

Original Research Article

Roots and Concepts of Ecological-Landscape Development and its Common Grounds with Iranian Architecture and Urbanism*

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Abstract | Ecological-Landscape development is proposed as a mature form of Ecological-Landscape Urbanism which is a recent discourse in Western architecture and urbanism whose roots can be traced back to environmental movements in the past century. In this regard, ecological-landscape development opens new horizons for contemporary cities by relying on conceptual frameworks such as landscape as a building block of the city, landscape ecology, and ecosystem services, where the difference between natural and built environment pales and the city is conceptualized as an ecosystem including humans. It can be stated that it departs from conventional urbanism approaches that are mostly based on modern views in many ways, and introduces a novel method of shaping the built environment. On the other hand, by dissecting the tenets and major approaches of this school, a high degree of commonality with Eastern architecture and urbanism, especially Iranian architecture, can be identified. This can be acknowledged as the point where Western architecture and urbanism meet Iranian architecture, as well as a solution to its continuity and development in today's world. Using an analytical- descriptive approach, this paper seeks to analyze the concepts, roots, and patterns hidden within this branch as the outcome of the synergy between the two schools of landscape urbanism and ecological urbanism, and propose a manifesto, albeit incomplete. Then, it introduces its common features with Iranian architecture and urbanism under concepts such as gradual development and integrity, fusion with nature, multidisciplinary knowledge, connectivity with politics, and ecology.

Keywords | *Ecological-landscape development, Landscape urbanism, Ecological urbanism, Iranian architecture and urbanism, Landscape ecology.*

Introduction | When confronted with modernity, especially modern architecture and urbanism, Eastern schools of architecture and urbanism have not found an opportunity to converse. Rather, they have been put aside by its rapid spread. Iranian architecture and urbanism have not been an exception as can be witnessed from their discontinuation in recent decades. In light of this phenomenon, a solution that is responsive to present needs must be developed. A solution that will help preserve the invaluable heritage of Iranian architecture and allow it to flourish. Ecological-landscape development forms following the environmental movements of the recent decades whose roots can be traced back to the philosophy of environmental ethics. Although

this movement is based on modern knowledge, it diverges from modern ideology in many regards including the relationship between humans and the environment, as well as how knowledge is used by humans. As a result, it shares many common features with the Eastern worldview in various approaches, which opens up the opportunity for communication between them. In particular, by stressing ecology and deploying ecosystem services, which have always had a unique place in Iranian architecture and urbanism. The topicality of this issue is of more prominence at the moment that climatic changes have become one of the greatest challenges for humankind and many consider it the result of the modern anthropocentric view and the built environment derived from it. By redefining

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the relationship between humans and the environment, the landscape urbanism movement and, following its development, ecological urbanism introduce a new method of tackling the built environment's problems, as well as how cities, neighborhoods, and even small-scale architecture are formed. Ultimately, the synergy of these two schools of thought is reflected in the theory of ecological-landscape development. This paper attempts to explore the evolution and development of this concept. Further, it will analyze the general approaches to ecological-landscape development and its relationship to Iranian architecture and urbanism, assuming the possibility of applying a particular existence and identity to Iranian architecture and urbanism.

Research Questions

Main question: What is the relationship between ecological-landscape development and Iranian architecture and urbanism?

Sub-questions: 1- What are the concepts and roots of ecological-landscape development? 2- What is the relationship between ecological-landscape development and conventional urbanism? 3- What are the common features between ecological-landscape thinking and Iranian architecture and urbanism?

Research Background

Due to the limited amount of research, the general title of ecological-landscape development can be found under landscape urbanism and ecological urbanism. In this regard, some sources have explored their intellectual and philosophical origins in environmental ethics (Benson & Roe, 2007; Brennan & Lo, 2016; Turner, 2014). Others, such as Daniels, have investigated the roots and the historical course. (Daniels, 2009) The main theorists of this matter, such as Waldheim, James Corner, and Mohsen Mostafavi, have contributed to explaining its main strategies, whose essence can be found in Waldheim's papers like *The Landscape Urbanism Reader* (Waldheim, 2002; 2012; 2016). Richard Weller and Chris Reed have also been effective in expanding the bases. Despite the emphasis of landscape theorists on ecology, this component has not been prominent in relevant projects and it has driven Mohsen Mostafavi to complete the landscape urbanism school by stressing the fundamental role of ecological knowledge by introducing ecological urbanism in a book with the same title in 2010. (Mostafavi & Doherty, 2010) Moreover, a significant part of his theory's scientific base was indebted to the achievements of his peer Richard Forman from Harvard University, who had a primary role in classifying landscape ecology, and subsequently urban ecology (Forman, 2014). People like John T. Lyle, Ian Thompson, and Frederick Steiner have also played crucial roles in shaping landscape ecology (Makhzoomi, 2016). Afterward, Jianguo Wu (Wu, 2002;

2008; 2013; 2014; 2019) landscape planning researcher, and Frederick Steiner (Steiner, 2011, 2014). had a special role in introducing and spreading landscape ecology and urban ecology, as well as describing ecosystem services as the bases of ecological thinking. Tom Turner and Frederick Steiner attempted to introduce a new research branch by presenting the idea of synthesizing the two landscape and ecological movements (Steiner, 2011; Turner, 2014). Nonetheless, this branch has not been shaped structurally and cohesively and requires more research. As far as the authors know, no comparative study of this movement with Iranian architecture and urbanism has been conducted.

Research Method

This study employs a qualitative approach, which is generally based on the content analysis of texts and their interpretation. In this regard, In the analysis of studies, two steps were taken: 1- Explaining ecological-landscape development and 2- Identifying the relationship between ecological-landscape development and Iranian architecture and urbanism. This method is more or less similar to the method used by Ian Thompson in *Ten Tenets and Six Questions for Landscape Urbanism* (2012). or Marc Treib's *Modern Landscape Architecture: A Critical Review* (1993). By looking up keywords such as "Landscape Urbanism", and "Ecological Urbanism", on the Google Scholar database and ProQuest, 400 initial data were obtained, among which 84 sources entered the study after filtering. After analyzing the sources, 41 other sources were added to the list, which culminated in 125 documents in the form of papers and books. The next step was to extract the main concepts and roots hidden within the mentioned texts and trace their historical roots using the grounded theory and open and axial coding. Afterward, the novel ecological-landscape movement is introduced and explained as the outcome of synthesizing the two previous movements based on the determined features. Using a case study, examples of Iranian architecture and urbanism will be introduced concerning the concepts of ecological-landscape thinking. In addition, by focusing on sources regarding Iranian architecture and urbanism and their fundamental views using thematic analysis, we attempt to extract characteristics of Iranian architecture and urbanism and their common grounds with ecological-landscape approaches through a deductive-inferential method. First, landscape urbanism and then ecological urbanism are analyzed. Finally, ecological-landscape development is introduced as a result of the two previous schools, and its general strategies will be developed. Furthermore, its common features with Iranian architecture and urbanism throughout the seven main tenets are explained.

Landscape Urbanism and its Formation

This theory is derived from two disciplines of landscape

architecture² and architecture in whose making post-structuralist and post-modern thinking has played a crucial role. The first substantial conference on landscape urbanism could be considered the one held in Chicago, which was sponsored by the Graham Foundation (Thompson, 2012, 7; Waldheim, 2012, 7). Landscape urbanism emerged at the same time as the rise in the post-modernism movement, the trending of terms such as global capital, the transition from the industrial economy, and decentralization, which were effective in its shaping. As Waldheim stated: “The work of many contemporary landscape practices evidences the tendency to use landscape as a remedy for the wounds of the industrial age” (Waldheim, 2002, 15). Therefore, landscape-oriented thinking to some extent diverges from the modernist worldview and complies with the environment instead of dominating it. The landscape urbanism concept derives from the tradition of garden design and landscape design (Mostafavi, 2015; Turner, 2010). It explores the design of neighborhoods and cities using landscape architecture techniques (Mostafavi, 2015). In landscape urbanism, the landscape functions as the building block of the city, while in conventional cities, architecture or the network of ways plays this role (Waldheim, 2012, 11). Accordingly, the role of the landscape is like a flexible and ordering factor that the urban land uses will be placed on and combined with, as we see in the Iranian vernacular architecture, the geometric patterns of architectural blocks are replaced with the morphology of the ground. In particular, it occurs during the formation of Isfahan during the Safavid dynasty when the network of gardens and creeks is formed. Or in Rome during the late 16th century when neighborhoods were formed based on the city churches’ links and the landscape of the region (Fig. 1). Emphasis on the role of landscape as an organizer can be observed in the early 20th century during the playground and city beautiful movements. Works of People such as Frederick Law Olmsted, Daniel Burnham, Joseph Lee, and Jane Adams are also examples of this although being influenced by Romanticist thinking and are rather formal. In populated cities in the 19th century, the landscape was

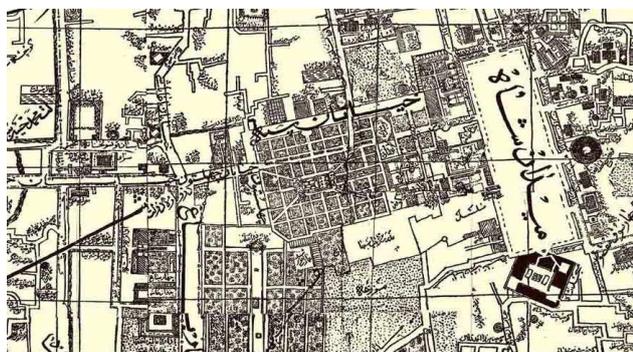


Fig. 1. An old map of Isfahan and the role of gardens and landscape in forming the urban texture. 1924. Illustrated by sultan Reza Khan. Source: www.memari20.ir

also presented as a solution to health and social problems in the city’s texture (Daniels, 2009; Waldheim, 2016, 5). This idea can more or less be seen in modern organic architecture, especially in the works of Frank Lloyd Wright and Le Corbusier who formally illustrated the idea of placing architecture in the core of the landscape in projects such as Broadacre City and Chandigarh. However, the difference between these views and present thinking of landscape urbanism is the way that they perceive nature and non-human beings, as well as the entanglement of the city and landscape. Therefore, in landscape urbanism, the duality of city and landscape is rejected and they are considered as one whole (Thompson, 2012, 9; Waldheim, 2002, 12; Dabiri&Mousavi, 2016). As a result, urban elements such as information infrastructures and public buildings find their way into green spaces, promoting the fusion of nature and the built environment (Thompson, 2012; Turner, 2014) in such a way that humans and their living needs are classified as a part of nature and in interaction with it. In the garden city movement, Ebenezer Howard also promoted the idea of using the advantages of the country by bringing nature to the city. This can be considered one of the origins of today’s landscape urbanism thinking. Nonetheless, in terms of the formation philosophy and the type of view toward nature, the ecological-landscape school is significantly different from the garden city idea. The utopian ideal of a garden city emphasizes human dominance over nature by specific zoning, whereas ecological-landscape development takes on a flexible approach sensitive to the natural environment and integrates the landscape as the foundation to form the built environment. In this regard, myriad Iranian cities, such as Isfahan whose structure is based on a garden system, can be considered consistent with ecological-landscape thinking. Meanwhile, in many Iranian texts, Howard’s idea of a garden city has been mistakenly connected with historic cities in Iran because they possess numerous gardens, and have even been considered the origin of the garden city movement (Etezadi, 2017, 82). As Esmaeil Shieh has written: “ChaharBagh Street in Isfahan itself creates a big garden city.....Not only does the plan of the city not lack anything from the objectives proposed in Ebenezer Howard’s theory, but it was more complete” (Shieh, 2000, 6). On the one hand, the landscape movement bases its pillars on scientific and ecological approaches whose history can be found in the environmental planning movement. Mid-20th century, ecological planning based on the beliefs of John Muir and David Thoreau was promoted through the Regional Planning Association of America (RPAA). Through this association, people such as Benton MacKaye and Lewis Mumford explored environmental values in the form of planning on an urban scale (Daniels, 2009; Waldheim, 2002, 12). Patrick Geddes, one of the members of this association, viewed region, or as stated today, landscape as a group of

environmental relationships between the ground, water, and air, which formed human culture (Daniels, 2009, 183; Mumford, 1927). that could also be considered the initial definition of the urban ecosystem. Landscape design and planning enters a new season with Ian McHarg's layer-cake model, which had a more prominent role in systemizing and documenting environmental planning.

Ecological Urbanism

Using the term ecological vaguely refers to things that are linked to the environment (Madge, 1997, 48). Ecological urbanism was first introduced by Mohsen Mostafavi (Steiner, 2014, 336; Turner, 2014, 19), which can be seen as an evolution of landscape urbanism, with the ecosystem approach to the city being its most significant aspect. (Forman, 2014; Waldheim, 2016). Ecological urbanism attempts to respond to criticism of landscape urbanism regarding its shallowness and the ecological impracticality of the projects (Mohebi & Tahbaz, 2021). Accordingly, ecological urbanism bases its theories on landscape ecology and urban ecology, which have a strong scientific history and were developed by Richard Forman earlier. Mohsen Mostafavi also believes ecological urbanism aims to provide a framework to achieve the image of what the city can be in the future by connecting urbanism with ecology (Mostafavi, 2010, 1). Urban ecology roots in the concept of landscape ecology, which currently focuses on studying and enhancing the relationship between spatial patterns and ecological processes at the landscape scale. Nonetheless, it greatly overlaps with physical and cultural geography, landscape architecture, ecosystem management, and sustainability science (Wu, 2019, 179; Makhzoomi, 2016; Mansouri, 2016). Landscape ecology makes ecological urbanization possible through the three following components: 1- Connecting landscape patterns with biological diversity and ecosystem processes, 2- measuring connectivity and flows in spatial systems, and 3- Presentation of systematic understanding of the links between disturbance, resilience, and recovery. (Frazier et al., 2019, 1) Therefore, researchers in this field have employed ecological methods in urbanism (Dabiri & Masnavi, 2015, 67). Nevertheless, using the knowledge of ecology in constructing cities has been of prominence in recent decades and has different approaches depending on the extent of humans' role and the type of their relationship to the natural parts (Fig. 2) but it is not the main axis like ecological urbanism. The Chicago and Berlin schools are at the two ends of the spectrum where the former sees the city as an anthropocentric system and the latter as the destroyed habitat of non-human beings with humans in the role of the destroyer. In this light, from the 60s and 70s onward, we witness the formation of balanced and holistic views by acknowledging the city as an ecosystem where humans are recognized as a part of it (Dabiri & Masnavi, 2016;

Mansouri, 2016). In addition, in Iranian architecture and urbanism, ecology has had a fundamental role in forming Iranian traditional cities in the form of tactic knowledge derived from experience over time, rather than in the form of coherent and compiled knowledge (Fig. 3). By using the natural potentials, the role of humans was defined as coordinating and complying with nature (Pirnia, 2014; Shieh, 2000; Falamaki, 2015).

Ecological-Landscape Development

Frederick Steiner first used the terms landscape and ecological together under the title "landscape ecological urbanism" (Steiner, 2011). He aimed to introduce a movement that was the outcome of the synergy of both schools; however, the dimensions were not developed. Given that this domain's sphere of influence is not limited to large-scale urbanism, we propose and use the term "ecological-landscape development" as its sphere of influence encompasses middle-scale neighborhood and small-scale architecture in addition to city scale (Mohebi & Tahbaz, 2021). With this background, ecological-landscape theory can be defined as follows: A view that conceptualizes the city as an ecosystem with human dominance and takes a problem-based and organic approach toward the concept of development. Further, by impacting architecture throughout time and identifying ecological potentials, it proposes solutions for the cohesion of the urban fabric, preservation of the natural sources, and meeting the needs of its inhabitants. In other words, ecological-landscape development seeks to create a balance between urban ecosystem needs and the ecosystem services supplying them through the tools it possesses such as architectural blocks and green infrastructure. Accordingly, it will influence ecosystems at a larger scale (Fig. 4), which in some way illustrates the concept of landscape sustainability, and subsequently urban sustainability. In fact, Landscape sustainability focuses on enhancing the dynamic relationship between ecosystem services and human welfare within dynamic environmental, social, and economic circumstances (Frazier et al., 2019, 5; Liao et al., 2020). John Barry categorized landscape and environment into 1-pristine nature, 2- countryside and garden, 3- urban texture, 4-as a global system (Barry, 2007, 22-25). Considering that the topic of a landscape is defined on different scales, ecological-landscape development is a discourse between large-scale cities and small-scale architecture. Further, it spans a great range of solutions from policy-making to recommending construction materials. According to James Corner, one of the most significant potentials of the landscape movement is its capability of passing through scales to place the urban fabric in its setting and to plan relationships between environmental processes and

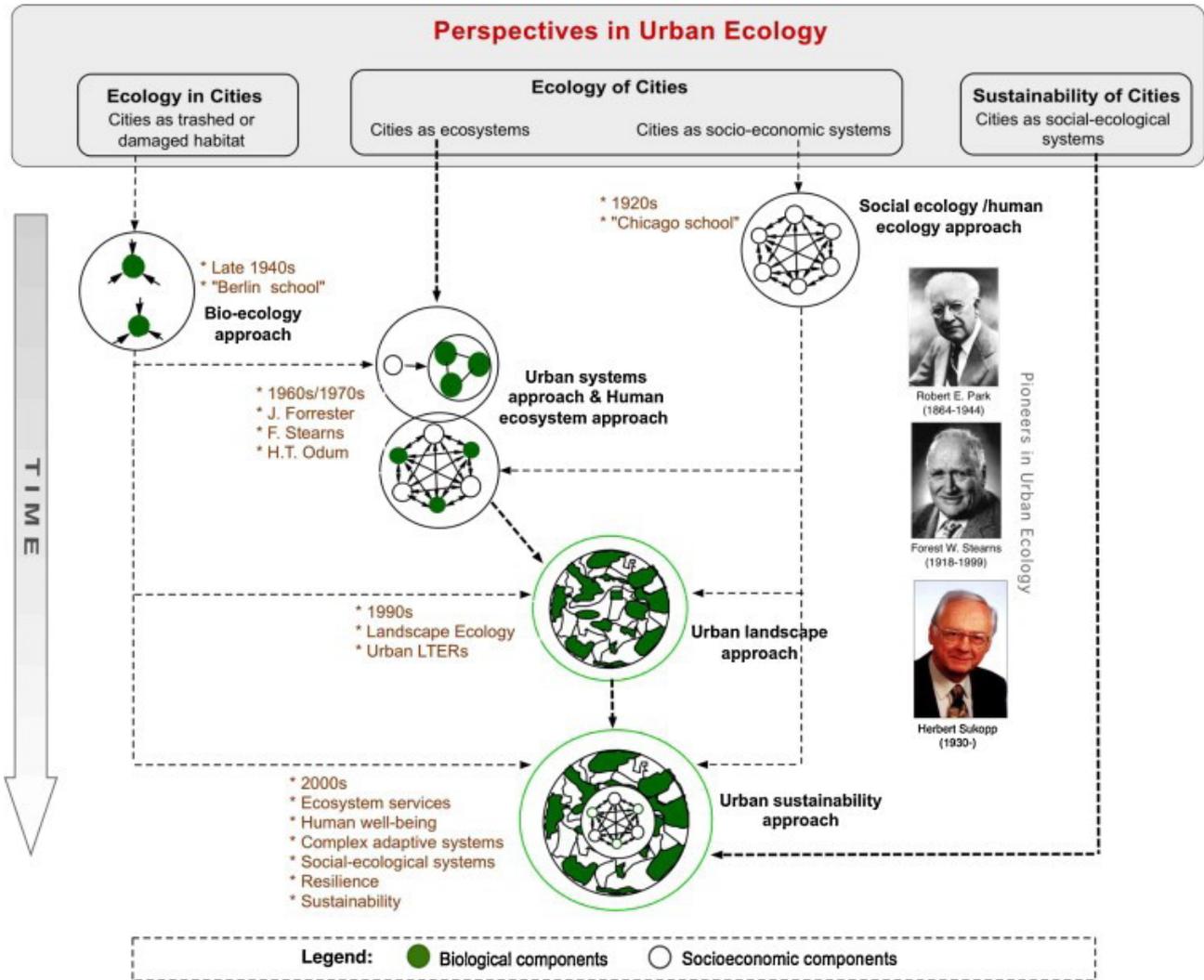


Fig. 2. Different perspectives in urban ecology. Source: Wu et al, 2014, 4.

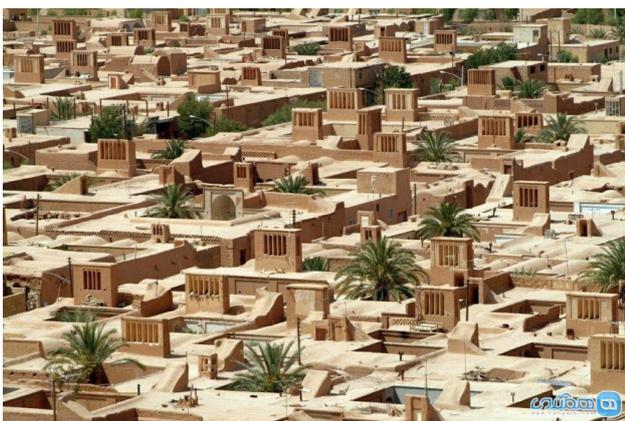


Fig. 3. Chupanan village in Nain is an example of the fusion of architecture with nature and the role of ecology in traditional architecture. Source: www.hamgardi.com

urban form (Waldheim, 2012, 24). Therefore, ecological-landscape thinking can be considered the connector between architecture, neighborhood, and city by relying on its multi-scalar characteristic. The ecological-

landscape view also proposes a novel understanding of aesthetics, which could be called natural aesthetics of ecological aesthetics. In ecological-landscape urbanism, functionalism is preferred over absolute aesthetics as the intellectuals of this movement believe a generative landscape possesses natural aesthetics within itself. In this regard, Richard Weller states: "Implicitly, landscape architecture is associated with dynamic materials and processes, and it is in a position to define ecological aesthetics. Landscape architecture is not frozen music" (Waldheim, 2012, 75). Not only does this thinking aim to protect the ecosystem and benefit from its services but it also educates people and raises awareness about the natural environment. Landscape urbanism denies hiding ecological systems behind an environmentalist image with no function and considers these systems and urban landscapes the producers of mechanisms to organize the city (Waldheim, 2002, 13). Regarding this, some similarities can be found in Iranian architecture and urbanism as Pirnia believes a function is taken into

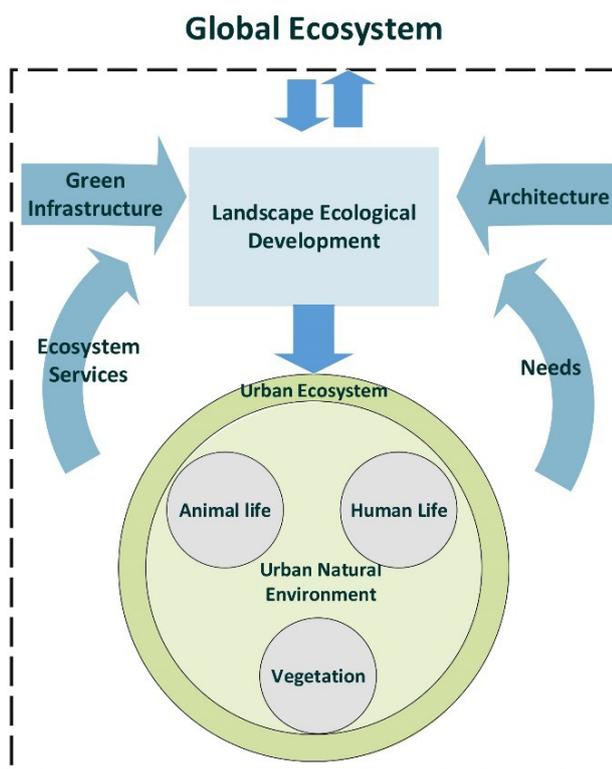


Fig. 4. The concept of ecological-landscape development. Source: Authors.

account for each part of Iranian ecological architecture so that even building ornaments function as insulation or have a structural performance (Pirnia, 2005, 28). As one of the main points of ecological-landscape thinking is mentioning the green infrastructure as a factor in ordering the urban fabric, demonstrating green infrastructure is more valuable than aesthetics (Khansefid, 2017). Waldheim believes landscape urbanism promotes the use of infrastructure systems and public landscapes to produce ordering mechanisms (Waldheim, 2012, 39). Gary Armstrong was one of the first theorists who mentioned the idea of urban development through green infrastructure design. Green infrastructure provides the opportunity to balance the damaging effects of natural disasters and witness a decline in costs by increasing the efficiency of ecosystem services and reducing the load on existing infrastructure (Steiner, 2014, 307; Khansefid, 2016). For instance, Ian L. McHarg's design for Woodlands, Texas in 1970 led to a decline in the cost of traditional flood walls, while causing a growth in the potential of open spaces and the formation of wildlife corridors (McHarg, 1996; Steiner, 2014). In Iranian traditional architecture, however, qanat can be considered the prime example of complying with the idea of built environment formation based on green infrastructure (Fig. 5). Its effects can be observed not only in residential houses but also in other infrastructure elements such as a

network of ways, neighborhood centers, and washrooms (Soltani Mohammadi, 2018).

Ecological-landscape development does not present a compiled framework of urbanism tenets but rather a problem-based approach to the formation of the built environment. Using the knowledge of ecology, it seeks to modify the anomalies and challenges of the living environment after identifying them to reinforce the ecosystem functioning of the city. In recent years, hence, we have witnessed the increasing cooperation and activity of landscape architects in reviving and planning post-industrial and infrastructure lands (Waldheim, 2002, 15). Given this history, in numerous cases, North American industrial cities have used landscape urbanism as a tool to reform vast lands with an industrial history. Downsview Park in Toronto, which was designed on what was once a military airport, and the Freshkills Park project, which was implemented on New York's landfill site, are some examples. Considering that landscape and ecological movements, and subsequently ecological-landscape development, are known as a response to the shortcomings of conventional urbanism (Mostafavi & Doherty, 2010; Waldheim, 2002; Waldheim, 2016, 2). this paper compares their approach toward key concepts in the design of cities and neighborhoods for better understanding of ecological-landscape development (Table 1). Perhaps the most fundamental difference between conventional urbanism and ecological-landscape development is how each views the relationship between humans and the environment. The former proposes an instrumental definition for the value of creatures based on their roles in relation to humans; whereas, the latter puts humans and other creatures in the same category and non-human beings have their intrinsic value. This can also be traced in the concept of "The Land Ethics" proposed by Aldo Leopold in *A Sand County Almanac*: "Land (landscape) is a community and a basic concept of ecology, which must be loved and respected as an extension of ethics" (Leopold, 1949). Accordingly, ecological-landscape development, which traces its philosophical roots to environmental ethics, takes a critical position against the approach derived from the modern worldview. As a result, compared to conventional urbanism, it gives more value to the natural environment that generally allocates second-hand and undeveloped public spaces to green and natural spaces (Fig. 6). In this regard, by distancing itself from the instrumental and exploitative view of nature that spread post-industrial revolution, Iranian architecture seeks to comply with natural laws and use them in a built environment, which will culminate in the synergy of architecture and nature.

• The manifestations of the ecological-landscape thinking in Iranian architecture and urbanism

Ecological-landscape urbanism diverges from many modern approaches. The modernist view is partial and



Fig. 5. The map of a qanat as the green infrastructure in the formation of the traditional texture of Mohammadieh, Nain. 1957. Source: Soltani Mohammadi, 2018.

expertise-oriented. It also views elements regardless of their relationship to the environment (Mansouri, 2015, 1010); Therefore, it has some common features with Eastern schools whether it intends to or not. Thus, in some cases, such as ecology and the use of ecosystem services, it appears that it is renewing old tenets that failed to make it into the classic literature of architecture and urbanism because they were created by indigenous and unknown architects. In this light, Iranian vernacular architecture and urbanism pay attention to organic flows and the production of natural resources, as well as how to consume them. Given that ecological-landscape thinking and Iranian architecture and urbanism overlap in many areas, we will analyze and compare these concepts below.

- Gradual development and evolution

Landscape urbanism is a “timeless” concept in which oldness and newness concepts fade, and the design process, as well as policy-making, becomes a real-time process in which the city’s elements must adjust themselves to the natural environmental systems regardless of time and place. As one of the ecological-landscape theorists, Weller also stresses this characteristic of landscape that deals with dynamic materials and processes (Waldheim, 2012, 75). From this viewpoint, design styles and movements

lose their status, and organic development consistent with urban ecological requirements is taken into account; the significant point regarding ecological-landscape designers is that they welcome long-run changes in their designs in the sense that they see it as “seeding”. This seeding allows the region of interest to develop organically (Steiner, 2014, 308) as if ecological-landscape urbanism challenges the conventional methods derived from modernism in proposing the maps designed in a short time and all at once. This characteristic has a strong image in Iranian architecture. Due to Iranian architecture being mixed with “meaning”, a phenomenon that cannot be received or recognized at once, (Falamaki, 2015, 27-35) its formation process often occurs throughout time, and as the architects’ understanding of the building and the area develop. For instance, according to Professor Eugenio Galdieri, the Ali Qapu structure was formed in five stages and spanned 70-100 years (Pirnia, 2005, 303-307). Additionally, the Jame’s Mosque of Isfahan, which is the product of a few hundred years of development, is one of the various methods of Iranian architecture (Pirnia, 2005, 178-187).

- Fusion with nature

Ecological-landscape development considers making

Table 1. Comparison of ecological-landscape development with conventional urbanism. Source: Authors.

	Conventional Urbanism	Ecological-Landscape Development
Human and environment relationship	Human dominates the environment	Human complies with the environment.
Ecology	Leaning to shallow ecology	Leaning to deep ecology
Architecture	Architecture as the building block of the city	Architecture as the urban element to be placed in the core of the landscape
Building a city	Based on geometric architecture and network	Based on environmental characteristics and morphology
Nature	Nature is equal to designing elements	Nature as the base of city formation
Network of ways and accessibility	Based on the geometry of design	Compliant with the environment
Design	Presenting the designs and suggestions at a certain time.	Gradual and step-by-step in the long run
Infrastructure	Product of technology and hidden in the core of the city.	Green infrastructure in coordination and compliance with the natural environment. Infrastructure as the element
Energy	Mostly focusing on technological methods of using renewable energy	Using passive methods to reduce the building's consumed energy
Destroyed natural organs or in the process of being destroyed	No program	Attempts at reviving them
City landscape	Mostly focusing on the architectural element in designing urban landscape	Developing natural organs in the urban landscape and eco-revelatory design
City garbage	Minimizing the production of garbage using biomaterial	Focusing on novel methods of collecting and disposing of garbage

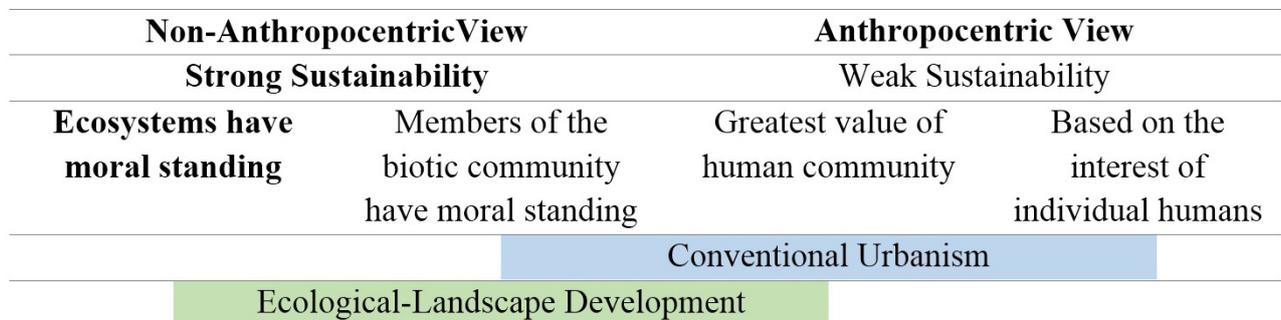


Fig. 6. Comparison of the philosophical view of ecological-landscape development with conventional urbanism. Source: Based on the categorization of Benson & Roe, 2007.

the line between architecture and nature fade, one of its basic values. The idea that originated from green modern architects like Frank Lloyd Wright has also remained for ecological-landscape development as one of its objectives is bringing landscape into the building and presenting its ecosystem services to the residents of the buildings and neighborhoods (Mostafavi, 2015). As Bernard Tschumi states regarding parc de la Villette (as one of the first examples of landscape urbanism), the base of the formation of this park is in contrast to the 19th-century saying by Olmsted “no signs of a city are expected to be found in a park.” Nonetheless, what we witness is a social-cultural park (Turner, 2014, 12). Hence, there will be no

duality and boundary between landscape elements and the rough urban fabric. This phenomenon’s manifestation can be seen in numerous Iranian architectural spaces such as iwans, columned halls, and ravages. For instance, the Hasht Behesht Palace is open to the garden from four sides and the core of the palace can be seen from the outdoors, which is more emphasized through the water (Fig. 7). In indoor spaces, where using water and plants was not practically and functionally possible, this mentality was brought to the indoors using carpets and ornaments (Fig. 8). It is noteworthy that in traditional cities, the green space was generally seen mixed with architecture in the form of a central courtyard. On the one hand, this leads

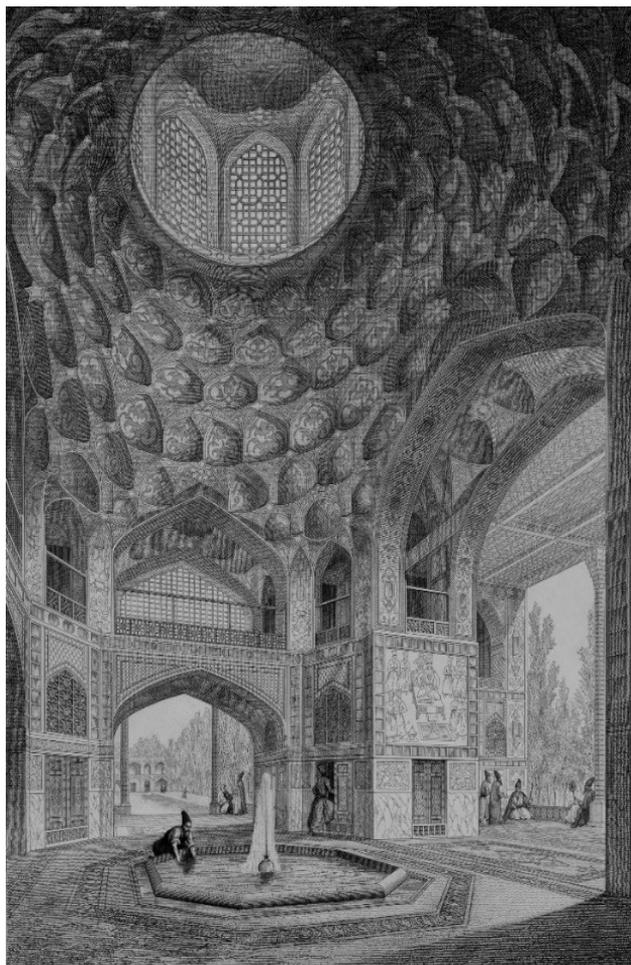


Fig. 7. Hasht Behesht Palace by Pascal Coste, 1870.
Source: www.wikimedia.org



Fig.8. 19th century carpet with a tree pattern, woven in Kerman.
Source: persiancarpetassociation.com

to green space development in the city in a balanced way (Shieh, 2000, 212). On a larger scale, Iranian cities adapt to the environment in such a way as if they are the natural environment too (Shieh, 2000, 4).

- Integrity in structure and meaning

Integrity can be interpreted as the coordination of components and parts at various scales. Falamaki mentions unity in architecture as integrity in outdoor, in-between, and indoor spaces, as well as its spiritual and mental integrity (Falamaki, 2015, 35-44). Iranian architecture has an integrated and multi-scale view. The manifestations of Iranian architecture, from the smallest components such as a window and door to mesoscale spaces such as a bazaar or square, can be seen in a way that there is full integrity between Iranian architecture and urbanism (Fig. 9). Given that ecological-landscape development is a multi-scale phenomenon, it encompasses a large range of solutions spanning from policy-making to suggesting construction materials. Since conventional urbanism inevitably admits architectural parts as a pre-determined factor, landscape urbanism solves this problem by intervening at small architectural and neighborhood

scales (Mostafavi, 2015). Ecological-landscape theorists seek to introduce this viewpoint as a connector of the built environment at various scales, which can be considered as the essence of Iranian architecture that is the connecting part between various scales. According to Falamaki, in Iranian architecture, there are agreements in selecting, combining, and making architectural components efficient that speak of their integrity (Falamaki, 2015, 141). The systematic approach to ecological-landscape development can also be seen through urban ecology, which is basic knowledge in this domain (Dabiri & Masnavi, 2016; Makhzoomi, 2016; Mansouri, 2016). Urban ecology focuses on almost all the urban elements on various scales including streets, walls, greenery, sewer network, industrial sites, etc (Forman, 2014, 3).

- Flexibility and organic growth

In Iranian ecological urbanism, the growth of cities is generally based on access to water sources or being sheltered from rough climates. Hence, development based on a map and through an arranged geometric structure can rarely be seen. In response, growth consistent with contextual characteristics to maximize the use of

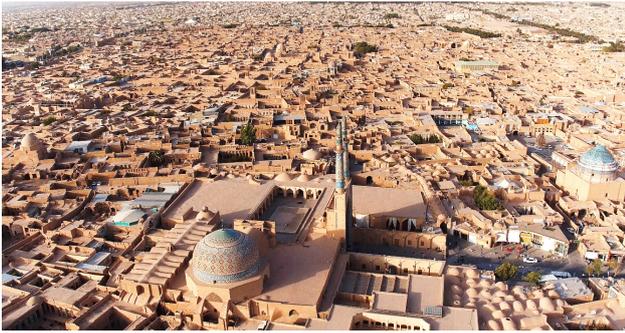


Fig. 9. An Image of the old texture of Yazd.
Source: <https://whc.unesco.org/en/documents/158104>

environmental capabilities will occur (Fig. 10). In many cases, the width and the form of the pavements' paths were designed to take advantage of the power of ventilation, as well as shading or sheltering from the wind (Shieh, 2000). Given the myriad problems caused by absolute reliance on modern designed maps, it seems what today's architecture and urbanism require is to look at designing not as permanent and fixed solutions but instead as an ongoing process and in compliance with changes in the setting (Steiner, 2014, 310). One idea that is fully consistent with the ecological-landscape movement is that of Waldheim when he considers landscape as a tool that functions based on the contemporary city's circumstance in the discourse of uncertainty and changes. Further, quoting Stan Allen, he states landscape is not simply a formation model for today's urbanism but rather a model for the process (Waldheim, 2002, 14). With this assumption, considering some of the spaces as flexible and adaptable to conditions can also be practically interesting in tackling unpredictable factors (Thompson, 2012). Accordingly, landscape urbanism does not introduce a fixed set of rules but rather promotes flexible principles that can adapt to the circumstances of different points (Mostafavi, 2010, 10). According to Rem Koolhaas, one of the claimants to ecological-landscape urbanism, regarding the formation philosophy of parc de la Villette, it can be said with certainty that this plan will undergo many changes along the park's lifetime. The park will be in an ever-changing process, which confirms the uncertainty principle in the design of the park. Further, it allows any change and modification without endangering its initial formation theories (Waldheim, 2002, 14).

- Ecological approach

Ecological design is a way to integrate human objectives with flows, patterns, and natural cycles. This process starts with a deep understanding of the design problem's ecological context and develops solutions that are consistent with the cultural context (Van der Ryn & Cowan, 2013, 40) Iranian architecture and urbanism derive from ecological knowledge that combines physical elements in

an organized manner (Falamaki, 2015, 69) to manifest from location to construction of components such as tables-band. For instance, at the location where a city is built, they would pay attention to characteristics such as not being a flood area, solid ground, and earthquake resistance (Pirnia, 2004, 1). One of its manifestations is using vernacular materials in which case the building operation would be faster. Additionally, architecture and nature will be compatible and materials will be accessible during renovations (ibid., 31). In Sharestan neighborhood, Yazd, there was a 2-meter layer of clay on the solid ground, which would be dug up and later used for the building" (Pirnia, 2013, 1). Moreover, elements such as Panam (monument insulation), two-layered roof coating, or solutions such as the building's positioning to be more consistent with the ecology and climate, were used (ibid., 154-158). The vegetation used in these cities was also based on the climate and water shortage adaptation, as well as local, and often fruitful (Shieh, 2000, 212). On the other hand, ecological-landscape theorists present a dynamic and flexible framework, which would create a balance between sustainable usage of natural resources, environmental health, and economic-social welfare (Makhzoumi, 2015, 55). From 2005 and following the report on Millennium Ecosystem Assessment, ecosystem services took on a central role in the ecological-landscape urbanism discourse. Ecosystem services point out advantages that humans receive from nature, which have not been valued in the traditional economic system until recently (Steiner, 2014, 304). and one of its modern areas is green infrastructure (Khansefid, 2016). Steiner believes the goal behind ecological-landscape thinking is to provide neighborhoods and cities with ecosystem services (Steiner, 2011, 336). In this light, sunken courtyards and wind towers could be introduced as adequate examples of using ecosystem services (Figs. 11 & 12), which play a role in providing thermal comfort through the local potentials of urban ecosystems. Sunken courtyards also give access



Fig. 10. Aerial photo of the old city of Gerash in 1965 and its organic structure. Source: Document Centre of Iran National Cartographic Center.



Fig. 11. The sunken courtyard of Abbasian Historical House.
Source: commons.wikimedia.org



Fig. 12. The wind tower of Aghazadeh Historical House.
Source: Aga Khan Documentation at MIT.

to the qanat water. Furthermore, its surrounding area is more resilient to earthquakes due to ground support and it is cooler during summers while warmer during winters (Ghobadian, 1994).

- Encyclopedia knowledge

In Iranian architecture, the creator of the architectural work is also against the modern idea of limiting each person to one expert, and the architect is generally informed on a wide variety of knowledge from structure to studying the grounds. Likewise, this discrimination does

not exist in Iranian vernacular architecture. Regarding this and the necessity of acquiring sciences relevant to each profession, in *The Nasirean Ethics*, Nasir al-Din al-Tusi states: "In any science, one must be eager to acquire what belongs to that science from science communities and etiquettes. For instance, as one learns writing, they must also dedicate their time learning tajwid (orthoepy), tehzeeb (refinement of speech), and preservation of messages, speech, and such. Failure to acquire art is of the most outrageous and depraved characteristics" (Tusi, 1991, 188). By mentioning landscape as a common area, ecological-landscape development seeks to make architectural professions, landscape architecture, design, and urban planning consistent, as well as diminish distinct professional boundaries. As Mostafavi believes, in ecological urbanism, the design of cities and neighborhoods is not exclusive to one particular profession but rather is a set of measures and different experiences. (Mostafavi, 2010, 5; 2015). Waldheim also believes that the landscape view seeks to integrate domains such as architecture, landscape architecture, and civil engineering for the construction of public spaces (Waldheim, 2012, 181). The urban ecological view, which is based on ecological-landscape development, stresses that the urban ecosystem could be acknowledged through characteristics such as complexity, variety, and fusion. Therefore, the best way to study them is through the interdisciplinary approach (Steiner, 2011, 336).

- Connection to politics and governance

Nature makes up a significant part of our political identity in the 21st century (Peet, Watts, & Watts, 2004, 4). Urban ecology is also related to the urban policy as relevant policies are followed in promoting urban sustainability (Endlicher et al., n.d., 13). Enhancing living conditions in urban regions requires individual and social awareness of the problems that are, in turn, related to urban policies. Therefore, ecological-landscape development seeks to carry out the changes of its interest by impacting the political and governing structures rather than relying on merely architects and urban planners. This is not taken seriously by modern architecture and urbanism and modern theorists seldom pay attention to building a corresponding relationship with the political structure and the governing system. Additionally, we have witnessed the significant influence of political systems governing the making of cities in Iran, and in many cases, political officials such as Nasir al-Din al-Tusi would appear as architects and city planners. Ancient Iranian cities also had spaces coordinated with the social-administrative system that covered them and used connections, relationships, and hierarchies that reflected them (Kiani, 1987, 1). Mostafavi also believes that the concept of Guattari from Ecological Ethics is a political concept committed to confronting Capitalism (Mostafavi,

2010, 12). From this angle, ecological-landscape views can be considered consistent with the theory of political ecology. Political ecology thinking analyzes the impact of human actions and social policies on nature (Miles, 2007; Peet et al., 2004). Accordingly, one of the significant challenges of ecological urbanism is determining the governing conditions under which an integrated planning model can be achieved (Mostafavi, 2010, 7).

Discussion

The ecological-landscape development is the outcome of the synergy between the two landscape urbanism and ecological urbanism movements, which were formed following the historical course of urban men's interest in connecting with nature. Its roots back to environmental movements of architecture and urbanism in the last century such as parks and playgrounds, garden cities, environmental planning, and naturalist modernism. As a new domain supported by science, the ecological-landscape movement has introduced various capabilities in facing built environment problems in different scales of time and place by relying on concepts such as ecosystem services, landscape ecology, and urban ecology. In particular, having the ecosystem view and the integrated approach to the environment as the base, we can consider it an efficient framework for confronting sustainability problems. Solutions by this movement to tackle the challenges of contemporary cities stems from the view of this school in redefining the relationship between humans and the environment, which roots in environmental ethics philosophy. Accordingly, the role of humans is defined by nature and as a part of it, and the elements of nature are taken into consideration based on their intrinsic values rather than instrumental. Ecological-landscape development presents a novel method and view in the human-built environmental design discourse through approaches such as systematic and holistic view, uncertainty in design and organic development, multi-scalar function, connection with politics, and reinforcement of ecosystem services. In other words, by impacting architecture and its connection to the context, it modifies the construction and fabric of the built environment throughout time. On this course, it bases its hierarchy of values on the knowledge of the urban ecology, which defines the position of humans in it in association with their surrounding environment and provides the chance to adapt to the natural forces and movements. A process similar to this can also be witnessed in Iranian architecture and urbanism.

Conclusion

In numerous cases, the ecological-landscape school diverges from the modern worldview and tenets of architecture and urbanism so that some consider it postmodernism or post-postmodernism. In this course, ecological-landscape

development as a mature form of the ecological-landscape urbanism finds some common ground with Eastern schools and worldviews including Iranian architecture and urbanism. This matter becomes significant when we recognize that Iranian architecture and urbanism have failed to establish a constructive connection with modern architecture in recent decades as it has not found any common grounds. We are witnessing the discontinuity of its evolution during the contemporary era. Nonetheless, regarding the ecological-landscape school, there are significant commonalities with Iranian architecture and planning. Organic and free-of-physical-determination growth of the master plans is of great significance in both movements. Further, neither movement reflects the rules that have derived from the modern worldview's rigid geometric structures. This matter, especially in the strategic motto of the ecological-landscape development "landscape as the building block of a city", does not go unnoticed in which the built environment is formed based on landscape and context necessities rather than geometric network requirements. In addition, these two movements are mutual in their problem-oriented views on development, which go side by side with a deep understanding of the area and ecology. Therefore, throughout time and based on the needs originating from the built environment and considering the hidden and obvious natural flows, seeks to organize the neighborhood and city fabric, as well as establish necessary relationships in the urban ecosystem. As a result, since one of the biggest challenges of present Iranian architecture and urbanism is the discontinuation of past tenets and values in the structure of the cities, it may be possible to view ecological-landscape development as a new solution given its numerous commonalities. Considering the massive scientific support, this can not only respond to the necessities of modern life but also become a stimulant for the continuation and evolution of Iranian architecture and urbanism in the core of Iran's current cities. This research acknowledged and explained seven common features between the ecological-landscape development and Iranian architecture and urbanism as follows: 1- Gradual development and evolution, 2- Fusion with nature, 3- Integrity and unity, 4- ecological approach, 5- encyclopedic knowledge, 6- flexibility and organic growth, and 7- connectivity with politics. (Fig. 15) This domain also has great potential for development and complementary studies in regulation adaptation, and assessment systems development. In addition, due to the academic origin and obscure language, the ecological-landscape school has rarely had the chance to appear in the professional world. With its flexible and process-oriented structure, by having some changes throughout time and complying with ground conditions, the ecological-landscape school also has great potential in professional projects, as it is interesting in terms of implementation.

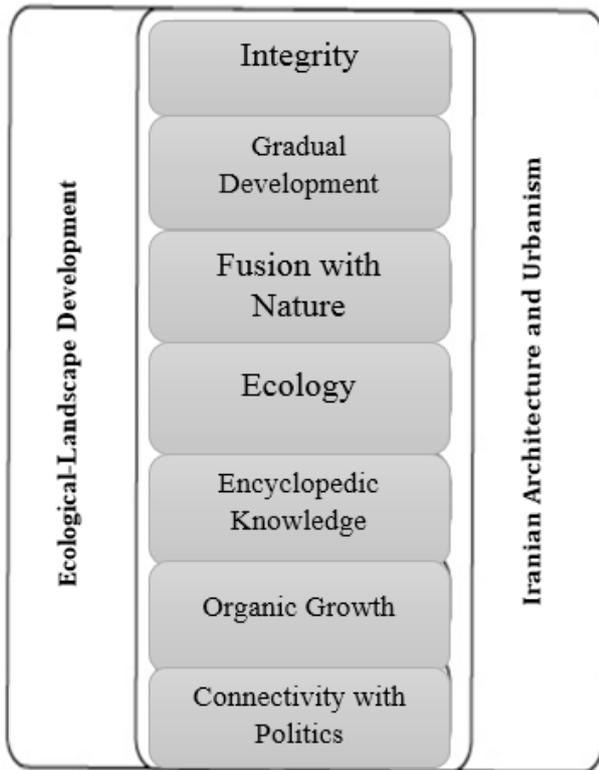


Fig. 13. Common features between the ecological-landscape development and Iranian architecture and urbanism. Source: Authors.

Endnote

* This article extracted from Ph.D. thesis of first author entitled "Environmental Sustainability Assessment Framework for Tehran's Neighborhoods" that under supervision of Dr. Mansoureh Tahbaz and Dr. Niloufar Razavi and in consultation of Dr. Sahar Nedaei Tousi has been done at Shahid Beheshti University, Faculty of Architecture and Urbanism, Tehran, Iran in 2022.

1. By conventional urbanism, this paper means the dominant type of urbanism during the contemporary era derived from the modern worldview.

2. The landscape is an interconnected and dynamic set consisting of inanimate nature including geographical lands such as mountains, and animate natural elements such as plants, animals, and humans, which are in a relationship with each other and influence each other.

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