

The Influence of Culture in the Body of Traditional Courtyards of Hamedan Based on Data Theory

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Abstract

Having a shelter has been of the utmost importance to humans. Humans have been developing all kinds of residential buildings to protect themselves, one of them is courtyard houses. When examining the form of a house. One of the critical reasons for prioritizing the study of indigenous buildings is the belief that social and cultural factors greatly contribute to the form of a house. In this article, the content analysis method with the help of data foundation theory, open, axial, and selective coding methods have been used. The strategy of this article in the analysis and judging stage is both quantitative and qualitative method. to investigate the reasons for the formation of the central courtyard from the perspective of culture in the city of Hamedan, the impact of the entrance and the central space of houses and their halls have been studied in general. Based on the results, the Iranian architectural methods and the cultural elements in the indigenous architecture are considered to have played a decisive role in the formation of the architectural model of the Qajar and Pahlavi period. In these houses, an attempt has been made to separate private and public spaces through designing the open space of the yard as a coordinator between the outside and inside space to maintain the identity of the other spaces and to prevent any disruption in using them.

Keywords : Culture, Yard, Traditional houses, City of hamedan, Data theory of the foundation

1. Introduction

The importance of the impact of culture on architecture requires comprehensive studies and research in this field.. The courtyard is one of the critical spaces that should be taken in consideration in reviving the identity of the architectural past. Factors that help shape yards include environmental ones, beliefs, religious convictions, and culture. Due to the ongoing intertwined nature of home and the culture of family life, a change in the culture and lifestyle of families can lead to a change in the structure of houses. Courtyard buildings in Iran are several thousand years old. The city of Hamedan has been selected as an example due to its long history in local architecture, especially the existence of various courtyards. In this research, the courtyards of traditional houses in Hamedan and the impact of cultural factors on them have been studied.

Yards in historical houses were necessary for the Iranian lifestyle, and based on materialistic and spiritual needs and observance of hierarchy, various types of traditional yards have been formed (Mazaheri et al., 1397: 99). From the socio-cultural, climatic, and physical aspects, the yard plays an essential role in the cohesion of the Iranian house (Zeinliani and Ohkot, 1396: 18).

Historic houses, while accounting for the greater part of Iran's historic cities, are in danger of being destroyed. One of the crucial reasons for prioritizing the study of indigenous buildings when examining the form of a house is the belief that social and cultural factors have the greatest role in the emergence of the form of the house (Rapoport, 1398: 90). The entrance space, while being a part of the space of each architectural unit, has not

remained only as a communication space and culture and behavioral patterns, spiritual and social values, have played an important role in their formation (Sultanzadeh, 1390: 11). Therefore, to preserve this cultural heritage, it seems necessary to study them. This study aims to pay attention to the impact of cultural factors on the designing criteria of the structure of central courtyards in historic houses in Hamadan. This study compares the function of the central courtyard in the houses of the Introverted Qajar, Extroverted Pahlavi and the Eclectic period in the city of Hamadan. This research attempts to make a contribution in preserving the culture of people and in implementing it in contemporary residential houses.

2. Research Methods

Research method In the data collection stage, content analysis method and with the help of grounded theory method (foundation data theory), open, axial, and selective coding method has been used. Additionally, By extracting data from case samples, classification, analysis, and finally, selection of relevant data and their integration is done. When analyzing the samples, to produce meaning, execution, presentation, and description in open coding alongside comparison, analysis through axial coding and pattern explanation through selective coding have been used respectively (Nikghadam, 1394:78). In the data collection stage, with the help of the grounded theory method (foundation data theory), content analysis, open, axial and selective coding methods have been used.






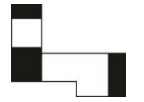

Twenty-three house samples were selected for review. In selecting the samples, fixed time variables and houses related to the Qajar and Pahlavi periods have been

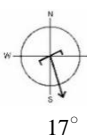
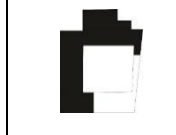

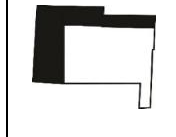
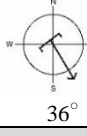

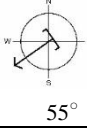
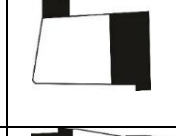

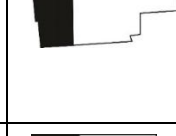
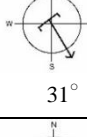

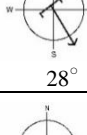



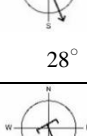


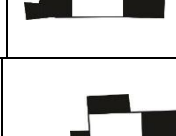
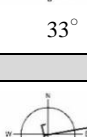
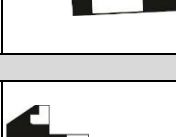
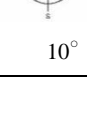
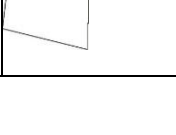
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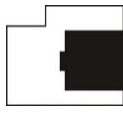


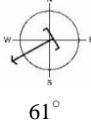
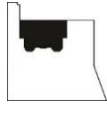
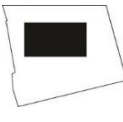
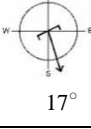
considered. Structurally, houses fall into three categories. The first group of introverted Qajar houses is divided into five categories in terms of their establishment method and orientation are: one-way, two-way, four-way and shaped. The second category is Pahlavi extroverted houses, which are located in such a way that the spaces are located in the middle or part of the garden. After passing through the entrance, according to the entrance hierarchy, they enter the linear division space (corridor) or the central division space. The third category is eclectic houses, which combine Qajar introverts and Pahlavi extroverts. They are divided into five categories based on how they have been placed: one-sided, two-sided, three-sided, four-sided, L-shaped. The multiplicity of samples is for the purpose of introducing the variety in different modes of connection of subsidiary spaces with the yard. Therefore, in selecting case samples, the time factor and

physical structure have been considered. In this study, first, the data obtained in the field of culture in architecture are collected. Then, the foundation data method has been compared and analyzed in the axial coding stage. The results obtained from the analysis of each of them become a theory in the selective coding stage. By summarizing the selected data, the conclusion is made in the field of research title. Table 1 lists some of the important features of each house (Including the construction period, how to plan the mass, the direction of establishment, entrance features, number of yards, characteristics of the Qajar introverted period and Pahlavi extrovert, the relationship between the house and the outside, and showing how to place closed and open spaces (closed spaces with black color and open spaces with White color))

Table 1
Introducing selected houses in the Qajar and Pahlavi periods in the city of Hamedan

House name	Construction period	Location	For placement	Entrance		courtyard	Characteristics of Qajar introverted species			Characteristics of Pahlavi extrovert species				Communication with the outside	Image of open space house: white Closed space of the house: black
				Pre-entry	guest room		Winter and summer combination		Ground floor services	Balcony	Half porch space - linear corridor - moonlight	Gable roof	Stair location		
							hall	Porch							
Selected houses of Qajar introverts															
Chazanfari-1	Qajar	One way	 42°	-	-	External	✓	✓	✓	-	-	-	(Takhgah) -	-	
Shalbaf -2			-	✓	✓	External	✓	✓	✓	-	-	-	-	-	-
Ahmadi -3	Qajar Pahlavi	One way	-	-	-	External	✓	✓	✓	-	-	-	(Porch) -	-	Entering and occupying the yard
Shahid -4 Madani	Qajar		 15°	-	-	External	✓	-	✓	-	-	-	-	✓ Upstairs	
-5 Shabbazian	Qajar	two way	 37°	✓	✓	inner-outer	✓	✓	✓	-	-	-	(Porch) -	-	
araghchi -6	Pahlavi		 26°	✓	✓	External	✓	-	✓	-	-	-	-	✓ Upstairs	Entering and occupying the yard

7- Parsiavashan	Qajar		 17°	✓	-	External	✓	-	✓	-	-	-	-	-	-	-	-			
Entezam -8			L-shape	 23°	✓	-	External	✓	-	✓	-	-	-	-	-	-	-	-		
Naraq-i-9			sided-4	 36°	-	-	inner - outer	✓	-	✓	-	-	-	-	-	-	-	-	-	
Selected Eclectic Houses																				
Seifi -1	Qajar	One way	 55°	✓	✓	inner - outer	✓	✓	✓	-	-	-	-	-	✓	Tanbi	✓	Upstairs		
Sharifi -2			 33°	-	-	inner - outer	✓	✓	✓	-	-	-	-	-	-	✓	Tanbi-Porch	-	-	
Sharafi -3			 31°	-	-	inner - outer	✓	-	✓	-	-	-	-	-	-	✓	Tanbi	-	-	
4-Samavat	Qajar Pahlavi	two way	 28°	-	-	External	✓	✓	Porch	✓	✓	-	-	-	✓	Tanbi	✓	Floor 2		
5- Tajbakhshia n	Pahlavi		 9°	✓	✓	External	✓	✓	✓	-	-	-	-	-	✓	Porch	-	-		
6-Zarrabi	Pahlavi		 28°	✓	✓	External	✓	-	✓	✓	-	-	-	-	✓	Tanbi	✓	Upstairs		
7- Samadian	Qajar	sided-3	 28°	✓	✓	External	✓	-	✓	-	-	-	-	✓	Tanbi	✓	Upstairs			
8- Khalabani	Pahlavi		 33°	✓	-	External	✓	✓	✓	-	-	-	-	-	✓	Porch	✓	Upstairs		
Selected houses of Pahlavi extrovert species																				
Saberion-1	Pahlavi	Central division	 10°	✓	✓	External- External	room	-	-	✓	Mahtabi	✓	-	-	-	-	-	-		

Sarem -2 Aslani	Qajar Pahlavi	Linear division space		✓	✓	External	room	-	Porch	✓	✓	-	✓	-	✓	
3-Ebadi				✓	✓	External	room	-	Porch	✓	✓	Half porch	✓	-	-	
Mazuchi -4				✓	-	External	room	-	Porch	✓	✓	Half porch	✓	-	✓	
5-Bagh Nazari				-	-	External	room	✓	-	-	✓	-	✓	-	-	
6-Poosti Zade				-	-	External	room	-	-	✓	✓	-	✓	✓	Tambi	-

(Source: Authors adapted from (Zarei et al., 1397) and Cultural Heritage Office)

3. Background Research

The importance of the impact of culture on architecture requires comprehensive studies and research in this field. Rapoport, in his book "Housing Anthropology," points out that two groups of determining and influential factors effectively affect the form of housing, and culture can be mentioned as a deciding factor. On the other hand, the importance of other factors such as economy, technology, climate, materials, etc., cannot be ignored (Rapoport,1398). Mahmoudi Nejad and Hassanzadeh, in their book "Indigenous architecture, climate and courtyard" have studied the courtyard concept in desert architecture. Case studies show that the first species of Chinese courtyard date back to 3000 BC. Traditional courtyard houses have been the only architectural form in Beijing for centuries. In terms of shape, a backyard house is more suitable than other types of indigenous housing in many parts of China for adapting to the natural environment and meet life's needs. Historically, one of the most enduring patterns in Korea was the courtyard house design. Yard pattern has been created in Korea as a suitable solution for the functional, climatic, social, and cultural needs of the Korean people. The courtyard symbolized the space for introversion that formed part of a great tradition of Korean society (Mahmoudi Nejad and Hassanzadeh,1398). Ghiyasvand et al., in a study called "Determining the physical criteria affecting the thermal performance of different types of historic houses in the city of Hamadan," has studied the Qajar houses to the Pahlavi period in the city of Hamadan. This research intends to study the effect of the cold climate typology of Hamedan city and recognize the climatic factors and physical characteristics of the historical houses of this city to study their effect on the thermal performance of these

species. Energy consumption in different types of houses depends on physical characteristics, location in the tissue, and the microclimate created around them. The context of the historical areas of the Islamic period shows that various factors such as climate and culture have influenced the structure and formation of residential houses (Ghiyasvand et al., 1399). Yazdi et al. in the study "Design criteria in the structure of the Central Courtyard and Hall of Qajar Houses in Yazd," examines the design criteria in the structure of the central courtyard and hall of Qajar houses in hot and dry regions of Iran. It has been concluded that the central courtyard and the summer hall have close proportions and similar physical patterns, This indicates the influence of climatic factors in their design. The role of the central courtyard and the summer hall as a factor in creating a micro-climate is very effective in creating cooling and ventilation of living spaces and the formation of buildings, especially residential houses (Yazdi et al., 1398). Sharbatian in his research "Study of climate, Architecture, and Culture of Masouleh with a native architectural approach from the perspective of urban anthropology," stated The texture of Masouleh city is stepped. Since in temperate and humid areas, the best solution to regulate environmental conditions is the use of wind flow and air conditioning, the best morphology of architecture with an extroverted form. indigenous architecture is derived from cultural patterns and reflects the customs, spirit, feelings, thoughts, beliefs, tastes and art of the community (Sharbatian,1397).Yaran and Behroo, in the study "The Impact of Islamic Culture and Ethics on Housing and Spatial Body of Houses: A Case Study: Qajar Houses in Ardabil," expressed the direct relationship between community culture and the formation of buildings .In these houses, the climate itself has led the building to introversion(Yaran and

Behroo,1396). Nikghadam, in the study "Extraction of climatic patterns of functional spaces in native houses of Bushehr port using the data theory of the foundation," states that climatic patterns in houses of Bushehr port are in line with the general conditions of hot and humid areas and with local climate components (Nikghadam, 1394). In a study conducted by Dalkılıç & Nabikoğlu (2020), the architectural features of traditional Turk houses in southeastern Anatolia are studied. These houses are introverted and use the original criteria of traditional housing with a new design. They reflect the social, cultural, and architectural structures of the past. Another study conducted by (Shakir Haraty, Mat Raschid & Mohd Yunos, 2019) on the morphology of traditional Iraqi courtyard houses stated that housing design in Iraq does not meet their place of residence's cultural and social needs. The social culture of the Iraqi people is mainly centered on privacy and the existence of separate spaces between family and guests. Neglecting this massive architecture can lead to loss of identity and distortion in future designs. (Abdelkader & Park, 2018) A study of traditional courtyard houses in Cairo shows that they have common features that reflect the unique local identity of Egyptian architecture. They have adapted to the needs, social, cultural, and climatic environment over several generations. Although the spatial composition of these houses varies in time, there are similar spatial principles that underlie all houses. A study (Amiriparyan & Kiani, 2016) demonstrates that the central courtyard always plays a crucial role in organizing Iranian cities on a large scale and houses on a small scale. In the spatial organization of traditional houses, the central courtyard plays a pivotal role as a focal point and contributes to the continuity of the space. In another research (Hanan, 2012), Batak Tuba people face the problem of maintaining their tradition. Understanding these needs and goals may lead to creating a new conceptual model of preserving traditional homes meet the needs of new residents. (Eskandari, 2011) has analyzed the traditional houses of Kashan in terms of space organization and access. Several factors affect the architecture of the region. Among these, the most significant impact on the organization of space and internal and external relations are climatic conditions and culture.

Indigenous architecture is entirely different from a climatic and cultural perspective, so each section should be studied independently. In previous studies, the importance of climate patterns on design has been pointed out, and less attention has been paid to cultural studies and their impact on the yards of traditional cold climate houses. This study aims to influence culture on the formation of residential yards in the cold climate of Hamedan during Qajar and Pahlavi periods. In this way, the data theory in terms of the foundation has been used. This issue has led to the novelty of this research compared to similar examples.

4. Theoretical Framework

An integral part of traditional Iranian houses is the yard. In most traditional houses, at least one yard can be identified, which is located hierarchically in respect to

The entrance of the house and organizes other spaces of the house. Houses with this spatial system are central courtyard houses (Hajian et al., 1399: 43). Rapaport calls the reason for the existence of courtyard houses a cultural factor rather than a climatic factor (Bagheri, 1393: 152). The central courtyard is the name given to the various types of courtyards in which there is space on at least one side and the upper hand on all four sides (Sultanzadeh, 1390: 82). The yard's dimensions are determined by the number and function of the surrounding spaces. Due to the effect of sun rotation on different fronts of the house, its builders have assigned each front to a particular season and time of the day. The rooms located on the north side of the yard are more significant than other parts, the hall is also located on this side of the yard (Mahmoudi Nejad and Hassanzadeh, 1398: 70). The functional role of the hall in the overall organization of the space has caused an essential axis of beautification with other spaces (Yazdi et al., 1398: 95). Next to the hall are large corridors called beds. Buildings in this climate have shallow porches and are used only to protect the entrances of the building from snow and rain. The form of porches can be divided into two main types of porches and single porches (Mahmoudi Nejad and Hassanzadeh, 1398: 154). The combination of winter and summer living in the houses of Hamedan in a way that the summer porch was combined with the sash of the winter living house and is located on the northern front of the building (Zarei et al., 1397: 41). Another point is that the yard floor is low in the cold climate by 1 to 1.5 meters from the sidewalk (Mahmoudi Nejad and Hassanzadeh, 1398: 71). One of the characteristics of a traditional house is its spatial navigation method, which traditional architects call Ron. The city of Hamedan is located in Ron Kermani in the east-west direction. Choosing the location of the building depends on factors such as the natural state of the land, the need for private space, noise control, reduction, the two factors of wind and sunlight (Zarei et al., 1397: 40). According to studies, the orientation angle of the building in a cold climate is in the range of 20 degrees from south to west to 45 degrees from south to east (Kasmaei, 1385: 127). The orientation of the main spaces of the house and the hall in general is considered. To investigate the causes of the formation of the central courtyard in the city of Hamedan, the effect of entrance and pre-entrance are discussed. This space is not only built to meet material needs but cultural and behavioral patterns alongside spiritual and social values have played an essential role in their formation. The entrance consists of the arch, the gate, the porch and the corridor. They function as an area for making a stop, waiting and dividing the entrance route into two or more directions for an indirect entry into the yard. The entrance elements include the entrance door that controls the connection between the interior and exterior of the building, the platform for relieving fatigue, and the hole installed in some introverted houses to provide light to the porch above the entrance door. The shape of the path to the interior spaces are according to several factors such as the function of each building and socio-cultural patterns are divided into direct, indirect and spiral. Table 2 and the data column discuss the views of experts on culture. Each

cultural data is assigned with an identifier equivalent to the first Latin letter of the culture (culture) and is represented by the letter (C). The "concept (code)"

column refers to the concept that the cultural sentence has in the form of a short phrase.

Table 2
Definitions of culture from the perspective of experts¹

ID	Data	Concept (code)
C1	The effect of the site on the form is more cultural than physical. The ideal site depends on the goals, ideals, and values of a nation (Rapoport,1398:52).	The effect of the site on the form
C2	The cultural characteristics of each era can be recognized in its architecture. When architecture is created under the influence of the conditions of a period, it can be known as independent and alive. When the effects of creating an architectural work disappear, that architecture may survive. If the factors they create are in line with cultural demands, that architecture will take deep root. If those factors are unstable, the architecture becomes lifeless, and new factors destroy it (Nik Fetrat & Bitaraf,1395:128).	Cultural characteristics of each era on architecture
C3	The buildings are formed according to tradition and custom around the interior space or are so-called introverted.And, it seems that introversion is not the result of climate, location, and region, but social and cultural factors that can be seen in both urban and rural areas (Abdolhosseini, 1390: 16).	Introverts and socio-cultural factors
C4	Rapaport: Culture is a set of values and beliefs that embody the ideals of a group of people passed on among members in the process of learning culture (Yaran and Behro, 1396: 94).	Transfer of values
C5	The culture of a society is the result of that society's whole history, which has a deep connection with the neighboring societies and world cultures (Momeni and Masoudi, 1394: 68).	Culture and history of society
C6	(Cleanliness): Behavioral model of culture and ethics (Yaran and Behro, 1396: 96).	Clarity
C7	In social views, culture and beliefs, and way of life are considered to be the most determining factors in the formation of architecture. Other factors such as climate, economy, etc. are considered as secondary factors. Based on this attitude, socially sustainable design can be defined as follows, Designing spaces that align with human culture, behaviors, and lifestyles for the maximum possible time and provide a suitable living environment for long periods. So that the quality of space over time is in harmony with human needs and guarantees his quality of life (Issazadeh, 1396: 78).	Sustainable social design
C8	The most important aspects of lifestyle that affect the form include some basic needs, family, female status, privacy, social relations (Rapoport, 1398: 93).	Lifestyle and form aspects
C9	Factors influencing the formation of architectural spaces: Material factors (matter, building science and technology, economics), Environmental (climate, natural and artificial environment), Functional (behavioral patterns and spatial features of activities, technology, and biological tools), Cultural (sustainable culture and patterns, beauty, fashion and taste, innovation and creativity) (Ali Mohammadi and Abdollahi, 1397: 36).	Culture and the influential factor in shaping the face of architectural space
C10	Introversion is a climatic issue, and moral meanings such as being introverted and inclined to inner states in the interior of the home are secondary meanings that have contributed to beliefs through introversion (Bahmani et al., 1395: 60).	Being introverted
C11	The presence of architectural culture in various ways, including elements, roles, decorations, volumetric combinations, or in the plan (Ali Mohammadi and Abdollahi, 1397: 38).	Presence of architectural culture
C12	Schumbardolo: Culture has two aspects, and on the one hand, it is constant and seeks to preserve the acquired values of society, and it is both creative and innovative (Issazadeh, 1396: 73).	Aspects of culture
C13	All societies have cultures. They have beliefs and customs. They value things that they call the spiritual dimension of culture. Culture has another dimension called the material dimension, and it means handicrafts, buildings, etc. (Ali Mohammadi and Abdollahi, 1397: 35).	The spiritual and material dimension of culture
C14	Zweidi: Culture includes all the habits of a society. If we consider society a group of organized people who have a particular way of life, then culture is the same way (Rashidpour et al., 1393: 83).	Culture and lifestyle of people in the community
C15	Taylor: Culture is a generality that includes knowledge, religion, law, ethics, customs, and any habits that a person acquires as a member of society (Rashidpour et al., 1393: 80).	Acquire any abilities and habitsmorals and customs
C16	Marcuse: considers original culture as the realization of the will and independence of the individual (Issazadeh, 1396: 73).	Individual will and independence
C17	Humanism is a behavioral model of Islamic culture and ethics: Observing the fit between building organs and human organs and paying attention to his needs in construction work. The primary goal of all theories is about the proportions in the work of art and the emergence of order and organization between the parts of a visual combination or visual composition (Yaran and Behro, 1396: 96).	People-like
C18	The semantics of culture includes religion, language, aesthetics, laws and politics, technology and material culture, values and way of thinking, education, and social organizations (Momeni and Masoudi, 1395: 68).	Semantics of culture
C19	Plan: The concept of symmetry in whole and part is similar in a way reminiscent of traditional Iranian buildings and reflects the culture and tradition of Iran. Utilizing the main axes (Momeni and Masoudi, 1395: 75).	Iranian culture and tradition

¹ Source:This table is a collection of information from several sources compiled and written by the authors. In each row of the table, its source is mentioned

C20	Culture determines what spaces are related to each other and to what extent (Momeni and Masoudi, 1395: 70).	Culture and space communication
C21	Values derived from Islamic culture and ethics affecting housing and the spatial structure of houses include: Hijab, cooperation, purity, contentment, God-centeredness and obedience, humility (Yaran and Behro, 1396: 91).	Values of culture and ethics
C22	Introversion is one of the architectural indicators of the Islamic city. The yard is one of the constituent elements of introversion (Bagheri, 1393: 145).	Yard and Introversion
C23	The general culture of the traditional cities of Iran is to provide a space to achieve peace and in accordance with the spirit of current life in them (Nik Fitrat and neutral, 1395: 129).	Culture and tranquility
C24	Avoiding the extravagance of cultural behavior patterns And Islamic ethics: In Iranian architecture, they have tried not to work in vain in construction and They avoided extravagance (Yaran and Behro, 1396: 96).	Iranian architecture and avoiding extravagance
C25	Components of Iranian indigenous architecture: fourfold relationship with self, others, nature of God, privacy, security, introversion, centrality, reflection, geometry, hierarchy, transparency of continuity (Ali Mohammadi and Abdollahi, 1397: 40).	Indigenous architectural components
C26	Construction architecture is based on factors resulting from mental patterns. By coming together and being influenced by culture as a controlling factor, these factors eventually become indigenous architecture (Ali Mohammadi and Abdollahi, 1397: 34).	Controlling agent
C27	Ali Karimi: Cultural identity includes emotions, values, reality, norms with which people shape their experience and look at the world with it. Others look at society from the same perspective (Momeni and Masoudi, 1394: 69).	Attitude to the world
C28	If indigenous architecture is considered to grow within communities and is compatible with the values, lifestyles, and cultures that produce them, This architecture adapts and evolves with social, climatic, technological conditions (Ali Mohammadi and Abdollahi, 1397: 38).	Indigenous architecture compatibility
C29	Sigmund Freud: Culture is a set of abilities and devices that take our lives away from the lives of our animal ancestors and serve two purposes. Protect human beings against nature and regulate human relations between individuals (Yaran and Behro, 1396: 94).	Culture goals
C30	Shahid Motahari: Culture knows the spiritual, intellectual, intellectual, moral, and social reserves of a nation (Yaran and Behro, 1396: 94).	Cultural reserves

Analysis

Production of major categories

After finding the concepts related to culture, they are categorized. In Table 3, in the Identities and Concepts section, all the definitions stated in the previous step and

Table 3

Concepts and categories related to culture in architecture

Categories (components)	Concepts (codes)	ID
Introversion	Being introverted+ Yard and Introversion+ Introverts and socio-cultural factors	C10 +C22+C3
Avoid futility	Iranian architecture and avoiding extravagance+ Sustainable social design	C24+C7
Self-sufficiency	Indigenous architecture compatibility+ Controlling agent+ Culture and history of society	C28+C26+C5
People-like	The semantics of culture+ People-like+ Acquire Acquire any abilities and habitsmorals and customs+ The spiritual and material dimension of culture	C18+C17+C15+C13
Communication with self-others-nature-God	Transfer of values+ clarity+ Aspects of culture+ Individual will and independence+ Culture and tranquility+ Culture goals+ Cultural reserves+ Attitude to the world+ Culture and lifestyle of people in the community	C4 +C6 +C12+ +C16+C23+ +C29+C30+C27 +C14
Architecture	The effect of the site on the form+ Lifestyle and form aspects+ Presence of architectural culture+ Iranian culture and tradition+ Culture and space communication+ Values of culture and ethics+ Indigenous architectural components+ Culture and the influential factor in shaping the face of architectural space+ Cultural characteristics of each era on architecture	C1 +C8 +C11+ C19+C20+C21+C25+ C9 +C2

4.1. Axial coding: In this study, the obtained items can be divided into two categories.

- Iranian architectural methods (introversion, self-sufficiency, avoiding futility, Humanism)
- Cultural elements in indigenous architecture (relationship with self, others, nature, and God), geometry and form design, centrality, transparency, and continuity.

Table 4 examines the cultural features of Qajar introverted and Pahlavi extroverted houses. The first column is entitled activities (Behavioral Patterns) and expresses the concepts associated with each component. The second column, entitled House Shape (Architectural Pattern), refers to introducing

had similar concepts are written in one line, and in the category column, a more comprehensive phrase that includes the characteristics of the mentioned concepts is mentioned.

spaces connected to the central courtyard and is intended to explain behavioral patterns. In the following columns, the names of the houses of the Qajar introverted and Pahlavi extroverted periods are mentioned separately. If the houses under study follow the above-mentioned architectural patterns, they will be marked with a checkmark. If the mentioned houses do not have the above architectural patterns, it will be indicated by a dash, and if they follow these conditions to some extent, it will be marked with a cross.

Table 4
Expression of cultural features in Qajar introverted and Pahlavi extroverted houses

Pahlavi extroverted		Eclectic Houses		Qajar introverted																				
Posti zadeh	Bgh Nazari	Mazochi	Ebadi	Sarem Aslani	Saberion	Khalabani	Samadian	Zarabi	Tajbakhshian	Samavat	Sharafi	Sharifi	Seifi	Naraghi	Parsiavashan	Entezam	Araghchi	Shahbazian	Shahid Madani	Ahmadi	Shalbfaf	Gazanfari	House shape (architectural pattern)	Activities (Behavioral Pattern)
-	-	-	-	-	-	✓	✓	✓	✓	*	*	-	✓	*	✓	*	*	*	*	*	*	*	Input components: Front arch, doorway, porch, corridor	Introversion: Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference
Direct	Direct	مستقیم	Direct	Direct	Direct	indirect	Direct	indirect	indirect	*	*	-	✓	*	✓	*	*	*	*	*	*	Input elements:door, platform, opening	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	
-	-	-	Direct	Direct	Direct	indirect	Direct	indirect	indirect	*	*	-	✓	*	✓	*	*	*	*	*	*	Path shape: straight, indirect, helical	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	
-	-	-	Direct	Direct	Direct	indirect	Direct	indirect	indirect	*	*	-	✓	*	✓	*	*	*	*	*	*	Input relative to the passage: level, lower	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Entry hierarchy	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	
-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Lack of holes to the outside	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Create a sense of yard enclosure	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Separation of private and public spaces	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	The simplicity of form, use of native materials	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Multi-functional space	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Moderation in decorations	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	
✓	*	*	*	*	*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Design with minimums	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	The exterior fit of the facade	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	The interior fit of the building	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	
-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Hierarchy of social classes in vertical layers	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	
-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Allocate the largest room to the large family at the highest point of the courtyard and the main axis	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	
-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Humanism: Pay attention to human needs, Observance of justice and social justice, Family structure, Observing the proportions between building organs and human organs	Stop and wait, Aggregation, Redirect, Enter gradually, Visual constraints Communication monitoring, No intimate view from the entrance to the inside, Confidentiality, Discipline, Security, Peace, Area delimitation and separation, Continuity and spatial continuity, Simplicity outside and decorations inside, In accordance with belief and religion, Avoid visual audio interference	

4.2. Selective coding

The final inference is made by summarizing the data and integrating the obtained information. According to studies conducted by researchers, the following results have been obtained in the field of traditional housing in different climates.

- In traditional houses, temperate, humid and mountainous areas, like Masouleh, the best architecture is the extroverted form and Without yard, because wind flow and ventilation are used to regulate environmental conditions.
- In hot and dry climates, ;like Yazd, the role of the central courtyard and summer hall as a microclimate are very effective in ventilation and cooling of living spaces.
- In the cold climate of Ardabil, the weather itself has led to introversion. Also, hierarchical divisions and the issue of the hijab affect on the spatial body of the house, because of that The houses have a central courtyard. In the city of Hamedan, Qajar period houses were introverted with a central courtyard. They are Gradually influenced by the architectural culture of the west, consequently the plans have become extroverted, which has caused consistency problems.
- In hot and humid climates, houses are designed to be extroverted to use airflow. however in Bushehr, we could point to the extension of closed spaces in to the yard, the use of winter shelters and natural ventilation system.

Indigenous architecture is entirely different from a climatic and cultural perspective, so each section should be studied independently. In previous studies, the importance of climate patterns on design has been pointed out, and less attention has been paid to cultural studies and their impact on the yards of the traditional cold climate of Hamedan houses. In the cultural study of Hamedan in this research, two general categories of components and their subdivisions have been expressed. The status of the frequency percentage of each architectural pattern in each of the Qajar introverted, Eclectic period and extroverted Pahlavi houses has been evaluated.

5. Conclusion

Based on the studies, cultural factors influencing the formation of the yard are in two categories:

Iranian architectural methods (Introversion, Self-sufficiency, Avoid futility Humanism).

Cultural elements in indigenous architecture (Communication with self, others, nature and God, Geometry and form design method, Centrality, transparency and continuity.

It is observed that more attention has been paid to the components, hierarch of entry and installation of a room for guests near the entrance in eclectic and introverted Qajar species while not being addressed in the Pahlavi

extroverted species.. This issue is directly related to the construction of the courtyard in the center of the building and the placement of spaces around it, which has become less common in the houses of the extroverted Pahlavi period. The hierarchy of open, semi-open, and closed spaces, following the same pattern, is not observed in Pahlavi extroverted houses. The shape of the entrance path from indirect and spiral examples has been inclined towards the direct path in the Pahlavi period. As a result, the separation of private and public spaces has gradually diminished. Allocating space under the title of summer residence and winter residence has also been less discussed in the Pahlavi period. In the field of application of indigenous materials, compatibility with nature and multi-functional spaces, use of natural light in indoor spaces, outdoor worship, indoor and outdoor proportions have been considered in all three periods. In several examples of the Qajar introverted period, the holes were opened only towards the courtyard. In some examples of extroverted houses next to the street, the openings opened to the street, and the house's privacy established more connection with the alley. In Pahlavi's extroverted houses, the houses have moved away from the design mode with minimal details. The hierarchy of social classes in the vertical layers has been much less considered. Symmetry, orientation, unity, balance, order, and rhythm have given identity and personality to Qajar's introverted houses. In eclectic houses, the largest room is located at the highest level and in the main axis according to the large family. It can be seen in all samples that this feature is less in the Qajar introverted period and not in the Pahlavi extroversion period.

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