophical depth informs the design process: The garden offers spaces of silence and solitude

- It fosters introspection and heightened awareness
- It proposes a way of living that flows with the rhythm of time.

*3.6.5. Section Conclusion*

**Methodological grounding:** In this section, the sub-themes of "the rhythm of time, the wisdom of the garden, acceptance, and harmony with nature" were classified under the code families TMP-Temporal Cycle, WIS-Garden Wisdom, ACC-Acceptance, and SYM-Symbolic Depth within the descriptive analysis. During the coding process, Bachelard's approach to poetic space, Young's philosophy of the garden, Levine's interpretation of spatial patience and wabi-sabi, and Beatley's proposals for harmony with nature were comparatively reorganized. In this way, philosophical approaches that are often discussed in fragmented form in the literature were synthesized into a unified model within the framework of house-garden unity.

**Comparative interpretation:** The cross-analysis of codes revealed that the garden functions not only as an aesthetic or ecological space, but also as an ontological and phenomenological one. From this analysis, the following propositions were developed:

- P18 (TMP↔SYM): The visibility of seasonal cycles shifts the user's perception of time away from the efficiency-driven pace of modern life toward a notion of "slow time," thereby creating temporal awareness within architectural space.
- P19 (WIS↔ACC): Garden care, observation, and cyclical processes requiring patience foster virtues of acceptance and simplicity in the user, transforming the space into a pedagogical environment.
- P20 (ACC↔BIO/CLI): In the face of natural disasters, climatic changes, or seasonal losses, the changing face of the garden generates existential acceptance in the individual, synchronizing architecture with the rhythm of nature.
- P21 (SYM↔TMP/WIS): Symbolic elements in the garden (play of shadows, aging stones, seasonal blossoming) provide users not only with aesthetic pleasure but also with a deeper understanding of life cycles.

**Synthesis and application outputs:** These propositions were consolidated into three main parameter sets that concretize the philosophical dimension of house-garden unity:

1. Temporal Awareness Parameter (TMP): Ensuring the visibility of seasonality, changes in light, and cyclical processes in design.
2. Wisdom-Patience Parameter (WIS/ACC): Planning garden care, seasonal waiting, and adaptation to the slow cycles of nature as a form of mental cultivation for users.
3. Symbolic Depth Parameter (SYM): Designing the garden as a symbolic layer that produces philosophical-existential meaning through its elements.

**Resulting contribution:** This section consolidates fragmented philosophical and poetic approaches into a unified "philosophical depth framework." Its contribution is to redefine house-garden unity as a philosophical domain generating existential awareness and to translate this role into measurable design parameters, thereby revealing the ontological and phenomenological layers of the human–nature bond beyond spatial continuity.

*3.7. A Vision for the Future*

Organic architecture expresses humanity's timeless bond with nature, yet it need not be limited to traditional aesthetics. Integrated with contemporary technologies, its core principles, environmental harmony, sensory integration, sustainability, and structural-natural symbiosis can be reinterpreted through new forms and functions. Computational and

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responsive landscape approaches, supported by digital modeling and sensor-based systems, provide powerful tools for reshaping nature-centered design and transforming the form, function, and meaning of landscape environments (Rossi & Buratti, 2018).

*3.7.1. Nature-Inspired Code: Computational Morphologies*

Today's architectural design processes are shaped not only by drawing, but by algorithmic systems, data-driven decision making, and parametric modeling. These digital approaches do more than mimic the forms of nature they analyze and regenerate natural morphogenetic processes such as growth, branching, and curving (Harris, 2012).

Rossi and Buratti (2018) refer to this approach as "computational morphologies." Within such systems, the following data sets serve as design inputs:

- Plant growth algorithms
- Layered topographic data
- Solar radiation maps
- Wind flow simulations

These tools support the integration of structure and landscape into a cohesive system. The ideal of organic architecture designs that do not merely resemble nature, but function like it, can be more effectively realized through such technologies.

*3.7.2. Responsive Systems: Sensor-Based Feedback in Gardens*

Responsive landscapes are systems that perceive environmental conditions and react accordingly. Data such as soil moisture, air temperature, daylight exposure, and user movement can be monitored via sensors and used to automatically manage irrigation, lighting, and shading systems (Roesler, 2022).

The key components of these systems include IoT-based moisture and temperature sensors, sun-tracking movable panels, automated irrigation systems, seasonal plant care scheduling, and user-responsive light and sound modulation.

These technologies not only contribute to the conservation of natural resources but also enhance users' environmental awareness. By conceptualizing the garden as a living system, the relationship between human and nature is re-coded through interactive experience.

*3.7.3. Biomimetic and Bio-Intelligent Design*

Biomimetic approaches, inspired by nature, integrate the intelligence of living organisms into technological systems. For example, termite mounds have inspired passive ventilation systems, while the vascular structures of plants have informed rainwater distribution systems (Salingaros, 2006).

The principles of biological systems self self-renewal, equilibrium, and maximizing function with minimal energy, directly contribute to architectural concerns such as energy efficiency, low maintenance, and aesthetic coherence. In this way, organic gardens become environments that do not aim to reproduce nature, but to learn and apply its underlying algorithms.

*3.7.4. The Garden of the Future: Smart, Adaptive, and Emotional*

With advancing technologies, the garden of the future will not only adapt to its environment but also interact with users, learn, evolve, and reorganize itself as an adaptive system. Dynamic plant arrangements, emotionally responsive gardens, AI-supported landscape tools, and autonomous maintenance systems exemplify this shift, moving beyond the nature–technology divide. By merging ecological sensitivity with smart infrastructures, organic architecture aims not just for sustainability but for the creation of living, intelligent systems.

*3.7.5. Section Conclusion*

**Methodological grounding:** In this section, the sub-themes of digital modeling

(parametric, algorithmic), sensor-based adaptive systems, biomimetic design, and "emotional gardens" were thematically coded within the descriptive analysis under the families COM-Computational Morphologies, RES-Responsive Systems, BIO-Biomimetic/Bio-Intelligence, and EMO-Emotional/Psycho-Digital Interface. During the coding process, Rossi & Buratti's (2018) computational morphology approaches, Roesler's (2022) sensor-based climate control systems, and Salingaros' (2006) principles of biological organization-typically discussed in technology-oriented contexts-were reinterpreted within the scope of house-garden unity and integrated with ecological design parameters.

Comparative interpretation. Cross-analysis of the codes revealed that future-oriented technological approaches form complementary relationships with the principles of organic architecture. From this, the following propositions were derived:

- P22 (COM↔ECO/STR): Algorithmic morphologies replicate natural growth and fractal repetition, reproducing house-garden unity through nature-like processes.
- P23 (RES↔BIO): Sensor-based systems
- P24 (BIO↔CLI): Biomimetic strategies enhance building energy performance while positioning the garden as a testing ground for biological algorithms.
- P25 (EMO↔PSY): The concept of the "emotional garden" introduces a psychologically interactive design layer in which sensor and AI technologies adapt the environment to the user's emotional state.

**Synthesis and application outputs:** This comparative interpretation demonstrates that the vision for the future strengthens house–garden integration through four innovative design parameters:

- Computational Morphology Parameter (COM): Translating natural growth processes into house-garden design through algorithmic modeling.
- Responsive Systems Parameter (RES): Integrating sensor-supported feedback mechanisms (automatic irrigation, movable shading) between building and garden.
- Biomimetic Design Parameter (BIO): Adapting energy-efficient solutions derived from natural organisms to enhance the ecological performance of the garden.
- Emotional Interface Parameter (EMO): Incorporating lighting, sound, and spatial arrangements responsive to user emotions into house-garden unity.

This section unifies digital, biomimetic, and sensory technologies, redefining house-garden unity through ecological, computational, responsive, and emotional parameters. It presents organic architecture as an intelligent, adaptive model evolving into a techno-ecological paradigm.

## 4. Conclusion and Discussion

This study employed a qualitative descriptive analysis to investigate the unity of house and garden within organic architecture. By systematically reviewing theoretical texts, applying thematic coding, conducting comparative interpretation, and synthesizing results, it moved beyond compilation to generate original design parameters addressing ecological, sensory, cognitive, symbolic, and technological dimensions. The main contribution lies in transforming theoretical insights into an applicable framework: concepts were grouped under code families (ECO, STR, BIO, PER, PSY, SYM, COM, RES, EMO, etc.), cross-analyzed into propositions (P1-P25), and synthesized into measurable design parameters. Each thematic discussion concluded with a Section Conclusion, distinguishing literature-based insights from original contributions and ensuring methodological transparency.

The outcomes of this process are presented in Table 1, which systematically maps code families, sub-themes, propositions, and design parameters. Among the derived contributions are the Multisensory Parameter, the Soil Continuity Model, the Wisdom-Patience Parameter, and the Computational Morphology Parameter. Collectively, these parameters redefine house-garden unity not as a static boundary but as a "living envelope," a dynamic interface that integrates ecological continuity, multisensory engagement, cognitive resonance, symbolic depth, and technological adaptability.

*Table 1. Summary of Findings and Original Contributions According to the Methodological Framework*

| **Code Family** | **Sub-Themes** | **Intermediate Propositions (P)** | **Section Conclusion / Original Contribution** | **Proposed Design Parameters** |
|---|---|---|---|---|
| ECO – Ecological Continuity | Site orientation, material authenticity | P3, P8, P10, P11 | The house–garden relationship gains continuity through microclimatic buffering and soil cycles. | Soil Continuity Model, Microclimate Parameter |
| STR – Fractal Structure | Fractal repetition, hierarchy, and information density | P2, P6, P15 | Fractal patterns generate cognitive resonance and perceptual calm. | Cognitive Resonance Parameter, Fractal Structure Indicator |
| BIO – Biophilic Interaction | Nature contact, light, air, water, seasonality | P1, P5, P6, P14 | Biophilic indicators, combined with spatial permeability and fractal order, establish continuous contact with nature. | Multisensory Parameter, Biophilic Diversity Index |
| PER – Spatial Permeability | Indoor–outdoor continuity, terraces, courtyards, visual corridors | P1, P5 | House–garden unity forms a living envelope through permeable thresholds. | Spatial Permeability Parameter |
| PSY – Psychological Restoration | Sensory richness, stress reduction | P16, P17 | The garden becomes a restorative space through sensory–cognitive integration. | Psychological Restoration Parameter |
| SYM – Symbolic Space | Temporal cycles, life–death, shadow, seasonality | P18, P19, P21 | The garden functions as a symbolic layer, fostering existential awareness. | Symbolic Depth Parameter, Wisdom–Patience Parameter |
| CLI – Microclimatic Regulation | Shading, transpiration, and humidity balance | P9, P10 | Planting and water management support the building's energy performance. | Microclimate Parameter |
| COM – Computational Morphologies | Algorithmic design, digital modeling | P22 | Natural growth processes are reproduced through algorithmic morphologies. | Computational Morphology Parameter |
| RES – Responsive Systems | Sensor-based climate control | P23 | The house–garden relationship evolves into a dynamic climatic system. | Responsive Systems Parameter |
| EMO – Emotional Interfaces | Emotion-responsive environments | P25 | The garden transforms into an interactive environment, adapting to user psychology. | Emotional Interface Parameter |

A conceptual diagram (Figure 4) complements the tabular synthesis by showing how the five main dimensions-ecological, sensory, cognitive, symbolic, and technological-converge in the "living envelope" model, linking each dimension to its parameters and addressing the reviewer's request for graphic material. Although qualitative, the findings hold strong contemporary relevance: multisensory and cognitive parameters connect to neuroarchitecture, ecological and biomimetic aspects align with sustainability-focused design, and computational and responsive parameters intersect with digital and AI-driven practices. Thus, the study not only synthesizes past theory but also positions itself within the 21st-century architectural research agenda.

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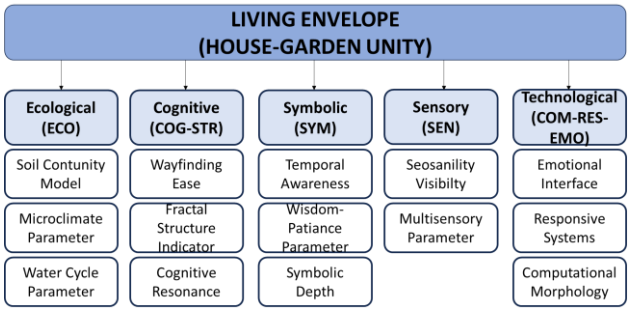


*Figure 4. Conceptual framework: Living envelope model (House-Garden Unity)*

In conclusion, this research provides a comprehensive and reproducible methodological framework for understanding the house-garden unity. By transforming dispersed theoretical approaches into measurable design parameters and visualizing them through a tabular and diagrammatic synthesis, the study offers both conceptual and practical contributions. It demonstrates that the house-garden relationship is not merely an aesthetic or functional connection, but a multi-layered ecological, psychological, and technological interface. This framework establishes a foundation for guiding future design practices and enriching contemporary architectural discourse.

## Ethical Statement

This study does not involve humans, animals, or personal data requiring ethical approval. The authors contributed equally, and there are no conflicts of interest.

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