

Investigating the Patterns of Islamic Architecture in Architecture Design of Third Millennium Mosques

Parvin Farazmand^{1*}, Hassan Satari Sarbangholi²

¹Young Researchers and Elite Club, Tabriz Branch, Islamic Azad University, Tabriz, Iran;

²Architecture Group of Azad-e-Eslami University, Tabriz Branch

*Email: parvinfarazmand@yahoo.com

Abstract

Islamic architecture, which is based on the Islamic school, has been shaped by the total awareness of architects' of techniques of architecture and adherence to the principles of geometry and inspired by religious beliefs. Principles of geometry and religious beliefs caused certain patterns to take shape in Islamic architecture that were used in designing buildings including mosques. With the advancements in technology, architecture entered a new stage considering the form of construction and the buildings. Islamic architecture and mosque, which is the primary symbol of Islamic architecture, are not different and consequently went through changes in forms and patterns. In this paper, the purpose is to express the place of patterns of Islamic Architecture in the mosques of the third millennium. The method used is descriptive-analytic and the mosques of the third millennium are the statistical population and ten of them are the statistical sample. The tools used are the library studies and the data has been analyzed using charts obtained from Excel. The result indicated that in the architecture of the mosques of the third millennium, the patterns of Islamic architecture have been fixed and proposed, and yet do create different designs that would be novel. In fact, the traditional patterns of Islamic architecture in the mosques of the third millennium included reaching epiphany in certain ways, the effort to achieve the principle of unity, the main concern for being monotheism, unity in meaning and body, considering the background, the struggle to reach perfection, regularity and symmetry in body, meaning and function, justice and equilibrium in totality and its components, utilizing the natural and Islamic shapes, the lack of individuality and anonymity while facing the work, and the act of constructing the building as an act of worship.

Keywords: Islamic Architecture, Mosques, Patterns, Architectural Design, Third Millennium.

Introduction

A pattern consists of a set of principles, doctrines, paradigms, strategies, general guidelines, samples, models, approach and all the matters similar to this, which would be a prerequisite of attempting minor and major activities and be for works that are supposed to move and progress in the right direction and would seek to achieve the predicted goal (Program Magazine, Vice Presidency of Strategic Planning and Monitoring of the President 2009). Architecture is no exception, and patterns have a special place in architecture and especially Islamic architecture and it has been embodied in different forms in the building.

Islamic architecture is an art that must be inspired by the essence of Islam and the core of it be shaped by liturgical and theological matters. Islamic architecture in mosques is one of the most prominent of arts that affects the individual soul; in fact, the focus is on artistic elements and images that possess different spiritual aspects and showcase the craft of Islamic artists. In Islamic architecture, the internal parts of the mosques are considered to be important and certain decorations and are done, and on the external side, the walls, the yard, the porch, the hall and the Vozukhaneh were of prime importance (Pourjafar and others 2012).

The history of building mosques in Islamic countries has experienced at least two important conflicts. The first experience was in the 12th century AD, which eventually led to the demise of the simple design of mosques with yards as a unified pattern against the new location-based ideas, and the new conflict which started since the 20th century between location-based architecture (previously popular) and modern architecture as a new opponent. The building of mosques in non-Muslim countries was more complicated. The plan of any major project in these countries had to first fulfill the needs of societies of Muslims as minorities, needs and wants that usually stemmed from the nostalgic memories of the buildings in their own countries. With the spreading of modern architecture, the concern of mosque designers was not only building a worthy temple, but also adapting to the wave of technical evolutions and the new materials and also the advancement of the modern western schools of architecture. Many of the architects are still building their mosques in familiar and traditional frameworks and are inclined to traditional materials and methods. There were also architects that were not much obsessed with the choice of materials. Although these architects did pay attention to keeping the traditions of architecture, but they did not consider using concrete as a modern material to be proper. There were also other architects having certain critical outlooks at tradition (Hakim 2012).

But still the question remains, “what is the place of patterns of Islamic architecture in the design of mosques of the third millennium?”

The method used is descriptive-analytic, and the mosques of the third millennium are the statistical group and ten of these mosques are the statistical sample, which include Mosque of Penzberg, Germany, Mosque of Pavlodar, Kazakhstan, Mosque of Bushehr’s Cement Factory, Mosque of International Center of Xin Xiang aside the great market of Uromchi, Homeland Memorial mosque in Dagestan, Mosque of Shakerin in Istanbul, Mosque of Islamic Center of Princess Jura Bogonju, Al-Hadie Mosque of Vancouver, K.A.F.D Mosque of Saudi Arabia, Al-Salam Mosque of Canada. The tools used are library studies and data analysis using data charts obtained from Excel.

Islamic Architecture

Muslim architects, have always tried to strive toward discovery of hidden secrets of creation through working closely with the natural surroundings. By the time they make the connection, using symbolic and metaphoric expressions, in terms of physical forms and spatial quality, have created mysterious and yet understandable works in order to picture the inherent holy uniqueness and make man worthy of presence in his domain. The ultimate expression of sacred architecture in the domain of Muslims has been shown in the semantic and physical structure of mosques which has been an obvious manifestation of harmony, balance, order, and unity of supreme being's incarnation. In fact, expression of spiritual manifestations is a platform for evolution and excellence of the spirit and a wonderful, beautiful, and warm-tempered atmosphere; an atmosphere which raise religious hilarity through the embodiment of purity, righteousness, and piety of god the exalted (unity) in its hidden layers of epistemic. Mosque sets free the restless souls of men from the fetters of the sensible world and guide them to absolute light. The mosque belongs to supreme being and is considered as an obvious symbol of his divine mercy and a symbolic language of his spiritual and religious ideas. Indeed, the mosque, through emphasis on the transcendent goal of monotheistic religions, which is to become godly in the light of self-discovery, has always tried to provide self-transition and reaching to Supreme being by establishing a logical link between the earth (the platform of self-awareness) and the sky (reaching to divinity) (Bemanian and others 2011). Mosques, regardless of their position for social and political activities, have always been home to artists, architects, tile

workers, and calligraphers, all of whom considered working toward exaltation of the house of Supreme Being (Tarighi 1998).

Islamic Patterns

Without a doubt, creating structures, whether religious or non-religious, requires knowledge of certain sciences such as geometry, mathematics, and design, and over the centuries and by taking advantage of these sciences, craftsmen have been able to create masterpieces of art and architecture. This was also true in mosques. Self-transition and reaching to supreme being and Islamic concepts in the architecture of mosques have led to formation of special architectural and design patterns. Islamic architecture patterns, include architectural elements, architectural decoration, spiritual foundations, and materials. Each part of the Islamic patterns have a separate segmentation as follows:

Architectural Elements

Every Islamic structure, such as a mosque, is composed of different spaces and sometimes it is possible that new spaces to be added as an addition to other structures.

Mian Sara (courtyard): is a characteristic of Islamic architecture. Most of the mosques, schools, and caravanserais, have a central courtyard or patio. Mian Sara had two important in the Islamic era: First, it could satisfy Muslim's need for a place to preform ablution and cleansing in the mosques. Second, it could separate the building from the noise and activity everyday life by putting the focus on the interior of the building.

Ravagh: Covered spaces that are placed around the mosque's apron or Mian sara. The entry of such spaces is towards the apron and connects the mosque's entry to the Shabestan or the vault.

Dome: A dome covering has numerous characteristics in Islamic architecture and has had more functions than any other covering.

Stellar Shabestan: They do not have much height and are usually placed around the domes. These Shabestans are designed in a way that they could be expanded or made smaller by adding or removing entries.

Minaret: Minaret or Minar means the place of light, and is used to refer to high buildings that were usually placed close to religious buildings such as mosques (Kiyani 2007). Before the emergence of Islam, minarets were built between the cities and fires were lit upon then, and they were called Guiding Towers. Later on that Islam became the dominant religion, minarets were built beautifully and a Mazene was placed on top of it (Maher Al-Naghsh 2001).

Entry: In Iranian architecture, the entry propylaeum and the finials were one of the distinct and essential visual elements. In such buildings, the attempt was that the entry be more striking in appearance compared to others around. The retreat in the doorway of the mosques invites people in and welcomes them.

Architectural Ornamentation

The ornamentation include epigraphs, verses of holy book, brickwork and geometric ornamentation and calligraphy. Arabesque designs are exclusive to Islam and are created from two elements; intertwined designs and vegetable schemes. Intertwined designs are essentially a showcase of geometric thought. While the vegetable schemes are a sign of attempts to outline weight, and since they are made up of intertwined shapes, it could be said that it has been inspired less from a real vegetable than a simply linear method (Imeni 2011).

Spiritual Foundations

It includes the following elements:

Space: The Muslim architect considers the rhyme of ascension in all his buildings and seeks to transcend from the earthly realm and reach a greater and more meaningful space and also free himself from the changes and evolutions of this world.

Shape: The universe is made up of a certain but unseen truth, and it will return to it. Shapes have always been in the perfect purity and perfection; It is this purity and perfection that attributes architecture with a metaphysical characteristic and brings it closer to the images of the other realm.

Symmetry: Symmetry in architecture is inspired by nature. Symmetry itself consists of two types: vertical and horizontal. In vertical symmetry the image of the building was created so using the waterfront, and in horizontal symmetry wall opposite to each other are identical.

The Orientation of the Mosque: The whole building is oriented towards Qibla. The rotation of Mosques towards the nearby rows comes from the same respect.

Lack of Orientation: In contrast to the general view that is oriented towards Qibla, the interior of the mosque is completely without orientation and intends to respect the lack of any visual discrimination in the mosque by either absolute plurality or absolute simplicity.

Color: Although the Muslim architect sees the visual meaning of colors but seeks other concepts beyond it. He demonstrates the total unity of space by the contrasting colors placed besides each other, and he is inspired by his worldview in such a use of colors. Professor Pope says so about colors: "In most of Islamic periods, the use of diverse and lively colors reached such a height and harmony that was never seen before. Such a severe dependence on colors is required by the outlook and the scenery" (Pourjafar 2011).

Light: Light enters the mosque through the use of glass in the windows and spirituality to the space.


Materials





The materials used in the Islamic period buildings are rather diverse including bricks, chalk, tiles, stone, wood and glass. Initially raw adobe was used as the main material, then it was replaced by bricks and so far it has had the most usage in mosques. Also, chalk was used for the interior part of the mosques. And glass has had an important role in lighting the interior of the mosque and adding spirituality to it.


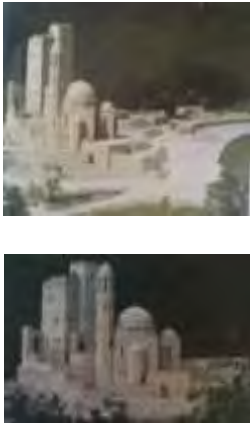
Sample Mosques






The samples are 10 mosques from the third millennium including: Princess Jura Islamic Center Mosque, Pavlodar Mosque, Bushehr's Cement Factory Mosque, Xing Xiang International Center Mosque, Al-Ahdieh Mosque, Nation Memorial Mosque, Pensburg Mosque of Germany, K.A.F.D Mosque, Al-Salam Mosque, Shakerin Mosque.






Table 1. Features of sample mosques

Number	Name of the mosque, designer	Location, year	Pictures	Approach	Description
1	Islamic Center Mosque of Princess Zhoura, A.D.S Studio	Bosnia and Herzegovina/ Bōgu Genoa, 2000		Modern materials with postmodern approach	-Strongly curved walls, along with special domes and minarets have given special symbolic expression to the building. -Main building

					materials: Reinforced concrete, brick and stucco coating
2	Pavlodar Mosque, Tolegen Abida	Kazakhstan / Pavlodar, 2001		Combining traditional and modern materials with postmodern approach	<ul style="list-style-type: none"> - Two prayer halls - A dome with the filled 8 star design and 4 minarets. - This monolithic structure has been built using reinforced concrete, brick and aluminum
3	Cement plant Mosque at Bushehr, Hamid Erfanian	Iran / Bushehr, 2001		Modern and traditional materials with modern neo-soul	<ul style="list-style-type: none"> - Square design -In the center of a garden called 4 Gardens - A reinforced concrete frame with yellow brick, window in a concrete roof , Inspired by traditional vents as a symbol of the dome -4 palms inspired by the minarets at the corners of the building
4	Zhing Zhiang international mosque, Zhaou Dong Wang	China / Ürümqi, 2003		Traditional materials with traditional spirit	<ul style="list-style-type: none"> - Islamic architectural elements and traditional patterns are greatly emphasized through appropriate integration with modern techniques
5	Al-Hadih Mosque, Studio	Canada/ Vancouver		Modern and traditional	<ul style="list-style-type: none"> - Located in the forestlands and

	Senbel	,2003	 <p data-bbox="781 703 1029 772">www.studiosenbel.com</p>	<p data-bbox="1052 212 1229 317">materials with modern spirit</p>	<p data-bbox="1252 212 1507 317">used local materials and methods.</p> <ul data-bbox="1252 323 1511 1117" style="list-style-type: none"> - Concrete building with brick coatings, clay and wood colored which is blended into the background - Decorative use of geometry - Minarets, at the insistence of the employer, has been symbolically incorporated into the building - The use of light to create an atmosphere of inspiration which strengthen the relationship with God during prayer
6	Homeland Memorial Mosque, Kurban Magomed Karimov	Russia / Dagestan, 2004		<p data-bbox="1052 1125 1203 1308">Traditional materials with traditional spirit</p>	<ul data-bbox="1252 1125 1511 1890" style="list-style-type: none"> - Cladding and local natural stones - The mosque is composed of two parts: 1- The first structure which is the memorial, and 2- the second structure, a medieval style fort -The building has coordinated Terracing and walls, ladders and other elements that induce a sense of unity - Integrating the traditional methods based on modern design

<p>7</p>	<p>Penzberg Mosque, Germany, Jasurik</p>	<p>Germany/ Bayern 2005</p>	 <p>www.mimooa.eu</p>  <p>architous.1fr1.net</p>  <p>s577.photobucket.com</p>	<p>Modern materials with modern spirit</p>	<p>a</p> <ul style="list-style-type: none"> - Consistent with the architecture of the surrounding buildings. - In addition to the main hall for prayer, it includes gatherings rooms and administrative offices, a large library, two auditoriums and classrooms for students which is built on the ground in the form of "L" (the letter in English). - Sand-colored building, decorated with blue glass, has a minarets which is decorated with calls to the faithful for prayers in Arabic letters. - The mosque's entrance is a stairway which is built in a classic style with bright colors and the prayer hall is located to the left of it.
<p>8</p>	<p>K.E.F.D Fax Full Mosque</p>	<p>Saudi Arabia / Riyadh 2007</p>	  <p>www.constructionweekconstr.com</p>	<p>Modern materials with modern spirit</p>	<p>a</p> <ul style="list-style-type: none"> - This mosque is inspired from the Holy book. - The building of this mosque is simple and tries to bring the man closer to his Holy person. - The use of advanced technology in this

			 <p>www.ifud.org</p>		<p>mosque.</p> <ul style="list-style-type: none"> - Smart aluminum materials are used on the façade.
9	al-Salam Mosque, Senbe Studio	Canada / Vancouver , 2008	  <p>www.studiosenbel.com</p>	<p>Traditional materials with syncretistic spirit</p>	<ul style="list-style-type: none"> - Has a prayer room and a prayer room for children - A central courtyard - With domes and minarets
10	Shakerin Mosque, Khosru Taila – Zainab Zazili Aghlu	Turkey / Istanbul, 2009	 <p>istanbulmetropolitan.blogfa.com</p>  <p>www.gonapa.ws</p>	<p>Modern materials with traditional spirit</p>	<ul style="list-style-type: none"> - Two minarets, each 35 meters high - The dome is made of aluminum composite - Calligraphy inside the dome - Large windows on 3 sides of the prayer hall - Decorative motifs inspired by the Seljuk art -Fountains in the courtyard

Based on (Pourjafar, M, Amirkhani, A, Lilian, M, 2011) from the author

Architectural Elements of Case Examples

Case examples are investigated in terms of Architectural Elements.

Table 2. Architectural elements in the 10 mosques

Number	Name of the mosque	Architectural Elements					
		MianSara (courtyard)	Entry	Dome	Nave (Shabestan)	Minaret	Ravagh
1	Islamic Center Mosque of Princess Zhoura		+	+		+	
2	Pavlodar Mosque		+	+		+	
3	Cement plant Mosque at Bushehr						
4	Zhing Zhiang international mosque	+		+		+	
5	Al-Hadie Mosque					+	
6	Yadbud vatan Mosque		+	+		+	
7	Penzberg Mosque in Germany					+	
8	K.E.F.D Mosque					+	
9	al-Salam Mosque	+		+		+	
10	Shakerin Mosque	+		+		+	

Architectural Decorations of Case Examples

Table 3. Architectural decorations of the 10 mosques

Number	Name of the mosque	Architectural decorations			
		Geometric decorations	plant decorations	Quranic verses	Brickwork
1	Islamic Center Mosque of Princess Zhoura	+			
2	Pavlodar Mosque				+
3	Cement plant Mosque at Bushehr				+
4	Zhing Zhiang international mosque				+
5	Al-Hadie Mosque	+		+	
6	Homeland Memorial Mosque				
7	Penzberg Mosque in Germany	+		+	
8	K.E.F.D Mosque	+			
9	al-Salam Mosque	+		+	+
10	Shakerin Mosque	+		+	

Spiritual Basis of Case Examples

Table 4. Spiritual basis of the 10 mosques

Number	Name of the mosque	Spiritual Basics						
		Superior Space	Simplicity	Symmetry	Design based on the direction of Qibla	Design without considering the direction of Qibla	Color	Light
1	Islamic Center Mosque of Princess Zhoura		+	+	+			+
2	Pavlodar Mosque	+	+	+		+	+	
3	Cement plant Mosque at Bushehr			+		+		
4	Zhing Zhiang international mosque					+		
5	Al-Hadieh Mosque	+			+		+	+
6	Homeland Memorial Mosque					+		
7	Penzberg Mosque in Germany	+	+	+		+	+	+
8	K.E.F.D Mosque		+	+		+		+
9	al-Salam Mosque						+	
10	Shakerin Mosque	+		+			+	+

Materials of sample examples

Table 5. Materials used in 10 mosques

Number	Name of the mosque	Spiritual Basics						
		Brick	Concrete	Glass	Stone	Stucco	Aluminum	Wood
1	Islamic Center Mosque of Princess Zhoura	+	+	+		+		
2	Pavlodar Mosque	+	+				+	
3	Cement plant Mosque at Bushehr	+	+					
4	Zhing Zhiang international mosque	+				+		
5	Al-Hadieh Mosque	+				+		+
6	Homeland Memorial Mosque				+			
7	Penzberg Mosque in Germany			+	+	+		
8	K.E.F.D Mosque		+		+			
9	al-Salam Mosque	+		+				
10	Shakerin Mosque			+	+		+	

Data analysis

Data analysis has been conducted using diagrams from Excel Software.

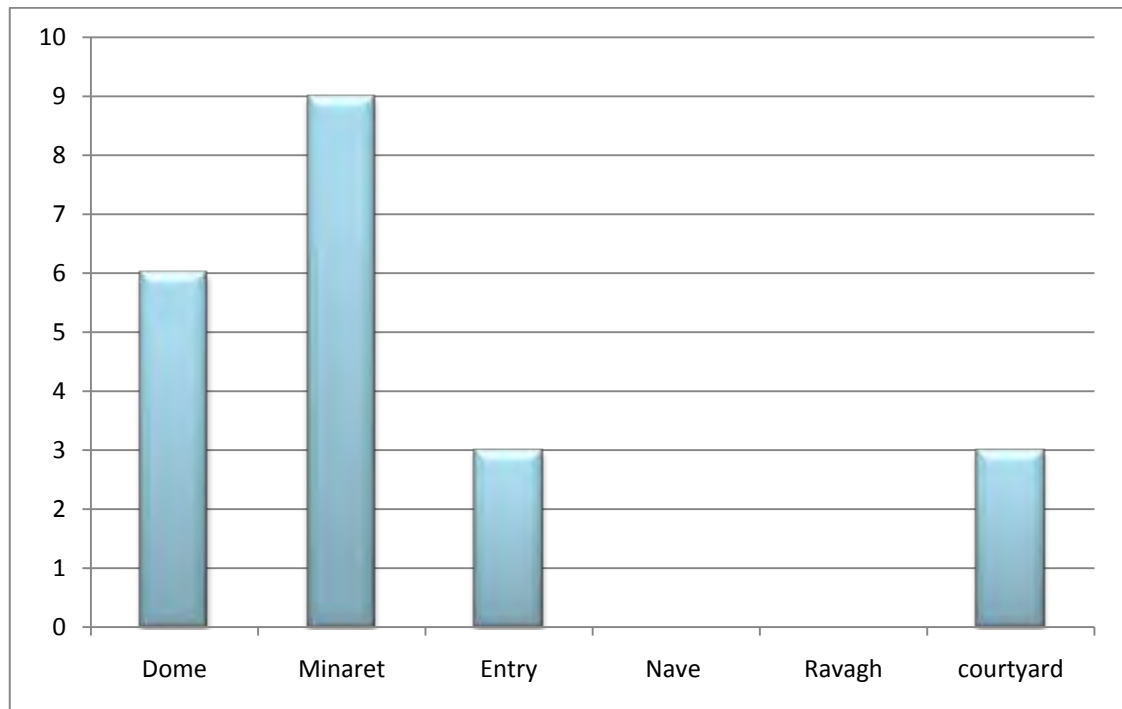


Figure 1. Architectural elements in the 10 mosques

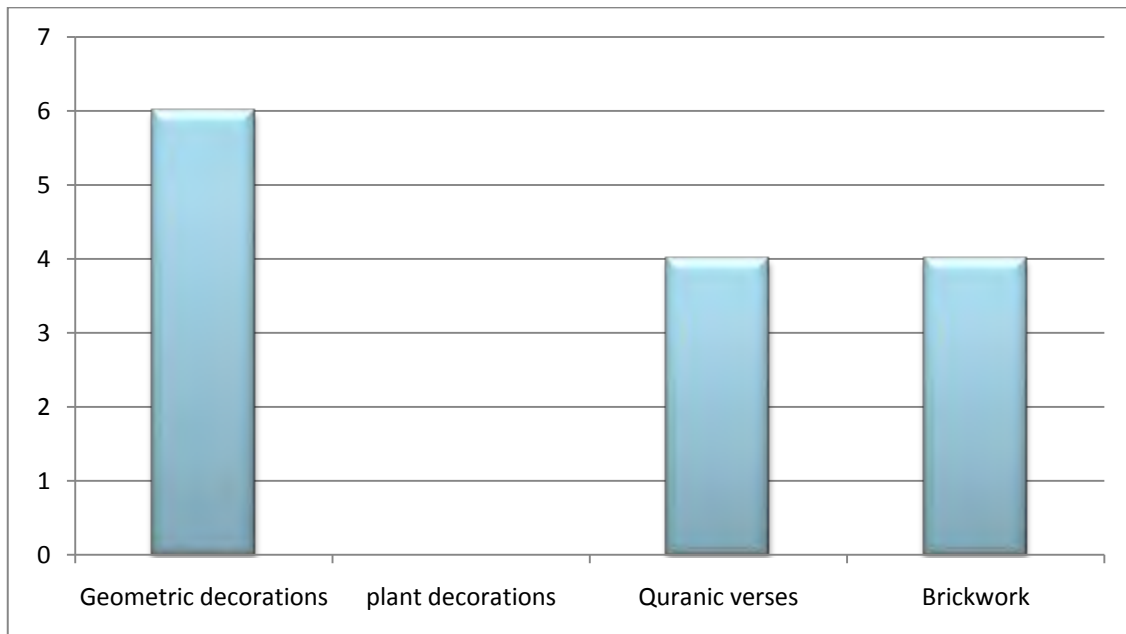


Figure 2. Architectural decorations of the 10 mosques

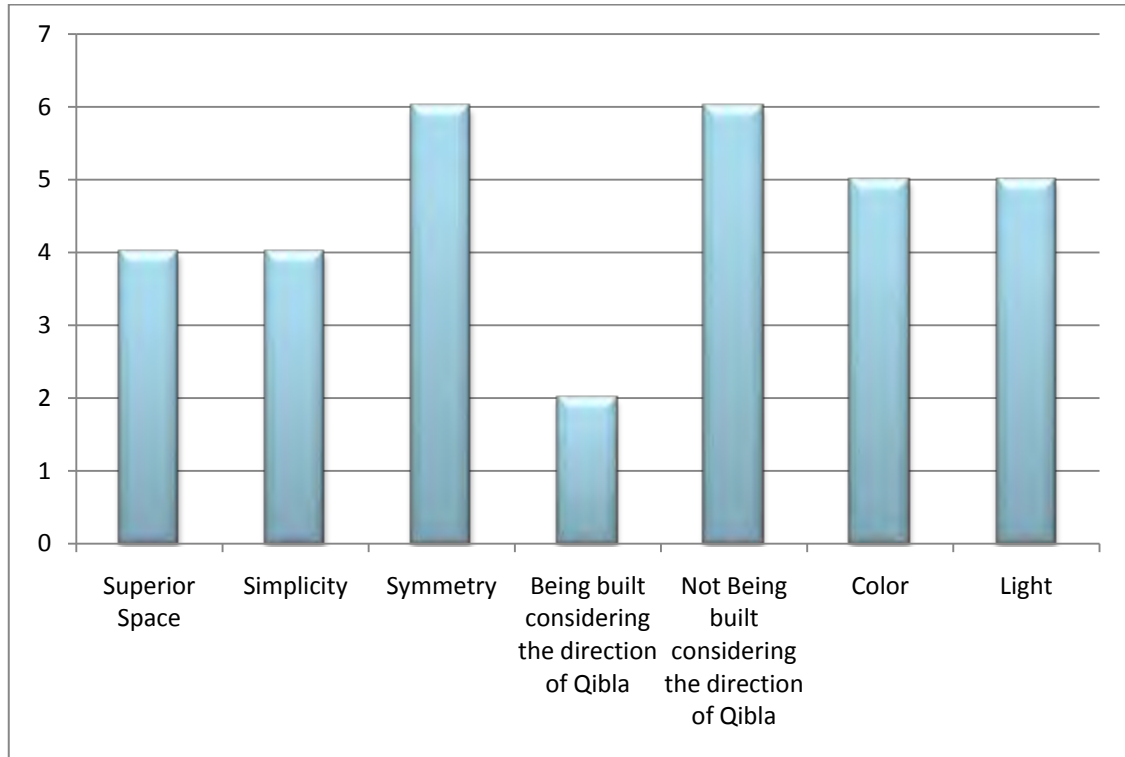


Figure 3. Spiritual basics of the 10 mosques

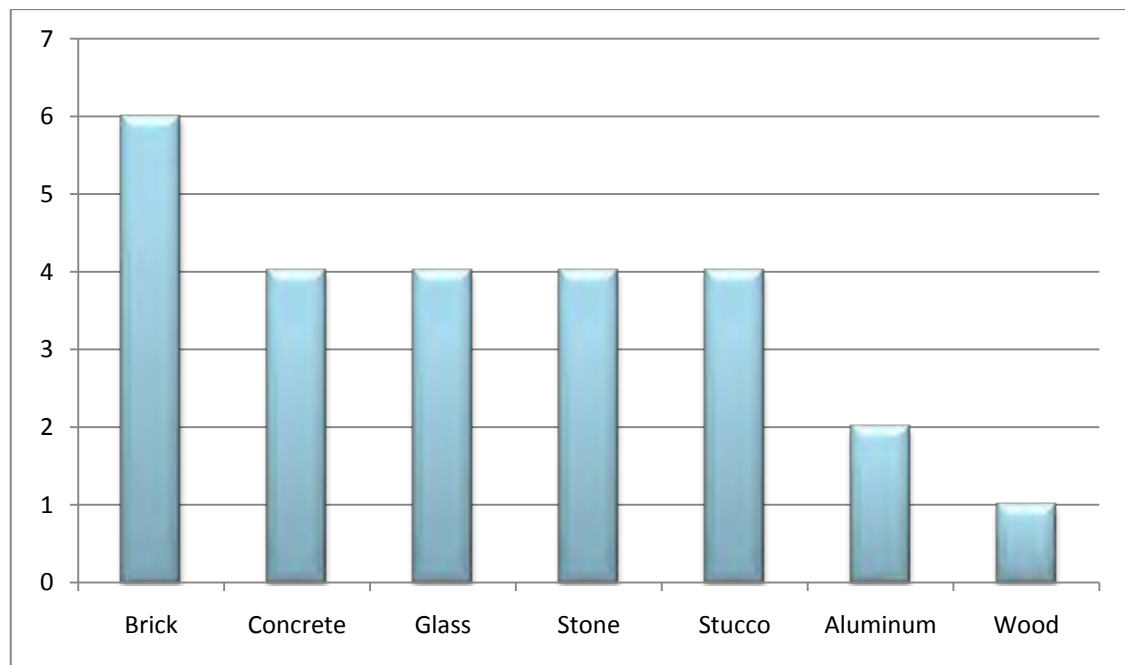


Figure 4. Materials of the 10 mosques

Conclusion

Generally, Islamic architectural patterns in mosques can be investigated from four perspectives:

Architectural Elements: Through analysis of statistical samples, it can be seen that minarets have the most use in mosques of the third millennium. The second element which is used in most of the mosques is dome. Also, Sardar and Central Courtyard have been used in some mosques.

Shabestan and Ravagh are rarely used in most of the modern mosques. Therefore, minarets and domes are the main architectural elements in mosques of the third millennium.

Architectural Decorations: Architectural Decorations in mosques consist of four parts: Geometric decoration, decorative plants, holy book verses, and brickwork. The geometric decorations are used in most of the modern mosques. Also, holy book verses and brickwork have the second place in the decoration of today's mosques. However, Decorative plants do not have much use in modern mosques. Therefore, geometric decoration, holy book verses, and brickwork are mostly used.

Spiritual Basis: Spiritual Basics in mosques are defined as follows: superior space, simplicity, symmetry, being built considering the direction of Qibla, not being built considering the direction of Qibla, light, and color.

Symmetry is observed in most modern mosques. Also, most of the mosques are not built in the direction of Qibla. Light and color have the second place among the spiritual basis of mosques. The third place is associated with simplicity and consideration of superior space. Therefore, symmetry, light, and color are among the most important spiritual basis of today's mosques.

Materials: Like traditional mosques, most of the modern mosques use bricks as their main material. Concrete, glass, stone and have an equal role in today's mosques after bricks. Aluminum and finally wood, have been used very little in mosques.

Therefore, architecture of mosques in the third millennium, Islamic architecture design patterns have been constant and dominant and yet they create different designs which are far from being repetitive. In fact, traditional architecture patterns in the mosques of the third millennium are as follows: trying to achieve the principle of monotheism, the main direction toward the Unitarianism, unity in the meaning and body, attention to traditions, trying to achieve perfection, order and symmetry and harmony in the body, meaning, and function, justice and balance in the whole or partially, utilization of natural factors and natural and Islamic motifs, the absence of individuality and anonymity in the effect and construction of the structure as a practical approach to worship. By analyzing sample examples it can be said that mosques of the third millennium have not ignored traditional Islamic architecture patterns. In contrast, modern mosques have considered these patterns as the most important part of their work. Also, they have incorporated today's modern spirit into mosques and implemented traditional patterns with modern spirit. Therefore, further investigations and researches in order to answer the following question, seem necessary: In what forms do the Islamic architecture patterns are manifested in the modern format?

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