Original Research Article

Morphology of Meaning-Oriented Architecture Using Space Syntax Method
Case Study: Ali Mosque of Isfahan*

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Abstract

Problem statement: The meaning of a place is a factor that distinguishes that particular place from other places and spaces. The meaning of place can be examined from two aspects: mental and objective or physical dimensions. The purpose of this study is to explain the meaning in the architecture of religious buildings of the Safavid period of Isfahan, using the analysis of physical features of their architectural space.

Research objectives: The present study seeks to answer the central question which of the mosque spaces has more meaning in physical terms and what is the reason for the significance of mosque spaces? For this purpose, among the historical periods, the Safavid period, which has semantic values and among the religious buildings, the Ali Mosque of Isfahan, which is used for prayers, was selected as a case study.

Research method: The research method in the present study is descriptive-analytical. Its analysis method also uses space Syntax method, analysis of interviews by protege software and statistical analysis by Spss 22 software and analysis of architectural morphological components such as integration , permeability, variety, intelligibility, transparency, scale and proportion, flexibility and spatial unity in different spaces of Ali Mosque.

Conclusion: After analyzing the maps by "DepthMap" software, distributing and analyzing the questionnaire and interviewing the statistical population, it was concluded that the yard due to the location between other spaces and establishing communication and access to them in addition to transparency and continuity. Visual vision has a higher degree of integration. Among the spaces of the mosque, the users of Ali Mosque consider the courtyard to have physical components, through which the space is called meaningful. The achievements of this research can be used in designing meaningful architecture according to its physical components and in designing new mosques according to new requirements and needs.

Keywords: *Morphology, Meaning-Oriented Architecture, Space Syntax, Ali Mosque, Isfahan.*

Introduction

Nowadays, a lot of research has been done in place definition, one of the subjects in psychology, sociology, architecture, urban and landscape design domains. Relph in the Book of "place and Placelessness", looks for how and why places make sense to people with a phenomenological point of view (Relph, 1976). He defines place in three ways: body, activity and meaning. Ralph believes that of these three aspects, meaning is more important than the other two and is more difficult to obtain than the others (Tuan, 1977).

In a sense, the theory of space syntax is human visual and motor characteristics in the architectural space that shape the architectural space, constructive and social relations. In the view of this theory, not only space and human activity are not two independent and different matters but also they are a single matter that has two different manifestations. This single matter is hidden in man and his motor and visual characteristics (Vaughan, 2007, 208).

Therefore, the present study intends to study and analyze the meaning of a religious and spiritual space in terms of its physical components of shaping, using the space arrangement method. Since religious spaces are often evaluated semantically and consider only mentally, including their individual, social and cultural components, in this research, an attempt has been made to look at the above issue from a physical point of view, in order to achieve new results regarding the significance of religious spaces.

Research background

In this field, various experimental studies have been performed on both architectural and urban scales, which have yielded various results based on the purpose. Hillier and Hanson (1984) argued that there is a fundamental difference between new and old residential environments. He clearly identified these cities by analyzing the structures of ancient cities, which usually look chaotic from the bird's point of view but are legible on the ground. Chang and Penn (1998) studied pedestrian behavior in two multi-level urban complexes in London. Kim (1999) conducted a study in the northern suburbs of London to understand the relationship between configuration, cognition and behavior. Lay, Reis, Dreux, Becker and Ambrosini (2005) examined the relationships between spatial configuration, spatial behavior and spatial cognition on readability and visibility. In Iran, Abbaszadegan (2002) was one of the first researchers to introduce the space layout approach. Abbaszadegan in his article, while explaining this method and its application in urban design, he analyzed the sequential features of Yazd city spaces during three stages of historical development. Then, using this approach, research was conducted in urban areas in Iran, including the article by Rismanchian and Bell (2011) that in order to participate in the special renovation plan, examine spatial characteristics of worn tissues by space arrangement method based on natural motion theory. The results of this study are to provide reasoned evidence on how the spatial separation of worn-out structures from the structure of the city of Tehran and eliminate the lack of validity of historical studies.

In the field of architecture, in an article Hamedani Golshan (2015), reread the principles and intellectual foundations of the theory of "space syntax" in the house of Boroujerdi Kashan. Soheili and Arefian (2016) analyzed socio-human relations in mosque-school spaces of Qazvin in Qajar period based on explanatory diagrams of space syntax approach. Memarian and Maddahi (2017) also expanded this view in the analysis of the spatial configuration of native houses in the city of Boshrouyeh. Behzadfar and Rezvani (2015) compared the historical context of Gorgan with ancient Iranian-Islamic cities with the aim of identifying morphological norms from an Islamic perspective, while defining the Islamic city, its elements and components. Due to these issues, the emptiness of using this method in meaning-oriented architecture or meaningful architectural spaces

is felt. There are spaces in architecture that have semantic value for their audience. Therefore, this study intends to achieve unknown dimensions of this issue and what is important in this discussion is to study the physical aspects and dimensions of meaningful spaces in meaning-oriented architecture using the space syntax method.

The meaning of place

Given that most researchers have a positivist view of the problem of place and the meaning of place, however, each considers different factors and parameters in the formation of the meaning of place. Some of them have explained the importance of physical factors in the formation of meaning and others have explained the importance of conceptual factors. One group considers the effect of individual parameters on the formation of the meaning of place and another group considers the importance of social factors. But what is certain is that the effective parameters in shaping the meaning of

place in different environments vary depending on the people who use it. Different people perceive different levels of this meaning depending on the type of perception they have of the environment and how they experience it (Table 1).

As shown in the above table and according to the theorists, one of the dimensions that creates the meaning of the place is its physical dimension. The purpose of this study is to investigate the meaning-oriented architecture from its physical and morphological dimension. Some theorists believe that meaning is created by designing the physical environment. In their views, the physical structure of the environment acts as a sign and conveys meaning. Accordingly, the meaning of place is formed due to the designer's attention to the physical characteristics of the environment, including the combination of form, shadow and light, color, sound and light. They also believe that a building that is created in a place according to the mentioned cases has a special meaning and if this building is rebuilt

Table 1. Effective dimensions in creating the meaning of place from the perspective of theorists. Source: authors.

Row	Name of theorist	Year	Creator dimensions of the meaning of the place
1	Gustafson	2001	Environmental factors, others and individual factors
2	Gifford	2002	Personal factors, physical factors and cultural factors
3	Manzo	2005	Physical factors, social structure, perceptual factors
4	Carmona	2006	Physical structure and activity
5	Childress	1994	Physical environment, activities, people, person and environmental control
6	Meesters	2009	Social factors, physical factors
7	Ariel Windsong	2010	Symbolic and meaningful information of the environment, past experiences
8	Amdur & Epstein Pleouchtch	2012	Social factors, physical factors
9	Norberg Schulz	2007	Natural characters, spiritual characters and human characters
10	Afshar Naderi	1999	Human behavior, concepts and physical characteristics of the environment
11	Kalali & Modiri	2012	Personal, social and physical
12	Vahdat, Karimi Moshaver & Bakhshi Balkanloo	2017	Social factors, environmental and physical factors, perceptual and cognitive factors

in another place, it may no longer have its original meaning or, in his words, the sense of the original place (Heydari & Behdadfar, 2016). Architects should design places where users can experience meaningful living in those places because building meaningful places is one of the main missions of architects and urban designers. Spaces without meaning and identity in architecture and urban structure are created because of Inadequate and inefficient knowledge of place. "Norberg Schulz" points out that the seeking meaning is the common denominator of the broad tendencies and trends that make up architecture. Today, the discussion about the concept of place, how a person perceives a place and how the person experiences it is one of the important topics in architecture and urban planning, especially in the field of behavioral sciences. Cognition and the process of forming the place and defining the effective factors in it, can be effective in creating a favorable environment which is one of the main goals of architecture and urban designing (Vahdat, Karimi Moshaver & Bakhshi Balkanloo, 2017).

Meaningful architecture

In the past decades, our environment has not only been subject to pollution and urban sprawl, but has also lost the qualities that gave human beings a sense of belonging and participation. As a result, many people feel that their lives are "meaningless" and have become "alienated from themselves" (Norberg Schulz, 2014). Relying on phenomenological definitions, one can claim that the nature of "place" is special in relation to the more general concept of "space". A property that results from the attribution of meaning, the emergence of social interactions, entanglement with memories and in a word, the assignment of identity to place. Nuremberg "Norberg Schulz" is significantly influenced by other philosophies, pointing to fundamental differences in place and space and even in everyday language. The nature of space in terms of power is also associated with

movement and the nature of place is associated with stopping and pausing. He considers each pause as a reason for the possibility of turning a space into a place and introduces space as a place to move between places. In fact, place is a defined part of the general and undefined space that is formed in the personal relationship with human and his perception, emotion and experience. Place has been introduced as a center of meaning and a field of attention based on human experiences, social relations, emotions and cognition (Tuan, 1977).

Qualities of architectural spatial morphology from the perspective of thinkers

In this study, the morphological qualities of religious buildings with historical value have been considered by explaining the theoretical views on the subject of morphology. In this regard, relevant sources have been studied and environmental qualities have been extracted from the perspective of Western and Iranian theorists (Table 2). Among Western architecture experts, three types of views and among Iranian-Islamic experts, the analysis of five views became the basis for developing the final research model. After extracting the relevant criteria, based on the importance and quality, it has been prioritized and scored in order to finally provide a comprehensive interpretation of the examples of morphological qualities.

• **Morphological components from the perspective of Western thinkers**
The idea of space in the field of architecture has a very short life and most of its prominent point of views have been formed in the contemporary era and have been influenced by both modern and postmodern movements. According to the first view, the idea of space is derived from the cultural requirements of modern thought and only in this period with the addition of time, space has reached its true value and meaning. Therefore, the indicators of space in this thinking are completely based on modernist slogans. Also according to this

Table 2. Classification of Western perspectives in describing the morphological components of architecture. Source: authors.

Researcher	Reference	Component
- Bruno Zevi	- Zevi (2008)	- Space freedom - Detoxification - Continuous display of motion and time - Fluid flow in and out - Continuity of vision - Quantitative-qualitative domination of the intangible part to the tangible part - Empty overcomes feathers - Centrifugal - Extraversion - Maximum benefit from light and brightness - Dynamics and being alive - Lightheadedness - The feeling of beauty and human pleasure of space
- Robert Venturi - Christine Norberg Schulz	- Venturi (2010) - Norberg Schulz (2014)	- Space stillness - Return to symbolic and material properties - Restrictions and confinement - Distinguish between inside and outside - Vague layers of vision - Sensory dominance of the material and tangible part - Centralism - Introversion - A sense of darkness and shadow - Spatial calm and stability - Feeling heavy
- Siegfried Gideon - Jorg Kurt Grutter - Pierre Von Meiss - Adrian Forti - Hermann Hertzberger	- Gideon (2012) - Grutter (2007) - Von Meiss (2005) - Forti (2000) - Hertzberger (2008)	- Feeling of belonging - Interaction and challenge between - Motion-stillness - Freedom-Restrictions - Communication-Enclosure - Out-in - Space-mass - Empty – full - Centralism - Centrifugal

view, architecture is considered as (space art). The beginning of the second view was accompanied by the ideas of "Robert Venturi", who, by criticizing the unlimited freedom of space, questioned the boldest message of modern architecture of the psychic space and called for the revival of the old tradition (closed and contradictory interior space). In fact, from his point of view, creating the distinction between inside and outside is the main goal of interior spaces. In the third thinking, the basic characteristics of space are extracted without tending to one side of the dualities.

"Siegfried Gideon", one of the first founders of this balanced view, praised the approach of modern architecture (1960s) to sculpture and the importance of volume in space, calling for a balance in spatial indicators. In his view, the relations of volumes and material indicators should be emphasized alongside previous spatial thinking. This balanced view or lack of orientation in explaining space indices is also seen in the views of recent experts such as "Hermann Hertz Berger", "Jourg Kurt Groter", "Adrian Forti" and "Pierre von Mays" (Soleimanzadeh, Hbib & Etesam, 2019).

• **Morphological components from the perspective of Iranian-Islamic thinkers**

Examining the perspectives related to space in Iranian-Islamic architecture, it becomes clear

that in most of them, one-sided attention to some of the spatial features has been avoided; And the simultaneous role and presence of dual indicators has always been emphasized. This issue is the most important spatial difference between traditional Iranian architecture and modern or earlier (medieval, classical and ancient) architecture, in which features (materialistic and restrictive) or (Detoxifying) has been considered alone. This distinctive feature is evident in the study of the spatial effects of the "Sheikh Lotfollah Mosque" in Isfahan, which is considered a masterpiece of Islamic architecture in Iran and its inner space is the scene of simultaneous challenge between dual indicators such as: light-darkness, motion-stillness and material-immaterial qualities (Soleimanzadeh et al., 2019). Table 3 categorizes the dominant views in the analysis of space indicators in Iranian-Islamic art and architecture:

Using the overlap of the above two tables and sharing the views of Western and Iranian thinkers, the components of integration, permeability, diversity, intelligibility, transparency, flexibility, scale and proportion and spatial unity were extracted. Table 4 summarizes each of the variables. In many researches, physical context of that environment is the one of the influential parameters in the meaning of environment. According to what was said in the definition of variables. This study investigates the effect of physical components on the significance of space in the religious buildings of the Safavid period of Isfahan and in the case of Ali Mosque. Therefore, in other words, the independent variable in this study is the morphological components of space and the dependent variable is the significance of space. Based on the model obtained in this study, mental factors are divided into two categories: individual factors and social and cultural factors of the audience. The following individual factors such as: values, perceptions, mentalities, tastes and desires, can be examined, which in this study is considered

Table 3. Components of architectural morphology from the perspective of Iranian thinkers. Source: authors.

Resercher	Year	Index
- Seyed Hossein Nasr - Daryus Shaygan	- Nasr (1989) - Shaygan (2004)	- Centrality of empty space - Expresses the principle of monotheism
- Nader Ardalan - Lale Bakhtyar - Darab Diba - Kamran Afshar Naderi	- Ardalan & Bakhtyar (2000) - Diba (1999) - Afshar Naderi (1999)	- Introversion - Centerality - Continuity - Hierarchy - Continuity - Transparency - Axing
- Mohammad Reza Haeri Mazandarani - Seyed Hadi Mirmiran	- Haeri Mazandarani (2009) - Mirmiran (1998)	- Three types of space covered, closed and open - Mobility while stable - Composition while independence - Transparency
- Mahmood Tavassoli	- Tavassoli (1999)	- Connectivity - Permeability - variety - Unity
- Sara Sadeghi, - Mahmood Ghal'eno'i - Safoora Mokhtarzadeh	- Sadeghi , Ghal'eno'i & Mokhtarzadeh (2012)	- Enclosure and geometry - Variety and mixing - Applications - Compression - Confidentiality and introversion - Security

Table 4. Definition of research variables. Source: authors.

Variable		Definition
Integration	Relation	Each body honestly expresses its function and has an amazing relationship with other bodies in the unifying hierarchy (Noghrehkar, 2008).
	Continuity	Continuity can be considered as one of the physical manifestations of the principle of unity. Connection refers to the existence of a lawful and orderly relationship between the elements of a set, which results in the emergence of visual and semantic unity (Naghizadeh, 2007).
Permeability	Availability	Providing access does not simply mean being able to move to the places you need; Rather, availability, locating user coordination, is one of the main examples of proper access (Naghizadeh, 2007).
	Visual continuity	One of the manifestations of unity is the continuity of beauty in all spaces (Naghizadeh, 2007). Sudden changes in the facade of buildings weaken the visual continuity (Tavassoli, 1988).
Variety	Contrast	Different spaces are spaces that differ from each other in terms of width, length, height and enclosing elements. The value of different spaces is that it reduces the uniformity of connecting spaces (Tavassoli, 1988).
	Variety	It can be dynamically and statically adjusted by combining different but harmonious bodies by breaking the uniform empty space into several narrow and wide spaces in a dynamic and static way. This is actually reducing the length and creating diversity in the space that makes it visually interesting (Tavassoli, 1988).
Unity	Balance	Balance is equalizing or equalizing the visual weights in the facade. To achieve visual calm in the facade, all visual forces in a facade must neutralize each other (Tavassoli, 1988).
	Combination	A large number of different elements, in cooperation and coordination, form unity. In the view of the originality of existence, all the higher levels in the subject of existence reach unity and the levels of existence raise the levels of beauty (Noghrehkar, 2008).
Proportion and scale		Proportions are a set of ratios. Proportion between components as well as between each component and the whole can be established. Scale is one of the most important factors in understanding space and has a great impact on the type of relationship that man establishes with space. Measuring between two things creates a ratio and compatibility is the equality of these ratios. The basic goal of all theories about proportions is to create a sense of order and organization between the parts of a mixture (Noghrehkar, 2008, 407).
Transparency		Transparency means the possibility and ability to see beyond and this causes the root of this discussion to reach concepts such as internal and external communication, continuity, integration, lightness and finally to enlightenment (Diba, 1999, 103). Therefore, in architecture, transparency is a quality of space that is created in the relationship between inside and outside the surfaces of space and in fact its rigidity is reduced and becomes transparent (Dori & Talischi, 2017).
Flexibility		Each space system, with the ability to change internally, can meet the needs of more users at different times and thus have a more desirable function than single-function space systems. Achieving the ability to change in space systems is a sub-branch of space flexibility (Ghafourian & Aghaei, 2016, 43).
Intelligibility		Readability helps people to find themselves in space and feel safe in it and to be able to guide their body in it. It should be possible for the person to easily enter the building (entrance of the building) and with the knowledge of the point of origin, destination and route to reach it to position and identify (Okhot & Mamavi, 2015).

as a mediating variable. The type of perception and personal experience of the audience, perceptions, mental images and expectations are also among the factors influencing the research process, which was addressed in the form of an intervening variable (Fig. 1).

Research method

The research method in this research is descriptive-analytical. First, through library studies, definitions of meaning of place and morphological components of meaning-oriented architecture were extracted from the perspectives of various theorists and then
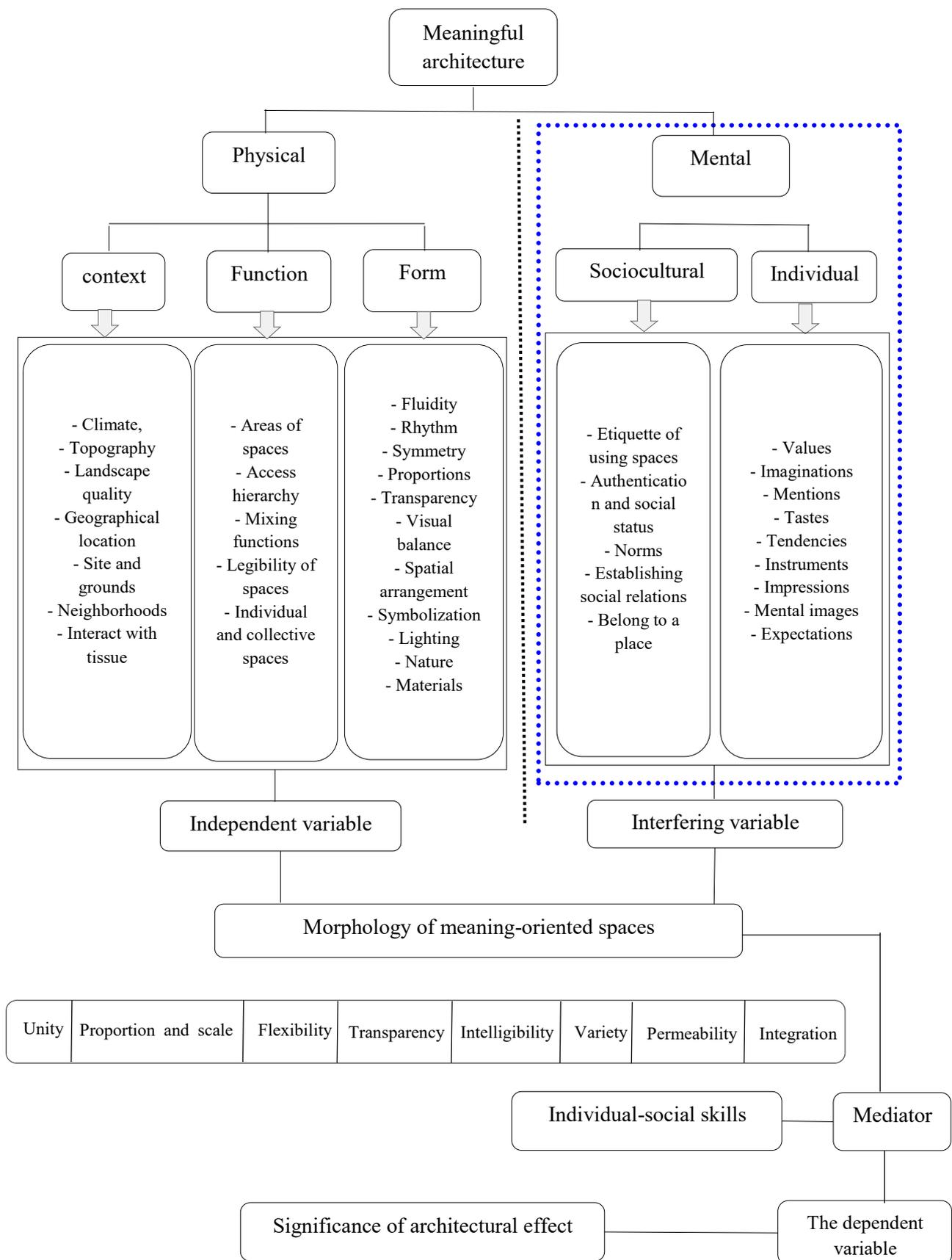
Fig. 1. Theoretical framework of research. Source: authors.

Ali Mosque of Isfahan was selected as a qualified sample for case study. The sample studied in this research is visually analyzed using the space layout method and specialized software of this method with the approach of visual graph, communication index and traceable depth (Kamalipour, Memarian, Feizi & Mousavian, 2012). The process is as follows: After preparing the maps from the Isfahan Documentation Center and preparing it, in order to achieve a variety of indicators of combined analysis using the axial map, among the software available in this regard, by studying and reviewing the software UCL "DepthMap" has been used for this research. By describing Ali Mosque as a case study of meaning-oriented architecture from the Safavid era of Isfahan, based on the theory of space layout, social relations in its architecture were analyzed. Combined features typically considered to measure the spatial configuration of an environment include: integration, permeability, variety, unity, Proportion and scale, intelligibility and flexibility. In the questionnaires section, according to the Cochran's formula, 384 users of Ali Mosque were interviewed at specific intervals and at different times during the week and in addition to the questionnaire, they were also interviewed. Finally, the spaces identified and prioritized by visitors were compared with the spaces predicted by the software model.

Space syntax
Analytical methods and techniques of space syntax have become a common tool in the faculties of architecture and urban planning. Continuous software development and its theories in Bartlett College and other places, the need for continuous theoretical and practical updates is inevitable (Hamedani Golshan, 2015). This process requires rethinking the basics and looking at developing those basics and finally implementing them on new case studies. In this regard, reviewing the basic concepts and implementing it on a valuable architecture is considered in this dissertation. The focus of the present study is to focus on

the religious buildings of Safavid architecture in Isfahan and as a case study of Ali Mosque in Isfahan and rethink the methods and developments that occurred in Bill Hillier's theory in its form. Considering that most of the studies conducted with this method have been related to urban research and contemporary architecture and in the field of meaning-oriented architecture, it is necessary to analyze examples that are highly relevant. For this purpose, prominent historical mosques reminiscent of previous centuries, whose manifestation of meaning in their bodies has been proven over time, were selected (Hejazi & Mehdizadeh Saradj, 2014). According to "Flanden", mosques are superior to all other buildings because the best resources have been used in them and magnificent mosques were built during the reign of Shah Abbas due to the emergence of central power and with the help of religious unity (cited in Nilforoshan, 2007). Also, "Henry Stirlen", in his book, which is decorated with the introduction of "Henry Carbone", pays attention to the subject of architecture and spirituality, a special school in Iranian philosophy, namely the philosophy of enlightenment and deals with the city of Isfahan as an example (cited in Sahhaf, 2016). Thought in the valuable building of Ali Mosque in Isfahan, can express the realities hidden in the heart of valuable Iranian architecture; It explored the spatial and social structures in it and ultimately helped us to understand the thought and life of our past.

Analysis of Ali Mosque in Isfahan using UCL "DepthMap" software
The analyzes were done through UCL "DepthMap" software and in the form of motion and visual analysis. Visual analysis in relation to an observer examines two modes: the number of spaces that are visually connected to each other and the number of observers that are visually connected to each other (Fig. 2). In kinematic analysis, the degree of correlation is directly related to the degree of connection and the degree of contraction or

diffusion of a space means that the spaces that humans have the most power of choice are more secure (Fig. 3).

Fig. 4 shows the correlation between connectivity and degree of connectivity. Blue indicates the lowest level of correlation and red indicates the highest level. The amount of R^2 in the linear regression equation of Ali Mosque of Isfahan is 0.93. Since the correlation is below 0.4 Weak, between 0.4 And 0.7 Average and above 0.7 is strong, this number is higher than 0.7 Indicates high correlation between components. Quantitative values of the measured components are given in Table 5 and Fig. 5.

The effect of physical components on the significance of the space in Imam Ali Mosque from the users' point of view

Morphological components that were introduced in the form of research variables; In the form of 30 questions, it was distributed among the statistical population. From the point of view of the respondents, "courtyard" is the most meaningful space of Imam Ali Mosque with a frequency of 54. Considering the frequency percentages, the interconnectedness and permeability components
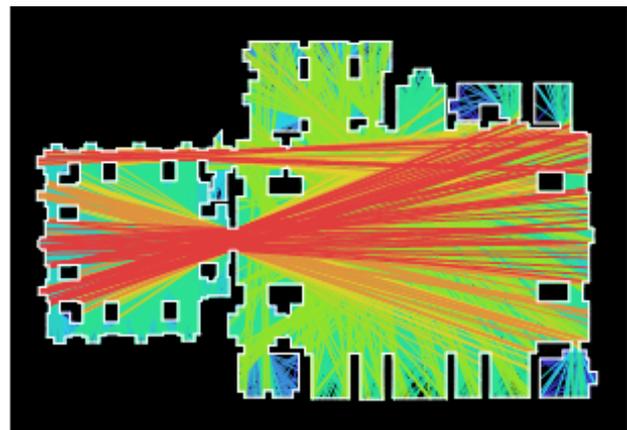

Fig. 2. Motion analysis of Ali Mosque in Isfahan. Source: authors.
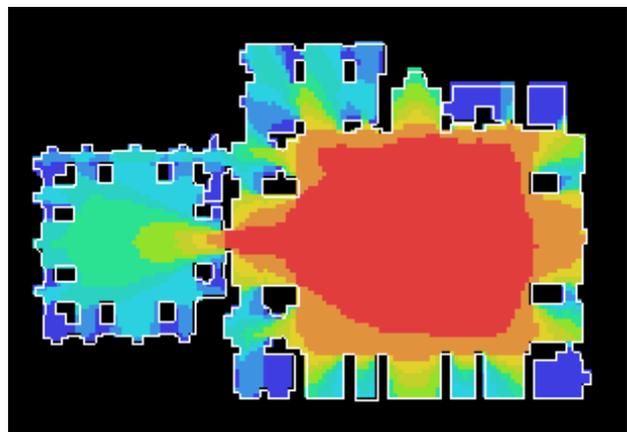

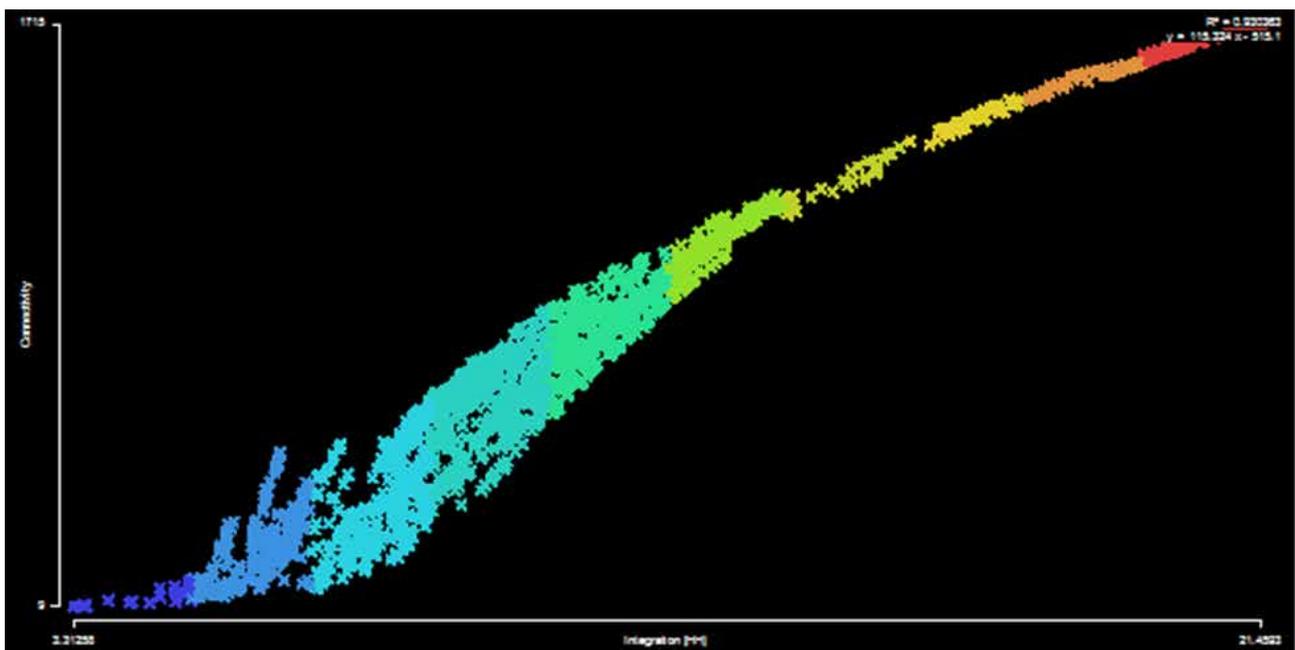Fig. 3. Visual analysis of Ali Mosque in Isfahan. Source: authors.

Fig. 4. Scattering plot of Ali Mosque. Source: authors. (Ali Mosque Linear Regression Equation: R2= 0.93, Y=115.324x-515.1)

Table 5. Results of spatial configuration analysis of Ali Mosque in Isfahan by DepthMap software. Source: authors.

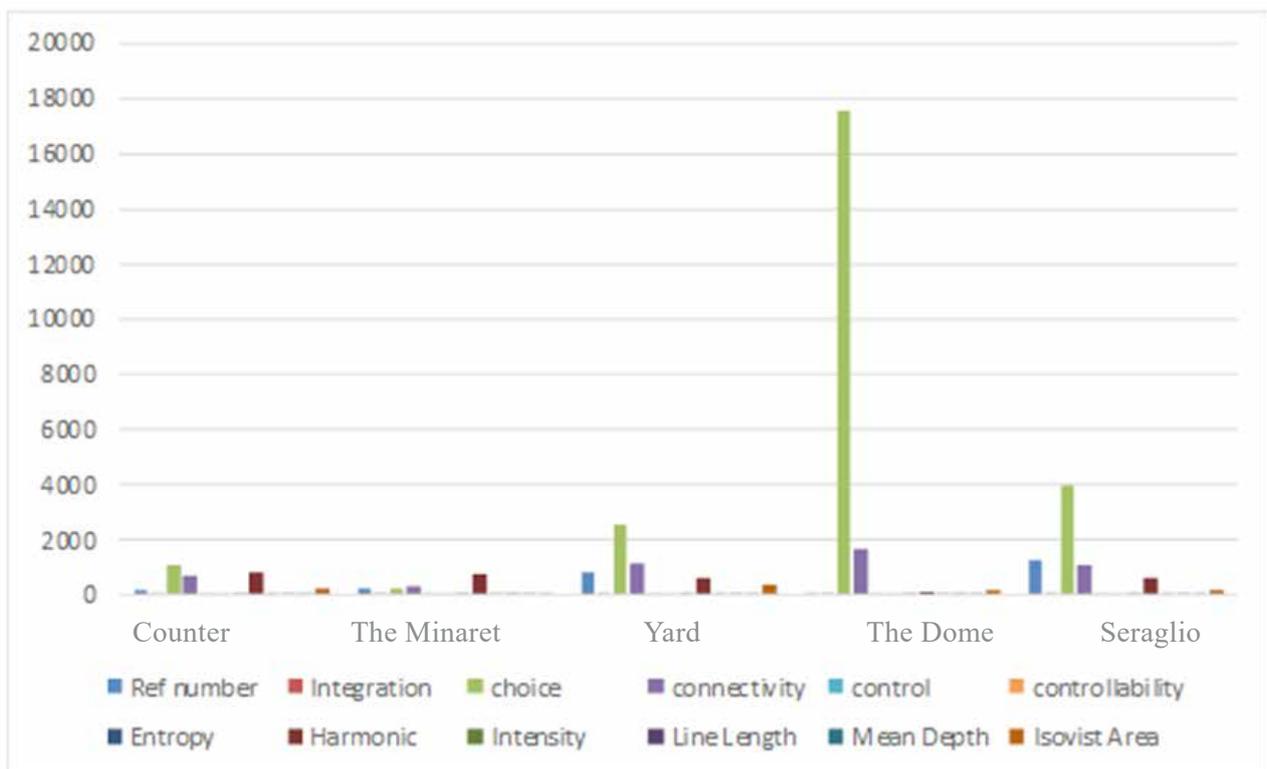| Name of mosque spaces	Ref number	Integration	choice	connectivity	control	controllability	Entropy	Harmonic	Intensity	Line Length	Mean Depth	Isovist Area
Counter	184	10/45	1099	673	0/80	0/25	1/16	828/263	1/36	15/20	1/85	222/335
The minaret	204	8/79	216	289	0/44	0/11	0/96	725/55	0/94	7/93	2/01	8/569
Yard	809	31/36	2541	1111	1/43	0/40	1/20	591/82	1/81	25/15	1/66	356/932
The dome	3	20/05	17541	1631	2/10	0/56	1/03	78/24	2/32	34/72	1/44	177/834
Seraglio	1250	13/30	3953	1102	1/42	0/39	1/20	591/54	1/79	24/10	1/67	180/127

Fig. 5. Diagram obtained from the spatial configuration analysis of Ali Mosque in Isfahan. Source: authors.

had the greatest impact on the significance of the "courtyard" in Imam Ali Mosque. Friedman test was used to prioritize the effect of research components on the significance of space in Imam Ali Mosque (Table 6).

In the interviews section, people were asked to

Table 6. Results of Friedman test to prioritize the effect of research components on the significance of space in Ali Mosque. Source: authors.

prioritize	Significance level	Degrees of freedom	The amount of chi-square statistics	Average ratings	Component
1				5/67	integration
7				3/07	Permeability
4				5/21	variety
5	0.001	7	144/923	4/70	intelligibility
6				4/69	Transparency
3				5/27	Flexibility
8				2/05	Proportion and scale
2				5/34	Unity

choose a meaningful atmosphere and state the reason for its significance. This data was encoded and classified by the Protege software. The research findings were classified and presented as a subset of morphological components of meaningful architecture (Fig. 6).

Discuss and conform the findings

In analyzing the morphology of Ali Mosque in Isfahan, two methods of software analysis (physical and objective analysis of space) and field perceptions (perceptual and mental analysis of space) were used to study space from a semantic perspective. Also, as can be seen from the analysis of research findings in the two mentioned sections, the physical and objective characteristics of meaning-oriented spaces are compatible with the perceptual and mental states of meaningful space. Accordingly, the adaptation or non-adaptation according to the research findings is explained as follows:

- In the analysis of software findings and in explaining the degree of interconnection, the yard with the highest value and then the dome, has the desired degree of interconnection. Field studies also show that the mezzanine or courtyard, due to the ease of access and having a high level of aggregation from the point of view of visitors, has a favorable connection. On the other hand, software results show that the minaret has a lower degree of interconnection due to its physical characteristics.

And the results of field surveys show the same. According to the obtained results, it seems that the software and field findings in this regard are consistent with each other.

- The numerical amount of the dome can be selected from other spaces of this mosque is more and the minaret has the least amount of selection. Field studies show that people move towards the dome after entering the mosque. Most people pause in the dome space and are impressed by the proportions, decorations and transparency of the space. Congregational prayers are held daily at noon and evening in this mosque and often merchants participate in it.

- Regarding the connectivity component, the dome has the highest value and the minaret has the lowest value. The results of field observations and interviews show that visitors move from the courtyard to the dome and the place of prayer. In this case, it can be said that the results of the observations and the output of the software are compatible.

- The amount of control and capability of the dome is more than other spaces and the minaret is less than other spaces.

- The disorder of the nave and then the yard is more than other spaces. The least irregularity belongs to the minaret.

- Software analysis shows that the counter is more coordinated than other spaces.
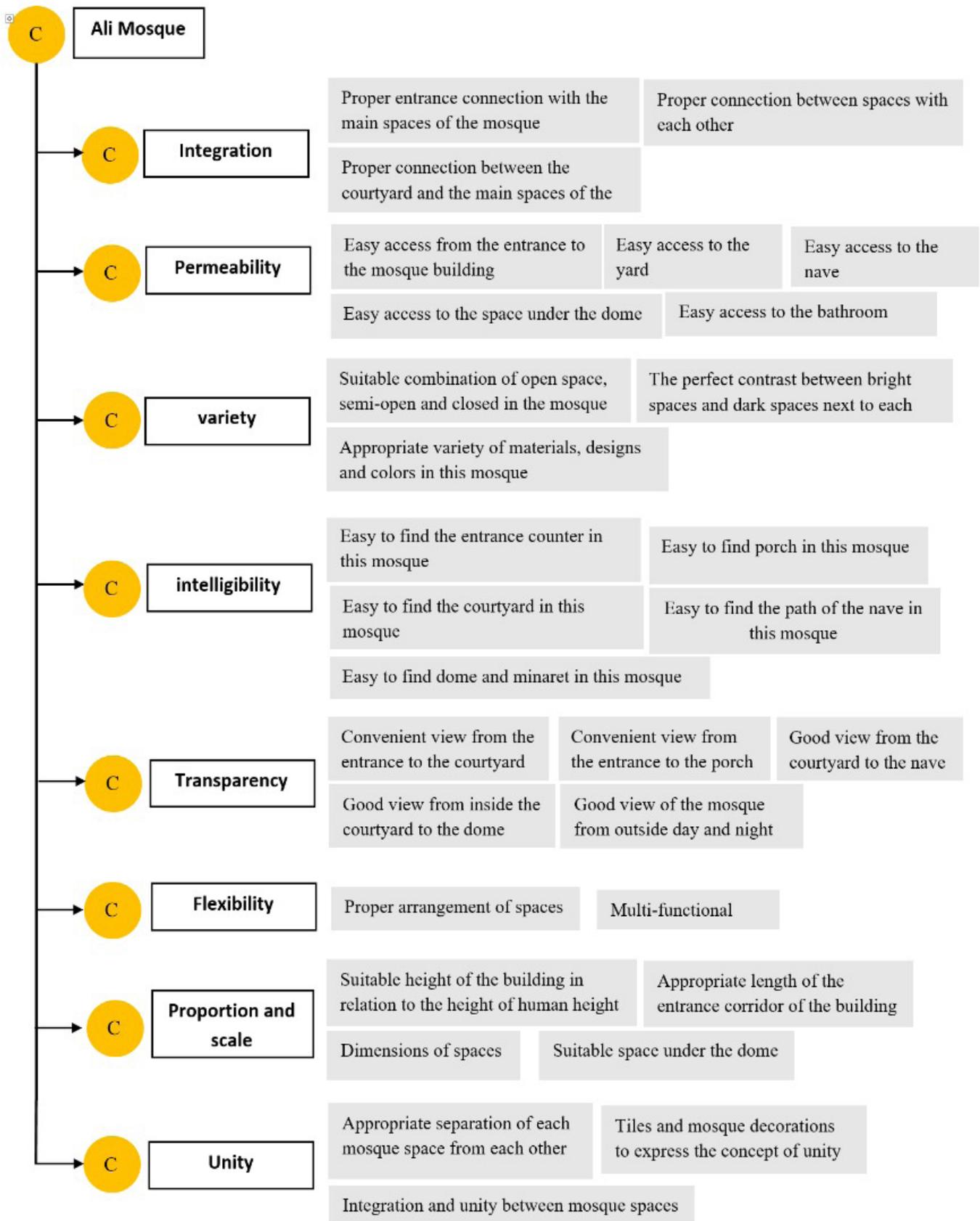
Fig. 6. Classification of morphological components of meaning-based architecture based on Protege software. Source: authors.

- The intensity and length of the line component have the highest value in the dome space.
- The medium depth component in the minaret has the highest value.
- The visual view of the courtyard space is more than other spaces and therefore its readability is more than other spaces of this mosque. On the other hand, by examining the results obtained from field observations, the dome as a space that has more transparency than other spaces, has a higher visual visibility and also the visual visibility of the minaret is lower than other spaces. However, the matching of the results obtained from the software output in explaining the meaningful spaces from a morphological point of view as well as the analysis of questionnaires and interviews, shows a relative matching regarding the position of meaningful spaces in the mosque under study. The difference between this research and similar studies, which was also mentioned in the research background, is in the meaning-oriented approach and the selection of a case study from among the religiously significant spaces of architecture. What has been done in architectural studies using space layout method has often been in urban spaces or sometimes single architecture that have measured morphological components in those urban spaces or architectural works. However, this study has been structured with a semantic orientation approach and has sought to find the reason for the significance of religious spaces from the morphological perspective of those spaces.

Summary and conclusion

What has been achieved in similar articles with the research topic has been the study of the degree of interconnectedness, readability, permeability, diversity and spatial unity in urban spaces and architecture so that its results can be used in the field of urban design and architectural design. This study seeks to find the reason for the significance of significant devotional spaces, whose significance has been proven many times throughout history in terms of mysticism and quality. This time from the morphological point of view and through the study of quantitative and of course qualitative components in the form of intervening variables and According to the semantic approach, following the study of the above-mentioned components in the special meaning-oriented buildings of the religious buildings of the Safavid period of Isfahan and Ali Mosque as an example of this period, which is still used according to the tradition of the past. Studies show that in terms of physical components that ultimately make the space meaningful and among the spaces of the mosque, the mezzanine space has more permeability than other spaces. Regarding the interconnection component, according to the outputs of UCL "DepthMap" software and field observations, the yard has a higher degree of interconnection. Coordination was also evaluated as another component of the morphology of meaning-oriented spaces and the space of the nave had a higher level of coordination than other spaces. The visual and readability components were examined in the same way. The results show that the yard has more visual and readability than other spaces. The opinion of users in the above-mentioned spaces also confirms this claim.

What has already been learned from the study of Safavid mosques has often been evaluated semantically in terms of mental components and through logical reasoning. Therefore, in the discussion of the meaning of space, less mosque spaces have been studied in terms of morphology and physical and quantitative components. This research has been formed to provide a reasoned answer based on quantitative outputs to analyze the reason for the significance of a space, which is a place of worship. In this regard, the physical components that can be measured by UCL "DepthMap" software were evaluated through the analysis of the mosque plan. Then, in order to match the numerical data with the visitors of the significant architectural effect, the field method of questionnaire distribution and interview was

used. Therefore, the main research question can be answered as follows: Architectural morphological components such as: Integration, permeability, variety, intelligibility, transparency, flexibility, proportions and scale and unity, are effective on the meaning of space in the religious buildings of the Safavid period of Isfahan and the prioritization of physical components as well as the selection of meaningful space from the users' point of view is compatible with software outputs and analysis by spatial arrangement method. The results of this research can be used to create meaningful architectural works in contemporary architecture.

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