

A Cross-Scale Rereading of the Linkage between House-Garden and Garden-City in the Historic Urban Fabric of Urmia: A Mixed-Methods Approach to Reconciling Vernacular Architecture and Urban Planning

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Date of submission: 2026/06/26

Revision: 2026/09/13

Acceptance: 2026/09/15

Detailed abstract

Introduction

The historical cities of Iran represent a profound legacy of complex interactions between human habitation, natural elements, and built structures that evolved over centuries. Among these, the Persian garden (Bagh-e Irani) stands as a persistent archetype not merely as a space for contemplation and tranquility, but as a fundamental element shaping the physical fabric and urban landscape of traditional Iranian cities. Three interconnected factors water, vegetation, and architectural units have historically constituted the structural framework of Iran's traditional urban centers, with the Persian garden serving as the connective tissue linking these elements into what is known as the "Sharbagh" or Persian garden-city model.

In this paradigm, green corridors aligned with water channels formed the city's structural backbone, with gardens and agricultural lands embracing urban neighborhoods. House-gardens functioned as green urban seeds, simultaneously fulfilling residential and productive needs while creating favorable microclimates for inhabitants. These units were interconnected through garden-alleys, forming continuous chains of green spaces within the urban context. Urmia, historically designated as "Dar al-Neshat" (Abode of Joy) during the Qajar period, exemplifies a city where this integrated relationship remains traceable. Its historical fabric contains significant architectural landmarks, including the Sardar Mosque, the Grand Mosque, the historical bazaar, and a collection of valuable house-gardens featuring rectangular buildings centered within courtyards surrounded by extensive gardens. Despite several of these being registered as national heritage sites, they currently face serious challenges regarding the continuity of garden-city identity.

The historical disconnection between vernacular architecture and contemporary urban planning constitutes a primary factor in this identity crisis. While architectural patterns at the house-garden scale have largely persisted, urban planning systems have failed to recognize and sustain these patterns at a macro level. This gap not only endangers Urmia's garden-city identity but also eliminates the potential to leverage valuable vernacular architectural capacities for urban landscape enhancement. Previous research predominantly focused on the internal structure of house-gardens, with less attention paid to their connection patterns with urban fabric and their role in forming the garden-city model. Consequently, the necessity of re-examining the link between these two scales and developing an integrated approach for unifying vernacular architecture and urban planning emerges as a fundamental issue in revitalizing Urmia's garden-city identity.

The present study addresses the core question: How can connection patterns between house-garden and garden-city be re-interpreted in Urmia's historical fabric, and what approach can be proposed for

integrating vernacular architecture and urban planning? The research hypothesis posits that recognizing and reviving the spatial-physical patterns of house-gardens, along with redesigning access systems and circulation networks based on these patterns, can reduce the gap between vernacular architecture and urban planning, thereby revitalizing Urmia's garden-city identity.

Methodology

This research adopts an applied-developmental purpose with a mixed-methods (qualitative-quantitative) design, employing descriptive-analytical and historical-interpretive approaches. The investigation focuses on spatial-physical structures, access systems, visual axes, spatial hierarchies, and building placement patterns in relation to urban fabric. The research proceeded through four integrated stages.

In the first stage, systematic literature review and analysis of previous research on Persian gardens, house-gardens, and garden-cities established the theoretical foundations and research background. Semi-structured interviews were conducted with 15 experts, including landscape architecture professors (4 individuals), cultural heritage managers (3 individuals), municipal experts (4 individuals), and native architects (4 individuals), selected through purposive and snowball sampling. Each interview lasted approximately 45 to 60 minutes, following an interview guide covering spatial structure, connection patterns with urban fabric, garden-city identity, and factors affecting integration.

The second stage involved qualitative data analysis from library sources and interviews using qualitative content analysis with open, axial, and selective coding. The coding process was conducted manually using an inductive approach. Following transcription and repeated readings of interview texts, 54 open codes were extracted and aggregated into 12 axial categories, ultimately organized into 4 selective categories. To enhance coding accuracy and reliability, two researchers independently performed the coding process, with inter-coder agreement confirmed using Scott's coefficient (exceeding 80%). Connection patterns between house-garden and garden-city were classified at two levels: micro-level (spatial structure, physical patterns, geometric system, and spatial hierarchy of house-gardens) and macro-level (placement system, circulation network, urban axes, and urban landscape structure). Triangulation (combining three data sources: library sources, field evidence, and expert opinions) was employed to validate qualitative findings.

In the third stage, based on extracted categories, a researcher-developed questionnaire using a 5-point Likert scale (1=strongly disagree to 5=strongly agree) was designed. Following content and face validity confirmation by 5 experts, the questionnaire was administered to 80 target participants (including experts, urban managers, and historical fabric residents) using simple random sampling. Questionnaire reliability was confirmed through Cronbach's alpha coefficient (0.87).

The fourth stage involved quantitative data analysis using descriptive statistics (mean, standard deviation, frequency distribution) and inferential statistics (Pearson correlation and second-order confirmatory factor analysis) through SPSS and AMOS software. Finally, integrating qualitative and quantitative findings, and drawing on urban landscape and Persian garden-city theories, a framework for integrating vernacular architecture and urban planning in Urmia's historical fabric was developed.

Findings

Qualitative content analysis and open, axial, and selective coding yielded 54 open codes organized into 12 axial categories and 4 selective categories. The selective category "Spatial-Physical Structure of House-Garden" received the highest frequency with 115 references (35% of total codes), indicating its fundamental importance in linking house-garden and garden-city. "Garden-City Identity" followed with

85 references (26%), "Connection Pattern with Urban Fabric" with 73 references (22%), and "Integration of Architecture and Urban Planning" with 63 references (19%), the latter indicating this dimension's neglect in previous research.

Quantitative analysis revealed that the spatial-physical structure of house-gardens remains largely intact (mean=4.2), while integration of vernacular architecture and urban planning (mean=2.5) and garden-city identity continuity (mean=2.8) remain critically low. This significant gap between micro-level (house-garden) and macro-level (urban planning) indicates the historical disconnection between vernacular architecture and contemporary planning systems in Urmia.

Pearson correlation analysis demonstrated the strongest correlation between garden-city identity and integration ($r=0.67$), indicating that garden-city identity revival is unattainable without integration between vernacular architecture and urban planning. A relatively strong correlation between connection pattern with urban fabric and garden-city identity ($r=0.63$) suggests that the connection pattern of house-gardens to urban fabric plays a key role in maintaining garden-city identity continuity. The weakest correlation was observed between house-garden spatial structure and integration ($r=0.35$), indicating that merely preserving house-garden spatial structures without attention to urban dimensions cannot lead to desirable integration.

Second-order confirmatory factor analysis revealed that garden-city identity had the highest factor loading on integration ($\beta=0.71$), followed by connection pattern with urban fabric ($\beta=0.58$), and spatial-physical structure ($\beta=0.42$). All paths were significant at $p<0.001$, confirming the structural model's good fit.

Discussion

The findings reveal a profound disconnection between architectural and urban planning scales in Urmia's historical fabric a gap that not only endangers the city's garden-city identity but also eliminates the potential to leverage valuable vernacular architectural capacities within contemporary planning systems. What distinguishes this research from previous studies is its cross-scale approach, which for the first time employs a mixed-methods design to analyze and model the gap between house-garden (micro-scale) and garden-city (macro-scale) within the theoretical framework of Sharbagh and multifunctional landscape.

While most previous research (Pirnia, 2008; Shahcheraghi, 2015; Heydarnetaj, 2014) focused on the internal structure of Persian gardens, the present findings demonstrate that exclusive focus on internal physical fabric, without attention to connection patterns with urban fabric, cannot lead to desirable integration ($r=0.35$). This finding highlights the necessity of moving beyond single-scale perspectives toward a systemic approach to urban landscape.

The strongest correlation between garden-city identity and integration ($r=0.67$) and the highest factor loading of garden-city identity on integration ($\beta=0.71$) reveal the fundamental reality that garden-city identity revival is impossible without accepting and perpetuating vernacular architectural patterns within urban planning systems. In other words, garden-city identity is not merely a historical-cultural category but a driving force that can orient integration mechanisms. This finding aligns theoretically with Farshchian's (2025) emphasis on the role of third places in recreating urban landscape quality, and with Barati et al.'s (2025) approach to applying garden patterns in contemporary green spaces, with the distinction that the present study validates this synergy through a quantitative structural model emphasizing the connection between architectural and urban planning scales.

The relatively strong correlation between connection pattern with urban fabric and garden-city identity ($r=0.63$) indicates that circulation networks, garden-alleys, and peripheral green belts play key roles in maintaining urban landscape continuity. This finding is fully consistent with the Sharbagh concept (Sheibani & Esmaeildokht, 2015) emphasizing green corridors aligned with water channels, suggesting that access network redesign based on historical waterway and garden-alley patterns could be the missing link connecting house-garden and garden-city.

Furthermore, the findings affirm the flexibility of the Persian garden pattern (Fatemi, 2022) and its high capacity for adaptation to contemporary needs. This flexibility, combined with the multifunctional landscape approach (Farzin et al., 2020) that recognizes Persian gardens not merely as recreational-residential spaces but as areas with productive, cultural, regulatory, and habitat functions, can offer an effective model for moving beyond single-functional approaches in contemporary urban green space design.

Conclusion

This research, aimed at re-examining the link between house-garden as an architectural unit and garden-city as an urban planning paradigm in Urmia's historical fabric, and developing an integrated approach, clearly demonstrates that although house-garden spatial-physical structures remain largely intact (mean=4.2), this pattern has not been reflected at the urban scale in contemporary planning systems, creating a deep gap between micro and macro levels. The lowest scores for integration of vernacular architecture and urban planning (mean=2.5) and garden-city identity continuity (mean=2.8) indicate historical disconnection and neglect of Sharbagh pattern capacities in today's urban management.

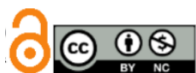
Pearson correlation results revealed the strongest relationship between garden-city identity and integration ($r=0.67$), meaning that garden-city identity revival is directly dependent on the planning system's ability to accept and perpetuate vernacular architectural patterns. The relatively strong correlation between connection pattern with urban fabric and garden-city identity ($r=0.63$) confirms that circulation networks, garden-alleys, and peripheral green belts play key roles in maintaining urban landscape continuity. Conversely, the weakest correlation between house-garden spatial structure and integration ($r=0.35$) indicates that exclusive focus on internal physical fabric without attention to urban fabric connection cannot lead to desirable integration. Second-order confirmatory factor analysis revealed that garden-city identity has the strongest impact on integration ($\beta=0.71$), followed by connection pattern with urban fabric ($\beta=0.58$) and spatial-physical structure ($\beta=0.42$).

The research also demonstrated that Persian gardens, contrary to common perception, have been flexible patterns that transformed throughout history based on material, functional, and semantic requirements. This characteristic offers high capacity for adapting house-garden and garden-city patterns to contemporary needs, including mixed-use functions, sustainable tourism, and green urban management. The multifunctional landscape of Persian gardens, encompassing productive, cultural, regulatory, and habitat functions, can provide an effective model for moving beyond single-functional approaches in contemporary urban green space design.

The response to the main research question—how to re-interpret house-garden and garden-city connection patterns in Urmia—can be articulated through a three-layered approach: (1) recognition of geometric system and spatial hierarchy of house-gardens and documentation of their placement patterns; (2) redesign of access networks and visual axes based on historical water channels and garden-alleys; and (3) formulation of overarching integration regulations that can institutionalize vernacular architectural values in urban development plans and historical fabric preservation. This approach not

only fills the theoretical gap in the Persian garden-city field but also offers a replicable model for other Iranian historical cities facing similar disconnection challenges between vernacular architecture and urban planning.

Keywords: House-garden, Garden-city, Historic fabric of Urmia, Integration of architecture and urban planning, Urban landscape identity



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