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Basics of Biophilic Design and Iranian Garden

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Abstract:- One of the critical themes in architecture that brings about comfort and calm for people is the interaction between man and the environment. Nature is now regarded as a cultural heritage in all nations due to the physical and mental necessity for man to interact with it. Historically, gardening has been one of the humans' methods to carry out this significant heritage. The biophilic hypothesis aims to reunite man and nature and return this lost contact. This research compares the perspectives of the Iranian and biophilic gardens to nature and humans to better understand these two crucial concerns. The Iranian garden is one of the oldest gardening models in the world and has been in use for many years. The study's descriptive-analytical research approach was used using documents and library resources. For this reason, it first discusses the biophilic design and its components. It explains the theoretical underpinnings of the Iranian garden, after which it compares and analyzes the information data in the findings section. The study's findings indicate that the biophilic theory and the Iranian garden share similar principles for appreciating and relating to nature and humanity. However, regarding the results, these two follow different paths. Biophilic focuses on issues related to physical and mental health. In contrast, the Iranian garden also considers the user's attention to the world of meaning and the promised paradise in addition to his physical and psychological needs.

Keywords*: Iranian garden; biophilic design; nature; human, environment*

Introduction

Today's urban lifestyle, technical advancements, and expanding economic necessities have pushed people further away from nature and transformed their mindset into a mindless machine system [1, 2]. The modern era's population density, information overload, and the rise of a crisis in the connection between man and nature have all contributed to the establishment of stressful settings in daily life.

Devotion, citing Beatley, stated that:

A growing body of scientific study indicates that humans need daily contact with nature to be productive and healthy, have evolved as part of nature, and are interdependent and interconnected to nature and other life forms. This connection to' nature' can be defined as comprising "...[an] innately emotional affiliation of human beings to other living organisms. Innate means hereditary and hence part of ultimate human nature" [3].

One of the features of modern life is the separation of man from nature and her gifts, as well as his exposure to urban and industrial living patterns [4].

The unquestionable human reliance on the natural world throughout history has reinforced the intuition of the human affinity for nature and the notion that human physical, psychological, and even moral well-being largely depends on experiencing a diverse and healthy natural environment [5, 6].

Nature is now regarded as a cultural heritage in all nations due to the physical and spiritual necessity for man to interact with it [7]. The Iranian garden, which demonstrates the clever blending of water and plants in the creation of spaces in Iranian gardens, that all three conceptual, functional, and aesthetic approaches are well observed in it, and that the key to the stability of Iranian gardens is the crystallization of these three concepts in a single garden

complex, is one of the methods that has responded to this need throughout history [7]. The garden is a living artwork that depicts each nation's culture and the climatic circumstances of its birthplace since it combines Jamad and Nabat architecture. The primary framework of all historical gardens is based on organizing the body to provide an appropriate environment for human existence or the process of fusing plants, water, and structures [8]. Being close to nature helps people stay healthy, improving their physical performance [9]. Therefore, connecting man and nature is one of architecture's key goals. Biophilic architecture, which aims to incorporate aspects of nature in designs to produce health and enhance human emotional states, is one of the more contemporary architectural ideas that strives to link humans with nature. To build surroundings that can improve quality of life, which at a glance aims to acknowledge the intrinsic human urge to communicate with nature with sustainability and global design ideas (Kalantari 2015, 386). According to Professor Kellert, biophilic design is a cutting-edge example of green architecture that has the potential to restore the human connection to nature. Generally speaking, biophilic design endeavors to carefully comprehend how human beings' innate desire for connection and solidarity with nature affects the creation of habitats suited for life. By asking how the elements of an Iranian garden might be compared to biophilic architecture, this research seeks to understand the link between Iranian gardens and biophilic design and focuses on investigating this issue.

Literature review

Iranian gardens and biophilic architecture are compared in this study. Although several studies on these two subjects have been conducted, there has never been a comparison. A few studies in this area are summarized in Table 1.

[Insert Table 1 near here]

Theoretical foundations

Human-nature interaction

If the interaction between man, nature, and the built environment is positive, people's physical and mental health will likewise improve to a hopeful level. Researchers categorize our interactions with nature into three levels: observing natural landscapes or images of nature, being in nature, and conflict and engagement with nature. They contend that, consciously or subconsciously, being exposed to nature causes the effector to respond favorably. Numerous studies on how the natural world affects people have been undertaken recently, demonstrating that stress and eye strain may be reduced not only by being in natural settings but also by merely seeing them or watching images and videos of them. Another research has demonstrated that experiencing any aspect of nature—seeing it, hearing its noises, or even thinking about it—decreases anxiety and stress. The space's occupants experience calm and tranquility as they communicate with nature. Research has even shown that having natural materials around and being near nature may improve one's physical and mental well-being and degree of happiness and productivity. Depending on the traits of various natural surroundings, people respond to nature in various ways. Parks, gardens, and beaches by rivers and the sea provide joy, amusement, coziness, and dialogue. Environments with water landscapes are more significant locations for leisure, entertainment, socializing, and other social activities [10].

Architecture and nature

Despite its allure and beauty, nature imposes two restrictions on people:

A- Physical restrictions: Since of this, man is compelled to live apart from nature and in a different habitat because he cannot withstand all situations.

B- Theoretical restrictions: Human understanding of the position of nature and our relationship to it can sometimes classify it as being on a higher or lower level than humans. Both elements contribute to the development of architecture and various surroundings in the middle of nature. Different climatic conditions give rise to particular architectural elements. This element may be seen as the superstructure and physical layer of architectural identity, and it has served as a criterion for identification in global architecture and gardening. The second aspect is concealed since the outward variations between different architectural styles are explained by how they regard

people and the natural world differently. This layer might be referred to as the conceptual and underpinning layer of architectural identity [10]. Table 2 displays three distinct perspectives on how architecture, nature, and people interact. These perspectives are based on several worldviews.

[Insert Table 2 near here]

Iranian garden

The connection of the inhabitants of this area with nature and natural components is founded on respect for nature and cohabitation with it, according to the ancient worldview and Iranian-Islamic culture. According to this way of thought, the earth is God's property. Water and plants, two examples of the natural elements revered in this culture as signs and manifestations of God, have their names repeated several times throughout Islamic literature. The art of Iranian gardening, one of the country's oldest crafts with rich traditions and spiritual significance, exhibits the most beautiful combination of water and plants thanks to the presence of these two components from three conceptual, practical, and aesthetic perspectives.

The garden has played a significant role in Iranian culture and civilization for a very long time. It is regarded as one of the core ideas underlying the social, cultural, and environmental concerns of this region. It can be found in contemporary Iranian literature, architecture, and urban planning. Finally, it may be claimed that the Iranian garden represents an intelligent coexistence of man and nature. As a result, it may be seen as a human environment that reveals human knowledge, completes and represents the environment, and compiles meanings [10]. A typical Iranian garden is an enclosed space where plants, water, and buildings are mixed using a particular architectural system to produce a suitable, secure, and comfortable atmosphere for people. Iranian gardens are cultural, historical, and physical phenomena in Iran [10]. It is a collection in which the elements above' spiritual, practical, and aesthetic components are optimally blended to create a singular system known as the "Iranian garden" [7].

According to the majority of experts, "in the Iranian garden, the material goal is raised to the spiritual end... the garden is built as simply and clearly as possible and does not allow "material" ambiguity in the interaction between man and space" [8]. Iranian gardens are described as "an interaction between form and surface... and produce a clean place, full with tranquility and free of any tension as well as a thought-provoking setting" [8]. Furthermore, it can be said that the qualities of tranquility, comfort, and "a place for contemplation, thought[1]," thinking, reflection, and "creative imagination[2]" have reached the human senses through numbers, geometry, color, and material, i.e., physical elements, because all these qualities are included in "the process of inferring mentalities from objective things and providing the foundation for understanding the Iranian garden" [8]. The creation of the landscape system, shaped under the human system and affected by regional perspectives and culture, marks the conclusion of Iran's gardening, or, to put it another way, the perfection of Iran's gardening. The Iranian garden's landscape primarily aims to heighten people's enjoyment. As a result, specific practical approaches also try to do this. The characteristics listed below apply to this system. The intention behind creating the Iranian garden is depicted in (Figure 1).

1. The primary goal: perfection of inner satisfaction (satisfaction of worldly needs)

2. Secondary goal: turning human pleasure into semantic perfection

3. Heaven is the sum of worldly and semantic perfection [11].

[Insert Figure 1 near here]

Biophilic design

No specific building style is associated with biophilic design; it can be applied to any area of the built environment. All architectural forms, even the complete and amorphous shapes of the contemporary era, may be produced using biophilic design. Biophilic architecture may enhance well-being by lowering stress levels and boosting creativity and thinking [12].

Kellert et al. (2008, 14) propose that combining "the biophilic desire to harmonize with nature" together with the design of the built environment results in "some degree of deliberate refashioning of nature to satisfy human

needs, but in ways that celebrate the integrity and utility of the natural world [13]." Accordingly, biophilic design has the potential to enrich nature and humanity [14].

According to Moltrap, biophilic design involves:

The premise of biophilic design "aims not only to reduce the harm that stems from the built environment but also to make the built environment more pleasing and enjoyable. It seeks to avoid and minimize harmful impacts on the natural environment and to provide and restore valuable contacts between people and nature in the built environment [15]."

The bond a person has with nature is where biophilic design starts [16]. In this regard, Kellert continues, "There is no formula for the biophilic design that I am aware of, but my knowledge leads me to believe that every sort of building may have a compatible and acceptable connection with biophilic design.

The successful application of biophilic design will depend on recognizing how much nature remains the basis for a healthy, productive, and meaningful human existence [17].

Experiences and characteristics of biophilic design

In their brief mention of 24 qualities in their classification of biophilic design, Kellert and Kalbers divide it into three categories: direct experience of nature, the indirect experience of nature, and experiences of space and location (Table 3).

[Insert Table 3 near here]

All these biophilic design qualities are experienced through various human senses, including sight, sound, touch, smell, taste, and movement [17].

"Direct experience of nature" refers to a genuine connection with the built environment's environmental elements, such as natural light, air, flora, wildlife, water, and landscapes. The term "indirect experience of nature" refers to the representation or image of nature, the transformation or transformation of nature from its original state, or the display of distinctive processes and patterns from the natural world. Examples include photographs and works of art, natural materials like wooden tables and woolen goods, decorations inspired by natural shapes and forms, environmental processes like evolution and maturity or the passage of time, the science of nature geometry, etc. The "experience of space and place," which includes mobility and accessibility, ordered complexity, shelter, and landscape, is the index of the spatial composition of the natural environment that indicates human health and attentiveness [18].

Principles and benefits of biophilic design

Kellert and Calabrese (2015) have identified fundamental conditions for the effective practice of biophilic design, comprising:

1. Biophilic design requires repeated and sustained engagement with nature;

2. Biophilic design focuses on human adaptations to the natural world that, over evolutionary time, have advanced people's health, fitness, and well-being;

3. Biophilic design encourages an emotional attachment to particular settings and places;

4. Biophilic design promotes positive interactions between people and nature that encourage an expanded sense of relationship and responsibility for the human and natural communities; and,

5. Biophilic design encourages mutually reinforcing, interconnected, and integrated architectural solutions [14].

Methods

The descriptive-analytical approach was chosen to achieve the research's goal of examining the connection between the Iranian garden and biophilic design. Its content is based on library studies from among the trustworthy sources available, including referring to books, magazines, and research projects to use the most recent

information on the topic that is currently available. Finally, a comparison of the elements of biophilic architecture and the Iranian garden is made, along with an analysis of how they relate to one another.

Findings

A comparative analysis of biophilic basics with Iranian garden

Using three examples of biophilic design[4], Tables 4-6 compare and assess its patterns and traits with those of the Iranian garden.

[Insert Tables 4-6 near here]

[Insert Figure 2 near here]

Conclusion

As can be seen, Iranian gardens and biophilic architecture both aim to use nature to achieve their goals. The Iranian garden, which has a history dating back thousands of years, uses nature, combines various materials, and tries to interact between these elements to portray a cohesive nature next to man-made objects. In this respect, it pursues various initial, secondary, and ultimate objectives. At the elementary level, the main objectives are to attempt to meet the users' physiological and other demands, and in doing so, they never give up. Water, air, plants, shadow, light, color, texture, transparency, simplicity, and complexity, among other things, must all be used. For the human spirit to be at rest and comfortable in addition to his body, the second stage adds the perfection of meaning to material items. It employs boundaries, privacy, hierarchy, symmetry, unity, plurality, transparency, and continuity, among other things, in this approach. To connect the material entity to the non-material universe, a group of objects and subjectivities combines form and meaning in the final stage. As a result, it takes on the satisfaction of transcendental requirements and the bodily, mental, and social demands that ensure a person's health.

In contrast to the horticultural heritage, biophilic thinking is somewhat recent. However, he has constantly been exposed to exploiting nature in various ways from the beginning of human existence. This approach has also benefited from the wisdom gained over many years in reuniting people with nature. According to this paradigm, there are three ways to interact with nature: directly, indirectly, and spatially. This philosophy makes an effort to make nature accessible to the consumer in any manner feasible by paying both direct and indirect attention to natural aspects.

Unlike the Iranian garden, where being in the natural world is a fully immersive experience. Each of these experiences has been discussed independently in the biophilic theory (perhaps because of the constraints of modern existence). Direct and indirect experiences of nature have been combined in the Iranian garden's garden and pavilion. After entering the garden area and strolling down the path, the space user who has already had a direct encounter with nature enters the booth to have an indirect experience with it. In this sense, the space-place is an experience brought on by a past viewpoint. It is simple to comprehend the garden's cultural and native qualities, overall composition, and many levels of complexity. In other words, the Iranian garden is a location and environment that may be readily touched.

The striking similarity between the Iranian garden and biophilic architecture is in their overall perspectives. According to the biophilic idea, the ultimate objective should be to link humans with nature as much as possible while also paying attention to it rather than destroying it. These objectives appear to be focused on meeting physiological requirements (physical health), followed by mental health. The Iranian garden considers physiological demands and mental wellness in addition to considering nature and protecting it. The Iranian garden's route, however, transcends the biophilic point of view at this point since human attention is focused on semantic perfection owing to attention to semantic, spiritual, and transcendental concerns. The Iranian garden is likewise attempting to accomplish this since, from the standpoint of Iranian culture, getting to the higher realm and the promised paradise is the ultimate purpose of everything. The biophilic perspective seems to have missed this stage since it was unremarkable. The objectives of Iranian garden design and biophilic design are compared and summarized in Figure 2.

Conflict of interest: The authors declare no conflict of interest.

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1. Citing Ardalan, Bakhtiar 2014, p.68

2. Citing Mirfendersky, 2014 p. 10

3. The materials used to make the booths are mainly brick, clay, wood, plaster, colored glass, etc.

4. Citing Kellert and Kalabarz

5. Moving on the debris, the turtles' breasts, or the turquoise tiles covering the bottom of ponds and pools, whether a tiny or colossal pond or a narrow or wide pond [8].

6. In Iranian culture, the sound of water has a symbolic, aesthetic meaning for people, thus, hearing the sound is pleasant for them, and their mind conjures up an excellent experience; something like an association takes place [8].

7. Planting trees in the shape of five points causes the trees to seem thicker and denser [8].

* For more information, refer to Shahcheraghi 2010.

** For more information, refer to Kellert, Culbers, and 2015.

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Tables

Table 1. Summary of literature review (Source: authors).

	Author	**Description**
Biophilic design	Wilson (1984), Kellert and Wilson (1993) [3, 19]	The biophilia theory was first presented in 1984 by E.O. Wilson, who defined it as "the propensity to depend on other kinds of life." According to Wilson's biophilia concept, there is an innate bond between people and other living things.
	Kellert and Calabrese (2015) [17]	In four chapters, this study discusses biophilic design, principles, benefits, and applications (experiences and features of biophilic).
	Browning et al. (2014). [12]	It offers tools to enrich design opportunities and apply design to significantly improve people's health and well-being by articulating 14 biophilic design patterns in a framework for human-nature relations, biological sciences, and nature for environmental design.
	Kellert (2008) [13]	It provides a sustainable design strategy to re-connect people with the "natural environment" by thoroughly exhibiting biophilic design, their division, and their constituent biophilic design aspects.
	Mohammadkhani (2013) [9]	The study's findings support the hypothesis that biophilic design improves continuity, health, and emotional states in humans and that sound environmental design also saves money on heating, cooling, and temperature control systems in structures.
Iranian garden	Shahcheraghi (2010) [8]	It comprehensively discusses the Iranian garden, its definitions, systems, functions, a description of the components, experiments, etc., and does it from several angles.
	Elah Mutadin and Mutadin (2010, 2015)	The main reasons for creating an Iranian garden are being fruitful, creating beautiful spaces based on the art of gardening, religious reasons, recreation, and political-government reasons. These factors are explained in two sections: the common and general factors and the reasons for the formation of gardens.
	Mahdinejad et al. (2014)	He introduced Iranian gardens as a wise relationship between man and nature, incorporating natural elements in a way that satisfies

	[10]	the physical needs of users while also paying attention to its supernatural and spiritual dimension to connect man with nature and natural elements and identifying the place of Iranian gardens in the type of interaction between man and nature.
	Alaei (2012) [20]	It covers the description and analysis of the article by Arthur Pope titled Gardens in the survey of Iranian Art. Topics covered include the history of the Iranian garden, why Iranians create gardens, examples of Iranian gardens, the design and layout of Iranian gardens, and the components, elements, and decorations of Iranian gardens.
	Shibani and Hashemizadegan (2015) [21]	The article examines the various layers and eras of the background of Iranian garden studies as well as the primary theoretical structures of Iranian garden studies by categorizing Iranian garden studies based on the theoretical framework that governs them, focusing on the issue of sanctity, describing the abrupt emergence of Iranian gardens, and describing their internal validity.
	Shibani and Hashemizadegan (2015) [21]	It examines the connection between the Iranian garden and beauty, identifies the guiding principles and fundamentals of Iranian garden beauty, and concludes that it also displays various manifestations of qualitative and spiritual beauty in addition to sensory and quantitative beauty.
	Netaj and Rezazadeh (2014) [22]	Introducing a model that examines the idea, landscape, and garden components as the foundation for creating the Iranian garden model rather than focusing on the geometry of the Iranian garden.

Table 2. Different approaches to the relationship between man, nature, and architecture based on different worldviews.

Main approaches	**Domination on nature**	**Naturephobic**		**Naturalistic**	**Complementing nature**
Man's attitude towards nature	Dominating attitude toward nature	An attitude of indifference to nature	Transcendental attitude (Self-mysticism)	The attitude of becoming one with nature (Afaghi mysticism)	A verse attitude to nature
Man-nature interaction	Nature is a commodity in human hands	Inherent lack of communication	Nature, human prison (originality of the soul)	Nature, the innate purpose of man	Nature is the initial bed for the growth of the human soul, but its ultimate veil
System type	Non-systematic	Non-systematic	Non-systematic	Organic) (system	Hyper system

Table 3. Experiences and characteristics of biophilic design [17].

Experience of Space and Place	Indirect Experience with Nature	Direct Experience with Nature
• Light • Air • Water • Plants • Animals • Weather •Natural landscapes and ecosystems • Fire	• Images of nature • Natural materials • Natural colors • Simulating natural light and air •Naturalistic shapes and forms • Evoking nature •Information richness • Age, change, and the patina of time •Natural geometries • Biomimicry	•Prospect and refuge •Organized complexity •Integration of parts to wholes •Transitional spaces •Mobility and wayfinding •Cultural and ecological attachment to the place

Table 4. A comparative analysis of "direct experience from nature" biophilic design with Iranian garden.

Direct experience from nature		
Elements	**** Biophilic**	***Iranian Garden**
Light	- Existing natural light is essential for human health - Orientation to day, night, and seasons - Facilitating movement and helping comfort and satisfaction - Creating creative forms of light and shadow - Light reflection into the building through the glass and colored walls. [17]	- Receiving natural light from all sides by placing it in the garden - Ease of movement and comfort due to open spaces in the axes of the garden and between the plots - Creating shade and light for trees and plants in different seasons - Due to its location in the middle of the garden, numerous openings are designed on the four sides of the pavilion, and natural light is directed into the pavilion from all sides (Authors)
Air	- Natural ventilation for human comfort and productivity with changes in air flow, temperature, - Humidity and pressure gauges through technological and engineering openings and strategies Citing from [17].	- When plants and water are around, the humidity rises, the temperature drops, and an air current is generated. Because of the humidity already there, the air current cools and produces fresh, pleasant air. - air dust suppression and removal owing to plant presence (Authors)

Water	-Reducing stress - Absorption through the senses of sight, sound, touch, taste, and movement (a state that improves the experience of being in a place by seeing, hearing, and touching the water) - The desire to contact water: fountains, aquariums, constructed wetlands, etc. [17]	The use of all senses is one of the critical components of the garden, and it affects how we see water in the following ways: Vision: a unique approach to locate and conceal water[5], showing water in a volumetric, linear, or linear-surface manner in a waterfall, pond, fountain, or atmosphere. The impact of unique items, such as a chest of drawers or stone pavement, on amplifying reflections in water and producing lighting and reflections of garden features in the water. To excite and take in the sense of hearing in humans, various noises, sounds, and sound reflections are produced and brought into touch with water[7]. Touch: By combining wind, water, shade, and a touch of water in various garden areas, a cool breeze creates a relaxed environment. Taste and smell: by producing dampness and a soil-like aroma Movement: the potential for water to travel along the routes that were built for the garden, as well as along the movement axes and through all levels
plants (green space)	- Reducing stress - Reducing stress - Promoting physical health, enhancing comfort, and boosting effectiveness and productivity. - The liberal use of plants in architecture and landscaping. - In terms of the ecosystem, using native, uncommon, and invasive species [17]	- It produces freshness, energy, and comfort. It decreases stress while improving people's physical and mental health by softening the air and perfuming the area with flowers, aromatic and fragrant fruits, and medicinal and climatic plants in different garden regions. - Shading is one of the garden's primary components. - Applying the five-point approach to create a simulated density of trees[7] - Planting various fruit trees throughout the year that have both culinary and medicinal applications.
Animal	- Positive interactions with animal life through the use of features like aquariums, green roofs, gardens, and feeders [17]	- Special birds are drawn to the Iranian garden's atmosphere and sing songs there because of the presence of water, many types of ornamental trees, fruit trees, four-season flowers, and domestic animals.
Weather	- It is essential to a person's survival. - Direct interaction with the outside environment to communicate with the weather. - Designing outdoor views, operable windows, courtyards, decks, balconies, colonnades, hallways, gardens, etc., to simulate climatic conditions	Long holes on each of the booth's four sides allow for the passage of fresh air and air drafts inside the structure. The booth is designed to be in the middle of the garden at a relative height from the ground level, with an excellent and aristocratic view of the garden via the balconies. - The garden area makes it possible to enjoy natural landscapes and communicate directly with the weather.

Natural landscapes and ecosystems	- Including vegetation, wildlife, aquatic life, soil, rocks, and landforms. - The growth of trees, the availability of open spaces, water, forests, and... - Making use of design techniques like artificial wetlands, springs and meadows in the forest, green roofs, simulated water environments, and other ways to interact with natural processes [17]	- Planting trees and other vegetation in the garden's significant axes and routes, removing visual stumbling blocks, and creating trails with a purpose. - Designing water features such as ponds, pools, and fountains with various shapes, sizes, and water levels in various garden locations, such as in front of buildings or pavilions, in the middle of the garden, and inside as a fountain. - Designing water circulation and its movement in the garden through streams and waterfalls. - The use of vegetation and natural resources
Fire	- Changing an object's status - Two causes of worry and comfort about fire - The creative use of light, color, movement, and other materials to simulate heat conduction	Wooden, stone, brick, and plaster fireplace designs, combined with plastering, color paints, and mirror work (depending on the particular architecture of each time), provide light, color, and movement creativity. Under the climate in that area, it develops thermal conductivity in space.

Table 5. A comparative analysis of "indirect experience of nature" biophilic design with Iranian garden.

Indirect experience from nature		
Elements	**** Biophilic**	***Iranian Garden**
Images of nature	Through images, paintings, sculptures, murals, videos, computer simulations, and other display techniques, nature's image is captured, including plants, animals, landscapes, water, and geological elements [17]	Paintings of birds, flowers, plants, and landscapes adorn the booth's walls and bodies (Authors).
Natural materials	-Using natural materials like wood, stone, wool, cotton, and leather to create pleasing visual and tactile effects in a variety of items, including furniture, textiles, and other interior and exterior designs [17]	- The booth's roof, walls, and floor are made of wooden beams, bricks, clay, stone, and plaster (local materials are used depending on the temperature of each location). - The furniture in the rooms includes original Iranian rugs, tables, chairs, and wooden beds for sitting.

Natural colors	- Use of color effectively in architecture. - Steer clear of highly synthetic, contrasting, and "vibrating" hues. - Use neutral hues for soil, stone, and plants instead of bright colors if they highlight beautiful environmental forms like flowers, sunsets, the sun, rainbows, and some plants and animals [17]	- Painting the booth's floors a neutral shade of stone, brick, or another material. - The booths often have vibrant colors (white). - Inside the pavilion, colored tiles with images of flowers, trees, and birds. - Making use of organic materials with organic shapes and colors.
Natural simulation of light and air	- Indoor lighting and the application of artificial light to mimic the spectrum and dynamic properties of natural light. Changes in air flow, temperature, humidity, and pressure gauge simulate natural ventilation [17]	- The utilization of windows and customized lighting in the room that reflects sunlight through the kiosk's colorful glass to maximize natural light. The cool breeze that blows in the mix of wind, water, and shade and the flow of new air via the booth's apertures provide natural ventilation, creating cool air and maintaining the right humidity inside the booth.
Natural shapes and forms	- Textural, patterned, and numbered configurations are seen throughout nature. (Form of a plant, an animal, etc.) mimicking and imitating - From natural shapes, primarily employed in structures' outside and interior facades [17].	- Plaster and stone reliefs of Burston's, as well as the outside and interior walls of the Kushk, all depicting flora and animals in various shapes. - The use of wooden doors and windows with nature-inspired window and door decorations (floral patterns in the opening frames and the usage of mesh and geometric networks) (Authors).
Invention of Nature	The use of fictitious pictures and shapes in designs, none of which occur in nature but which all draw inspiration from natural design ideas and characteristics, such as colored glass windows [17].	- Installing colored windows in tiny apertures to block entry or block the view from the outside to the inside (Authors).
Information richness	Humans yearn for complexity, coherence, and understandable variety in the natural environment, whether it is created naturally or artificially [17].	- The Iranian garden is cohesive in its overall lines, geometry, and implementation materials despite having a range of autonomous areas. - The Iranian garden's architectural system, which is calculated and created based on a highly accurate mathematical structure, specifies and dictates how to organize all the natural and artificial components in physical systems (plants, water, installation of structures). - The combination of a structure and a garden, which constantly observes the phenomena of transition from one area to another, is one of the hallmarks of an Iranian garden. As a result, it is difficult to tell where one garden development project stops and another one begins [8].

		- The construction of the Iranian garden door does not obstruct the garden's space; instead, it allows human vision to travel through and connect with other garden areas. Additionally, there is no separation between the garden grounds and the building. From the interior of the structure, water extends into the garden. One of the critical elements in Iranian garden design is the picture of the building in the water, which suggests some contact and fusion between the structure and the garden. [8] The connection between the hut and the garden and the unification of the two spaces is made possible by the association of water with humans from the interior of the garden to the inside of the hut.
Age, change, and developments	Understanding how natural processes work, particularly how healthy ecosystems experience seasonal and short-term shifts [17].	- Planting deciduous trees - During each season, a variety of fruits with both culinary and medicinal purposes are available
Natural geometries	Instead of replicating and copying organic shapes and rigid artificial geometry, fractal geometry uses natural patterns and functions. These patterns and functions repeat the same basic shapes in various ways. - Well-known natural geometries include the "Fibonacci sequence" and "golden ratio." [17]	- Indicators suggest the existence of fractal geometry in some decorations, such as self-repeating or single-form tile patterns, stone, plaster, and wooden reliefs on columns and walls.
Biomimicry	- Using forms and abilities that are unique to particular species found in nature, such as the structural integrity of spider webs, the capacity of termite carp to withstand heat, the hair on various animals, etc., to address the demands and issues of humans [17].	- Reinforcing the structure using animal hair - The use of arc-shaped features is prevalent in the building's construction.

Table 6. A comparative analysis of "space and time experience" of biophilic design with Iranian garden.

Space and time experience		
Elements	**** Biophilic**	***Iranian Garden**
Landscape and shelter	View: A limitless panorama with room for planning and upkeep. Shelter: a location where a person is shielded from the front and back while being sheltered from the elements or the primary activity [17].	The mansion is a place to settle and observe the garden, an endless view with distance for planning and maintenance. - The design in the natural slope in most Iranian gardens offers a perfect site for installing the booth in the elevated region of the garden

		The towering trees planted on each side of the garden's longitudinal axis and the central landscape's presence in a straight line contribute significantly to the viewpoint that gives the garden a more extended appearance. The central axis and routes of the garden have deep, expansive vistas, there are no obstructions in the way of sight, and the paths have a purpose - Building a physical barrier, such as a wall, around the garden to maintain security and calm by preventing visitors' admission and encroachment. (Adapted from Shahcheraghi 2009)
Organized complexity	Organized areas have the qualities of connectedness and cohesiveness, whereas complex spaces frequently alter and fluctuate. Complete sensory data concerning a set of orders (order) that are similar to those found in nature [17]	- Consolidation and expansion of the public view from the kiosk's inside to its exterior and vice versa The geometric, visual, and sensory link (stimulation of human senses), and fundamentally the physical qualities of the garden and the location of buildings in it, produce continuity, interference, integration, and boundlessness of the Iranian garden area. (Transmission of sounds such as wind, birds, and water) the movement of the water flows inside the structure and its extension into the garden, stimulation of the sense of sight and the presence of a visual connection between the interior and exterior of the pavilion, the passage of the breeze and the transfer of the smell of flowers and plants from the garden space into the booth, and the existence of a visual relationship between the interior and exterior of the pavilion. Hierarchy, symmetry, center, rhythm, independence, awareness of places, diversity in unity, and unity in diversity may all be found in Iranian garden design.
Integration of parts into the whole	People favor discrete, integrated components, frequently achieved by continuously connecting places and having distinct, recognized borders. A focal point that is practical or thematic can further this pleasing integration of space [17].	The main and sub-axis of geometry and executive concerns establish the unity and integrity of the Iranian garden, which has a singular spatial, visual, and functional diversity. Diverse uses include merging or splitting geometric shapes like squares and rectangles, planting techniques, numerous plant species combinations, the formal and practical uses of water, diverse materials, and similar things. - Despite the enormous range in the construction materials, the primary and secondary axis of the plots, all varieties of ponds, and created spaces adhere to a single geometric order that permeates the entire garden

		and organizes the concept of the group's oneness in mind [8]
transitional spaces	- Perceived links between locations made possible by distinguishable and unambiguous transitions - Areas that connect inside and outside the home, mainly flats, courtyards, colonnades, etc., are considered transitional spaces [17]	- The garden fence's most noticeable component is a bridge between inside and outdoors. The garden's hierarchy begins at the entrance gate or, occasionally, the square and water view inside the garden and continues past the vestibule and central axis to the garden pavilion. Typically, the Sardar's mansion takes the shape of an indentation on the garden wall to have an inviting appearance to the observer.
Mobility and accessibility	- Comfortable, well-being-promoting, and unrestricted travel between various, sometimes complicated settings. - A thorough awareness of pathways and places of entry and departure to encourage mobility and a sense of security [17]	One axis, two axes that are perpendicular to one another, and three parallel lengths make up the geometric framework of the garden, which makes it easy to navigate and move freely between the different areas. - Improving the axis of movement's vision - The movement axis has winding corridors lined with shaded trees. - Establishing a line of sight between the Sardar and Kushk mansions
Cultural and native affiliations of the place	- Culturally appropriate designs convey a feeling of a place with a particular human identity. Emotional ties to a place, notably familiarity with its topography, native wildlife, and unique weather patterns - Environmental and cultural bonds can inspire people to protect both the natural and built environments [17]	The Iranian garden is designed with harmony and proportion, sacredness and deprivation, separation from inappropriateness, freedom from futility and excesses, obligation to be effective and profitable, encouragement of satisfaction and thrift, and stability [8]. When designing gardens, axes, plots, ponds, pools, etc., in the pattern of squares, Iranians often employ ideas like the sanctity of numbers and their distinctive ways of sanctifying and endowing objects with symbolic meaning. - In Iranian culture, the consecration and symbolism of natural elements like water and vegetation Planting natural trees and plants in each region; building booths suited to each region's culture and environment; preserving and converting arid regions into green spaces; and isolating the garden from outside influences such as religion.

Figures

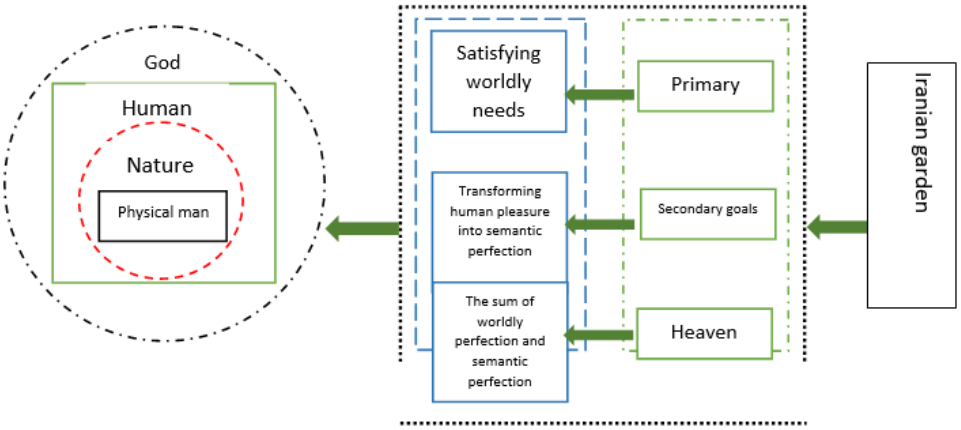

Figure 1. The purpose of the formation of the Iranian garden (Source: authors).

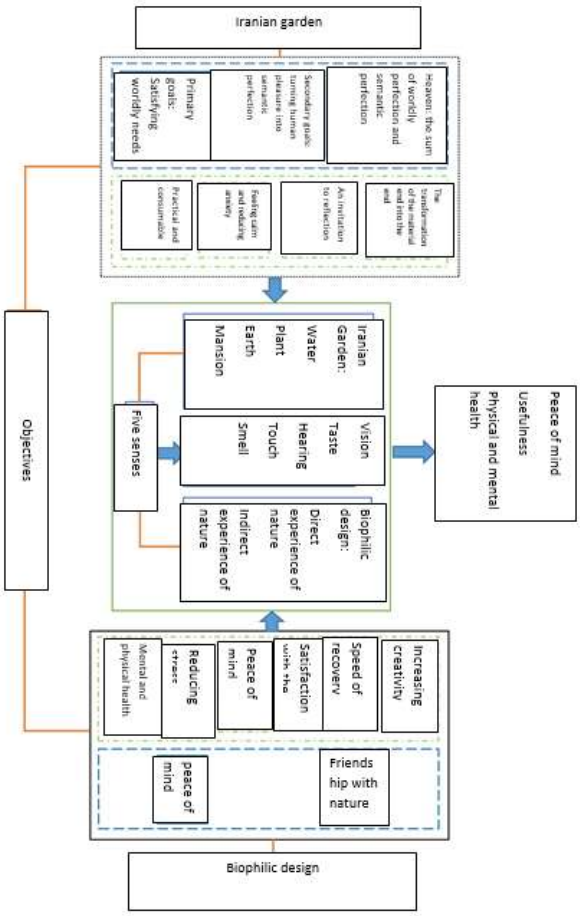

Figure 2. A comparative analysis of biophilic design and Iranian garden at a glance.

Figure captions

Figure 1. The purpose of the formation of the Iranian garden (Source: authors).

Figure 2. A comparative analysis of biophilic design and Iranian garden at a glance.