Identifying the Principles of Traditional Iranian Architecture in the Light of Vastu Shastra, the Traditional Indian Wisdom

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Traditional Iranian houses have always been recognized as examples of "good-design" in the context of Iranian Architecture according to many scholars. It is believed that their creation has been influenced by the systems of beliefs in the traditional Iranian society; an established system closely followed in their design process which has led to their phenomenal architectural design. The traditional houses of Kashan are excellent examples of such which have often been described as the finest examples of Traditional Iranian houses. However insufficient documentation of the design process of these architectural masterpieces has led to disputes among scholars in determining the exacct architectural system, behind their creation. The effect therefore is not only the inability in creating houses with the same quality in current architectural societies of Iran, but also their decay due to lack of attention and preservation. Historical studies point towards an influence of Indian Architectural system, Vastu Shastra, on the creation of traditional Iranian houses, which appears to be the earlier practice of house design within the Indo-Aryan communities. Using Vastu Shastra as a framework, the objective is to conduct case studies on 22 traditional houses of Kashan to identify the existence of a similar well-established system in Iran based on which all the traditional houses have been designed, and further to introduce it as the traditional architectural system in Iran. In this way the principles of traditional houses of Kashan can be identified in the light of Vastu Shastra, the traditional Indian wisdom.

Keywords: *traditional houses of Kashan, Iranian housing architecture, Vastu Shastra*

1. INTRODUCTION

Contemporary houses in Iran have been mostly underperforming in terms of design and application in recent years and are often described by terms such as "rootless, poor, unhealthy and materialistic" (Ansari & Talischi, 2009). They are merely being built following an improper interpretation of western theories, disregarding the cultural beliefs and values of the society (Abedin Darkoosh, 1998; Ansari & Talischi, 2009; Barati, 2003). In this case since the role of *"tradition as a regulating factor"* (Rapoport, 1969) has been ignored, many new forms and patterns have appeared in the creation of houses which are not as healthy and sophisticated as before (Ghazbanpour, 1991). Through this Modernism, many traditional houses have been destroyed and are replaced by new and vast housing projects, which are significantly weaker in design, construction and application compared to previous houses (Moosavi Rozati & Hossein, 1996).

On the other hand most of the scholars, architects and traditional master builders believe that traditional dwellings in Iran provide a better place of habitation compared to contemporary houses. Designing such houses, which provide the inhabitant with all his physical, psychological and spiritual needs, is often called "good-design" architecture, which is a direct result of the application of a well-established architectural system in their creation (Abedin Darkoosh, 1998; Ansari & Talischi, 2009; Barati, 2003; Farsayi, 2008; Hadadian, 2007; Hojjat, 2009).

In other words the characteristics and the repeated patterns in the traditional built space reveal the existence of a complex system of architecture applied in constructing these houses. This is evident especially in the traditional houses of Kashan, which are among the most recognized dwelling masterpieces of Iranian architecture. Based on Helli's ideas, the general manager of Kashan Art Organization and winner of Best Traditional Architect for three decades, the traditional houses of Kashan, which are among the finest examples of Iranian houses, have been built based on certain established patterns; but at the same time, no two houses could be found which are completely similar to each other. *'Some certain beliefs and principles in traditional Iranian architecture are fundamental, and their application is obligatory'* (Helli 2009). Although this core similarity proves the existence of a well-established architectural system in traditional Iranian architecture which is in fact agreed by almost all, there are disagreements among the scholars in

determining them (Ghazbanpour, 1991; Pirnia, 2004; Pope, 1976).

Due to the existence of a hierarchy of discipleship in traditional Iranian architectural societies, and loss of the written documents through history, these principles are not currently available and there are no any written rules and guidelines in Persian scriptures, which can be used to revive this traditional architectural wisdom (Babayian, 2009; Mohandes, 2009).

Therefore there is a need to investigate the historical background of Iranian architecture and the principles behind the creation of the traditional houses in particular to use as a guideline suggesting the patterns of good-design in current Iranian housing architecture.

Based on historical studies, the guidelines used in traditional Iranian architecture is believed to be similar to the architectural system of India, Vastu Shastra, since it has been established by the Indo-Aryan culture in both ancient India and Iran, and also due to many cross-cultural exchanges between the two countries throughout history (Bausani, 1971; Hojjat, 2009; Shayegan, 2003). The similarity of the terms used in Vastu Shastra and in traditional Iranian architecture, further strengthens this theory. This pattern, similar to its Iranian counterpart, is also believed to improve the human health at all levels as seen in Table 1 (Ardalan & Bakhtiar, 1979).

This similarity can also be seen in the physical appearance of the built space including form, size and pattern of the plan; location, orientation and ventilation; properties of spaces; and ornamentation as shown in Figures 1 to 8.

Table 1: Comparing the means of creating successful dwellings in Vastu Shastra with the Iranian architecture

Universal Concepts in Traditional Architecture	Concepts in Iranian Traditional Housing Architecture
Physiological Health Concerning the physical shelter, many rules and principles were **derived from environment** to make **a micro-climate compatible with human comfort**. Such subjects are highly important in sustainable architecture of the day.	Concerning **Jesm** Jesm in traditional Iranian architecture is known as **the body or the physical shelter** which should be built from local materials, with proper stability and in complete harmony with the surrounding environment. Jesm is in fact the outer surface of objects.
Psychological Health Deals with the **psychological effects of forms, patterns, spatial organizations, colour, light and vegetation in the human body** which was important issues in traditional dwelling architecture. **"House as a mirror of self"** is a well-known phrase signifying the importance of concerning psychological concepts in design.	Concerning **Ravān** Ravān is the psychological aspects of human beings **which is more important than jesm** in designing any building. Therefore any dwelling should be built considering its psychological impacts on human brain and his nervous system. **Based on the concept of psychosomatic diseases, any form, pattern or element which negatively affects ravan, will lead to health problems for the inhabitants**.
Spiritual Health For primitive man, every object has an outer as well as **an inner aspect** from which the **latter is more important** and is known as the soul. Therefore in constructing any structure, soul should be regarded first. In this case, **the world is considered as a united whole in which every particle is connected to other parts which should be built and kept in harmony with the whole.**	Concerning **Rūh** **Rūh is the most important concept of all which connects human to God**. Rūh is the soul which should be considered as the most important aspect of dwelling design. Therefore, **any form, pattern or symbolic decoration which transcends the human soul and leads to spiritual development was considered auspicious** and should be used in dwelling construction.

(Source: Authors' compilation from Alexander, 2004; Day, 2004; Salingaros, 1995; Shabanzadeh, 2009; Sui, 2006)

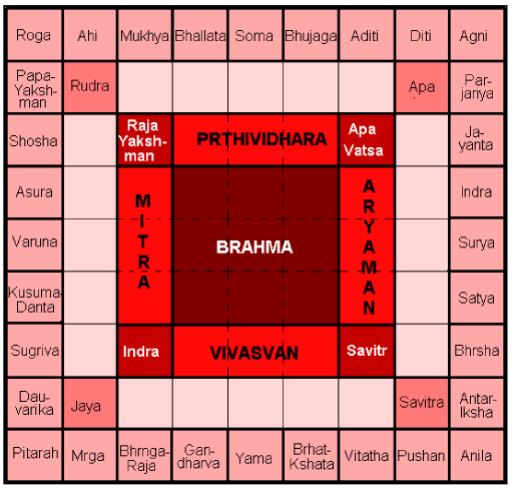

Figure 1: Concentric Squares in Vastu Purusha Mandala
(Source: ssubbanna.sulekha.com)

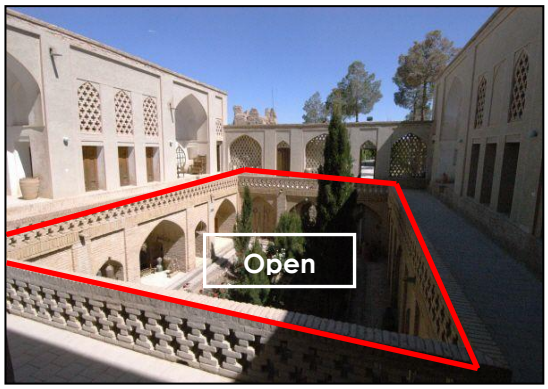

Figure 2: The concept of Concentric Squares in an Abbasian House, Kashan
(Source: Authors)

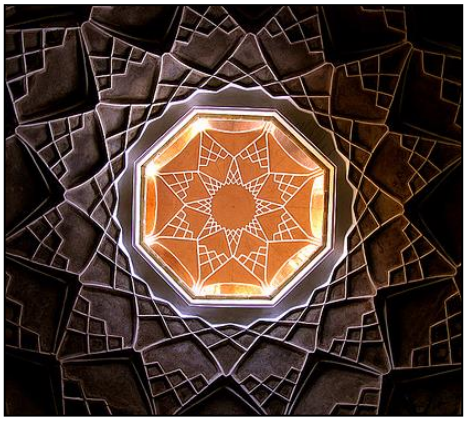

Figure 3: The Vastu Purusha Mandala
(Source: schoolofsacredplace.com)

Figure 4: Decorations of the roof of Abbasian House, shaping a perfect mandala, Iran
(Source: Authors)

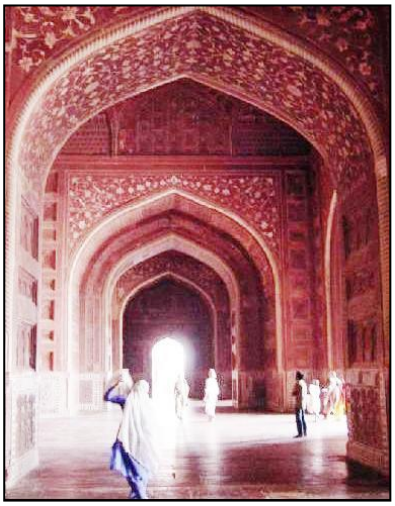

Figure 5: The arch structure of Taj Mahal, India
(Source: flickr.com)

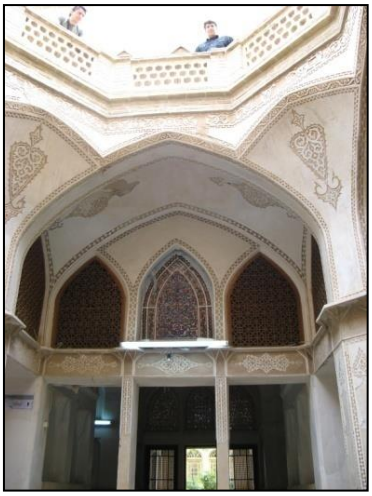

Figure 6: The arch structure of Abbasian House, Kashan Iran
(Souce: Authors)

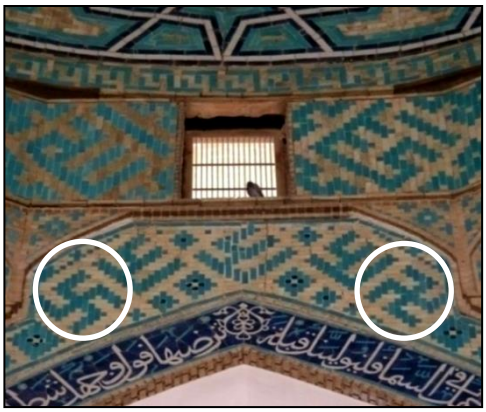

Figure 7: Swastika in decorative tiles of Friday Mosque of Yazd, Iran
(Source: paulstravelblog.com)

Figure 8: Swastika on entrance gate of a Hindu temple in Delhi, India
(Source: flickr.com)

Therefore the rules and patterns of traditional Iranian houses can be categorized and studied under the same categories of Vastu Shastra architectural guideline. In this way the objective is to employ Vastu Shastra as a framework to identify the patterns and principles behind the creation of traditional houses of Kashan, Iran.

Through a comprehensive literature review four main concepts of Vastu Shastra have been extracted, which will function as a platform to conduct the data collection and determine the patterns of traditional houses of Kashan:

1. Existence of a complex geometric diagram or mandala in the designed plan, which proposes the form and size of the plan, the spatial orders, the spatial organizations and the spatial features.
2. Concept of eight directions and the centre that suggests the auspicious directions, the location of areas in the complex, the orientation of the plan, direction of the entrance doors and providing the proper ventilation.
3. Concept of five elements which refers to the proper use of colours, forms, decorations and materials to create proper places due to their functions, proposing the properties of important spaces.
4. Concept of human chakras proposing the main elements, features and decorations of important spaces.

The data collection is composed of two parts. In-depth, open-ended interviews with three master builders and one architectural theorist, and case studies on 22 traditional houses of Kashan. The aim of the interviews is to provide a basis for direct observations and a foundation on how to search for the principles of traditional houses in Kashan since the three master builders are able to give proper guidance on why these dwellings fall under the category of good design. Through the direct observations, the dwellings are studied and compared to Vastu Shastra guidelines to extract the rules and patterns that have been applied in the construction of traditional dwellings in Iran.

The results of this stage of data collection have been analysed qualitatively and quantitatively to show the percentage of active principles of Vastu Shastra in traditional houses of Kashan. Through these data the research will then try to reveal the principles behind the creation of traditional houses of Kashan, in the following areas:

- Form, size and pattern of the plan
- Location, Orientation and Ventilation
- Properties of Spaces
- Ornamentation

2. ARCHITECTURAL PATTERNS OF HOUSES OF KASHAN BASED ON THE GUIDELINES OF VASTU SHASTRA

2.1 THE EXISTENCE OF A MANDALIC DIAGRAM

Although in traditional dwelling architecture of Iran, concepts like mandala or concentric squares, which are important concepts in Vastu Shastra, have not been literally mentioned, the existence of a well-established geometric diagram composed of complex mathematical and symbolic interpretations reveal the existence of such concepts.

Mandala is basically a mathematical diagram which is metaphysically significant, representing a graphical shape of what exists on a more subtle level of reality than what is usually perceived (Silverman, 2007). An important mandala, dealing with dwelling architecture in Vastu Shastra is called Vastu Purusha mandala. Vastu Purusha mandala is basically the figure of a body facing the earth whose head is towards northeast direction, as shown in Figure 9 (Devi Vasudev & Dash, 1998).

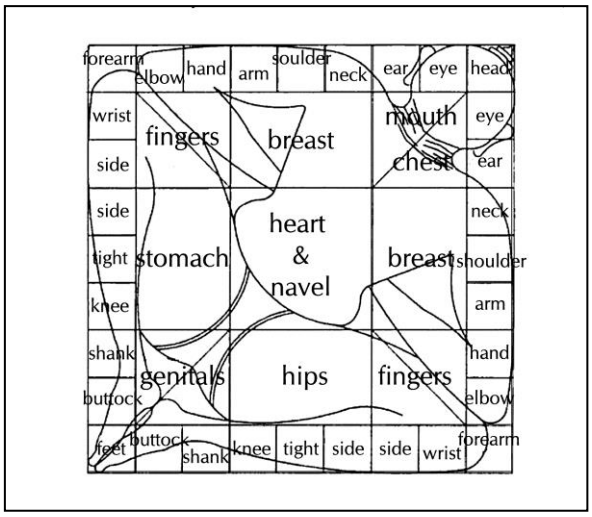

Figure 9: The analogy of house to human body in mandala of the house
(Source: Silverman, 2007)

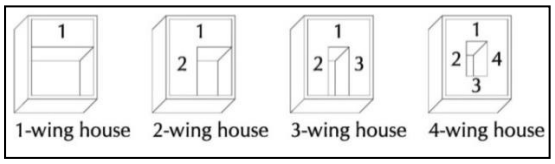

Figure 10: Patterns of houses with one open space based on Vastu Shastra guidelines
(Source: Oliver, 1997, p. 553)

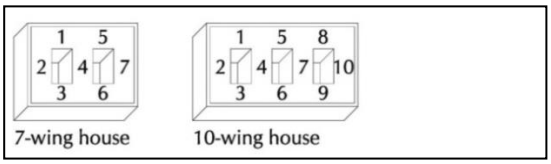

Figure 11: Patterns of houses with two and three open space based on Vastu Shastra
(Source: Oliver, 1997, p. 553)

From this mandala, the organization of spaces in the complex, hierarchy of architectural spaces and spatial orders are extracted, application of which is evident in all the traditional houses. Such geometrical positioning or spatial diagram is one of the important principles of traditional Iranian houses and its application was obligatory in traditional societies (Arzandeh, 2009; Helli, 2009). Derived from this diagram, all houses should be built in a rectangular plan with a central open space, creating the pattern of the central courtyard. There are a few factors which decide the pattern of this geometric diagram as:

1. Number of open spaces (central courtyards)
2. Distribution of spaces around the courtyard
3. Number and distribution of the entrance doors at different levels
4. Division of birūni and andarūni (public and private) spaces
5.

Number of the Central Open Spaces

The number of open spaces in the plan of the houses is one of the basic concepts in the creation of different diagrams for the plans. The categorization of houses, based on the number of central open spaces is in fact very similar to the categorization of houses in Vastu Shastra done by a group of researchers, introduced in the "Encyclopaedia of Vernacular Architecture of the World," presented in Figures 10 and 11 (Oliver, 1997). Creation of these different models for the houses in this section is mainly due to the wealth of the owner. While the houses of ordinary citizens have merely one open space around which all the spaces have been shaped, the wealthy households often have houses with two central open spaces; in this model one courtyard is for public areas (*birūni* section) and one is limited to private use (*andarūni* section). In some instances the house has another courtyard which is limited to the workers use (Kateb, 2005).

As seen in the figures, houses with one open space can have four models of distribution of spaces. Houses with two or three central courtyards often appear as one model. The categorization of houses of Kashan based on this model is presented in Table 2.

Table 2: Examples of houses built based on three models of distribution of open spaces

Type of house based on the central yard	Example of houses among 22 houses of Kashan
Houses with one open space	Esfehanian BaniKāzemi Tahāmi JahānĀrayi Kheirieh Dastmālchi Sajjādi Sharifiān Sāleh Attārha Alāqeband Karkhānechi Mortazavi Tāj
Houses with two open space	Āle-Yāsin Bakūchi RezāHoseini Tabātabāyihā Heshmat-allahĀmeri
Houses with three or more open space	Boroujerdihā Abbāsian The Great Āmeriha

(Source: Authors' compilation from Cultural Heritage Organization, 2008; Moosavi Rozati & Hossein, 1996)

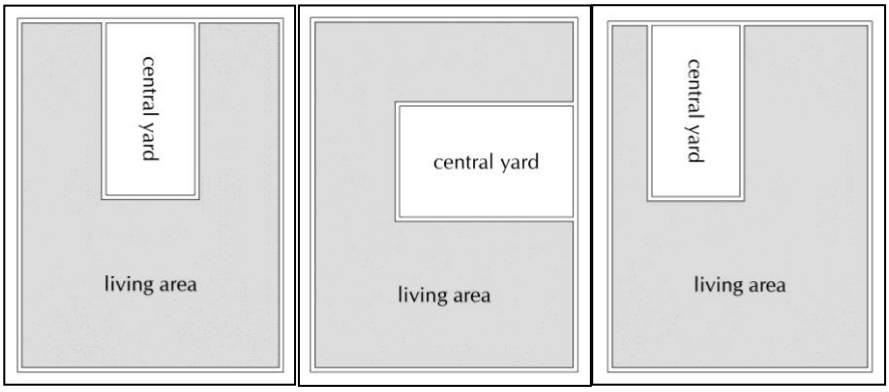

Figure 12 Diagrams, showing the Model 1 houses

(Source: Authors)

Distribution of Spaces Around the Courtyard

Houses can also be categorized based on the distribution of spaces around the central courtyard.

In fact central courtyard is one of the important features of traditional houses of Kashan (which has been also emphasized in Vastu Shastra) that creates a centralist order. In Vastu Shastra, central courtyard is the place of *"Brahman"* (God); it is holy and should be kept open (Devi Vasudev & Dash, 1998). There are three common patterns for the creation of living spaces around one central courtyard in traditional houses of Kashan as followed:

Model 1: Three wings around the central yard; Figures 12, 13 and 14

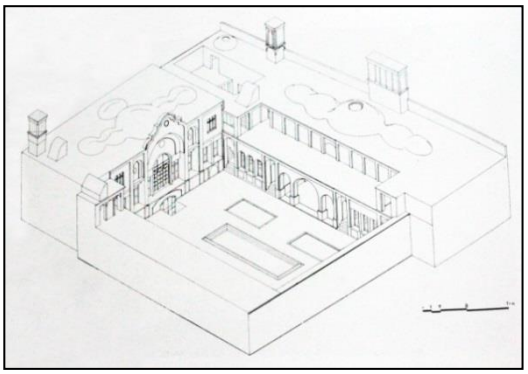

Figure 13: Attārhā house, an example of Model 1 houses
(Source: Moosavi Rozati & Hossein 1996, p. 133)

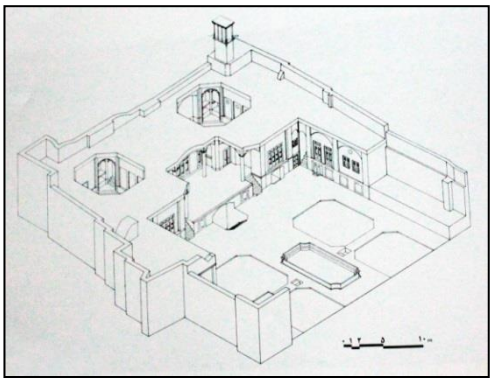

Figure 14: Alāqeband house, an example of Model 1 houses
(Source: Moosavi Rozati & Hossein 1996, p. 141)

Model 2: Two large and two small wings / three large and one small wing around the central yard; Figures 15, 16 and 17

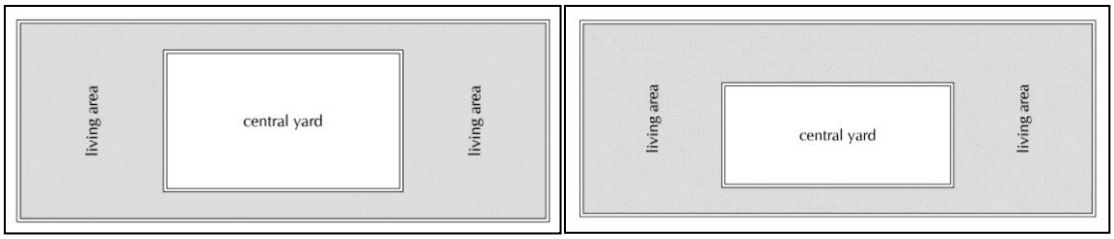

Figure 15: Diagrams, showing the Model 2 houses
(Source: Authors)

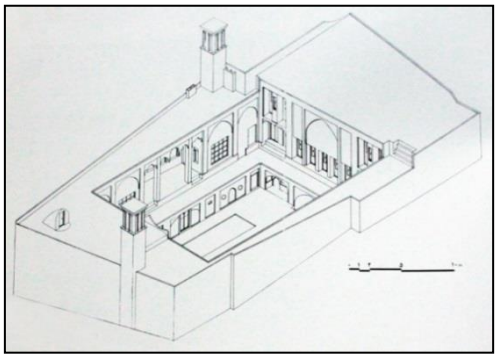

Figure 16: Tahāmi house, as an example of Model 2 houses
(Source: Moosavi Rozati & Hossein, 1996, p. 53)

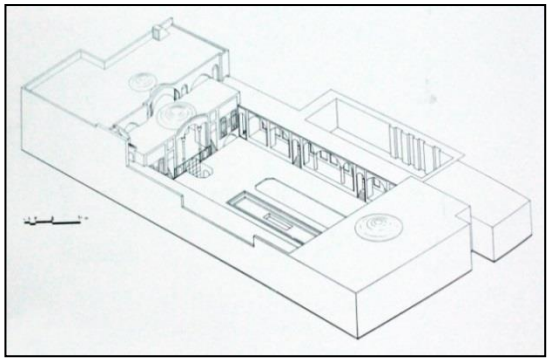

Figure 17: Sāleh house, as an example of Model 2 houses
(Source: Moosavi Rozati & Hossein, 1996, p. 105)

Model 3: Four wings around the central yard; figures 18 and 19

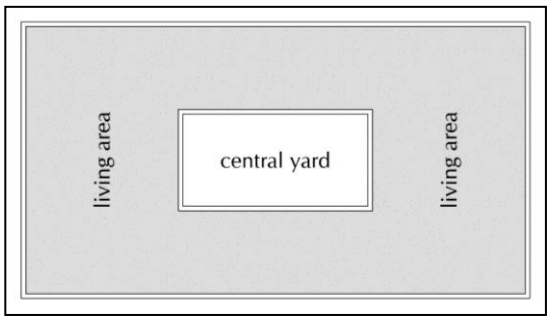

Figure 1: Diagram, showing the Model 3 houses (Source: Authors)

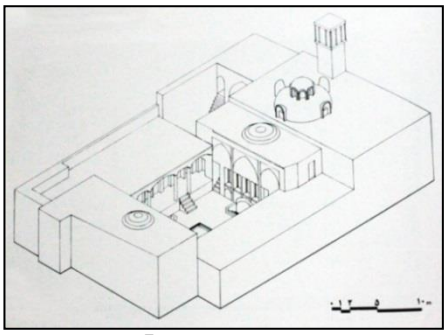

Figure 2: Jahān Ārayi house, example of Model 3 houses
(Source: Moosavi Rozati & Hossein, 1996, p. 61)

Model 4: Seven wings around two central yards; figure 20

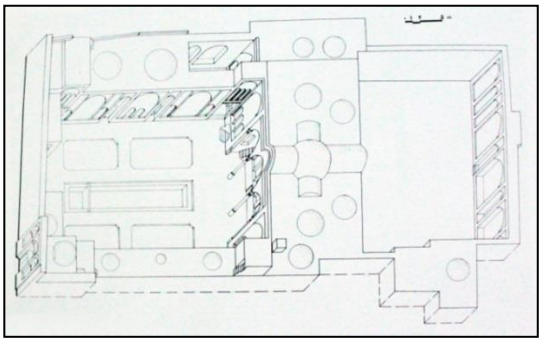

Figure 20: Rezā Hoseini house, example of Model 4 houses
(Source: Moosavi Rozati & Hossein, 1996, p. 83)

Model 5: Ten wings around three central yards; figure 21

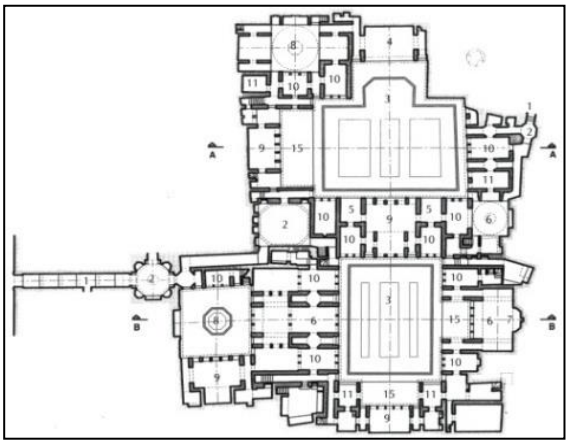

Figure 21: Abbasiān house, example of Model 5 houses
(Source: Cultural Heritage Organization, 2008)

Table 3: Number of houses, built in each of the patterns of the plan

Models of houses	Number of houses among 22 houses of Kashan	
With one central yard	Model 1 houses	7
	Model 2 houses	5
	Model 3 houses	2
With two central yard (Model 4 houses)		5
With three or more central yards (Model 5 houses)		3

(Source: Authors)

A summary of the models of houses and the number of houses built based on each model is presented in Table 3.

Number and Distribution of the Entrance Doors

Based on the number and distribution of the entrances on different floors, three common models are identified.

Model A: One or several entrance doors at first level; Figure 22

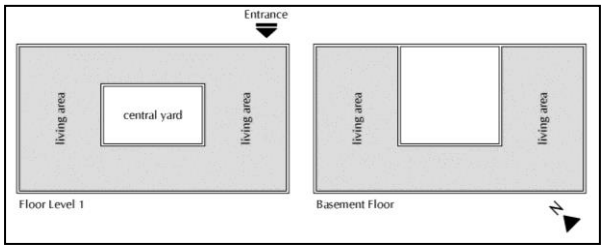

Figure 22: Dastmālchi house, example of Model A houses
(Source: Authors)

Model B: One or several entrance doors at second level (sunken-garden); Figure 23

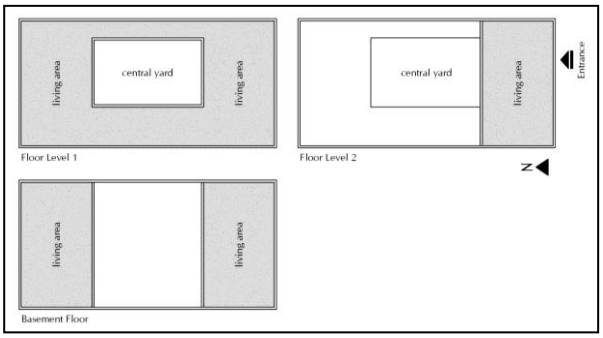

Figure 23: Sāleh house, an example of Model B houses
(Source: Authors)

Model C: Several entrance doors in the first and second levels; Figure 24

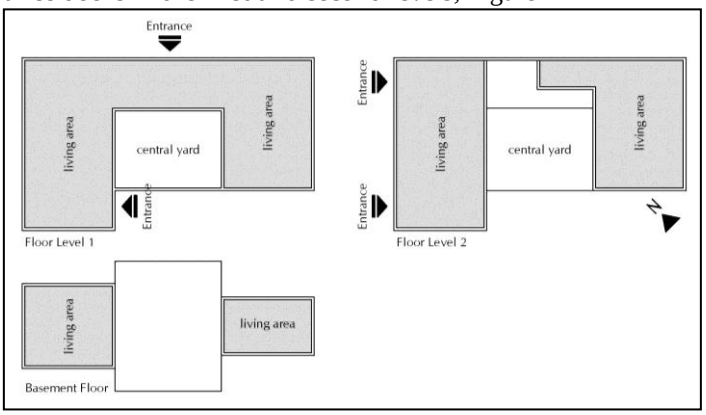

Figure 24: Bani Kāzemi house, an example of Model C houses

(Source: Authors)

Division of Birūni and Andarūni Spaces

Another important factor in identifying the patterns of traditional houses in Kashan is the division of spaces based on their privacy, which is more connected to the cultural beliefs and values of the Aryans. In Indo-Aryan tradition, there was a strict belief on the categorization of spaces into sacred and profane. The indoor space was regarded as the most inner sacred space in one's life (Babayian, 2009; Nasr, 1978). That is why ornamental features and symbolic decorations of interiors are often similar to places of worship in Indo-Aryan tradition and is only applied in the indoor space.

After Islam, and its emphasis on *"hijab"* or veil as one of the important concepts, the division of spaces in the architectural plan continued to be one of the most important principles of traditional Iranian houses. This principle has in fact imposed a hierarchical order to housing architecture in the way that the spaces appear in the plan based on their rate of privacy. It means that public spaces have been shaped next to the entrance door and the private spaces appear as we move further inside. In many cases, a separate entrance door is even dedicated for the private spaces.

In fact in traditional houses of Kashan, there is an established order in organizing the spaces. The entrance door in this case, is the threshold between the outer profane space and the sacred inner area, which through a set of spaces such as *"hashti"* and several corridors guides people to the public and private areas. The public spaces are mostly used by men and guests, while the use of private areas is limited to the family including the women, children and close relatives.

While the first floor and basement areas are divided between public and private usages, the second floor is usually restricted to the private use.

2.2 ORIENTATION OF PLAN AND ENTRANCE DOORS TOWARDS 8 DIRECTIONS

In traditional Iranian societies there was a strict belief on the auspiciousness of certain directions toward which the building should be oriented. The eight directions in Iranian beliefs are associated with *'the gateways to heavens'* (Ardalan & Bakhtiar, 1979, p. 15). In other words as observed by the traditional master builders each direction was believed to radiate a specific quality of energy or *"Barkah"* in Islamic terminology which affects the human system and enhances or destroys the human health. Every direction therefore was associated with a certain colour and was considered either auspicious or inauspicious.

It was also believed that the entrance door, especially the main entrance, should be opened towards the auspicious directions. This belief system which was practiced in ancient Iran by the Zoroastrians, continued after Islam as well (Ayatollahi & Haghshenas, 2003; Minorsky, 1971). Therefore the traditional houses of the Islamic era, until the advent of the Pahlavi period, were widely built based on the same pattern, shown in Figures 25 and 26.

In Vastu Shastra the categorization of directions into auspicious and inauspicious is basically based on the knowledge of the sun rays and the magnetic poles of the planet earth, besides the cultural religious beliefs and values. Thus four directions of northeast, north, east and northwest are considered auspicious while southeast is neutral and south, west and southwest are inauspicious since they absorb a wide range of destructive ultra violet rays in the afternoons.

In Iran, after Islam, southwest suddenly became auspicious since it was the direction of the Kaaba towards which people perform their prayers every day. Therefore a conflict appeared between the previous practiced beliefs and the new teachings. As a matter of fact, southwest (the direction of the holy Kaaba) was added to the category of auspicious directions in Iran, which is more based on the cultural religious values after Islam.

As displayed in Figures 27 and 28, a wide range of traditional houses (even in Islamic era), have been built based on the auspicious directions of Indo-Aryan culture. Southwest direction, as the direction of the Kaaba, has also been considered auspicious.

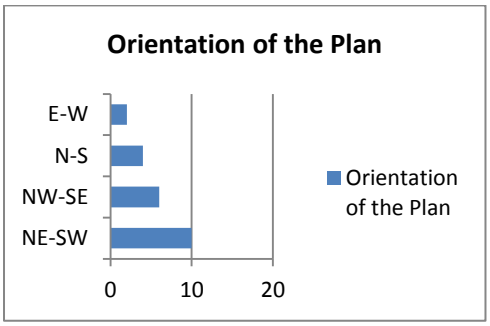

Figure 25: Orientation of the plan of 22 traditional houses of Kashan
(Source: Authors)

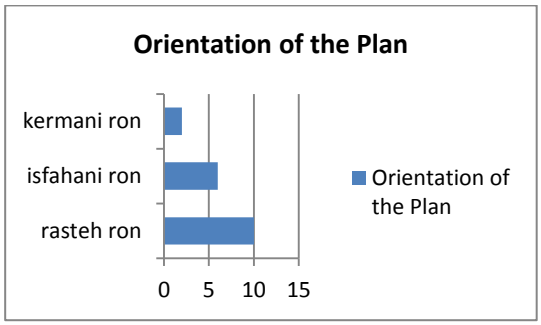

Figure 26: Orientation of the plan of 22 traditional houses based on the concept of rons
(Source: Authors)

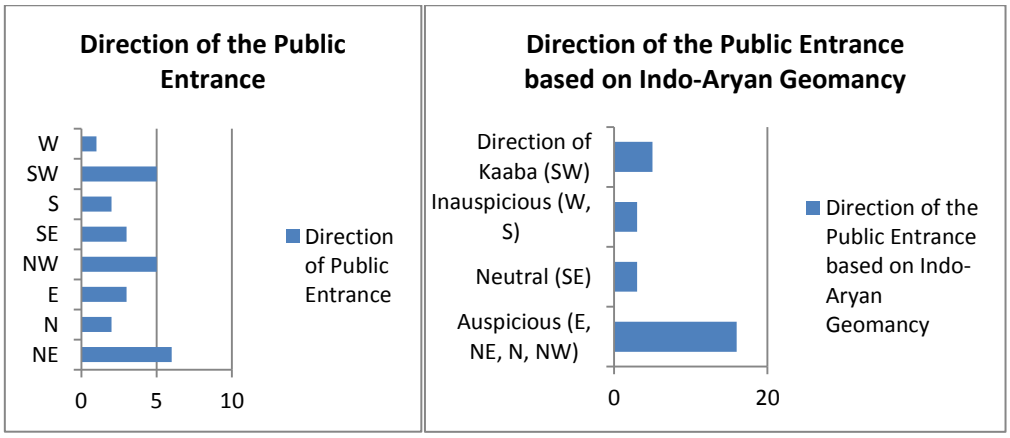

Figure 27: Directions toward which the public entrances in 22 houses are opened
(Source: Authors)

Another important factor in determining the orientation of houses is the concept of *"ron."* Ron basically means the direction towards which the house is stretched, or in other words the elongation of the plan. Houses of Kashan are mostly based on the *"Rasteh ron"* (Figure 29) in which houses are orientated along the NE-SW direction. *"Isfahani ron"* has also been used in building a number of houses, in which the house is elongated towards NW-SE direction. The concept of *ron* was strictly followed by the architects in Kashan in the construction of houses. The *ron* is usually shown through the model of a rectangle inside a hexagon, (which is used to propose the proportions of the Iranian *golden ratio*).

The importance of *ron* can be studied from several perspectives.

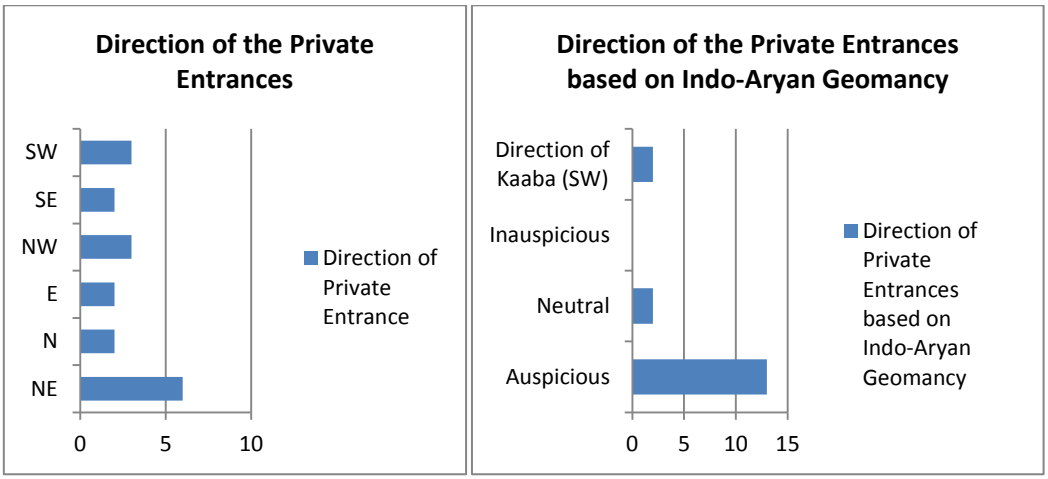

Figure 28: Directions toward which the private entrances in 22 houses are opened

(Source: Authors)

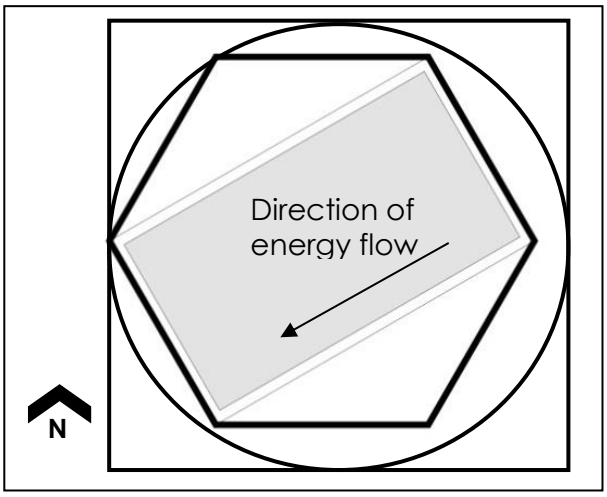

Figure 29: Diagram showing the Rasteh Ron

(Source: Authors)

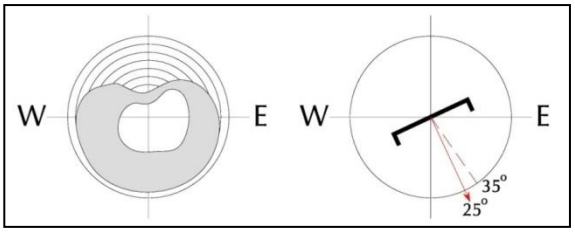

Figure 30: The best orientation in hot & dry region of Kashan

(Source: Kasmai & Ahmadinezhad, 2004, p. 127)

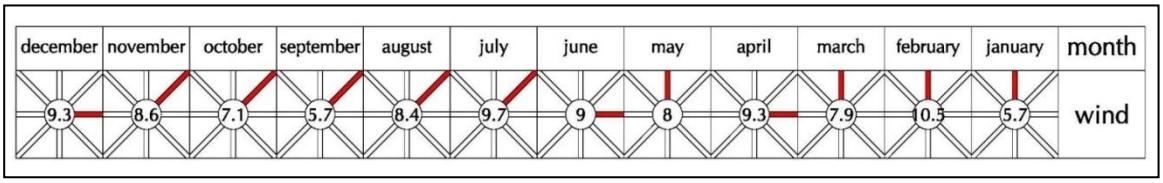

Figure 31: The amount and direction of the winds in Kashan
(Source: Kasmai & Ahmadinezhad, 2004, p. 148)

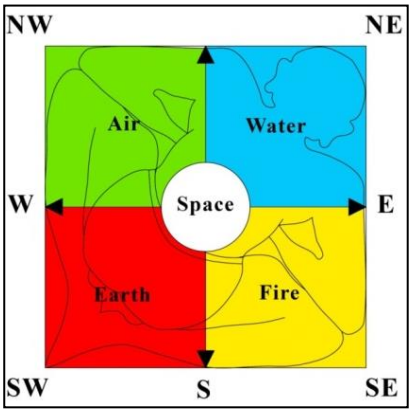

Figure 32: Five elements in Vastu Purusha Mandala
(Source: Sui, 2009; vaastuyogam.com)

From a cultural perspective, the northeast direction is one of the most auspicious directions in Indo-Aryan culture and as explained, in Vastu Shastra it is believed that many positive invisible forces or energies enter the house from northeastern corner. Therefore the northeastern part of the house is filled with positive energies and it is advisable to put the entrance door in this section or in eastern or northern corners of the house to let the beneficial energies enter.

From an environmental perspective, the application of *rasteh ron* will let less light and heat enter the house in the hot summer season, while providing more light and heat for the inhabitants in winter (Hadji Ghasemi, 2001). In fact studies on the orientation of the buildings in different climatic regions, reveals that in the hot and dry region, the buildings should be oriented towards NE-SW direction, to absorb less heat in summer days and more heat in winter times, as shown in Figure 30 (Hadji Ghasemi, 2001). Therefore it is a proper pattern to create spaces compatible with human comfort.

Furthermore, based on Kashan's climatic configurations, the winds usually blow from northeast, north and east directions which are presented in figure 31. Therefore the elongation of the plan towards them, as well as having more openings towards these directions can help in getting the proper winds.

As a summary, the concept of eight directions was significant in determining the location of areas in the plan and the orientation of the plan and entrance doors in traditional Iranian houses.

2.3 THE FIVE ELEMENTS

According to ancient Indo-Aryan literature, human's destiny is operated through the principles known as the basic five elements of nature: ether (or space), air, fire, water and earth, shown in Figure 32. Based on the Vedas there is nothing beyond these five principles in the physical world. *'Under varying conditions these principles attract, repel, bind and blend with one another in unending ways, always following perfect logistics'* (Krishna, 2001, p. 20). These elements are not literally considered, but symbolically they are connected with the *'processes, qualities and phases of cycles, inherent capabilities or changing phenomena'* (Bramble, 2003, p. 23).

It is not known to the current scholars, whether the existence of five elements was known to the Iranians or four elements. The available documents have mainly referred to the idea of four elements in traditional Iranian geomancy which were believed to be the essential elements of all creation and were commonly used to harmonize architectural spaces. However, based on this author's findings, five elements were important in

traditional spiritual beliefs of Iran, influencing housing architecture as well.

Due to the Vedic mythology of creation of the universe, Brahman, the creator, first created the five basic elements called *"Panch Mahabhootas"* in the form of lords of different senses such as Agni, Vayu, etc. They were subjected to thirst and hunger so required a body to demand their needs. First Brahman created other animals but eventually the creation of the human body pleased all the deities. Brahman then ordered them to place in their proper position accordingly (Aitrey Upanishads I, 2). *"Panch"* in Persian term also means five, which further proves the application of the same patterns and concepts in traditional Iranian architecture. Combing the Iranian beliefs with the teachings of Vastu Shastra, the five elements in traditional Iranian architecture can be determined as shown in Table 4.

The pattern of five elements in the creation of traditional houses of Kashan is basically applied in two different levels. On a macro level, the architectural design of the whole complex is based on the concept of five elements as followed:

First, the central open space of the courtyard is designed to absorb the invisible cosmic energies (or ether), and also to allow fresh air inside the house (wind).

The sun, which is the symbol of fire element, shines through the central open space. A central pool is also located in the middle of the central courtyard which is the symbol of water. Two or four symmetrical gardens are situated around the central pool representing the earth element. The material with which the whole complex is created is clay which further increases the earth element inside the house (Figure 33). In this way, in the creation of the central courtyard all the elements have been considered by the architects (Fatehi, 2009; Helli, 2009).

Table 4: The five elements and their characteristics

Element	Earth	Water	Fire	Air	Ether
Shape	Square	Circle	Triangle		pentagon
Volume	Cube (hexahedron)	icosahedrons	octahedron	tetrahedron	dodecahedron
Quality	Cold and Dry	Cold and Wet	Hot and Dry	Hot and Wet	-
Characteristics	Heavy, passive and dense	Smoothness and flexibility	Generator of heat and light	Light and vivid	Very subtle
Symbol	Cosmic mountains	Life giving God/ Descent of revelation	The purifying light		The vehicle of light

(Source: Ardalan & Bakhtiar, 1979; Nimrouzi, 2008)

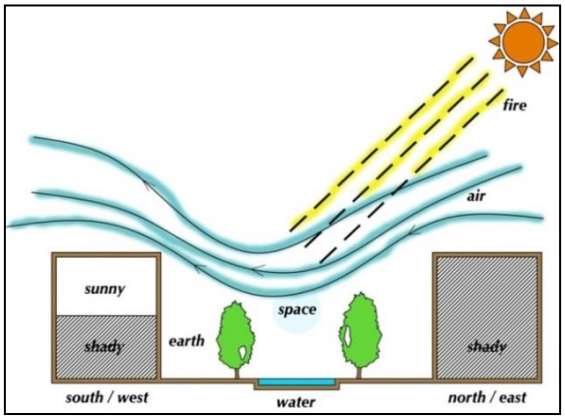

Figure 33: Diagram showing the distribution of five elements in the central courtyard

(Source: Authors)

On a micro level, the concept of five elements has been used by the architects in the creation of architectural spaces of the houses, based on their function and spatial characteristics. For example, the earth and fire elements activate the lower chakras ("Basic, Navel and Solar Plexus," which will be explained later) and therefore by activating the adrenal glands, the body will be recharged physically and become dynamic. This pattern is appropriate for the guest halls, auditoriums and dining rooms, as shown in Figure 34. Such spaces are called "yang" in Feng Shui terminology (Barrett, Coolidge & Steenburgen, 2003). Therefore in decorating the walls and windows of yang spaces, warm colours such as red, orange and yellow have been used widely. On the other hand, in the bedrooms and meditation areas, more cooling and soothing colours have been used such as white, blue and green which deactivate the lower glands and activate the upper glands and chakras, shown in Figure 35. Such spaces are called "yin" in Feng Shui terminology (Smith & Stewart, 2006).

The colours used in decorating the traditional Iranian houses were also originated from the concept of five elements and further with the qualities and influence of human chakras (which will be explained in the next section).

2.4 THE SYSTEM OF SEVEN COLOURS

Ardalan and Bakhtiar (1979) have divided the important colours of traditional Iranian housing architecture into seven colours, based on the traditional Iranian poems and the knowledge of astrology: system of three colours (white, black and sandalwood) and system of four colours (red, yellow, green and blue) (Ardalan & Bakhtiar, 1979). However, the study of applied colours in traditional houses of Kashan highlights a slight difference with the above categorization and furthermore reveals the importance of another colour which was not considered in the previous systems: the night-blue or *"lājward".*

Lājward or night-blue is in fact different from the turquoise or *"firūzeh"* used in traditional art works and is very popular in designing the mosques and houses (Barry, 1996).

'Persian usage imposed this traditional name of the "Seven Colours" or Haft Rang, because the number seven was held to correspond to that of the sanctified Seven Heavenly Bodies of determining importance so identified in all the calendars stemming from Ancient Mesopotamian astronomy: Saturn, the Sun, the Moon, Mars, Mercury, Jupiter and Venus' (Barry, 1996, p. 33).

According to the Persian poet, Nezami, the seven planets respectively match seven colours as black, yellow (or gold), green, red, blue, sandalwood (or brown) and white, however the craftsmen use slightly different set of colours in their work. For example, based on Master Abd-ol-Ahad Ahmadi, the seven colours are: yellow or brown (zard), turquoise (firūzeh), white (sefid), black (siāh), green (sabz), red (sorkh) and night-blue (lājward) (Barry, 1996). The characteristics of colours, based on the studies of current Iranian scholars, are in Table 5.

Figure 34: The proper use of warm colours in the guests' hall of the Tabatabayiha House
(Source: Authors)

Figure 35: The proper use of cool colours in the sardāb which is located at basement floor and is used in hot seasons
(Source: Authors)

Table 5: Qualities of Four Elements in Traditional Iranian Architecture

Element	Earth	Water	Fire	Air	Ether
Colour	Blue	Green	Red	Yellow	White
Qualities	Cold and Dry	Cold and Humid	Hot and dry	Hot and Wet	-
Associations	Passive, Contractive and insoluble	Passive, Contractive and Soluble	Expansive, Active and Insoluble	Active, Expansive, Contemplative and Soluble	Very Subtle
Symbol	Inferior Soul	Superior Soul	Vital Spirit		The vehicle of light
Cyclically	Night, Winter and Old ages	Evening, Fall and Maturity	Morning, Spring and Childhood	Noon, Summer and Youth	-

(Source: Ardalan & Bakhtiar, 1979)

Table 6: Colours and their characteristics based on scientific researches on the Chakra system

Colour	Blue	Green	Red	Yellow
Qualities	Inhibiting, Cooling and Soothing	Cleansing, Dissolving, Digestive and Disinfecting	Strengthening, Expansive, Warming and activating	Assimilating, Multiplying, Initiating, Cementing
Chakra	Ajna	Throat	Basic	Solar Plexus

(Source: Leadbeater, 1972; Sui, 2009)

Table 7: Re-identifying the Elements and their associated colour in traditional Iranian architecture. Since the sex chakra is associated with water in traditional Iranian teachings it is sometimes shown with blue colour.

Element	Earth	Water	Fire	Air	Ether
Colour	Red	Orange / Blue	Yellow	Green	White / Violet
Chakra	Basic	Sex	Solar Plexus	Throat	Crown

(Source: Ardalan & Bakhtiar, 1979; Sui, 2009)

As discussed earlier, the studies show that there are still controversies between the scholars in determining the exact colours of this system of seven colours. Based on author's studies, interviews and observations, the seven colours or *"haft rang"* in the palette of traditional houses of Iran are violet, blue (composed of two shades: night-blue and turquoise), green, yellow, orange, red and white which is the basic colour from which all the other colours are originated (Fatehi, 2009; Helli, 2009; Mohandes, 2009). This categorization of colours is basically very close to the knowledge of the chakras and their colours. In fact, black, which is known to be one of the colours of haft rang was not used in the decorations of the traditional houses.

Based on the recent scientific discoveries, through the use of Krilian photography, each colour is associated with a specific chakra and stimulates certain physical and psychological states in the human body. Therefore the use of certain colours in certain architectural spaces by the traditional Iranian architects might be related to the chakra system. Since they have been aware of different aspects of the human body and its energy centres, the colour system in traditional Iranian architecture can be re-studied based on these scientific discoveries, as presented in table 6.

In this way, the system of five elements and their colours in Iranian architecture can also be re-defined as shown in Table 7.

'The purposeful use of colours creates order where otherwise chaos might exist in the mind of the beholder' (Ardalan & Bakhtiar, 1979, p. 50). The purpose behind the wide use of colours was both qualitative and quantitative. The primary source of integration of qualitative and quantitative aspects of colours is to be found in nature.

Colours in nature are widely produced by dyes and pigments, by scattering, refraction and diffraction as well as polarization. *'Although the colour harmonies of nature are many, they exhibit strong group characteristics that are predominately of analogous or complementary harmony systems'* (Ardalan & Bakhtiar, 1979, p. 50). The existence of both harmonies and contrasting systems in nature is also present in traditional Iranian housing architecture through the proper use of colours which provides observable systems as well as visual clarity for the buildings. In this case not only the buildings were the representations of visual beauty, but also through the application of chakra system and qualities of each colour, psychological delight was achieved as well (Day, 2004).

Chakras and the Proper Use of Colours and Decorations

Chakra is a Sanskrit word which means wheel or turning disk while in Persian terms it refers to a pathway composing of two words: *"chak"* meaning open and *"ra"* or *"rah"* meaning pathway. Chakras in Indian tradition are the wheel-like vortices of energy extending from the surface of the human body to five inches outward. Chakras are served as energy centres of the body from which body absorbs fresh energy and expels the used up energies (Leadbeater, 1972).

As earth has a magnetic field around it, the human body also has an invisible energy filed around it, which is called the bioplasmic, etheric or energy body. (Plasma is the fourth state of matter and is composed of ionized gas or gas particles which are positively or negatively charged.) Based on Master Choa Kok Sui's (2009) observations and several experiments of Russian scientists such as Dr. Semyon Davidovich Kirlian, Dr. Mikhail Kuzmich Gaikin and Viktor Adamenko, the bioplasmic energy field around the body follows the counters of the physical body and its function is to *'absorb, distribute and energize the whole physical body with prana or ki. Prana or ki is that life energy which nourishes the whole body so that it could, together with its different organs, function properly and normally. Without energy, the body would die… The energy body, through energy centres or chakras, controls and is responsible for the proper functioning of the whole physical body and its different parts and organs. This includes the endocrine glands, which are the physical manifestations of some of the major energy centres'* (Powell, 2005; Sui, 2006; Sui, 2009, p. 6).

These energy centres were described in seven numbers in ancient traditions; the current scientific discoveries reveal the existence of 11 major chakras, as presented in Figure 36. Each of these chakras serves a different function in the entire body and controls and energies specific organs.

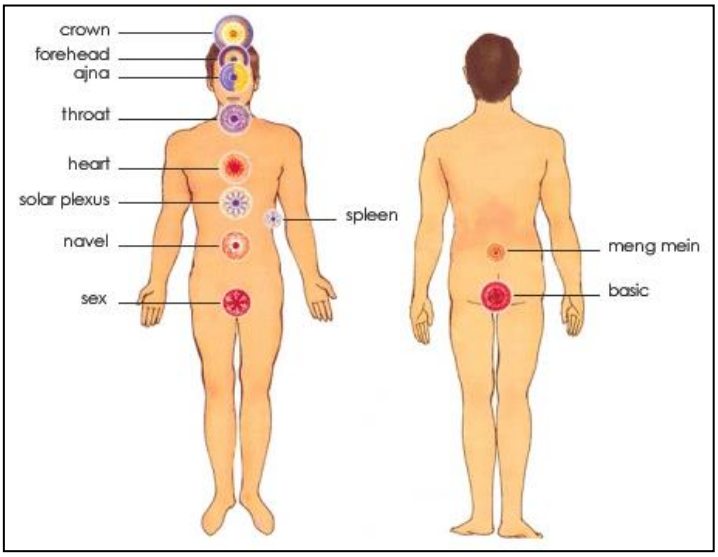

Figure 36: The eleven major energy centres of the body
(Source: lightstreams.com.au)

'Basic Chakra - Instinct of survival, related to dynamic activities, controlling the adrenal glands

Sex Chakra - Instinct of procreation, centre of sexual derive and lower creativity, associated with the gonads and sexual glands

Navel Chakra - Instinct of knowing

Meng Mein Chakra - Regulates the upward flow of pranic energy from the Basic Chakra

Spleen Chakra – Energizer, it receives the air energy from the surroundings

Solar Plexus Chakra - Lower emotions, assertiveness and Centre of emotional will for the masses, controlling the pancreas

Heart Chakra - Centre for higher emotions like love and peace, cooperating with the thymus glands

Throat Chakra - Concrete mental faculty and higher creativity, associated with the thyroid glands

Ajna Chakra - Abstract mental faculty, direction centre and centre of will power, controlling the pituitary glands

Forehead Chakra - Centre for lower intuitive faculty and wisdom

Crown Chakra - Centre for divine love, higher intuitive faculty, centre for illumination and entry point of spiritual consciousness, associated with the pineal glands' (Sui, 2005, p. 173).

Chakras in modern orthodox medicine are known as glands, as explained in Table 8.

The main colours used in the design of traditional Iranian houses are basically based on the knowledge of the chakras.

As discussed, seven colours were widely used in the design of traditional Iranian houses referring to seven planets and seven chakras; white, violet, blue (night-blue and turquoise), green, yellow (or sandalwood), orange and red from which blue, green, yellow, orange and red are more commonly used in the decoration of the colourful windows.

Based on several researches done on characteristics of colours and their influences on human chakras, it is observed that each colour creates certain effects on the chakras and relatively on the human gland, shown in Table 9 (which is slightly different from the system of colours discussed by current Iranian scholars as presented in Table 10).

Table 8: Seven Chakras and their related glands in the body

Chakras	Basic	Sex	Solar Plexus	Heart	Throat	Ajna	Crown
Glands	adrenal glands	sexual glands	Pancreas	thymus glands	thyroid glands	pituitary glands	pineal glands

(Source: Sui, 2005, p. 173)

Table 9: Chakras and their colours based on Master Choa Kok Sui's observations

Chakras	Basic	Sex	Solar Plexus	Heart	Throat	Ajna	Crown
Colours	Red	Orange	Yellow	Pink / Green	Blue	Indigo	Violet

(Source: Sui, 2009)

Table 10: Chakras and their colours in traditional Iranian houses introduced by current scholars

Chakra	Basic	Sex	Solar Plexus	Heart	Throat	Ajna	Crown
Colour	Red	White	Yellow	Green	Indigo	Sandalwood	Black
or	Red	White	Yellow	Green	Turquoise-blue	Night-blue	Black

(Source: Ardalan & Bakhtiar, 1979; Barry, 1996)

In fact, the applied colours in traditional Iranian housing architecture are very similar to Master Choa Kok Sui's findings. The application of colours in decorative walls and windows were mostly based on their physical and psychological influences on the human body; shown in Tables 11 and 12. Thus warm colours were used in halls, ceremony rooms and places where more physical activity was needed, as well as the rooms that were used in winter season. In this way and through the use of warm colours by activating the lower chakras, the body would tend to get heated and active. The cooler colours were used in praying areas, bedrooms and the areas which were used in summer so that by cooling the body and decreasing its temperature, people could feel more comfortable.

As evident from the above tables, the colours associated with each chakra do not necessarily activate the same chakra. For example the colour of the sex chakra is defined as orange, however the orange colour does not activate the sex chakra but cleanses and loosens all the chakras; on the other hand white activates all the chakras to a mild degree. Therefore some differences between the colours and their associated chakras in traditional Iranian housing architecture and modern scientific discoveries might be due to the different influences of colours on the chakras, their corresponding glands and on the whole body.

The belief in the existence of chakras and their influence on the body's glands and organs as well as their effects on psychological states of human beings is also evident in the symbolic forms and decorations of the houses. One of the most important examples is the decorations of the vaulted roofs which in some cases forms the structure of the roof as well. In fact the decorations of the vaulted roof symbolize a specific chakra, which was chosen by the architect based on the function of each architectural space. For example in decorations of the *"hashti"* in all the traditional houses of Kashan, example of which is shown in Figures 37 and 38, the pattern of navel chakra has been used; in fact hashti literally means 8-sided or "with eight petals" which further refers to the geometrical pattern of its ceiling.

Table 11: Seven Chakras, their functions and their related glands in the body

Chakras	Basic	Sex	Solar Plexus	Heart	Throat	Ajna	Crown
Glands	adrenal glands	sexual glands	Pancreas	thymus glands	thyroid glands	pituitary glands	pineal glands
Physical Functions	Controls the muscular and skeletal system, energizes the whole body	Centre for procreation, controls and energizes the sex organs, influences throat and the head	Controls and energizes the gastrointestinal system and diaphragm	Controls and energizes the heart, the thymus gland and lungs	Controls and energizes the throat, voice box, air tube, thyroid and parathyroid glands	Controls and energizes the pituitary glands, endocrine glands and energizes the brain	Controls and energizes the pineal gland, the brain and the entire body
Psychological Functions	Instinct of survival and dynamic activities	Instinct of procreation, centre of lower creativity	Centre of lower emotions and lower will	Centre of higher emotions, love and peace	Centre of concrete mental faculty and higher creativity	Centre of abstract mental faculty, higher will and lower wisdom	Centre of divine love and higher intuitive faculty, the entry point of spiritual consciousness

(Source: Sui, 2005, p. 173; Sui, 2009)

Table 12: Colours and their influences on the body based on their corresponding glands and chakras

Colours	Red	Orange	Yellow	Green	Indigo	Violet	White
Influence on the body	Warming stimulating activating	Expelling cleansing loosening	Assimilating multiplying stimulating effect on the nerves	Cleansing Detoxifying Disinfecting	Inhibiting soothing cooling	Has the properties of other colours, but amplifying when used with other colours	Has the properties of other colours in mild form so it's always safe to be used

(Source: Sui, 2005, p. 173; Sui, 2009)

The function of chakras is basically to absorb and expel energy or in other words exchange energy with the outside environment (Sui, 2009). In some of the vaulted roofs, the central part works as an open space to exchange light and air with the surrounding environment which is again a resemblance of their function.

One of the important issues in studying the vaulted roofs and their decoration which connects them to the concept of chakras is their geometrical diagram, colours and the number of their petals. Each chakra has a specific number of petals which is decisive in the type of energy they produce, as presented in Table 13.

In the same way, it is believed that a roof with 12 petals resembles the heart chakra, thus it produces or magnifies a gentle, loving energy, which is appropriate for meditation room, religious and family gatherings. Example of using heart chakra is the family gathering room of the Tabatabayiha house, shown in Figures 39 and 40.

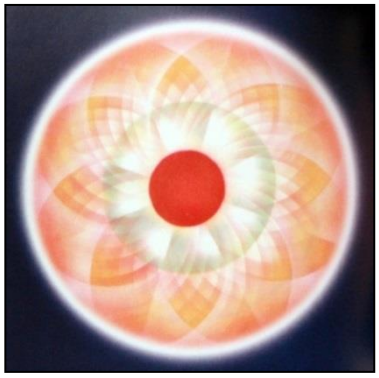

Figure 37: The navel chakra with 8 petals
(Source: Sui, 2009, p. 63)

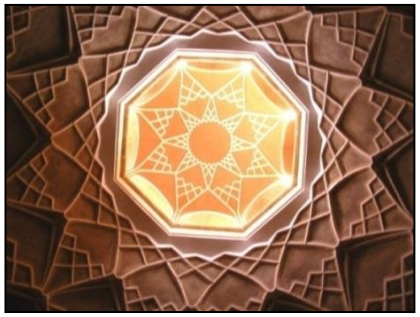

Figure 38: The roof decoration of *Hashti* (meaning eight-sided or with eight petals) in Abbasian house which works as a vent to absorb light and air (with 8 petals)
(Source: Authors)

Table 13: The number of petals and colours of each chakra

Chakra	Basic	Sex	Navel	Meng-Mein	Spleen	Solar Plexus	Heart front/back	Throat	Ajna (2 divisions)	Forehead (12 divisions)	Crown (inner & outer)
Colors	Red, Orange	Red, Orange	Yellow, Green, Blue, Red, Violet	Orange, Less Red	-	Red, Yellow, Green, Blue	Golden, Light red / Golden, Red, Orange, Yellow	Blue, Less Green & Violet	Part1: yellow or green / Part2: Violet	Violet, Blue, Red, Orange, Yellow, Green	Inner: Golden / Outer: Blue, Yellow, Green, Orange, Red & Violet
Number of Petals	4	6	8	8	6	10	12	16	96 (48+48)	144 (12×12)	12 / 960

(Source: Sui, 2009)

Figure 39: The heart chakra (with 12 petals)
(Source: Sui, 2009, p. 93)

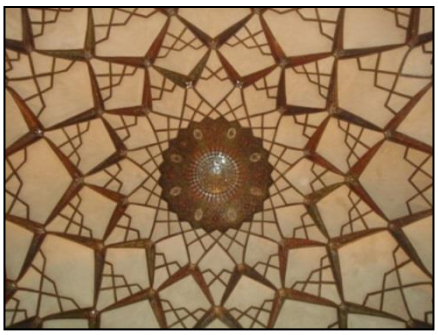

Figure 40: Pattern of heart chakra on ceiling decorations of the family gathering room, in andarūni section
(Source: Authors)

3.0 CONCLUSIONS

Based on the expert interviews and case studies, it is clearly evident that the traditional houses of Kashan have been built following a well-established system which is very similar to the patterns and beliefs of Vastu Shastra guidelines.

In fact most of the patterns, available in traditional houses of Kashan, are the evolutionary models of the traditional architectural system of Indo-Aryan culture. Therefore they share many similarities with Vastu Shastra, which is also originated from the beliefs and practices of the Indo-Aryans. Although after Islam some changes have occurred in the application of this well-established system of architecture, still a great portion of the rules and patterns are similar to Vastu Shastra. In this case the studies strongly suggest that the traditional Iranian houses of Kashan have been designed based on a set of rules and systems of beliefs similar to Vastu Shastra guidelines.

The results of case studies further reveal that the application of the four discussed concepts of Existence of a complex geometric diagram or mandala, Concept of eight directions, Concept of five elements, and Concept of human chakras in the construction of traditional houses of Kashan vary to some extent from the exact rules of Vastu Shastra in a few cases. This is due to differences in the environment and cultural beliefs of the Iranians, especially after Islam. However it is wise to mention that most of the patterns are following Vastu Shastra.

In this way, Vastu Shastra has been a proper architectural system in determining the lost set of rules and systems of beliefs in traditional Iranian architecture.

One of the most valuable contributions of this comparative study is the concept of seven chakras which was completely forgotten in Iranian architectural societies. The knowledge of chakra system was very significant among the architects in traditional societies of Iran and India and was used to prescribe the best form and decoration, leading to physical, psychological and spiritual health of the inhabitants. Based on traditional beliefs, which are scientifically proven today, the environment, through the stimulation of chakras, affects the human body and either promotes its health in all the three aspects or depraves it. In designing the traditional houses of Kashan, the pattern of chakras have been used constructively to stimulate certain chakras based on the functions of each space.

The application of this knowledge could in fact be the reason why many consider the traditional dwellings of Kashan a fine example of good-design.

This well-established system of architecture and its principles have been partially defined by a number of Iranian scholars, but since most of the guidelines and patterns had not been preserved in Iran and were lost due to the invasions and the system of apprenticeship, the complete concepts dealing with traditional housing architecture was not identified correctly.

Therefore at this stage and through this research we are able to employ Vastu Shastra as a framework to identify the patterns and principles behind the creation of traditional houses of Kashan. In this case, not only the reason behind the success of such magnificent pieces of architecture have been revealed to a great extent, we are also able to define a fresh set of guidelines based on this knowledge and today's technological advancements in order to achieve good-design in the Iranian dwelling architecture of now.

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