

RESEARCH ARTICLE

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The classification study of Xowun patterns and their naming of Qajar houses in Dezful

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Abstract

Purpose Motifs are influenced beliefs and how individuals interact with architectural features. Additionally, decorations have been emphasized as a critical component of traditional architecture. The studying architecture in Dezful, which incorporates Xowun decorations and its historical context, motivates this study. The motifs are influenced by ideas derived from Dezful's traditional society's worldview. Therefore, in addition to documenting patterns, the study of these factors affecting the formation can be considered as research objectives.

Methodology The present study is a method for studying patterns and name of Xowun decoration. In this method, the name and pattern of the designs are matched and the factors affecting them are explained. Finally, a conclusion is made based on logical inference and research findings.

Results The research findings describe the hidden ideas within each of the decorative groups of Xowun decoration and represent a distinct architecture level within a valuable historical context. Furthermore, the research evidence includes a comparison of the naming and patterns associated with Xowun decoration.

Conclusion The study's findings indicated that society's attitudes toward Xowun decorations influence the decoration names. Therefore, Xowun decoration can be classified into Geometric pattern, Animal-related pattern, Pattern related to plants and nature, Belief and religious model, pattern of combined geometries, Pattern influenced by construction technique. Additionally, most motifs in Xowun decorations are related to plant patterns (40.65%), while the lowest percentage is related to animal patterns (4.87%).

Keywords Geometry, Name of *Xowun* decorations, Documentation, Historic house, Dezful

Introduction

Iranian architecture is influenced by the skills and experience of traditional architects and has created a variety of brick decorations in historic cities. Dezful is a significant historical city in Iran that embodies the values of traditional society with its decorations. The Xowun decorations are referred to by various names based on cultural, religious, and functional considerations. Ignoring these ornaments in Dezful's contemporary architecture

and their elegant historical heritage paved the way for researching this field. Thus, this study examines Dezful's Xowun decorations, with the primary objective of study to document and the factors affecting the name of decorations. Numerous studies on the architecture of Iranian cities and their physical elements have been conducted, examining the issues of social ideas in architecture.

Therefore, social components in architecture can be examined based on beliefs, human commonalities and social needs, collective interests and rights (Molaei and Aysham 2019, p. 135). For this reason, the emphasis of the present research is on religious and belief aspects due to their significant impact on the creation and formation of Xowun patterns. The experts in this field have presented cases that can serve as a starting point for studying process factors. This is a fundamental concept

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that is inextricably linked to the human–environment relationship.

Additionally, by examining the factors that influence the body of architecture, it is possible to understand better society's intellectual frameworks and ideas, which serve as the foundation for establishing the identity and survival of significant ideas from the past (Mak and Peacock 2011). The biological and social quality of historical architecture can be improved (Atanda 2019), and it can be adapted to meet the social and cultural needs of modern humans (Catalani et al. 2018, p. 11–15; Fatourehchi

et al. 2020). In this research, an attempt is made to point out the factors affecting the formation of patterns. Besides that, documenting them and mentioning the name of each of them in a category can be another important issue (Fig. 1).

In general, brick decorations are used in the courtyard wall inside the house, outside wall and entrance, which can be seen and checked in Fig. 2. Also, extraction of decorative patterns is obtained from the main motifs based on Fig. 1 and categorized into different groups.

Xowun decoration

Architecture is one of the sciences that affects the environment of people. Therefore, it is possible to lay the groundwork for a complete understanding of the body of architecture through measures and thoughts that affect this environment. Therefore, one of the influential aspects of the architectural environment is decoration. "The motifs used in the decorations are drawn from various patterns, each of which represents influential concepts in society and people's perspectives on the past" (Hossinzadeh Kohsari 2020, personal interview in 2020). Thus, the study of decorative patterns and the recognition of hidden concepts can be regarded as a form of intergenerational communication.

Since the decorations are created with brick materials, they are formed by using the soil available in the area

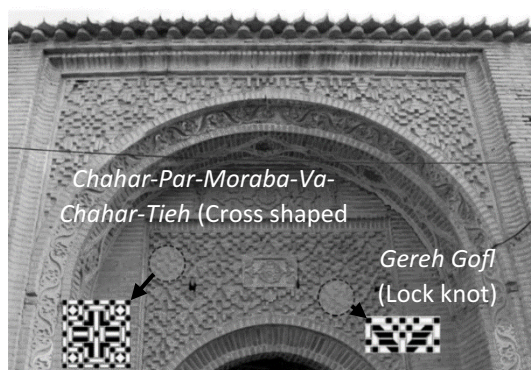


Fig. 1 Xowun decoration in Sohrabi house in Dezful

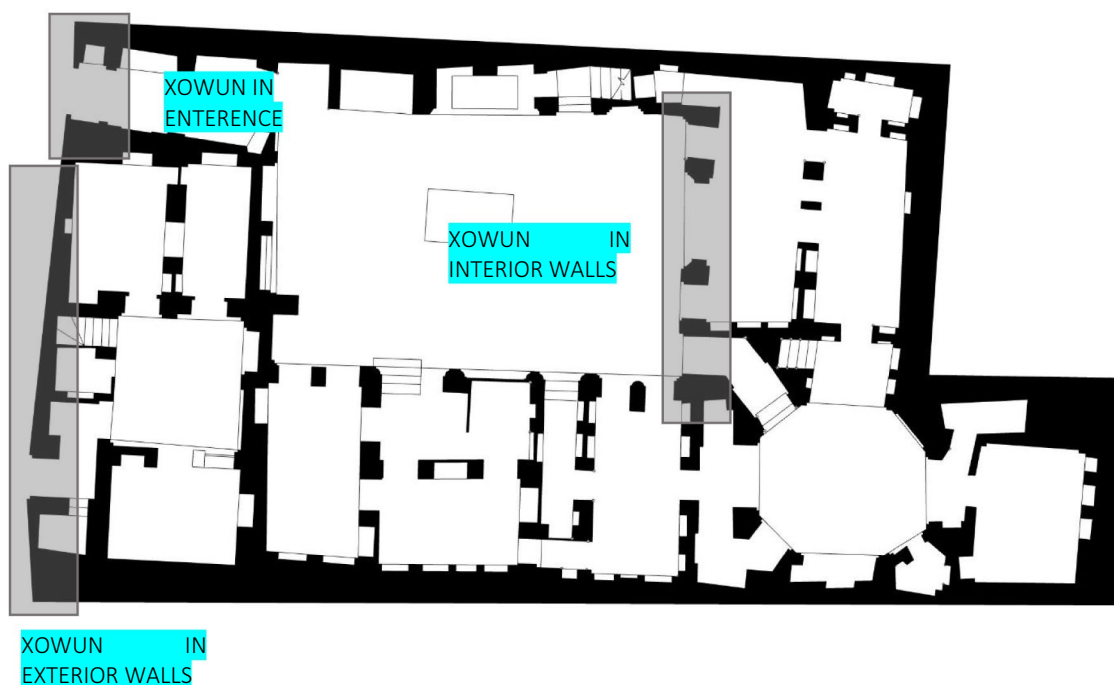


Fig. 2 The plan of Ghalambor house in Dezful

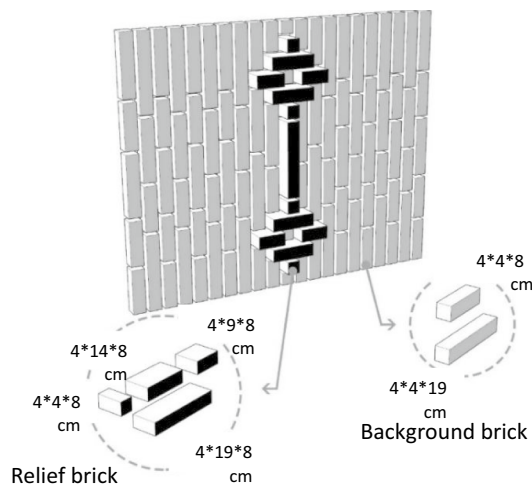


Fig. 3 Xowun decoration in a pattern-like manner

and baking raw clay (Sarrafzadeh et al. 2020). So that in the city of Dezful, the soil used in brick has two different colors with very limited changes. The soil used in these bricks are divided into four types of Sufian soil, Imam Reza Deimi soil, Shushtar soil and Shoor region soil, all of which are considered within the internal borders of Dezful. The production of bricks with the help of soil has different properties and characteristics. "Sufian soil has more adhesion and red color, Imam Reza Deimi soil has good adhesion but has termites, Shushtar region soil is sandy and the soil of the salty area has white powdery mildew on the bricks" (Nemanifar 2022, personal interview in 2022). In this case, you can see the decorations and bricks used in the architecture of this city, derived from different regional flowers, but with red and yellow colors.

Additionally, one of the most prevalent and widely used elements in the architecture of Dezful houses is a type of brick decoration known as Xowun decoration. Numerous

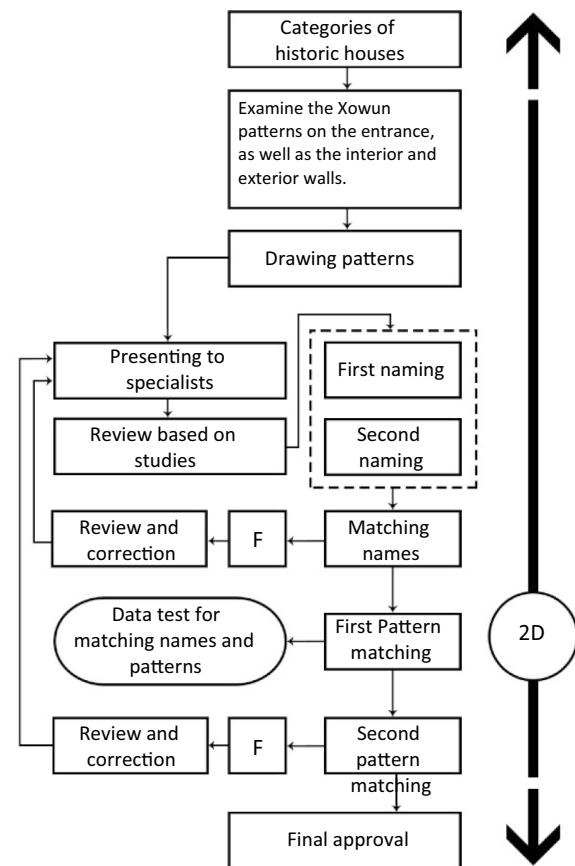


Fig. 5 Methodology

patterns have developed a strong connection with society's thoughts in these motifs that can be examined. In this regard, the role of decorative patterns by choosing people in creating different designs of their houses has not been ineffective and has led to the formation of a pattern influenced by their thought and life (sarrafzadeh et al

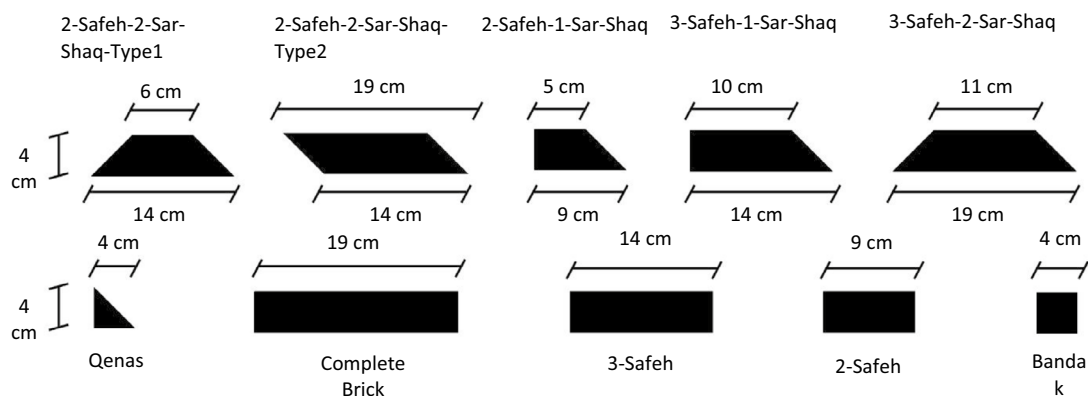


Fig. 4 Various sized bricks

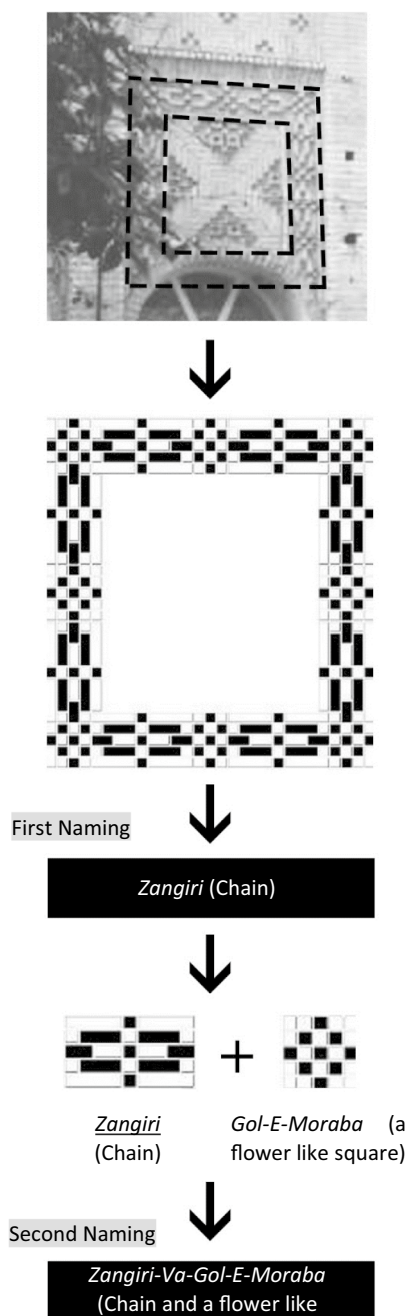


Fig. 6 Naming decorations in a sample (Case study of Zargar house in Dezful)

2022) which can sometimes be attributed to occupation, religion and other factors, related. "Xowun is a term used by the city's traditional architects in the Dezful dialect" (Moghadamnia Dezfuli Zand 2020, personal interview in 2020). The motifs appear forward (Seer) and backward (Gorosneh) and are located throughout the house

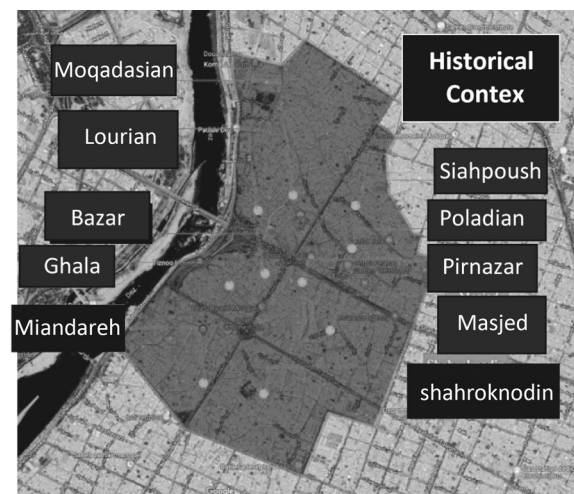


Fig. 7 Areas of historical significance and the surveyed neighbourhood

(Fig. 3) (Sarrafzadeh et al. 2020). Various motifs are used in Xowun decorations, and masters place them precisely with the required skill and expertise. Xowun decorations come in various styles and can be seen in the work of Dezful's traditional architects. Additionally, the variety of designs results from the diverse thoughts and perspectives of society's members. Thus, paying attention to socially influenced patterns and their symbolism within a body of architecture can be viewed as communicating a society's indigenous concepts.

This concept transfer occurs between diverse human groups and incorporates past experiences. In other words, the patterns found in Xowun decoration motifs can be thought of as an architectural language that establishes a context for communication between people from various eras.

On the other hand, the decorative patterns in contemporary architecture are reduced and other facades and decorated bodies of different materials are less seen. For this reason, the study of Xowun decoration ornaments in brick materials is a ground for re-reading and reviving these ornaments in Xowun decoration motifs, which need to emerge with new perspectives. Therefore, these motifs can be used in abstract and simpler methods in the interior and exterior of contemporary houses.

Geometry in Xowun decorations

Geometry was reintroduced to the sciences of mathematics by the Arabs and Greeks and was accomplished by categorizing shapes and creating distinct groups. This science has had a significant impact on architecture, creating various patterns with characteristics such as similarity, repetition, diversity, and size variation (Kiani and

Table 1 The *Xowun* names in combined motifs (the name of the brick decoration is derived from architectural terms in the native language)

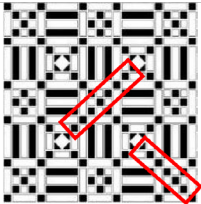
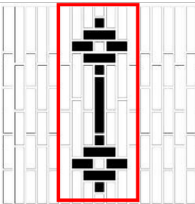
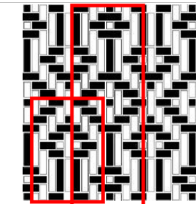
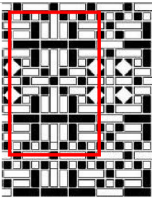
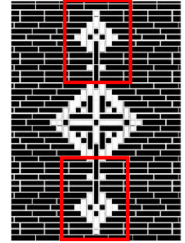
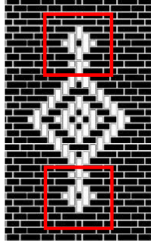
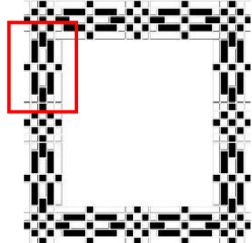

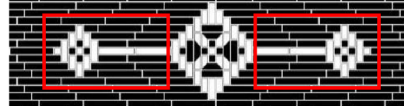
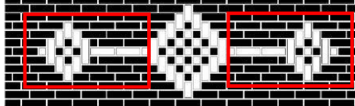
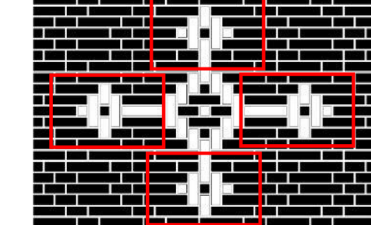
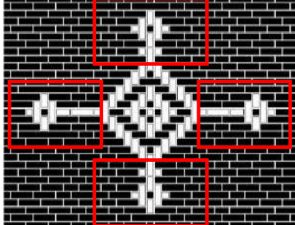
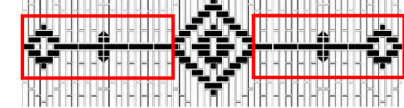

 <p><u>Zangiri-Va-Gol-E-Moraba</u> (Chain and flower like square) in Kohinejad house.</p>	 <p><u>Gheliuni Sadeh</u> (Simple hookah) in Adl house.</p>	 <p><u>Gheliuni-Va-Gol-E-Sham</u> (Hookah and a flower like candle shape) in Toloei Far house.</p>	 <p><u>Jum-Va-Chahar-Tieh</u> (Cup and 4 eyes shape) in Ghalambor house.</p>
 <p><u>Sham-Va-Toffah</u> (Candle and cross shaped flower) in Alidad Ghasemi house.</p>	 <p><u>Sham-Va-Gol-Andaz</u> (Bundles in the shape of a candle and a flower) in Chinisaz house.</p>	 <p><u>Zangiri-Va-Gol-E-Moraba</u> (Chain and a flower like square) in Zargar house.</p>	
 <p><u>Dor-E-Xowun-E-Gereh Gofl</u> (Lock knot around Xowun decoration) in Tahmasebi house.</p>			
 <p><u>Sham-Gol-E-Botal</u> (Bundles in the shape of horizontal candles and a flower shaped like a beetle) in Chaeideh house.</p>	 <p><u>Sham-Gol-E-Moraba</u> (Bundles in the shape of horizontal candles and a flower shaped like a square) in Mohseni house.</p>		
 <p><u>Sham-Gol-E-Khofteh-Va-Rasteh</u> (Horizontal and vertical candle shape and flower in the center) in Chinisaz house.</p>	 <p><u>Sham-Gol-Andaz</u> (Bundle in shape of horizontal and vertical candles and flower in center) in Chinisaz house.</p>		
 <p><u>Sham-Gol-Andaz</u> (Bundle in shape of horizontal candles and flower) in Shayegan house.</p>	 <p><u>Sham-Gol-E-Khofteh-Va-Rasteh</u> (Horizontal candle and flower) in Ghalambor house.</p>		
The Shaygan House, Tolouifar House, Mahdavi House, Weiss Namdamal House and etc.			

Table 2 The *Xowun* names in geometric motifs (the name of the brick decoration is derived from architectural terms in the native language)

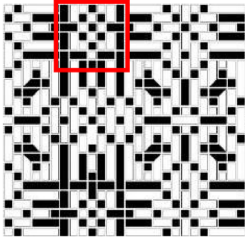
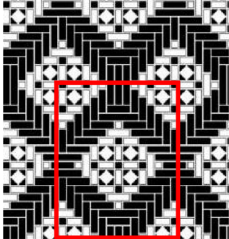
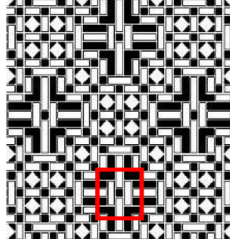
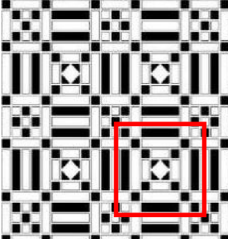
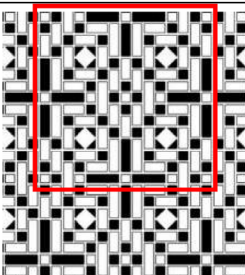
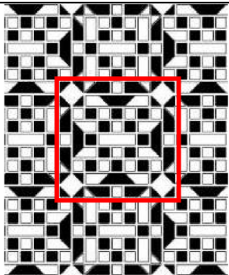
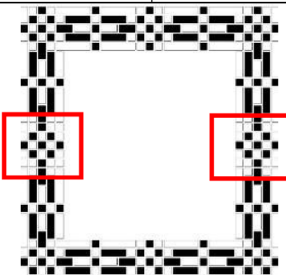

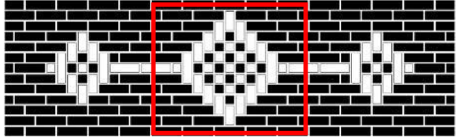
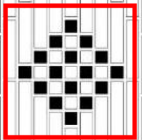
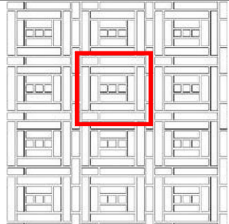
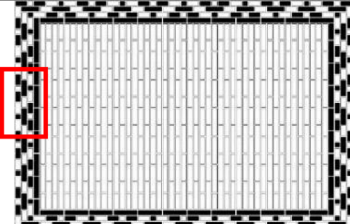

 <p><i>Chahar-Ali-Va-Gol-E-Moraba</i> (4 Ali and flower like a square) in Charmaki house.</p>	 <p><i>Lozi-Va-Chahar-Tieh</i> (Lozenge and 4 eyes) in Zargar house.</p>	 <p><i>Chahar-Par-Moraba-Va-Chahar-Tieh</i> (Cross shaped and 4 eyes) in Asef house.</p>	 <p><i>Zangiri-Va-Gol-E-Moraba</i> (Chain and flower shaped like square) in Kohinejad house.</p>
 <p><i>Chahar-Tieh-Va-Hasht-Chahar-Goleh (Gol)</i> (4 eyes and an octagonal) in Alidad Ghasemi house.</p>	 <p><i>Chahar-Gol-E-Hasht-Zel-E</i> (4 octagonal flowers) in Sozangar house.</p>	 <p><i>Gol-E-Moraba -Va-Zangiri</i> (Flower shaped like square and chain) in Zargar house.</p>	
 <p><i>Gol-E-Moraba</i> (Flower shaped like square) in Yek Khalilo house.</p>		 <p><i>Gol-E-Moraba-Va-Sham</i> (Bundles in the shape of candles and a flower shaped like a square) in Mohseni house.</p>	
 <p><i>Gol-E-Moraba-Sadeh</i> (Simple flower shaped like square) in Azarbad house.</p>	 <p><i>Gol-E-Moraba</i> (Flower shaped like square) in Nilsaz house.</p>	 <p><i>Gol-E-Mosalas (Nim-Gol)</i> (Flower shaped like a triangle) in Nilsaz house.</p>	
		 <p><i>Khoftah-Rasteh-Va-Gol-E-Mosalas (Nim-Gol)</i> (Horizontal and vertical bricks and flower shaped like a triangle) in Golchin house.</p>	
The Zargaran's house, Bozi bozorg house, da'ei house, and etc.			



Fig. 8 Sham-Gol-Andaz Xowun in Shayegan house. Source: MCHT of Dezful

Amiriparyan 2016, p. 766). This phenomenon was successful in decorating Qajar houses in Dezful, resulting in a variety of geometric patterns. They are also known as Xowun decorations and are one of the most widely used brick decorations because they are constructed entirely or in part from whole bricks.

Bricks of various sizes are available, including complete bricks (4 part), three heights (3 part), quartile (Charak—2 part), Bandak (1 part), Qenas (out of shape), 2-Safeh-1-Sar-Shaq (2 parts with a diagonal side), 2-Safeh-2-Sar-Shaq (2 parts with 2 diagonal sides), 3-Safeh-1-Sar-Shaq (3 parts with a diagonal side), 3-Safeh-2-Sar-Shaq (3 parts with 2 diagonal sides), 4-Safeh-1-Sar-Shaq (4 parts with 1 diagonal side), and 4-Safeh-2-Sar-Shaq (4 parts with 2 diagonal sides) (Naeima 1996, p. 52). The pieces are

arranged to create various and elegant patterns of brick Xowun decorations based on the determined cuts in the façade and the type of motifs (Fig. 4).

Decoration in New building

Brick decorations in the past architecture have two aspects of beauty and function that have created a favorable environment for themselves by benefiting from these two approaches (Sarrafzadeh et al 2022). Therefore, their use in architecture can be considered in addition to creating facades, due to solving problems and creating functionality in architecture. The use of decorative patterns in today's architecture will be a basis for improving the beauty and performance, which can be adapted to the architecture of this period by benefiting from the technique of simplifying patterns to decorate different parts of the architecture and create functions for it.

Methodology

In the present study, an attempt is made to match the names of Xowun decorations ornaments with their patterns and, in addition to documenting them, to point out the factors influencing the naming of these ornaments. Accordingly, the research method (Fig. 5) is as follows.

Initially, its patterns are created in two dimensions using the Rhino software, as the motifs can only be viewed in two dimensions. Following that, the drawn designs are presented to experts and traditional performers to initiate the process of naming.



Fig. 9 Different shapes of Xowun in Mohseni Entrance house. Source: MCHT of Dezful

Table 3 The *Xowun* names in plant and nature motifs (the name of the brick decoration is derived from architectural terms in the native language)

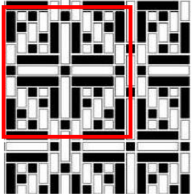
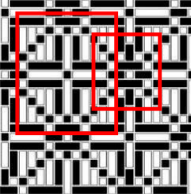
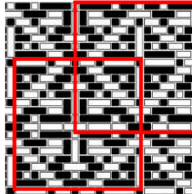
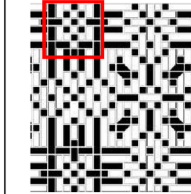
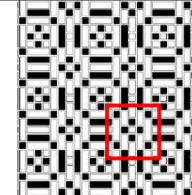
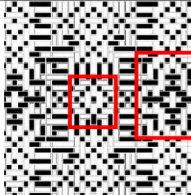
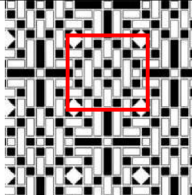
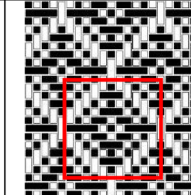
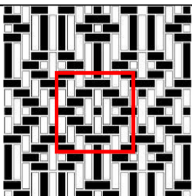
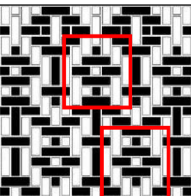
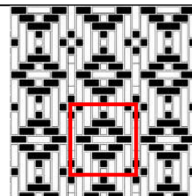
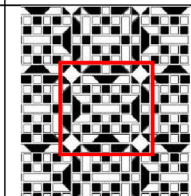
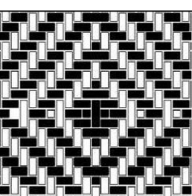
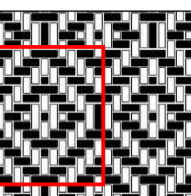
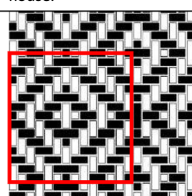
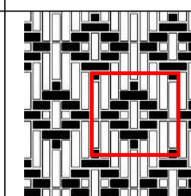
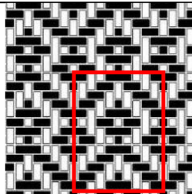
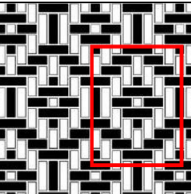
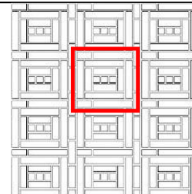
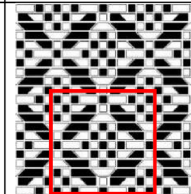
 <p><i>Toffah</i> (Shaped like a cross) in Alidad Ghasemi house.</p>	 <p><i>Toffah</i> and <i>Gol-Andaz</i> (A flower shaped like cross and flower) Alidad Ghasemi house.</p>	 <p><i>Toffah</i> and <i>Chahar-Gol</i> (A flower shaped like a cross and 4 flower) in Daei house.</p>	 <p><i>Chahar-Ali-Va-Gol-E-Moraba</i> (4 Ali and a flower in the middle) in Charmaki house.</p>
 <p><i>Chahar-Gol-Gosheh</i> (4 flower in the corner) in Mirza Ebrahimi house.</p>	 <p><i>Chahar-Ali-Gol-Dar</i> (4 Ali with flower) in Vasi Namadmal house.</p>	 <p><i>Chahar-Tieh-Va-Hasht-Chahar-Goleh</i> (4 eyes and octagonal) in Alidad Ghasemi house.</p>	 <p><i>Chahar-Gol-E-Bozorg</i> (4 big flowers) in Mirza Ebrahimi house.</p>
 <p><i>Gheliuni-Va-Gol-E-Sham</i> (Hookah and a flower shaped like a candle) in Toloei Far house.</p>	 <p><i>Khofteh-Va-Rasteh-Ye-Gol-E-Riz</i> (Horizontal and vertical bricks with small flower) in Firozi house.</p>	 <p><i>Hasirbaft-Chahar-Gol-E-Pangerehe-Salibi</i> (Linked texture and flower with empty space) in Kohinejad house.</p>	 <p><i>Chahar-Gol-E-Hasht-Zel-E</i> (4 flower shaped like an octagon) in Sozangar house.</p>
 <p><i>Gol-Andaz</i> (A kind of flower in center) in Firozi house.</p>	 <p><i>Gol-Andaz</i> (A kind of flower) in Firozi house.</p>	 <p><i>Gol-Andaz-Khofteh-Va-Rasteh</i> (A kind of flower that is arranged horizontally and vertically) in Khalaj Ghasab house.</p>	 <p><i>Khofteh-Va-Rasteh-Gol-Andaz</i> (A kind of flower that is arranged horizontally and vertically) in Daei house.</p>
 <p><i>Khushah-Angouri</i> (Bunch of grapes) in Firozi house.</p>	 <p><i>Gol-E-Takdaneh</i> (Single part flower) in Mojahed house.</p>	 <p><i>Gol-E-Moraba</i> (A flower shaped like a square) in Nilsaz house.</p>	 <p><i>Gol-E-Pagh</i> (chamfered flower) in Daei house.</p>

Table 3 (continued)

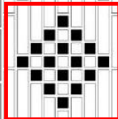
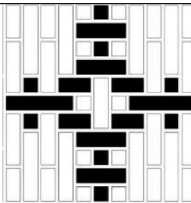
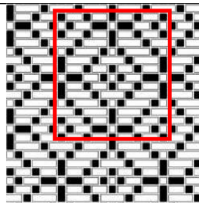
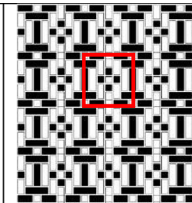
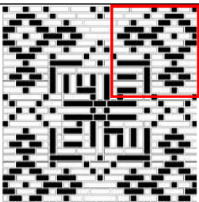
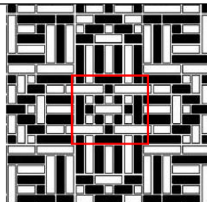
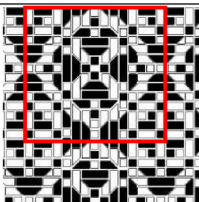
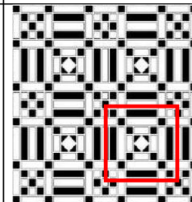
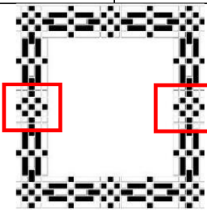
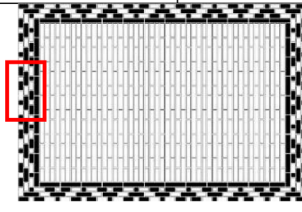
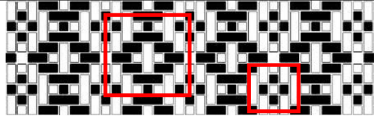
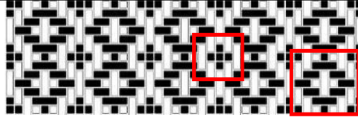

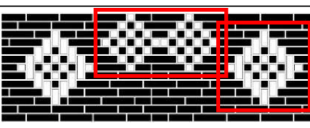

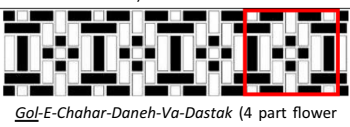
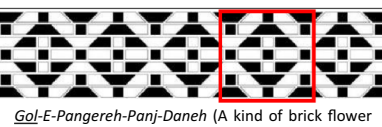

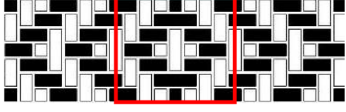
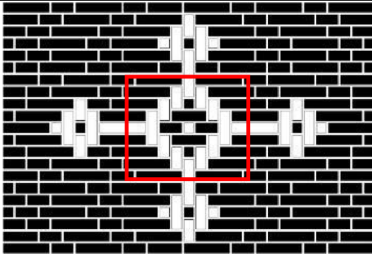
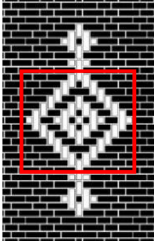
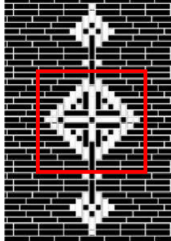
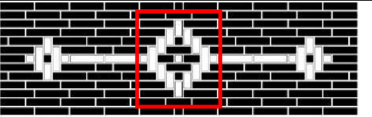
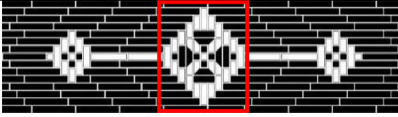
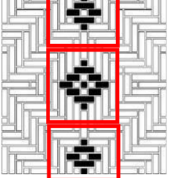
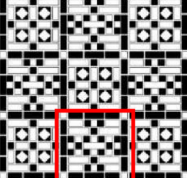
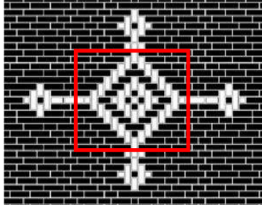
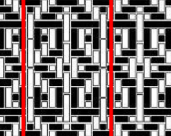
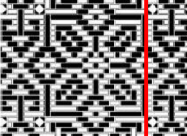
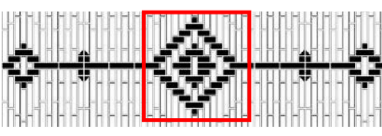
			
<p><i>Gol-E-Moraba-Sadeh</i> (a flower shaped like a square) in Azarbad house.</p>	<p><i>Gol-E-Sadeh-Chaharpar</i> (simple 4 corner flower) in Firozi house.</p>	<p><i>Gol-E-Torang</i> (The flower of bergamot) in Moezi house.</p>	<p><i>Gol-E-Chahar-Daneh-Va-Dastak</i> (4 part flower and I shaped arrangement) in Mohseni house.</p>
			
<p><i>Hasht-E-Siri-Va-Ali</i> (Eight corner with the name of Ali and Garlic-shaped flowers around it) in Bozi Bozorg house.</p>	<p><i>Chahar-Ali-Va-Gol-E-Chaharpar</i> (4 Ali and 4 corner flower) in Kohinejad house.</p>	<p><i>Mouji</i> (wave) in Alidad Ghasemi house.</p>	<p><i>Zangiri-Va-Gol-E-Moraba</i> (Chain and a flower shaped like a square) in Kohinejad house.</p>
			
<p><i>Gol-E-Moraba -Va-Zangiri</i> (A flower shaped like a square and chain) in Zargar house.</p>		<p><i>Gol-E-Mosalas (Nim-Gol)</i> (Flower shaped like a triangle) in Nilsaz house.</p>	
			
<p><i>Gol-E-Pangereh-Va-Gol-E-Chahar-Daneh</i> (Flower with empty space and 4 part flower) in Kohinejad house.</p>	<p><i>Gol-E-Pangereh-Va-Gol-E-Panj-Daneh</i> (A flower shaped with empty cross space and 5 part flower) in Firozi house.</p>		
			
<p><i>Khoftah-Va-Rasteh-Va-Gol-E-Mosalas (Nim-Gol)</i> (Horizontal and vertical arrangement and a flower shaped like a triangle in the middle) in Golchin house.</p>			
	<p><i>Chahar-Gol-E-Moraba</i> (4 flowers shaped like a square) in Yek Khalilo house.</p>		
			
<p><i>Gol-E-Chahar-Daneh-Va-Dastak</i> (4 part flower and I shaped arrangement) in Golchin house.</p>	<p><i>Gol-E-Pangereh-Panj-Daneh</i> (A kind of brick flower with 5 parts) in Filbanzadeh house.</p>		

Table 3 (continued)

 <p><i>Gol-E-Moraba-Va-Sham</i> (Flowers shaped like square and candle) in Mohseni house.</p>	 <p><i>Khurmahi-Va-Gol-E-Panjereh-Y-Miyani</i> (The fish bone and an empty space in the center) in Kohinejad house.</p>
 <p><i>Sham-Gol-E-Khofteh-Va-Rasteh</i> (A flower in center and candle shaped that are arranged vertically and horizontally)</p>	<div data-bbox="635 443 798 695">  <p><i>Sham-Va-Gol-Andaz</i> (Closed flower and 2 vertical candles) in Chinisaz house.</p> </div> <div data-bbox="842 443 1023 695">  <p><i>Sham-Va-Toffah</i> (Candle and cross shaped flower) in Alidad Ghasemi house.</p> </div>
 <p><i>Sham-Gol-E-Khofteh-Va-Rasteh</i> (Flowers shaped like horizontal candles) in Ghalambor house.</p>	 <p><i>Sham-Gol-E-Bbotol</i> (Flowers shaped like candle and beetle) in Chaeideh house.</p>
<div data-bbox="180 968 360 1157">  <p><i>Khofteh-Va-Rasteh-Se-Gol</i> (Vertical shapes with 3 flowers) in Masoumi house.</p> </div> <div data-bbox="392 968 588 1157">  <p><i>Chahar-Tieh-Va-Chahar-Goleh (Gol)</i> (4 eyes and 4 flowers) in Alidad Ghasemi house.</p> </div>	 <p><i>Sham-Gol-Andaz</i> (Bundle in shape of horizontal and vertical candles and flower in center) in Chinisaz house.</p>
<div data-bbox="180 1262 360 1409">  <p><i>Zolf-E-Aroos</i> (A pattern taken from hair curling) in Masoumi house.</p> </div> <div data-bbox="392 1262 588 1409">  <p><i>Zolf-E-Aroos-Va-Hasht-Par</i> (A pattern taken from hair curling and 8 corners) in Daei house.</p> </div>	 <p><i>Sham-Gol-Andaz</i> (Bundle in shape of horizontal candles and flower) in Shayegan house.</p>
<p>The Alidad Ghasemi's house, Aramesh (Firoozi), Chinisaz house, Golchin, Khalaj Qassab, Koohinejad, Masoumi house, Moezi house, Moezzi House, Mohseni House, Mojahedin House, Zargar House, etc.</p>	

This is because there has been no coherent and specific study in this regard and the names of Dezful Xowun decorations have not been provided in writing and specific to this city. Therefore, their names can only be found in the memory of the traditional masters and specialists of this city. The next step, examines the initial names against by the library documents and, if necessary, corrects them. Then, their patterning is completed by matching the obtained names to Xowun decoration motifs. this

method entails matching the decoration's name to the existing geometry and serves as a test for re-examining the decoration's names.

The focus of the research is on the factors influencing social beliefs in the formation of decorative motifs, and the naming of all motifs has been avoided. But due to the better expression of the topic, an example of decorations according to Fig. 6 has been examined. In addition, this



Fig. 10 Toffah Xowun in Alidad ghasemi house. Source: MCHT of Dezful

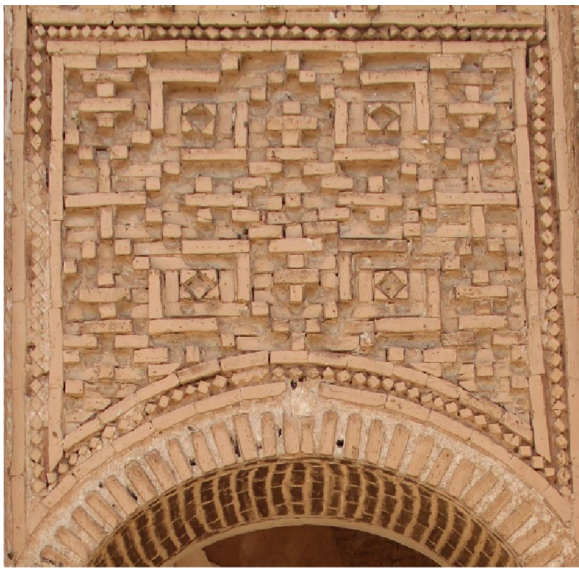


Fig. 11 Sar-Antary Xowun in Bozi Bozorg house. Source: MCHT of Dezful

Table 4 The *Xowun* names in animal motifs (the name of the brick decoration is derived from architectural terms in the native language)


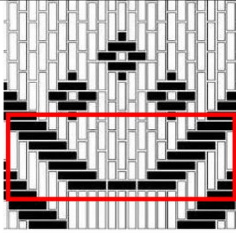
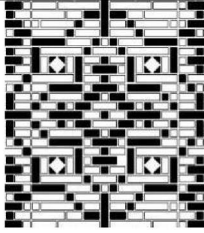

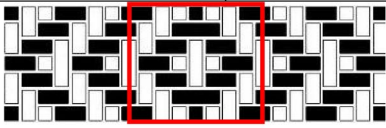
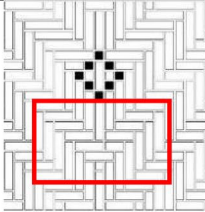

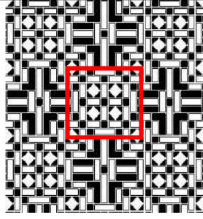
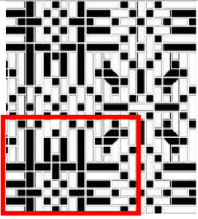
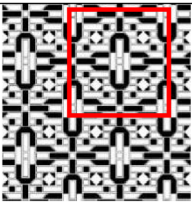
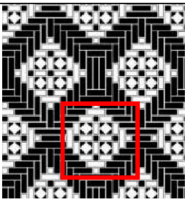
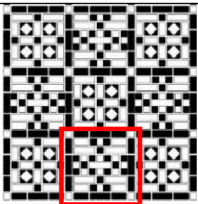
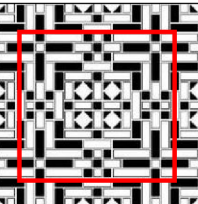
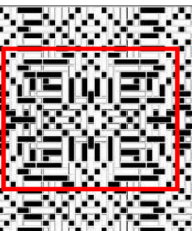
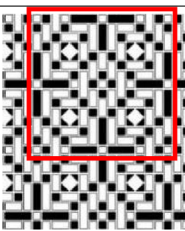
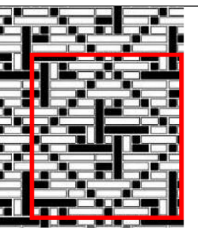
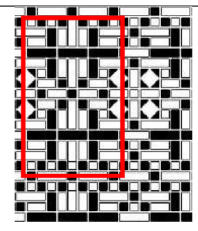
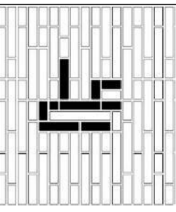
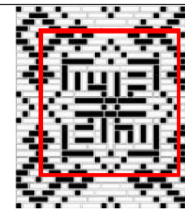
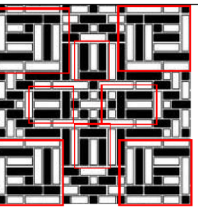
 <p><i>Tieh-Gavi</i>(A kind of decoration that is shaped like the eyes of a cow) in Sozangar house.</p>	 <p><i>Khoftah-Va-Rasteh-Jenaghi</i> (Part of the body of a pigeon that is arranged horizontally and vertically with bricks) in Bozi Bozorg house.</p>	 <p><i>Sar-Antary (Meymoon)</i> (Shaped like a monkey) in Bozi Bozorg house.</p>
 <p><i>Sham-Gol-E-Botal</i> (Flowers shaped like candle and beetle) in Chaeideh house.</p>	 <p><i>Khurmahi-Va-Gol-E-Panjereh-Y-Miyani</i> (The fish bone and an empty space in the center) in Kohinejad house.</p>	
 <p><i>Khoftah-Va-Rasteh-Sineh-Kaftari</i> (Part of the body of a pigeon that is arranged horizontally and vertically with bricks) in Golchin house.</p>		
The Koohinejad House, Ashraf koochak, Bozi Bozorg house, Qalambor and etc.		

Table 5 The *Xowun* names in religious and belief motifs (the name of the brick decoration is derived from architectural terms in the native language)

 <p><i>Tieh-Gavi</i> (A kind of decoration that is shaped like the eyes of a cow) in Sozangar house.</p>	 <p><i>Chahar-Par-Moraba-Va-Chahar-Tieh</i> (4 corner and 4 eyes) in Asef house.</p>	 <p><i>Chahar-Ali-Va-Gol-E-Moraba</i> (4 Ali and flower like a square) in Charmaki house.</p>	
 <p><i>Chahar-Tieh</i> (4 eyes) in Golchin house.</p>	 <p><i>Lozi-Va-Chahar-Tieh</i> (Lozenge and 4 eyes) in Zargar house.</p>	 <p><i>Chahar-Tieh-Va-Chahar-Goleh</i> (4 eyes and 4 flowers) in Alidad Ghasemi house.</p>	 <p><i>Chahar-Par-Va-Chahar-Tieh</i> (4 corner and 4 eyes) in Jafar Khan Sohrabi house.</p>
 <p><i>Chahar-Ali-Gol-Dar</i> (4 Ali with flowers) in Kohinejad house.</p>	 <p><i>Chahar-Tieh-Va-Chahar-Goleh (Gol)</i> (4 eyes and an octagon) in Alidad Ghasemi house.</p>	 <p><i>Chahar-Ali-Va-Band-E-Roomy</i> (4 Ali and the linear form around it) in Moezi house.</p>	 <p><i>Jum-Va-Chahar-Tieh</i> (Cup and 4 eyes shape) in Ghalambor house.</p>
 <p><i>Ali Sadeh</i> (Ali in simple shaped) in Jafar Khan Sohrabi house.</p>	 <p><i>Hasht-E-Siri-Va-Ali</i> (Eight corner with the name of Ali and Garlic-shaped flowers around it) in Bozi Bozorg house.</p>	 <p><i>Chahar-Ali-Va-Gol-E-Chaharpar</i> (4 Ali and 4 corner flower) in Kohinejad house.</p>	

The Koohinejad House, Qalambor House, Adasi House and etc.

The Koohinejad House, Qalambor House, Adasi House and etc.

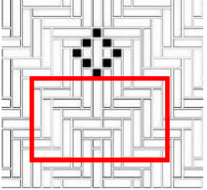
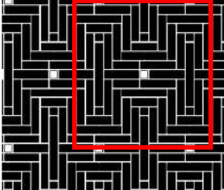
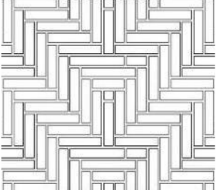
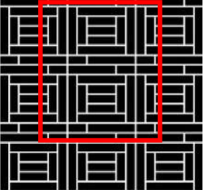
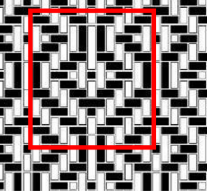
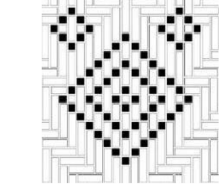
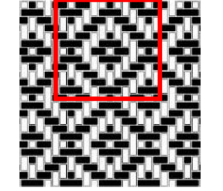
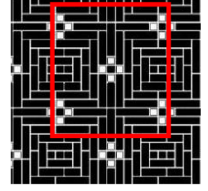
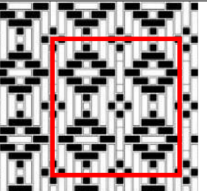
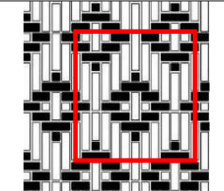
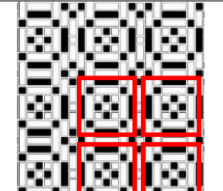
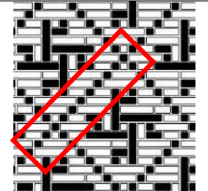
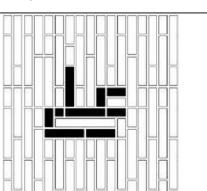
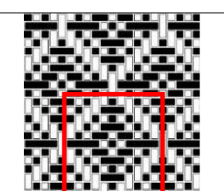
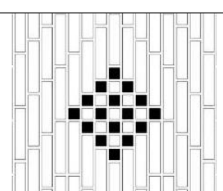
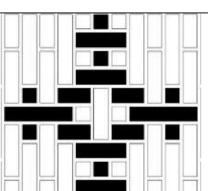
process provides a better understanding of the factors influencing the naming of ornaments.

Then, by studying the social factors and beliefs that influence decorative designs, the historical values associated with them are discussed. Finally, conclusions are drawn based on logical inference and research findings, and the factors that contribute to the formation

of social beliefs and cultural values in a society with a rich history are presented. Patterns and names associated with each role of *Xowun* decorations are also documented.

The study's platform is located in the north of Khuzestan Province (Dezful), an area rich in historical significance. Furthermore, the reason for choosing it is to

Table 6 The *Xowun* names in the motifs derived from the implementation and construction technique (the name of the brick decoration is derived from architectural terms in the native language)

 <p><u>Khoftah-Va-Rasteh-Sineh-Kaftari</u> (Part of the body of a pigeon that is arranged horizontally and vertically with bricks) in Golchin house.</p>	 <p><u>Hasiri-Yek-DanehVa-Lozi</u> (brick texture and lozenge form) in Chinisaz house.</p>	 <p><u>Chap-Va-Rast</u> (Right and left) in Kohinejad house.</p>	 <p><u>Chap-Va-Rast</u> (Right and left) (Bumpy) in Alidad Ghasemi house.</p>
 <p><u>Moalagh-Khoftah-Va-Rasteh</u> (Vertical and horizontal hanging) in Mojahed house.</p>	 <p><u>Khoftah-Va-Rasteh-Ye-Gofband</u> (Horizontal and vertical bricks with lozenge shaped) in Golchin house.</p>	 <p><u>Saye-Va-Roshan</u> (Shadow and light) in Firozi house.</p>	 <p><u>Hasiri-Chahar-Daneh</u> (Linked texture with 4 part) in Daei house.</p>
 <p><u>Hasirbaft-Chahar-Gol-E-Pangerehe-Salibi</u> (Linked texture with 4 cross shaped flower) in Yek Khalilo house.</p>	 <p><u>Khoftah-Va-Rasteh-Gol-Andaz</u> (Linked texture and flower) in Daei house.</p>	 <p><u>Chahar-Gol-Gosheh</u> (4 flower in the corner) in Mirza Ebrahimi house.</p>	 <p><u>Chahar-Ali-Va-Band-E-Roomy</u> (4 Ali and the linear form around it) in Moezi house.</p>
 <p><u>Ali Sadeh</u> (Ali in simple shaped) in Jafar Khan Sohrabi house.</p>	 <p><u>Chahar-Gol-E-Bozorg</u> (4 big flowers) in Mirza Ebrahimi house.</p>	 <p><u>Gol-E-Moraba-Sadeh</u> (Simple flower shaped like square) in Azarbad house.</p>	 <p><u>Gol-E-Sadeh-Chaharpar</u> (Simple 4 part flower) in Firozi house.</p>

preserve valuable examples that are being destroyed due to cultural and social beliefs values being neglected and ignored. Therefore, future generations must be aware of their, analyze and study these decorative designs, and lay the groundwork for their incorporation into contemporary architecture.

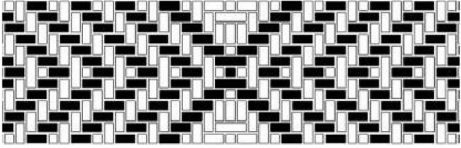
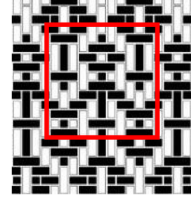
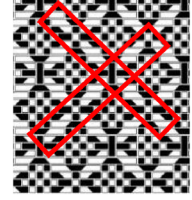

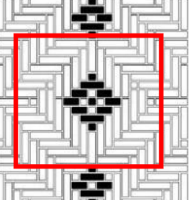
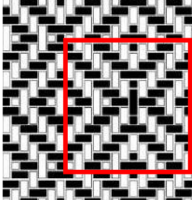
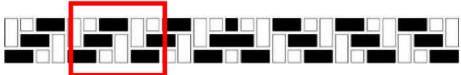
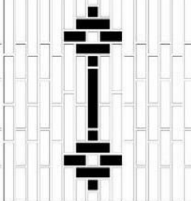
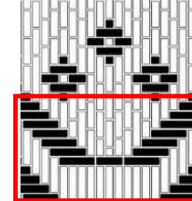
Thus, the investigations in this study focused on the houses listed on Iran's national heritage list. Miandara, Ghalae, Bazar, Lourian, Moqadasian, Siahpoushan,

Poladian, Pirnazar, Masjid, and Shahroknodin were the neighborhoods where the houses were located (Fig. 7).

Results

The patterns of *Xowun* decoration in residential architecture have been classified into geometric and nongeometric categories and named according to the influence of various factors. architectural decorations have developed in response to the expertise and skill of traditional

Table 6 (continued)

 <p><i>Hasir-Raft-Va-Bargasht</i> (Linked reciprocation texture) in Golchin house.</p>	 <p><i>Khofteh-Va-Rasteh-Ye-Gole-Riz</i> (Vertical and horizontal bricks with small flower) in Firozi house.</p>	 <p><i>Gereh-E-Goff</i> (Linked texture lock) in Daei house.</p>
 <p><i>Hasirbaft-D-Gol</i> (Linked texture with 2 complete and 2 semi flowers) in Yek Khalilo house.</p>	 <p><i>Khofteh-Va-Rasteh-Se-Gol</i> (Vertical shaped with 3 flowers) in Masoumi house.</p>	 <p><i>Gol-Andaz-Khofteh-Va-Rasteh</i> (Vertical and horizontal bricks with lozenge flowers) in Khalaj Ghasab house.</p>
 <p><i>Khofteh-Rasteh-Va-Gol-E-Mosalas (Nim-Gol)</i> (Horizontal and vertical bricks and flower shaped like a triangle) in Golchin house.</p>	 <p><i>Gheliuni Sadeh</i> (Simple hookah) in Adl house.</p>	 <p><i>Khofteh-Va-Rasteh-Jenagi</i> (Part of the body of a pigeon that is arranged horizontally and vertically with bricks) in Bozi Bozorg house.</p>
The Golchin, Moezzi house, Mujahid house, Ziaei, Tahmasebi house, Adl house and etc.		

masters, as well as the surrounding structures and social beliefs factors, and have taken on a variety of forms (Ali-zadeh and Zarghami 2014, p. 61); (Janbazi 2015. 51). The motifs are classified according to their geometry and similarity to known shapes. Thus, the decorations can be classified into geometric, combined, plant, animal, and religious motifs and those influenced by the construction technique.

The combined geometry

In the combined geometry decoration group (Table 1), the masters drew inspiration from the objects and shapes around them as artificial elements and created decorations such as chain margins, cups, hooks, and candles (Fig. 8).

The examples of designs in this section can be seen in the courtyard of Shaygan House (Fig. 8), the courtyard of Tolouifar House, the outer courtyard and wall of Mahdavi House, the courtyard of Weiss Namdamal House, etc. The cup motif was created to illustrate combined motifs using the geometry of two reversed cups adjacent to one another. Geometry was discovered in artificial objects and was named for its resemblance to human structures. The hookah motif was created using geometry that resembles the hookah. The instrument was significant during the Qajar era and earned a prominent place in Xowun decorations.

The candle element was traditionally used in holy places, as evidenced by Xowun decorations. As a result of its geometric resemblance, the flower-candle motif

frequently conveys the concept of holiness. The candle is a religious and ritual symbol that has been classified as such due to its geometric shape and name. This element represents life, and the candle tears represent the plight of the poor and can be used in religious vows (Safari & Daghighi 2016). The chain motif was inspired by the resemblance between its name and intertwined chains and the geometric shape of each ring. The symbol of unity is desired in this motif, which is placed within the group of combined geometry.

The patterns in this collection of designs extend beyond simple geometric volumes. Thus, patterns created by combining several geometric shapes were combined, and new patterns were created. These patterns are similar to those found in the environment (artificial objects such as cups, hooks, chains, and candles) and are influenced by their interactions. The impact of social behaviors can be observed on how these tools are used and the social beliefs status of some of them.

The geometric shapes

The geometric motifs were initially named according to their predefined shapes, and they were commonly referred to as square, octagon, and others (Table 2). These motifs incorporate square, diamond, chalipa (cross), triangle, and circle geometry. Thus, the motifs can be analyzed independently of the signs.

Examples of these designs can be seen at the entrance of the Mohseni's house (Fig. 9), the entrance of the Zargar's house, the yard of the Bozi bozorg house, the yard of the Da'ei house, and so on.

The square and the diamond are the most fundamental geometric shapes, representing the ground (earth) (Dallviella 1894). Due to the motif's association with the number four can be considered a strong motif (Golan 2003). The circle is one of the most enigmatic geometric motifs, serving as a symbol of humanity and a mirror image of the universe. This motif has been significant in Iranian architecture's historical works and can be described using terms such as perfection, homogeneity, and uniformity (Adkinson 2009). Another geometric motif is the cross geometric motif. In Iranian architecture, the most frequently used motif symbolizes happiness, progress, growth, and fertility (Baring and Cashford 1991). A triangle is another geometric motif that can be observed in both upward and downward directions. The upward-mode motif represents womanhood and fertility and is a metaphor for the material world, water, and capitals.

The downward triangle represents man and power (Roach 2008), a concept rooted in ancient Iranian thought. Additionally, this motif was used in Islamic architecture. In some cases, the decorations with

triangular geometry incorporate zigzag lines, which could be interpreted as a symbol of Choghaznabil and Holy Mountain architecture (Chevalier & Berg 2006). However, this has occasionally been interpreted as a wave symbol (Keel 1997).

Geometric patterns in conjunction with motifs allude to concepts of law and order, as seen in Xowun decorations. Furthermore, it demonstrates society's interest in logic and mathematics, which play a role in the behavioral patterns of society. The pattern names are influenced by similarities between predefined mathematical patterns (triangles, squares, circles, and others) and Xowun decorations.

The nature-related geometries

Natural properties and relevant motifs were used to generate nature-related geometries. The effect of nature is emphasized in this group, and the decorations are named accordingly (Table 3). Wave, flower, grape cluster, bride hair, garlic, and bergamot are among the motifs.

The examples of these designs can be found in the entrance of Alidad Ghasemi's house (Fig. 10), Aramesh (Firoozi) courtyard, the outside body of Chinisaz house, Golchin courtyard, Khalaj Qassab courtyard, Koohinejad courtyard, Masoumi house entrance, Moezi house entrance, the courtyard of Moezzi House, the entrance of Mohseni House, the entrance of Mojahedin House, the entrance of Zargar House, etc.

The wave motif is reminiscent of the Xowun decorative forms with rounded water waves, an abstraction that has created the relevant motif. The flower Xowun decorations are another example of natural motifs derived from the geometry of blooming flowers and created on small and large scales (Shahpasand Zadeh 2016). The grape cluster motif is inspired by nature and depicts an abstraction of small grapes suspended from branches. The bride's hair is a natural motif inspired by the twist created in the bride's hair. "The garlic motif is named for its resemblance to the blooming garlic flower and has developed a relevant pattern" (Nemanifar 2020, personal interview in 2020). Another motif family, bergamot, demonstrates the form, which is named for its elongation and similar geometry and has resulted in bergamot-shaped motifs.

This collection of Xowun decoration patterns reflects society's sensitivity to nature and incorporating natural motifs into the architecture. The nature's influence and tendency in the naming and patterning of Xowun decorations can be observed.

The geometry associated with animals

"The geometry associated with animals, which plays a significant role in naming Xowun decorations, was developed to be similar to the forms found in nature" (Moghadamnia Dezfuli Zand 2020, personal interview in 2020). Thus, motifs such as the cow's eye, the fishbone, the beetle, the monkey head, and the pigeon breast can be used as examples.

The examples of these designs can be seen in the courtyard of Koochinejad House, Ashraf koochak courtyard, gardener courtyard, Bozi Bozorg house (Fig. 11), Qalambor courtyard, etc.

The cow's eye was created due to social beliefs considerations and is included in this category due to its resemblance to the eyes of a cow. The fishbone is another animal motif derived from the skeleton of a fish. The motif, like the fishbone, has elongated proportions.

The beetle motif was created due to the insect's body's similarity to the geometry of Xowun decorations, and it serves as a symbol of natural creatures in decorations. "The monkey head is another animal motif that was created due to the similarity between the geometry of the Xowun decorations and the margins of the monkey's face" (Hossinzadeh Kohsari 2020, personal interview in 2020). Table 4 summarizes these motifs.

The naming of Xowun decoration patterns after animals demonstrates the value placed on vitality and freshness by other living things and members of society who influence their thought processes. They were used as symbolic patterns in Xowun decoration ornaments and given animal-like names.

The religious and belief motifs

Another factor influencing the Xowun decorations' name is the motifs derived from religious and non-religious beliefs (Table 5). Decorative types such as Ali motifs, four

Ali, and Bismillah (in the name of God) inscriptions can be counted in this case.

The examples of designs with religious patterns can be seen in the courtyard of Koochinejad House (Fig. 12), the entrance of Qalambor House, the courtyard of Adasi House, etc. Also, religious and non-religious motifs can be examined in examples such as the entrance of Jafar Khan Sohrabi's house, Qalambor courtyard, Nilsaz house entrance, etc.

The Bismillah motifs have been used in two distinct injunctive and combined configurations. Traditionally, the entire motif was devoted to religious decorations and divine names in injunctive motifs. Thus, this motif reflects the religious quality and beliefs of the residents. However, a portion of the decoration in combined motifs is reserved for religious patterns and is displayed in the form of an inscription or a part of the Xowun decorations. Specific motifs derive from non-religious beliefs. The cow's eye is one of these motifs. Historically, people regarded the cow as a valuable animal and believed that the cow's eyes could act as a protective talisman against natural disasters. Hence, the cow eye motif in Xowun decorations represents protection and safety from disasters.

The patterns used in this category of Xowun decorations are derived from social beliefs, both religious and non-religious, and have similarly influenced the naming of ornaments. These patterns are utilized both directly and indirectly and are symbolically represented. On the one hand, direct patterns with holy names were created, while in the group of indirect patterns, motifs were used to convey a belief narrative through the decorative body. Thus, formed thoughts and their consequences can be viewed as symbolic motifs.

Motifs derived from the implementation and construction technique

Finally, the origin names deduced from implementation techniques are presented (Table 6). The origin of the name Xowun decorations in this group is based on their implementation method and their simplicity or difficulty. For instance, the motifs of vertical sleeping, suspended, simple flower, and simple Ali can be mentioned.

These designs can be studied in the entrance of the porcelain house, the inner body of the Golchin courtyard, the entrance and courtyard of the Moezzi house, the entrance of the Mujahid house, the courtyard of Ziaei, the entrance of Tahmasebi house, the courtyard of Adl house and the Mirza Ebrahimi house (Fig. 13).

The vertical sleeping motif was created by vertically arranging bricks. This motif is a technique for emphasizing motifs and can be classified as part of this group (Shahpasand Zadeh 2016). Another motif, hanging, emphasizes the method of implementation, which is



Fig. 12 Chahar-Ali-Gol-Dar Xowun in Kohinejad house. Source: MCHT of Dezful

Table 7 *Xowun* decorations and essential components

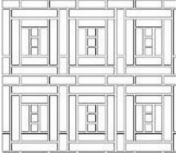
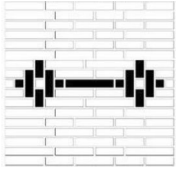

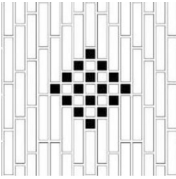
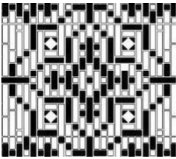
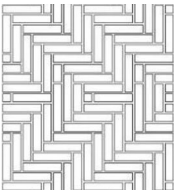
Pattern/aspects	Geometric pattern	Pattern of combined geometries	Belief and religious model	Pattern related to plants and nature	Animal-related pattern	Pattern influenced by construction technique
Forms used in designs	Geometric	Geometric-non-geometric	Geometric—non-geometric—written	Geometric-non-geometric	Geometric-non-geometric	Geometric and non-geometric
The hidden concept in the motif	Discipline and Mathematics	Modernization of designs and creating new patterns	The religion and historical and cultural traditions	Naturalism in order to create vitality and freshness	Living organisms and creating dynamics	Presenting methods and techniques of pattern design
Rate of use of the motif	11.38%	11.38%	11.47%	40.65%	4.87%	20.34%
Case study	 Xowun in Nilsaz house	 Xowun in Adl house	 Xowun in Bozi Bozorg house	 Xowun in Azarbad house	 Xowun in Bozi Bozorg house	 Xowun in Kohi Nejad house

Table 8 The influence of social beliefs and beliefs in different decorative groups

Social beliefs	
Pattern	Description
Geometric	<ul style="list-style-type: none"> - The square and rhombus symbol of the earth, which is related to the number 4 - The circle pattern is a symbol of humanity and a mirror of the universe - Cross motifs are a symbol of growth and fertility, which also emphasizes the number 4 and its related concepts - The downward triangle is the concept of man and his power, and the zigzag forms are a symbol of holy mountains and waves
Combined geometries	<ul style="list-style-type: none"> - The use of the candle pattern with the concept of sanctity and ritual thinking is considered in the society's thought - Chain patterns are a symbol of unity and integrity
Belief and Religious	<p><i>In the group of religious thoughts:</i></p> <ul style="list-style-type: none"> - Objective use of religious names such as Bismillah, Muhammad, Ali, etc <p><i>In the group of non-religious beliefs:</i></p> <ul style="list-style-type: none"> - Attention to the eye pattern that protects people from natural disasters and problems
Related to plants and nature	<ul style="list-style-type: none"> - The role of the wave, which is reminiscent of a pattern in nature - The flower pattern, which is inspired by plants and flowers in nature and has a variety of patterns - The role of grape clusters, which have been used as a natural element in motifs
Animal-related	<ul style="list-style-type: none"> - The role of the cow's eye, which is influenced by people's attention to the cow as a valuable animal - The role of monkey and cockroach, which was chosen because of the similarity of the pattern to them, and is a symbol of life and living nature in architecture
Influenced by construction technique	<ul style="list-style-type: none"> - The role of the cow's eye, which is influenced by people's attention to the cow as a valuable animal - The role of monkey and cockroach, which was chosen because of the similarity of the pattern to them, and is a symbol of life and living nature in architecture

derived from hanging objects. The implemented motif can convey the designer's thoughts in this instance. In motifs such as simple Ali or simple flower, the visual quality that distinguishes simple from complex motifs can be considered. Some motifs were created for their applicability, while others were created for their simplicity of

implementation and ability to demonstrate the quality of Xowun decorations.

Patterns in this category are considered experimental concepts in pattern composition and design. Thus, the designer's mindset when developing the role of Xowun decoration can be interpreted symbolically.

However, the names of these designs are directly related to their complexity and simplicity, the pattern's placement, the arrangement of the bricks, and the number of designs.

The rate at which each role is used is calculated using the distribution in various species. This rate includes religious motifs with 14 patterns equaling 11.47%, plant motifs with 50 patterns equaling 40.65%, animal motifs with 6 patterns equaling 4.87%, construction technique-influenced designs with 25 patterns equaling 20.34%, geometric patterns with 14 patterns equaling 11.38%, and geometric compositional patterns with 14 patterns equaling 11.38%.

Conclusion

The Xowun's patterns and hidden thoughts have been analyzed, indicating the existence of a shared language between generations and members of society. Therefore, we can refer to the various decorative categories to which include Geometric, religious, plant-related, animal-related, combined geometric groups, and patterns influenced by construction techniques are all examples of brick patterns.



Fig. 13 Gol-E-Bozorg Xowun in Mirza Ebrahimi house. Source: MCHT of Dezful

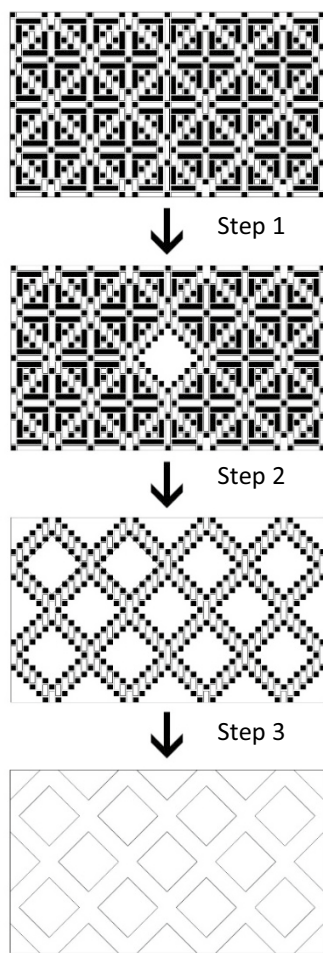


Fig. 14 Simplification steps in brick decoration for contemporary architecture

The most decorative patterns are related to plant and nature with 40% and the least amount of motifs is animal related pattern with 8%. Each of these patterns is based on a specific concept, as described in Table 7. Therefore, we can refer to each of them as having a hidden species. An example of each of them is presented in Table 7 to better express the issue in different types of Xowun decoration.

The Geometric patterns are ordered thought structures that mathematics and predefined geometries create. This contrasts with how Xowun decoration in composite geometries have been developed from a broader perspective and outside the basic framework. This meta-thinking through the use of combined motifs is accompanied by establishing intellectual frameworks, combining multiple roles, and creating patterns derived from natural and artificial geometries.

Religious and doctrinal motifs form a group influenced by society's beliefs and adherence. Additionally,

animal- and plant-related motifs have been created through the use of naturalism's structure and the integration of architecture and nature. These motifs permeate the decorative body and infuse the populace with vitality. Finally, the patterns influenced by the construction technique are derived from the technical and executive structures of the designs, which are an expression of the traditional performers' creativity, art, and skill.

The elements influencing in the naming of Xowun decorations are influenced by society's ideas and intellectual structures and show attachment to motifs, creating a common language between generations and connecting motifs with society's thoughts.

Xowun decoration motifs effectively create comfort and tranquility in society through patterns, symbolizing societal values and people's satisfaction with decorative motifs. The relationship between Xowun patterns and community thinking has been effective in naming them, which can be seen in the influence of thoughts and similes of the name of the decoration and the roles used.

Therefore, the strong relationship between decorative motifs and society's thoughts can be considered as a quality of religious aspects and social beliefs of society that have led to the naming of architectural patterns. As a result, the continuation and use of the name of decorative motifs in the architecture of this city represents the quality of architecture on the lives of people in the society.

The effective social aspects can be considered the hidden concepts used in the Xowun patterns (Table 8), which include the application of order and mathematics, attention to the implementation method and patterns derived from the skill and expertise of architectural masters, religious ideas and non-religious influence on the formation of decorative patterns, inspiration from nature and the living beings in creating vitality and freshness, considering innovation and creating new combined designs with each other.

Based on this, the use of decorations in today's architecture can be improved by simplifying decorations and reusing them, which is shown in Fig. 14.

This technique can be used with the help of geometric simplification, simplification in the materials used and even the use of simple patterns with other materials. The simplified pattern creates a different effect by combining it with simple surfaces that can be raised or hollow.

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Author contributions

SA arranged the analysis, a part of the result, a part of the conclusions, and a part of the research literature. DI arranged a part of the research literature, a part of the result, and the introduction. VA arranged the methodology and a part of the conclusions. However, all sections of the article are based on the opinions of the authors, which are approved by them. All authors read and approved the final manuscript.

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The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

- Adkinson R (2009) Sacred symbols, people, religions, mysteries. Thames & Hudson, London
- Alizade D, Zarghami E (2014) Assessment and study of brick tombs in Dezful. *Paykareh* 2:59–68
- Atanda JO (2019) Developing a social sustainability assessment framework, sustain. Cities. <https://doi.org/10.1016/j.scs.2018.09.023>
- Baring A, Cashford J (1991) The mythe of the goddess. Arkana, England
- Catalani A, Nour Z, Versaci A, Hawkes D, Bougdah H, Sotoca A, Ghoneem M, Trapani F (2018) Cities' identity through architecture and arts. Taylor & francis group, London
- Chevalier J, Berg A (2006) Dictionnaire de symboles, translate by Sodabeh Fazayeli. Iran: Jayhoun.
- Dalviella C (1894) Snator and member of the royal academy of Belgium, a constable and cofe. Westminster, London
- Fatourechi S, Salehi S, Zarghami E (2020) Social sustainability assessment framework for managing sustainable construction in residential building. *J Build Eng* 32:1–15. <https://doi.org/10.1016/j.jobe.2020.101761>
- Golan A (2003) Prehistoric Religion: Mythology, Symbolism. Jerusalem: the University of Virginia
- Hossinzadeh Kohsari A (2020) Personal interview in his office work. Dezful. (An unpublished interview)
- Janbazi F (2015) A study of animal motifs in Jiroft civilization. *Jelve-Y-Honar* 7:49–62
- Keel O (1997) The symbolism of the biblical world, translate by Timothy J Hallett. Idiana eisenbrauns.
- Kiani Z, Amiriparyan P (2016) The Structural and Spatial Analysing of Fractal Geometry in Organizing of Iranian Traditional Architecture. *J Procedia Soc Behav Sci* 216:766–777
- Mak M, Peacock CJ (2011) Social sustainability: a comparison of case studies in UK, Usa and Aust. In: Poster presented at the 17th pacific rim real estate society conference, Gold coast.
- Moghadamnia Dezfuli Zand MA (2020) Personal interview in Usul al-din institute of higher education, Dezful. (An unpublished interview)
- Molaei A, Aysham M (2019) The situation of social factors in the forming of Iranian cities structure's. *Urban Manag* 53(17):121–140 (In Persian)
- Naeima G (1996) Dezful: The city of bricks, first ed, Tehran, cultural heritage handicrafts of Iran. [a book In Persian]
- Nemani Far MH (2020) Personal interview in his office work, Dezful. (An unpublished interview)
- Roach K J (2008) The elamite cylinder seal corpus, sydeny: university of sydeny.
- Safari M, Daghighi G (2016) A study of the symbolic aspect of water in the Iranian architecture. International conference on research in science and technology, 9 July. Berlin, Germany. [In Persian]
- Sarrafzadeh A, Didehban M, Vasigh B (2020) Classification and functional roots of the geometric patterns in the ornament of traditional houses in dezful based on vikor method. *Soffeh* 30:27–42 (In Persian)
- Sarrafzadeh A, Vasigh B, Didehban M (2022) The art of xowun decoration in historical context of Khuzestan. Jundi Shapur Unive of Tech, Dezful (a book In Persian)

Shahpasan Zadeh B (2016) Brick as an identify element in iranaian Islamic architecture. research paper at the brick and brickwork in Iranian Art and Architecture Conference, Azad University, Dezful.

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