

Representation of the Patterns and Designs of Tabriz Historical Gardens in the Garden Carpets of Northwestern Iran

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ABSTRACT

Persian gardens play a key role in shaping forms, giving meaning, theme, and the very particulars of many works of art, including the art of carpet weaving. The effects of these gardens on decorating the drawings and geometric composition of garden-design carpets were examined in this study. This research aimed to investigate the way carpets of garden design adopted patterns of historic gardens of Tabriz in the 17th and 18th centuries. Using a comparative study and case analysis, three historical gardens of Tabriz, including the Sahebabad, Shomal, and E'lgoli Gardens, and seven carpets of garden design dating from the 17th and 18th centuries of Northwestern Iran were selected. The map of the gardens and the designs of the carpets were taken from historical documents and library sources. Then, the extent to which geometric elements of the historical gardens were represented in garden design carpets was studied using physical-structural features of Iranian gardens, including geographical-environmental features, spatial-physical elements, natural elements, form-geometry, and design-aesthetic principles. The research findings demonstrated the presence of common design features such as using Chaharbagh pattern, rectangular geometry, straight lines, focus on the main axis through water streams, pavilions and ponds in the center, fence and gardens, decorative trees and shrubs, symmetry, spatial-functional arrangement and independence-diversity of spaces. In sum, it was found that the general design and structure of garden design carpets from northwestern Iran was harmonious with the general structure of Sahebabad, Shomal, and E'lgoli Gardens. Sahebabad, Shomal, and E'lgoli Gardens were found to have the highest effects on the patterns and designs of garden carpets.

Keywords: Persian Garden, Sahebabad, Shomal and E'lgoli Gardens, Northwest Garden Carpets.

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1. STATEMENT OF THE PROBLEM

Gardens and carpets are the salient works of art in Iran that are deeply rooted in culture and civilization representing natural human interests, emotions, and inner beliefs. Both garden artists and carpet weavers and designers have shown great skills and tastes to instill their inner thoughts, feelings, and secrets within their designs through serious and diligent efforts (Chitsazian, 2009). Persian gardens and relevant themes have played a significant role throughout the ancient and Islamic history of Iran. Garden, in its physical and objective aspect, i.e., from an architectural form to the designs it has on crafted works, carpets, and paintings, and in its mental and abstract aspect in literature, has always been of great concern in different artistic fields (Atari, Ashori, Arbabi, & Keshavarz Afshar, 2016). Garden designs are hardly seen on carpets with the garden theme mainly representing the designs indirectly and abstractly. Therefore, most studies conducted on the relationship between the garden and the carpet, have emphasized the allegorical and semantic significance of the garden in the carpet, while the issue of the geometric system and garden elements and the way they affect and are affected by the garden themes are less focused attention. Looking at the long-established link between the garden and the carpet, this study aimed to investigate the geometric shapes of Tabriz historical gardens such as Sahebabad, Shomal, and E'lgoli and their elements on designing northwest garden carpets as well as the relationship between these two traditionally valuable arts. Because these gardens were simultaneously erected in Tabriz (Agh Ghuyunlu Turkmen era) and that they left a predominant influence (especially Sahebabad garden) on the Safavid era garden-establishment patterns (Mirzaie, Mosavi Haji, Taghavi, & Moradi, 2017) and also considering that Chaharbagh-styles garden and garden carpet weaving were flourished in Safavid era (Zarei, 2011), the study aimed to examine the effect of garden design pattern from the Turkman era in Tabriz on garden design pattern and garden carpets of following periods. The design pattern of northwestern garden carpets seems to have been inspired by the Chaharbagh gardens within the spatial range of the sites. Accordingly, the research questions are:

What are the similarities between Iranian gardens and Tabriz historical gardens in terms of geometric system and composition of elements? and

How has the architecture of the Chaharbagh gardens of northwestern Iran, such as Sahebabad, Shomal, and E'lgoli, inspired the drawings and the geometric composition of the garden carpets in that region?

2. LITERATURE REVIEW

Gardens and their elements have inspired various arts such as painting, carpet weaving, gilding, literature, woodcarving, etc. Numerous researches

have focused on Persian gardens, painting gardens, and garden carpets, taking into account different aspects of history, aesthetics, mythology, and so on. However, the relationship between the two arts, i.e., the geometric structure and composition of elements in gardens and garden carpets have been less focused attention. An article entitled "Understanding gardens through a symbolic context of Iranian architecture and carpets", demonstrated that Iranian garden carpets were consistent with the religious beliefs of Iranians with the garden carpet designs being harmonious with the general structure of Iranian gardens. Also, both Iranian gardens and carpet designs were found to evoke Paradise (Chitsazian, 2009). In an introduction to the aesthetics of Persian Gardens, Mansouri introduces the beauty elements of the Iranian garden to be infinite landscape, presence of water, spatial diversity and independent spaces, harmony with nature instead of naturalism or nature aversion, joyful landscaping, rectangular geometry, introvert geometry, and confinement. Another article entitled: "Iranian garden: an allegory of the Paradise", emphasized the values of the Persian Garden during the Safavid era, the allegorical concept of Paradise in a Persian garden, while so-called elements of the Paradise in Iranian Garden, are represented by streams, springs, waterfalls and ponds, trees and plants, pavilions, and the walls and doors of paradise (Ansari & Mahmoudinejad, 2007). In the article "Vantage point" the main garden elements depicted in the paintings of Iranian gardens include water, vegetation, man, etc., as well as pavilions, porches, balconies, etc. (Teimouri gorde & Heidarnattaj, 2014). Examining the structure and points of view of Iranian gardens in garden painting and garden carpets from the Safavid era, Iranian gardens in garden paintings from the Safavid era are seen to have been composed of Chaharbagh pattern with emphasis laid on ponds as central axes, existing water supply network, symmetrical water flow, naturalism and harmonious elements of the gardens as well as separation of spaces (Mohammadzadeh & Noori, 2018). The comparative study of the painting from the second school in Tabriz and Iranian gardens in the Timurid and Safavid eras described the features of Iranian gardens in the form of natural, architectural, decorative, and thematic elements, with the gardens depicted in the paintings sharing the features of this era. A majority of these features are also seen to have repeated in the Safavid era (Ansari & Saleh, 2012). A comparative study of painting from the Shiraz School and elements of Iranian gardens in the Timurid and Safavid eras suggested the effects of garden space and its elements on the Iranian painting of the Shiraz School as researches have demonstrated the identical features between gardens and landscapes as with regards to such elements as the interior spaces and mansions, plants and trees, water system and geometry, and decorative elements such inscriptions, etc. (Ansari &

Nami, 2017). As demonstrated by previous researches, physical-structural features and elements of Iranian gardens from the perspective of some researchers are summarized in Table 1.

Table 1: Physical-structural Features of Iranian Gardens

	Pirnia (1995)	Pope (A'laei, 2012)	Heidartaj (2010)	Naeama (2007)	Soltanzadeh (1999)	Pourmand and Farmer Qalati (2011)	
Environmental and Geographical	Flat Garden and Sloped Garden		Flat Garden and Sloped Garden	Flat Garden and Sloped Garden, Water Garden, and House Garden	Residential-Governmental, Office, Tomb Garden and Physical Garden	Soil Type, Irrigability, Sloped Land, and Geographical Directions	
Architectural and Physical Spaces	Main Pavilion, Facade, Summer and Winter Mansions, and Service Spaces	Pergolas, Pavilions, Tents, Fences, Towers, and Pigeon Houses	Pavilion, Facades, Garden Wall, Interior Space of the Mansion, Service Spaces, Bathroom, Kitchen, and Janitor House	Mansion Facade, Interior Space of the Mansion, Service and Secondary Spaces	Mansion Facade, Interior Space of the Mansion, Service and Secondary Spaces	Pavilions, Facade, Porches, Lattice Walls, Fences, and Secondary Buildings	
Form and Geometry	Protracted Lines Alongside Each other, Regular Terrace, Pond, and Pool	Quadripartite Pattern, Checkered Pattern with the Main Street	The Main Axis of the Garden, Subaxes of the Garden, Gardening, Square and Rectangular Plan	Location of the Pavilion in the Middle of the Garden or 1.3 Ends of the Garden	Terrace, Main and Subaxes, Square and Rectangular Plan and Using Straight and Intersecting Lines	The Rectangular form of the Garden, Square Terrace, and Vertical Axes	
Natural Elements	Water	Ponds, Waterways and Streams, Dipper, Pools, Fountains, and Spouts	Waterways, Reservoirs, and Fountains	Water Canal, Pool, and Pool, Waterway, Fountain, and Waterfall	Fountains, Spouts, Ponds and Pools, Streams and Fountains	Pond, reservoir, stream, fountain, pool, and waterfall	Paradise Streams, Waterways, Waterfalls, Fountains, and Pools
	Plants and Animals	Shady and Fruitful Trees, Decorative Flowers, and Shrubs	Flowers, Trees, Plants, Decorative Trees, Birds, and Fish	Decorative Shrubs and Flowers, Trees, Birds, Fish, and Gazelles	Shady and Fruitful Trees, Decorative Flowers, and Shrubs	Shady and Fruitful Trees, Decorative Flowers, and Shrubs	Shady and Fruitful Trees
Aesthetic design Principles		Symmetry and Centrality of Pavilions	Symmetry, Centrality, Rhythm, Hierarchy, Independence, and Identifications of Spaces		Symmetry, Centrality, Rhythm, Arrangement, Independence, and Identifications of Spaces and Naturalism	Arrangement of Spaces, Public and Private Areas	

3. THEORETICAL BASICS

The oldest Iranian garden based on a Chaharbagh pattern is the Pasargadae Garden of the Achaemenid era (Stronach, 1993). After the Achaemenid era, the Chaharbagh pattern flourished in the Sassanid era West of Iran through a new structure in Sassanid palaces. Great examples of this style, which had a far greater impact on Golestan carpets, especially Chaharbagh carpets, are seen in such works as the Gardens of Ctesiphon Palace and the Garden of Hoshkhaneh (Hoshkooori) in Qasr Shirin. The garden carpet, known as "Bahar Khosrow", was designed and woven using a pattern similar to the garden and palace of Cyrus the

Great in Pasargadae (being a thousand years older) (Zarei, 2011). Most researchers see the Chaharbagh pattern in the architecture of the Islamic period as an outcome of the pre-Islamic gardens in Iran (Fagih, 2004). The straight-geometry of the Iranian gardens characterized by regular axes and considering the Iranians' belief in number four, led to the concept of the Chaharbagh pattern, meaning four gardens. Looking at Pasargadae Garden and many other Iranian gardens surviving from the Sassanid and Safavid eras, we find that Chaharbagh was not an Iranian garden-making style, rather it can only be considered as a special model of the Iranian garden. In sum, the concept of Chaharbagh does not only refer to a garden with two

perpendicular intersecting axes while dividing the space into four parts, rather as a general concept of a garden (Heydar Nattaj & Mansouri, 2009).

3.1. Sahebabad Garden

The Sahebabad Garden and Square Complex are known to have formed at the hand of Khajeh Shamsuddin Mohammad Jovini, the prime minister of Holakokhan, in the 13th century. After the demise of the government succeeding the Timur reign in Herat and the rise of the Turkmen of Agh Ghuyunlu to power (14th century) and the establishment of Tabriz as the capital, the Sahebabad Garden and Square complex was deployed as the government headquarters of the Agh Ghuyunlu kings. The Sahebabad Garden and Square complex served as the seat for the Hasht Behesht Palace in a specific period and with a pre-planned design and in accordance with some specific socio-political conditions. Generally speaking, the Sahebabad complex can be categorized as government-residential squares with socio-religious functionalities (Bani Masoud, 2011). Sahebabad garden is characterized by the following features:

- Sahebabad square and garden complex are considered to be among government-residential buildings characterized by some salient buildings such as Hasht Behesht mansion, facade mansion, interior design mansion (Haramsara), and secondary spaces such as worship houses.
- The garden structure was following a geometric order, the characterized element of which was the axis.
- The Hasht Behesht mansion was one of the four-platform buildings with a square or octagonal plan. This mansion had a middle space in the center, and four middle squares with each angle related to the porches, four corner squares leading to the rooms, as well as the central square for the establishment of the dome.

3.2. Shomal Garden

This garden, designed and constructed during the reign of Sultan Yaghub, son of Ozon Hassan Agha Ghuyunlu based on a pre-planned plan, lies outside the city and south of Tabriz and was highly focused attention as a great residential-government garden by the kings. Mirza Ali Agha Theqah al-Salam stated that King Yaghub imitated the Shomal Gardens of Herat to design the Shomal Garden in Tabriz (Bani Masoud, 2007). The Shomal Garden is characterized by the following:

- The Shomal garden was originally made of four gardens: Big Garden (apples and pears), Almond Garden, Farhad and Shirin Garden, and Golestan Garden. The geometry of the garden was designed on a longitudinal axis and two-side symmetry of the middle axis, lying in a complex of square and rectangular gardens, with a large pavilion next to a beautiful pond that covered about two-thirds of the garden.
- Emphasis on the interior space of courtyard as a

garden and naming this space as "Takht-e-Golzar", "Rose Garden" and "Farhad and Shirin Garden", while the myriad spaces in the old mansion suggested a long stay in the garden.

- In Shomal Garden, there are two main mansions (old and pergola mansions) with shady trees frequently used along the main and secondary axes.
- There were no water directions in the Garden as Iranian principles set no design for it while the main and secondary axes of the garden were designed without considering the direction of the water.

3.3. E'Igoli Garden

No information is available about the founder of the E'Igoli Garden; however, it is said that the original reservoir was established by the time of the Agh Ghuyunlu kings, and the erection of the central pavilion dated back to the Safavid and Qajar eras (Mashkor, 1973). The E'Igoli Garden is characterized by the following:

- E'Igoli is a recreational garden with its main buildings including mansions, a swimming pool, and a water garden.
- E'Igoli is a type of sloped and platform-based garden, with the pool and the garden designed on the slope of the hill, and the northwestern hill slope, overlooking the pool, made of up-to-bottom platforms alongside the pool connected by stairs.
- The garden structure is based on geometric order with the element of order, symmetry being among the main axes.
- E'Igoli mansion has an octagonal plan and the main entrance overlooks the main axis of the garden.

3.4. Garden Design Carpets

The oldest garden-patterned carpets following the Pazyryk rug is the Sassanid Baharestan carpet (Chitsazian, 2009). Weaving carpets of garden design became very popular in the Safavid era which saw weaving Chaharbagh carpets of garden design flourishing (Ansari, 1999). Most of the carpets with the garden design were woven from the Safavid era onwards with less than twenty of such carpets remaining in this world (Feizabadi, Mirhosseini, & Ansari, 2015). These carpets are held in private collections and various museums across the world such as the Victoria and Albert Museum in London, The Academy of Fine Arts Vienna and Musée des Arts Décoratifs (Museum of Decorative Arts), the Pennsylvania Museum, the Jaipur Museum in India, the Metropolitan Museum, the National Museum of Iranian Carpets and the Astan Quds Razavi Museum. Garden design carpets can be divided into two main categories according to their structure:

- A) Garden designs with geometric (cross-shaped) carpet forms. A carpet divided into four parts by two streams, that could indicate a concept of Iranian Chaharbagh. In these carpets, a pond in the center

evokes the Kosar Pond (Hoz e Kausar), with the streams separated from it constituting four heavenly streams (water, milk, honey, and wine). This structure fully corresponds to Chaharbagh designs of the Safavid era, suggesting the symbolic concept of the Paradise in the art of carpet weaving and garden making in Iran, and describing the efforts by the Iranian mystic artist to visualize and conceptualize the sublime concepts of the Paradise in a way the mundane human understands it. B) In second type designs, imagination and symbolism are more evident, as no geometric lining and waterways are seen, with the carpet space so vast that it involves a safe divine space, while trees, animals, mythological mysteries and shapes, are laid side by side on the carpet. In these designs, the artist uses elements such as a tree, peacock, fish and phoenix, and fighting motifs (Mirzaamini & Bassam, 2011).

4. RESEARCH METHOD

The research method in this research was descriptive-analytical. Using library documents and comparative studies and case analysis methods, data and variables were investigated and analyzed. To analyze the interactive effects of the physical elements of Iranian garden design carpets, three historical gardens leftover from the Turkmen era of Tabriz, e.g., Sahebabad, Shomal, and E'lgoli gardens and seven carpets of garden design dating back to the 17th and 18th centuries in northwestern of Iran were selected. The Sahebabad Garden map is reconstructed from the miniature map by Metraghchi, the Shomal Garden from the map by Dar al-Saltanah Qarajahdagi, and the E'lgoli Garden from the map by Donald Wilber (Bani Masoud,

2007 & 2011; Wilber, 2003). Garden design carpets were also selected from among the ones held in the Metropolitan Museum of Art in New York (carpets 1, 5, 6, and 7), Joseph McMullen Collection (carpets 2, 4), and Adel Basim Collection (carpet 3). Iranian gardens are characterized by such physical features as environmental-geographical, spatial-physical elements, natural elements, form-geometry, and design-aesthetic principles, which are under study.

5. FINDING ANALYSIS

As suggested by features in Table 1, physical components of Iranian gardens can be classified into five main groups: 1) Environmental-geographical features such as flat, sloped, and stepped gardens and water garden, 2) Architectural and service spaces including facades, pavilion-pergola, interior-exterior mansion, wall-fence, service, and secondary spaces, 3) form and geometry of pavilions (in the center, 1.3 at the end and end of the garden), quadripartite plan, six- and eight-fold plans, two orthogonal main axes, one main longitudinal axis, three parallel stretches, diagonal paving, 4) Natural elements such as the presence of water (pond, pools, streams, fountains, and spouts), plants and trees (shady and fruitful trees, shrubs and decorative flowers, birds, etc.) and 5) Design-aesthetic principles such as symmetry, centrality, rhythm, spatial and functional arrangement, independence and unity of spaces. Tables 2 and 3 illustrate the design pattern analysis of Sahebabad, Shomal, and E'lgoli gardens as well as 17th and 18th century garden design carpets in northwestern Iran.

Table 2: Analyzing the Design Pattern of the Tabriz Historical Gardens Understudy

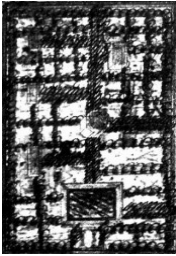



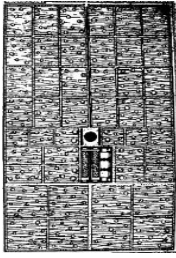
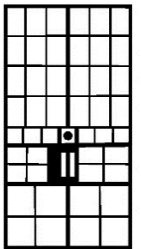
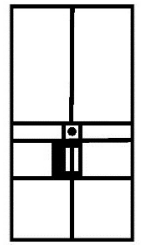
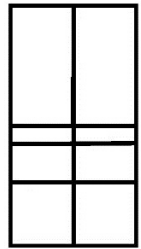
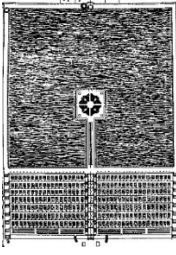






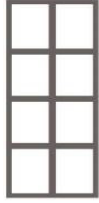
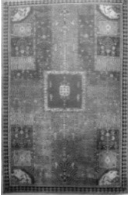
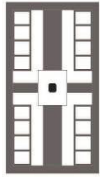



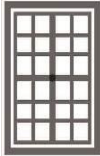


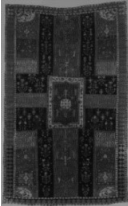
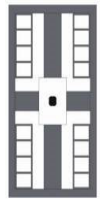


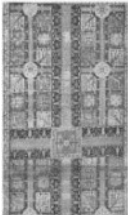
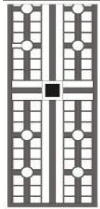
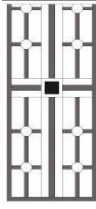


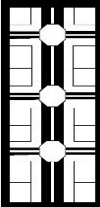
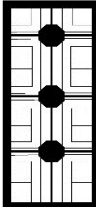

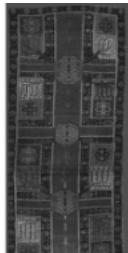
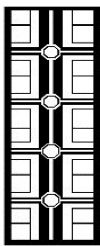
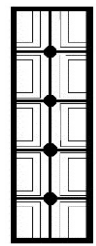
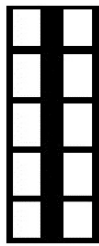
Name of Garden	Image and Map of the Garden	Terrace Systems	Garden Architecture System	Main and Secondary Axes	Design Principles
Sahebabad Garden					Rectangular Plan, Two Main Orthogonal Axes, and the Location of the Pavilion in the Center
Shomal Garden					Rectangular Plan, Two Main Orthogonal Axes, and the Location of the Pavilion in the Center at the 1.3. of the Axes
E'lgoli Garden					Rectangular Plan, Two Main Orthogonal Axes, and the Location of the Pavilion in the Center

Table 3: Analyzing the Design Pattern of the Garden Design Carpets Understudy

Name of the Carpet	Image and Map of the Carpet	Division System	Waterways, Pavilions, and Medallion	Margin and Main Axes	Design Principles
1. Garden Carpets of Azerbaijan (Late 17 th Century)					Rectangular Plan, A Longitudinal Axis
2. Northwest Garden Carpet (18 th Century)					Rectangular Plan, Two Main Orthogonal Axes, and the Location of the Pavilion in 1.2 of This Axis
3. Haris Garden Carpet (18 th Century)					Rectangular Plan, Two Main Orthogonal Axes
4. Kurdistan Garden Carpet (18 th Century)					Rectangular Plan, Two Main Orthogonal Axes, and the Location of the Pavilion in 1.2 of This Axis
5. Northwest Garden Carpet (17 th Century)					Rectangular Plan, Two Main Orthogonal Axes, and the Location of the Pavilion in 1.2 of This Axis
6. Northwest Garden Carpet (17 th Century)					Rectangular Plan, A Longitudinal Axis
7. Northwest Garden Carpet (Inscribed Brick, 17 th Century)					Rectangular Plan, A Longitudinal Axis

A comparative analysis of the design pattern of Sahebabad, Shomal, and E'lgoli gardens, as well as garden design carpets using the elements and features of the Iranian gardens, are provided in Tables 4 and 5.

Table 4: Comparison of the Elements and Features between the Iranian and Tabriz Historical Gardens

Iranian Gardens Features		Sahebabad Garden	Shomal Garden	E'lgoli Garden	No.	
Environmental Geographical	Sloped and Flat Gardens	*	*		2	
	Sloped and Stepped Gardens			*	1	
	Water Garden			*	1	
Architectural Spaces	Facade Entrance	*	*		2	
	Pavilion and Pergola	*	*	*	3	
	Interior Space of the Mansion	*	*		2	
	Wall and Fence	*	*	*	3	
	Service and Secondary Spaces	*	*		2	
Form and Geometry	Pavilion in the Middle of the Garden	*		*	2	
	Pavilion At 1.3 Ends of the Garden		*		1	
	Pavilion at the End of the Garden				0	
	Four Part Plan	*			1	
	6-and 8-Fold Plans		*		1	
	Two Main Orthogonal Axes	*	*		2	
	A Longitudinal Main Axis			*	1	
	Three Stretches (Two Longitudinal Parallel Axes)				0	
	Sloped Paving				0	
	Natural Elements	Water	Pool and Pond	*	*	*
Water Streams and Canals			*	*	*	3
Fountains, and Streams			*	*	*	3
Animals and Plants		Shady Trees	*	*	*	3
		Fruitful Trees	*	*	*	3
		Decorative Shrubs and Flowers	*	*	*	3
Aesthetics Design Principles	Fish, Birds, and Others	*	*	*	3	
	Symmetry	*	*	*	3	
	Centrality	*		*	2	
	Rhythm	*	*	*	3	
	Spatial-Functional Arrangement	*	*	*	3	
	Independence and Identification of Spaces	*	*	*	3	
No.		21	20	18		
Percentage of Elements Shared between Historical and Iranian Gardens		72.41	68.96	62.06		

The results in Table 4 suggest that such features as pavilions, fences and walls, main axis, pond and pool, streams and canals, fountains and basins, shady and fruitful trees, decorative shrubs and flowers, symmetry, rhythm, and arrangement of spaces are present in all three gardens, i.e., Sahebabad, Shomal, and E'lgoli. Features such as the location of the pavilion at the end of

the garden, two longitudinal parallel axes, and oblique paving were not seen in any of the gardens under study. The elements and features of the Iranian garden were mostly seen in the design of Sahebabad garden with 72.41%, Shomal garden with 68.96%, and E'lgoli with 62.06%, respectively. Sahebabad and Shomal gardens shared the most physical-structural features.

Table 5: Comparison of the Elements and Features of Iranian and Garden Carpets Studied

Features of Iranian Gardens		Garden Carpets							No.	
		1	2	3	4	5	6	7		
Environmental and Geographical	Sloped and Flat Gardens	*	*	*	*	*	*	*	7	
	Sloped and Stepped Gardens								0	
	Water Garden								0	
Architectural Spaces	Facade Entrance								0	
	Pavilion and Pergola		*		*	*			3	
	Interior Space of the Mansion								0	
	Wall and Fence	*	*	*	*	*	*	*	7	
Form and Geometry	Service and Secondary Spaces								0	
	Pavilion in the Middle of the Garden		*		*	*			3	
	Pavilion at 1.3 Ends of the Garden								0	
	Pavilion at the End of the Garden								0	
	Four-Part Plan		*	*	*	*			4	
	6-And 8-Fold Plans	*					*	*	3	
	Two Main Orthogonal Axes		*	*	*	*			4	
	A Longitudinal Main Axis	*					*	*	3	
	Three Stretches (Two Longitudinal Parallel Axes)								0	
	Sloped Paving								0	
Natural Elements	Pool and Pond	*	*		*	*	*	*	6	
	Water Streams and Canals	*	*		*	*	*	*	6	
	Fountains, and Streams	*	*		*	*	*	*	6	
	Plants and Animals	Shady Trees	*	*	*	*	*	*	*	7
		Fruitful Trees	*	*	*	*	*	*	*	7
		Decorative Shrubs and Flowers	*	*	*	*	*	*	*	7
		Fish, Birds, and Others	*	*		*		*	*	5
Design Aesthetics Principles	Symmetry	*	*	*	*	*	*	*	7	
	Centrality		*	*	*	*			4	
	Rhythm	*	*	*	*	*	*	*	7	
	Spatial-Functional Arrangement	*	*	*	*	*	*	*	7	
	Independence and Identification of Spaces	*	*	*	*	*	*	*	7	
No.		15	18	12	18	17	15	15		
Percentage of Elements Shared between Garden Carpet and Iranian Gardens		51.72	62.06	41.37	62.06	58.62	51.72	51.72		

Data from Table 5 indicate that elements such as low-slope and flat gardens, fence and wall, main axis, shady and fruitful trees, decorative shrubs and flowers, symmetry, rhythm, arrangement, and independence of spaces are present in all seven carpet samples under study. Also, elements such as sloped and stepped gardens, water gardens, facades, interior design mansion, service and secondary spaces, pavilion at 1.3

ends and end of the garden, two longitudinal parallel axes, and oblique paving are not present in any of the carpets. The features of Iranian gardens are represented in carpet designs numbers 2 and 4 (62.06%), carpet no. 5 (58.62%), carpet no. 1, 6, and 7 (51.72%), and carpet no. 3 (41.37%), respectively. Most elements and features of the Iranian gardens are seen in carpets No. 2 and 4. The presence of common elements in garden

and carpet design, level of similarities, and consistency of the design pattern in Sahebabad, Shomal, and E'Igoli

gardens with the garden design carpets under study are seen in Table 6 and Figure 1.

Table 6: Comparison of the Common Elements and Features of Tabriz Historical Gardens and Northwest Garden Carpets

Iranian Garden Features		Tabriz Historical Gardens	Garden Design Carpets	
Environmental-Geographical	Low Slope and Flat Gardens	Sahebabad, Shomal	1, 2, 3, 4, 5, 6, 7	
	Sloped and Stepped Gardens	E'Igoli		
	Water Garden	E'Igoli		
Architectural Spaces	Facade	Sahebabad, Shomal		
	Pavilion-Pergola	Sahebabad, Shomal, and E'Igoli Gardens	2, 4, 5	
	Interior Space of the Mansion	Sahebabad, Shomal		
	Fence and Wall	Sahebabad, Shomal and E'Igoli Gardens	1, 2, 3, 4, 5, 6, 7	
	Service and Secondary Spaces	Sahebabad, Shomal		
	Form and Geometry	Pavilion in the Middle of the Garden	Sahebabad, E'Igoli	2, 4, 5
Pavilion at 1.3 Ends of the Garden		Shomal		
Pavilion at the End of the Garden				
Four-Fold Design		Sahebabad	2, 3, 4, 5	
Six and Eightfold Designs		Shomal	1, 6, 7	
Two Main Orthogonal Axes		Sahebabad and Shomal	2, 3, 4, 5	
A Longitudinal Major Axis		E'Igoli	1, 6, 7	
Three Stretches (Two Longitudinal Parallel Axes)				
Sloped Paving				
Natural Elements		Pool and Pond	Sahebabad, Shomal, and E'Igoli Gardens	1, 2, 4, 5, 6, 7
	Water Streams and Canals	Sahebabad, Shomal and E'Igoli Gardens	1, 2, 4, 5, 6, 7	
	Fountains and Waterfalls	Sahebabad, Shomal and E'Igoli Gardens	1, 2, 4, 5, 6, 7	
	Plants and Animals	Shady Trees	Sahebabad, Shomal and E'Igoli Gardens	1, 2, 3, 4, 5, 6, 7
		Fruitful Trees	Sahebabad, Shomal and E'Igoli Gardens	1, 2, 3, 4, 5, 6, 7
		Decorative Flowers And Shrubs	Sahebabad, Shomal and E'Igoli Gardens	1, 2, 3, 4, 5, 6, 7
		Birds and Fish, etc.	Sahebabad, Shomal, and E'Igoli Gardens	1, 2, 4, 6, 7
	Design Aesthetics Principles	Symmetry	Sahebabad, Shomal, and E'Igoli Gardens	1, 2, 3, 4, 5, 6, 7
Centrality		Sahebabad, and E'Igoli Gardens	2, 3, 4, 5	
Rhythm		Sahebabad, Shomal and E'Igoli Gardens	1, 2, 3, 4, 5, 6, 7	
Spatial-Functional Hierarchy		Sahebabad, Shomal and E'Igoli Gardens	1, 2, 3, 4, 5, 6, 7	
Independence and Identifications of Spaces		Sahebabad, Shomal and E'Igoli Gardens	1, 2, 3, 4, 5, 6, 7	

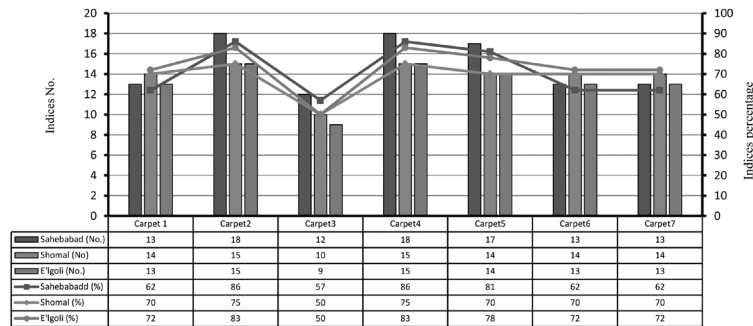


Fig. 1. Number and Percentage of Common Elements of Garden Carpets and Historical Gardens of Tabriz

Data from Table 6 indicate that the geometric structure and elements of Sahebabad, Shomal, and E'lgoli gardens have affected the garden carpets under study. The comparative study suggests the use of common elements such as four-part pattern, rectangular geometry, vertical and horizontal straight lines, emphasis on the main axis through the water streams, the centrality of the pavilion and pond, fence (margins) and gardens, four and eight-part divisions in terraces, shady, fruitful trees and decorative shrubs in the margins and central pond, symmetry, rhythm, spatial-functional hierarchy, and the independence and identification of spaces. Also, the features and elements shared by all the gardens and carpets under study include pavilions, fences and walls, decorative trees and shrubs, symmetry, rhythm, spatial-functional hierarchy, and the independence and identification of spaces. According to Figure 1, the highest percentage of similarity between carpets No. 2 and 4 with Sahebabad Garden was 86%, with E'lgoli Garden 83%, and with Shomal Garden 75%.

Also, the least percentage of similarity between carpet number 3 with Sahebabad garden was 57%, and with Shomal and E'lgoli gardens 50%. In sum, the design pattern of carpets No. 2, 3, 4, and 5 was highly compatible with the Sahebabad garden while that of carpets 1, 6, and 7 with Shomal garden; whereas the carpets were least compatible with E'lgoli garden in terms of common elements. This is because the Sahebabad Garden and Square complex and Hasht Behesht Palace were appointed as the governmental-residential headquarters of the Turkmen Kings in the city of Tabriz. After the end of the Turkmen Kings and the rise of the Safavid government to power, Tabriz remained as the capital during the reign of Shah Ismail I and much of the Shah Tahmasb I rule with the Sahebabad square and Hasht Behesht Palace used by the early Safavid kings and courtiers. When the Safavid capital was transferred from Tabriz to Qazvin and then to Isfahan, the Qazvin royal pavilion complex and the garden of Isfahan Hashtabhesht Palace were designed an erected based on the architectural model of Sahebabad Garden and Hashtabhesht Palace of Tabriz (Mirzaie et al., 2017). Considering that most garden carpets were woven in the Safavid era (17th and 18th centuries) using the pattern of Chaharbagh,

the following design pattern of Sahebabad garden and its architectural elements is seen in the Safavid Chaharbagh and onwards.

6. Conclusion

Considering the long-established relationship between gardens and carpets, this research aimed to investigate the way carpets of garden design adopted patterns of historic gardens of Tabriz in the 17th and 18th centuries. Using a comparative study and case analysis, three historical gardens of Tabriz, including the Sahebabad, Shomal, and E'lgoli Gardens, and seven carpets of garden design dating from the 17th and 18th centuries of Northwestern Iran were selected. Selected. Then, the extent to which geometric elements of the historical gardens was represented in garden design carpets was studied using physical-structural features of Iranian gardens, including geographical-environmental features, spatial-physical elements, natural elements, form-geometry, and design-aesthetic principles in Sahebabad, North, and E'lgoli gardens. Most of the elements and features of the Iranian garden are reflected in the design of the Sahebabad, Shomal, and E'lgoli gardens, respectively. Also, most elements and features of the Iranian garden are seen in the design of carpets No. 2 and 4, respectively, and the least in carpet No. 3, respectively. The results of this study suggested the presence of common elements such as the use of the Chaharbagh pattern, rectangular geometry, use of straight lines, emphasis on the main axis through the water streams, the pavilion as the center and pond, fences and gardens, trees and shrubs, symmetry, rhythm, spatial-functional hierarchy and independence and identification of spaces between gardens and carpets. Therefore, the general design and structure of garden carpets in northwestern Iran was seen in harmony with the general structure of Sahebabad, Shomal, and E'lgoli gardens. Sahebabad, Shomal, and E'lgoli gardens had the most impact on the studied carpets in terms of design pattern, respectively

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