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Screening the Components of the Sense of Place in the Residential Complex of Tehran

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Research Article

Abstract

In today's world, due to the increase in the use of technology and the quantification of criteria, disorders and meaningful gaps in social life, it is very important to pay attention to the quality of space and try to create a space that creates a sense of place. The existing residential complexes in big cities lack the spirit and sense of place and have become a shelter for life, which lack a sense of place in terms of perception and attention to the place and have not been able to communicate with their spatial users, this research aims to Identifying the importance of the effect of each component of the sense of place in the residential complexes of Tehran. The research method is of a descriptive-analytical and screening type, for this purpose, the dominant components in the sense of place were extracted through document analysis and library studies from articles and books, and then a questionnaire was used to examine the contribution of each component from the residents' point of view and screening. It was done in the sense of location of the residential complex of Tehran and fuzzy Delphi technique and MATLAB software were used to achieve this. The results indicate that in urban furniture, lighting with a value of 0.77 and membership degree H is the highest and trash cans with a value of 0.21 and membership degree VL is the lowest and can be removed. In the solid elements of the spaces, the elements with the value of 0.89 and the membership degree of VH are the highest. In natural spaces, the water feature is 0.85 and membership degree is VH. In the walls, panels with a value of 0.87 and membership degree of VH and doors with a value of 0.37 and membership degree of L are the lowest. In terms of landscape, the natural landscape with a value of 0.88 and the membership degree of VH and the skyline with a value of 0.21 and the membership degree of VL are the lowest. From urban furniture, trash cans are from the VL category, from the floor, the slope of the ground is from the L category, and from the

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natural space, the tree is from the L category, and from the windows, the doors are from the L category, and visual platforms are from the VL category, and from the perspective of depth of vision and weak points They belong to the L category and the sky line belongs to the VL category, and the quality of the color space belongs to the L category and they can be removed.

Keywords: Screening; Sense of Place; Residential Complexes; Fuzzy Delphi

1. Introduction

With the expansion of communication methods in the modern world, social relations have declined and decreased. In residential complexes, communicating with the environment and perceiving it through various senses has been degraded and has created spaces that lack the necessary efficiency and function, which, in addition to being useless, have become places that lack identity. Development in modern cities, humans has made the city and architecture unfamiliar with meaning and feeling and has created a large number of unknown and meaningless spaces. In general, the loss of the idea of the place of life can be one of the dominant crises in the present era and it causes a change in the perception of memories in the residential complexes of the modern world and turns them into a place without spirit and feeling and only a place for has been lived. In fact, these modern collections seem to have an insufficient sense of place. The impact that architecture has on the human soul and psyche in the short and long term is undeniable, the space can be from a dry and soulless and cold body to a body in which the sense and spirit of the place flows, currently in today's cities Spaces that are full of a rich sense of place are empty. In the same way, a good atmosphere has a positive effect on a person's soul and psyche and causes the emergence of identity crisis and unfamiliar symbols in large-scale cities. The interest in the sense of place has grown rapidly in recent years. And the concept of spending time has been transformed into entertainment and a wide range of programs (Stedman, 2003). The concept of sense of place is an interdisciplinary concept that is studied in sciences such as psychology, sociology, architecture, and geography. However, paying attention to place belonging has a historical background (Schultz, 2013: 52). This research is aimed at extracting the components in the sense of place and screening them with regard to residential complexes, which tries to answer the question of how many of the components in the sense of place can be effective in residential complexes and how many they can be deleted.

2. Theoretical Foundations

2.1. Sense of Place

Sense of place means people's subjective perception of the environment and their more or less conscious feelings about their environment, which places a person in an internal relationship with the environment, so that the person's understanding and feeling are linked and integrated with the semantic context of the environment. This feeling is a factor that transforms a space into a place with special sensory and behavioral characteristics for certain people. The sense of place, in addition to causing a feeling of comfort in an environment, supports the cultural concepts desired by the people, the social and cultural relations of the society in a specific place and causes people to remember past experiences and achieve identity (Falahat, 2006). In addition to physical elements, the environment includes messages, meanings, and codes, which people decipher and understand based on their roles, expectations, motivations, and other factors, and make judgments about it.

This general feeling, which then arises from the perception and judgment of the specific environment in a person, it is called the sense of place. The sense of place is an important factor in the harmony of the person and the environment, and it causes a better use of the environment, the satisfaction of the users, and ultimately their sense of belonging to the environment and the continuation of their presence in it (Sermast Metouslani, 2010). This concept covers a wide range from human entertainment and pleasure to more serious applications of life. This concept covers a wide range of relationships between people and place (Raymond, 2017), which includes the meaning of place and belonging to place (Stedman, 2003; Smaldone, 2005). According to Rolf, one of the factors in spatial semantic quality is the sense of place (Rolf, 1976: 43). Lynch sees the sense of place as a factor that connects people and places and brings unity (Schultz, 1997). A sense of place is typically associated with the connectedness of a group of people who experience a place. or feelings that people have attributed to a specific place (Cresswel, 2004). The sense of place is a subjective thing, and it changes based on culture and different experiences (Cross, 2001) and the sense of place means people's subjective perception of the environment and their more or less conscious feelings about their environment. It puts the inner with the environment. So that a person's understanding and feelings are linked and integrated with the semantic context of the environment. This feeling is a factor that transforms a space into a place with special behavioral characteristics for certain people. The sense of place, in addition to making people feel comfortable in an environment, supports the cultural concepts desired by the people, the social and cultural relations of the community in a specific place, and causes people to remember past experiences and achieve identity (Falahat, 2006). The sense of place is a mixture of self-conscious and unconscious feelings and perceptions and perceptions, a rich concept that includes how to receive, experience and express people, and gives a meaning, and a person's sense of place affects his attitudes and behavior in that place (Shamai, 1991: 347). In addition to physical elements, the environment includes messages, meanings, and codes that people decipher and understand based on roles, expectations, motivations, and other factors, and make judgments about it. This general sense that arises in a person after perceiving and judging the specific environment is called the sense of place (Rappaport, 1990). The perceived sense of place is descriptive, symbolic and symbolic of the concept of place (Steaman, 2016).

According to Lynch, the sense of place is a factor that establishes a connection between man and place and creates unity. He believes that space must have a perceptible identity and be identifiable, memorable and visible in order to create a sense of place. This kind of sense of place can also bring a sense of belonging (Lynch, 2016). Tuan has a different interpretation, he believes that "the sense of place is actually a distance, an abstract distance between oneself and the place" by which it is possible to understand the place" (Tuan, 1980: 4-8) The sense of place can be changed with external changes, with economic, social and political changes (Devine Wright, 2009). Modernity has a great impact on the loss of the sense of place. "The weakening of the sense of place through economic globalization is facilitated by the standard product" integrative concepts in the planning and development of urban spaces have sometimes led to the loss of local identity. As a result, currently urban development tends to reduce dependency It undermines the place and the depth of meaning as well as the diversity of the experience of the place (Scannell, 2010: 401). The sense of place is a dynamic link that a person has as a result of attachment to the place, awareness of the place, belonging to the place, satisfaction with the place and commitment to the place. The place develops them (Shamai, 1991).

The specific experience of a person in a specific environment (feeling stimulated, excited, happy, developmental, etc.) (Steele, 1981) is relative and everyone has a specific experience, but at the

same time collective, local and with a specific meaning that connects a person to the world. which transforms mere space into place (Hay, 1988: 208) sense of place emerges over time in long-term use of place (Stedman, 2002) sense of place is an experience created by the environment combined with what Six brings to it is created (Steele, 1981: 9) William in 2014 expresses two branches of the sense of place; Place as an axis of belonging and place as an axis of attachment (Raymond, 2017). They are from the human mind and without him (Lakoff and Johnson, 1999). A person is guided by the external factors that surround him, which also includes biological variables (Heft, 2013). Researchers generally use analogical methods to process such information. Input information is in the form of (cognition, belief, it refers to the belief and attitude and other mental representations about the place. Another approach that refers to the meaning of the place, which refers to the experimental processes about the construction of the place, such as the meaning and experiences of the place, which emphasizes the approach and interpretation based on knowledge and with the phenomenological conversational hermeneutic approach, how the sense of place is created is disseminated and established (Raymond, 2017). The sense of place is a link between a person and the environment as an emotional link between people and places is created after cognitions (Najafi et al., 2011: 189).

Table 1 Summary of theories

definitions	Concept	Theorist
The primary place is considered as a possible approach towards the conceptualization of space	concept	Aristotle 323
Archytas claims that every person occupies some places, and if those places do not exist, he himself will not exist (Swinburne, 1968).	dependent on the person	Archytas 428
The place seems to be acceptable by the scope that it covers and by the material objects and logical thinking.	objects	Swinburne 1934
A person is born in a village that exists before him, but gradually this village becomes his homeland with all his memories, paths and places become memories, and time and space become his life history (Schultz, 39)	the memories	Rudolph 1997
The sense of place is related to identity, and groups that are distinct and unforgettable places are not compatible (Schultz, 39).	Unforgettable place	Lynch 1981
He considers the sense of place to be experiences such as excitement and the inference of memory in a specific behavioral location and believes that it is the spirit of the place or the character of the space that evokes these special feelings.	Thrill	Steele 1981
He sees the sense of place as the experience of space by man, in other words, place is a combination of man and a special plan of the physical environment of his life, which is perceived and experienced through feeling. The desire to visit or not to visit, continuity and stability of presence, benefit from the place and participation in its activities originate from this feeling.	Space experience	Shamay 1991
The sense of place is the combination of characteristics that make a place special and unique and protect the cultural heritage of the areas, promote cultural awareness and kinship relations.	Unique place	Zou 1995
He believes that the sense of place is the distinguishing feature of the success of the regions, and with the sense of life, happiness and joy in the sense of place.	Vitality	Montgomery 1998
A sense of place is found in places that have a distinct personality. They are the identity of the place and this specific character is made of tangible things with materials, shapes, textures and colors.	Distinct personality	Norberg Schultz 2000
The sense of place is created from the interaction of three elements	Landscape -	Salvassen 2002

of location, landscape and individual interweaving, physical personality, ownership, authenticity, residents, amenities, private and collective spaces are effective in creating a sense of place.	location	
A sense of place is a shared sense of local history and geography that shows a combination of pride and commitment to improving the place	History and geography	Ralph 2007
The way places are controlled and managed over time affects the sense of place	Time	Cremona 2007
Signs are an effective factor in enhancing the sense of place.	Symptoms	Falahat 2006
Emotional attachment to a place can be related to the physical environment as well as the social environment	emotional connection	Kyle2005
The sense of place is a subjective matter and varies according to different cultures and experiences	subjective experience	Cross 2001
The perceived sense of place is descriptive, symbolic and symbolic of the concept of place	variable based on out	Devine Wright 2009
The perceived sense of place is descriptive, symbolic and symbolic of the concept of place	A symbolic description	Stamina 2016
The concept covers a wide range from human fun and enjoyment to more serious applications in life. This concept covers a wide range of relationships between people and places.	Man	Raymond 2017

In the diagram below, the variables in the sense of place literature have been extracted, which are categorized as follows;

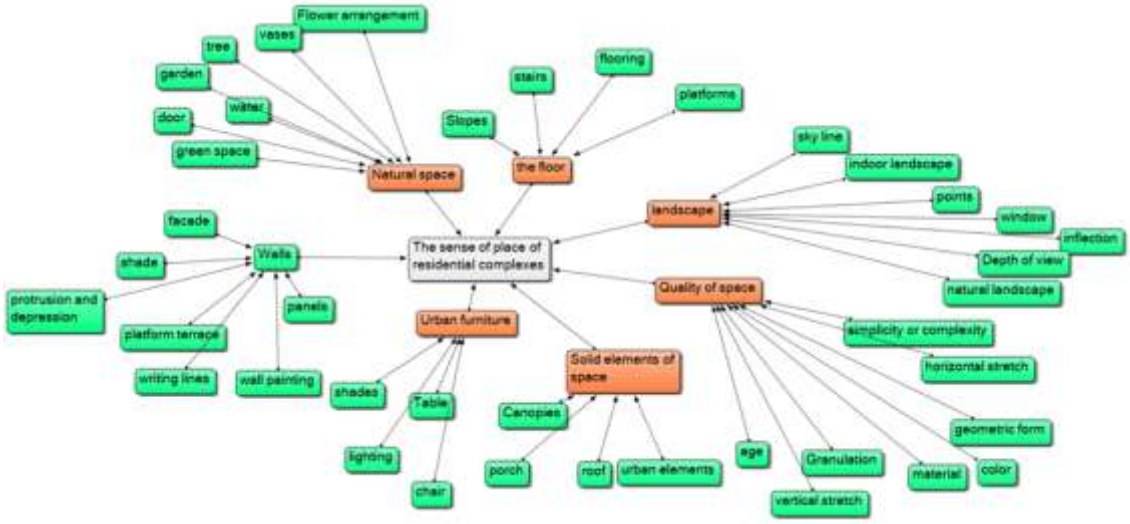


Diagram 1 Variables extracted from the theoretical and effective literature on the sense of place

3. Research Method

The research method of the mentioned research is applied in terms of purpose and descriptive-analytical in terms of method. First, to compile the questionnaire, experts were interviewed. Choosing the circle of experts is a very important part of the Delphi method. The awareness of this group is a good guarantee for the high quality of Delphi results; Therefore, the members of the Delphi circle in a study are selected based on specialization, not based on a random selection process. As a result, the researchers first selected a list of fourteen university professors who have extensive knowledge and vision in the field of vitality and have scientific-research articles and ISI. In the first stage, semi-structured interviews were arranged. In these interviews, the researcher tried to explore the approach and its relationship with the field of urban planning and architecture and to

identify the experts' view on the subject of factors influencing the improvement of the sense of place in the open spaces of residential complexes from their point of view. They also have two types of design approaches.

In the second survey, it was used to collect the opinion of each specialist about each K variable. If a variable is suggested, it is added to the list and additional variables are deleted. Finally, the desired questionnaire was compiled. The structure of the questionnaire including questions related to the main question of the research; That is, to investigate the extent of the effect of each of the sense of place factors in residential complexes and was in the direction of answering it. According to the experts, the sense of place codes and variables were classified into 7 thematic categories. These categories were: urban furniture, rigid elements of space, floor, natural space, window and quality of space. Then, the extracted variables were examined by a circle of fourteen experts in the form of a closed questionnaire with five-point Likert answers. According to the sense of place factors, the questions related to each factor include scores, which are added to the score related to the sense of place. It is checked for each element separately. According to this analysis, whether each of the sense of place variables are effective or not in residential complexes and also the extent of their influence is qualitatively determined. In order to perform the calculations, a score of 5 for "very high impact" and a score of 1 for "very low impact" were considered by each expert. In order to minimize the cost and time, the questionnaire was distributed among a random sample of the statistical community (residents of the considered complexes). The sample size was selected using Morgan's table, which includes 376 people who were randomly distributed in nine selected communities according to the population. In order to measure the reliability and validity of the measurement tool, the pre-test method was also used.

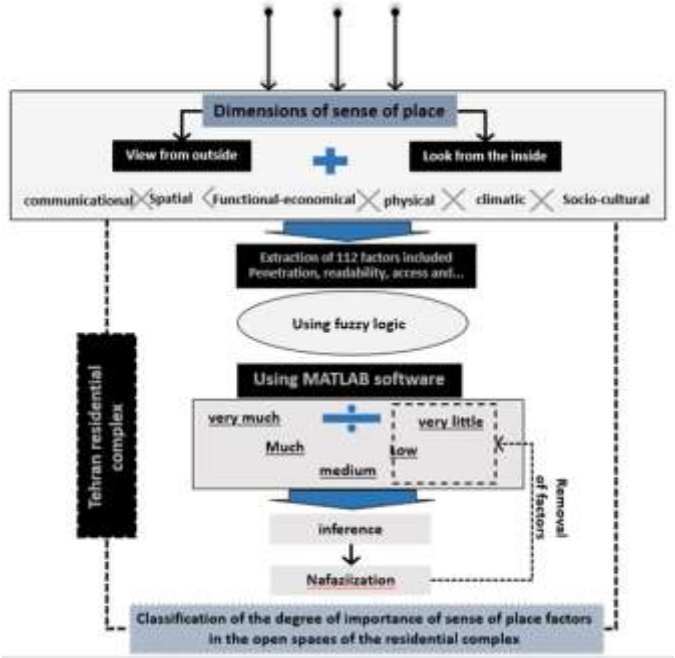


Diagram 2 The stages of performing the fuzzy Delphi research method

3.1. Fuzzy Delphi Method

Fuzzy logic is a mathematical theory used to express the complexity of unstructured problems. Fuzzy set is a function that can show the possible value of a set number between zero and one as

degrees of membership. In general, the evaluation process of fuzzy inference includes three stages: 1. Fuzzification 2. Inference and 3. De-fuzzification. The purpose of this research is to reach the most reliable group agreement of experts on a specific subject, which by using a questionnaire and asking experts' opinions, many times, it is done according to their feedback. In fact, this method is a complete examination of the opinions of experts, with three main points, unbiased answers to questions and receiving their feedback and their statistical analysis, answering questions in the Delphi method, subjective data of experts using analyzes Statistics become almost objective data. This method leads to consensus in decision making. The Delphi method has been used in many fields of forecasting, decision-making and screening (Abdullahzadeh and Arzhmand, 2011: 112). In the world around us, issues cannot be divided into two or more white or black categories, but each issue fits into a spectrum. Using definite numbers in solving problems such as prediction and classification will lead to results that are out of reality. The use of this method in order to make decisions and reach consensus on issues where the goals and parameters are not clearly defined. It leads to very valuable results (Cheng and Lin, 2002). In this method, thinkers present their ideas in the form of minimum possible, most probable value and maximum (triangular fuzzification).

3.2. Fuzzification

The main necessity in designing a fuzzy system is the selection of membership functions for linguistic variables. The importance of the obtained effect was defined by linguistic values (very low VL, low L, medium M, high H and very high VH). To screen the factors in the open spaces of the residential complex, the factors that are placed in low and very low floors will be removed from the list of factors affecting the sense of place.

Table 2 Membership functions related to the profile and importance of the effect to obtain the degree of membership

Function type	Membership function
Very low	$\mu_{VL} = \begin{bmatrix} 1 & 0 \le x \le 0.2 \\ -6.25x+2.25 & 0.2 \le x \le 0.36 \end{bmatrix}$
low	$\mu_{L} = \begin{bmatrix} 6.25x-1.25 & 0.2 \le x \le 0.36 \\ -6.25x+2.25 & 0.36 \le x \le 0.52 \end{bmatrix}$
average	$\mu_{M} = \begin{bmatrix} 6.25x-2.25 & 0.36 \le x \le 0.52 \\ -6.25x+4.25 & 0.52 \le x \le 0.68 \end{bmatrix}$
high	$\mu_{H} = \begin{bmatrix} 6.25x-3.25 & 0.52 \le x \le 0.68 \\ -6.25x+5.25 & 0.68 \le x \le 0.84 \end{bmatrix}$
Very high	$\mu_{VH} = \begin{bmatrix} 6.25x-4.25 & 0.68 \le x \le 0.84 \\ 1 & 0.84 \le x \le 1 \end{bmatrix}$

The most important part in the fuzzy inference method is building the law base. The purpose of writing these rules is to define various propositions that are obtained from the combination of different states defined for each profile (base and complement) (Pourghasemi et al., 2008: 375; Shakibaei, 2008: 149).

3.3. DeFuzzification

Non-fuzzification is a unit that has functioned from a fuzzy set to a definite value. In this study, the final deterministic value, in fact, the center under the surface of the curve in the final fuzzy sets, was obtained (Amini Fashkhudi, 2014: 39-45). The final value of the output is calculated from the

following equation, where y is the output value, μ(y) is the degree of membership of the output y, and Y is the true value of the output.

$$\bar{Y} = \frac{\int y\mu(y)\,dy}{\mu(y)\,dy}$$

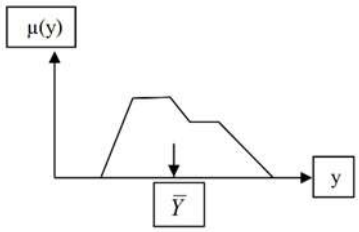


Diagram 3 The method of nephasizing the center of gravity (source: Monem et al., 2007) Statistical population of participants

The statistical population is the thinkers and experts in the field of architecture and urban planning, who are experts in the field of architecture and urban planning, and 33 of them are selected as the sample size. Residential have a resume. The first person will be selected in a targeted manner and the next ones will be selected in a snowball manner.

Table 3 Selected experts

Position	Field of activity	Number
University professor	Urban planning	5
University professor	architecture	8
Professional designers	Urban	7
University professor	Complex and town design	6
University professor	Urban sociologist	4
University professor	Behavioral psychologist	3

4. Study Area

Due to the limitations of the research, field studies were focused on selected areas that can be generalized to the whole city. At first, based on the available statistics, areas with the largest number of residential complexes were selected; Then, all residential complexes eligible for research were identified and visited in the field. Based on the information collected in the field, matching and comparing the data, the common factor between the collections, the extraction and the typology model of the residential complexes with the open space approach were compiled.

Due to the tendency to build multi-unit complexes and its noticeable increase, the statistical community included areas that tend to build more residential units in one complex (Rafiian and Hadadan, 2007, 105). According to the picture below, the massing space in the neighborhoods of Tehran also indicates the superiority of the northern areas of the city based on the number of units in the license plate. Therefore, northern regions 1 to 7 and region 14, 21 and 22 were selected as the studied regions.

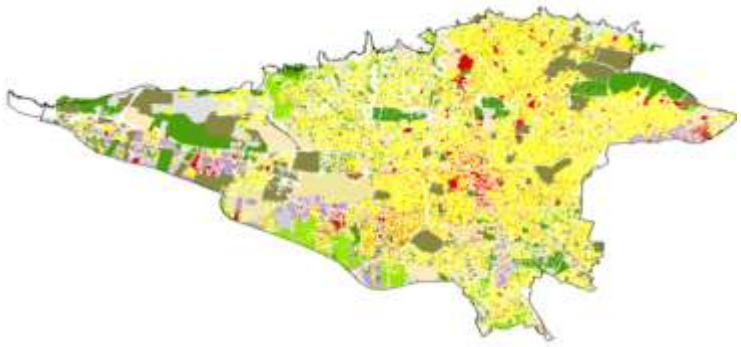


Fig 1 Residential density in the regions (Source: Tehran municipality data, 2018)

The initial selection of collections is based on the amount of open space. For this purpose, all residential complexes of nine regions were extracted with the help of existing maps of Tehran, GIS maps and satellite images. Then, all the residential complexes whose open space is more than 65% of the land surface were taken and visited in the field, and the detailed specifications of each complex were taken. Also, based on the available maps, Google Earth images and field survey of the site plan of the collections were extracted. In order to obtain a sample that represents the entire statistical community, residential complexes as described below, whose characteristics cannot be generalized to the entire city, were excluded from the studied community.

• Military and law enforcement complexes that are built and supervised by the Ministry of Defense and the Army of the Islamic Republic.

• Residential complexes that belong to a specific and limited segment of the society.

• Residential complexes that, despite allocating less than 35% of the area to the built space, their open space is undesigned, barren and lacks green space.

• Residential complexes that, despite being built at the same time and integrated, do not have a precise and specific spatial boundary and are sometimes divided into smaller blocks.

• The residential complexes where the residents stay for less than 5 years, the complexes in the northern areas of the region, belong to the constructions of the last decade, which were formed by the expansion of the city, and the complexes belonging to the decade of 1970 are concentrated in the middle part of the region. None of the residential complexes located in Haft region, due to their limited open space, did not match the conditions of this research. In total, in nine regions, 52 eligible collections were found for the purpose of the research. According to Table 4, the complexes include 637 blocks and 29,476 thousand residential units.

Table 4 Statistics of studied residential complexes in each region by the number of blocks and units

Name of the region	The number of sets	Total block	Total unit
1	3	17	1216
2	23	353	11925
3	2	6	805
4	7	59	2114
5	4	71	8540
6	6	22	1360
14	1	2	320
21	1	16	404
22	5	91	2792
Total	52	637	29476

Table 5 Typology of residential complexes in each region by the number of blocks and units

Number of units			Pattern of open spaces of residential complexes	Height
+505	**216-504**	**216 <**		
Spring city arrow	-	Nasim Danesh	Scattered	**6<**
College students Kush	The mountain Apadana City culture 1	Saman region 2	Strip	
-	-	Prophecy	Concentrated	
Sadra Akbatan	Sinai Flowers zone 4 purple Behjatabad	Flowers (Sadatabad)	Scattered	**12-7**
-	Besat	Golnaz	Strip	
-	Academics Optimizers Ashrafi Mahan	The breeze	Concentrated	
Glory be to you Hormzan Prince Park Future A Future B	Golestan Pars Sattarkhan Venk Pars Biston and Persepolis	Tulip	Scattered	**+13**
-	-	-	Strip	
Ati-saz C Mehstan Hafez A.S.P	Hope Iran land Sarvistan	Mahestan	Concentrated	

5. Findings

In this study, the importance of the factors that make up the sense of place was calculated using Matlab software and they were classified based on the degree of membership (Table 3).

According to the above diagram, the importance of the effect of each language variable is shown. In order to evaluate the fuzzy model, the sense of place factors and features whose quality was determined by experts according to the desired quality index were calculated using the software and used as the output of the fuzzy model. In fuzzy logic, a work belongs to two membership functions with different degrees of membership. Finally, the highest degree of membership determines the importance of the effect of the type of linguistic variable. When the variable x is increasing, the amount of the effect value is changing and increasing from a very low attribute (very low linguistic variable) to a very high attribute, which is shown in the Table 2; That is, as the variable x increases, the value of the language variable in each class increases, which can be seen in the output of the matrix as a class, for example, if the variable is x=0.53, it belongs to the middle class and If the

variable is x=0.67, even though it has increased numerically, it still belongs to the middle class. The fuzzy Delphi method of this fuzzy logic solves this problem, and its output is meaningful based on the degree of membership, and for example, if the output of the fuzzy logic is Yˆ = 0.67, then the fuzzy logic determines the degree of membership for two membership functions. It improves slowness and uncertainty.

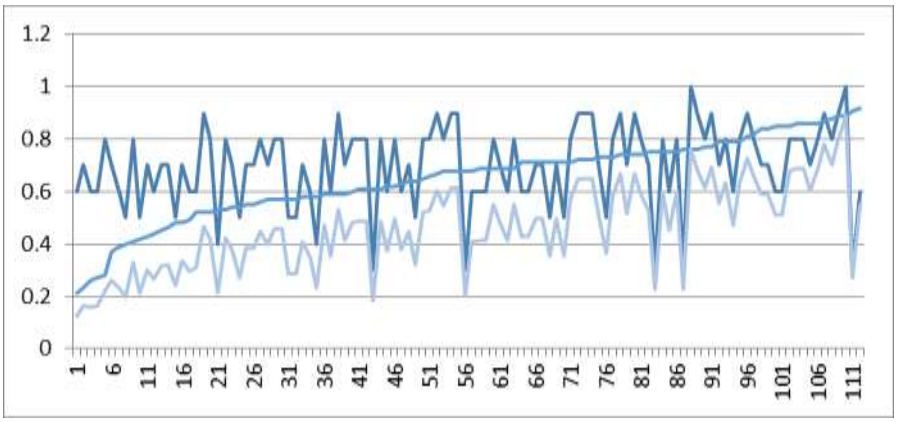


Diagram 4 Classification of the importance of each linguistic variable

By examining the table 6, it can be seen that out of 49 factors, in urban furniture, lighting with a value of 0.77 and membership degree H is the highest, and trash cans with a value of 0.21 and membership degree VL is the least and can be removed. In the solid elements of the spaces, the elements with the value of 0.89 and the membership degree of VH are the highest. In natural spaces, the water feature is 0.85 and membership degree is VH. In the walls, panels with a value of 0.87 and membership degree of VH and doors with a value of 0.37 and membership degree of L are the lowest. In terms of landscape, the natural landscape with a value of 0.88 and the membership degree of VH and the skyline with a value of 0.21 and the membership degree of VL are the lowest. From urban furniture, trash cans are from the VL category, from the floor, the slope of the ground is from the L category, and from the natural space, the tree is from the L category, and from the windows, the doors are from the L category, and visual platforms are from the VL category, and from the perspective of depth of vision and weak points They belong to the L category and the sky line belongs to the VL category, and the quality of the color space belongs to the L category and they can be removed.

Table 6 Components that were removed in fuzzification

Fuzzy Logic					
Factor	Degree of membership	Category	Factor	Degree of membership	Category
Table	0.53	M	Door	0.37	L
Trash bin	0.21	VL	Written lines	0.55	M
The chair	0.56	M	Prominence and depression	0.53	M
Lighting	0.77	H	Symbolic shades	0.71	H
Shades	0.61	H	Mural	0.69	H
Raoqha	0.69	H	the terrace	0.59	M
Ceiling	0.54	M	Visual platforms	0.21	VL

Germans	0.89	VH	boards	0.87	VH
Slope	0.44	L	view	0.59	M
Platforms	0.56	M	window	0.79	H
Flooring	0.69	H	depth of view	0.49	L
Step	0.58	M	weak points	0.51	L
Flower decoration	0.68	H	Interior view	0.60	M
Flower pots	0.61	M	Natural landscape	0.88	VH
Fountain	0.85	VH	Skyline	0.21	VL
Garden	0.68	H	Scale	0.84	VH
Tree	0.52	L	Old age	0.87	VH
Green space	0.69	M	Simplicity or complexity	0.85	VH
Floor / Solid elements of space / Urban furniture / landscape / Wall / Natural space / Quality of space			Vertical elongation	0.62	H
			Color	0.49	L
			Material type	0.74	H
			Horizontal elongation	0.84	VH
			Geometric form	0.64	M
			Grading	0.89	VH

In the diagram 5, an example of the surface observer of the fuzzy model is presented considering the effect of 49 variables in different dimensions as input variables. In this diagram, you can see how different input values affect an output value (sense of location). In the sense that you can see the reaction in one view. According to the diagram below, the sense of place is associated with an almost irregular trend of the qualitative degree recorded in the surface observer.

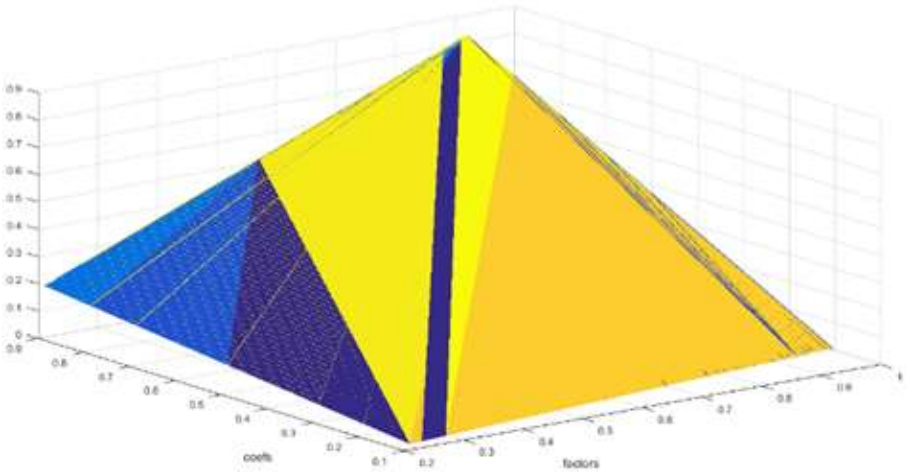


Diagram 5 Variables in the areas of urban furniture, solid elements, walls, etc. with MATLAB software

In this way, relying on the table and considering the direct effect of the investigated indicators on the sense of place of the mentioned residential complex, the frequency distribution of the two residential complexes was visited in the field according to the diagram below, and for the accuracy

of the effect of each variable, a linear diagram was made. The regression for the drawn factors, which indicates the accuracy of the impact in the residential complex, both lines benefit from a curved slope.

In addition to being an arena for the formation and strengthening of people's social interactions, residential complexes are places with the characteristics and requirements of a house, they are also a suitable place for recreation, entertainment, sports and spending leisure time of different strata of society, but nowadays in researches Various open spaces in residential complexes are limited to closed and limited spaces of balconies or small private yards on the ground floor, parking lots or shared spaces without a plan, and the sense of place is only considered from a few dimensions. Therefore, in order to make proper use of this approach in residential centers, the importance, location, and function of residential complexes were investigated and analyzed in this research in order to use the maximum capabilities of open spaces to achieve a place with a sense of place. And in addition to that, it should also contribute to collective benefits, to achieve some kind of revival of family activities in traditional and private courtyards of houses. Finally, after adapting this relatively complex chart to the current state of open space in residential complexes and relying on analytical comparison, it was determined that;

It was found that the presence of lighting is very important among the urban furniture in the residential complexes of Tehran and it can make the presence of people at all hours of the day and night and increase the efficiency of the spaces. There is a difference between the daily hours, from the solid elements of the space, the elements due to the meaning and conceptualization of the narrative, as well as the metaphor of the specific themes, can be engraved in the audience's mind and create memories, and from the natural space of the presence of water features due to the softening of the air. Both physical and psychological aspects of people can cause more impact than other factors. Due to the presence of decorative elements and the emphasis on additional elements, the panels can strengthen the sense of place and evoke the desired feeling in the spatial audience and give a special identity to the space. From the point of view of the natural landscape as a background for different images and with minor changes in different seasons, it can increase the sense of place in the space or create it. For the accuracy of the influence of each factor in both residential complexes, a regression line is drawn for the distribution of the obtained data. The slope of both these lines has the same coefficients in the direction of increase. This is due to the influence of the components to a slope and amount in each of the oil or non-oil collections. In the next step, in order to check the impact of each of the variables in different dimensions, the factors that have "low" and "very low" effects were screened. From the table 1, items such as trash cans, trees, doors and visual platforms and depth of view, weak points, sky line can be removed due to being in low and very low.

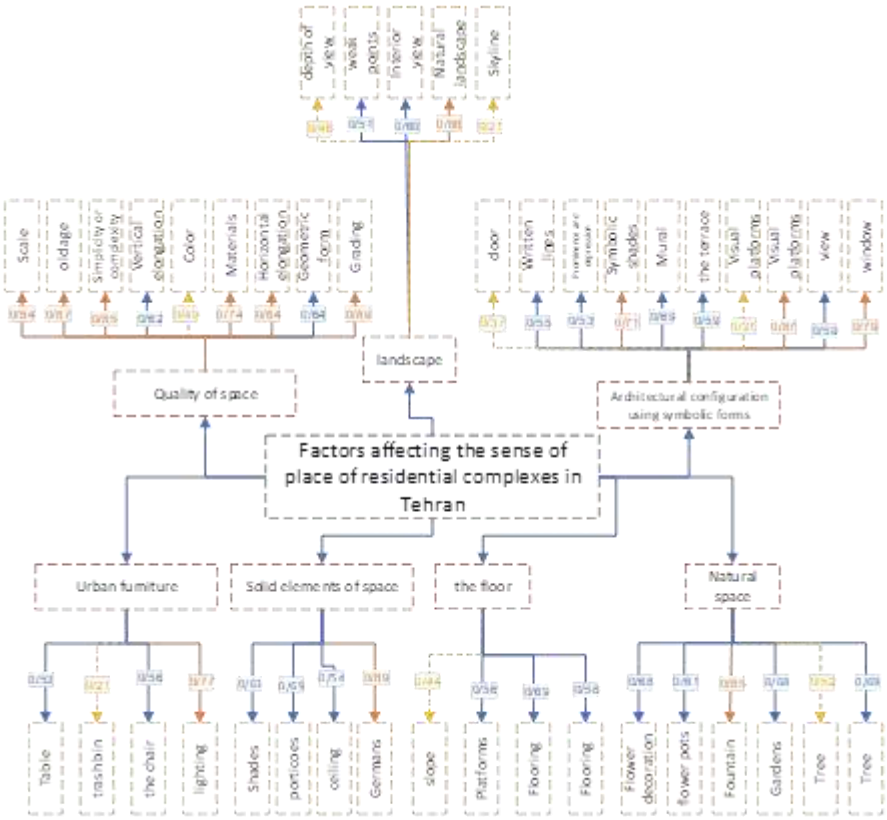


Diagram 6 Effect of each factor on the sense of place of residential complexes

6. Conclusion

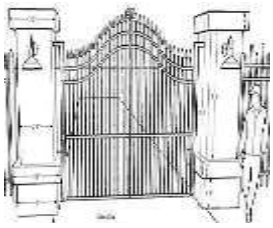
Cities are considered to be the greatest achievements of mankind in terms of technological, economic, cultural, and social aspects. The different relationships of people with each other and the living space of the tunnel are exciting. Following this, the need to pay attention to the concept of the quality of space and its improvement in residential complexes is already felt. Because the basic role of the environment is to respond to predetermined functions. If the environment is not designed properly, the desire of people to be present in the space and participate in it will be reduced and the ability of the person to communicate with the environment will be lost. In other words, if the surrounding environments located in residential complexes are not purposefully and creatively designed, they cannot establish the necessary relationship with their users. Therefore, in addition to its physical aspects, these spaces should also be addressed to its spiritual aspects, so that its effective factors can be used as the first and most vital residential space and the desired quality of the spaces can be restored. Residential buildings in Tehran city are from the sense of place and the investigation of environmental indicators and their screening. For this purpose, theoretical literature in this area is first collected and the factors are extracted. The criteria were scored in five categories according to table 1, and finally the variables that had "low" and "very low" effect on different dimensions of the sense of place were removed, and thus the effective factors in the sense of place in Residential complexes were identified.

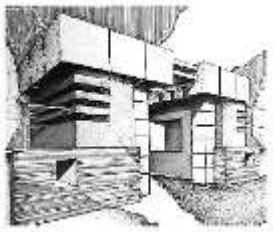
The conducted evaluations show the fact that the categories that have a "high" effect on the sense of place of residential complexes are respectively: quality of space, view and view, windows,

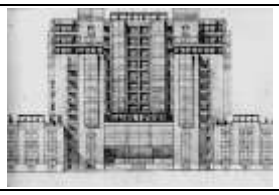
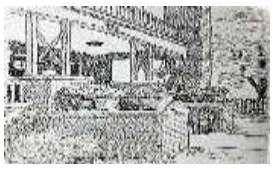
solid elements of space, natural space and urban furniture and floor. Also, the sense of place in different groups by families has not been taken into consideration and exploited in almost any of the visited complexes. Only in some residential complexes, according to the special design of a group of building blocks, private terraces and balconies have been created for residents, which, due to their considerable size, meet the needs of a group of families for outdoor space. Also, the scattered structure of the mentioned complexes has led to the creation of spatial diversity and a different range of privacy and public in the open space of this complex; And the amount of direct lighting of the apartments and natural ventilation between the blocks is more than the patterns of other complexes.

Components related to cultural and social needs and activities exist only in some residential complexes, which, of course, have been considered in open spaces after residents felt the need and by changing the use of parts of parking lots or building low-quality buildings. Is. The components of the economic field have been built in the form of commercial complexes in various scales in the visited complexes. In almost all the visited complexes, the physical, spatial and environmental-climatic aspects have been considered. For productivity and inducing a sense of place in residential complexes, various components and reinforcements should be used in the space.

Table 7 Solutions for the sense of place in the residential complexes suitable for each component

Components	Solutions	Sketches
Height	In order to achieve the advantages of the short-order species to increase the security and controllability of the environment, as well as to use the advantages of the intermediate-order species to increase the density per unit area and increase the area of open space, it is suggested to use a combination of these two species. The location of the middle tier should also be such that it does not cast a shadow on other buildings.	
Physical, social and economic continuity	In order to achieve the present components, the site of the project is selected in such a way that it can create a suitable link with different uses such as commercial and green spaces. It is also suggested to consider commercial and sports use in the physical program on a scale that has justification and continuity of economy.	
Identification	In order to achieve the present components, more diversity in the design of residential units, as well as differentiating the different scales of the complexes from each other and legibility and diversity in the form of the buildings, which causes the adjustment of the scale of the large complexes, is suggested.	
A sense of security	Defining the territory of the residential complex by physical factors and defining an entrance gate with a guard, reducing inappropriate visibility along the fence around the complex with physical factors and softening it by using natural factors, avoiding the creation of dumb and blind corners by considering. Pedestrian and riding routes around the site, creation of medium density in order to avoid crowding or solitude, the ability to monitor the open space of residential units.	

Children's play area	The children's play environment should be established in such a way that a proper view from the units to the playground is possible.	
Seating areas	It is recommended to pay attention to the sitting space for parents to observe and supervise children, the type of bench, the choice of the location of the bench according to the surrounding views, the types of seating and special rest benches for the elderly and the physically challenged.	
Permeability	The small scale of the constructions, especially in the open spaces of the complex, so that there is suitable land for creating all the activities in the complex. There is a path for riding and walking inside the complex. So that it is possible to access the place for both pedestrians and riders. The existence of a hierarchical system inside the plans and in the open space of the complex.	
Variety	Diversity in space and scale of space and height. Such as the variety in the number of floors and the existence of various plans in the blocks and the existence of different uses in the complex and the absence of uniform and uniform buildings. Variety in facades and decorations. Variations in light and reflectors, such as the use of mesh windows. Diversity in structure.	
Readability	The presence of the main gate and the presence of a guard at the main entrance of the complex. The presence of necessary readability in the facades of the building. Like the non-identity of the views and the form of the buildings. Ease of understanding the space from the functional aspect. Respecting the spatial hierarchy of the entrance, yard and spaces inside each unit.	
Key body elements	Existence of elements such as road, edge, domain, sign and nodes such as the main and central square.	
Flexibility	There are places to increase activities and increase social interactions. Like having a chair to sit in the green space. Existence of active places such as sports field and children's playground and places to sit and shopping center and coffee shop. Ability to change activity in space. Like the presence of a suitable balcony to be used as a space for eating in some seasons. The presence of shady vegetation and temporary canopies.	
Applicability	The existence of a space with a multi-purpose appearance, such as the use of fountains and covered ceilings. Appropriate combination of spaces with each other. and the existence of spatial hierarchy, order, unity, geometry and symmetry.	

Visual proportions	The presence of quality details, especially in the facade. The presence of balconies in most of the block's plans. The amount of shading according to different heights should be taken into consideration. The volume should be designed in a way that it prevents the creation of shadows in the central life of the collection.	
Sense of belonging	The possibility of color belonging to the environment by people who can change their values, interests and personal signs based on it. Such as the use of natural materials and materials, including stone and brick, which can cause the mind to belong to the building and ultimately cause familiarity with it.	
Use of natural agents	Proper use of sunlight. For example, all plans should have light from at least two sides. Optimal use of wind. Dealing with issues caused by temperature rise and fall. For example, indoor and outdoor spaces should be made according to different seasons of the year in terms of temperature balance.	

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