

From Courtyard to Corridor: The Transformation of Iranian Residential Circulation Features (Case Study: Zand, Qajar, and Pahlavi Periods)

¹Erfan Shadravan, ^{2*}Sara Dashtgard

¹Faculty of Civil Engineering, Architecture, and Art, Islamic Azad University, Science and Research Branch, Tehran, Iran.

^{2*}Faculty of Architecture, Islamic Azad University, Hashtgerd Branch, Hashtgerd, Iran.

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ABSTRACT: This paper conducts a comparative analysis of residential floor plans from three pivotal periods in Iranian history: the Zand (1751–1794 CE), Qajar (1789–1925 CE), and Pahlavi (1925–1979 CE) eras. By examining prominent residential buildings from each period, the study investigates the transformation of circulation features, namely courtyards, iwans, corridors, and vestibules (hashtis). Findings reveal a progressive reduction in courtyard centrality and hierarchical access systems during the Zand and Qajar eras, shifting toward linear, corridor-based, and Western-influenced layouts in the Pahlavi period. This change decreased reliance on introverted, multi-courtyard configurations for privacy and climate control, favoring open-plan structures with direct entrances and reduced spatial segregation. This evolution reflects changing approaches to spatial organization, privacy, and formal access in response to modernization and shifting cultural paradigms. The study contributes to understanding the dynamic interplay between architecture and historical context in Iran, highlighting the significance of residential spaces as cultural artifacts. Through a focused architectural lens, this analysis provides insight into the broader historical shifts embedded in built environments.

Keywords: : Iranian Architecture, Residential Floor Plans, Zand Period, Qajar Period, Pahlavi Period, Residential Circulation, Spatial Organization.

INTRODUCTION

Iran is located in the Middle East, characterized by diverse climates. The historical architecture reflects adaptations to these climates, utilizing techniques such as Shenasil, Taremi, and Wind towers to effectively adapt to local environmental conditions (Najafabadi et al., 2006).

The Zand, Qajar, and Pahlavi eras represent critical phases in the evolution of Iranian architecture, each marked by distinctive styles and significant socio-political influences. Spanning from the mid-18th century to the late 20th century, these periods not only reflect the artistic and architectural trends of their time but also embody the broader cultural and historical narratives of Iran, including responses to modernization, foreign influence, and the formation of national identity. The Zand era (1750-1794) is recognized for its elegant simplicity and the integration of traditional Persian motifs with emerging

styles, laying the foundation for an aesthetic that influenced subsequent architectural practices. Key characteristics of this period include harmonious proportions and intricate tile work, which established a unique architectural language that would resonate through the following Qajar and Pahlavi periods (Hajikarimian, 2015; Islami et al., 2016). In contrast, the Qajar period (1789-1925) is characterized by a dynamic interplay between tradition and Western influence, resulting in a distinctive eclectic architectural style. This era saw the introduction of expansive courtyards and lavish decorations in structures such as palaces and mosques, reflecting a burgeoning national identity that sought to synthesize local heritage with modern elements (Chamanara & Abbasi, 2015; Neyestani et al., 2022). This cultural amalgamation was both celebrated and contested, as it prompted debates on the essence of Iranian identity in the face of globalization and foreign dominance (Sharifi & Morid, 2020). The Pahlavi era (1925-

*Corresponding Author Email: Sara.dashtgard@iau.ac.ir ORCID: 0000-0003-1728-0419

1979) marked a vigorous embrace of modernism, leading to substantial architectural innovation and urban transformation. The primary reason for the fundamental changes and simplification of residential house plans during the Pahlavi era was the influence of modernity and the reforms initiated by Reza Shah, the ruling monarch of Iran at the time (Rastegar et al., 2020). This period emphasized functionality and the use of industrial materials, fostering a modern architectural landscape that sought to express the aspirations of a newly defined nation-state. However, this rapid modernization also led to chaotic urban development and significant controversies surrounding cultural preservation and identity as the relationship between modernity and tradition became increasingly complex and contentious (Chamanara & Abbasi, 2015; Khatami & Boujari, 2022; Yekta, 2015).

Some of the key terms used in this study include circulation elements/features, privacy, hierarchy, and spatial transition. Circulation features encompass horizontal circulation, vertical circulation, entrances and exits, and nodes and junctions. Horizontal circulation refers to corridors, hallways, atria, walkways, and galleries designed to facilitate movement across a single floor or within a specific area. Vertical circulation includes stairs, elevators, escalators, ramps, and other means that enable movement between floors or levels. Entrances and exits comprise lobbies and other spaces that function as access points to and from the building's interior circulation network. Nodes and junctions represent points of spatial intersection, such as lobbies or atria, that organize and distribute movement throughout the building (Alagamy et al., 2019). In traditional Iranian architecture, privacy is defined as family privacy, emphasizing the importance of individual and family territories. Despite potential for personal spaces, individuality is often overshadowed by communal relationships, highlighting a cultural preference for collective over individual values (Valibeigi et al., 2022). In Iranian traditional architecture, hierarchy refers to the spatial organization that prioritizes privacy, particularly for family members, by structuring spaces to reflect social relationships and cultural values, ensuring a balance between public and private areas within the home (Hosseini Raviz et al., 2015). For spatial transition, this paper refers to the evolution of space arrangement over time. Architectural styles evolve, reflecting changes in societal values and technological advancements. Transitional spaces adapt to these shifts, maintaining relevance across different architectural movements (Atabeyoğlu & Ozturk, 2024).

The architectural characteristics of the Zand, Qajar, and Pahlavi eras can be understood through various analytical lenses that reflect both functional and cultural priorities. While these periods differ significantly in their socio-political contexts, they each produced architectural responses that can be compared and contrasted through recurring spatial and environmental strategies. Among the most relevant aspects to consider when

examining these residential typologies are layout and spatial organization, the use of courtyards and open spaces, the incorporation of natural elements, structural materials and construction methods, the influence of foreign architectural styles, privacy and security features, and adaptation to climatic conditions.

Layout and Spatial Organization

Zand Era: Zand residences, such as the Mohtasham and Kazamzadeh Houses, feature a central courtyard with rooms arranged symmetrically around it. This inward-focused layout prioritizes family privacy and communal activities with minimal external openings (Zarei, 2017).

Qajar Era: Qajar homes, like Narenjestan-e Qavam, exhibit more complex layouts with multiple courtyards and distinct public and private zones. Reception halls (talar) and ornate entrances reflect social status and European influences (Kakae & Moztaezadeh, 2021; Tahmasbifard, 2020). Moreover, a clear separation between the andaruni (family-only) and biruni (public area) is evident during the Qajar era (Zahrani & Tabaeian, 2016).

Pahlavi Era: Pahlavi residences, such as Shapouri House, adopt linear, open-plan layouts influenced by modernist principles. Courtyards are less central, with an emphasis on functional spaces and external visibility (Mohammadi, 2019).

Use of Courtyards and Open Spaces

Zand Era: Courtyards are the heart of Zand homes, facilitating social interactions and climate control. Arcades (riwaq) and water features enhance functionality and aesthetics (Zarei, 2017).

Qajar Era: Qajar courtyards are more decorative, often featuring tiled walls and formal gardens. Structures like Zinat ol Molk House incorporate terraces inspired by European designs (Danesh et al., 2021).

Pahlavi Era: Pahlavi homes prioritize open interiors and landscaped gardens, reducing the prominence of courtyards. Rashali House exemplifies this shift toward modernist outdoor spaces (Mohammadi, 2019).

Incorporation of Natural Elements

Zand Era: Zand architecture incorporates water pools, plants, and windcatchers (badgirs) for cooling and aesthetic appeal. Akbari House features shaded arcades to mitigate heat (Zarei, 2017).

Qajar Era: Qajar homes incorporate natural elements with ornate tilework and floral motifs, as exemplified by the Forough-al-molk House, striking a balance between function and decoration (Kakae & Moztaezadeh, 2021; Momeni et al., 2015).

Pahlavi Era: Pahlavi residences feature large windows and balconies for optimal light and ventilation, reflecting modernist

design priorities. Shapouri House exemplifies this approach (Mirinezhad, 2013).

Structural Materials and Building Techniques

Zand Era: Traditional materials, such as mud-brick, stone, and wood, dominate, with intricate plasterwork and decorative tiles. Construction relies on skilled craftsmanship (Zarei, 2017).

Qajar Era: Qajar architecture introduces glazed tiles, iron, and glass, influenced by European techniques. Narenjestan-e Qavam showcases this hybrid approach (Kakaee & Moztarzadeh, 2021).

Pahlavi Era: Pahlavi homes use concrete and steel for larger, more durable structures. Haft Rang tiles remain popular, often paired with minimalist designs (Mohammadi, 2019).

Influence of Foreign Architectural Styles

Zand Era: Zand architecture is predominantly traditional, drawing on pre-Islamic Persian forms like arches and domes (Zarei, 2017).

Qajar Era: Qajar residences blend Persian and European styles, incorporating neoclassical elements, such as columns, as seen in the Atrvash House (Kakaee & Moztarzadeh, 2021).

Pahlavi Era: Pahlavi architecture embraces Western modernism, with cubic forms and Bauhaus influences evident in Mohandesi House (Baghalian et al., 2024).

Privacy and Security Features

Zand Era: High walls and indirect entrances ensure privacy in Zand homes, as exemplified in the original design of the Oscrud Hotel (Zarei, 2017).

Qajar Era: Qajar homes maintained privacy with lattice screens and hierarchical layouts, but featured grand entrances for social display (Danesh et al., 2021; Mohammadi, 2019).

Pahlavi Era: Pahlavi residences prioritize openness, with larger windows that reduce traditional privacy measures, although some retain courtyards (Mohammadi, 2019).

Adaptation to Climatic Conditions

Zand Era: Zand homes are designed for Shiraz's hot climate, featuring thick walls, courtyards, and windcatchers, as seen in the original structure of the Darb-e Shazde Hotel (Zarei, 2017).

Qajar Era: Qajar architecture refines climatic adaptations with decorative elements, such as tiled courtyards in the Manteghi-nejhad House (Kakaee & Moztarzadeh, 2021).

Pahlavi Era: Pahlavi homes incorporate modern solutions, such as air conditioning, but retain traditional features, like shaded areas, as seen in the Rashali House (Mirinezhad, 2013). This paper aims to investigate the evolution of Iranian circulation features across residential buildings from each of the Zand, Qajar, and Pahlavi periods. The analysis focuses on three key elements, namely courtyards, entrances and corridors, and verandas or iwans, as historically significant

tools of spatial circulation in Iranian domestic architecture. The purpose is to examine whether these elements demonstrate any formal or functional transformation over time and how such changes may correspond with broader cultural developments and the historical progression of each era.

This paper aims to address the following research questions:

1. How have Iranian circulation features evolved throughout the Zand, Qajar, and Pahlavi periods in residential buildings?
2. What factors have influenced the transformation of Iranian circulation features across these periods, including cultural shifts, modernization, and European influence?
3. How does the transformation of architectural circulation features relate to the broader changes occurring across the Zand, Qajar, and Pahlavi periods?

Although several studies, including those discussed in this section, have addressed the architecture and spatial configuration of houses during the Zand, Qajar, and Pahlavi periods, no prior research has specifically focused on the evolution of circulation features in Iranian residential houses across these three eras. This research contributes to the understanding of Iranian architectural heritage by providing a focused analysis of Iranian circulation features, including courtyards, entrances, corridors, and verandas (or iwans), across three transformative historical periods. By tracing the evolution of these elements, the study provides insight into how architecture responded to changing cultural and spatial needs. Its findings are valuable for architectural historians, preservationists, and designers seeking to reinterpret traditional circulation logic within contemporary practice.

MATERIALS AND METHODS

This research adopts a qualitative comparative approach, focusing on the analysis of Iranian residential architecture across three historical periods: the Zand, Qajar, and Pahlavi eras. The study combines a literature review and an analysis of the existing architectural floor plans. These plans were examined visually and systematically to identify key spatial and formal characteristics of Iranian circulation elements, providing comparative insights into architectural transformations over time. The selection criteria for buildings are:

- Residential Use: Buildings must have served primarily as private residences.
- Historical Prominence: Structures must be well-documented and recognized as significant.
- Geographical Diversity: Selected buildings represent different parts of the country to ensure a broader regional scope and avoid focusing exclusively on a single city or province.
- Data Availability: Floor plans or detailed descriptions must be accessible.

All floor plans analyzed in this study were obtained from student projects that were made available for research purposes. Due to accessibility and preservation constraints, no site visits

were conducted, and it was also not possible to validate the plans through in-person documentation. This reliance on archival drawings introduces potential bias, as the availability, accuracy, and completeness of such documentation may vary. Acknowledging these limitations, the study has approached the comparative analysis with caution, focusing on recurring spatial and circulation patterns that remain discernible despite these constraints.

RESULTS AND DISCUSSION

The analysis of 16 residential buildings across the Zand, Qajar, and Pahlavi periods reveals a clear evolution in spatial structure, functional zoning, and circulation systems.

Zand Period Houses (Z1–Z4)

(Z1) – Behnam House

A two-story house with two courtyards and a modest, shallow veranda. The spatial organization is introverted, and the main entrance passes through a traditional hashti before accessing the central yard.

(Z2) – Mohtasham House

This single-story residence features a symmetrical layout centered around a central courtyard. A small veranda with two stone columns faces the yard, and entry occurs directly through the porch.

(Z3) – Saber House

This two-story building features one courtyard and a tall porch supported by columns. The L-shaped corridor defines its circulation, featuring a compact spatial layout that opens inward.

(Z4) – Ameriha House

A large residence with seven courtyards and multiple iwans serving various family sectors. Access begins at a vestibule leading to andaruni, supporting functional privacy zones.

Qajar Period Houses (Q1–Q6)

(Q1) – Tabatabaei ha House

A two-story house with four courtyards for different functional zones. Columned verandas surround the spaces, and movement occurs through a hashti and several internal corridors.

(Q2) – Borujerdi House

A house with one courtyard and a tall iwan supported by decorative columns. Entry is via a grand hashti, and the space reflects ceremonial and domestic uses.

(Q3) – Rasoulia House

This building features a single courtyard and an arcaded veranda. A covered corridor provides circulation, supporting separation between public and private parts of the home.

(Q4) – Amir Nezam Garousi House

A two-story mansion with dual courtyards and a large iwan featuring 16 columns. Circulation follows an L-shaped corridor, allowing access to rooms from both sides.

(Q5) – Abbassian House

A residential complex with two courtyards and a private veranda used by women. The house is accessed through a simple hashti with inward-oriented circulation patterns.

(Q6) – Forough al-Molk House

Includes two courtyards and a central indoor porch. The spatial flow involves a vestibule that leads to winding corridors and layered access throughout the plan.

Pahlavi Period Houses (P1–P6)

(P1) – Afshar House

This modern house features a central courtyard and a large, open porch. The entrance is made through a direct lobby that connects to the rest of the interior.

(P2) – Ahmad Shahi Pavilion

A royal garden residence featuring a classical veranda facing a landscaped court. A grand symmetrical vestibule on the axis frames the building's entrance.

(P3) – Teymourtash House

Includes one small courtyard and an open veranda with wide visual access. Entry circulation is linear and direct, typical of early Pahlavi residential planning.

(P4) – Sa'dabad Palace (Main)

This monumental structure contains a large garden forecourt and a Western-style porch. The main entrance leads to a central lobby that serves as the building's anchor.

(P5) – Savejbolaghi House

A two-story house with one courtyard and a covered veranda. Internal circulation follows a hallway entrance, dividing the plan into defined domestic zones.

(P6) – Laleh House

A compact residential design with one small courtyard and a modern-style veranda. Movement occurs through a straight internal corridor linking all parts efficiently.

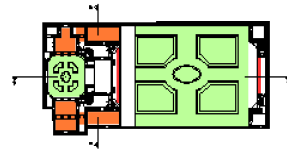
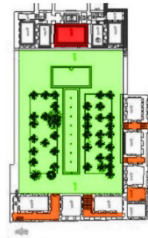
Across the three periods, the number of courtyards steadily decreases while circulation evolves from enclosed and centralized (Zand) to semi-linear and hierarchical (Qajar) to fully linear and extroverted (Pahlavi). The entrance logic remains mostly single-point access but shifts from ceremonial and layered toward direct and simplified paths. Spatial geometry loosens progressively, and privacy planning transitions from courtyard-based segregation to individual room positioning. These transformations collectively reflect deeper socio-cultural shifts, including the diminishing role of traditional family structures, new functional needs, and changes in urban land use. These findings are summarized in [Tables 1, 2, and 3](#).

One of the most notable findings is the consistent evolution of courtyard usage. Whereas Zand and early Qajar homes heavily relied on the courtyard as a spatial, social, and environmental core, Pahlavi residences either minimized or eliminated it. This shift represents more than a formal change; it reflects a broader transformation in values, from introverted, climate-

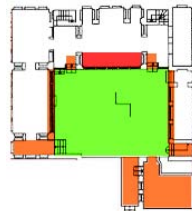
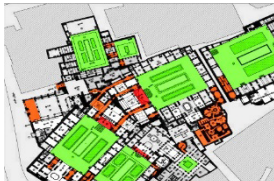

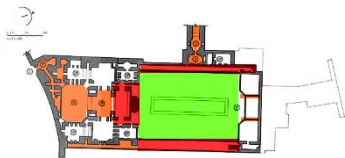
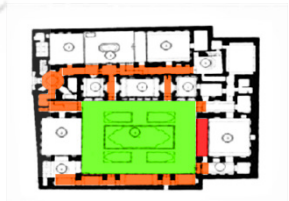

Table 1: Architectural Features of Sample Houses from the Zand, Qajar, and Pahlavi Periods

Code	House Name	Period	City	Approx. Date (Solar Hijri)	Courtyards	Verandas/Iwans	Corridors/Entrances
Z1	Behnam House	Zand	Tabriz	Approx. 1150 SH	2	Shallow veranda	Hashti leads to the courtyard
Z2	Mohtasham House	Zand	Shiraz	Approx. 1155 SH	1	Veranda with stone columns	Direct entrance from the porch
Z3	Saber House	Zand	Shiraz	Approx. 1160 SH	1	Tall porch with columns	L-shaped corridor
Z4	Ameriha House	Zand	Kashan	Approx. 1165 SH	7	Multiple iwans	Vestibule to andaruni
Q1	Tabatabaei ha House	Qajar	Kashan	Approx. 1259 SH	4	Columned verandas	Hashti and multiple corridors
Q2	Borujerdi House	Qajar	Kashan	Approx. 1236 SH	1	Tall Iwan with columns	Grand hashti
Q3	Rasoulia House	Qajar	Yazd	Approx. 1260 SH	1	Arcaded veranda	Covered corridor
Q4	Amir Nezam Garousi House	Qajar	Tabriz	Approx. 1250 SH	2	Iwan with 16 columns	L-shaped corridor
Q5	Abbassian House	Qajar	Kashan	Approx. 1178 SH	2	Veranda on the women's side	Simple vestibule (hashti)
Q6	Forough al-Molk House	Qajar	Shiraz	Approx. 1269 SH	2	Indoor porch	Vestibule with winding corridors
P1	Afshar House	Pahlavi	Tehran	Approx. 1355 SH	1	Open porch	Lobby entrance
P2	Ahmad Shahi Pavilion	Pahlavi	Tehran	Approx. 1300 SH	Garden	Classical veranda	Grand symmetrical vestibule
P3	Teymourtash House	Pahlavi	Tehran	Approx. 1313 SH	1	Open veranda	Linear entrance corridor
P4	Sa'dabad Palace ((Main	Pahlavi	Tehran	Approx. 1320 SH	Garden	Western-style porch	Central lobby entrance
P5	Savejbolaghi House	Pahlavi	Tabriz	Approx. 1300 SH	1	Covered veranda	Hallway entrance
P6	Laleh House	Pahlavi	Tabriz	Approx. 1320 SH	1	Modern-style veranda	Direct internal corridor

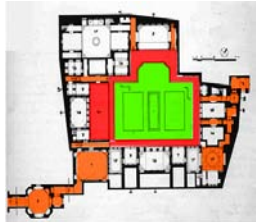

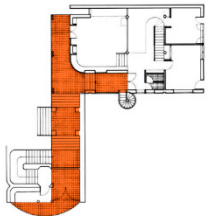
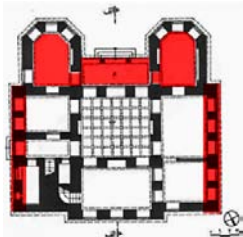
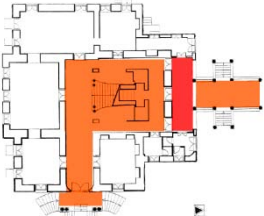
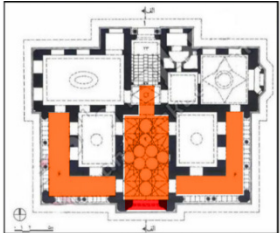
Table 2: Circulation of Sample Houses from the Zand, Qajar, and Pahlavi Periods

Code	House Name	Period	City	Approx. Date (Solar Hijri)	Color Mapping
Z1	Behnam House	Zand	Tabriz	Approx. 1150 SH	
Z2	Mohtasham House	Zand	Shiraz	Approx. 1155 SH	

Continiue of Table 2: Circulation of Sample Houses from the Zand, Qajar, and Pahlavi Periods

Code	House Name	Period	City	Approx. Date (Solar Hijri)	Color Mapping
Z3	Saber House	Zand	Shiraz	Approx. 1160 SH	
Z4	Ameriha House	Zand	Kashan	Approx. 1165 SH	
Q1	Tabatabaei ha House	Qajar	Kashan	Approx. 1259 SH	
Q2	Borujerdi House	Qajar	Kashan	Approx. 1236 SH	
Q3	Rasoulia House	Qajar	Yazd	Approx. 1260 SH	
Q4	Amir Nezam Garousi House	Qajar	Tabriz	Approx. 1250 SH	

Continiue of Table 2: Circulation of Sample Houses from the Zand, Qajar, and Pahlavi Periods

Code	House Name	Period	City	Approx. Date (Solar Hijri)	Color Mapping
Q5	Abbassian House	Qajar	Kashan	Approx. 1178 SH	
Q6	Forough al-Molk House	Qajar	Shiraz	Approx. 1269 SH	
P1	Afshar House	Pahlavi	Tehran	Approx. 1355 SH	
P2	Ahmad Shahi Pavilion	Pahlavi	Tehran	Approx. 1300 SH	
P3	Teymourtash House	Pahlavi	Tehran	Approx. 1313 SH	
P4	Sa'dabad Palace (Main)	Pahlavi	Tehran	Approx. 1320 SH	


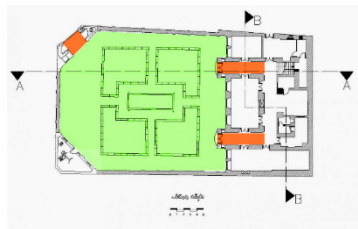



Code	House Name	Period	City	Approx. Date (Solar Hijri)	Color Mapping
P5	Savejbolaghi House	Pahlavi	Tabriz	Approx. 1300 SH	
P6	Laleh House	Pahlavi	Tabriz	Approx. 1320 SH	
<p>Courtyards  Entrances, Corridors  Iwans, Verandas </p>					

Table 3: Evolution of Spatial-Formal Features in Iranian Residential Plans (Zand vs. Qajar vs. Pahlavi)

Feature	Zand Period (1750s–1790s)	Qajar Period (1790s–1920s)	Pahlavi Period (1920s–1970s)
Courtyard Layout	Single main courtyard (small inner yard); introverted plan; sometimes secondary service yard.	Usually dual courts (outer biruni & inner andaruni); strong central pool or garden	Often, there is one main courtyard (or none, just a garden forecourt); verandas replace the secondary yard.
Circulation	Direct from the porch to the courtyard; rooms open to the courtyard; no interior corridors.	Court-centered movement; direct access from iwan to halls/rooms; rarely corridors.	Corridors emerge (especially early Pahlavi), linking entries to rooms, and reducing dependence on the courtyard for circulation.
Hierarchy of Access	Simple sequence: porch → main court → family rooms; strong veiling of inner space.	Formal <i>hashti</i> (vestibule) into outer court; gradations of privacy via inner court and concealed chambers	Vestibule/corridor from the entry; this may blur the distinction between inner and outer areas; still, guest reception is separate from private quarters.
Symmetry	Generally symmetric on the plan, but smaller houses may be asymmetrical due to the site.	Highly symmetric along the main axis (façades, courtyard layout).	Decreasing symmetry in mid/late Pahlavi; some retained in formal axes, but many villas were asymmetrical or free-form.
Geometry	Simple orthogonal shapes, occasionally octagonal niches or pools.	Clear geometric organization: rectangular and polygonal rooms, symmetrical iwan shapes, eight-pointed pool.	A mix of Persian geometry and modern forms; square/rectangular rooms, occasional curves (bow windows, rotundas).
Seasonal Features	Separate winter (sunny) and summer (shaded) wings; windcatchers/basements in hot regions; a pool for cooling.	Similar to climatic adaptations, many courtyard houses feature covered iwans (for sun control) and dividing windows, as well as outdoor fountains.	Continuation of some features (verandas, trees, ponds) early on; later houses rely more on mechanical climate control, but still often have a shaded porch.
Cultural Elements	Strong introversion, <i>andaruni</i> principle; heavy use of traditional elements (iwan, <i>hashti</i>).	Continuation of privacy norms; <i>biruni/andaruni</i> clearly separated; rituals (separate doors, guest divans).	Privacy is valued but relaxed; exterior façades often feature conventional curtain walls; family life is less segregated by sex or status.
Influences	Echoes Safavid past; some Sasanian revival motifs (stone carving, Pahlavi scripts occasionally).	Fusion of Persian tradition with superficial European elements (e.g., hall colonnades); strong Zand continuation.	Pronounced Western influence: corridors, stairs, libraries; also some Art Deco or neoclassical touches blended with Persian taste.

adapted planning toward extroverted, stylistically modern configurations. The courtyard, once a multifunctional element for privacy, ventilation, and symbolic expression, is replaced in Pahlavi homes with corridors and terraces that favor linear circulation and openness to the exterior.

Another key point is the transformation of circulation logic. Zand houses exhibit compact, closed movement systems with predictable spatial hierarchy. Qajar residences introduce complex layering through winding corridors and multiple courtyards, reflecting increasing functional differentiation. In Pahlavi architecture, however, circulation becomes more streamlined and direct, often via single-axis layouts and centralized hallways. This change suggests a broader shift toward efficiency and privacy through spatial zoning rather than formal barriers, and possibly, a Western architectural influence in domestic typologies.

This study also draws attention to overlooked micro-patterns. For example, while Pahlavi homes are commonly viewed as entirely modernist, several cases, such as the Savejbolaghi house and Laleh house, still preserve fragments of introverted zoning, albeit in reinterpreted ways. These hybrid conditions suggest that the transition from traditional to modern was neither abrupt nor uniform, but rather negotiated across different regions and building scales.

These transitions also hold implications for contemporary design thinking and architectural education. The gradual shift from introverted, courtyard-centered layouts in the Zand and Qajar eras to the more extroverted, linear systems of the Pahlavi period illustrates how circulation strategies respond to cultural values, social structures, and pressures of modernization. For present-day architects, this highlights the importance of striking a balance between traditional principles of privacy, hierarchy, and climate adaptation and modern needs for openness and efficiency. In architectural education, analyzing such transformations can encourage students to critically evaluate spatial logics across time, rather than treating traditional and modern approaches as mutually exclusive. Instead, historical circulation features can be reinterpreted as design resources, enabling more context-sensitive, innovative solutions in contemporary housing and urban design.

By organizing findings into structured tables and descriptive analysis, the study provides a dataset that can serve as a reference point for future researchers, educators, and designers.

CONCLUSION

This research has demonstrated how circulation features in Iranian residential architecture evolved across three major historical periods by systematically analyzing spatial configurations, access strategies, and planning hierarchies. Through detailed comparison, the study uncovered not only macro-level trends (such as the gradual marginalization of courtyards and vestibules) but also micro-level nuances that reveal how traditional elements were adapted, blended, or

challenged within emerging modern layouts.

The findings also confirm that architectural change is not merely a matter of style but reflects deeper socio-cultural and climatic responses. In this sense, circulation can be read as a cultural text, a spatial expression of social ideology, family structure, and collective memory. The shift from inward-facing, courtyard-based designs to linear and extroverted layouts corresponds with broader changes in privacy norms, modernization processes, and the negotiation between tradition and Western influence.

The innovation of this study lies in shifting the analytical focus from general morphology to circulation as a distinct architectural feature, while also structuring a large body of historical data into a comparative framework. This approach not only clarifies the continuities and ruptures across the Zand, Qajar, and Pahlavi periods but also offers a methodological contribution for future architectural-historical studies.

Finally, these insights carry implications for contemporary practice. For today's architects and educators, reinterpreting traditional Iranian circulation logic—its emphasis on hierarchy, privacy, and spatial transitions—provides an opportunity to design dwellings that are both culturally resonant and responsive to present-day needs. Integrating these lessons into architectural education encourages critical engagement with heritage, ensuring that circulation remains not only a functional system but also a bearer of cultural meaning in modern design. Future studies can expand this work by including post-revolutionary houses, rural-urban comparisons, or user experience perspectives. Incorporating interviews or behavioral data would also enhance understanding of how these spatial shifts affected daily life.

AUTHOR CONTRIBUTIONS

S.Dashtgard supervised the research, conducted the literature review and data analysis, and edited the manuscript. E.Shadravan. Conducted the literature review, performed the data analysis, prepared the tables, wrote the manuscript, and contributed to editing.

CONFLICT OF INTERESTS

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the authors have acknowledged the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancy.

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