International Journal of Applied Arts Studies

Volume 9, Issue 4

November – December 2024

Islamic Azad University, Yazd Branch, Iran

Acknowledgement

IJAPAS would like to thank the following people for their contributions in this volume.

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In the Name of God

Dear Readers,

I, on behalf of the editorial board, am proud to present this issue of the *International Journal of Applied Arts Studies (IJAPAS)* under the sponsorship of the Islamic Azad University, Yazd Branch. We were driven to found the *IJAPAS* by a noticeable lack of journals, in the Islamic Republic of Iran in particular, devoted to architecture, urban design, urban planning, architectural conservation and restoration, painting, art history, graphic, digital arts, fashion design, performing art, industrial design, aesthetics and semantics. Although the academic world is increasingly driven by cross-disciplinary visions and models, we seek multi-disciplinary views, an attempt to inform researchers, graduate students, and professionals about the trends, ideas and innovations being put forward in applied arts. To this end, in addition to standard articles, in every volume of the *IJAPAS* we hope to provide a special issue related to a respective field with innovation.

We are also sending out a call for papers related to *Applied Arts* to appear in the next issue of *IJAPAS* in Feb – Mar 2025.

Finally, I should mention that we are committed to a speedy refereeing process for every article submitted to us. We effort to reply to all papers submitted within five weeks' time with a response about acceptance or rejection. We also do not require formatting for submissions in our style until *after* the paper has been accepted by us for publication.

I would like to thank our Editorial Board for their work so far in helping to establish the *IJAPAS*. And, finally, I would like to extend my deepest gratitude to Dr. Ali Boloor, the assistant editor of the *IJAPAS*, for all of his hard work to ensure the timely completion of the issue.

I am delighted to invite you to visit us at www.ijapas.org.

Sincerely,

Dr. Abolfazl Davodi Roknabadi
Editor-in-Chief
International Journal of Applied Arts Studies (IJAPAS)
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IJAPAS

International Journal of Applied Arts Studies

Print ISSN: 2588-4506 Online ISSN: 2588-4670

Homepage: www.ijapas.ir

Islamic Azad University
Yazd Branch

Investigating the Quality Improvement of Architecture in term of the Use of Structure and Function in Traditional Architecture with the Approach of Investigation in the Religious Buildings of Mashhad

Majid Azizi[1], Mohsen Vafamehr[2], Mohammad Hadi Mahdinia[3]

1. Department of Architecture, Mashhad Branch, Islamic Azad University, Mashhad, Iran. E-mail: engmazizi636@gmail.com
2. Corresponding author, Department of Architecture, Mashhad Branch, Islamic Azad University, Mashhad, Iran. Faculty of Architecture and Urban Planning, Ferdowsi University of Mashhad, Iran. E-mail: dr.vafamehr@iau.ac.ir
3. Department of Architecture, Mashhad Branch, Islamic Azad University, Mashhad, Iran. E-mail: h_mahdinia@mshdiau.ac.ir

Article Info

Article type:
Research Article

Article history:
Received September 18, 2024
Received in revised form June 19, 2024
Accepted September 05, 2024
Published online December 29, 2024

Keywords:
Islamic architecture,
Structure,
Religious building,
Mashhad city,
Quality Improvement

ABSTRACT

Throughout the history of architecture, the structure has always played an effective role on architecture. Paying attention to the fact that the structure is a necessary and unavoidable part of the building can play a significant role in improving the quality of architecture. The traditional Iranian architect, by using the principles of Islamic architecture and geometry in the implementation of the building, has been able to be effective in improving the quality of the architecture of the implemented buildings. As a museum of traditional and Islamic architecture, Khorasan Architecture presents numerous and diverse works in this field. In this research, 41 historical monuments were selected by examining the religious buildings of Mashhad. The condition of the studied buildings was investigated in terms of the qualitative improvement of the Plate structure, the spatial structure and the illustrative structure in different historical periods from the Sassanid era to the Pahlavi period. With field surveys, it was found that 26 buildings have 65% improvement in the quality of plate structures, 15 buildings have 37.5% improvement in the quality of spatial structures, and 2 buildings have illustrative quality improvement in their records. Through the analysis, it was observed that most of the buildings were executed during the Safavid period and the quality improvement of the internal surfaces due to the plate structure was the most used with 22.5%.

Cite this article: Azizi, M., Vafamehr, M., & Mahdinia, M. H. (2024). Investigating the Quality Improvement of Architecture in terms of the Use of Structure and Function in Traditional Architecture with the Approach of Investigation in the Religious Buildings of Mashhad. ***International Journal of Applied Arts Studies***, *9*(4), 07-24.

Introduction

Balance, which is the most important event in stability, means the state of non-movement and stillness in the whole and parts of the building. If the forces acting on the object are in balance with each other, the object will not move in that direction and this situation is called equilibrium. In fact, equal and opposite forces cause balance in the desired direction. In this condition, the incoming external forces and the internal and external reactions of the building are in balance. Resistance in a structural element means flawlessness of the structural components and the ability to withstand the loads applied to these components. This concept, which is directly related to the type of structural materials, means the amount of tolerance of a structural element under the applied forces.

Stability means the resistance of the building against overturning (against external forces), without its components being separated, which is called geometric stability. Geometric stability is related to the number and types of connections and how they are used (simple or roller connections and complex connections such as joints). On the other hand, there is resistance stability (internal stability) which is the concept of bearing load of material particles of the building under the influence of forces.

Structural form is the creation of beauty through cutting and appropriate size, in order to facilitate the flow of power in a structural system, which is of particular importance. Such forms are visually beautiful and effective.

Examples of this form can be seen abundantly in nature, and for this reason, designers take examples from nature; Therefore, in order to achieve a suitable and beautiful combination in the form, the designers should also consider the force cutting (Alami, 2015). In many cases, the structure is not visible and the architecture covers it (Brigati, 1997).

The important and significant point is that there is a grammar to understand and recognize the structure which depends on the force. Power is the basic pillar of the structure and its most important part. In fact, the structure is a geometric order for the transfer and flow of forces.

These are the forces that give different shapes, dimensions and characteristics to different materials; Therefore, in order to understand the structure, it is necessary to study and understand the forces and how they spread and distribute and withstand them in different materials.

Conscious regulation of the safe and smooth flow of forces in a component as well as in a set of components (the whole building) is one of the fundamental factors of the formation and emergence of the building form, Therefore, knowing the force and its components is essential (Alami, 2015).

Therefore, the position of the structure and its importance in the design and the role it has in shaping the form is a subject that must be studied due to its importance. On the other hand, the knowledge of how the knowledge of the structure was created, clarifies the relationship between this knowledge and architecture throughout history. Although the form is considered as a manifestation of architecture, the formation of the form depends on the structure; Therefore, the structure and its concepts and method of operation have the main role in creating the form (Iranmanesh, 2018).

The combination of architecture and structure is a combination of art, aesthetic values, technology, materials and their behavior, function and execution. The main goal of architectural design is to create forms that both meet the practical needs of the space and are successful in terms of aesthetics. Also, the purpose of the structure design should be to create forms that, while meeting the practical needs, also bear the applied loads in the best way and in an economical way. Therefore, the harmony between structure and architecture should be the creation of places and spaces that lead people to understand the meaning and identity of the environment. Also, the coordination of structure and architecture with the new knowledge of space against the material and spiritual needs of man provides a new solution in order to improve the quality of the environment and make it suitable for the desirable life of man (Jahan Tigh, 2015). It is important to acknowledge that the various elements of Islamic architecture have the capability to instill a sense of order, harmony, spirituality, identity, and vitality within the environment. This not only creates an aesthetically and emotionally pleasing experience for observers but also emphasizes the importance of understanding the identifying elements of Islamic architecture (Mirjalili, 2023).

in the process of creating an architectural work, the simultaneous design of the structure and architecture has always had a great result in the design of an architectural work; Architectural and structural designers have achieved different methods and ideas in an effort to integrate architectural and structural considerations, and nature has been a special source for providing efficient ideas in this field. The structure of nature has obtained unique patterns in response to each of the architectural and structural design categories, their use can be effective in creating optimal results (Hoseledar, 2013).

In ancient Iran, it is not everyone's job to create a traditional building that, in addition to a decent appearance, also pays attention to the interior and a valuable meaning. In ancient Iran, creating a traditional building that, in addition to a decent appearance, also pays attention to the interior and a valuable meaning, is not everyone's job and needs a special architect (traditional architecture).

Regarding the characteristics of this person and her training method, Qayoumi Bidhandi has given very good explanations:

The traditional architect considered his profession sacred, because he saw his place in a sacred chain through which he was connected to (the architect of the world). Architects considered God as the architect who raised the blue and huge dome of the world and created the whole world so beautiful and efficient that no weakness can be seen in it.

Therefore, we should look for similarities in architecture as well and in order, efficiency, beauty and inviolability, he imitated the divine mansion. The building should be built in such a way that it is in harmony with the architecture of the universe and it does not stand against the system of nature, but is considered a part of it (Qayyumi Bidhandi, 2015). Residential houses, as the main center of human life, should have the highest level of peace. Historical and traditional houses have a hidden peace inside them, which has diminished with the passage of time (Ghaemi, 2023).

A traditional architect was a builder who was an architect, engineer, contractor, designer and builder at the same time and he was the one who supervised the construction of buildings such as churches, palaces and other traditional and epic structures (Dorsey, 2013).

It is written in the dictionary of Dehkhoda (Dehkhoda, 2010), Designing means the action and job of a designer, planning, drawing a construction plan on paper or on the ground, monitoring means taking care and being under the supervision of having a job (official work and stewardship) and building, edifice. It is making and preparing, which has been addressed in the field of architecture under the title of construction and protection or repair (Rahim Nia, 2016). Architecture education has long been related to many topics. The assortment of these topics and their correct arrangement in the learning process has been one of the key subjects in forming educational systems and the description of courses in this university major. Simultaneously, the effectiveness of an educational system in educating people in the work environment is another concern that is considered as a measure of the quality of the same educational system in public judgment (Asgari, 2022).

In the Razi method, facade brickwork was done along with stiffening, and the building became more stable and its facade more durable. But in the Azeri way, first the building was made with clay or brick and rubble stone or pickaxe, with haste and in a rough way (without facade).

Then facade construction was added to it, which was either with a skin of bricks, brick knotting and plaster, or it was coated with plaster and painted on it. Little by little, the use of brick was reduced and it was replaced by tiles (glazed pottery) and potters with embossed designs (Mehri) (Pirnia, 2010).

Safavid kings who had relations with European countries and countries that were neighboring and close to Iran, such as India and Turkey today, which is called the Ottoman state. They used

luxury, beauty, glory and splendor in Iranian buildings, especially from the Ottomans Without having a tradition of Indians and Ottomans. For this reason, they added to the decorations of the buildings in every way (Pirnia, 2010).

During the Qajar dynasty, unfortunate events happened in Iran, which led to the weakness of the country and the loss of its various parts, the influence of foreigners and the weakening of the foundation and independence of Iran.in this period, we have the decline of Isfahani style.

At this time, when Iran's relations with the West increase, unfortunately, Iranians become self-absorbed and are influenced by the culture and civilization of the West. So that everything comes from the West and they consider themselves to be lacking in everything. Anyway, after the Isfahani style, there is no other style to replace it and no matter how much they tried to fix this discrete art field, they did not succeed.

In this period, they paid a lot of attention to decorations and found their place in palaces and residential houses. Mirroring and plastering quickly became common, large halls were decorated with various geometric shapes of mirrors (mirror hall of Golestan Palace) And the wooden roofs of the houses were painted (Pirnia, 2010).

Research Objectives

Main objective:

Improving the quality of architecture by using the structure in the group of plate structure, spatial structure and illustrative structure and its function in traditional architecture

Sub objective

1. How to model traditional architecture for quality improvement
2. How structure and architecture interact in the group of plate, spatial and illustrative structures
3. Investigating the religious and historical works of Mashhad city in terms of quality improvement in different historical period

Statistical Society, Sampling Method and Sampling Size

According to the available statistics of the national heritage registered in Khorasan Razavi province as in (Table 1), which is equal to 1372 until the time of preparing this text. By identifying the national heritage registered in the city of Mashhad as the city studied in this research, it was discussed and the number of registered inheritances was 218. By examining this heritage and separating the registered national religious heritage in Mashhad city, its number was equal to 50 heritages. These heritages have been placed in different historical eras in terms of number and variety and it makes it possible to examine the buildings from the point of view of

the integration of architecture and construction in different historical periods from the 4th century onwards.

Table 1. The number of registered heritages examined

Registered religious national heritage in city of Mashhad	Registered national heritage in city of Mashhad	Registered national heritage in Razavi Khorasan province
50	218	1372

The sampling method is also mentioned according to the reporting forms, in-person review and collection from the national heritage (Figure 1). Also, the studies conducted on each heritage and matching each of them based on the construction method, form, geometry and performance will be from the point of view of structural and architectural integration.

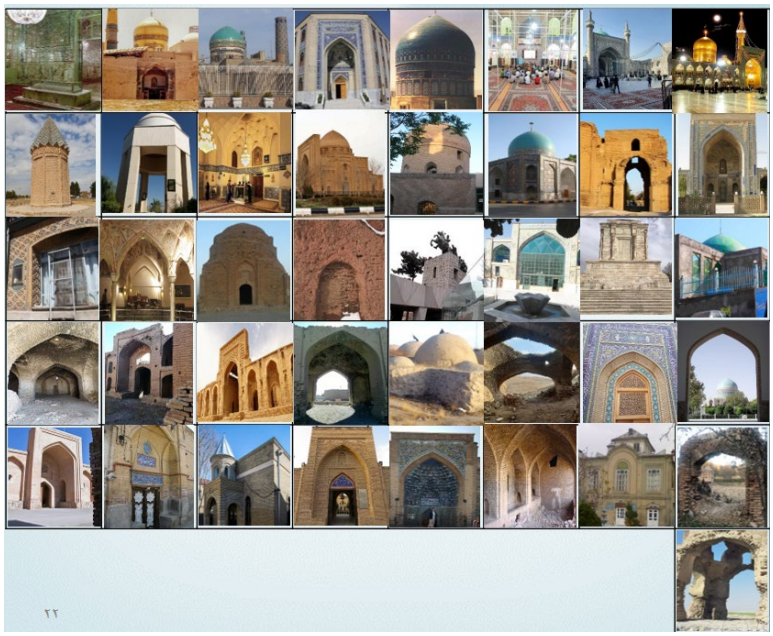

Figure 1. Image of the studied buildings

Research Method

Based on the purpose of the research and since in this research the relationships between the data have been dealt with using rational and analogical reasoning method, the research method is fundamental. From the point of view of the data collection method, according to the description of the conditions and buildings under investigation, the research method is based on the descriptive-analytical method.

In this research, first by examining the library of historical works in Khorasan province and then selecting the religious works in Mashhad city, it reached the number of 41 works that can be

checked in this city and then, we analyzed and analyzed these works with in-person collection and field study.

The condition of the studied buildings was investigated in terms of the qualitative improvement of the planar structure, the spatial structure and the expressive structure in different historical periods from the Sassanid era to the Pahlavi period. The results were analyzed and checked with SPSS software, and the results are presented in separate sections.

How to Enter and Process Data

By knowing the types of relationship between the structure and the physical or functional aspects of the building in architecture, we investigate the religious buildings in the city of Mashhad in different periods of history.

For this purpose, we will first collect the required items according to the field investigation of the desired works and then we will record the information by documenting the obtained information.

In order to record the information, the information collected for each building has been documented according to the prepared tables and analyze the requested items, we enter the collected information in SPSS software to obtain the required analysis.

Entering Multiple Response Data into SPSS

In some cases, each observation (subject) in a variable may have more than one response for example, a historical monument may be present in different historical periods during its lifetime. Therefore, it is necessary to record the historical periods in the form of multiple answers for such buildings.

In the upcoming project, the data was of multi-response type, which will be explained below on how to enter and exit from them. For example, the presence of 14 investigated buildings in 9 historical periods is recorded as numbers 0 and 1, where 1 means the presence of the building in that period and zero means the absence of the building in that period.

Improving the Quality of Internal Surface due to the Structure

The quality improvement of internal surfaces due to the structure can be checked based on the following:

Surface structure: The structure can help architecture by means of piling and creating texture on the surfaces.
- Spatial structure: spatial structure, like a self-standing column, has a tangible effect on the space around it (Ching, 1996).

Van Mis expresses his concern: "Some spaces have a lot of trouble becoming places. Consider an example of "neutral" spaces (Van Mis,1990).

- Expressive structure: which focuses on the meaningful role of the structure (Golabchi, 2019). The structure does not need to be clear and understandable. There is no firm or binding belief that a structure should be understood as a functional skeleton of a building or a machine built with advanced technology. Of course, it can be vague or obvious; it will be a precious experience in my mind, if some kind of puzzle or a layer of ambiguity, casts a curtain on my perception of "structure" (Balmond, 2002). According to the mentioned cases, it can be said that the structure is a geometric order for the transmission and flow of forces.

In addition to a decent appearance, traditional buildings have also paid attention to the inside and a valuable meaning. In addition to being an architect, the traditional architect was also a structural engineer.

By using the specifications mentioned above, it is possible to categorize the factors and specifications that express the integration of architecture and structure Therefore, a building from the perspective of form, qualitative improvement of the internal surface due to the structure will be placed in the group of Surface structure, spatial structure or expressive structure.

Quality Improvement Review

In the (Table 2 and Figure 2), the condition of the studied buildings has been checked in terms of quality improvement.

Table 2. Examination of buildings in terms of quality improvement

Percentage of all buildings	**Answers**		**Quality improvement**
	Percentage	**Number of responses**	
65%	60.5%	26	**Surface structure**
37.5%	34.9%	15	**Spatial structure**
5%	4.6%	2	**Illustrative structure**
107.5%	100%	43	**Total**

- Based on the obtained results, it can be seen that 26 buildings have the quality improvement of the Surface structure in their record. In other words, 65% of the studied buildings have been identified in this quality improvement.
- Based on the obtained results, it can be seen that 15 buildings have quality improvement of spatial structure in their portfolio, in other words, 37.5% of the studied buildings have been determined in this quality improvement.

- According to the conducted study, it can be seen that 2 buildings have the qualitative improvement of the Goya structure in their records. In other words, 5 percent of the studied buildings have been determined in this quality improvement.
- Quality improvement according to the last column of the (Table 2) is also depicted in the (Figure 2):

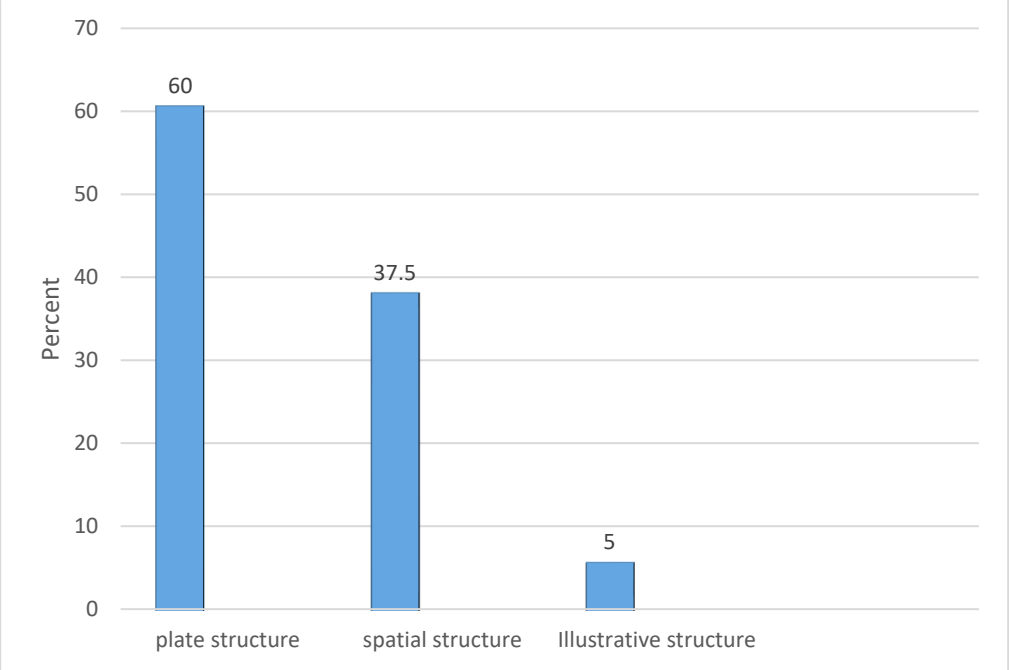

Figure 2. The percentage of quality improvement in the studied buildings

Simultaneous Examination of the Historical Period and Other Variables in the Studied Buildings

Investigating the Historical Period and Improving the Quality of Buildings

In order to simultaneously examine the historical period and improve the quality of the studied buildings, the (Table 3) was prepared.

Table 3. Examination of buildings in terms of historical period and quality improvement

		Total	Quality improvement	Indicator	Historical period
	Illustrative structure	**Spatial structure**	**Surface structure**		
1	1	1	1	Abundance	Samanian
	100%	100%	100%	Percentage	
1	1	1	1	Abundance	Ghaznavi
	100%	100%	100%	Percentage	
6	1	3	4	Abundance	Seljuks
	16.7%	50%	66.7%	Percentage	
12	2	6	7	Abundance	Timurian
	16.7%	50%	58.3%	Percentage	
14	1	6	9	Abundance	Safavian
	7.1%	42.9%	64.3%	Percentage	
2	1	1	2	Abundance	Afsharian
	50%	50%	100%	Percentage	
10	1	2	9	Abundance	Qajar
	10%	20%	90%	Percentage	
4	1	2	3	Abundance	Pahlavi
	25%	50%	75%	Percentage	
40	2	15	26	Abundance	**Total**

In 41 studied buildings, quality improvement is observed in 40 buildings and the following results were obtained and shown in (Figure 3):

- In the Samanian historical period, a building has a qualitative improvement of the type of Surface structure, spatial structure and expressive structure.
- The historical period of Ghaznavid is a building with a qualitative improvement of the type of Surface structure, spatial structure and expressive structure.
- In the historical period of the Seljuqs, out of 6 buildings with qualitative improvement, in 66.7% of the buildings, the improvement is of the Surface structure type. In 50% of the buildings, the improvement of the spatial structure has been used. In 16.7 percent of the buildings, the improvement of the Goya structure has been used.
- In the historical period of the Timurids, out of 12 buildings with quality improvement, 58.3% of the buildings are of the type of surface structure. In 50% of the buildings, the upgrade of the spatial structure has been used. In 16.7 percent of the buildings, the improvement of the Goya structure has been used.

- In the historical period of the Safavids, out of 14 buildings with quality improvement, in 64.3% of the buildings, the improvement is of the Surface structure type. In 42.9% of buildings, spatial structure improvement was used. In 1.7% of the buildings, the improvement of the Goya structure has been used.
- In the Afsharian historical period, out of 2 buildings with quality improvement, in 100 percent of the buildings, the improvement is of the Surface structure type. In 50% of the buildings, the upgrade of the spatial structure has been used. In 50% of the buildings, the improvement of the Goya structure has been used.
- In the historical period of Qajar, out of 10 buildings with quality improvement, in 90% of the buildings, the improvement is of the plate structure type. In 20 percent of the buildings, the improvement of the spatial structure has been used. In 10 percent of the buildings, the improvement of the Goya structure can be seen.
- In the Pahlavi historical period, out of 4 buildings with quality improvement, in 75% of the buildings, the improvement is of the Surface structure type. In 50% of the buildings, the improvement of the spatial structure has been used. In 25% of the buildings, the improvement of the Goya structure has been used.

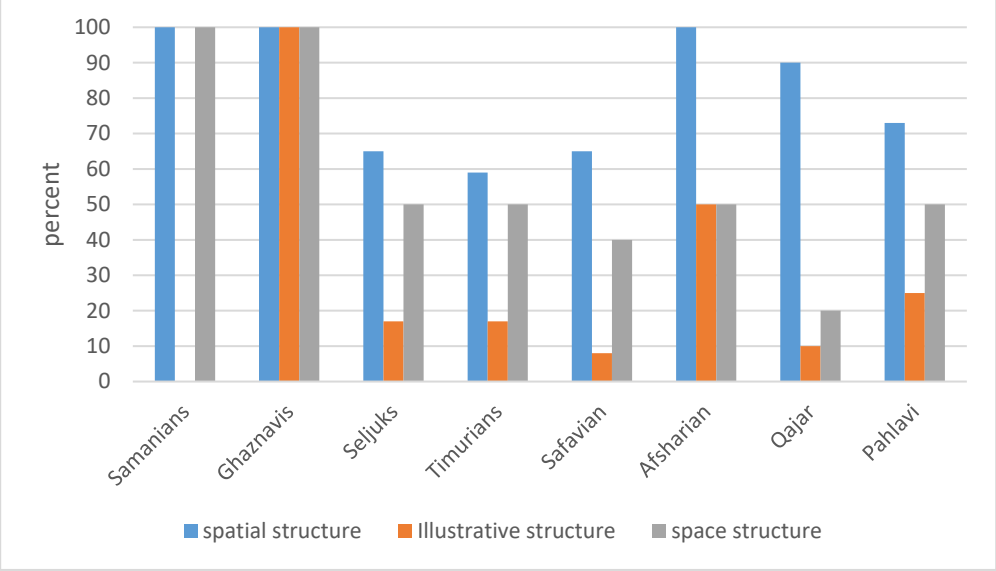

Figure 3. Review of quality improvement by historical periods

Investigating the Type of Building Quality Improvement in Different Historical Periods

In order to simultaneously examine the historical period and improve the quality of the studied buildings, the (Table 4) was prepared.

Table 4. Examination of the buildings in terms of the quality improvement of the building in different periods

All	Quality improvement			Indicator	Historical period
	Illustrative structure	**Spatial structure**	**Surface structure**		
1	1	1	1	Abundance	Samanian
	50%	6.7%	3.8%	Percentage	
1	1	1	1	Abundance	Ghaznavi
	50%	6.7%	3.8%	Percentage	
6	1	3	4	Abundance	Seljuk
	50%	20%	15.4%	Percentage	
12	2	6	7	Abundance	Timurian
	100%	40%	26.9%	Percentage	
14	1	6	9	Abundance	Safavian
	50%	40%	34.6%	Percentage	
2	1	1	2	Abundance	Afsharian
	50%	67%	77%	Percentage	
10	1	2	9	Abundance	Qajar
	50%	13.3%	34.6%	Percentage	
4	1	2	3	Abundance	Pahlavi
	50%	13.3%	11.5%	Percentage	
40	2	15	26	Abundance	**Total**

Out of all the studied Surface structures, most of the buildings (equivalent to 34.6%) belong to the Safavid and Qajar period. Of all the buildings of spatial structure studied, most of the buildings (equivalent to 40%) are equally located in the Timurid and Safavid periods. Also, most of the buildings with Illustrative structures (equivalent to 100%) were located in the Timurid period.

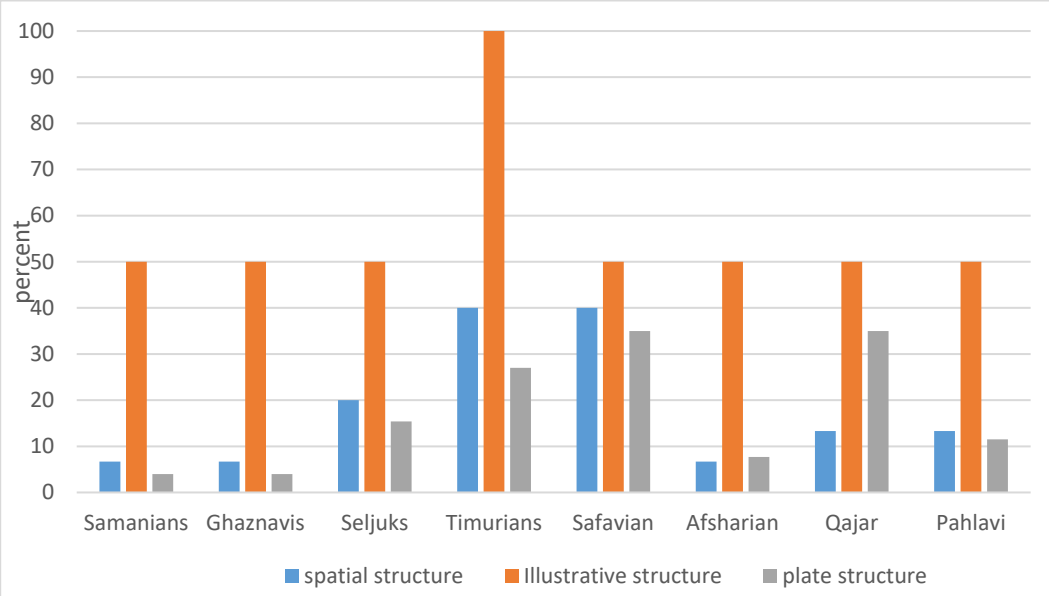

Figure 4. Examining the percentage of quality improvement of different buildings in different historical periods

In (Table 5 and Figure 5), the percentage of the total has been considered, in such a way, 40 buildings that have been upgraded in quality and the type of their historical period is known, are considered 100% ,and the percentages are calculated.

Table 5. Examination of the buildings in terms of the quality improvement of the building in different periods

All	Quality improvement			Indicator	Historical period
	Illustrative structure	**Spatial structure**	**Surface structure**		
1	1	1	1	Abundance	Samanians
2.5%	2.5%	2.5%	2.5%	Percentage	
1	1	1	1	Abundance	Ghaznavis
2.5%	2.5%	2.5%	2.5%	Percentage	
6	1	3	4	Abundance	Seljuks
15%	2.5%	7.5%	10%	Percentage	
12	2	6	7	Abundance	Timurians
30%	5%	15%	17.5%	Percentage	
14	1	6	9	Abundance	Safavian
35%	2.5%	15%	22.5%	Percentage	
2	1	1	2	Abundance	Afsharian

5%	2.5%	2.5%	5%	Percentage	
10	1	2	9	Abundance	Qajar
25%	2.5%	5%	22.5%	Percentage	
4	1	2	3	Abundance	Pahlavi
10%	2.5%	5%	7.5%	Percentage	
40	2	15	26	Abundance	**Total**

- Out of all the considered buildings, only one building has had a qualitative improvement during the Samanid and Ghaznavid periods, which is equivalent to 2.5% of all buildings, and it is a Surface structure, a spatial structure, and an illustrative structure.
- In the Seljuq period, a total of 6 buildings were upgraded, most of them were Surface structures, and they constitute 15% of all buildings under investigation.
- The Timurid period, the number of buildings reaches 12, which constitutes 30% of the total buildings, and 17.5% of the buildings are plate structures.
- In the Safavid era, when we have the largest number and percentage of buildings under investigation (14 buildings and 35% of all buildings), the highest percentage of quality improvement of the Surface structure has also happened.
- Only two buildings have been upgraded in the Afshariya period and they comprise 5% of all buildings under investigation.
- In the Qajar period, 10 buildings and 25% of all buildings had building upgrades, the majority of which is equal to 22.5%, belongs to the quality improvement of the Surface structure.
- During the Pahlavi period, 4 buildings and 10% of all the buildings under investigation have been improved in quality.

Of all the studied buildings, most of the buildings had a qualitative upgrade of the planar structure and were located in the Safavid and Qajar period.

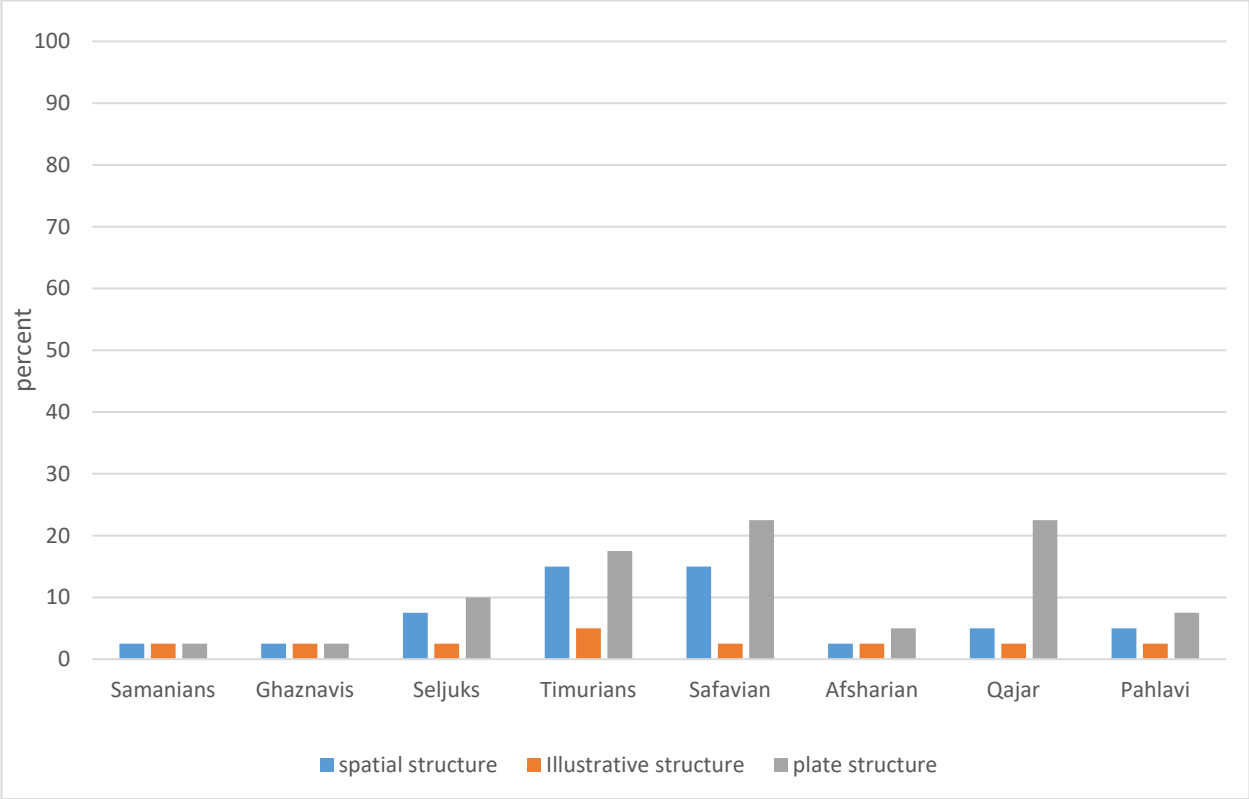

Figure 5. Examination of buildings in terms of quality improvement of different buildings in historical periods (percentage of the total)

Conclusion

According to the survey of 41 historical monuments, the following results were obtained, the results that are mainly mentioned are related to the features that at least 50% of the buildings had that feature and its type may be different.

- By examining the historical periods of the buildings, it was determined that 15 buildings have the Safavid historical period in their records. In other words, 36.6% of the studied buildings were determined in this historical period. Also, 29.3% of the buildings were in the Timurid period and 24.4% of the studied buildings were in the Qajar period.
- The inspection of the buildings in terms of quality improvement showed that 65% of the buildings have quality improvement of the plate structure type. Also, 37.5 percent of the buildings have quality improvement of the spatial structure type and the rest of the quality improvement of the illustrative structure type.

The results of the simultaneous examination of the historical period and variables show the following:

- Examining the quality improvement of the buildings shows that the plate structure has been used the most and was used in all the Samanid, Ghaznavid, and Afsharian

buildings and in the Safavid and Qajar historical periods, it includes more than 22% of all the investigated buildings

- By examining the religious buildings of the city, it was determined that the traditional architect was able to improve the quality of the building by using the surface structure as an influencing element on the architecture, and in this way, he benefited from the integration and combination of architecture and structure and create a sustainable building in the history of architecture.

Author Contributions

All authors contributed equally to the conceptualization of the article and writing of the original and subsequent drafts.

Data Availability Statement

Not applicable

Acknowledgements

The authors would like to thank all participants of the present study.

Ethical considerations

The study was approved by the Ethics Committee of the Islamic Azad University, Mashhad Branch. The authors avoided data fabrication, falsification, plagiarism, and misconduct.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest

The authors declare no conflict of interest.

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IJAPAS

International Journal of Applied Arts Studies

Print ISSN: 2588-4506 Online ISSN: 2588-4670

Homepage: www.ijapas.ir

Islamic Azad University
Yazd Branch

Explaining the Components of Western Architecture on the Physical Design of Tall Residential Buildings in Tehran from the 1961s to the 2010s

Moslem Mostajeran Goortani[1], Hossein Soltanzadeh[2] , Mehrdad Matin[3]

1. Department of Architecture, Central Tehran Branch, Islamic Azad University, Tehran, Iran. E-mail: moslem.mostajeran.g@gmail.com
2. Corresponding author, Department of Architecture, Central Tehran Branch, Islamic Azad University, Tehran, Iran. E-mail: hos.soltanzadeh@iauctb.ac.ir
3. Department of Architecture, Central Tehran Branch, Islamic Azad University, Tehran, Iran. E-mail: meh.matin@iauctb.ac.ir

Article Info

Article type:
Research Article

Article history:
Received April 27, 2024
Received in revised form September 19, 2024
Accepted October 28, 2024
Published online December 29, 2024

Keywords:
Western architecture,
Physical design,
Tall residential building

ABSTRACT

Tall residential buildings as a demographic solution for vertical development and creating diverse housing were a response to population growth in cities that arose following modern Western architecture. This research is aimed at extracting the components of the western intellectual trends after entering Iran and shaping the Tall residential buildings. The question of this research is, which are the components of western architecture that are effective in the physical design of Tall residential buildings and which of them is more effective in their formation. As a result, the research method is a kind of quantitative and qualitative research and used a mixed qualitative and quantitative method to explain the components of western architecture on the physical design of Tall residential buildings after the Islamic revolution. To extract the components, a semi-structured interview was conducted with 46 people. The results are entered into ATLASTI software and have been subjected to data reduction with coding. At the end, the results of the components were extracted and compiled in the form of a questionnaire and provided to 384 space users. Then the data was analyzed with descriptive and inferential statistics in JMPSAS software. The results of the research show that in the group of designers, the highest factor share is related to late modern architecture with a value of (0.955) and the lowest factor share is related to deconstruction architecture with a value of (0.121). In the group of users of deconstruction architecture, with a value of (0.225), the lowest factor share is related to postmodern architecture with a value of (0.923).

Cite this article: Mostajeran Goortani, M., Soltanzadeh, H., & Matin, M. (2024). Explaining the Components of Western Architecture on the Physical Design of Tall Residential Buildings in Tehran from the 1961s to the 2010s. ***International Journal of Applied Arts Studies****, 9*(4), 25-54.

Publisher: Islamic Azad University, Yazd Branch.

Introduction

The rapid development of urbanization along with the emergence of new building technology in the second Pahlavi period gradually caused the formation of a new face in the cities of Iran. Due to the excessive growth of the population, the country immediately faced a big problem called housing. Before the Islamic revolution in 1978. Five development programs were implemented in Iran. The first and second development plans, which were approved between 1949 and 1962, were inspired by the developments of modern societies such as the United States of America and Western European countries. The main focus of both programs was on defining an infrastructure framework for social, economic and cultural growth and development. The third development plan, which was implemented between 1963 and 1967, looked at the housing problem from the perspective of general economy and social development. The fourth development plan, which was approved between 1968 and 1972, emphasized the use of special construction materials, architectural styles, and neighborhood renovation. This program also encouraged the construction of apartments and residential complexes. The fifth development program -the program written between 1973 and 1978- marked a turning point in the history of Iran. The stunning increase in oil revenues prompted the government to increase the amount of investment up to five times. In this program, the construction of 30,000 residential units per year was planned. The first period in the 1950s, 1960s and 1970s. Before the Islamic revolution, the first examples of Tall buildings were built with a functional approach. In these years, the architecture of Tall buildings is more influenced by modern international architecture and architects of developed countries. After the Islamic Revolution of Iran, in the 1960s. Due to the imposed war, there is no Tall construction, but in the third period, which was in the 1970s. There are examples of Tall buildings built based on the principles of postmodern architecture.

Tall buildings are presented as a product of the modern world after entering the country as a population solution; which can accommodate a large population and cause the vertical development of the city. This eclectic product can contain various features of modern architecture in the form of component application.

By reviewing the articles and researches done so far in relation to the existing Tall buildings, it is concluded that these buildings have different views and social approaches such as social interactions and sense of belonging, structural approaches such as passive defense, climatic approaches such as heat island, etc. They have been analyzed; and it is only a superficial and mere import of a form from western Tall buildings, while the methods and methods of design and even its construction methods have not been examined in detail, thus the fundamentals of thinking have been neglected. In the contemporary era, it is necessary and necessary to define the transformation, its beginning and completion and the components that create it precisely. This research aims to extract the components of modern architecture in the form of different styles and

tries to extract the most factor contribution related to them and tries to answer the question that which are the components of western architecture effective in the physical design of Tall residential buildings and which of them are effective More is in their formation.

Theoretical Foundations:

Modern architecture developed in the first half of the 20th century and gradually gained a global aspect; thus, the international school was formed. A new tradition was being formed, a tradition that had to be broken by the explicit decree of modernity, even though it was called modern (Aghajari, 2010: 37). However, modern architecture underwent a transformation after several decades due to cultural and social aspects not being considered.

The characteristics of modern architecture that separate it from the ancient and traditional architecture are shown in (Table 1).

Table 1. Characteristics of modern architecture from the perspective of foreign and Iranian thinkers

Characteristics of modern architecture		Theorist
Modern architecture was born with a change in the definition of architectural beauty. According to Peter Collins: ...all that is added to the Vitruvian Trinity - stability, efficiency and beauty - is that space is a positive architectural quality, and this is the life of modern architecture. (Bani Massoud, 2014: 17)		Peter Collins
Modern architecture is the architecture of breaking previous molds and frameworks. Rejection of the past as a source of inspiration for works of art and the use of technology in a pure way are among the topics of attention of modern architects. (Bani Massoud, 2013: 19)		Ernst Borden
Applying the industry with an aesthetic approach and expanding its facilities	Early modern	
Functionalism, paying attention to car aesthetics, urban issues, production and construction, etc.	Superior modern	
Getting rid of purely functional restrictions, expanding form-oriented features, dealing with symbolic analogies (Bani Masoud, 2011: 115)	Late modern	
The language of modern architecture includes: the list of functions, non-perspective, anti-perspective, breaking the box, architectural structures; Membrane, sheath, space in time, building in the city (Bani Massoud, 2013: 115).		Bruno Zoey
Formalism and functionalist thinking, "radical break" from history, "honest" expression of materials and structure (Haghiqi, 2013, 21).		Kit Nesbiat
Removal of decorations, complete abandonment of history and historical elements, a free plan from the constraints of classical geometry, special attention to the function of the building, combination of simple and pure geometric volumes such as cubes, cylinders, cones, etc., and finally building a building that can answer all Humans should be of different cultures and races (Saremi, 1995: 58).		Ali Akbar Sarmi
Renewing the construction and design processes, rejecting traditional environments and following the principle of universality, following the same principles in construction, having a wise and practical order, using new materials of glass, concrete and steel, avoiding unnecessary decorations (Bani Masoud, 2013, 277).		Amir Bani Massoud
An end to historicist architecture and looking to the past, inventing new and emerging forms		Vahid

and emphasizing performance and compliance with new science and technology and observing geometric and mathematical proportions and optimism towards logical and scientific solutions (Haghiqi, 2013, 21).	Qobadian
Modern architecture is based on innovation, depends on time and breaks the pattern. Philosophically, it is subject to modern thought and philosophy (modernity), benefits from advanced techniques and materials, and is constantly changing and evolving. Relying on new technologies, this architecture does not consider itself obliged to adapt to the conditions and use environmental resources and can be established in various environmental conditions. Modern architecture appears in the West as an original phenomenon and in other lands as an imported and alternative phenomenon (Hojjat et al., 2018, 104, 105, 108).	Isa Hujjat
Eschewing history, reduction based on the simplest elements, concentrating the spatial entity to the main core, uniformity of all components by reaching a simpler form, avoiding decorations and the use of even a redundant form, reaching forms to show the main function of the building, brevity, functionalism and extremes in simplicity (Haghiqi, 2013, 22).	Mustafa Kayani

In the second half of the 20th century, modern architecture underwent a transformation in its ideals and attitudes, so that even pioneers such as Le Corbusier presented designs that were different from the early versions of modern architecture, which were often called box modern by critics. had These trends became a platform for the emergence of postmodern architecture (Hojjat et al., 2018). In the postmodern era, there is an emphasis on the practicality of building parts such as modern architecture, however, in the style of postmodernism architecture, architects are more creative and away from rigid and idealistic modern rules that emphasize simplicity, abstraction and Simple forms are encouraging (Bani Massoud, 2011). In postmodern architecture, a variety of architectural elements and motifs from arts and crafts, classicism, neoclassicism and many other different styles of architecture can be seen, so not only a building preserves the rich history and culture of its region. Rather, it will show off with an attractive appearance (Rahnama and Razzagian, 2012: 47).

The influence of western architecture on the contemporary architectural styles of Iran

Examining many sources related to the modern architecture of Iran, the modern period of Iranian architecture is considered from the beginning of the Qajar period (1786), especially during the Qajar period, contact with Europe made Iranians familiar with Western painting and decorations, which had a direct effect on laid architecture examining the historical period of contemporary Iranian architecture divides it into four parts (Abbasi, 2016):

1. The first Pahlavi era
2. Second Pahlavi era
3. The era after the victory of the Islamic Revolution

The first Pahlavi era coincides with the early stages of Iran's industrialization. The influence of the industrial era's architecture can be seen with the construction of roads, bridges, and examples such as railways, etc. These are examples of the emergence of the modernism school in Iran. The emergence of the modernism school in Iran was due to reasons such as the prevalence of western

patterns in various fields, changes in the structure of social classes, the expansion of western goods and industry, new activities, the intellectual tendencies of western educated people, new materials and new systems. (Falamaki, 1992: 94). If the first Pahlavi period can be called the emergence of modern Iranian architecture, the second Pahlavi period can be considered the period of development and popularization of modern Iranian architecture. This is for several reasons (Qobadian, 2004: 93):

- Establishment of modern educational institutions such as the Faculty of Fine Arts
- The spread of international style in Europe and America after World War II
- Promotion of European American culture in Iran
- Rapid growth of urbanization
- Economic-social development

During this period, buildings with modern functions such as airport, hotel, stadium, parliament, etc. were built. The main approaches in this era are (Abbasi, 2016: 47):

- Freedom of form and plan as a result of using modern structural systems
- International modern architecture and the metaphorical perception of Iranian past architecture

Also, in the first Pahlavi period, there was a neoclassical style. Neoclassical architecture, which was referred to as foreign architecture in the Qajar era, continued in this period as well. But there were two major differences compared to the previous period. During the Qajar era, neoclassical architecture was a style mainly for the design of the palaces of nobles and nobles, which was used in their gardens and estates (Karimi, 2015: 113) but in this period, this style of architecture was mostly used for extroverted buildings in the urban body, especially government buildings. Administration and services such as governorates, municipalities and hotels were used. Another difference, considering that these buildings in the recent period were often of public use, therefore the dimensions of the buildings were bigger and wider than the previous period. In this period, Baroque Revival and Romantic symbols are also observed in the buildings of this style. (Samsami Hosseini, 2011)

In the second Pahlavi period, in this period of traditional architecture, it still included a part of the country's architecture. Mosques, bazaars, old schools, baths and some houses were built in this way and with traditional execution methods. (Qobadian, 2012). Of course, government buildings and buildings with new functions, followed by a number of noblemen's houses, were designed and built using new styles and methods (Rahnama and Razzagian, 2012). From the beginning of the Pahlavi dynasty, modern materials such as; Beams, rebars and cement were imported to the country to build factories, bridges and road and railway networks. This issue was gradually used in important government buildings and prominent buildings of nobles and courtiers (Omidvar, 2010: 92). This gradually led to the marginalization of traditional technology

and materials, and modern technology and materials and new designs replaced the previous methods. But at the same time, buildings were built in Iran whose design was traditional, but with new materials and technology, and sometimes for new governmental and social institutions and organizations. The style of traditionalism began in the first Pahlavi period (Baman, 2012). The difference between traditional architecture and traditionalism is that traditional architecture is designed and implemented in continuation of past architectural methods (Bani Massoud, 2014: 24). In other words, the general principles, the shape and design of the building and its implementation are related to the previous periods, which have been passed down from generation to generation. In traditional architecture, techniques, methods, decorations and building forms have always been implemented following the way and methods of the ancestors and in its perfection; In other words, the source of inspiration in traditional architecture is the legacy of the past (Anabastani et al., 2015: 17). On the other hand, the architecture of traditionalism has the design and symbols of traditional symbols. But for its implementation, modern technology and materials are used. Buildings of this style are designed for modern or traditional functions (Farqani et al., 2019: 215).

During the second Pahlavi period, communication with the outside world, especially with Western countries, expanded. As a result, modern construction materials and technology were imported to Iran more than in the past, and also a large number of workshops and factories were built in Iran to produce modern construction materials (Karimi, 2014). Modern architecture was considered as the only avant-garde style at the international level. Therefore, in this period more than the previous period, traditional designs and traditional methods and materials were marginalized and modern designs and new technology replaced tradition; But all these conditions did not cause the removal of tradition in the architecture of this period (Shahrokhifar, 2015: 46).

The reign of the Pahlavi II was approximately parallel to the late modern architecture in 1945-1972. At this time, modern architecture was considered the dominant and avant-garde style in all parts of the world, including in Iran. A large number of important buildings in Iran were designed and implemented in the style of modern architecture during this period. Transcendent and late modern architecture has many styles, as this architecture in the first Pahlavi period was summarized as art deco and international style, but in the second Pahlavi period, other late modern architectural styles were also considered. Art Deco style is related to the period of sublime modern architecture and it was close to its end with the beginning of the Second World War, but still a number of master architects of the previous period were engaged in this style and created valuable architectural works in the country (Alavi et al., 2017: 873).

Research Background

Eslami and Alborzi in 2021, the article "Investigation of the evolution and influence of modernism on the architecture of residential apartment complexes in Iran and Uzbekistan" have been done comparatively and with a qualitative approach with the help of documentary studies, in which the method of historical-interpretive research in the section Collection of theoretical-historical bases and descriptive-analytical research method have been used in the field of architectural investigation of residential complexes. The statistical population includes all the apartment complexes that were built in the modern architectural style in Iran during the second Pahlavi period and at the same time in Uzbekistan.

In 2019, in the article "Analysis of the effects of high-rise construction on the urban form of Mashhad metropolis", Farqani et al. conducted an analysis of the spatial distribution of high-rise buildings built in Mashhad metropolis (during the decade of 2017-2018) and its effect on the urban form of Mashhad metropolis are the research is of applied type and in terms of method, it is a survey and it has used descriptive-analytical analysis method. For this purpose, available statistics and information, spatial autocorrelation model and geographic information system were used. The results show that the high-rise buildings of Mashhad during this time period had a spatial autocorrelation pattern and it can be considered as a cluster pattern. The study of the effects of these buildings on the urban form also shows a multi-centered pattern with a dominant centrality in the central core (around the Holy Shrine) with commercial and residential use, which has reduced the role of the main core by creating several sub-cores, and considering the main advantage and distribution of the cluster Various activities at the level of the city have a positive relationship with the stability of the urban form, because through its multi-center distribution, many problems and issues surrounding the border core of the city and the complete single-border pattern have been reduced.

In 2019, Latif Aghili et al., in the article "Analysis of Spatial Justice Indicators in Gorgan high-rise Buildings" conducted on the existing high-rise buildings that have seven floors or 20 meters above the ground according to the master plan in Gorgan city. The research method of this research is documentary studies, survey method and questionnaire distribution. The questionnaire created by the researcher included 322 questionnaires among the statistical community formed by the supervisors of 1900 residential units, and its reliability was 97% using Cochran's method and Cronbach's alpha; Statistical analysis was done in an inferential and descriptive way in the SPSS software environment and the results of the studies showed that there is a significant relationship between the components of spatial justice and the satisfaction of citizens living in high-rise buildings. The results of the hypothesis test in both hypotheses show that due to the inappropriate access of the residents of high-rise buildings and the decrease in the quality of services, their level of satisfaction will decrease.

In 2018, Hojjat et al., in the article "Explanation of qualitative parameters and evaluation criteria of the interaction between form and structure in today's architecture of Iran" seeks to explain the criteria for evaluating buildings in terms of the interaction of form and structure and by examining examples of today's architecture. Iran should provide solutions to improve it. Based on this, qualitative research method, content analysis is used. In this way, firstly, the buildings are classified into three groups of self-presenting structures, compatible with the form, and forgotten in the form, based on the relationship between the form and the structure. Then, based on the needs of the structure and the form and the characteristics of each group, the qualitative parameters of this interaction include the participation of the form in the higher efficiency of the structure, honesty in expressing the elements of the structure, understanding the behavior of the structure in the form, the suitability of the structure with the functional and semantic needs of the form, and the suitability of the form with the construction needs of the structure. (time, economy and quality considerations) are presented. The results of this research include providing solutions to improve today's Iranian architecture in the interaction of form and structure.

In 2018, in his master's thesis entitled "Designing a high-rise building with residential use with the aim of revitalizing the Iranian courtyard" in 2018, Ghorban Niad Delavar investigated the effect of high-rise construction on the loss of open space (yard) in contemporary buildings. The results obtained in the design of a high-rise residential building in the 22nd district of Tehran on a site near the Persian Gulf Lake are presented as a practical example.

Unlike the Art Deco style, whose flourishing in the West is related to the period of transcendental modern architecture, the international style was also considered as an important style in the West during the period of late modern architecture. This style is considered one of the most important styles of late modern architecture. Many buildings in the west and other parts of the world, including Iran, were built in this style. But three new styles were introduced in modern and late architecture in the West, which had an impact on Iran's architecture as well. These three are called sculpturalism, brutalism and minimalism (Vahdat, 2015: 299). Sculptorism is a style in which concrete, like sculpting paste, is used to design and implement the body of buildings. In the buildings of this style, the concrete surface is often visible and the building is displayed as a beautiful sculpture. The Brutalism style, which was popular in the West from the 1950s to the mid-1970s, is a style that in the works made of it; The rough surface of the concrete is displayed. Sometimes the grooves of the wooden molds are visible on the concrete surface and usually the dimensions of the beams and columns are exaggerated (Alavipour, 2015: 142). On the other hand, the motto "Less is more" which was proposed by Mies van der Rohe, is the main idea of the minimalism style. In this style, straight and elongated lines, smooth and polished surfaces and cube-shaped volumes are used. The execution of the building and its components is done with

great beauty and precision. In this style, the decorations of diagonal and curved lines and any additions that are not needed are avoided (Rahnama and Razzagian, 2012: 52).

Organic architecture, organic architecture is considered one of the branches of modern architecture, with the difference that if modern architecture was based on science and technology, organic architecture was nature-oriented and considered nature as the main idea in its designs. Organic architecture was formed in America in the 19th century by Frank Furness and Louis Sullivan (Bani Massoud, 2014: 29). The heyday of this theory can be seen in the writings and designs of Frank Lloyd Wright in the first half of the last century. Wright's name is synonymous with organic architecture more than any other architect (Latif Aghili et al., 2019: 128). The goal of organic architecture is to combine spaces, materials and artificial environment with natural environment. In such a way that the architectural effect is mixed with the surrounding natural environment and they interact with each other. In organic architecture, materials are displayed naturally and as they are. In this regard, Wright states that glass should be used as glass, stone should be used as stone, and wood should be used as wood. Some examples of this architecture in Iran can be seen in the past or in a phrase in the native architecture of Iran (Farqani et al., 2019: 213). Native architecture, especially in villages, was built in harmony with its natural environment. This architecture was not a combination that was imposed on nature, but was complementary to the context and conditions in which it was placed. Masoleh village in Gilan province can be called as one of the best examples of organic architecture in Iran (Abbasi, 2016). The body of the village, which is located on the slopes of Talash mountains, has been expanded as a series of row buildings parallel to the ground level. All the buildings have their backs to the slope of the land and the sunset, the valley and the river. The beautiful view of nature has an eternal effect in front of all the spaces and buildings of the village (Karimi, 2015). Unlike the first Pahlavi period, when no organic style buildings and indicators were observed in Iran, in the second Pahlavi period, a number of buildings and parks were designed and implemented, which have benefited from the characteristics of the organic style; That is, their homogeneity with nature, natural materials, or the use of curved and curved lines in the design (which originates from the famous slogan of the architects of this style, that is, no straight line can be found in nature), is often seen in these works.

Postmodern Architecture

Although traditional architecture was gradually marginalized since the arrival of western architecture in Iran, but there has always been a look to the past and inspiration from historical architecture in contemporary Iranian architecture. In the second Pahlavi era, in the designs of a number of renowned architects of that period, this look at the past and its integration with the current conditions was proposed (Jehanbeglu, 1995: 51). The tradition used on their facades is outside the subject of this architectural style, but the buildings and a type of architecture where

the two topics of tradition and modernity are parallel to each other in the physical plan of the building are included in the framework of this architectural style (Bemanian, 2016). Hoshang Seyhun can be called the founder and theoretician of this type of architecture. He says the following about the integration of modern architecture with historical architecture in this period. In the work of modern architecture in Iran, there were some people, like myself, who paid attention to the fact that the color, smell and continuity of the past architecture should be preserved. We should somehow be reflected in modern architecture (Anabastani et al., 2015: 13). It should be said that perhaps before the postmodern issue started in Europe or America, modernism had emerged in Iran in the buildings that were built 30 to 50 years ago. And it smells like postmodernism. Anyway, if we want to translate modernism into Persian, it means modernism. Indeed, our thought and our knowledge should be in the service of architecture, which answers our past and present in terms of the artistic form of the moods that people live in (Bani Masoud, 2003). With the support of Farah Pahlavi's office, in September 1970, the first international congress of architects was held in Isfahan in the name of exploring the possibility of combining traditional architecture with modern construction methods. In this conference, eighteen of the most famous architects in the world at that time, such as "Louis Kahn", "Paul Rudolph", "Buckminister Fuller" and "George Kandelist" were involved (Aghajari, 2010: 38). The most famous architects from Iran including "Mohsen Foroughi", "Nader Ardalan", "Hoshang Seyhun", "Kamran Diba" and "Ali Sardar Afkhami" were present. Understanding the maintenance and combination of this wealth of civilization and culture with the current context of Iranian society and its physical and material environment is inevitable. In the course of Iran's social developments, special attention should be paid to the preservation and renewal of the regional and urban values of existing models and systems. The topics raised in this congress were about the tradition of technology and modernity, which were addressed by Iranian architects and prominent American architect Louis Kahn. The recommendations of the congress expressed the vision of the Iranian avant-garde architects in the late 1940s, and at the same time, these topics are the framework of avant-garde architecture, or in other words, postmodern architecture. explained Iran until the time of the Islamic Revolution (Farqani et al., 2019: 214). Amir Bani Massoud writes; A trend parallel to the atmosphere of modern Iranian architecture, which was mainly supported by Iranian educated architects both abroad and Tehran University graduates, was formed between the 1960s and 1970s, which was strongly influenced by the atmosphere of Iranian intellectual currents in the aforementioned decades. Of course, we should not forget that the flow of Iranian architecture that was formed in the 1960s and 1970s was the same modern architecture that was mutilated between international styles and nationalism. Most of the national writings consider this current to be influenced by the ideas and discussions raised in post-modern Europe and mainly the discussions raised in postmodern architecture; But according to the opinion of many experts, the atmosphere formed in Iran in the 1950s cannot be equated with the

post-modern debates, which are called postmodern. (Bani Masoud, 2014) In the post-modern era, post-modern architecture was proposed since 1967, with the book "Robert Venturi" called "Complexity and Contradiction in Architecture", and it took on a global form mainly since the late seventies (Qobadian, 2012). Seyhun and Bani Masoud consider the combination of traditional and modern architecture in Iran to be unrelated to postmodern architecture before. Bani Masoud calls this type of architecture in Iran, which he considers to be influenced by the intellectual movement of that period in Iran, as "historical modern" given (Bani Masoud, 2014). By examining the buildings built during the 37-year period of Pahlavi II, a total of 28 landmark buildings, which have been intended to integrate the historical architecture of Iran and the modern architecture of the West in their physical plan, have been identified and their physical characteristics will be investigated in the upcoming research (Karimi, 2015).

The theoretical and intellectual principles of this style were based on the fact that the original Iranian architecture should be combined with the modern styles common at the time and the new construction methods and technologies, and this integration is not only the interference of the shells in appearance, but also the penetration of the integrity of the form in such a way that their separation to damage the nature of the building from each other (Bani Masoud, 2014). Although the aim and goal of Iranian modernism architecture is similar to postmodern architecture in the West, in both modern era architecture is designed with regard to history and the past. According to the above explanations, the integration of historical and modern architecture in Iran started in 1945 and therefore could not be influenced by postmodern architecture which started in 1967 (Giddens, 2001: 12); therefore, Seyhun and Bani Massoud's opinion about the lack of connection between these two architectural styles is correct. In this way, even before the postmodern architecture spread in the west and finally in other countries, a type of modern Iranian architecture that paid attention to the civilization, culture and history of Iran grew in the country. Therefore, for this type of architecture, the name of modern Iranian architecture can be chosen in the buildings of this style. The style can be seen on the one hand, the characteristics and innovations of the modern era, and on the other hand, the continuity of Iran's past architectural methods is clearly and artistically manifested in the physical form of the building. After the Islamic Revolution in 1978, most of the designers of these buildings went abroad. The idea of this architectural style is not seen. Therefore, the year 1978 can be called the year of the end of Iranian postmodern architecture (Omidvar, 2010: 29).

Hi-tech Architecture

A year before the announcement of the death of modern architecture by Charles Jenks, the successor of this hi-tech style architecture emerged in Paris. In conventional buildings, building technology is usually hidden in the inner layers of the building, but one of the characteristics of high-tech buildings is the display inside and outside the building (Armstrong & Mir, 2008). And

naked is seen (Pourmohammadi, 2015: 18). Single architectures represent the achievements of the modern era. Modern science and technology are one of the key achievements of this work (Armstrong and Mir, 2006). In this architecture, the advancement of the construction profession using modern technology is artistically designed and exposed (Saremi, 1995: 59), after many studies about this style in the second Pahlavi period, see It was found that due to the emergence of single architectures in the second Pahlavi period, only three works of this style were identified in the country (Talebi, 1996: 57). One is Tehran's "Takhti Stadium" by Jahangir Darvish, which is due to the covering of two openings (two high columns) at a distance of 247 meters from each other, with a concrete roof due to components and tension cables, and the other is the Kermanshah Regional Museum by Mehrazan Consulting Engineers, which is due to Having a transparent body and visibility of the structure are among the best examples of technology styles in the country (Shahrokhi Far, 2015).

The contemporary architecture of Iran after the Islamic revolution, in 1978, has had many challenges from the imposed war, the post-war era and the need for rapid reconstruction to coincide with the postmodern trends in the West (Samsami Hosseini, 2001).

Green Architectural Style

Climate since the 70s and sustainable architecture since the 90s have been among the most important topics in the field of architecture, and these two styles have been called green architecture. In western countries and in Iran, due to the reduction of oil reserves, environmental pollution and endangerment of the environment of the planet, green architecture becomes more important (Alavipour, 2015: 143).

Folding Architectural Style

Architects of this style are opposed to Tall vertical buildings. Most of the buildings built in this style have a horizontal shape. Perhaps this is one of the reasons why this type of building is rarely seen in the new architecture of Iran. Each space in a folding style building is like a layer (Leilian et al., 2009). These layers are sometimes parallel and sometimes twisted. Layering is one of the most obvious features of this style and can be seen in almost all buildings of this style (Qobadian, 2012). Bahram Shirdel pays special attention to the relationships between spaces and space, as a result, according to the evolution of his architecture, he can be seen as similar to John Hidek, whose main concerns are spatial and volumetric relationships. According to his critics, until the fourth decade of his life in Jirga, he is considered the world's leading architect, especially in the folding (architectural) approach (Leilian, 2009: 52).

The trend of deconstruction or deconstruction was brought up in Iran during the years 2004 to 2011 and during the events of contemporary western architecture. Above all, philosophical-

theoretical approaches in architecture were mentioned. In Iran, continuing to pay attention to current trends in architecture, attention was paid to the category of deconstruction and its related approaches, which started in the discourse and discussions of architecture in the translation of a number of related books or articles and in a number of architectural projects, both in the professional environment and in the academic environment. They found the possibility of emergence (Qobadian, 2012: 53). There are also some examples built in the private sector, which unfortunately indicate the emergence of a false de structuring trend based on the superficial and apparent imitation of Western architectural examples rather than a deep understanding of what de structuring in architecture suggests. Many architects who spread this view in Iranian architecture by resorting to certain arguments, they try to connect the theoretical foundations of this tendency with some philosophical, mystical and religious fields of Iran. Perhaps this tendency can find legitimacy and validity in the contemporary architecture of Iran (Farqani et al., 2019: 52).

Populist Trend

The possibility of mechanical reproduction on the one hand to produce ridiculous works of art and on the other hand to expand the spectrum of consumers of works of art and decline the taste of works and as a result of producing a trend in architecture that can be called populist trend. The populist tendency is an emotional and sentimental tendency whose purpose is to satisfy the consumer and the people. The most important feature of this trend is its market orientation (Omidvar, 2010: 57).

The trend of favorable factors from 2013 until now. This trend, which in fact uses the simplest and most trivial tastes and mental ideas of people in order to create works, is formed based on characteristics such as hypocrisy, luxury, consumerism. In fact, the populist trend is not a trend that adheres to a specific model and form and seeks to simply imitate styles and combine them with each other without any clear rules and order (Qobadian, 2012). The dead and alive of the previous era, especially those that arouse the nostalgic feeling of the consumer (Çizgen, 2012). As an example, he uses the color similarity of white cement and stone and tries to show cheap materials instead of expensive materials. Most of the buildings that are built today in Tehran and of course in other parts of the country fall under this architectural trend (Bemanian, 2016: 69).

Tall Buildings

The height of a building is a relative matter and various definitions for Tall buildings have been presented from different aspects:

Urban planners and designers often call buildings with 10 floors or more as Tall buildings (Yeang, 2007) and consider the characteristic of a Tall building to be at least A designed facade should represent the number of its multiple floors (Kunstler and Salingaros, 2001). In other

words, an exhibition, factory or any building with a high height does not fit into this definition (Niu, 2003). Buildings against fire, the minimum number of floors of a Tall building is 8 floors. (Tavakoli and Sabetan, 2022: 8). However, due to the advancement of equipment and facilities, this number of floors can be increased to 12 floors. Also, based on the text of the rules and regulations for the construction of buildings with 6 floors and more in Tehran, which is considered as a guideline for Tall buildings in Tehran, wherever Tall buildings, Tall buildings and Tall buildings are mentioned, it means buildings with 6 floors and more (Khalvati et al., 2022: 16). According to all the mentioned cases, a high-rise building can be called a building with at least 10 floors, which falls within the scope of all the above definitions (Pourmohammadi, 2015: 119).

Also, Tall buildings in Iran are defined as buildings above 6 floors based on the rules and regulations of the Supreme Council of Architecture and Urban Planning of Iran approved in 1998, but this definition is applied to buildings above 12 floors based on the comprehensive plan of Tehran, approved in 2007. A high-rise building is a building that is multi-story and high-rise and usually has a residential, commercial or office-residential or multi-use use, and it differs from a skyscraper in height. A high-rise building with a residential use is called a residential complex, an apartment block, and a tower. Regarding the minimum height of a high-rise building, there is no single and standard definition, but most of them agree on a building with a minimum height of 23 meters. A high-rise residential building is a single high building whose height is higher than the diameter of the enclosing circle of the plan (Karimi, 2015: 28). This is while Bemanian considers a high-rise residential building to have a height of more than 10 floors and about 32 meters (Bemanian, 2016). In 2003, Barney defined high-rise residential buildings as 15 and 16 floors and very high-rise residential buildings as 30 to 40 stories (Barney, 2003). Saeed nia calls high-rise apartments with more than 10 floors as towers (Samsami Hosseini, 2011: 49).

In 2014, Anabestani et al., in the article "Comparative comparison of multi-criteria decision-making methods in the optimal location of high-rise buildings (case study: District 9 of Mashhad Municipality)" this research analyzed the results of the widely used Analytical Network Model (ANP) and Analytical Hierarchy Model (AHP). It is based on the fact that research data and information were collected through a questionnaire by 25 expert experts. The results of the research showed that in the ANP method, the criteria of compatibility and land price with a coefficient of 0.143 are in the first place, and per capita services and population density are in the second place, while in the AHP method, the distance from the fault is in the first place with a coefficient of 0.255 and the slope of land is with a coefficient of 234. 0/0 is ranked second. After preparing the zoning map of suitable areas for the construction of high-rise buildings, a space between 439 and 449 hectares has been determined to be completely suitable in the ANP and AHP methods, respectively. Finally, among the eight high-rise buildings under construction in

the studied area, according to the ANP method, none of them are located in completely suitable areas, while in the AHP method, two buildings, Armitage and Mania, are located in completely suitable areas.

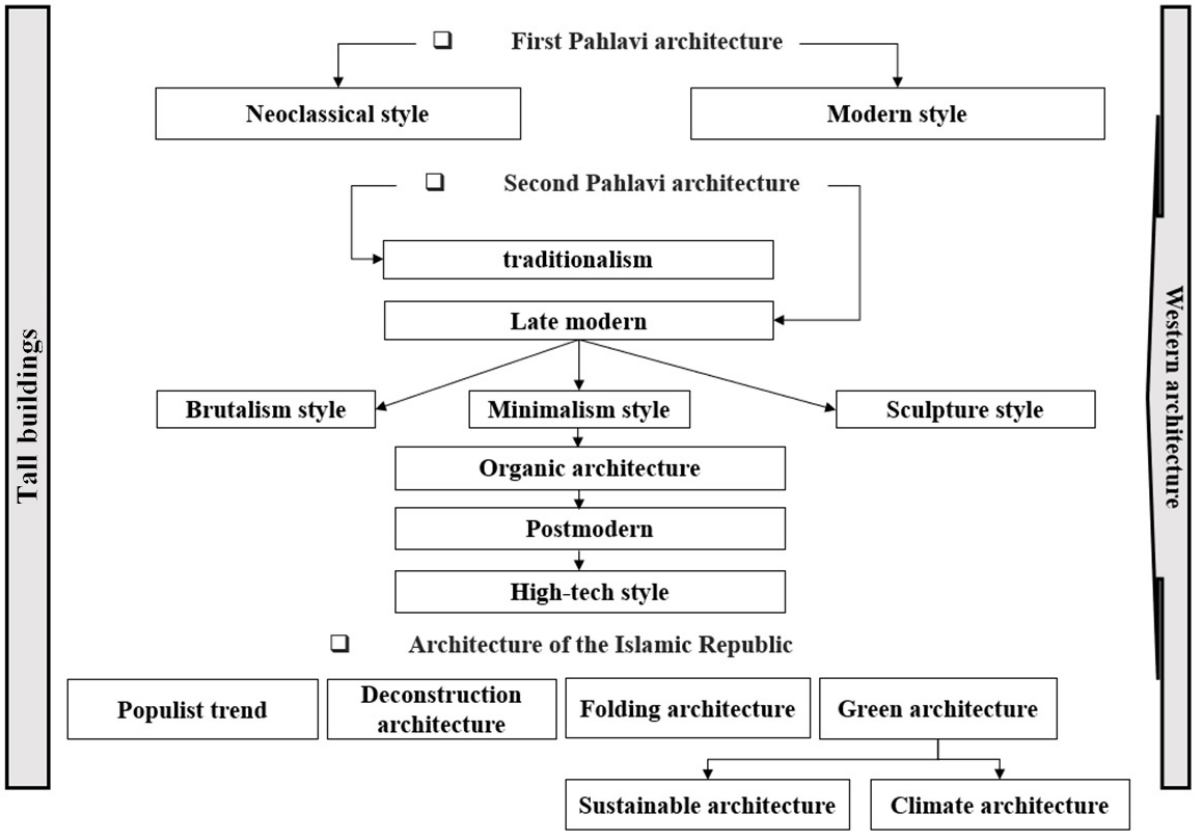

Figure 1. Summary diagram of the architectural styles of the West influencing the contemporary architecture of Iran from the theoretical foundations and background of the research (Source: Authors)

Research Methodology

In this research, due to the difference between the components of the theoretical field and the measuring range, it is necessary to refine a variable based on the selected range. Based on this, the mixed research method is qualitative and quantitative. First, the concepts based on the theoretical fields in connection with the introduction of the western architectural components effective in Tall design are extracted with a systematic review system and the qualitative stage begins. Semi-structured interview questions, definitions and concepts are compiled and provided to academic experts. The questions are based on the extraction of western architectural components that are effective in the design of Tall residential buildings in the target area. The interviews are entered into the ATLASTI software and begin to be labeled with a coding system based on description and interpretation. The results are presented in the form of a conceptual

spider diagram in the form of introducing the components. The stage of data reduction is based on open and axial coding and by relating categories. In this stage, the sample size selected from the statistical community of experts is 31 people who were selected with the snowball system, and the results reach saturation from the 24th person onwards. The sampling method is snowball. In the next step, the quantitative approach begins. The components are placed in the form of a questionnaire with a Likert scale. Space is randomly distributed among users. The sample size is selected based on the highest value of the Morgan table. The results are entered into JMPSAS software and analyzed with inferential statistics. For this stage, analyzes involving causal relationships, such as regression and correlation, and corresponding pre-tests are chosen. The validity of the questionnaire was obtained with the CVR formula for 21 experts, whose value was 0.749, and Cronbach's alpha was calculated for reliability, which was 0.831.

Tall Buildings under Study

In this research, the area under study is the city of Tehran, due to the existence of more multiplicity and different types, and an attempt is to select a number of selected samples from among them in a purposeful way shown in (Table 2).

Table 2. Targeted examples of Tall residential buildings

Name of the building	Designer/design group Manufacturer/Owner	Year of construction	Property	Image
Tehran International Tower	Setec Batiment	2005	Tehran International Tower is the most Tall residential tower in Iran with a height of 162 meters and 56 floors. This tower has 3 wings and 220,000 square meters of infrastructure, which consists of 572 units, including 43 suite apartments, 172 two-bedroom apartments, 313 three-bedroom apartments, 16 four-bedroom apartments, 11 triplex penthouse apartments, and 17 commercial units on the ground floor. Tehran International Tower is located between Hakim Gharb, Kurdistan and Sheikh Bahai highways and in the north of Amirabad neighborhood of Tehran.	

Third Millennium Tower or Millennium Tower	A group of shareholders in two helicopter hangar housing cooperatives and Millennium Iranian construction and trading company.	1996	Third Millennium Tower or Millennium Tower is one of the towers with a height of more than 100 meters in Tehran, which is located on Sheikh Bahai Street and near Tehran International Tower. This 34-story tower is built on a land of 15,200 square meters and with an infrastructure equal to 123,000 square meters, residential and commercial use, and the height of the tower structure is 110 meters from the ground level, and considering the helipad and truss, the height of the tower reaches 118 meters.	
Sattarkhan residential towers	National Construction Company	1975-1980	The 360-unit complex of Sattar Khan was built in 3 towers with 21 floors. The contract for the mentioned project was concluded in February 2014 between Maskan Waqt and National Construction Company for the execution of the work in 36 months. The 360-unit complex of Sattar Khan was built in 3 towers with 21 floors. The contract for the mentioned project was concluded in February 2014 between the Housing Organization and the National Construction Company for the implementation of the work in 36 months.	
Taj Tehran	French contractor (S.A.E. company)	1975-1989	18 towers and 54 villas The towers are in three classes A including buildings 17 to 21, class B including buildings 1 to 14 and class C including building 16. Currently, the number of residential units in Omid town is equal to 1946 units. It was designed for the residence of	

			royal military families and army officers, officers and emirs. After construction, these units were handed over to the families of the 21st Hamza Division of the Ground Forces of the Islamic Republic of Iran.	
Known as the three buildings of Sattar Khan	Armeh company manager	1974-1978	This complex included three blocks named Damavand, Alvand and Dana (later renamed to a-b-c towers), which were 27, 22 and 19 floors, respectively, including the basement floors. Of course, the initial naming of buildings. The construction of these towers lasted for about four years due to various problems, and while it was close to completion, it was stopped during the days of the revolution and was finally completed after the revolution in 1980.	
Omid town	Italian company - (Archi Test) design and preparation of executive plans Elevator contractor: Japanese company called (Mitsubishi) Made by: Ati Saz Company	1976-1990	Including 23 towers from 12 to 31 floors, it has been built in three phases. Phase one includes 9 towers of 12 to 22 floors with a floor area of 12,3335 square meters including 690 residential units built by 1988. The second phase includes 9 towers of 12 to 26 floors with an area of 134396 square meters and 832 residential units, and the third phase includes 5 towers of 28 floors with an area of 117104 square meters and 768 residential units. The construction of new blocks in Complex area for financial profitability.	
Before the revolution called Farhanaz town	Iran Saman Construction Company)It was formed by the government under the management of Ahmad Ali Ebtehaj and Abdul Majid Aalam) Designer: Abdulaziz Farman farmaiyan	1968-1970	Two 20-story blocks, the purpose of forming the company was to introduce Tall residential buildings and practical test of the law of ownership of apartments. Each with three floors of parking and a business unit. The first block, which has more infrastructure than the second block, and each floor has	

			between four and seven units, and according to the 600-meter area of each floor in these towers, the first and last floors are built as duplexes. At first, the first block was commercial, but later it became residential. But the second block has been residential from the beginning. This complex has an old commercial center as well as a mosque that was established after the revolution.	

Findings

Qualitative Findings

In the qualitative phase, after the interviews, the data is entered into ATLASTI software and coding begins. The coding approach using description and interpretation was used for them. Among the components of western architecture, there are 8 core codes including late modern architecture, traditionalism architecture, organic architecture, single architectures, folding architecture, popular architecture, deconstruction architecture, green architecture, organic architecture, postmodern architecture.

Based on this, the results showed data repetition and theoretical saturation in the 35th interview. The most frequent is related to the components derived from late modern architecture and related to the non-use of traditional decorations with a prominence of 18, and the least related to deconstruction components with the number of overlapping volumes and suspended surfaces in an artistic combination with a prominence of 6. The following (Table 3) shows the codes.

Table 3. Components taken from western architecture used in Tall residential buildings

The use of simple geometric volumes such as cubes, pyramids, cylinders in combination with contrasting and bright colors. Attention to natural light in interior architecture Use of symbolic form Appropriate and correct use of architectural space elements Creating a desirable architectural space as a result of very disciplined and precise thinking and reasoning Creating a basic system for learning, recognizing, creating and understanding spatial messages Discovering the space to better understand the messages of the architectural space Applying geometrical order and axial symmetry in the design of the building ٩Use of brick or stone in the facade	**Postmodern architecture**	According to the Euclidean geometry, the form is often in the form of a rectangular cube Using smooth surfaces and straight lines Not using traditional decorations Covering the facade with stone, glass, metal plates and sometimes bricks Using materials, structures and modern technology Flat roof Using concrete to create new and innovative objects Dividing building spaces into service spaces and serviced spaces and separating these spaces from each other	**Late modern architecture**
Minimal interference with the natural environment Integration of the artificial environment with the natural environment Using native materials and displaying them in a natural way Adjacency of natural and artificial materials next to each other Homogeneity and integration of parts together and with the whole Existence of multifunctional spaces Playing with light and color Designing open and semi-open spaces for proper lighting A combination of intangible and mental factors with objective factors	**organic architecture**	Dominant views and symbols in the plan of the building Introverted plan of religious buildings The plan of buildings with a new outward-looking function Brick facades with tiling decorations Glazed, turquoise tiles with Slimi, Khatai and Chinese knot designs The roof of the buildings is often in the form of convex arches and domes Using new technology Structure of the load-bearing wall or metal or concrete frame Inspiration from historical architectural styles of Iran Existence of spatial hierarchy in the interior of the house	**Traditionalist architecture**

Using the climate to provide human comfort inside the building Reducing energy consumption, especially fossil energy in the building Reducing the creation of pollution and waste in the environment Updating traditional elements and functions to ensure human comfort Use of technological materials and green or optimal facilities Choosing the field of green building materials	**green architecture, sustainable architecture**	Showing the structure, facilities and circulation system Making the body and parts of the building transparent Using shiny metalic materials or exposed concrete on building surfaces Using light tensile components Not using historical symbols and decorations In this style, the structure is not hidden, but the essential elements are used meaningfully and clearly. The form serves the function of the building Using minimal style, simplicity Not using unnecessary and luxurious details Use of metal structure for these buildings Failure to hide connections and structures Creating a tough and impenetrable outer shell in buildings Creative placement of prefabricated industrial parts Use of glass walls in buildings Lots of internal open spaces and easy access to all floors according to the use of the building	**High-tech architecture**
Creating a feeling of suspense, instability and dynamism Using diagonal and slanted surfaces and lines The juxtaposition of unrelated symbols next to each other Interference of suspended volumes and surfaces in an artistic composition Placement of symmetrical and asymmetrical volumes next to each other The existence of smooth or flat lines and broken or crushed irregular and disproportionate volumes Lack of coordination, linearity and continuity Absence of right angles or 90 degrees Rejection of Euclidean symmetry and geometry Fragmented volumes	**Deconstruction architecture**	The influence of the building form on the surrounding and internal conditions of the project The fluidity of the body, surfaces and lines Soft and flexible movement of the body depending on the site Using curved and malleable lines Emphasis on horizontal lines and divisions in the facade Rejection of verticalism, spatial classification and hierarchy Balanced homogeneity of layers in terms of shape, color, materials and texture Coordinating semi-fluid forms with container and physical bed Combining unrelated factors in a continuous mixture	**Folding architecture**
The facades of buildings are a sign of distinguishing a person from other social groups Reading history in a selective manner, having familiar motifs, glamorous, magnificent and luxurious and reminding and pointing Dependence on decorations The form is unrelated to the context Form variety Imitative use of classical architectural signs without paying attention to proportions, symmetry, and composition, etc., many elements used in popular, false, and decorative architectural facades Terraces hidden behind the windows to maintain the symmetry of the facades and columns Making it look important by changing the scale of windows and columns with two-story height and using multiple vertical elements. Using elements and materials related to collective memories Using signs outside the time and place of their cultural system			**Deconstruction architecture**

Descriptive Statistics

In this section, one question has been formulated for each variable. The questions are based on the Likert scale, which has answers from very high to very low. To convert them in the JMP software, they are given a range of 1 to 5 points. The statistical population for this research, at this stage, are space users and residents, and Morgan's table is used to find the sample size. 384 people are selected as the sample size. The results show that 37% of the participants are women and 63% are men. The most age group of the participants in this research is 47% between 18-22 and 26% between 22-26 and 27% between 26 and 30. The highest frequency is related to visual diversity with a value of 1906 and the lowest is related to contrast with a value of 1285. The support of the moving average of the data distribution shows the correctness of the instrument's measurement method, and the answers are correlated with each other and can be predicted with the fitting diagram shown in (Figure 2). In the group of designers, the highest frequency is related to postmodern architecture with a value of 1879 and the lowest is related to deconstruction with a value of 635. In the group of beneficiaries, late modern architecture with a value of 1821 is the highest and deconstruction architecture with a value of 503 is the lowest.

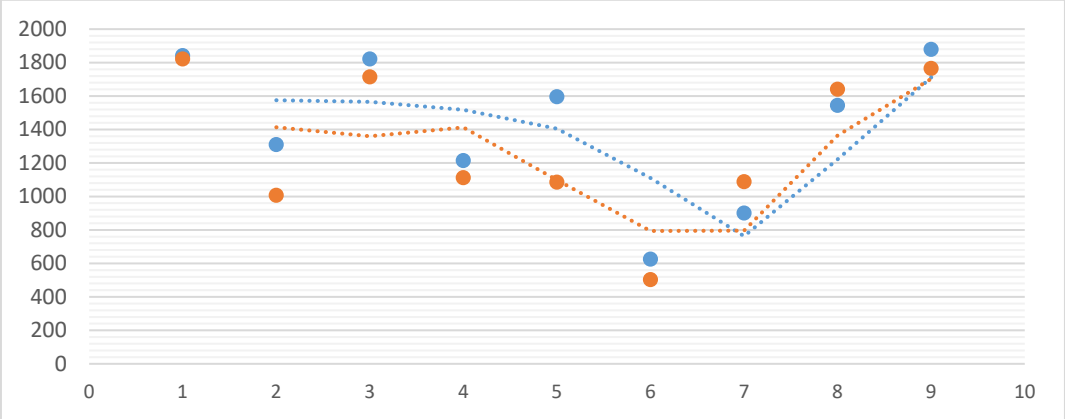

Figure 2. Data distribution frequency diagram of various western architectures

Inferential Statistics

Correlation

Two-Sample Kolmogorov-Smirnov Test is used to check the parametric and non-parametric type of data.

Table 4. Kolmogorov Smirnov test to check the normality of western architecture components affecting the body of Tall residential buildings

p	Z Kolmogorov Smirnov	The standard deviation	Average	Variable
0.281	0.798	228/3	25/44	Western architectural components on physical design

As can be seen in (Table 4), the Kolmogorov-Smirnov test is not significant (p=0.281) and therefore the components of western architecture on physical design are not normally distributed and non-parametric analysis can be used for them. Based on the data correlation results, it is clear that in the group of designers, the highest correlation coefficient is related to single architectures with a value of 0.843 and the lowest correlation coefficient is related to popular architecture with a value of 0.274. In the group of users, the highest value is related to the components of post-modern architecture with a value of 0.835 and the lowest is popular architecture with a value of 0.114 as shown in (Table 5).

Table 5. Spearman's correlation coefficient of western architectural components affecting the body of Tall residential buildings

Beneficiaries			Designers		
Significance level (Sig)	The correlation coefficient	Variable	Significance level (Sig)	The correlation coefficient	Variable
0.004	0.675	Late modern architecture	0.000	0.735	Late modern architecture
0.007	0.681	Traditionalist architecture	0.010	0.781	Traditionalist architecture
0.011	0.543	Single architectures	0.014	0.843	Single architectures
0.010	0.545	Folding architecture	0.012	0.482	Folding architecture
0.012	0.114	Popular architecture	0.016	0.274	Popular architecture
0.014	0.217	Deconstruction architecture	0.008	0.374	Deconstruction architecture
0.012	0.825	green architecture, sustainable architecture	0.006	0.721	green architecture, sustainable architecture
0.007	0.354	organic architecture	0.007	0.421	organic architecture
0.002	0.835	Postmodern architecture	0.005	0.735	Postmodern architecture

Regression

To use the linear or multivariate regression type, the internal correlation matrix diagram of the variables is used (Figure 3). After drawing the correlation matrix diagram, it was found that the factors have no linear relationship, so it is correct to use multivariate regression. The results show a multilinear relationship with a high amplitude, which is the best suggestion for using multivariate regression.

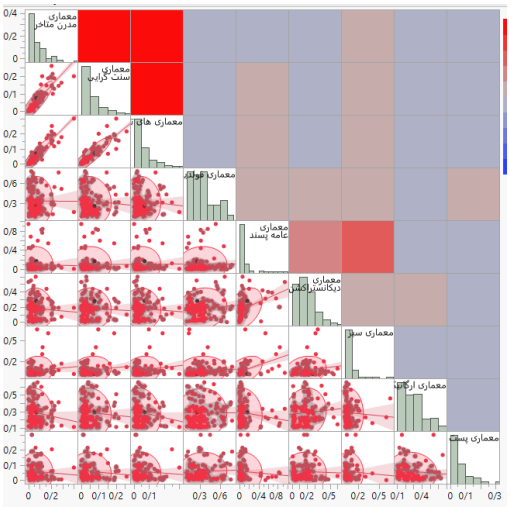

Figure 3. Internal correlation matrix of variables to identify the type of regression

Based on the results obtained from the regression model as shown in (Table 6), it is clear that in the group of designers, the highest factor contribution is related to late modern architecture with a value of (0.955) and the lowest factor contribution is related to deconstruction architecture with a value of 0.121. In the group of beneficiaries, deconstruction architecture with a value of 0.225 has the lowest factor share and the highest is related to postmodernism architecture with a value of 0.923.

Table 6. Multivariate regression in Western architecture affecting the body of Tall residential buildings

Degrees of freedom	meaningful	t	β	B	F	The coefficient of determination	Scale	group
383	0.021	581/54	0.265	1/000	501/318	0.955	Late modern architecture	designers
383	0.014	855/33	0.727	1/000	801/544	0.555	Traditionalist architecture	
383	0.022	255/31	0.331	1/000	857/369	0.714	Single architectures	
383	0.011	479/58	0.255	1/000	506/710	0.644	Folding architecture	
383	0.011	944/61	0.275	1/000	289/658	0.524	Popular architecture	
383	0.012	956/15	0.963	1/000	526/689	0.121	Deconstruction architecture	
383	0.001	712/65	0.588	1/000	314/278	0.820	green architecture, sustainable architecture	
383	0.004	632/84	0.624	1/000	586/784	0.529	organic architecture	
383	0.011	141/89	0.646	1/000	695/174	0.915	Postmodern architecture	

383	0.017	923/63	0.266	1/000	245/627	0.913	Late modern architecture	Beneficiaries
383	0.16	544/14	0.735	1/000	255/428	0.522	Traditionalist architecture	
383	0.015	488/21	0.881	1/000	383/527	0.685	Single architectures	
383	0.071	232/45	0.865	1/000	911/259	0.495	Folding architecture	
383	0.015	286/52	0.727	1/000	564/243	0.356	Popular architecture	
383	0.021	522/22	0.331	1/000	611/621	0.225	Deconstruction architecture	
383	0.038	581/54	0.425	1/000	619/872	0.706	green architecture, sustainable architecture	
383	0.002	855/33	0.823	1/000	652/349	0.723	organic architecture	
383	0.003	255/31	0.662	1/000	941/285	0.923	Postmodern architecture	

Discussion

This research follows an exploratory method to extract modern western architecture and its effective components in the design of Tall residential buildings. After coding, a number of 95 codes were extracted, which were placed in the form of 86 index codes after summarization. The core codes were predetermined in the form of a codebook, and a connection between the components was established with western architectural styles. After the interview, the experts and designers showed that the lack of using decorations as a distinct western characteristic in the association of western architecture is in the form of physical design in Tall buildings. According to them, the combination of volumes has existed in Iranian architecture since the past and the application of those volumes in an eclectic manner cannot evoke Western architecture in the mind of the audience. A questionnaire was used for the accuracy of the interviews and the development of the results to different societies.

In general, descriptive and inferential statistics have differences in the presentation of extremes, so the basis of the analysis unit should be placed in the inferential part. Based on statistics, it is clear that designers have a higher understanding of modern concepts and have placed more coefficients for them. From the experts of late modern architecture, he can make different aspects of the components of other architectural styles more modern. From the point of view of the users of the principles of postmodernism architecture, it can be adapted to their mental schemas which are derived from media images and can improve other components; as a result, based on the results of the coefficients of the regression model, it is clear that in Tall

residential buildings, the most related indicators can be He observed late modern architecture and postmodern architecture.

Based on the investigations, what can be seen in Tehran International Tower, Sattar Khan Residential Towers, Prince Park Residential Complex and Saman Twin Residential Complex is that all these four complexes follow the late modern style according to the taste of the designers. do These buildings have flat roofs. They have not used traditional decorations. These buildings have a simple shape that has nothing to do with their context and are just a vertical building.

The future building is a combination of late modern and hi-tech styles. In this Tall residential building, it is guided by a modern and minimalist style and has a glass facade and a sleek design. The unique geometric shapes and the interaction of light and shadows have created a stunning visual effect in this beautiful building that captivates the viewers. In the facade of this Tall building, according to the principles of high-tech architecture, unnecessary and luxurious details are not used. In the facade of this building, the simplicity of the windows of the same shape emphasizes the use of glass in the facade. In this tower, the body and components of the building are transparent and historical symbols and decorations are not used in any way.

In the residential building of the third millennium, it has high-tech styles. The main facade of the building, which faces west, controls the west light. In this building, there are three-paned windows from the floor to the ceiling. The glasses used are low-reflective and based on today's technology with minimal infrared transmission and very low heat exchange. The main view is one meter behind the windows inside the apartments.

In the residential buildings of Omid town, which is close to the style of green architecture, the roof of this complex is green, as well as the surfaces in the area and the terraces are considered to be green spaces in order to meet the goals of the plan, i.e. green architecture. To get closer, this Tall residential complex has private patios and balconies. In this residential complex, terraces are considered more in the rooms. As a result, the penetration of sunlight is suitable for bedrooms and living rooms. On the other hand, these terraces are a means of establishing social relations among neighbors.

Conclusion

The emergence of this type of architecture has created a variety of products in urban planning and architecture, following the advancement of technology and ease in the field of vertical growth and development of cities, one of which is the Tall residential building. The principles of modern architecture have always been used to design these collections, and these principles exist in an eclectic form in these buildings. This research showed that the effective styles in Tall construction in Iran include late modern architecture, traditionalist architecture, single architecture, folding architecture, popular architecture, deconstruction architecture, green

architecture, organic architecture and postmodern architecture. These styles were used eclectically and the opinions about the productivity of each of them in different groups seem to have differences. After its arrival in Iran, deconstruction architecture has undergone various changes and there is a consensus about not using its indicators in the design of Tall buildings.

According to the findings of the research and investigation of Tall residential buildings, the reception of late modern architecture in Tehran has been considered by the designers more according to the way of shaping the city after the revolution. Neomodern or late modern architecture is one of the famous and popular trends in contemporary Iranian architecture education. In this type of conceptual works such as changing the axis, breaking the box, etc. can be seen and recognized well. In fact, the architecture of Iran in the contemporary period has inevitably changed its shape under the influence of several factors, including the change of traditional to modern construction methods, and has moved from traditional introversion to modernist extroversion. The reason why this style is still considered by designers is that in the late modern style, freedom of action, curves and huge volumes are clearly defined and architects and designers in this style can freely implement ideas and whatever they have in mind.

Author Contributions

All authors contributed equally to the conceptualization of the article and writing of the original and subsequent drafts.

Data Availability Statement

Not applicable

Acknowledgements

The authors would like to thank all participants of the present study.

Ethical considerations

The study was approved by the Ethics Committee of the Islamic Azad University, Central Tehran Branch. The authors avoided data fabrication, falsification, plagiarism, and misconduct.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest

The authors declare no conflict of interest.

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IJAPAS

International Journal of Applied Arts Studies

Print ISSN: 2588-4506 Online ISSN: 2588-4670

Homepage: www.ijapas.ir

Islamic Azad University
Yazd Branch

Architectural, Structural and Decorative Patterns of Schools in Yazd During the Muzaffarid Period Based on the Existing Cases (14th Century AD)

Roya Rismanian[1], Reza Abouei[2], Ali Aram[3]

1. Ph.D. Student in Architecture, Yasuj Branch, Islamic Azad University, Yasuj, Iran. E-mail: roya.rismanian@iau.ir
2. Corresponding author, Department of Art & Architecture, Yazd University, Yazd, Iran. E-mail: r.abouei@yazd.ac.ir
3. Department of Engineering, Yasuj Branch, Islamic Azad University, Yasuj, Iran. E-mail: aliaram172@yahoo.com

Article Info

Article type:
Research Article

Article history:
Received September 24, 2024
Received in revised form October 6, 2024
Accepted October 27, 2024
Published online December 29, 2024

Keywords:
Architectural models,
Schools,
Muzaffarid period,
Yazd school of Architecture

ABSTRACT

No studies have thoroughly examined the Yazd Style of Historic Architecture. This architectural style was during the Atabakan and Muzaffarid eras in the 12th to 14th centuries AD. Although the short reign of the Muzaffarid dynasty, significant events and innovations occurred, in central Iran. This dynasty's legacy in Yazd includes a variety of buildings like seminaries, mosques, monasteries, bazaars, and numerous qanats that influenced later architecture. Public buildings from the Muzaffarid era in Yazd comprised seminaries and scientific schools. Many of these structures have been lost over time, and there is a lack of research to understand their architectural patterns. This study aims to analyze the architectural patterns of Muzaffarid schools in Yazd from "structural-physical," "construction technology," and "decoration" perspectives. It uses a descriptive-analytical method, referencing historical sources and field observations of the remaining Muzaffarid-era sites in Yazd. Due to the limited surviving examples, this research focuses on seven schools: Ziaieh, Kamalieh, Rukniyah, Shamsieh, Hoseinian, Khanzadeh, and Shah Abolqasem. The findings reveal that despite the brief Muzaffarid era and internal conflicts, there was sustained civil, cultural, and social activity, which protected the architectural legacy from the post-Mongol invasion. The schools' architectural patterns show a significant influence from the period's cultural and social context, favoring balance and symmetry, often with domes and durable decorations. Use of various applied geometry in design, especially in Shamsieh and Rukniyah seminaries, underscores the attention from Muzaffarid rulers and architects. Thus, despite the political instability, the balanced approach ensured continuous activity in about hundred schools, setting a subsequent model construction.

Cite this article: Rismanian, R., Abouei, R., & Aram, A. (2024). Architectural, Structural and Decorative Patterns of Schools in Yazd During the Muzaffarid Period Based on Exiting Cases (14th Century AD). ***International Journal of Applied Arts Studies***, *9*(4), 55-78.

Publisher: Islamic Azad University, Yazd Branch.

Introduction

The historic monuments of each city are parts of the identity and cultural-historical characteristics of the people who lived there. The city of Yazd is one of the important cities in Iran, which had numerous monuments dating back to 14th and 15th centuries. The value and importance of the works of this era is doubly understood when we know that the architectural signs of this era in its capital, have almost completely demolished and we do not have many works of this important historical period in other parts of Iran. From this point of view, Yazd region is the flagship of introducing the architecture of this period. Based on this, the study and recognition of the buildings left from the Muzaffarid period, especially in the central plateau of Iran and much more importantly in Yazd.

Muzaffarid were among the rulers of Iran in the 14th century, who ruled over different parts of the country, especially the central regions, and Yazd, during its historical life and ancient history, is the only one in this era that, as the capital of Shah Yahya Muzaffarid, has significant growth and prosperity all features of its life.

One of the types of those buildings left from Muzaffarid dynasty were schools, which have not yet been subject to independent research aimed at understanding the Yazd school of architecture. Although the construction of schools in Yazd began in the era of Atabakan (11 & 12th centuries AD), it flourished during the Muzaffarid era to such an extent that historians mention dozens of schools and seminaries in the city, each of the rich and capable people built a school for themselves and later it was used as a burial ground. Most of these schools have a high dome which is the burial place of founder. This method continued until the end of Muzaffarid period, but it was almost forgotten at the beginning of the Tamerlane era. The present research aims to examine the remains of this era in Yazd to introduce the architectural model of Muzaffarid period schools in Yazd as a part of the historical and cultural heritage for the recognition of the architectural Style. Accordingly, the main question of the research can be asked as follows:

- What was the common architectural pattern in the architecture of Yazd Schools during Muzaffarid period and what morphological features does it have?

Yazd During the Muzaffarid Era and the Status of Scientific and Religious Schools

The Muzaffarid family served the Atabakans from the beginning of their arrival in Yazd and reached positions in their court, and through this family they were introduced to the Mongols. The main ruler of Muzaffarid was Amir Mubarezuddin Muzaffar (1323 to 1358 AD), who ruled in the central and southern regions of Iran such as Yazd, Isfahan, Kerman, Shiraz and even the coast of the Persian Gulf (Iqbal, 2009: 442).

Figure 1. Muzaffarid territory among other kingdoms of Iran in the 6th to 8th centuries AH (Tus Foundation)

The era of Muzaffarid was short (less than a hundred years), but its influence in some areas was so great that it can be said that their central territory reached the peak of cultural prosperity. In addition to mosques and monasteries, the bazaars that were built in this period were considered a turning point for the economy of Yazd. These bazaars have still preserved their life to some extent. Among other actions of the rulers, is the creation of villages around Yazd and the running of aqueducts in this city, among which we can mention the Waqf Abad aqueduct located in Seyed Ruknaddin neighborhood. In additions to Yazd, these rulers worked in Fars, Kerman, and Isfahan. They built charitable and public buildings such as hospitals and repaired city wall and towers around the cities and assigned endowments of agricultural land, garden and bazaars for each to be a source of income for its costs.

The remaining buildings from the Muzaffarid era, especially the scientific and religious schools in the city, show an irreplaceable identity in the field of cultural and scientific activities of that time. Unfortunately, only a few remained from that large number and most of these magnificent cultural, scientific and religious buildings were destroyed, due to natural disasters and the neglect of the rulers after the Muzaffarid period. Various historians, including Ahmad ibn Hosein Katib, mentioned dozens of religious and scientific schools in Yazd alone, and the historical evidence and remains from that era show the great attention paid to the construction of schools and the importance of various religious and other sciences in this period. Some researchers estimated the number of these schools to be around one hundred and noted that in addition to these schools, two hundred domes and monasteries and twelve mosques were built in Yazd (Tafershi, 2010: 96). From the abundance of schools built at this time in Yazd, Meybod, Kerman, Shiraz and other cities, it is possible to understand the level of public attention and concern of the people and the rulers to the study of various sciences in the period after the

Mongol invasion. In this study, the schools of Ziaeieh (Alexander Prison), Kamaliyeh (Shah Kamaluddin'tomb), Rukniyah (Seyed ruknaddin's tomb), Shamsieh (Shamseddin's tomb son of Seyd Roknaddin and son-in-lawof Rashiduddin Fazlollah Hamdani), Hoseinian (Hoseinieh Hasht), Khanzadeh (Goldasteh) and Shahab Ghasem Taraz. (Shah Abul Qasim) have been investigated and examined and its architectural patterns have been analyzed.

Research Methodology

The method used in this research is based on historical research in a descriptive and analytical way. The primary information related to the history of Muzaffarid period and the context governing the architecture of that period was extracted from first-hand sources. The architectural features investigated in these schools are categorized in three areas including "physical-spatial features", construction technologies" and "decoration patterns" which are extracted separately for each school and finally by examining the commons between them, has led to the architectural model of Muzaffarid period schools in Yazd.

Table 1. Ilkhanids Muzaffarid considerable schools in Yazd

The name of the building	**founder**	**date of construction**	**References**
Ziaeieh School (Alexander Prison)	Zia al-Din Hosein Razi ibn Molana Sharaf al-Din Ali	1233 AD	Yadegarhay-e-Yazd(Monuments), 799 - History of Yazd, 116 - Jame Mofidi, vol.3, 144
Kamaliyeh School (Baqea Shah Kamaluddin)	Shah Kamalieh	1320 AD	Yadegarhay-e-Yazd(Monuments), 610- Tarikh Jadidizd, 137- Jame Mofidi, Vol.3, 252
Shamsiyah School (Hoseinieh Shams)	Seyed Shamsuddin Mohammad	1325 AD	Yadegarhay-e-Yazd(Monuments), 588- Jame Al-Khairat, 114, 124, 154- History of Yazd, 590
Rukniyeh School (Beqaa Siderkanuddin)	Seyed Roknadin	1325 AD	Yadegarhay-e-Yazd(Monuments), 561- History of Yazd, 83- New history of Yazd, 125
Hoseinian School (Hoseinieh Hasht)	Hoseinian School (Hoseinieh Hasht)	1326 AD	Yadegarhay-e-Yazd(Monuments), 369-new history of Yazd, 142-history of Yazd, 124, 127, 132
Khanzadeh School (Goldasteh)	Khanzadeh Khatun	1384 AD	Yadegarhay-e-Yazd(Monuments), 387 - History of Yazd, 104 and 36 - New History of Yazd, 162 and 87
Shahab al-Din Qasim Taraz School (Shah Abul Qasim)	Shahabuddin Qasim Taraz	1385 AD	Yadegarhay-e-Yazd(Monuments), 605- Jame Mofidi, vol. 3, 253

Introduction to Schools

As mentioned, seven schools left over from the Muzaffarid period in Yazd were considered as case studies, which will be briefly introduced. The architectural features also will be discussed in the following.

Kamaliye School (Shah Kamaluddin Dome)

Kamaliyeh school was built in 1320 (AD) by Kamal al-Din Abul Ma'ali. The author of the history of Yazd writes in the introduction of the school: "He built this excellent school with two minarets, a dome, a square in the school, a monastery, a medicine house, a good bathhouse, and excellent houses, and he decorated the whole school with tiles and paintings, and he dedicated many endowments to it (Figure 2, 3 & 4). He made aqueducts (*qanats*) flow from Farashah village. He has many endowments for his children. (Jaafari, 2005: 115-116).

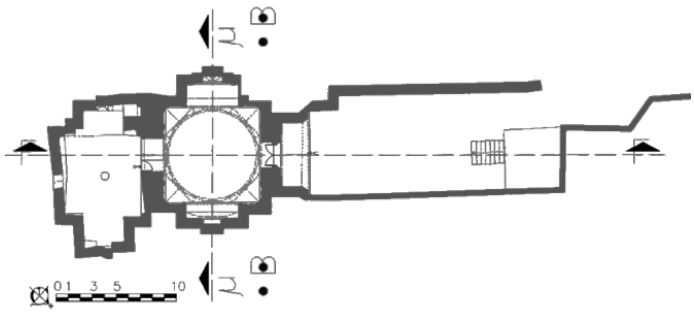


Figure 2. Plan of Kamaliye school

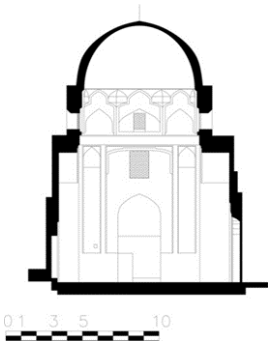


Figure 3. Section of Kamaliye School

Figure 4. Dome of Kamaliyeh School Source: Document Center of Yazd Cultural Heritage Organization

Shamsieh School

Shamsieh School is located in Chaharmanar quarter. This building was built by Seyed Shamsuddin Mohammad. Now this building is known as Seyed Shamsuddin shrine. The author of the history of Yazd writes about this building: "In Tabriz, he built a plan for the Charmanar school, Dar al-Siadeh, Khanqah, bazaar, and bath house and sent it to Yazd, and they built the foundations of the building, and built two schools facing each other, and they built the Charmanar around both schools, and a double bazaars and Taft water in the middle of the bazaars. He built the monastery and the school next to it, and decorated it with tiles, and built a good bathroom, shops and a caravanserai.

From this complex, which was originally composed of the mentioned buildings, now a part of the porch and the main dome on the east side of Charmanar alley and a part of the pediment and column on the west side remain. What is still standing from the Chaharmanar complex on the west side of the alley are the two columns of the porch, which is located in front of the entrance of the Chaharmanar Bazaar. The length and width of the four dome walls of the Shamsieh school are 58.6 x 9.10 from the inside, and the thickness of the walls is 1.60 meters. The entire body of the walls under the dome has been covered with beautiful geometric patterns and flowers and bushes of paint and plaster (Figure 5, 6, & 7) (Wilber, 1967).

Figure 5. The plan of Shamsieh school

Figure 6. Section of Shamsie school

Figure 7. Dome of Shamsieh School Source: Document Center of Yazd Cultural Heritage Organization

Rukniyeh School

Rukniyeh school is located in Waqtosaat quarter. The founder of this school is one of the main authorities of Yazd at the time. Seyed Roknadin who lived during the reign of Ilkhanids rulers was buried in this school in 1331 (AD) (Figure 8, 9, 10, & 11). According to the reports of historians, this school was probably one of the largest and most equipped schools in Yazd. Jaafari, the author of the history of Yazd, considers this school to be "Umm al-Baqaa Madrasa of Yazd" [the greatest dome] and wrote about it:

"The door of his lofty school is as good as a vault in the world, and his green dome... is famous in the world... its raised ceiling is unparalleled in its height in front of the school, an observatory was built and two small minarets were built on both sides of it... and the author of the observatory is Khalil ibn Abi Bakr Amoli... The observatory, the dome, the mosque, and the house were built in 1324" (Jaafari, 2005: 561).

The architecture of the dome has been described by Mohammad Karim Pirnia in his note as follows: "Inside, it is decorated with fine stucco and formal patterns of lapis lazuli and yellow, and the dome has two continuous shells on four squinch and formal spirals, decorative belt." (ibid: 562). The entrance gate of the mausoleum from the north has a plaster inscription, of which very little remains. This inscription has two rows of writing in Kufic script and the lower part is made of flowers. Donald Wilber, who saw this inscription about 70 years ago, has quoted its date in his book as 1324. The length and width of the walls of the dome from the inside are 11.86 x 11.82 and the thickness of the walls is 1.40 meters. (ibid: 565).

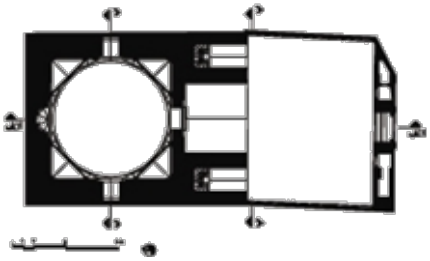


Figure 8. Rukniyeh school plan

Source: Yazd Cultural Heritage Organization Document Center

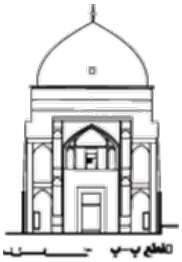


Figure 9. View of the dome of Rukniyeh school

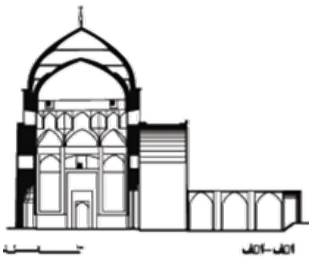


Figure 10. Section of the dome of Roknia school

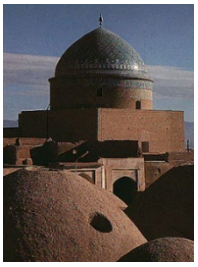


Figure 11. Rukniyeh school dome

Hosseinian School

This school was built in 1325 by Seyed Sharafuddin Hosein, whose name is mentioned in the history of Yazd as "Kocheh [alley] Hoseinian School" and in the new history of Yazd as "Hoseiniyeh School". The author of the history of Yazd writes about this school: "... this school was built by Amir Sharafuddin and Amir Moinuddin Ashraf made that school a mansion and placed a high dome behind it. His and his grandfather's tombs are there... and in the dome of that school Sadat Al-Qat are buried" (Jaafari, 2005: 124).

The dome of this school is very huge, which is known as the Gonbade-hasht. Later, a Hoseinieh was built next to it, which is known as Hoseinieh Hasht. The dome is built on thick walls, the internal size of which is 7.65 x 7 meters and the thickness of the walls is 1.5 meters. On the outer surface of the dome, there are no works that can be described. Its inner surface, which is completely covered with colorful inscriptions and carvings, has suffered a lot of damage due to the passage of time, climate situation and neglect. Quranic verses were engraved on all spaces under the dome and on the four sides of the wall and the period of the altar, and parts of them still

remain. In the middle of the courtyard of the school, which has now been converted into an octagonal Hoseiniyeh, is the Cellar (Figure 12, 13, & 14) (Ibid: 370).

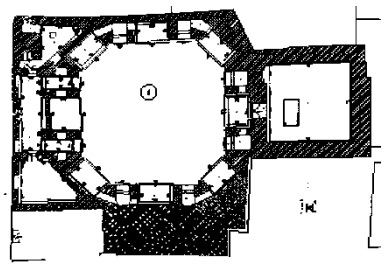


Figure 12. Hoseinian school plan

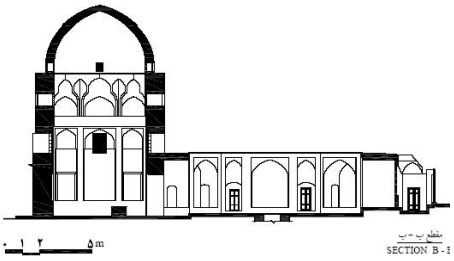


Figure 13. Section of Hoseinian school

Figure 14. Hoseinian school dome

Khanzadeh School (Galdaste)

Khanzadeh School is located in Sheikhdad quarter built by Khanzadeh Khatun, one of the daughters of Sultan Mubarizuddin Mohammad Muzaffar, outside the gate and next to the tomb of Sheikh Taqiuddin Dada Mohammad, in 1586, Following the death of the founder, he was buried in the dome (Afshar, 1995: 387). The author of the new history of Yazd writes about this school: "Khatun Azami... built amazing High School and opened the houses, four rows and the high door, and straightened the four rows in front of the blessed tomb (Taghiuddin Dada's tomb)" (Kateb, 2007: 162).

The main part of the building is built as a quadrangular space with four rows on each side. At the top of each row, there are deep arches, which today have a fence in front of them. A dome covered with bricks can be seen on top of the building. Its high walls are approximately 10 meters high. On both sides of the inner wall of the small porches, verses from Surah Fatah are engraved in thulth script with colored motifs on a narrow azure-colored background. Around the ceiling of the pavilions (Figure 15, 16, & 17). Among the decorations of the additional and newly constructed space of the mosque, we can mention the mehrab (altar) which is decorated with coloured tiles. (Khademzadeh, 2008: 85).

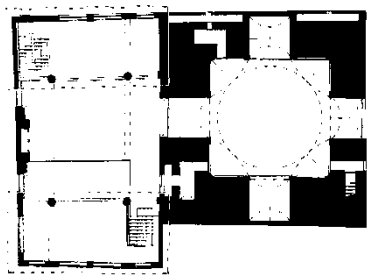


Figure 15. Khanzade school plan

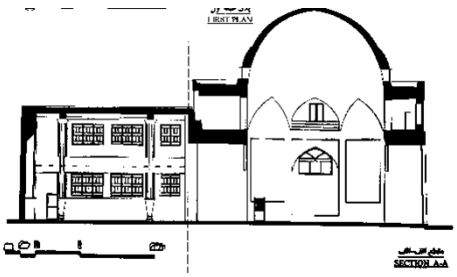


Figure 16. Section of Khanzadeh School

Figure 17. The dome and wind tower of Khanzadeh school

Shahabuddin Qaim Taraz School (Shah Abul Qasim)

Shahabuddin Qasim Taraz School was built in 1336 in Shah Abul Qasem quarter of Yazd by Shahabuddin Qasim Taraz. Mohammad Mofid Mostofi wrote in Jame Mofidi about the personality of Shahabuddin Qasim Taraz as follows: "Shahabuddin Qasim was famous for his good character and good morals. In the days of prestige and authority, a school was built in the end with elegance and purity, and all with tiles and decorated with lapis lazuli and gold (Figure 18, 19, & 20). They completed it in the seventh and eighth year of the 14th century and built amazing mosque in front of it and a bazaar containing livestock around it, and endowed the bazaar with many gardens and orchards (Mustafi Bafghi, 1963: 253).

Jafari wrote in his book about Shahabuddin Taraz school: "Even though the school is small, it is all decorated with cut tiles, and it has an excellent door and a good dome, and the water of Taft flows in it, and the area in the mosque in front of it is arranged for a good purpose, and the field of Tameher village Waqf is there, and its completion was in the year 787" (Jafari, 2005: 127).

Kateb in his book wrote: "This school is inside the city completely tiled with two floors. It has a good dome in the main row, and high entrance, a lofty square, and shops on four sides, and a mosque with a roof in front of the school, and a stream of water in it. It flows and sometimes Taft water passes there, and it has many endowments. And this school was completed in the year seven-thirty and seven-hundredth" (Kateb-Yazdi, 2007: 138).

Figure 18. Shah Abul Qasim school plan

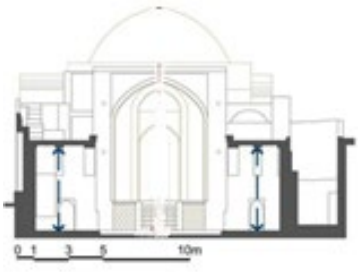


Figure 19. Section of Shah Abul Qasim School

Figure 20. Middle hall of Shah Abul Qasim school

Ziaeieh School (Alexander Prison)

The founder of this school is Ziauddin Hussain Razi, who founded the building in 1233. The school was completed by his sons in 1305 (Khademzadeh, 2008: 46). Although this building was built before the era of Muzaffarids, it is considered to be the era of Muzaffar due to its closeness. "This school consists of a courtyard and three porches on its three sides, a dome, a pillar, and numerous rooms. The plan of the dome is square and the size of each of its sides is 8.8 meters, on which a semi-circular dome with four-sided squinch has been implemented (Afshar, 1995, vol.2). The courtyard of the school is rectangular in shape and there are high porches on the three sides, south, north and west. Above the end room on the northeast side, there is a ventilation shaft (badgir), which can still be used today. On the eastern side of the building, there is a rectangular room covered with dome arches. In the western (main) porch, the remains of two altars and in the southern porch, a lofty altar can be seen" (Khademzadeh, 2008: 48). The space under the dome is one of the original parts of the building, which includes decorations such as kufi inscriptions, plant motifs with watercolors, and types of plastering. Inside the small arches under the dome, there are inscriptions in decorative Kufic script and in azure color (Figure 21, 22, & 23). The lofty mehrab of this building is built on two floors, and the moqarnas inside it are built with a simple pentagonal geometry (ibid: 51).

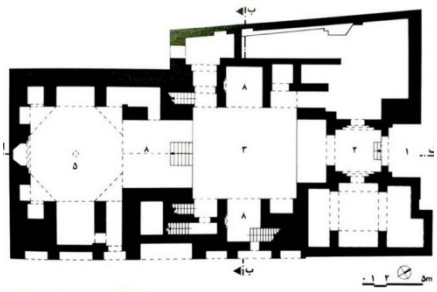


Figure 21. The plan of Ziaeieh school

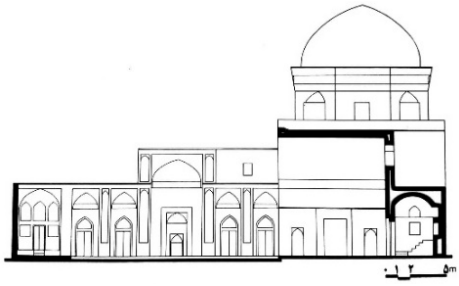


Figure 22. Section of Ziaeieh school

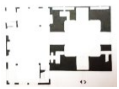
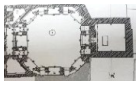
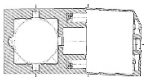
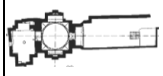
Figure 23. The dome of Ziaeieh school

Data Analysis

Here we analyze the architecture of these schools from three perspectives: "physical structural features", "construction technologies" and "decorations". Accordingly, each of these dimensions was examined in a separate table for case examples of the research, the results of which are given below:

Architecture analysis of Muzaffarid schools based on structural-physical features

Table 2. Analysis of Muzafarid period schools

Khanzadeh School	Shahabuddin Taraz School	Hoseinian School	Roknia School	Shamsie School	Kamaliya School	Ziaeieh school		
								
+	+	+	+	+	+	+	Builder's Tomb	Building performance
-	+	-	-	+	-	+	Vestibule	Components of the plan
Octagonal	Rectangular	It has turned into Hoseinieh	rectangular	rectangular	rectangular	rectangular	Yard	
-	+	-	blocked	+	seems to have existed	+	Rooms	
-	+	-	-	+	-	+	Inside the room	
Seems to have existed	Two porches	-	single porch	single porch	-	three porches	Porch	

-	-	-	-	+	-	+	Rooms inside the porch	
-	Dome	South corner of the dome	dome	dome	dome	Inside the porch and dome	Altar	
Cruciform (Mosque Section)	Cruciform	cruciform	cruciform	cruciform	cruciform	cruciform	dome	Geometric pattern of spaces
-	5 pieces:	12 pieces: On the corners and sides of the wall	12 pieces: On the corners and sides of the wall	8 pieces: On the corners and sides of the wall	12 pieces: On the corners and sides of the wall	8 pieces: On the corners and sides of the wall	Skylights of the dome	

According to the items mentioned in the above (Table 2), in relation to the common structural-physical characteristics of Muzaffarid period schools in Yazd, the following items can be extracted:

Building Performance

- One of the main features of Muzaffarid period schools is the collective function of these buildings; This means that in addition to the function of the school, other uses such as Daro-Shefa (hospital), Dar al-Adowieh (Drug Store), Dar al-Kitab (Libraries), Dar al-Hadith (Hedith House), Bait al-Qanun (Court), bath and other facilities needed by the people on an urban and local scale have been built in these schools.

- In some cases, the founders of these schools were also their teachers; Therefore it is probable that there is a residence of such people in the vicinity of the school.

- There have been service spaces especially for school attendants in their vicinities such as Kamaliye and Taraz schools, which seem to have service buildings in the northwest part of it. Among these spaces were water reservoirs or factories.

- There has been access to water resources, especially cellar, under grand channels (qanat). There is an example of this access in front of Kamaliyeh school and Rukniyeh school (the entrance of the aqueduct of this school were discovered in 2019 (Shahabinejad, 2019)).

- The vast majority of schools in this period were managed by the government on the basis of large endowments, and the role of the endowment in this period of time was outstandings. These endowments included canals, agricultural lands, water resources, livestock herds, bazaars, baths, caravanserais and other sources of income, and since this method of providing current expenses was not dependent on political developments, schools were more durable (Abouei et al., 2014).

- In most of these schools, Founder's tomb is located in the school itself and usually under its dome. Of course, according to the tradition of burial at that time, the tombs were in the form of a crypt and were located at a lower level than the existing level of the dome.

Components of Plan

- The plan of Muzaffarid period schools generally has a main axis, and the arrangement of spaces can be seen on this longitudinal axis. This axis starts with the main gate and after that spaces such as vestibule, entrance porch, small courtyard, main porch and dome. The overall plan of the schools is almost rectangular in shape with a ratio of more than 2 to 1 (length to width ratio). Only in two cases, Ziaeieh and Khanzadeh Schools, these plans have different proportions. In this rectangular shape, two axes of symmetry are observed perpendicularly, sometimes along the south-west direction and sometimes perpendicular to it. Where it was necessary, such as Kamaliyeh, Rukniyeh, Shamsieh and Taraz schools, after the head space in the direction of the Qibla, we reach the dome (south-west) and the extension that is in the direction of the Qibla. The domes of Kamaliyeh, Shamsieh and Rukniyeh now have tombs, and it seems that the domes of Taraz and Kamaliyeh also had graves.

From the point of view of structural features, the proportions of the dome space in Khanzadeh School are different and it also resembles the quadrilateral form with a separate or single square plan, and of course, more researches are needed for better results. All these schools have service spaces and except Hoseinian School which has an octagonal plan, the dome of other schools has a square plan. It seems that there have been additions in the Shamsieh school in the eastern front, and among these schools, perhaps the Kamaliyeh school shows a more pristine environment due to its current condition.

- Most of these schools have a rectangular mezzanine plan and have a vestibule. The main porch in the direction of the Qibla and sometimes the porch in front of it (north) has been one of the features of some of these schools, and small porches can be seen around the court yard of the three schools of Ziaeieh, Rukniyeh and Taraz. Also, the three divisions of the porch or the decorations and the three-piece archways are also considered to be the characteristics of these buildings. It should be noted that the place of the mehrab (altar) was placed in the dome space in most cases.

Geometric Pattern

Muzaffarid period schools generally have a main axis of symmetry along the north-south stretch. Except for minor differences between the eastern and western pavilions, this symmetry is fairly complete. In addition to the existence of the main symmetry in the whole collection, individual microspaces also have relative symmetry. In addition to the symmetry and proportions

in the plan, with the exception of the dome, which mostly has a high height due to its importance, the facades are also completely symmetrical and human proportions are observed in them.

- From the point of view of the plan, the entrances are usually located in the center of the main axis and include the main hall, the vestibule, the courtyard and the dome. Therefore, it can be said that the entrance of schools mainly has a linear structure and service spaces are sometimes observed around the vestibule.

- The architects of this period had a special style in building schools and erecting its dome. The domes are generally associated with the high height of the dome and the corners of the dome are mostly in the form of squnch and trombe patkaneh. The dome is on a square plan and often in the form of a tall arch. In the Khanzadeh school, due to the wideness of the jars, this design is mostly cruciform.

- Although there are no traces of badgir found in school architecture, the existence of badgir is mentioned in many places. For example, there is a weak quote that mentioned it was a badgir above the altar of the dome of the Taraz school in the old times.

- In the studied samples, there is no case of the presence of a pond or small pools in the middle of the school court yard, although schools have seen many changes and transformations in their bodies over the course of hundreds of years.

Architecture Analysis of Muzaffarid Schools based on Construction Technologies

In this section, the schools built in Muzaffarid period in Yazd are analyzed based on construction technologies. The data of this section will be analyzed from two perspectives including "structural patterns" and "construction materials" and the results of these investigations are presented in the table below in connection with the research samples.

Table 3. Comparative studies of Muzafarid period schools in terms of construction technology

Khanzadeh School	Shahabudd in Taraz School	Hoseinian School	Roknia School	Shamsie School	Kamaliya School	Ziaeieh school		
								
Khagi (oval)	From the 30s repairs	*Nari* three-part Continuous bilayer	Three parts slow	From the 50s repairs	*Nari* three-part Continuous bilayer	*Nari* three-part Continuou s bilayer	Dome type	Structural patterns
Convert 4 to 8 and 8 to 16	Skonj	Convert 4 to 8 and 8 to 16 hexagons	Convert 4 to 8 and 8 to 16	-	Convert 4 to 8 and 8 to 16	Convert 4 to 8 and 8 to 16	How to place a dome on a quadrilateral	

hexagons			hexagons		hexagons	hexagons	(corner making)	
Colombo with low rise	*Kaneh Posh*	-	-	*Kaneh Posh* with formalizati - on	-	-	top of the door	Arch performance technique
Colombo	*Colombo* with low rise	-	-		-	*Colombo*	vestibul e	
Elongated and pointed	Elongated and pointed	-	-	Elongated and pointed	Cradle (Semi-barrel)	-	Booths	
Ahang (barrel vault)	*Ahang* (barrel vault)	-	-	*Ahang* (barrel vault)	*Ahang* (barrel vault)	*Ahang* (barrel vault)	Porch	
Ahang (barrel vault)	-1 Elongated and -2 pointed Khanche Posh	Elongated and pointed	Elongated and pointed	-1 Elongated and -2 pointed Khanche Posh	-1 Elongated and -2 pointed Khanche Posh	-1 Elongated and -2 pointed Khanche Posh	internal space	
Terracotta bricks	Glazed brick, tile	Brick	plaster and painting	Brick, tile	Brick, tile	Brick, tile	elevation	Building Materials
Clay and mud, plaster	clay and mud	clay and mud	clay and mud	clay and mud	clay and mud	Clay and mud, plaster	Interior spaces	
Brick	Brick	Brick	Brick	Brick	Brick	Brick	The floor of the infrastructure	
Brick	Hexagonal brick	Brick	Brick	Brick	Brick	Brick	The floor of the yard	
Brick	Brick, tile	Brick	tile	Brick	Brick and blue tile	Brick	dome	

According to the results presented in (Table 3), the common architectural features of Muzaffarid period schools in Yazd can be examined from the perspective of construction technologies as follows:

Structure Patterns

- In Muzaffarid schools, the buildings have been made lighter by reducing the thickness of the joists. The method of transferring load in these schools, like other traditional buildings, is by compression; In this way, the roofs are in the form of pointed arches that are placed on heavy joists with a square or rectangular plan. The walls generally have a load-bearing role, and the non-load-bearing joists are often installed on both sides of the load-bearing joists. The load of the roof is transferred to the load-bearing walls and through it to the foundation and the ground. In fact, the entire covering of the roof and the wall forms an integrated structure that increases the resistance of the structure against earthquakes (Khakbaz alavandian, et al., 2006).

- The domes of the pre-Muzaffarid era, that is, the Seljuq and Ilkhanids periods, especially the Seljuq era, were usually single-shelled and decorated with structures, and of course, this feature was unique to the Razi style. In the past, that is, during the Buyid period, we also had rok domes (conical and pyramidal), but the permanent domes were usually shaped like a cone or an egg (oval). Gradually, during different eras, the domes changed from single-shelled to two-shelled and sometimes three-shelled, especially during the era of Ilkhans to Tamerlane. The production of such domes has gradually increased and has affected its internal proportions. In this situation, The Avgundar domes, the ratio of height to opening width increases, related to this period are rarely seen, but generally the domes have a peak and the height of the domes has increased in the post-Seljuq era, due to their elegance.

- Examining the samples of the buildings of that era, especially the residential buildings, dome with safavid forms, shows that there is no foundation in them. For example, the houses of Muzaffarid door are either without chairs or have chairs the size of a brick at most. In the school of Tarz and Shah Kamal's Tomb school, there is a chair the size of a brick. During the Safavid era, the construction of high base-courses (corsichini) under the building was promoted to such an extent that the height of the base-courses in some buildings was up to half a yard.

Construction Materials

- The main materials used in Muzaffarid schools in Yazd are bricks, clay, straw, plaster and tiles, and in some cases, wood has been used for uniform distribution of load from the upper area to the lower area. The predominant use of raw clay and mud in buildings caused homogeneity in the structural structure of the building and also the use of its thermal capacity in heating and cooling the building (Khakbaz Alvandian, et al., 2015). It should be voted that, the us of brick in these buildings is not seen anywhere else, except for a part of the walls, the dome, the path of the stairs, and the floor of the courtyard carpet.

- The studied buildings are sometimes accompanied by many decorations, which include plastering, colorful inscriptions, painting with pigments, and the like. It is worth considering that the use of tiles in some of these buildings has been in a mixed and rational manner. For example, in the Shahabuddin Taraz school, parts of the main entrance and vestibule have an extraordinary variety of decorations, and traces of Shah Abbas the Great era can be seen in these works. During this period (Muzaffarid and Ilkhanan), tiling, plastering, and painting decorations, such as those in the Soltanieh dome, reached their highest level so that the polish and glaze of the tiles have not changed after about 700 years.

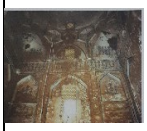
- In some buildings, combined tiles (Shamse Hasht and Bazobandi "Chalipa") as well as golden form tiles were used and traces of them are still visible in the buildings. Cruciform and

Shamseh tiles were also present in the buildings according to the photographs of the late Iraj Afshar, which have remained in some mosques from that era.

Architecture Analysis of Muzaffarid Schools based on Pattern of Decorations

In this section, the schools built during the Muzaffarid period in Yazd are analyzed based on the pattern of decorations. The results of these investigations are presented in the following table in connection with the research samples.

Table 4. Comparative studies of Muzaffarid period schools from the point of view of decorations

Khanzadeh School	Shahabuddin Taraz School	Hoseinian School	Roknia School	Shamsie School	Kamaliya School	Ziaeieh school		
								
Altar	*Sardar* (enterance), Hashti, Dome,	Dome	Porch, dome	Porch, dome, pavilions	Dome	Dome, altar	Focus on decorations	
-	Incomplete and destroyed - moqarnas	Projected and Embossed	Projected and Embossed and molded, low thickness	Projected and Embossed and molded, low thickness	Projected and Embossed and template	Projected and Embossed and .template Low thickness	plaster	Decorations
Clay or seven colors	*Maraq*	-	Maraq Zarin Fam	Maraq Zarin Fam	Maraq Zarin Fam	-	Tile	
-	watercolor	watercolor	watercolor	watercolor	watercolor	drawing	Drawing	
-	-	Prominent and shallow	Prominent and shallow	Prominent and shallow	Prominent and shallow	Prominent and shallow	Mud	
-	Geometric, Islamic	Geometric, abstract	Geometric, Islamic	Geometric, Islamic	Geometric, abstract	Geometric, Islamic	Plaster	Motifs
-	Geometric, Islamic	-	Geometric, Islamic	Geometric, Islamic	Geometric, Islamic	-	Tile	
-	-	Geometric, Islamic, inscription	Geometric, Islamic, inscription	Geometric, Islamic, inscription	Geometric, Islamic, inscription	Demolished	Drawing	
-	-	Geometric, abstract	Geometric, abstract	Geometric, abstract	Geometric, abstract	Copying and framing	Mud	

Thulth (sols)	*Thulth (sols)*, Naskh, *Kufi Banaei*, *Kufi Mezhar*	*Kufi Mozahar*	*Kufi Moshjar, Kufi Tahriri, Thulat, Kufi Mezhar*	*Kufi*, *Thulth (sols)*	*Thulth*, constructional kufi, *moshajar* kufi, decorative kufi	*Kufi, Kufi Mozhar*	Type of inscription lines
-	10-pointed star, geometric knot arrangement, plant elements	6-pointed star, solar bergamot	Shamseh, prominent star of David, bergamot	6-pointed star, solar bergamot, prominent star of David	6-pointed star, solar bergamot	Vase, 5 sides	The shape used
Azure	Blue, yellow, white, turquoise, azure	Turquoise	white, blue, turquoise, azure, navy, green, orange, black	Brown	Blue, green, red, brown	Gold, Azure, Blue, Red	Colors used

Based on the data in the (Table 4), the following are significant:

- The use of well-known Iranian geometric arches is clearly visible in the decorations used in the schools built during Muzaffarid period. In fact, the use of all kin of main geometric shapes, mesh designs using geometric principles, stars with various shapes and circles and twists in the designs used in the tiling of the main hall and vestibule, all express the objective effects of the use of geometry in the building.

- One of the most important features of the decorations in the buildings built during the Ilkhanids and Muzaffarid eras is the elaborateness of the decorations in these buildings. For example, in the schools of Shamsieh and Rukniyeh, almost no part of the building is left without decoration. The use of calligraphy in Islamic decorations in the form of verses of the Quran, praise of the founders, and inscriptions can be seen in most buildings and is an integral part of Islamic architecture.

- The use of thulth and naskh lines with plaster, tiles and paint in the decorations used in Muzaffarid era schools is common and a combination of tiles and bricks (maqli), single tiles, plastering and especially painting which can be clearly seen in the buildings of this era. It is vision (Hoseini-Yazdi, 1962).

- The wooden door of the main entrance of such buildings has been decorated with knots and mosaics. This is not far-fetched considering the fact that traces of such wooden doors existed in many mosques and schools (such as the Safdar Khan prayer school in Yazd) until the beginning of the Safavid era. Of course, gradually, the quality of the decorations of such doors decreased in

the later period, especially during the Qajar period, and less doors were made in the form of mosaic decorations in the style and style of Muzaffarid period doors.

- The porch with a lofty arch has been one of the most suitable places for all kin of painting and plastering decorations. The implementation of shallow arches on both sides of the inner wall of the porch is one of the other visible examples in the porch of Muzaffarid schools.

- In addition to the paint on the plaster, the decorations of these schools were in the form of plastering of wicks and reliefs and mosaic tiling.

- The outer surface of the dome was often covered with tiles. The glory of their tiled domes has shown the glory of the owner of the dome.

- The inner surface of the dome was often covered with inscriptions in Kufic and Thulth script, and colored drawings and plastering. The interior decorations of the dome were of the highest quality during this period.

- In the geometric rules, especially the geometry of the buildings of the Islamic period, and especially the buildings of the 14th century period, there is a mysterious role derived from the natural conditions of human life, as well as metaphysical concepts such as the unity of existence. It is from here that the buildings of this era (from after the Mongol invasion) to the end of the Safavid era are full of the most complex geometric motifs and its application in the body of architecture. Although this tradition existed centuries before that in many mosques, bazaars, baths, schools and even residential buildings, it has grown and diversified since the mentioned period (early years of the 8th century) until the Safavid period (16-17th centuries).

Conclusion

In the era of Muzaffarid, the measures taken especially in the city of Yazd had a different appearance. Because Yazd was safe more from the Mongols' attack than other Iranian cities and provided the same ground for further development of this desert city. In such a way that Muzaffarid construction works in Yazd, especially during the era of Shah Yahya, have remained in the mind until now, such as the Jame Mosque, (city wall and fortifications), which is still called by the same name. Among the buildings that this family built on a large scale, at least in Yazd, were schools. From medicine and astronomy to philosophical, rational and narrative sciences, were taught in these schools, they had a amazing impact on the production and promotion of science for hundreds of years. Muzaffarid made a lot of efforts for the well-being of the people by creating a monthly pension for the people of culture, art, religion and knowledge, handling the poor and weak, building public spaces and digging aqueducts (qanats), and allocating a lot of endowments for the welfare of the people, and especially the recent cases on Iranian and Islamic art of that era. Most of the schools built during this period, while having the

support of the ruler of the time, were managed by a scholar and religious scientist, which showed the respect of this family for the elites of science and literature. Among the historical books, it can be seen in a documentary form, the subtleties of the dealings of some of the nobles of this family with the people of science, literature and religion. Considering the era of oppression that was left behind by the Mongols and some Ilkhans also fueled it, it is natural that the disillusionment of some of these scholars and especially the mystics occurred in the post-Mongols period. Accordingly, in the era of Muzaffarid, special attention was paid to this social courses, so that tombs and monasteries were built with the names of these scholars next to the schools of the Bab.

The building of Muzaffarid era schools in Yazd has been mentioned by many historians and most of them have used expressions such as "elegance", "accuracy" and "goodness" in describing this building. There are also many endowments on these schools in the historians' books. Therefore, these schools have enjoyed such a status that they continue to exist for hundreds of years after that thanks to the good tradition of endowment. However, unfortunately, in some periods, due to side issues such as famine, floods, and of course devastating wars, which Tamerlane was the main cause of, some of these schools were marginalized and exposed to destruction.

The architectural pattern of Muzaffarid era schools was largely influenced by the cultural and social conditions prevailing at that time. In the architectural system, there is always a mutual relationship between the social situation and the cultural values of the society, which can be seen both in the macro field of architecture and in the elements and components used in it, especially in relation to the architecture of buildings. From the point of view of architecture, most of these clay-mud schools had a rectangular courtyards and porches around and equipped with pillars for various purposes. In addition to the use of people related to the school, this equipment was also used in the nearby neighborhooand by the city residents. Next to these schools, there are service spaces depending on the size and quantitative importance of the school, which usually do not have a separate entrance. The dome was usually built on the south and with many decorations. These very voluminous and varied decorations included all kinds of plastered or painted inscriptions, as well as plant motifs and all kinds of plastering. The dominant colors with high durability used in the decoration of school buildings were generally azure and to some extent ocher, which may be related to the peaceful spirit of such educational spaces. According to the common architecture of that time, the domes are usually tall and with a relatively high ratio of height to opening. Although some of them do not have the scale of large domes such as Nizam al-Molk, Taj al-Molk or Soltanieh, their proportions clearly show their elegance and sophistication. The coexistence of the building with access to water (aqueduct) through Payab or Pakaneh, as well as the presence of geometry in many of these schools is evident. These schools

played a role as the center of the quarter next to the mosques related to those practices, such as the Shamsieh school next to the Chaharmanar mosque and Hoseinieh, and the Shahabuddin Qasim Taraz school next to the mosque of the same name and the Rukniyeh school next to the Atiq Mosque in Yazd, which is the founder of the Rukniyeh school. himself is one of the founders of that mosque. Regarding the common materials in these schools, mainly clay, brick and mud mortars have been used. Among the other aspects of the architecture of these buildings, we can mention the pavilions and cells that seem to have undergone changes during the following centuries. These rooms were mostly located around the yard and sometimes the tombs of the founders of these schools are located there. As mentioned, the court of these schools are mostly rectangular in shape and some of them do not have an entrance vestibule. Except for a few exceptions, the dominant geometric pattern of the schools follows the Yazd pattern (northeast-southwest direction) and if there are limitations in the space used in the land or arena, the architect first designed the central courtyard or the rectangular courtyard, the dome. placed in the south of it and placed the spaces according to the boundaries of the designed land. In general, it can be concluded that despite the short life of the Muzaffarid era, there was continuity in the construction activities of the post-Mongol era, and although the Mongol invasion caused distress to the people of knowledge and religion, the attention of the Muzaffarid rulers to these classes and their interest in the development of the cities created prosperity and He followed the construction of public buildings, especially schools.

Author Contributions

All authors contributed equally to the conceptualization of the article and writing of the original and subsequent drafts.

Data Availability Statement

Not applicable

Acknowledgements

The authors would like to thank all participants of the present study.

Ethical considerations

The study was approved by the Ethics Committee of the Islamic Azad University, Yasuj Branch. The authors avoided data fabrication, falsification, plagiarism, and misconduct.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest

The authors declare no conflict of interest.

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IJAPAS

International Journal of Applied Arts Studies

Print ISSN: 2588-4506 Online ISSN: 2588-4670

Homepage: www.ijapas.ir

Islamic Azad University
Yazd Branch

Presenting a Proposed Model of Sustainable Performance in Traditional Residential Houses Using Critical Regionalism

Mohtaram Fatehi[1], Reza Mirzaei[2], Mehdi Sahragard[3], Ahmad Heydari[4]

1. Ph.D. Student, Faculty of Art and Architecture, Birjand Branch, Islamic Azad University, Birjand, Iran. E-mail: mohtaram.fatehi58@yahoo.com
2. Corresponding author, Assistant Professor, Department of Architecture, Faculty of Art and Architecture, Birjand Branch, Islamic Azad University, Birjand, Iran. E-mail: mirzaeireza@iaubir.ac.ir
3. Assistant Professor, Department of Architecture, Faculty of Art and Architecture, Mashhad Branch, Islamic Azad University, Mashhad, Iran. E-mail: mdsahragard@gmail.com
4. Assistant Professor, Department of Architecture, Faculty of Art and Architecture, Birjand Branch, Islamic Azad University, Birjand, Iran. E-mail: ahmed.heidari@iaubir.ac.ir

Article Info

Article type:
Research Article

Article history:
Received July 24, 2024
Received in revised form September 14, 2024
Accepted October 30, 2024
Published online December 29, 2024

Keywords:
Sustainable physical-social architecture,
Critical regionalism,
Regionalist architecture,
Grounded theory qualitative analysis
Residential houses

ABSTRACT

Critical regionalism has its roots in the depth of culture and nature. The new trends in critical regionalism are moving towards the concept of sustainable development. Kenneth Frampton, one of the greatest critics of critical regionalism, refers to this approach as a resistance against global standards and cultural homogeneity and the decline of modernism; there are two most important internal factors: culture and identity. This research aims to address the question of the basic conceptual model and criteria of critical regionalist architecture in order to improve the sustainable physical-social structure of residential houses in the city of Mashhad and the emergence of the greatest background of changes in culture, identity and indigenism from the perspective of critical regionalism. The aim of this research is to achieve the principles of critical regionalism, to present an effective conceptual model along with the preservation of authenticity and environmental principles. The present study uses grounded theory qualitative analysis to analyze the physical-functional typology, cultures and lifestyles of people in residential houses in Mashhad during the Pahlavi period, and to prove the research hypotheses based on the samples. This research concludes that the components of critical regionalism, considering the qualitative analysis, have the greatest impact on the form of the building, which, due to population growth, rising land values, and the result of dense and more compressed technology and sustainability, has shifted towards high-rise, complexing, etc., which is more compatible with the indigenous architecture of the region.

Cite this article: Fatehi, M., Mirzaei, R., Sahragard, M., & Heydari, A. (2024). Presenting a Proposed Model of Sustainable Performance in Traditional Residential Houses Using Critical Regionalism. ***International Journal of Applied Arts Studies***, *9*(4), 79-106.

Publisher: Islamic Azad University, Yazd Branch.

Introduction

Regionalism is an analytical and critical perspective that prioritizes the preservation of the specific characteristics and features of a place, over the general global characteristics. The theory of regionalism has shifted from indigenist approaches and emphasis on physical perceptions and social, cultural, ecological, and human communication issues, towards the moderation of past prejudiced and limiting ideas and the strengthening of an interactive approach and the use of global benefits (Bayzidi et al., 2014: 22). Globalization had very deep and profound impacts on the culture of countries, especially developing countries. Architecture also turned to industrial construction, standardization, and mass production under the influence of the industrial revolution. The phenomenon of globalization in architecture led to pragmatism, resulting in the creation of similar buildings in different parts of the world without regard to cultural, climatic, and environmental characteristics. Therefore, with the advent of modernity in architecture, relying on pure rationality and rationalism, the emotional, spiritual, and mental needs of humans were neglected (Mahdavi-Nejad et al., 2013: 59). Critical regionalism has its roots in the depth of culture and nature. It includes a more direct clarity with nature compared to most abstract modern avant-garde movements (Zoghi et al., 2019: 4). One of the most important buildings that evoke the indigenous architecture were residential houses, which could have represented the culture, customs, and traditions of the people of that region, and also provided the necessary climatic comfort and security for the general public. Given that the architecture of houses in the Pahlavi period was influenced by the Isfahan style. This research is aimed at achieving the primary conceptual model and critical regionalism architectural components of their specific operational types in order to improve the architecture of the past and also to provide an effective conceptual model in order to be more effective in improving the physical-functional structure of a socially sustainable residence. It has been done while maintaining authenticity and environmental principles. Therefore, the research question is as follows: - What is the primary conceptual model and architectural components of critical regionalism in order to improve the physical and functional structure of residential houses in Mashhad city and what are the most changes in the field of culture, identity and localism in Has the physical-social stable structure of the residential houses of Mashhad city happened in the Pahlavi period? It seems that respecting the principles of Iranian and sustainable architecture, creating a balance between local and global aspects by creating a building that is homogeneous and harmonious with the surrounding context, dependence on nature and culture, such as: the central courtyard and the flexibility of spaces, etc., lead to sustainability. Therefore, to manifest the architecture of the past and improve the architecture of Mashhad. Also, global technology such as vehicles, cooling and heating, etc., along with maintaining the originality and environmental principles. He has applied the most changes in the architecture of the houses of Mashhad.

Research Background

In the field of critical regionalism, research has been conducted by thinkers such as Kenneth Frampton, Alexander Tzonis, and Liane Lefaivre. The book "Architecture and Identity" by Abel (2008), the last chapter of which is "Architecture as Identity". The book "Introductory to Architectural Design Methods" by Urmala (2001), the sixth chapter of which is related to situationalism and regionalism. The book "The Poetics of Space" by Ando (2010), the last chapter of which includes critical essays. The article "Critical Regionalism" by Kenneth Frampton (2004), which examines how and the factors that create critical regionalism and examines the works of great architects around the world. The paper "Reinterpreting Regionalist Approaches in Prominent Contemporary Buildings of Mashhad City" by Zoghi Hosseini (2010), essays on explaining the perspectives of regionalism and the evolution of these perspectives in contemporary and globalized architecture, and "Globalization and Regionalism in Contemporary Architecture: Interaction or Confrontation", taken from the doctoral dissertation of Gader Bayzidi, entitled "Globalization and Regionalism in Iran".

Research Method

The grounded theory analysis method is used for theorizing in areas where quantitative positivist approaches are difficult. The aim of this type of analysis is to highlight the inductive approach in research; because it seeks to theorize through the collected data. Grounded theory is formulated in the field of research and utilizes the data obtained from observation and interviews. The inductive nature of this theory, in particular, leads to the researcher's creativity and freedom of action, and makes the research process highly flexible. The found articles were analyzed with the help of MAXQDA software (Grounded Data). The extraction of critical regionalism architectural indicators with the Grounded data approach is as follows:

a) Finding conceptual categories (open coding: creating concepts and their characteristics)

b) Finding the connection between categories (axial coding: communicating between concepts)

c) Conceptualization and reporting of these communications (selective coding: integration and improvement of concepts)

Theoretical Foundations: Regionalism in Architecture

Regionalism is an approach in design that prioritizes the specific identity of a region over the characteristics and features of a place (Table 1). In other words, while people possess a regional culture, they are also the inheritors and creators of a global culture, and they must gain an understanding of the interaction between the two (Figure 1 & 2) (Kami Shiraz et al., 2010: 55).

Table 1. Types of Regionalism (Source: Authors)

Title	Definition	Attributes
Lightness Regionalism	The main axis of all architectural activities (Bayzidi et al., 2013: 12)	Attention to climatic conditions (Kami Shirazi et al., 2019: 70)
Modern Regionalism	Using an old world and transforming traditional methods and goals by using new innovative technologies. (Bayzidi et al., 2020: 13)	The use of technology in a metaphorical way (ibid) - the use of new technologies - abstract regionalism responding to the climate - the sign and model of culture. (Abel, 2017)
New regionalism	It requires something beyond the need for "context" (Kami Shirazi et al., 2019: 72)	Creative Protection (ibid.)
Critical regionalism (non-modern)	It is a resistance against global standards and uniformity of culture and degradation of modernism. (Abel, 2008: 135)	Introduction of past and contemporary architecture - attention to sustainability - more complete and economical - rational approach to regionalism
Interactive regionalism	A two-way thinking in which differences are not considered absolute and imagines the relationship between oneself and the other as two-way and resists two types of views (Ghanbari et al., 2009: 1367)	It resists two types of views: 1- the unification of oneself and the other in which the differences disappear. 2- Staying separate and making the differences harder and stronger (Ghanbari et al., 2009: 1368)
Bio-regionalism	Influenced by sustainable and ecological development movements (Ghanbari et al., 2009: 1368)	Attention to location-based features (Ibid)
Reflective regionalism	To recognize the concept of the region, which in the opinion of the critical regionalists consists of a set of self-referential issues, in the cultural context of Chideh (Kami Shirazi et al., 2019: 78)	The connection between the product of the regionalism process and the desired sample should be established and in the analysis of the works, the understanding of how to relate to the region from the point of view of activities and functions should be replaced by examining the relationships between forms (Ibid)
Non-modern	based on re-recognition of the two concepts of place and technology (ibid)	Regenerative (Abel, 2017)
Executive regionalism	Emphasis on human interactions (Kami Shirazi et al., 2019: 78)	Paying attention to the concepts of culture, region and identity (Ibid)

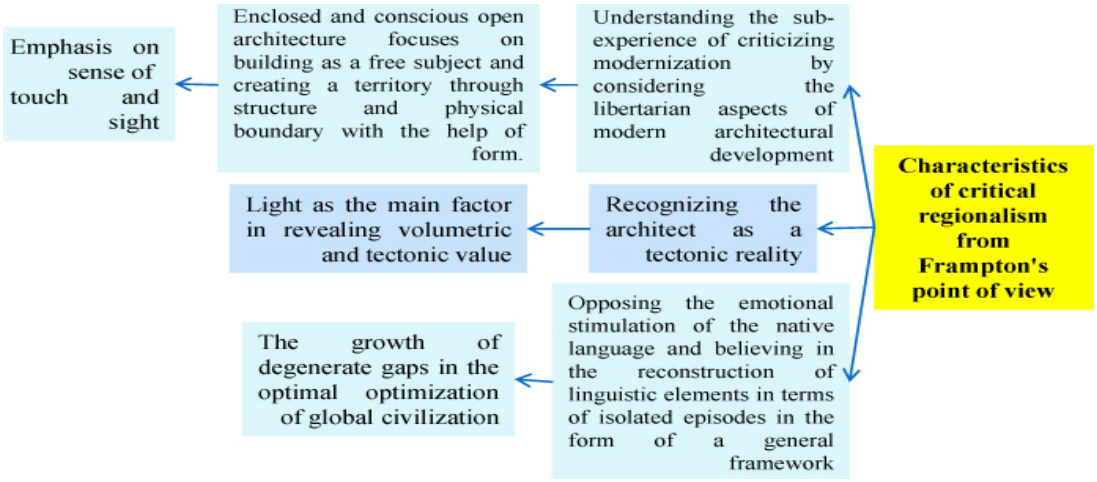


Figure 1. Characteristics of Critical Regionalism from the Perspective of Frampton (Source: Authors)

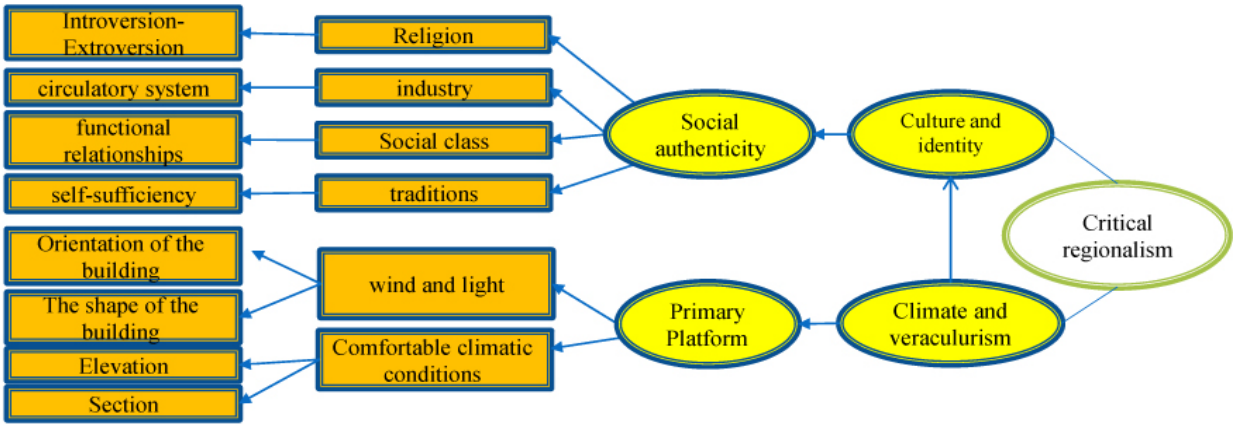


Figure 2. Critical regionalism based on the studies and opinions of experts and Kent Frampton's perspective (Frampton, 1983) Source: Authors

Physical-Social Sustainability Architecture

The concept of sustainable architecture, whether as the creation of human space and the regulation of the relationship between man and the physical environment, or as the product of this process, is always mixed with the sustainable environment and in a general framework, it can be interpreted as "the creation of a sustainable manmade environment" (Farhoudi, 2007). This architecture has an activity in the direction of restoration, reconstruction and renewal of natural systems and the earth, as well as cautious use of life cycle resources in nature (Soleimani, ,2008). Sustainable architecture, architecture compatible with the economic, social and natural environment, is the process of creating a space during which natural resources are minimally damaged during construction and operation. There are three basic principles for sustainability in architecture: resource conservation, which deals with the reduction, reuse and recycling of natural resources used in the building, life cycle design, which is a method for analyzing the building

process and it brings up its effects on the environment, and finally human design, which focuses on the interaction between humans and the natural world (Tavakoli Kazeruni et al; 2023: 73).

Sustainable development, development that can meet the needs of the present generation without compromising the ability of future generations to meet their own need. that sustainable development possesses three dimensions: environmental economic, and social so that tries to reduce environmental pollution, adjust unstable economic situations, and establish social balance in society. the social dimension of sustainable development is the most important factor in this field, because it means strengthening the vitality of society and increasing social and cultural values (Izadyari Aghmiuni et al., 2023: 75).

Physical Sustainability, also referred to as climatic sustainability, focuses on the sustainable design of the building structure and the optimization of material and energy consumption. Non-physical or social sustainability, on the other hand, deals with the qualitative enhancement and sustainability of the events taking place within the architectural structure. Socially sustainable design involves designing spaces that serve as a suitable container for human culture, behaviors, and lifestyles, and where the flow of life formed by these elements can be present for a longer period.

To increase the temporal span of social sustainability, one can employ flexible space-enabling strategies. In this way, it can be expected that the mentioned space will be able to respond to future changes in behavioral patterns (Raeisi, 2016: 282).

Research Findings

Extracting Enduring Indicators of Critical Regionalist Architecture using Grounded Theory

Finding Conceptual Categories (Open Coding: Generating Concepts and their Characteristics): After reaching the key points in the definitions of experts, a code was first assigned to each. Then, considering the similar cases, they were divided into concepts (codes) and eventually led to the formation of the concepts (codes) (Table 2).

Table 2. Extracting Critical Regionalist Notes and Data from the Perspective of Experts (Source: Authors)

Characteristics	Effective factors in regionalism and critical regionalism	ID	Theorist
Indigenous forms and elements	A1-Creation of urban form-Form forming land-Environment Substrate-Relationship of indigenous and social materials-Sustainability factors beyond limited horizons-Specific features of place-Absorption of indigenous		Frampton 1983-2006

Modern and indigenous culture	A2 - The interface between postmodernism (neo-traditionalists) and avant-gardes - culture and identity - reconciling the effects of global civilization and the characteristics and characteristics of the place - focused on local characteristics in the direction of resistance to the assimilation of modernism capitalism - resistance and local characteristics and architecture technology against abstract and global architecture - architectural strategies - optimization of technology - institutionalization of technology sensitivity in	A	
Diversity of the region	A3- Regional diversity		
Professional	A4- Requires a high level of self-awareness - a place-specific manner		
Sustainable design factors	A5- In addition to the visual characteristics of the place, the impact on qualitative aspects such as the intensity and quality of light, texture and		
Exclusive	A6- The unique identity of a culture		
Indigenous organic architecture	A7- Relationship with nature- direct dialectical relationship with nature		
Traditional architecture	B1-Criticism of the use of global architecture	B	Alexander TZounis 2017
Local architecture	B2 - sustainable design - priority with the specific identity of the region - rethinking architecture through the region - ecosystem balance and environmental issues - special characteristics of the project location		
Diversity and neo-nativism	B3 - Maintaining diversity and difference - creating diversity while benefiting from global benefits		
Identity and architecture	B4- The significance of architecture		
Human design	B5-An expression of common human aspects-complex human connections		
Sustainable design factors and neonativism	B6-Visual characteristics of the place and qualitative aspects, including the intensity and quality of light, texture and material type		
Indigenous culture	C1- Criticism of the use of global architecture	C	Lian Lefour 2013 2021
Indigenous and local	C2- internal characteristics		
Human culture and	C3- An expression of common human aspects		
Sustainable design factors and neo-nativism	C4 - The visual characteristics of the place and qualitative aspects, including the intensity and quality of light, texture and materials		
Modern, indigenous and specialized culture	C5 - Balancing local needs and capabilities with advanced modernization course		
Indigenous architecture and sense of place	D1 - Strengthening the sense of place - the special characteristic of a certain place or having an identity - harmony between humans, man-made works and nature - a specific mood	D	Schultz 2012
Human design and sense of place	D2- sense of belonging and safety - unity with the spirit of the place		
Culture, modern culture and indigenous	E1 - Culture - manifestation of culture - interaction with culture and cultural background	E	Colcohan 2018-2012
Indigenous and traditional architecture	E2- Geography - cultural and indigenous traditions including: using and changing the shape of local forms and natural materials - idealizing indigenous and folk traditions		
Factors of sustainable architecture	E3- climate- materials		

Characteristics	Effective factors in regionalism and critical regionalism	Id	Theorist
Traditional culture	F1- Historicism	F	Canizzaro 2015
Modern and traditional culture	F2- Nationalist romanticism		
Identity and introduction of past and contemporary architecture	F3 - The concept of originality - the heterogeneity of structures		
Indigenous and local architecture	F4 - reduction of indigenous differences		
Sustainable Development	F5 - Revive life		
Indigenous abstract architecture and sustainable development	F6 - beyond the design based on adaptation or mere reference of sources		
Indigenous and regional culture	G1- Development of culture and geography	G	Agner 2012
Modern and Indigenous culture, unique	G2- The balance of global civilization and the unique features of the place		
-Creative neo-nativism	H1- The use of new technologies- a contemporary interpretation of local architecture	H	Ozkan 2012
Indigenous architecture and rational and sustainable approach	H2 - Emphasis on preserving the specific features and characteristics of the place - opposition to the trend towards international style (globalization)		
Human and indigenous design	I1- Interaction between design generators and place	I	Newcom
Economic and conservative	J1- tolerance based	J	Berry
Indigenous and modern culture	K1- Emphasis on the existence of characteristics and differences and global culture	K	Harris 2012
Flexibility and sustainable development	K2- variety of freedom and expansion		
Modern culture, indigenous and neo-nativism	L1 - Linking regional characteristics with global components such as: technology and critical thinking	L	Lois Mumford 2012 2016
Extracorporeal and sustainable development	L2 - beyond the body - meaning beyond the body		
Ritual, traditional and innovative art	L3 - Understanding the art of the ancestors and creating the creative spirit		
Humane and sustainable design	L4- Balance between nature and man		
Sustainable Architecture	L5 - Stability		
Neo-nativism	L6- Current technology		
neo-nativism and localism	L7 - Contrast with assimilation		
Traditional, past and modern culture	L8 - Identity - background and history - a challenge to nationalists and the domination of national governments		
Unique and local	M1- an indicator for a specific group identity	M	Vitruvius 2013
Indigenous architecture and human design	M2 - architectural diversity is the result of physical, mental and behavioral characteristics of people - the establishment of buildings		
Introduction of past and contemporary architecture	N1- creation and continuity of the present with the past - a connection of indigenous traditions with other foreign forms of cultural exchange	N	Chris Abel 2008
Human and indigenous design	N2 - Spreading good social and cultural meaning		
Regional diversity	N3 - regional diversity		
neo-nativism	N4- Indigenous wisdom		
Nativist	N5- An effective response to the climate		

Creativity	N6- a creative process with the interweaving of cultural belief with the regionalization of foreign models		
Indigenous architecture and rational and sustainable approach	N7- Appropriate and original technology to establish a balance between man and nature		
Symbolic and abstract	N8-Infiltration of the obvious features of the regional style into some deeper mythological structures rooted in the past with		
- Combination of modern and traditional architecture	O1 - modern and traditional combination - paying attention to place and technology	O	William Curtis 2012-2016
-Sustainable neo-nativism	O2- Establishing harmony between people, their handiwork and nature- Continuation of indigenous traditions		
-Traditional, neo-nativism and modern culture	P1 - The relationship between technology and culture - integration of global architectural and technological developments with regional sensitivities caused by spatial, cultural and historical contexts.	P	Ken Ying 20121

Characteristics	**Effective factors in regionalism and critical regionalism**	**Id**	**Theorist**
Creativity	- Creativity Q1	Q	Gideon 2012 2015
Extracorporeal	Beyond compatibility with specific locale Q2		
Human design	Overcoming the gap between thought and feeling Q3		
creativity and innovation	Creative protection - Creative approach Q4		
Authenticity	- Return to the objects themselves Q5		
culture and civilization	Context and date- Q6		
Balance between contemporary and past culture	R1- Proportion between function-body-culture- indigenous and local	R	Ghadom 2012
Identification of indigenous culture and architecture	S1- Introduction of community characteristics and the combination of community characteristics (geography, climate, form and community)	S	Sirajuddin 2012
Sense of Place	S2- Sense of place		
Exclusive	S3- special feature		
Combination of traditional and modern culture	4 -New combination of community culture with specific regional culture		
Physical and indigenous	T1- characteristic topography of the region	T	Peterson
Sublime originality	U1- Using the sublime concepts of past architecture	U	Manfredi Nicoletti 2016
Compatible with nature	V1- Technology along with preserving the originality and principles of the environment by establishing a balance and a combination of technology between man, society and nature	V	Schumacher 2016
-Diverse local forms	W1 - production of more types of forms, better understanding and perception	W	Lamponiani 2016
Indigenous and traditional architecture	W2- A stronger return to tradition		
Human design	-X1 Architecture of a place for people	X	Balkrishna doshi 2018

Indigenous and sustainable architecture	Y1 - The main factors of space arrangement: dominant resources, energy and weather - climatic considerations - cultural background - local materials	Y	Charles Korah 2018-2016
Exclusive to the indigenous person	-Y2 unique site planning		
Authenticity and stability	-Z1 Use of natural materials on the building: culture and civilization	Z	Jeffrey Bowa 2018
Emotional factors	-Z1 Use of natural materials on the building: culture and civilization	α	Raj Roval
Indigenous- abstract architecture	B1 - a selection of past and present values	β	Alvaro Siza 2018
Modern neo-nativism	Γ1- Attention to place, people and technology	γ	Aini Fur 2012
Modern neo-nativism	1 -δAttention to place, people and technology	δ	Diba 2012
Indigenous architecture and creativity	1 -εSpecific characteristics of the place - creative approach (creative protection)	ε	Judet 2012
-local architecture	1 -ζA function of regional or national characteristics	ζ	Tolai 2016

Finding the Relationship Between Categories (Axial Coding: Establishing Relationships Between Concepts):

In this section, the concepts (codes) related to a common category were grouped and connected within a theoretical framework.

Table 3. Relationship Between Critical Regionalist Concepts (Source: Authors)

Dimensions	Category	Concepts	Characteristics	ID (codes)
Contextual	The architectural genre of critical regionalism The) importance of indigenous	Indigenous organic - architecture Traditional and - indigenous architecture Indigenous -local - architecture Indigenous architecture and rational and sustainable approach	Indigenous forms and elements - Indigenous - organic architecture - Traditional architecture - Indigenous architecture - Indigenous and local architecture - Indigenous architecture and sense of place - Indigenous and traditional architecture - Indigenous local architecture - Indigenous architecture and rational and sustainable approach - Indigenous architecture and human design - Indigenous ism - human and indigenous design - indigenous architecture and rational and sustainable approach - physical and indigenous - diverse	A1+A7+B1 +B2+C2+D 1+E2+F4+ M2+N2+N5 +N7+T1+W 1+W2+ Y1+ζ1
Contextual	The architectural genre of critical regionalism (cultural)	Identity and - architecture Modern and - indigenous -traditional culture Unique and - specialized Introduction of past - and contemporary architecture culture and - civilization Identification of local -	Modern and indigenous culture - Traditional culture - - Identity and architecture - Indigenous culture - Culture and human design - Modern, indigenous and specialized culture - Culture, modern and indigenous culture - Traditional culture - Modern and traditional culture - Indigenous and regional culture - Modern culture and indigenous , unique - modern and indigenous culture - modern culture, indigenous and neo-nativism - traditional, past and modern culture - introduction of past and contemporary architecture - traditional, neo-nativism and modern culture - authenticity - culture and civilization - balance between contemporary culture and past - identification of	A2+B1+B4 +C1+ C3+C5+E1+ F1+ F2+G1+G2 +K1+ L1+L8+N1+ P1+ Q5+Q6+R1 +S1+S4+U1 +Z1

Causal-conceptual	The architectural genre of Critical regionalism	Unique and specialized - Factors of sustainable design and neo-nativism - Principles of Iranian architecture - Sustainable Development -	Specialist - factors of sustainable design - unique - - human design - factors of sustainable design and neo-nativism - factors of sustainable design and neo-nativism - human design and sense of place - factors of sustainable architecture - sustainable development - human and sustainable design - sustainable architecture - unique to individual and neo-indigenous - sense of place - unique - compatible with nature - unique - indigenous	A4+A5+A6+B5+B6+C4+D2+E3+S2+S3+V1+Y2+F5+L4+L5+M1
	Critical regionalism architecture chapter	Introduction of past and contemporary architecture - Local and sustainable creative neo-nativism -	Past and contemporary identity and architecture - - Creative neo-nativism - neo-nativism - Indigenous and local - Combination of modern and traditional architecture - Sustainable neo-nativism - Modern neo-nativism - Indigenous architecture and creativity	F3+H1+L6+L7+N4+O1+O2+γ1+δ1+ε1
Causal-behavioral	The architectural genre of critical regionalism	Human and indigenous design -	Human and indigenous design - Human design - - Human design - Emotional factors	I1+Q3+X1+α1
		Complete and economical	Economic and conservative-	J1
		Principles of Iranian and sustainable architecture -	Flexibility and sustainable development	K2
		extracorporeal and sustainable development -	extracorporeal and sustainable development- - extracorporeal	L2+Q2
		Religious art form-	Traditional ritual art and innovation	L3
	Critical regionalism architecture chapter	The diversity of the region and neo-nationalism -	Diversity of the region-diversity and neo-nationalism- - diversity of the region	N3+A3+B3
		Creative-	Creativity-creativity and innovation-	Q1+Q4
Symbolic	The architectural genre of critical regionalis	Symbol and abstraction of indigenous architecture -	Abstract and indigenous architecture -abstract - indigenous architecture and sustainable development- symbolic and abstract	F6+N8+β1

Given that the goal in this section is to categorize the concepts of critical regionalist architecture, structure; It is a general concept that expresses part of the truth of the object and its contents. nature; It is an inherent generality that distinguishes a type from other types within a genus.

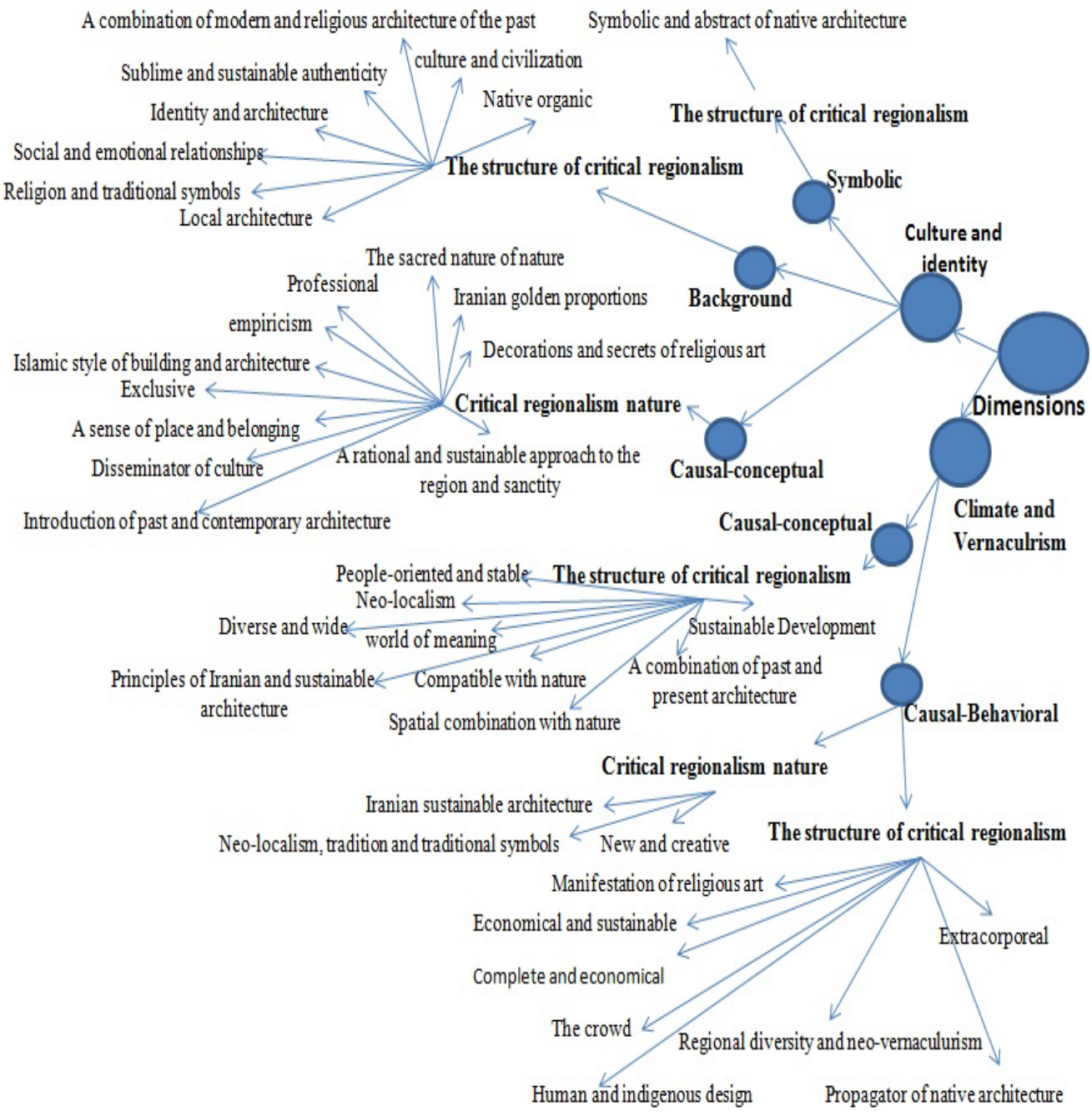


Figure 3. Preliminary Model for Extracting Concepts and Components of Critical Regionalist Architecture to Achieve Contemporary Housing (Source: Authors)

Conceptualization and Reporting of these Relationships (Selective Coding: Integrating and Improving Concepts):

After the axial coding is completed, the next step is selective coding, which arises from the fusion and combination of the main categories and is used for the initial formation of the model framework.

This work was also shaped by the overall mentality of the model and an approach based on the extraction of the enduring patterns of Iranian indigenous architecture. In this section, the related concepts (codes) in indigenous architecture were categorized under a related category in critical regionalist architecture, for the purpose of integrating and improving the categories. Then, to form the model, the categories were interconnected within a theoretical framework under the title of the components of conceptual patterns in housing.

Table 4. Categorization of Housing-Related Concepts in Relation to Indigenous and Critical Regionalist Architectural Concepts of Mashhad Homes in the Pahlavi Period

Index type	Indicators and concepts in critical regionalism housing	Trans-time-space human needs****	Values***	Concepts related to Iranian housing from the point of view of experts**	Concepts in critical regionalism architecture	Concepts in indigenous architecture*	Effects of concepts	Dimensions
Functional-conceptual	- Introversion - Privacy - The crowd	Feeling of character - Calm down -Identity - Security	- Cooperation and social unity - Honoring the guest of Arham Patch Neighborhood relations - importance to; Family, kinship, abstract categories such as common religion, ethnicity and political views	-Maintaining and promoting attention to family and family relationships	-Attention to culture, civilization and community identity - Introduction of past and contemporary architecture - A combination of modern and past culture - The symbolic nature of the local	Paying attention to the culture of the environment and the traditional ist society	physical-social	Background
		- A sense of belonging		- Maintaining and strengthening neighborhood relations				
		-Identity	compatibility - Honor	- Attention to the culture of society				
		-Security -Solitude and territory -Identity - A sense	- Contentment (avoid extravagance) - Moderation (balance and balance) - Confrontation with fashion and consumerism - Coordination	- Adherence to justice and attention to social justice (balance, harmony, harmony, balance, etc.)				

		of belonging	Beauty, simplicity and order -Emphasis on national identity and social unity - The unity and centrality of God -Avoid showing off and individualism and homogeneity with strangers	-unity in diversity	sample			
Functional-behavioral	- Light and purity - Transparency - Avoiding futility Indigenous decorations	safety and security - Calm down - Solitude and sense of territory	- Covering and hijab Importance and attention to inner- -Respect for personal life - Peace and comfort - Compatibility with the surrounding environment.	respecting the hierarchy; - Introversion - Security			psycho-physical	
Functional-conceptual	- Light and purity - Transparency - Avoiding futility - Indigenous decorations	- Flexibility - Calm down - A sense of belonging	- Back-casting - Compatibility - Contentment (avoiding extravagance; respecting justice and balance) - Observing and feeling the landscape, landscape and beautiful shapes -Avoid hypocrisy and deception	- Avoiding futility - Self-sufficiency	- The reliability of the building - Sublime and stable authenticity - Indigenous organic architecture - A sense of belonging and continuity	- Regional and local - Dependence on the environment	environmental	
	- A sense of belonging - Self-sufficiency	-Identity - Feeling of character	- Hope, effort, perseverance, Respect, adaptability	- Self-sufficiency -Perfectionism	- Unique and specialized - Social authenticity	- Depends on the conditions of the insider	Social	

Functional-behavioral	-Playing with light - Transpar	- Communication with	- Coexistence with water - Nurturing light - The importance of climate and yard	- Communication and coexistence with nature -Perfectionism	- neo-nativism - Indigenous organic architecture Compatible with nature and future	-Harmony and connection with nature	Environmental-social	Contextual
	- Multi-functional	- Flexibility	- Contentment (avoid extravagance) - Compatibility					
Functional-conceptual	- Use of traditional symbols - Light and purity - Transparency - Thank you very much - Degree of enclosure	- flexibility - Calm down - Feeling	- Multi-base architecture - Symmetry - Honesty and health Diversity and harmony - Similarity of whole and part - Refinement and elegance	- Comprehensiveness and unityism - Balance	- Unity in the same multiplicity - A sense of unity - Pimon- -conceptual needs -Physical flexibility	- Comprehensiveness and harmony (respecting the basic and aesthetic principles of architecture) - Performance	- Conceptual body	Causal-conceptual
		Changeable flexibility		Unity and plurality				
	- Abstract forms -Playing with light	Adaptable flexibility	- Maintaining vitality -identifiable	- Diversity and uniformity	-Abstract from past architecture			
	Multifunctional	- Diversifiable flexibility	- Increasing durability and quality of life - Interaction between space and society	- Multifunctionality of spaces and elements	-Different degrees of confinement - Quiet			
Behavioral-conceptual	- Social interaction - Emotional relationships	- Feeling of character	Respect for yourself and others	- Crowd	- Social authenticity	-Slang - People	Social	
functional-conceptual	- Abstract forms	-Identity	Easy and restrained - Satisfaction and savings -Avoid hypocrisy and deception	- Avoiding futility	- Symbolic and abstract forms - Meaning and sanctity	- Clear and simple	- Conceptual	
	- Transparency	- Communication	- A sense of respect for nature				- Environment	

	- Naturalist	with nature						
	- Traditional symbols	- flexibility -Identity	- Compatibility - Continuity and differentiation of material and spiritual life of man		- Physical flexibility	Timeless and placeless	conceptual	
Physical-conceptual	- Multi-functional	lexibility -Identity - Communication with nature - Calm down	- Compatibility -Bewitching of material things by spirituality	-Perfectionism	-Rhythm -Continuity - Evolution -belonging - Local symmetries	- Continuity - Evolution	conceptual	Causal-conceptual
	- Minor symmetries - Foresight		- The need to create a new space - Continuity (increasing the life of the building) - Visual communication				physical	
	- Human design -Human Scale - Pimon	- A sense of belonging - Solitude	-Discipline	-Hierarchy	- Life - A sense of belonging	- Attention to the value of space and its	conceptual-physical	
Behavioral-conceptual	- Private arena	- Calm down	- Dignity and moderation - Avoid showing off -Avoid arrogance	- Humility	- A sense of belonging - Balancing housing	-Humble	psychological	causal - behavioral
	- Characterizing the space	-Identity		- Reminder - Preferring spirituality over materiality	-Sense of Place - Balancing visual and tactile sense	-Innate insight and intuition - Unconscious		
Physical-conceptual	- Using abstract and symbolic forms - Abstract decoratio	-Identity	Trust and obedience	- Ambiguity and doubt	- Traditional symbols - Abstract forms - Symbolic aesthetic elements	- Semantic - Symbolic	Psycho-conceptual	symbolic

(*and**and***and ****taken from the article by Najranjad et al.)

Residential Houses in Mashhad During the Pahlavi Period

Studying Residential Buildings in the First Pahlavi Period

The continuous and harmonious architecture of the street edges gradually turned into the construction of buildings in a fragmented manner and within the open spaces of the street edges, with volumes that were more protuberant. Gradually, the ornaments of the buildings decreased, modern building materials replaced the brick and tile facades, the French cap replaced the skylights, and the domed and adobe roofs were replaced by gable roofs (Bahman Bijari, 2009). In general, in this period, the facades had fewer decorations compared to the Qajar era. In this period, more use was made of brick headers and brick battlements on the roof edges, as well as plasterwork for facade decorations, and sometimes tile decorations were also used. The doors and windows were wooden and had little value and decoration, and the facade bodies were simple and mostly symmetrical. The facades lacked or had inappropriate plinths. The decorations were mostly on the main entrance, creating symmetry in the facade, and the building roofs were flat or gable. The plan shapes were mostly semi-extroverted and semi-open, with simplicity on the outside and dynamism on the inside, being flexible, providing diverse lighting quality in the spaces, and providing cultural identity and a sense of belonging to the place.

Studying Residential Buildings in the Second Pahlavi Period

The height of the buildings around the streets located in the historical and old fabric of the city was constantly increasing, but the vast majority of the new urban fabric, except around the main streets - the main buildings - consisted of one-story to two-story buildings, mostly on very small plots (Naqi Zadeh, 35: 2002). The height of most of the city's buildings is one and two stories, and buildings up to 5 stories are rarely seen. The influential factor in the selection of the architectural style of the buildings was the natural characteristics of the environment, as the severe cold, snowy winters, and high humidity of the ground have determined the architectural characteristics of the city. As a result, the floors of the buildings were raised above the ground level, which was called "cat-faced". The walls were always thick, the windows were narrow, the ceilings were mostly high and as flat as possible. Later, when the gable roof became common, the majority of the buildings were covered with gable sheet roofs. The old fabric, apart from the removal of the arches from the old alleys, remained intact, and in general, the houses of Mashhad are made of mud, brick, and wood with wooden roofs and mud roofs (Bahman Bijari, 2009).

In this period, the facade decorations were simple and mostly symmetrical, and less than the previous two periods. Tile decorations were rarely used, and more brick decorations and sometimes plasterwork were used on the entrances, and geometric and abstract patterns of plants and living beings were used on the window guards. Towards the end of this period, stone or

cement facades with metal gable roofs were also used. In general, the facades in this period have little architectural value (Figure 4 & 5).

In this period, the plans have evolved from semi-introverted to extroverted; and have had partial symmetry and vitality. Simplification of form and building and flexibility, open plan, and use of traditional geometry, as well as the use of basements, were common. Towards the end of this period, high-rise (tower) and complex construction became prevalent.

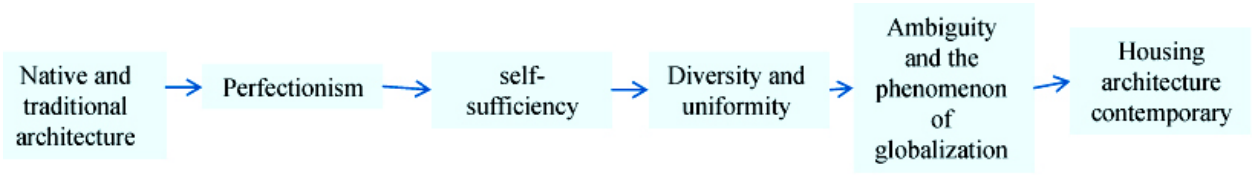


Figure 4. Contemporary housing changes in Iran

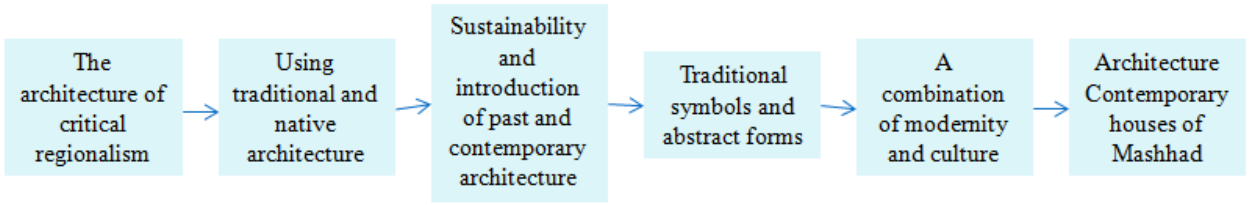
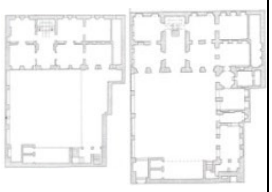
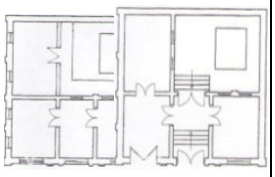
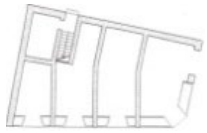


Figure 5. Process of changes in residential houses in Mashhad

Table 5. The effects of traditional, western, indigenous and critical regionalist architecture on the houses of the first Pahlavi period (Source: Authors)

Effects of globalization	* The effects of critical regionalist architecture	Effects of indigenous architecture	Western architectural influences	Effects of traditional architecture
1- The influence of foreign culture (Mahtabi, Hozcheh, and Dodari) 2- Not paying attention to the climate of the region (wide windows). 3- Creating broad perspectives. 4-Creating classes. 	1- Creating a central courtyard for stillness and visual peace in the heart of the space and play with light. (Mohammadi house: three-way introvert)   2- Aligning the buildings with the surrounding buildings with aesthetic proportions, light geometry, etc. 3- Use of local site materials and brick textures compatible with culture and economy. (Dr. Salari's house: semi-introverted with two perpendicular sides)   4- Creating the proper shape, form and orientation of the building in the direction of sustainable development. 5- Having a form based on the traditions on the site. (Judgment House: Borongrai Villai)   6- Increasing the sense of belonging to the place by using local patterns and symbols.	1- Using the basement for geothermal heating. 2-Using dense and compact form. 3- Using local materials with good heat capacity. 4- Minimizing the amount of indoor and outdoor air conditioning. 5- Choosing a flat roof and keeping snow for thermal insulation.	1- Space circulation system from corridor to room or foyer. 2- The centrality of the staircase and entrance hall in the organization of spatial communication. 3- Guards and metal decorative elements in windows. 4- Pond in the yard. 5- Creating a wide view in the windows. 6-Using moonlight instead of porch. 7- Three doors have been changed to two doors. 8- Slope of the roofs.	1 -Vertical communication is less important. 2-Smooth line. The sky 3- Janaghi Ilkhani arches. 4- Precedence of inside and outside decorations. 5- Insisting on creating symmetry in decorative motifs. 6- Rectangular doors and windows. 7- Roof covered with straw. 8- Iranian wall heater. 9- Use of brick and wood in the structure.

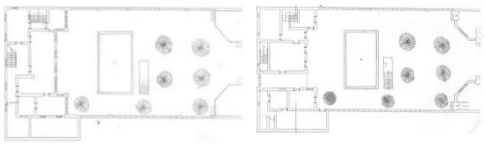
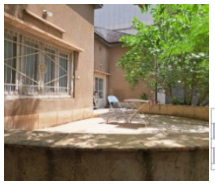
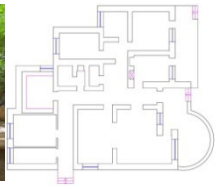
	7-The approach of stability and reliability of the building. 8- Human design and flexibility of spaces. 9-Using the principles of Iranian architecture (introversion, etc.). 10-Identity and affiliation and connection with the past. 11- The combination of space and nature and the balance of man and nature. 12- The world of meaning and creating security and peace with the appropriate hierarchy and creating privacy)  13- Paying attention to the special features of each place in addition to the design requirements. 14- Architecture in search of identity. 15- Struggle to preserve the traditions and cultural characteristics of the residents of the region. 16- Maintaining and creating continuity between present and past construction forms. 17- Maintaining and creating continuity between present and past construction forms.			

Table 6. The effects of traditional, western, indigenous and critical regionalist architecture on the houses of the second Pahlavi period (Source: Authors)

Effects of globalization	****Effects of critical regionalist architecture**	**Effects of indigenous architecture**	**Western architectural influences**	**Effects of traditional architecture**
1- The influence of foreign culture	1- Aligning the buildings with the surrounding buildings with aesthetic	1- Using the basement for	1- Space circulation	1- Unimportant vertical

(Mahtabi, Hozcheh, and Dodari) 2- Not paying attention to the climate of the region (wide windows). 3- Creating broad perspectives. 4-Creating classes. 5- High-rise building. (High-rise construction: high-rise apartments) 6-mass construction. (Residential complex of 600 units)   7-Using a metal frame	proportions, light geometry, etc. 2- Use of local site materials and brick textures compatible with culture and economy. (Pourhosseini house: semi-introvert with two perpendicular sides)  3- Creating the proper shape, form and orientation of the building in the direction of sustainable development. 4- Having the roots of the building form in the traditions on the site (Agronomist's house: Borongray Villai)  5- Increasing the sense of belonging to the place by using local patterns and symbols. 6- The approach of stability and reliability of the building. 7- Human design and flexibility of spaces. 8-Using the principles of Iranian architecture (introversion, etc.). 9- Identity and affiliation and connection with the past.	geothermal heating. 2-Using dense and compact form. 3- Using local materials with good heat capacity. 4- Minimizing the amount of indoor and outdoor air conditioning. 5- Choosing a flat roof and keeping snow for thermal insulation.	system from corridor to room or foyer. 2- The centrality of the staircase and entrance hall in the organization of spatial communication. 3- Guards and metal decorative elements in windows. 4- Pond in the yard. 5- Creating a wide view in the windows. 6-Using moonlight instead of porch. 7- Three doors have been changed to two doors. 8- Slope of the roofs.	communication. 2-Smooth line. The sky 3- Janaghi Ilkhani arches. 4- Precedence of inside and outside decorations. 5- Insisting on creating symmetry in decorative motifs. 6- Rectangular doors and windows. 7- Roof covered with straw. 8- Iranian wall heater. 9- Use of brick and wood in the structure.

	10- The combination of space and nature and the balance of man and nature. 11- The world of meaning and creating security and peace with proper hierarchy and privacy. (Dr. Kahraman's house: outgoing)   12-Paying attention to the special features of each place in addition to design requirements. 13- Architecture in search of identity. 14- Struggle to preserve the traditions and cultural characteristics of the residents of the region 15- Mediation between global and indigenous and local civilization. 16- Maintaining and creating continuity between present and past construction forms.			

*And** All the plans and photos in this column, as well as the photos in Table 11, are field surveys conducted by the author.

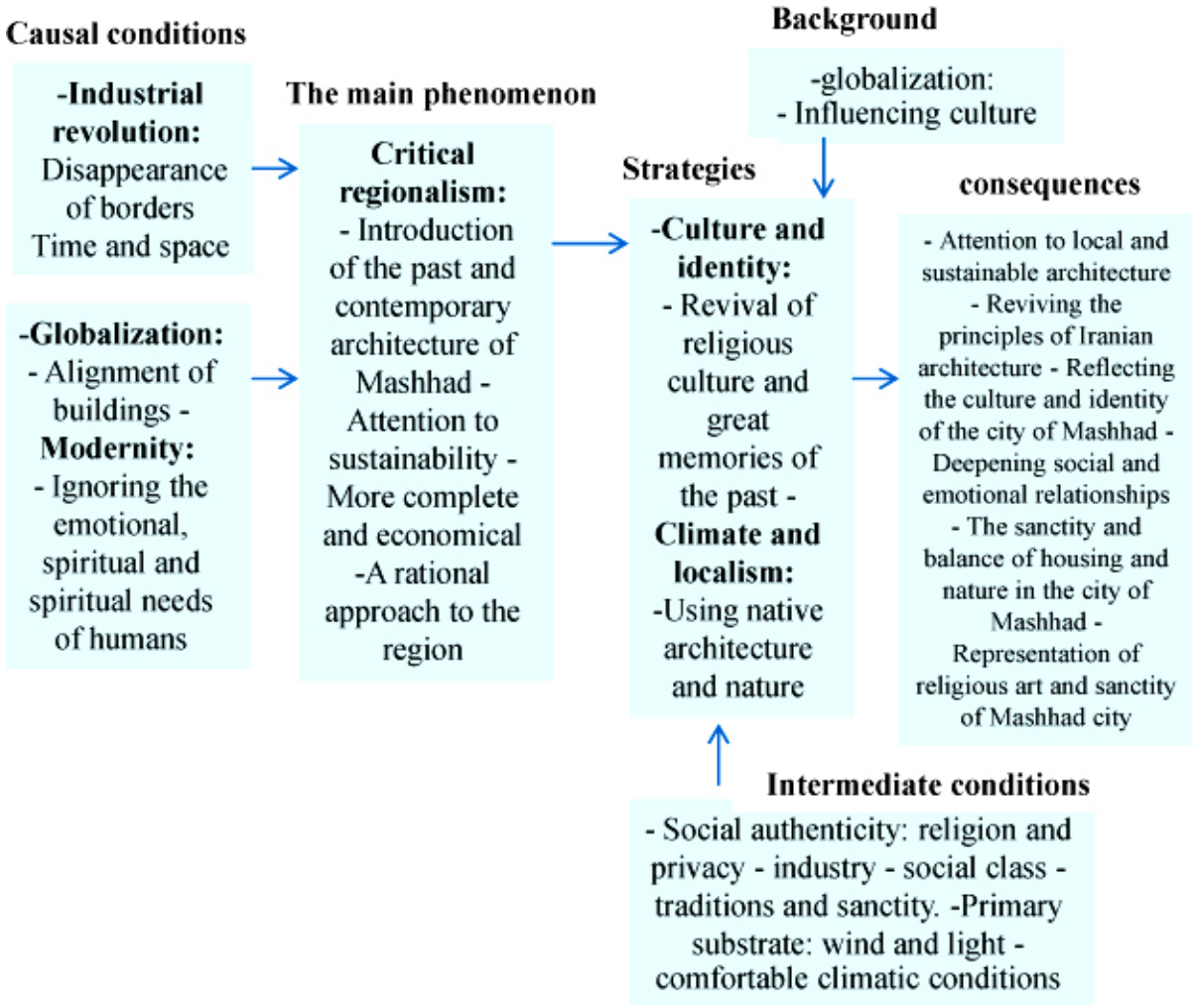


Figure 6. Grounded Theory in Mashhad Homes (Source: Authors)

Considering the (Tables 5 & 6, Figure 6), the presentation of an efficient plan model in the city of Mashhad is as follows in (Figure 7):

The use of a dense and compact form considering the indigenous architecture of the region and the principles of sustainable architecture, the use of a columned porch and three-door elements that were common in Iranian architecture. The use of greenery and nature, and their sanctity in the centrality of the plan and the privacy in the space, which is consistent with Iranian culture. Creating a public section on the ground floor and a private section on the first floor to reflect the Iranian-Islamic culture and the manifestation of religious art, which is a reflection of the architecture of the city of Mashhad. Creating deep social and emotional relationships with sustainable design, the sanctity of the family foundation, and creating a sense of belonging and a suitable place, which are the requirements of Iranian-Islamic house design. Identity, attachment, and continuity with the past in plan design, and creating security and tranquility with appropriate

hierarchies, attention to the specific characteristics of the place, and the factors of physical-social sustainable design in the form and shape of the building are evident.

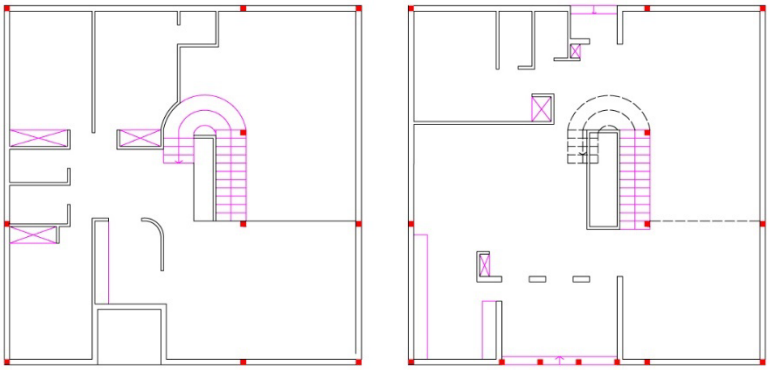


Figure 7. Efficient Proposed Model (Source: Author)

Conclusion

Critical regionalism should be understood as a kind of subsidiary experience through which, while criticizing modernization, the liberating and progressing aspects of the legacy of modern architecture are by no means overlooked. The critical regionalist architecture of the Pahlavi period in Iran has been the introduction of past and contemporary architecture, attention to physical-social and economic sustainability with a rational approach to the region. Creating a unique urban form in a way that, in addition to light, purity and transparency, is compatible with indigenous materials and brick textures compatible with the culture and economy of the region. Towards the end of this period, globalization and modern architecture have pushed the Isfahani style of the houses towards extroversion, high-rise and complex construction, etc. The architecture of the first Pahlavi period in the city of Mashhad, with the harmonization of the buildings, has had a trans-physical impact on the region, which has taken steps towards sustainable development. The plans in the first Pahlavi period were mostly in the Isfahani style; they had adaptable, changeable and diverse flexibility, semi-introverted, semi-open, inner dynamism, outer simplicity and cultural-social identity. Creating a central courtyard in the first Pahlavi period for visual stillness and calm in the heart of the space, balancing man and nature by playing with light and using traditional patterns, has brought a sense of belonging and a suitable sense of place. The depth of social and emotional relationships, the sanctity and balance of housing and nature in the design of the plans of this period are evident; which has been a manifestation of religious art and the sanctity of the family foundation in the city of Mashhad.

According to the analysis of tables 11 and 12 and consultation with experts, the comparative analysis of the buildings of the first and second Pahlavi periods is the most important in the form of the building, which has a combination of modern and local culture in an extroverted way.

In the second Pahlavi period, the greatest importance was in the form of the building, which was a combination of modern and indigenous culture in an extroverted way. The form of the building in this period, considering the population growth, the increase in land value and also the growth of technology, has manifested in a dense and compact form, which is more compatible with regional architecture. Therefore, the growth of global technologies such as vehicles, air conditioning and heating, etc., along with the preservation of authenticity and environmental principles, have made the greatest changes in the architecture of the houses. Therefore, respect for the principles of Iranian and sustainable architecture, creating a balance between indigenous and global aspects by creating a harmonious and harmonious building with the surrounding context, dependence on nature and culture, such as the central courtyard and the flexibility of spaces, etc. causes the sustainability of the building, the manifestation of the architecture of the ancestors and the promotion of the architecture of the city of Mashhad. Therefore, in the proposed efficient model, considering the past interpretations, the use of a dense and compact form and greenery in the centrality of the plan, the creation of a public section on the ground floor and a private section on the first floor to create deep social and emotional relationships, identity, attachment and continuity with the past in plan design and physical-social sustainable factors in model design have been taken into account.

Author Contributions

All authors contributed equally to the conceptualization of the article and writing of the original and subsequent drafts.

Data Availability Statement

Not applicable.

Acknowledgements

The authors would like to thank all participants of the present study.

Ethical considerations

The study was approved by the Ethics Committee of the Islamic Azad University, Birjand Branch. The authors avoided data fabrication, falsification, plagiarism, and misconduct.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest

The authors declare no conflict of interest.

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IJAPAS

International Journal of Applied Arts Studies

Print ISSN: 2588-4506 Online ISSN: 2588-4670

Homepage: www.ijapas.ir

Islamic Azad University
Yazd Branch

Explaining the Pragnanz of the Application of the Principles of Visual Perception of the Gestalt Theory in the Re-Reading Historical Houses of Yazd in the Qajar Period

Avid Talaei[1], Mahsa Aghaei[2], Zainab Damyar[3]

1. Corresponding author, Assistant Professor, Department of Architecture, Faculty of Art and Architecture, West Tehran Branch, Islamic Azad University, Tehran, Iran. E-mail: avid.talaei@gmail.com
2. Ph.D. Student of Architecture, Faculty of Art and Architecture, West Tehran Branch, Islamic Azad University, Tehran, Iran. E-mail: mahsa.aghaei@iau.ir
3. Ph.D. Researcher in Architecture, Faculty of Art and Architecture, West Tehran Branch, Islamic Azad University, Tehran, Iran. E-mail: zainabdamyar@gmail.com

Article Info

Article type:
Research Article

Article history:
Received August 19, 2024
Received in revised form September 29, 2024
Accepted December 8, 2024
Published online December 29, 2024

Keywords:
Gestalt theory,
Pragnanz,
Visual perception,
Yazd houses

ABSTRACT

Gestalt theory is one of the most influential theories in art and architecture, which focuses the process of visual perception on a unified view and integrity of the art work. Due to the alignment of the goal of visual communication and lasting effectiveness on the mind, the application of these principles is essential in architectural design. On the other hand, the traditional houses of Yazd during the Qajar period are considered to be among the most lasting architectural works of Iran, which apparently have no purpose other than lasting effectiveness in mind. In this regard, with the aim of studying the characteristics and visual perception, how to apply the laws of Gestalt visual perception in the historical houses of Yazd, to discover the quality of the impact of the laws of Gestalt visual perception on the houses and their capabilities in creating useful communication, as well as to investigate the significance of each principle of Gestalt. In order to analyze case samples, the descriptive-analytical method of Gestalt laws was used. The research method is a theory test based on 10 examples of traditional houses in Yazd during the Qajar period, which are among the most important houses, including the Golshan house, the Lari houses (Gholamohsin), the Lari houses (Ahmed), Mortaz, Rasoulian, Heiran, Farhangi and Mozafari, Ulumi houses, and Sigari Akhavan. Based on the prevalence of Gestalt principles, this research examines the role of visual perception features in the historical houses of Yazd with principles of similarity, proximity, symmetry, form and context, continuity, dependence, surface, overlapping, restoration, closure and experience, as re-reading the historical houses architecture of Yazd in the Qajar period according to the Gestalt theory of visual perception.

Cite this article: Talaei, A., Aghaei, M., & Damyar, Z. (2024). Explaining the Pragnanz of the Application of the Principles of Visual Perception of the Gestalt Theory in the Re-reading Historical Houses of Yazd in the Qajar Period. *International Journal of Applied Arts Studies*, *9*(4), 107-140.

Introduction

Understanding architectural forms requires understanding the whole form before addressing the details. Visual perception is the result of an inferential process of the brain. which is trying to understand the sensory input provided by the retina. Among the five human senses, the eye is the most effective sense in identifying the surrounding environment. Humans tend to gain most of their knowledge by seeing. All understanding and reception of the environment is done through seeing (Tahmasabi Fard et al, 1402). Most of human's sensory inputs are visual, and for this reason, most of the time when we talk about perception, we mean visual perception. Perception begins with the first impression, then the whole building catches one's attention. Finally, it reaches a level of cognitive processing of perception. Perception is divided into two stages. The first is information gathering. It is shown by visual perception and the second is the processing of this information. Which is called cognition, it is shown by both visual and mental. Visual perception starts with the general appearance of the building, then it reaches the mass of the building (Sabry Hegzi, Anwar Abdel-Fatah, 2018). In Iran, little research has been done on the application of Gestalt theory in architecture, and direct research related to the existence or non-existence of this theory in the architecture of traditional houses is insignificant, and so far Gestalt theory has not been carried out on the body of traditional houses in Yazd in a hot and dry climate. This has led to the identification of the historical houses of Yazd in the Qajar period based on the Gestalt theory of visual perception. In the current research, the question is raised, which of the principles of Gestalt visual perception was used in the historical houses of Yazd during the Qajar period, and what is the amount of pregnancy of each of these houses? How are the components of Gestalt visual perception related to the architecture of historical houses in Yazd during the Qajar period?

Table 1. History of the research (Source: Authors)

Scope of investigation	Row	Title	Researchers and year of publication	Research method	Considerations done	Results
Theory **Gestalt visual perception**	1	Analyzing the principles of visual perception in decorative Kufi with emphasis on the principle of form and context, continuity and common destiny; A case example of the Grivar inscription of the Tomb of the Twelve Imams	Safiye Hatami*, Shahriar Shekarpur 2023	Descriptive-analytical method and information gathering method, library and field studies	Examining the principle of shape and context, the principle of continuity is used in the general view and the components of the inscription very much, the principle of continuity is used in the general view very much and in the middle parts, and the principle of common destiny is used in the general view very much and has no precedent in the composition.	The result of applying each of the gestalt principles leads to the realization of strong presence, which causes more impact and better communication between the audience and the work.
	2	The effect of environmental capabilities on the desirability of visibility in Iranian market halls based on "Gestalt theory" and "Isovist analysis" (case study: Isfahan market halls)	Somaye Pahlavan, Hossein Sultanzadeh *, Farah Habib 2022	The combined, quantitative and qualitative method is descriptive-analytical. The method of collecting information for this research in the form of field and documents	By showing the desirability of visibility and field of view, it analyzes the level of visual attractiveness in the bazaar of Isfahan and evaluates the perceptual environment using Gestalt psychology theory and environmental capabilities in	In Isovist's view, there is a direct relationship between area and understanding of gestalt indicators. At the entrance, the field of view is not directly related to Gestalt principles in all cases.

				(library)	measuring observer's sight lines.	
	3	Explaining the process of visual perception in painting with an approach to the theory of Gestalt psychology (case study: three paintings from the Herat school of Shahnameh Baisangari)	Farnoosh Shamili *, Jaafar Mohammadzadeh, Fatemeh Ghafouri Far 2021	Descriptive-analytical	It explains how to perceive and recognize visual patterns in the elements of paintings by using the laws of Gestalt.	Visual perception, the meaning of the visual pattern and the way the human organism works in seeing and visual organization, leads to receiving accurate recognition features in the formal structure of images.
	4	Evaluation of the visual perception of specialists and non-specialists of local urban spaces in Dezful city based on Gestalt theory	Mohammad Dehban, Behnaz Safarali Najjar, Koresh Momeni, Koresh Attarian* 2020	Descriptive-survey method with field and library studies	This research has determined the difference between the criteria of understanding of those who create the environment and the people who encounter the environment and live in it.	The visually perceptible rules of Gestalt, such as symmetry and the law of completeness, are of great importance to experts, while these principles are less important to the user group.
	5	Reading the painting of the Ascension of the Prophet (PBUH) by Sultan Muhammad from the perspective of Gestalt principles of	Salime Babakhan,* Behnam Kamrani 2020	Descriptive-analytical method and method of collecting library information	The adaptation of Gestalt principles to the picture can be evaluated with strong significance, that by applying each of these principles, the process of visual	The artist's unconscious use of gestalt principles has led to better organization of image components and easier reception of the work,

		visual perception			perception is formed.	which has caused the audience to actively communicate with the painting in different periods.
	6	Comparative analysis of spatial patterns and cognitive characteristics of the Iranian market using the theories of "space arrangement" and "gestalt" case study: Qazvin market complex	Ali Akbar Heydari*, Maryam Kiaei 2019	Descriptive-analytical and comparative method	By evaluating the quality of perception of the environment using Gestalt psychology theory and analyzing the spatial configuration system of the market using the method of space arrangement, it has analyzed the cognitive and perceptual aspects related to the market space.	Multiple objective and subjective factors together and sometimes with prioritizations to each other are effective in determining the correct navigation of the space.
	7	Reading interactive layout of typography "in order to control" from the perspective of gestalt principles of visual perception.	Zahra Rahbarnia, Neda Shafiqi* 2018	descriptive-analytical method and inductive method	The discovery of the quality of the influence of the rules of visual perception of Gestalt on the composition-graph has been done in order to identify its capabilities in creating beneficial communication.	A person's eye and mind will have an easier understanding, better organization and more logical communication to understand a complex subject with the help of Gestalt principles.

	8	Analysis of the spatial structure of the Qiblah bath (Khanam) based on Gestalt laws	Alireza Mashbaki Esfahani 2018	Descriptive-analytical method with a qualitative approach	This research has investigated the presence of Gestalt rules in the Qiblah bath.	Gestalt laws have had a significant impact on the physical and spatial structure of the Qiblah bath and integrated visual perception has been created
	9	Analyzing the plan structure of the noble Pahlavi house of artists (Mohteshmi) in Isfahan based on Gestalt rules	Ladan Shahzamani Sichani, Maryam Ghasemi Sichani* 2017	Mixed, quantitative and qualitative research method modeling	The principles of Gestalt psychology have been used in the placement of spaces, their surrounding shape and dimensions, the proportion of spaces being full and empty, and the type of combination in the house plan.	Gestalt rules have led to a regular spatial structure and direction of spatial relations in the plan of the noble house of artists.
	10	Application of Gestalt rules of visual perception in the graphic design of advertising billboards, a case example: commercial billboards in Tehran in 2014	Sahar Ittihadmohkam, Afsane Nazeri,* Yaser Sobhani Fard, Salar Faramarzi 2017	Descriptive-analytical	The study of visual features and qualities, how and how to apply the laws of Gestalt visual perception in the graphic design of advertising billboards in Tehran, and the amount of Gestalt principles used	The principles of graphic design are included in a group of gestalt rules, which can be understood as an interactive and two-way relationship between the two, and in each rule, some

					in billboard images has been studied.	design principles can be used and vice versa.

Research Method

This research is among qualitative research. The research method of this study is descriptive-analytical. The method of gathering information for this research is field and document (library). In this research, after examining all the historical houses of Yazd during the Qajar period, which are registered in the list of national monuments, 10 of the most important houses, including the Golshan house, Lariha (Gholamhosein), Lari (Ahmed), Mortaz, Rasoulian, Hiran, Farhani and Mozaffari, Ulumi, Akhwan Sigari and Shokohi were visited and carefully examined in the field, and then the visual impressions associated in the mind with the understanding of Gestalt principles were investigated. First, the general structure of the traditional houses of Yazd during the Qajar period has been analyzed and after explaining the principles of gestalt perception, the compatibility between the principles of gestalt and the structure of traditional houses of Yazd has been examined. Pragnanz has been obtained in the research results. Figure 1, shows the inference mechanism and the research method.

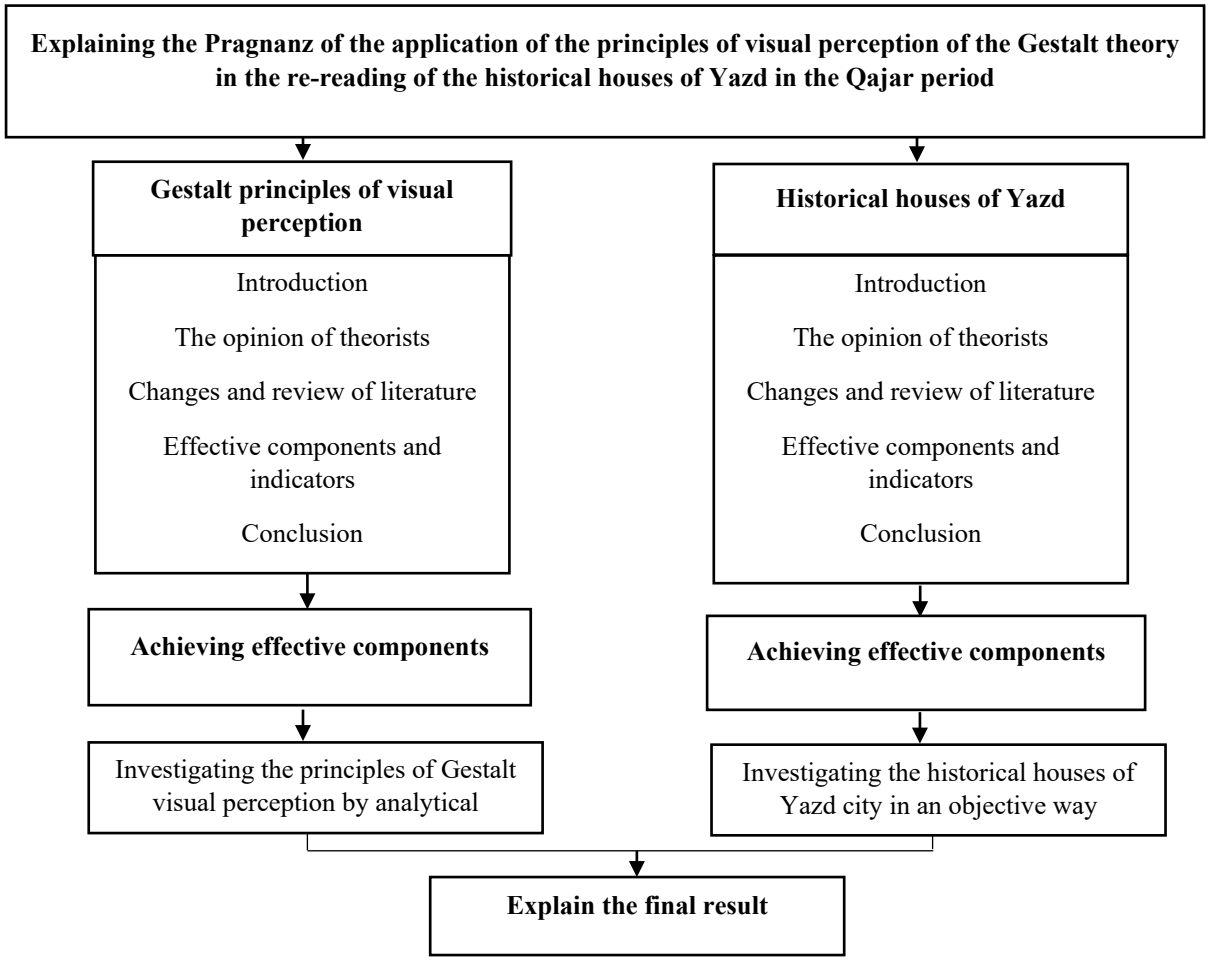


Figure 1. The theoretical framework of the research (Source: Authors)

Historical Houses of Yazd

God has made the house a place of comfort and physical and mental peace for people. In Dehkhoda culture, home is the place where a person lives (Dehkhoda, 2006: 1079). In a certain culture, house and house are different. House means a room and Sarai means a house (Moin, 2005: 1000). In Persian culture, Omid means a house, four walls with a roof, a room where a person lives. Manzel, place, residence are mentioned (Omid, 1984: 985). In the traditional architecture of Yazd, houses are designed and built based on special principles and patterns. The distinctive and distinguished feature in the architecture of historical houses in Yazd is the careful attention to detail. Details that can be found in spaces, corners, doors and windows, sashes; The architectural details of Yazd houses can be repeated. Many theorists have commented on the concept of home, including Christian Norberg Schultz, Imos Rappaport, Claire Cooper Marcus, Bachelard Gaston and many others; But the remarkable thing is that all theorists are determined

that the house is a place more than a physical structure that is perceived. The opinion of theorists about the concept of house is collected in (Figure 2).

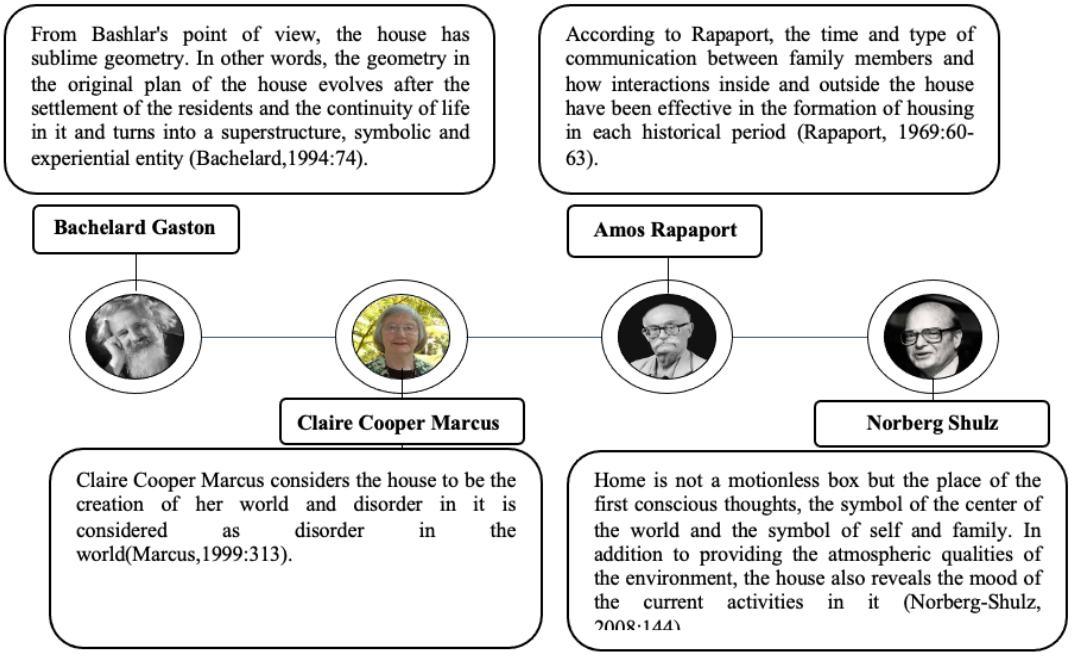


Figure 2. The opinion of theorists in the domain of the house (Source: Authors)

Course of Historical Development of the Houses in Qajar Period

Historical houses form a major part of the historical textures of cities. The Qajar period had an influential role in Iranian architecture. The architecture of the Qajar period can be considered the last period of Iran's model architecture, the period of metamorphosis of Iranian architectural concepts and the formation of new types of architectural elements. During the Qajar period, artists have acted according to Iranian culture in such a way as to make external culture impossible in themselves, this is one of the most valuable approaches of Qajar art (Pope, 1998: 149). In general, the architecture of the Qajar period can be divided into two general periods, the first period is from the beginning of the reign of Agha Muhammad Khan to the end of the reign of Muhammad Shah and the second period is from the beginning of the reign of Naser al-Din Shah to the end of the rule of the Qajar dynasty. And the second period of Qajar has been collected.

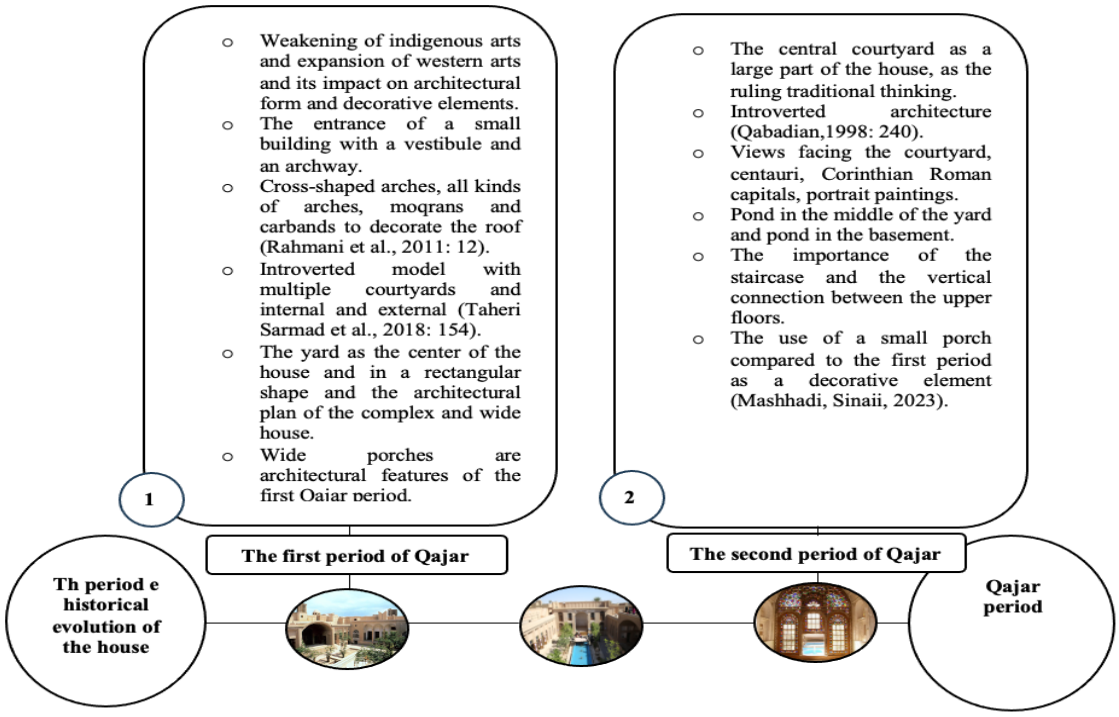


Figure 3. The historical evolution of the house during the Qajar period (Source: Authors)

Visual Perception

Architecture is one of disciplines in which discussing on the human beings is necessary. It has been widely stated that in designing or criticizing an architectural subject, one speaks of the perception (Abdolsamadi et al., 2019). Humans are creatures with perception, with different senses, including hearing, sight, touch, taste, and smell, and visual perception stands out as the most direct mode of perception in humans (Li et al., 2023). The discussion of perception is mainly focused on visual perception because most of the sensory inputs are visual. In architecture, visual perception is more important than other types of perception. Perception is studied to define human understanding of his environment. The quality of the environment is a major aspect of life (Ariannia et al., 2024). Perception is the biological and psychological process of acquiring information from the environment. This process is active and purposeful (Lang, 2012: 97). Humans do not perceive their environment randomly. The emotional inputs of the environment are collected by the human brain and find meanings in a certain order. According to Gestalt psychologists who are interested in this complex cognitive process, it is not the summation of all the parts that gives meaning to the whole, but the way the parts are combined with each other (Uzunoglu, Uzunoglu, 2011). The knowledge of geometry, like many human

sciences, has a long history, which has always been used in architecture to enhance the material and convey the spirit, meaning and special effect (Yaghoubi et al., 2024).

Gestalt Principles

Gestalt refers to the method according to which objects are placed and arranged together (Torrans, 1999). The principle of gestalt is general, material or psychological, with coordinates that its components individually do not have such coordinates. There are limited operations for the information that the mind can keep track of. When the amount and volume of visual information increases, the mind tries to simplify them using grouping. Therefore, Gestalt principles play a very important role in helping the human mind and perception. The principles of Gestalt include the principle of similarity, proximity, form and context, symmetry, dependence, continuity, closure, repair, surface, overlap and experience, all Gestalt principles are gathered in Figure 6.

Pragnanz

All the principles of Gestalt are under the influence of the principle of perfectionism, which forms the central core of Gestalt's perceptual theory (Shapourian, 2006: 94). Pragnanz is our perception of a good and strong gestalt or grouping, so that under the prevailing conditions (the perceptive power of the mind and the principles used in the work), it distinguishes it from existing weaker gestalts or groupings. In this research, it uses the significance of Gestalt principles because through it, it provides the basis and theoretical framework for a good and beautiful form (Sunstrum et al., 2024). Seven important principles out of the eleven general principles of Gestalt, which are the principle of similarity, proximity, continuity, restoration, form and context, dependence, overlap, create a strong presence. Therefore, the science of geometry is a powerful tool that has enabled the architect to measure spatial proportions and create balance, order and beauty (Ghaemi et al., 2023).

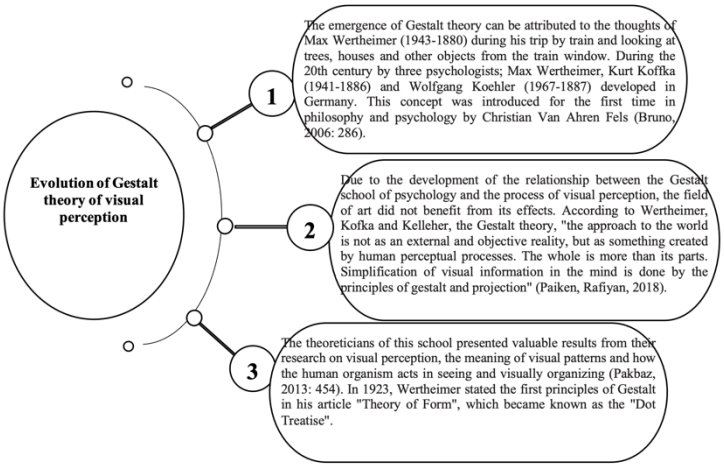


Figure 4. Evolution of Gestalt visual perception theory (Source: Authors)

Many theorists have discussed the Gestalt theory of visual perception. The most important opinion of theorists including William Itelsen, Rudolph Arnheim, Gregory is collected in Figure 5.

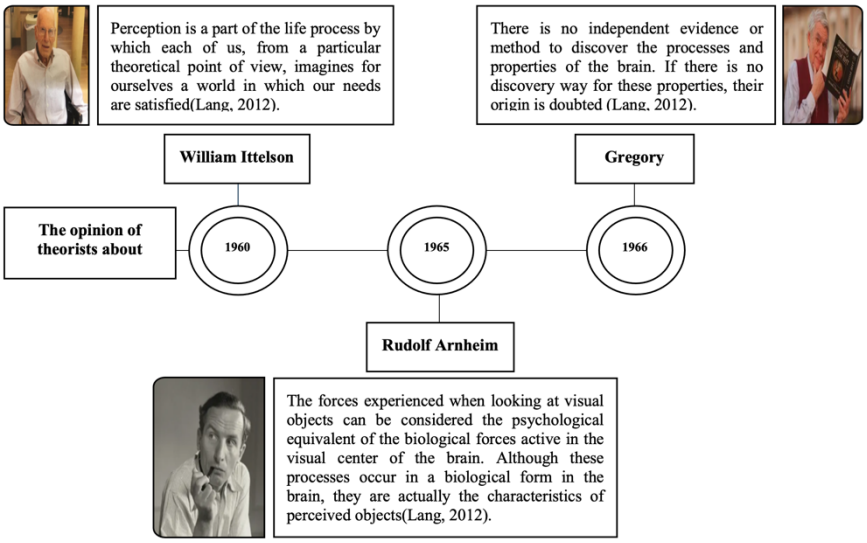


Figure 5 Theorists' opinion about the Gestalt theory of perception (Source: Authors)

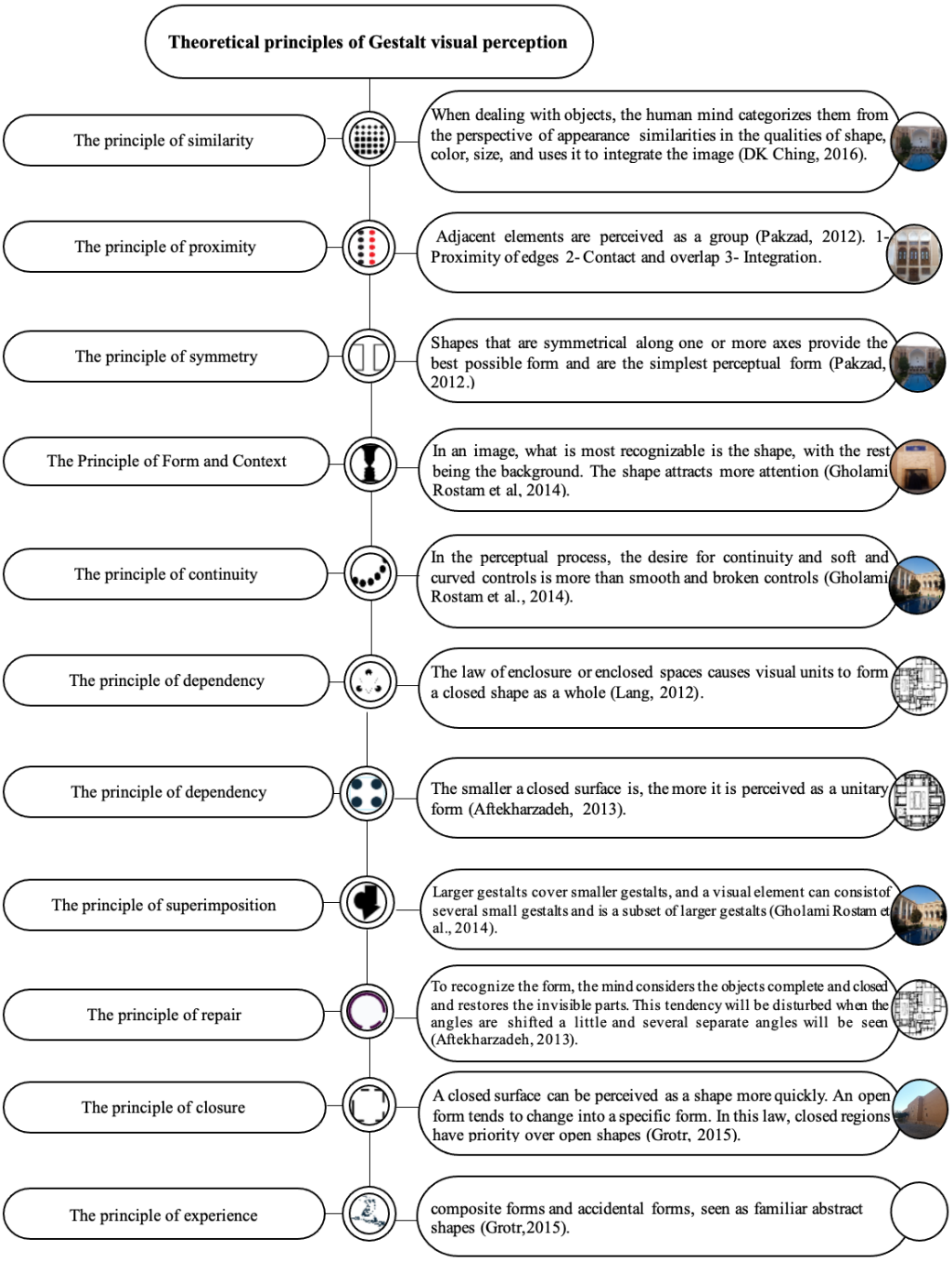


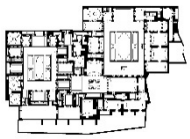
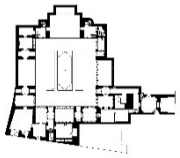
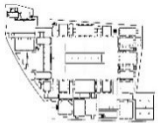
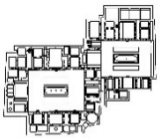
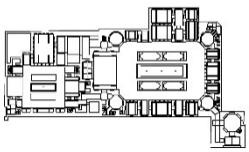
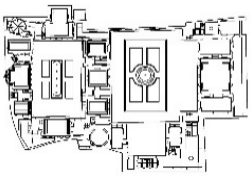
Figure 6. Principles of Gestalt visual perception theory (Source: Authors)

Case Sample Selection

Many houses were built in the Qajar period in Yazd city. After the preliminary investigation about the traditional houses of Yazd, ten important houses in the Qajar period, which are in the

same time frame, are not abandoned, are registered in the list of national monuments, and are still active and dynamic with the change of use, and are among the most important historical houses of the Qajar period. It is known that they are introduced in (Table 2).

Table 2. Selection of the case study sample

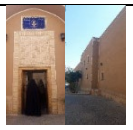
House	House plan	Location	House	House plan	Location
1-Golshan		Yazd, Tall neighborhood, 12th Farvardin St., Butchers Gate, next to Golshan reservoir	**2-Rasulian**		Yazd, Gudal Mosli neighborhood, Imam Khomeini St., Sahl Bin Ali Alley
3-Larriha **(Gholam Hossein)**		Yazd, Fahadan neighborhood, Gozer Yuzdaran	**4-Heirani**		Yazd, Fahadan neighborhood, Rokhtshorkhane St., in front of Kurosh Hotel
5- Sigari Akhavan		Yazd, Amircha khmaq Square, Imam Khomeini St., Third Alley	**6-Farhangi and Mozaffari**		Yazd, Push Bagh neighborhood, Farrokhi St., Derband Arabha Alley
7-Mortaz		Yazd, Tabrizian Quarter, Qiam Street, Tehrani Bazaar, Mahmoudi Alley	**8-Olumiha**		Yazd, Butchers Quarter, Amirchakhmaq Square, Koi Kassabha

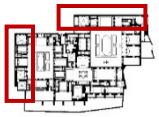
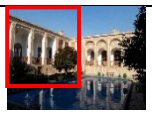
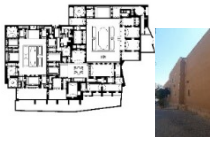
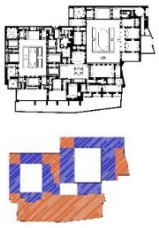
9-Shokuhi		Yazd, Imam Khomeini St., adjacent to Jame Mosque	**10-Lariha (Ahmad)**		Yazd, Fahadan neighborhood, Gozer Yuzdaran, in front of Lariha's house

Research Findings

Since the field of study in this research is to know the features of hidden visual perception in the parts of the historical houses of Yazd in the Qajar period. First, the theoretical issues of the Gestalt theory were stated, and then the adoption of case examples of historical houses in Yazd from the principles of Gestalt was examined. The main focus of the research is the analysis and conclusions that explain the resulting pregnancy rate. At this stage, in (Table 3), it has been investigated, analyzed and analyzed the components of the principles of Gestalt perception in ten historical houses of Yazd during the Qajar period.

Table 3. Analysis of the components of Gestalt perception principles in historical houses of Yazd (Source: Authors)

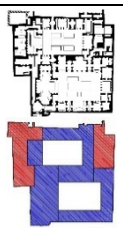
Golshan's house				
Gestalt principles		**Case study**	**Analysis based on Gestalt principles**	**The objectivity of relationships**
The principle of form and context			The wall of the building is simple and uniform, without components and decorations, and has a thatched covering as the background and front facade due to the presence of the arch, the rectangular brickwork frame around the entrance door, the platforms around it in the form of old people and the entrance door and its components as a shape are raised.	Merged
The Principle of symmetry			The principle of symmetry in the whole house can be seen in the form of the facade of the walls, and in the details, the elements and components of the walls and the plan of the spaces have symmetry.	obvious
	Proximity		The components of the walls in the form of doors, windows, arches and frames work as single groups.	obvious

original Proximity	Contact and overlap		The main spaces are connected by means of communication components such as corridors and beds.	obvious
	Consolidation		The placement of the spaces of the house is spatially within another space in the form of a labyrinth.	obvious
The principle of dependence			The central courtyards of the house create closed and semi-open spaces through the surrounding volumes in the form of rooms and other spaces.	obvious
The principle of similarity			Spaces and their components function similarly in multiple dimensions of the house.	Merged
The principle of continuity			The principle of continuity is perceived in the placement and repetition of frames, arches and doors of the walls of the central courtyard.	obvious
The principle of closure			The wall of the building in the form of a wall uniformly and the walls of the central courtyard, consisting of closed spaces, induce the principle of being closed.	obvious
The surface of principle			In this house, the module of the main spaces is determined based on the yard unit, and the closed surfaces are considered as the constituent units of the spaces.	hidden
The principle of restoration			The form of the house is perceived as a closed and integrated whole and components.	obvious
The principle of overlap			The general form of the house in the plan, the walls and their components separately have gestalt.	Merged
The principle of experience		○	Considering the construction of the building based on geometry and proportions and not using random shapes, the principle of experience is not perceived.	○

Lari's House (Gholamhossein)				
Gestalt principles		**Case study**	**Analysis based on Gestalt principles**	**Objectivity of relationships**
The principle of form and context			Due to the presence of the arch, the rectangular frame made of bricks around the entrance door, the platforms around it in the form of old people, the arched space like stairs and the entrance door and its components are similar in shape, and the wall of the building is simple and uniform with a thatched appearance It forms.	Merged
The principle of symmetry			The walls around the central courtyard in the form of numerous elements and components, as well as the plan of the spaces and their components have the principle of symmetry.	obvious
original Proximity	Proximity		Doors, windows, arches and frames form the components of the walls as single groups.	obvious
	Contact and overlap		The overlap of the spaces is realized through the communication components and the connection of the main spaces through corridors and flats.	obvious
	Consolidation		The integration of the spaces of the house is in the form of a space within another space in the form of a labyrinth.	obvious
The principle of dependence			The formation of the closed form of the building is perceived through the volumes around the central courtyards in the form of closed and semi-open spaces in the form of rooms, halls and secondary spaces.	obvious
The principle of similarity			The perception of the propositions of the principle of similarity, consisting of shape, color and size, is perceived in the various components of the walls of the central courtyard and the plan of the house spaces.	Merged
The principle of continuity			The multiplicity and repetition of the elements and components of the walls of the central courtyard in the form of frames, consisting of arches and doors, evokes the	obvious

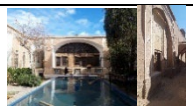
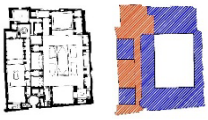
		principle of continuity.	
The principle of closure		The principle of closedness is understood based on the integrity and lack of holes of the surrounding wall of the house and the walls of the central courtyard consisting of closed spaces.	obvious
The surface of principle		Closed levels are explained as the units that make up the spaces based on the unit of gez and in the form of modules of the main spaces.	hidden
The principle of restoration		The form of the house is perceived as a closed and integrated whole and components.	obvious
The principle of overlap		Understanding the principle of gestalt is perceived in the plan, walls and components of the house as a whole and its components.	Merged
The principle of experience	○	The absence of the principle of experience regarding the construction of the house based on geometry, proportions and the lack of use of random spaces and shapes in it takes place.	○

Lari's house (Ahmad)			
Gestalt principles	**Analysis based on Gestalt principles**	**Analysis based on Gestalt principles**	**Objectivity of relationships**
The principle of form and context		The wall of the building is simple and uniform, without components and decorations, and has a thatched covering as the background and front facade due to the presence of the arch, the rectangular brickwork frame around the entrance door, the platforms around it in the form of old people and the entrance door and its components as a shape are raised	Merged

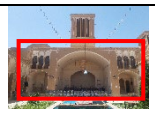
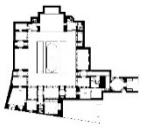
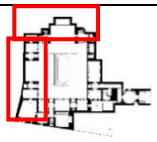
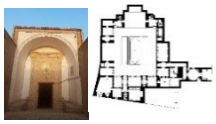
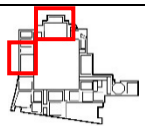
The principle of symmetry			The principle of symmetry in the whole house can be seen in the form of the facade of the walls, and in the details, the elements and components of the walls and the plan of the spaces have symmetry.	obvious
original Proximity	Proximity		The components of the walls in the form of doors, windows, arches and frames work as single groups.	obvious
	Contact and overlap		The main spaces are connected by means of communication components such as corridors and beds.	obvious
	Consolidation		The placement of the spaces of the house is spatially within another space in the form of a labyrinth.	obvious
The principle of dependence			The central courtyards of the house create closed and semi-open spaces through the surrounding volumes in the form of rooms and other spaces.	obvious
The principle of similarity			Spaces and their components function similarly in multiple dimensions of the house.	Merged
The principle of continuity			Spaces and their components function similarly in multiple dimensions of the house.	obvious
The principle of closure			The wall of the building in the form of a wall uniformly and the walls of the central courtyard, consisting of closed spaces, induce the principle of being closed.	obvious
The surface of principle			In this house, the module of the main spaces is determined based on the yard unit, and the closed surfaces are considered as the constituent units of the spaces.	hidden
The principle of restoration			The form of the house is perceived as a closed and integrated whole and components.	obvious

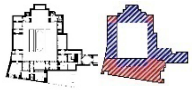
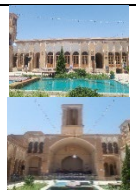
The principle of overlap		The general form of the house in the plan, the walls and their components separately have gestalt.	Merged
The principle of experience	○	Considering the construction of the building based on geometry and proportions and not using random shapes, the principle of experience is not perceived.	○

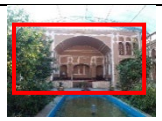
Rasulian's house				
Gestalt principles		**Case study**	**Analysis based on Gestalt principles**	**Objectivity of relationships**
The principle of form and context			The wall of the building is simple and uniform, without components and decorations, and has a thatched covering as the background and front facade due to the presence of the arch, the rectangular brickwork frame around the entrance door, the platforms around it in the form of old people and the entrance door and its components as a shape are raised.	Merged
The principle of symmetry			The principle of symmetry in the whole house can be seen in the form of the facade of the walls, and in the details, the elements and components of the walls and the plan of the spaces have symmetry.	obvious
original Proximity	Proximity		The components of the walls in the form of doors, windows, arches and frames work as single groups.	obvious
	Contact and overlap		The main spaces are connected by means of communication components such as corridors and beds.	obvious
	Consolidation		The placement of the spaces of the house is spatially within another space in the form of a labyrinth.	Obvious
The principle of dependence			The central courtyards of the house create closed and semi-open spaces through the surrounding volumes in the form of rooms and other spaces.	obvious

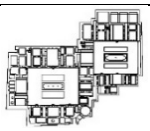
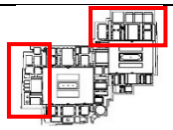
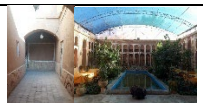
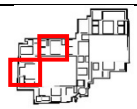
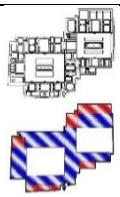
The principle of similarity		Spaces and their components function similarly in multiple dimensions of the house.	Merged
The principle of continuity		The principle of continuity is perceived in the placement and repetition of frames, arches and doors of the walls of the central courtyard.	obvious
The principle of closure		The wall of the building in the form of a wall uniformly and the walls of the central courtyard, consisting of closed spaces, induce the principle of being closed.	obvious
The surface principle		In this house, the module of the main spaces is determined based on the yard unit, and the closed surfaces are considered as the constituent units of the spaces.	hidden
The principle of restoration		The form of the house is perceived as a closed and integrated whole and components.	obvious
The principle of overlap		The general form of the house in the plan, the walls and their components separately have gestalt.	Merged
The principle of experience	○	Considering the construction of the building based on geometry and proportions and not using random shapes, the principle of experience is not perceived.	○

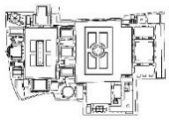
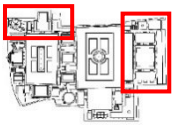
Heirani's House			
Gestalt principles	**Case study**	**Analysis based on Gestalt principles**	**Objectivity of relationships**
The principle of form and context		Due to the presence of the arch, the rectangular frame made of bricks around the entrance door, the platforms around it in the form of old people, the arched space like stairs and the entrance door and its components are similar in shape, and the wall of the building is simple and uniform with a thatched appearance It forms.	Merged

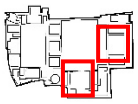
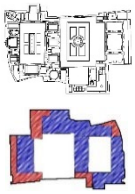
The principle of symmetry			The walls around the central courtyard in the form of numerous elements and components, as well as the plan of the spaces and their components have the principle of symmetry.	obvious
original Proximity	Proximity		Doors, windows, arches and frames form the components of the walls as single groups.	obvious
	Contact and overlap		The overlap of the spaces is realized through the communication components and the connection of the main spaces through corridors and flats.	obvious
	Consolidation		The integration of the spaces of the house is in the form of a space within another space in the form of a labyrinth.	obvious
The principle of dependence			The formation of the closed form of the building is perceived through the volumes around the central courtyards in the form of closed and semi-open spaces in the form of rooms, halls and secondary spaces.	obvious
The principle of similarity			The perception of the propositions of the principle of similarity, consisting of shape, color and size, is perceived in the various components of the walls of the central courtyard and the plan of the house spaces.	Merged
The principle of continuity			The multiplicity and repetition of the elements and components of the walls of the central courtyard in the form of frames, consisting of arches and doors, evokes the principle of continuity.	obvious
The principle of closure			The principle of closedness is understood based on the integrity and lack of holes of the surrounding wall of the house and the walls of the central courtyard consisting of closed spaces.	obvious
The surface of principle			Closed levels are explained as the units that make up the spaces based on the unit of gez and in the form of modules of the main spaces.	hidden

The principle of restoration		The form of the house is perceived as a closed and integrated whole and components.	obvious
The principle of overlap		Understanding the principle of gestalt is perceived in the plan, walls and components of the house as a whole and its components.	Merged
The principle of experience	○	The absence of the principle of experience regarding the construction of the house based on geometry, proportions and the lack of use of random spaces and shapes in it takes place.	○

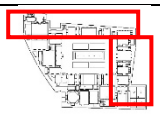
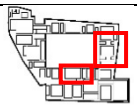
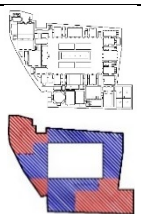
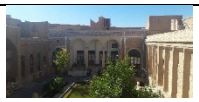
Farhang and Mozaffari 's House			
Gestalt principles	**Case study**	**Analysis based on Gestalt principles**	**Objectivity of relationships**
The principle of form and context		The wall of the building is simple and uniform, without components and decorations, and has a thatched covering as the background and front facade due to the presence of the arch, the rectangular brickwork frame around the entrance door, the platforms around it in the form of old people and the entrance door and its components as a shape are raised.	Merged
The principle of symmetry		The principle of symmetry in the whole house can be seen in the form of the facade of the walls, and in the details, the elements and components of the walls and the plan of the spaces have symmetry.	obvious
Proximity		The components of the walls in the form of doors, windows, arches and frames work as single groups.	obvious
Contact and overlap		The main spaces are connected by means of communication components such as corridors and beds.	obvious

original Proximity	Consolidation		The placement of the spaces of the house is spatially within another space in the form of a labyrinth.	obvious
The principle of dependence			The central courtyards of the house create closed and semi-open spaces through the surrounding volumes in the form of rooms and other spaces.	obvious
The principle of similarity			Spaces and their components function similarly in multiple dimensions of the house.	Merged
The principle of continuity			The principle of continuity is perceived in the placement and repetition of frames, arches and doors of the walls of the central courtyard.	obvious
The principle of closure			The wall of the building in the form of a wall uniformly and the walls of the central courtyard, consisting of closed spaces, induce the principle of being closed.	obvious
The surface of principle			In this house, the module of the main spaces is determined based on the yard unit, and the closed surfaces are considered as the constituent units of the spaces.	hidden
The principle of restoration			The form of the house is perceived as a closed and integrated whole and components.	obvious
The principle of overlap			The general form of the house in the plan, the walls and their components separately have gestalt.	obvious
The principle of experience		○	Considering the construction of the building based on geometry and proportions and not using random shapes, the principle of experience is not perceived.	○

Olumiha's house				
Objectivity of relationships		**Analysis based on Gestalt principles**	**Case study**	**Gestalt principles**
The principle of form and context			Due to the presence of the arch, the rectangular frame made of bricks around the entrance door, the platforms around it in the form of old people, the arched space like stairs and the entrance door and its components are similar in shape, and the wall of the building is simple and uniform with a thatched appearance It forms.	Merged
The principle of symmetry			The walls around the central courtyard in the form of numerous elements and components, as well as the plan of the spaces and their components have the principle of symmetry.	obvious
original Proximity	Proximity		Doors, windows, arches and frames form the components of the walls as single groups.	obvious
	Contact and overlap		The overlap of the spaces is realized through the communication components and the connection of the main spaces through corridors and flats.	obvious
	Consolidation		The integration of the spaces of the house is in the form of a space within another space in the form of a labyrinth.	obvious
The principle of dependence			The formation of the closed form of the building is perceived through the volumes around the central courtyards in the form of closed and semi-open spaces in the form of rooms, halls and secondary spaces.	obvious
principle of similarity			The perception of the propositions of the principle of similarity, consisting of shape, color and size, is perceived in the various components of the walls of the central courtyard and the plan of the house spaces.	Merged
The principle of continuity			The multiplicity and repetition of the elements and components of the walls of the central courtyard in the form of frames, consisting of arches and doors, evokes the principle of continuity.	obvious

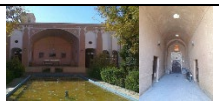
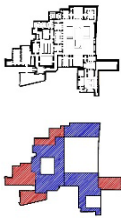
The principle of closure		The principle of closedness is understood based on the integrity and lack of holes of the surrounding wall of the house and the walls of the central courtyard consisting of closed spaces.	obvious
The surface principle		Closed levels are explained as the units that make up the spaces based on the unit of gez and in the form of modules of the main spaces.	hidden
The principle of restoration		The form of the house is perceived as a closed and integrated whole and components.	obvious
The principle of overlap		Understanding the principle of gestalt is perceived in the plan, walls and components of the house as a whole and its components.	Merged
The principle of experience	○	The absence of the principle of experience regarding the construction of the house based on geometry, proportions and the lack of use of random spaces and shapes in it. takes place	○

Sigari Akhavan's house			
Gestalt principles	**Case study**	**Analysis based on Gestalt principles**	**Objectivity of relationships**
The principle of form and context		The wall of the building is simple and uniform, without components and decorations, and has a thatched covering as the background and front facade due to the presence of the arch, the rectangular brickwork frame around the entrance door, the platforms around it in the form of old people and the entrance door and its components as a shape are raised.	Merged
The principle of symmetry		The principle of symmetry in the whole house can be seen in the form of the facade of the walls, and in the details, the elements and components of the walls and the plan of the spaces have symmetry.	obvious

original Proximity	Proximity		The components of the walls in the form of doors, windows, arches and frames work as single groups.	obvious
	Contact and overlap		The main spaces are connected by means of communication components such as corridors and beds.	obvious
	Consolidation		The placement of the spaces of the house is spatially within another space in the form of a labyrinth.	obvious
The principle of dependence			The central courtyards of the house create closed and semi-open spaces through the surrounding volumes in the form of rooms and other spaces.	obvious
The principle of similarity			Spaces and their components function similarly in multiple dimensions of the house.	Merged
The principle of continuity			The principle of continuity is perceived in the placement and repetition of frames, arches and doors of the walls of the central courtyard.	obvious
The principle of closure			The wall of the building in the form of a wall uniformly and the walls of the central courtyard, consisting of closed spaces, induce the principle of being closed.	obvious
The surface principle			In this house, the module of the main spaces is determined based on the yard unit, and the closed surfaces are considered as the constituent units of the spaces.	hidden
The principle of restoration			The form of the house is perceived as a closed and integrated whole and components.	obvious
The principle of overlap			The general form of the house in the plan, the walls and their components separately have gestalt.	Merged

			
The principle of experience	○	Considering the construction of the building based on geometry and proportions and not using random shapes, the principle of experience is not perceived.	○

Shokuhi's House				
Gestalt principles		**Case study**	**Analysis based on Gestalt principles**	**Objectivity of relationships**
The principle of form and context			Due to the presence of the arch, the rectangular frame made of bricks around the entrance door, the platforms around it in the form of old people, the arched space like stairs and the entrance door and its components are similar in shape, and the wall of the building is simple and uniform with a thatched appearance It forms.	Merged
The principle of symmetry			The walls around the central courtyard in the form of numerous elements and components, as well as the plan of the spaces and their components have the principle of symmetry.	obvious
original Proximity	Proximity		Doors, windows, arches and frames form the components of the walls as single groups.	obvious
	Contact and overlap		The overlap of the spaces is realized through the communication components and the connection of the main spaces through corridors and flats.	obvious
	Consolidation		The integration of the spaces of the house is in the form of a space within another space in the form of a labyrinth.	obvious
The principle of dependence			The formation of the closed form of the building is perceived through the volumes around the central courtyards in the form of closed and semi-open spaces in the form of rooms, halls and secondary spaces.	obvious

The principle of similarity		The perception of the propositions of the principle of similarity, consisting of shape, color and size, is perceived in the various components of the walls of the central courtyard and the plan of the house spaces.	Merged
The principle of continuity		The multiplicity and repetition of the elements and components of the walls of the central courtyard in the form of frames, consisting of arches and doors, evokes the principle of continuity.	obvious
The principle of closure		The principle of closedness is understood based on the integrity and lack of holes of the surrounding wall of the house and the walls of the central courtyard consisting of closed spaces.	obvious
The surface of principle		Closed levels are explained as the units that make up the spaces based on the unit of gez and in the form of modules of the main spaces.	hidden
The principle of restoration		The form of the house is perceived as a closed and integrated whole and components.	obvious
The principle of overlap		Understanding the principle of gestalt is perceived in the plan, walls and components of the house as a whole and its components.	Merged
The principle of experience	○	The absence of the principle of experience regarding the construction of the house based on geometry, proportions and the lack of use of random spaces and shapes in it takes place.	○

Conclusion and Recommendations

Based on one of the most valuable and scientific principles of visual perception in the field of art, which is the gestalt principle, it shows that the eye and brain will have a better organization, overall easier and more logical connection to understand the complex subject and dense components of the work by using the gestalt principle. According to the analysis and

investigations carried out in the historical houses of Yazd as examples of introversion indicators in the Qajar period with Gestalt laws, it was observed in (Table 3) that this theory can be a conceptual framework for understanding the physical structure of the building and these houses are acceptable from the level of visual perception according to the theory have gestalt and the amount of pregnancy resulting from them is high and strong as shown in (Table 4).

Table 4. The degree of prevalence in the principles of Gestalt visual perception in the historical houses of Yazd during the Qajar period (Source: Authors)

Gestalt principles **houses**	original similarity	Proximity principle	The principle of continuity	The principle of restoration	The principle of form and context	The principle of dependence	The principle of overlap	The original rate of pregnancy
Golshan	*	*	*	*	*	*	*	A lot and strong
Lariha (Gholam Hossein)	*	*	*	*	*	*	*	A lot and strong
Lariha (Ahmad	*	*	*	*	*	*	*	A lot and strong
Mortaz	*	*	*	*	*	*	*	A lot and strong
Rasoulian	*	*	*	*	*	*	*	A lot and strong
Heirani	*	*	*	*	*	*	*	A lot and strong
Farhangi and Mozaffari	*	*	*	*	*	*	*	A lot and strong
Olumiha	*	*	*	*	*	*	*	A lot and strong
Sigari Akhavan	*	*	*	*	*	*	*	A lot and strong
Shokuhi	*	*	*	*	*	*	*	A lot and strong

The result of the present research indicates that the principles of Gestalt are one of the effective factors in rereading the historical houses of Yazd and the results obtained from applying the rules of Gestalt to the case sample of houses showed that the houses selected in the analysis

place relatively all the rules of Gestalt except They consider the principle of experience and explain the seven important principles of Gestalt, which are the principle of similarity, proximity, continuity, restoration, form and context, dependence, overlapping, which creates a strong presence, and this shows that the historical houses of Yazd in the Qajar period were able to be universal. Create a good grouping and desirable beauty, in a way that can be expressed in the framework of Gestalt's theory of perception. This research can be applied to other buildings as well and it is suggested that the analysis of traditional houses related to other historical periods of Iranian architecture and in other cities based on the laws of visual perception of Gestalt theory should be the subject of future research.

Author Contributions

All authors contributed equally to the conceptualization of the article and writing of the original and subsequent drafts.

Data Availability Statement

Not applicable.

Acknowledgements

The authors would like to thank all participants as well, Dr. Mustafa Salehi (faculty member of Yazd University of Science and Art) is very grateful. With his talks and guidance on the architecture of traditional houses in Yazd and the psychology of the environment, he helped the authors to advance the goals of the research have done.

Ethical considerations

The study was approved by the Ethics Committee of the Islamic Azad University, West Tehran Branch. The authors avoided data fabrication, falsification, plagiarism, and misconduct.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest

The authors declare no conflict of interest.

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IJAPAS

International Journal of Applied Arts Studies

Print ISSN: 2588-4506 Online ISSN: 2588-4670

Homepage: www.ijapas.ir

Islamic Azad University
Yazd Branch

Investigating the Evolution of the Mountain Symbol and Form in Persian Miniature

Nastaran Barazandeh[1], Mohammadhossein Jafarinaemi[2]

1. Department of Painting, Yazd Branch, Islamic Azad University, Yazd, Iran. E-mail: nastaran.barazandeh548@gmail.com
2. Corresponding author, Department of Visual Arts, Faculty of Art and Architecture, Yazd University, Yazd, Iran. E-mail: mjafari@yazd.ac.ir

Article Info

Article type:
Research Article

Article history:
Received October 7, 2024
Received in revised form - -
Accepted October 21, 2024
Published online December 29, 2024

Keywords:
Mountain,
Baby,
Miniature,
Symbol,
Painting

ABSTRACT

This article deals with the importance of the evolution of mountains in Iranian painting from the point of view of form and symbol. From the Mongol period and the height of painting to the end of the Safavid period, mountains as a natural element have had different forms and had meanings and symbols. The trend of mountain shapes from the Mongol period to the Qajar period includes the transformation to private. Mountains have undergone changes in terms of concepts, textures, layering of mountains, as well as simple or complex lines, which can be seen with the existing surveys. The results show that the mountain has a special place in most of the paintings for conveying feelings as well as subjects. By covering a large amount of the frame, the mountain conveys its theme in the form of background and coloring and the use of relevant forms.

Cite this article: Barazandeh, N., & Jafarinaemi, M. (2024). Investigating the Evolution of the Mountain Symbol and Form in Persian Miniature. ***International Journal of Applied Arts Studies***, *9*(4), 141-152.

Introduction

Miniature means the art and profession of illustration and painting on different surfaces using pen and paint. miniatures and painters consider this art as a combined art in which image and text are combined. They emphasize that painting is a distinct art from painting due to the special features of the lines and colors used in it.

Miniature, as a distinct art field, has its own characteristics that distinguish it from other visual arts such as painting. These features include:

1. Combination of text and image: Art painting is a combination in which text and image are integrated and presented in a unified way.

2. The use of curved lines and transparent colors: painting uses curved lines and transparent and decorative colors that make it different from painting.

3. Illustration with pen and paint: Painting is a visual art in which the illustration is done using pen and paint on different surfaces.

4. Variety of topics: Painting has a variety of topics including literary, historical, religious themes, etc., which introduces it as an independent art field.

Therefore, miniature is known as an independent art discipline with its own characteristics.

The petroglyphs of Dusheh, Mirmelas and Humian caves show scenes of war and hunting with bows and arrows, quadrupeds such as horses, deer, foxes, mountain goats and dogs. These pictures are drawn in a simple and basic style with black, yellow and ocher colors. Most of them thematically belong to the beliefs of the first primitive humans (animism). In these petroglyphs, sometimes the whole face of a human being is shown, and the images of animals are also shown. The importance of these petroglyphs is that they are the first manifestation of the artistic taste of the cave-dwelling people of Lorestan's Kohdasht region (Pakzad, 2021; Qurashi, 2010; Yahaghi, 1996 & Campbell, 2008).

Figure 1. Hunting ground, Doshe petroglyphs in Lorestan, Kurshurab Strait

Wall paintings had a two-fold role in ancient Iranian civilizations: 1. decorative, 2. educational. This type of art could not only provide the means to elevate people's religious beliefs, but it was also a tool to show off the power of kings and those in power.

The mountain has been manifested in different ways and forms in the cultures formed in the plateau of Iran, and in terms of its high and holy position, it has been inspired in the creation of abstract symbols and signs and has been used in motifs with various themes. In the Islamic period of Iran, the mountain not only maintains its previous meaning, but with the cultural richness that occurs in this period, it also carries broader concepts of religious and mystical thinking. In the Aryan culture, the mountain has been associated with the sun, light, brilliance and glory. The sanctity of mountains and land in Iranian mythology is such that in the Shahnameh, Fereydun imprisoned Zahak in Mount Damavand, and Ki Khosro went to the mountain with that mystic attraction and disappeared.

In Iranian miniature and painting, symbols play a very important role and often have deep and extensive meanings beyond their surface level. Based on the research done, symbols in Iranian painting can be divided into three general categories:

1. Natural symbols: such as the sun, moon, stars, trees, animals, etc., which have cosmic and mythological meanings.

2. Religious and mythological symbols: such as divine figures, prophets, saints and concepts related to Iranian religious beliefs and myths.

3. Cultural and social symbols: such as clothes, utensils, tools and other cultural elements that express social and cultural themes.

In the Bible, the rock is a symbol of God's power and support. The rock is the symbol of Saint Peter. The name Peter comes from the Greek word petros, which means rock. Petros is Greek for rock. In Greek mythology, the evil king of Crete, Sisyphus, was punished to lift a large boulder up a mountain and watch it roll down and do it again and again. In Avesta, the holy book of Iranians, the mountain is considered one of the holy places with attributes such as: purity, heaven and comfort. The most complete account of creation in Pahlavi texts is described in the book "Banhadesh". In this book, all the mountains are holy and are in direct connection with us on earth (Spandar Mazd) and are considered its children, and on the other hand, they are in connection with the sky (as the first creation of the material world). In the legend of Gilgamesh, the Babylonian gods were placed on the holy mountain, and Sidori Sabituzen was called the wise man of the mountain of heaven. Also, in mythology, we are faced with exemplary and holy mountains that connect the world with this earth and are the manifestation of God and the best way for man to reach the world. In Iranian mythology, Mount Alborz is the place of bright Yazidi scales, measuring good deeds and knowledge. Belief in the mysterious sanctity of the mountain

and the role of forgiveness in connection with the transcendental world has permeated the great religions of the world. Most of the prophets have revealed their religion to people from the mountains and their occult communication has been established in the mountains where they have found an exemplary situation. One of the points of belief in ancient Iran is the sanctity of mountains and the proximity of this glorious manifestation of nature with the sky, which made it the owner of a double sanctity. Ferdowsi, who grew up in Islamic culture, found and knew the essence of mysticism in the epics and consciously used the secret of the mountains where the dragons and Divan slept. He should depict both the real history of ancient Iran and their monotheistic culture and vision. In the Jewish Bible, the Torah, the mountain is considered a holy and transcendental place of the divine spirit. Hara is a mountain one farsakh north of Mecca. The Prophet of Islam used to go to this mountain a lot before his mission and worshiped there. In the Holy Quran about the creation of mountains, different and meaningful expressions can be seen (Ferdowsi, 1995; Vahidi, 1995; Jung, 2016; Mittford, 2008; Yazdani and Zohoori, 2023; Yazdani and Zohoori, 2022).

In the following, the progress and development of the symbol and form of the mountain in the painting of different periods have been investigated, which includes the schools of Shiraz, Herat, Tabriz II, Safavid etc.

In (Figure 2) from the first Shiraz school, the death of Tus and Fariborz and Giv and Bijan in the middle of the snow is a page from Ferdowsi's Shahnameh. In this image, the mountains show depth, as a part of the rear mountain is hidden behind the front mountain. At the foot of the mountains, we see the image of animals, and on the slopes and sides of the mountain, we see the human body. In this picture, the central part is made up of mountains, and the shape of the mountains is triangular and very pointed.

Figure 2. The picture of the death of Tus and Friborz and Giv and Bijan in the middle of the snow

Bargah Kiyomarth Shahnameh of Shah Tahmasabi by Sultan Muhammad around 931 AH in Tabriz II Safavid school. In (Figure 3), mountains and rocks can be seen covering the background. Kyumarth is located in the mountain and all the creatures are gathered around it. It's as if the mountains and rocks have come to life and are on display in the splendor of Kyumarth. The artist has made this fantasy look very real as if the rocks and mountains have opened their mouths from its glory and have placed Kyomarth like a jewel in them. The variety of colors is very beautiful, the delicate layering of the rocks, the texture of their faded colors has increased the beauty of this work (Mittford, 2008; Ghezelayagh, Fooladian, and Khoshmardan, 2020).

Figure 3. The Court of Kiyomarth by Sultan Muhammad in the Tahmasbi Shahnameh (Tabriz II-Safawi school)

In (Figure 4) the Herat school, we see Bahram fighting a dragon. The background of this painting is boldly used in warm colors, especially yellow and orange, and we see a horse that is the same color as the background. The valleys and mountains are interwoven and it comes out from the left side of the frame. This battle took place in the mountains. On the right side, we see a tree with a dragon on it. We see rocks and stones that are scattered and close to the dragon's cave. Distant rocks are shown in cool color. The other half of the dragon's body is hidden among the rocks.

Figure 4. The Battle of Bahram Gur with the Dragon from Khamsa Nizami by Kamaluddin Behzad (898 AH), Herat School

In (Figure 5) of Khosrow and Shirin (first school of Shiraz, Al Muzafar), we see that all the events take place on the slopes of the mountains. In the background, mountains are lined up horizontally. The mountain range covers a large part of the picture on which the characters are based. On the ground, we see many plants that are placed together at regular intervals, and a cedar tree that is next to Shirin is curved. This cedar looks very calm. The peace and vastness of the scenery can be seen more in this work. Due to its romantic nature, the subjects make their elements very delicate. Here, the environment is subordinate to the elements (Yahaghi, 1996; Campbell, 2008; Ferdowsi, 1995; Vahidi, 1995; Jung, 2016).

Figure 5. Illustration of Khosrow and Shiraz Shiraz I Al Muzaffar (Military Khamse of the late AH-AH century)

Artistic and Practical Work Process

The theme of the paintings done is related to the mountain and rocks of Hormuz Island. Hormuz is an island known for its colored mountains and colored soil. Due to the proximity of this island to the writer's place of residence, I have a special attachment to this island, so I decided that the topic of the article should be about the nature itself and the mountains and rocks of this beautiful island. All works are done with oil paint technique and expressionism style.

The First Drawing

This painting is 30x40 with expressionism style and oil paint on paper (Figure 6). The painting is the valley of rainbows. The big stone located in this valley is known as the hands of God. Red, yellow, etc. colored mountains cover this valley. This valley is called rainbow because of the variety of colors.

Figure 6. The first drawing, rainbow

The Second Drawing

This painting is 30x40 with expressionism style and oil paint on paper. The painting shows the Valley of the Statues. Due to their special shapes and their forms, it is known as the valley of statues, which is considered one of the attractions of this island.

Figure 7. The second drawing, Valley of the statues

The Third Painting

The Figure 8 is a 60x80 painting with expressionism style and oil on canvas. This work is also from the Valley of Rainbows.

Figure 8. The third drawing, Valley of rainbows

The Fourth Drawing

The Figure 9 is a 30x40 painting with expressionism style and oil paint on cardboard. This painting is from the "Hormoz" collection. Saffron Valley is one of Hormuz's most famous places, which is named for its unique yellow rock salt.

Figure 9. The fourth drawing, Saffron Valley

The Fifth Drawing

The Figure 10 is a 30x40 painting with expressionism style and oil paint on cardboard. This painting is from the "Hormoz" collection. In this work, I have painted the Goddess of Salt, which is one of the unique attractions of Hormuz Island. The goddess of salt is a mountain of salt crystals that can be seen with various and beautiful colors.

Figure 10. The fifth drawing, goddess of salt

Conclusion

The trend of mountain shapes from the Mongol period to the Qajar period includes the transformation to private. Mountains have undergone changes in terms of concepts, textures, layering of mountains, as well as simple or complex lines, which can be seen with the existing surveys. The investigated case is the Mughal school with the Shiraz school, which in the Mughal school shows the mountain in such a way that the movement of the lines of the mountains shown is very rough and sharp and long. It can also be said that mountains are in harmony with subjects. According to the war topics of this school, the mountains have forms and shapes that match the topic. Caves and rocks cover most of the frame due to the thematic atmosphere of war and violence. But in the Shiraz school, according to the subjects of this school, which are mostly social, these forms become soft and flexible and convey the feeling of peace and tenderness in the landscapes. Also, in the works of the examined schools, we will come to the conclusion that in addition to the general form and state of the mountains, their color and position have a significant impact on the composition of paintings. The difference is palpable in Jalarian's school, where the mountain is implemented as a background and strongly blurred. But in the Herat school, the mountains are visible and interwoven and the main subject of the painting, which includes a large amount of frames.

It can be added here that cold colors such as gray or blue are used in war subjects, unlike social subjects. In the case of Shiraz school, where the social theme is dominant, the mountains have warmer colors, which can be referred to as red or orange. On the other hand, by examining the Isfahan school, we can come to the conclusion that the mountain has the lowest position in this school. In fact, there is no sign of the mountain in the paintings of this period, and figures, unlike other schools, have the main role to express the concept and subject. In the end, it can be concluded that the mountain has a special place in most of the paintings for conveying feelings as well as subjects. By covering a large amount of the frame, the mountain conveys its theme in the form of background and coloring and the use of relevant forms.

Author Contributions

All authors contributed equally to the conceptualization of the article and writing of the original and subsequent drafts.

Data Availability Statement

Not applicable

Acknowledgements

The authors would like to thank all participants of the present study.

Ethical considerations

The study was approved by the Ethics Committee of the Islamic Azad University, Yazd Branch. The authors avoided data fabrication, falsification, plagiarism, and misconduct.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest

The authors declare no conflict of interest.

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IJAPAS

International Journal of Applied Arts Studies

Print ISSN: 2588-4506 Online ISSN: 2588-4670

Homepage: www.ijapas.ir

Islamic Azad University
Yazd Branch

The Place of Time in the Development of Textile Art

Sima Ezadpanah[1], Abolfazl Davodiroknabadi[2], Salar Zohoori[3], Nayerehalsadat Mobinipour[4]

1. Department of Art Research, Kish International Branch, Islamic Azad University, Kish Island, Iran. E-mail: simaezadpanah63@gmail.com
2. Corresponding author, Department of Art Research, Yazd Branch, Islamic Azad University, Yazd, Iran. E-mail: davodi@iauyazd.ac.ir
3. Department of Art Research, Kish International Branch, Islamic Azad University, Kish Island, Iran. E-mail: s_textile@yahoo.com
4. Department of Art Research, Kish International Branch, Islamic Azad University, Kish Island, Iran. E-mail: Nareremobini@gmal.com

Article Info

Article type:
Research Article

Article history:
Received December 27, 2024
Received in revised form --
Accepted December 29, 2024
Published online December 29, 2024

Keywords:
Time,
Art,
Textiles

ABSTRACT

This article discusses the important role that time plays in the realm of textile art and sheds light on its profound impact on complex artistic creation. The process of making textile art is often labor intensive, with artists devoting countless hours to weaving, sewing, or dyeing materials. This investment of time not only enhances the aesthetic quality of the pieces, but adds meaning and personal narrative to each piece. Additionally, the historical context in which fabric is created can significantly increase its significance, as it reflects the sociocultural and technological developments of its time. By understanding the multifaceted ways time affects these textile works, viewers can gain a greater appreciation for the intricate crafts and stories embedded within them. In addition, its role in creation, the analysis of time is also vital for the promotion of textile art. Events such as exhibitions and workshops to highlight the importance of textile art in different cultures throughout history. These gatherings not only showcase the evolution of techniques and styles, but also create a deeper connection between artists and audiences, thereby drawing more attention to this often-overlooked art form. Additionally, the rise of social media and digital platforms has changed the way artists communicate, allowing for instant publishing and interaction. This shift has created a new relationship with time in the advertising process, enabling artists to reach wider audiences and cultivate communities around their art. Overall, this study emphasizes how the concept of time enriches the creation and promotion of textile art and ultimately leads to a deeper understanding of this unique and vibrant art medium.

Cite this article: Ezadpanah, S., Davodiroknabadi, A., Zohoori, S., & Mobinipour, N. (2024). The Place of Time in the Development of Textile Art. ***International Journal of Applied Arts Studies***, *9*(4), 153-167.

Introduction

In the realm of artistic expression, the dimensions of time and space play a central role in influencing the creation and understanding of works of art. The context in which a piece is created, whether it is a busy urban environment or a tranquil natural environment, can imbue it with unique characteristics and meaning. Similarly, the era in which a work of art was produced can reflect the prevailing beliefs and values of social norms, making it more significant. In addition, the passage of time can change the way a piece is viewed with new perspectives and interpretations emerging as historical personal and cultural contexts evolve. Time and space are therefore not merely background elements, but integral components that contribute to the richness and complexity of artistic endeavors. The historical background against which a work of art is created has a significant impact on the artist's decisions and the message conveyed through the work. This influence can be seen in the choice of the subject, the artistic techniques used and the overall interpretation of the artwork. Artists are often inspired by events, social norms and cultural movements of their time, using their creations as a means to express their thoughts and feelings, in response to the world around them. By understanding the historical context in which an artwork was created, audiences can gain deeper insight into the artist's intentions and the social issues that may have shaped their work. Artistic expressions are deeply influenced by the social and political landscapes in which they are created. Take for example a painting emerging from the chaos of war, it might embody the raw emotions of conflict and weight loss. On the contrary, a sculpture created in a time of peace can radiate a sense of peace and reciprocity. The context in which art is produced plays an important role in shaping its themes and messages and acts as a mirror to the world around it. Furthermore, the environment in which a work of art is exhibited plays a fundamental role in shaping the viewer's interpretation of it. The lighting of the environment and the placement of the piece in a gallery or museum can significantly affect its emotional and intellectual response. For example, a painting hung in a dimly lit room may convey a sense of mystery or melancholy. While the same artwork displayed in a large, well-lit area can create a sense of vitality and energy. Therefore, the physical environment of a work of art should not be neglected when considering its effect on the audience. Placing a sculpture in a busy city square in front of a quiet garden can drastically change the emotions it evokes. In a city square filled with the hustle and bustle of everyday life, the sculpture may be seen as a temporary escape and a moment of respite amidst the chaos. People in a hurry may spare only a passing glance, but the sculpture can still evoke feelings of wonder or contemplation in the middle of their busy day. On the other hand, in a quiet garden with a quiet and peaceful atmosphere, this same sculpture may evoke a deeper sense of introspection and tranquility. Visitors to the garden may spend time admiring these works of art so that its beauty resonates on a deeper level. Finally, the environment in which a sculpture is placed can affect its emotional impact on the

people who encounter it (Holden, 2023; Polina and Hanna, 2022; Aleš, 2024; Annika, 2024; Felix, 2015).

Moreover, the idea of time has a vital place in the realm of art and acts as a powerful force. This power allows artworks to capture a specific moment in history or convey eternal themes that have the ability to transcend time and connect with people of different eras. This inherent connection to time not only enriches the depth and meaning of the artwork, but also acts as a bridge between the past, present and future, creating a continuum of artistic expression that resonates with audiences across different time periods. An example is Charles Dickens' Oliver Twist, published in 1837, which deals with the harsh realities of poverty and the struggles orphaned children face. Despite being written more than a century ago, the themes of inequality and social injustice depicted in the novel are still current in today's society. This timeless quality of literature demonstrates how art has the ability to transcend time and resonate with audiences across generations, fueling dialogue and encouraging action to create a more just world (DaCosta, and Kaufmann, 2017; Pineda and Adryan, 2011).

In the Greek philosophy of art, the role of time has had a central place in shaping the aesthetic discourse over the centuries. Considering time, whether as a fleeting moment captured in a painting or as the permanence of a timeless masterpiece, was a fundamental aspect of how Greek philosophers analyzed and appreciated art. From the fleeting beauty of a sunrise painted by a skilled artist to the enduring legacy of ancient sculptures that have withstood the test of time, the concept of time in art has been a rich and multifaceted topic that continues to inspire thought and debate among scholars and enthusiasts. Ancient Greek thinkers, who were pioneers in various fields of thought, deeply believed in the importance of time in the creation and appreciation of art. They saw time not only as a mere measure of existence, but as a force influencing the nature of artistic expression. For them, the passage of time was intrinsically linked to the evolution of artistic ideas and techniques, which shaped not only the way art was produced but also perceived by audiences. This view highlights the deep-rooted connection between the concept of time and the world of art in ancient Greek culture. They understood the concept that art acts as a mirror to the ebb and flow of time, capturing the nuances of each passing season. Artists realized that their creations were not merely static representations, but living embodiments of the ever-evolving world around them. Artists throughout history have been inspired by the breathtaking beauty of nature and the fleeting moments that time inevitably takes with it. The ever-changing landscape, the delicate dance of light and shadow, and the fleeting emotions captured with a single stroke of the brush have all served as subject matter for countless creative minds. From the vibrant colors of sunsets to the intricate patterns of nature's leafy wonders, they have fueled artistic expression in many forms, whether through painting, sculpture, or poetry. These artists seek to immortalize

the fleeting beauty that surrounds us and create timeless works that resonate with audiences for generations to come (Demska-Budzuliak, 2022; Harry and Vlahakis, 2022; Theodora, 2015).

Famous for their deep insight into the nature of art, the Greek philosophers had a belief that went beyond mere aesthetics. They believed that art had a unique ability to capture the essence of time itself, allowing it to be immortalized in a moment of pure beauty. In their view, artists had a sacred duty to harness this power through their creative expression and distill the ephemeral into the eternal. This belief emphasizes the timeless appeal and importance of art in Greek culture and its role as a means of recording and preserving the fleeting moments that define our existence. They believed that art not only serves as a powerful tool to capture the essence of the past but also to establish a timeless connection with future generations. Their goal was to immortalize moments, emotions and stories through their creations. For them, art was not just a form of expression, but a bridge that connected past, present and future, allowing a continuous dialogue to unfold over time. Greek philosophy of art places a significant emphasis on the role of time, emphasizing the deep connection between art and human experience. It explores how art evolves and resonates with us as we collectively move through time. This perspective invites us to think about how art reflects our shared journey through life, capturing moments that capture emotions and perspectives that transcend the limitations of our time. In essence, it suggests that art acts as a timeless bridge that unites us in our diverse yet interconnected experiences (Faure, Valli, and Zucker, 2022).

The concept of time in the art of ancient Iran is of significant importance, which is deeply intertwined with its philosophical foundations over the centuries. Time in this context is not merely a time marker, but an essential element that shapes the artistic expression of culture. Ancient Iranian art, from complex images of celestial bodies to symbolic representations of cyclical patterns, shows a deep respect for the passage of time and its effect on human existence. This view of time is not static, but dynamic and depicts the essence of continuity and change in the artistic creations of civilization. The complex interaction of time and art in ancient Iranian culture is a window to the philosophical mindset of a society that seeks to understand the eternal dance of the past, present and future. Ancient Iranian artists had a deep belief in the important influence of time on their creative efforts. They saw time not only as a fleeting entity, but as a powerful force that directly influenced their artistic expression and shaped the way they perceived the world. This perspective instilled a sense of respect for the temporal aspects of existence in their works and inspired them to capture the essence of the fleeting nature of time and its profound impact on the human experience. The concept of time among this ancient civilization was deeply rooted in the idea of a cyclical force in which events unfolded in a perpetual loop. This unique view of time not only shaped their cultural beliefs, but also manifested itself in their artistic endeavors. The characteristic of their art was the combination of

elaborate patterns and repetitive motifs, which is a symbol of the eternal nature of time and the interconnectedness of the present and the future. The intricate designs served as a visual representation of the cyclical rhythm of life, reflecting the belief that history repeats itself in an endless cycle.

Ancient Iranian artists believed that time itself is a source of creativity and inspiration. They saw time not as a limitation, but as a powerful force that allowed them to immortalize the fleeting beauty of life in their art. By accepting the ephemeral nature of existence, these artists were able to infuse their works with a sense of vitality and elegance that resonates throughout the ages. Through their keen observation and skillful execution, they were able to capture the essence of life's fleeting moments and turn them into timeless masterpieces. For these artists, time served as a powerful thread that binds together the fabric of their artistic expression. By embracing time as a unifying force, they instilled a timeless quality in their art that resonates with audiences across generations. The timeless philosophy of time that pervades ancient Iranian art serves as a powerful source of inspiration for contemporary artists. Drawing on the deep well of their cultural heritage, these artists continue to create works that resonate with deep meaning and lasting beauty. By honoring the artistic traditions and techniques of their ancestors, they pay tribute to a legacy that has stood the test of time and infuses their creations with a sense of timelessness that transcends generations. This connection with the past not only enriches their art, but also allows them to contribute to the continuous narrative of Iranian artistic expression (Sajjad, 2006; Gololobova, 2017; Clemente and Domenico, 2020).

Result and Discussion

The place of time in the ontology of art

Time is a vital element in the world of public art that forms the essence of its existence. From the moment a piece is unveiled to its place in history, time weaves a narrative that gives depth and meaning to this artistic expression. The evolution of public art over time reflects social changes, cultural changes and the passage of generations. It is through the lens of time that we can truly appreciate the impact and relevance of public art in our communities. Public art is a powerful form of creative expression that is intentionally made to resonate with people in a particular place and moment. It serves as a visual and emotional representation of the surrounding community, engaging viewers in a unique dialogue with their environment. Whether it's a vibrant mural on a city street or a thought-provoking sculpture in a park, public art has the ability to transform ordinary spaces into extraordinary showcases of culture and creativity. By immersing themselves in these art installations, people can connect with their surroundings in a meaningful and inspiring way and foster a sense of unity and shared experience among different audiences. Public art acts as a temporary bridge that connects the past to the present. Public art creates a

dialogue between the artwork and its viewers by incorporating a moment in history or embodying the ideologies prevalent in a particular period. This ephemeral nature of public art evokes not only nostalgia, but also thought about social progress and changing values over time. Through its temporal aspect, public art becomes a living testimony to the evolution of human expression and serves as a powerful medium to foster understanding and communication between generations. Since public art lives on in its surroundings, the passage of time not only adds to its history, but also shapes its appearance. Interaction with the environment, including exposure to the elements and human interaction, can gradually change the original state of the artwork. Weathering and decay is part of the narrative of the artwork that shows the effect of time on its physical form. This evolution through natural wear and tear adds layers of complexity and depth to artworks that reflect the changing nature of the world around them. The interplay between time and public art is a fascinating and ever-changing dynamic that enriches artworks with layers of meaning and complexity. This makes art a living entity that constantly evolves and adapts to its surroundings. The passage of time gives new perspectives and interpretations to the piece and adds depth and importance to its existence. This symbiotic relationship between art and time ensures that each viewing experience is unique and allows the artwork to resonate with audiences in different ways as it continues to stand the test of time. Time is not merely a tool for measuring fleeting moments, but a fundamental component that weaves itself into the fabric of public art. The evolution of public art over time reflects changes in society's culture and artistic expression. As public art stands the test of time, it becomes a tangible representation of the values and beliefs of a society at a particular moment in history. The presence of public art in our surroundings is a constant reminder of our past, present and future, connecting us to the stories and emotions contained in each piece. Over time, public art becomes a living entity that evolves and transforms alongside the society it serves (Hadravová and Muchová, 2022; Laurence, 2018).

The central time in the ontology of art emphasizes the central role that time plays in every aspect of artistic expression. From the moment an artist begins their creative process to the viewer's experience interpreting the finished piece, time weaves its influence throughout. This temporal dimension shapes the evolution of an artwork that captures the essence of a moment frozen in time while allowing for a continuous dialogue between past, present and future. The artist's decisions, feelings, and experiences all take place in the artwork, creating layers of meaning that unfold over time. Similarly, viewers bring their own temporal perspectives to the work of art, which influence how it is perceived and understood. The concept of temporality thus invites us to appreciate the dynamic interplay between art and time, emphasizing the enduring importance of temporality in shaping our relationship with art. Artists frequently use the concept of time as a powerful tool to evoke emotion, tell compelling stories, and provoke thought in their creations. By manipulating time, artists can capture fleeting moments that evoke a sense of nostalgia or create a sense of urgency in their artwork. Time serves as a versatile medium that

allows artists to explore the passing of moments, be it a fleeting second or a timeless eternity that displays the connection between past, present and future. By incorporating time into their artistic expression, creators can transcend mere visual aesthetics and delve deeply into the realm of human experience and perception. In this example, an artist might choose a painting that depicts the different stages of a sunset using a range of colors and brushstrokes. In this mode, it conveys the ever-changing colors and mood of the sky as the sun dips below the horizon. By skillfully depicting this transition from day to night, the artist can evoke a bitter sense of the passing of time and the fleeting nature of beauty in the natural world. Through thoughtful composition and attention to detail, this painting can transport viewers to a moment of peaceful contemplation, where they can appreciate the fleeting yet captivating sight of a sunset. In the field of music, tempo changes play a vital role in conveying different emotions and moods to the listeners. For example, a sudden increase in speed can evoke feelings of excitement or tension, while a slower speed can evoke feelings of relaxation or reflection. These fluctuations in tempo are carefully orchestrated by the artist to guide the audience's emotional journey through the piece. Just as a skilled painter uses brushstrokes to create depth and emotion in a painting, a musician manipulates tempo changes to add layers of complexity and meaning to their compositions. Ultimately, tempo changes serve as a powerful tool for artists to communicate their goals and connect with their audience on a deeper level.

In addition, the temporality inherent in art plays an important role in shaping how audiences interpret and interact with art pieces. The context in which a work of art is created in the period it belongs to and the cultural influences surrounding it all contribute to how viewers experience and understand the work. The passage of time can change the meaning of a work of art as social values evolve and historical events shape our perspectives. This dynamic relationship between art and time adds a layer of complexity to the viewer's interaction with the piece, making each encounter unique and influenced by the time context in which it occurs. Viewers are often transported back in time when looking at a photograph that captures a moment from a bygone era. Feeling nostalgic can be overwhelming because it reminds them of simpler times and cherished memories. Similarly, there is a sense of connection with history and a deep appreciation for the enduring beauty of art when encountering a sculpture that has passed the years. The ability of photographs and sculptures to evoke such strong emotions is a testament to their power to transcend time and touch the hearts of those who see them. Time plays an important role in shaping the preservation and display of works of art. Curators are tasked with navigating complexities caused by the passage of time, which can manifest in various ways, such as natural aging and decay of the materials used in the creation of the artwork. Additionally, the cultural significance of a piece may change over time, forcing curators to reassess how they present it to the public. Finally, the interplay between time and art requires careful consideration to ensure that the integrity and message of the artwork is effectively conveyed to viewers. In

general, the temporality of the ontology of art highlights the dynamic and complex relationship between art and the passage of time (Chung, 2010; Galina and Aleksandrova, 2021).

Time and development of textile art

Time is a fundamental factor that significantly affects the evolution and growth of textile art. Over time, textile artists have been able to experience different techniques and styles that have led to the creation of unique and creative pieces. The history of textile art reflects the changes in society's culture and technology over time and shows how this art form has adapted and transformed throughout the ages. As time continues to advance, textile art will undoubtedly continue to evolve and inspire future generations of artists to push boundaries and explore new creative opportunities. Artists devote countless hours, sometimes lasting days or even months, carefully creating patterns and designs on various fabrics. This painstaking process involves a keen eye for detail and a steady hand to bring their artistic vision to life on canvas. The dedication and passion of these artists for their works leads to the production of stunning and unique pieces that showcase their creativity and skill. As artists progress in their careers, the passage of time gives them the opportunity to explore uncharted territories that push the boundaries of their creativity. This exploration of different techniques and materials not only expands their artistic horizons, but also paves the way for the emergence of novel styles and forms in the realm of textile art. Through this constant process of experimentation and growth, artists are able to create unique and captivating pieces that resonate with viewers on a deeper level. In addition, textiles play an important role in bridging past traditions with modern innovation and act as a bridge between the rich cultural heritage of the past and the evolving trends of today. The intricate patterns and designs found in textiles often tell stories of the past, reflecting the value beliefs and experiences of previous generations. By preserving these traditional techniques, we not only honor the craftsmanship of our ancestors, but also ensure that their legacy continues to thrive today.

In addition to other factors, time plays an important role in the appreciation of textile art. The passage of time allows for deep understanding and connection with the intricate details and stories in each piece. As textiles age, their colors may fade, threads may disappear, and patterns may evolve, adding layers of history and character. This evolution over time brings a unique charm to textile art, making it more attractive and valuable to those who take the time to observe and appreciate its beauty. When viewing a piece, viewers are captivated by the intricate detail and expert craftsmanship that evokes a sense of awe and appreciation for the time and effort that went into creating it. The dedication and patience required to bring such a work to life shows the artist's commitment to his art and mastery of his skills. It is through this careful attention to detail and precision that the real beauty and artistry of the piece is shown through the admiration of the talent and creativity behind the viewers. As it continues its relentless march forward, textile

artwork not only retains its inherent beauty, but also acquires greater value and importance. These intricate creations can become treasured heirlooms passed down through the generations, each strand telling a unique story from the past. Beyond mere decoration, they become valuable artifacts that weave a narrative of history, culture, and human creativity that transcends time itself. Time plays an important role in the world of textile art. It is not only a unit of measure for the hours spent creating intricate pieces, but also of great importance in the longevity and appreciation of this exceptional form of artistic representation. Every stitch of every carefully woven thread is a testament to the artist's dedication and patience, making time an essential element in the creation of textile art. In addition, time also plays a vital role in preserving these masterpieces, allowing future generations to appreciate and marvel at the craftsmanship and creativity that goes into each piece. Therefore, in the realm of textile art, time is not just a fleeting moment, but a timeless entity that adds depth and value to any creation.

The complex world of textiles is like a tapestry woven with threads of time. From ancient traditions passed down through generations to modern innovations that push the boundaries of what is possible, every piece of fabric holds a story from the past and a promise for the future. Time is not simply a measure of the hours and minutes that pass, but a reflection of the skill of patience and dedication required to create something truly remarkable. In every stitch, every pattern and every design, textile art reveals a timeless beauty that can only be achieved through the delicate dance between creativity and history. The textiles are carefully crafted through a complex process that requires considerable time and unwavering patience. Every step from choosing the best materials to weaving intricate patterns requires precision and dedication. The art of textile creation is a painstaking yet rewarding journey that showcases the skill and artistry of the artisans behind each exquisitely crafted piece. From choosing the perfect fabric to carefully designing and skillfully weaving each thread, the entire fabric creation process requires a thoughtful approach and an investment of time. Every decision, from the type of materials used to the intricate woven patterns, plays an important role in the quality and appeal of the final product. This attention to detail and dedication to the craft is what sets Exceptional Textiles apart from the rest. Additionally, a look at the evolution of textiles presents textile art rich with cultural and historical influences that have shaped the art form over the centuries. From ancient civilizations to modern innovations, the journey of textiles reflects the ever-changing landscape of human creativity and craftsmanship. Each thread woven into this complex history tells a story of a tradition of innovation and a lasting legacy of textile art (Saviţkaia-Baraghin, 2023; Vasconcelos, Rodrigues, and Lima, 2022).

Time is not only a factor but also an essential element in shaping the complex world of textile art. The passage of time allows the evolution of new material discovery techniques and the emergence of new perspectives in this creative realm. As artists and artisans delve deeper into the

opportunities that time presents, they are able to challenge boundaries and create pieces that resonate with the essence of their time. In essence, time serves as both a museum and a canvas for textile artists, influencing their work in profound and lasting ways. Over the centuries, artists have continuously pushed the boundaries of creativity by exploring a myriad of techniques and materials to create elaborate and ornate designs. From traditional methods like painting and sculpture to more modern approaches like digital art and mixed media, the artistic journey has been a constant evolution of innovation and imagination. This relentless pursuit of new ways of expression has resulted in the creation of mesmerizing patterns and intricate designs that captivate and inspire audiences around the world. These innovations are not only formed by the cultural and technological developments of different historical periods, but also pushed forward by them. The unique contributions of each era have left an indelible mark on the evolution of ideas and creations that drive the continuous cycle of innovation. From ancient civilizations to the modern era, the integration of diverse influences has sparked new perspectives and pushed boundaries in the realm of invention. The interaction between culture and technology continues to inspire the advances that shape our world today. The invention of the loom was a game changer in the world of textiles and changed the way artists approached their craft. With the introduction of this innovative technology, complex and elaborate designs became more achievable and pushed the boundaries of creativity in textile production. Artists could now weave together threads of colors and patterns that were previously unimaginable, opening up a new world of possibilities in the realm of textile art.

In addition, over time, the art of preserving and enhancing traditional textile techniques has flourished. The passage of years has not only protected these ancient methods but also enabled them to adapt and grow with the changing times. These complex techniques have been carefully preserved and woven into the fabric of every culture throughout the ages. Intricate patterns and vibrant colors tell stories of tradition and heritage, with each stitch a testament to the skill and dedication of the artisans who have mastered these ancient crafts. As these techniques are passed down from generation to generation, they continue to evolve and adapt, creating vibrant artistic styles that showcase the beauty and creativity of each culture. As today's artists continuously challenge the traditional boundaries of textile art by integrating advanced technologies and unconventional materials into their works. This innovative approach not only breathes new life into old art, but also opens up endless opportunities for artistic expression. By embracing the latest tools and materials, contemporary artists are changing the landscape of textile art and pushing the boundaries more than ever before. The fusion of traditional and contemporary techniques in textile art not only preserves its rich history, but also propels it into the realm of continuous innovation and creativity. By embracing ancient methods and modern approaches, textile artists can create works that resonate with both the past and the present, making art a dynamic and evolving medium. This harmonious combination of old and new ensures that textile

art maintains its relevance and vitality in the ever-changing landscape of the art world (Saviţkaia-Baraghin, 2023).

Time is an essential element to nurture and promote the art of textiles. The intricate designs and techniques used to create textile masterpieces require patience and a deep understanding of the industry. Over time, textile artists have honed their skills and developed new methods and preserved traditional practices, ensuring that this ancient art continues to flourish. Each stitch of each thread tells a story of the past and present that weaves threads of history and culture together that transcend generations. Time not only shapes the physical creation of textiles, but also enriches the emotional and artistic value of each piece. As time passes in textile art, textile art becomes more adaptive and vibrant, reflecting the beauty and complexity of the human experience. As time goes by, artists are constantly discovering new techniques and materials that pave the way for creating groundbreaking and unique textile pieces. Throughout history, artists have had the chance to enhance their craft and push the boundaries of creativity by exploring different techniques and aesthetics. This journey of artistic exploration has resulted in the creation of a wide range of exquisite textile art forms that showcase the richness and diversity of human creativity. Additionally, the growing popularity of textile art has sparked a new appreciation for the intricate craftsmanship and creativity found in this medium. This increased interest has created opportunities for talented artists to showcase their skills and gain recognition in the art world. As textile art continues to captivate audiences with its unique blend of tradition and innovation, the future looks bright for those who choose to express themselves through this versatile and dynamic form of artistic expression.

In addition, with the passing of time, there is an opportunity to not only preserve but also accurately document traditional textile techniques and intricate designs. This process ensures that these ancient practices are not lost to history and allows future generations to appreciate and learn from the rich painting skills and arts that have been passed down through the ages. Studying the textiles of past civilizations is a window into the intricate art and techniques that have been used for generations. Through this exploration, artists can imbue their contemporary works with a sense of history and cultural significance. Paying homage to traditional crafts, they can create a dialogue between past and present, breathing new life into old techniques and designs. This fusion of old and new not only adds depth and richness to their work, but also links them to the lineage of skilled craftsmen who came before them. The fusion of traditional and contemporary styles in textile art not only preserves its rich heritage but also propels it into the future and ensures its enduring legacy for years to come. This harmonious fusion of past and present gives a new life to art and captivates the audience with its beauty and constant innovation. Through this seamless integration of old and new, textile art remains a vibrant and dynamic force that inspires awe and admiration for generations to come. As a result, time is undoubtedly a precious resource

that is of great importance in the field of textiles. It acts as the backbone for innovation and advancement in the industry, pushing the art of textiles to new heights. The intricate designs, meticulous craftsmanship and intricate patterns found in textiles are all the result of time and dedication invested by skilled artisans. Time allows for experimentation and evolution in textile techniques, paving the way for breathtaking creations that fascinate and inspire. Without the element of time, textile art lacks the depth and beauty that makes it enchanting and lasting (Vasconcelos, Rodrigues, Lima, 2022; Barbara, 2015).

Conclusion

As one of the most fundamental aspects of human experience, the element of time plays a vital role in textile art. Throughout history, textile art has always served as a tool to express the history, culture, and identity of societies. Analysis of the role of time in this field shows that textile art is not only a medium for conveying aesthetic concepts, but also a platform for interpreting and representing social, economic, and technological changes over time. Time is linked to the history and collective memory of societies through textiles. Knitting and sewing patterns, designs, and techniques have been continuously passed down from generation to generation, helping to preserve cultures. In this regard, textiles act as the "unspoken language" of cultures, embodying their history and values. Another important aspect of the role of time in textile art is its effect on sustainability. In modern societies, where consumerism has greatly increased, returning to sustainable production methods and respecting the time spent in the production of handmade textiles has become more important. This not only promotes respect for traditional arts, but also helps reduce waste and preserve the environment. The element of time in textiles is also investigated as an aesthetic factor. Time-consuming processes such as natural dyeing, hand weaving, and intricate stitching not only add to the beauty of the work but also tell stories of the artist's patience, dedication, and skill. These valuable works gain more spiritual and cultural value due to the long time spent to create them.

Finally, examining the role of time in textile art shows that this element affects the creation, evolution and promotion of this art in different ways. Time has acted both as a historical force that led to the formation of cultural identity and as a factor of innovation and stability in modern societies. Finally, the analysis of time in the art of textiles leads us to a deeper understanding of the values and evolutions of this art and emphasizes that textiles are not only material products but bearers of cultural and historical meanings.

Author Contributions

All authors contributed equally to the conceptualization of the article and writing of the original and subsequent drafts.

Data Availability Statement

Not applicable

Acknowledgements

The authors would like to thank all participants of the present study.

Ethical considerations

The study was approved by the Ethics Committee of the Islamic Azad University, Yazd Branch. The authors avoided data fabrication, falsification, plagiarism, and misconduct.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest

The authors declare no conflict of interest.

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