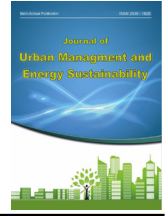


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Evaluation of mental image of topological representation method with emphasis on urban identity (Case study: the central area of Kashan city)

Sahar Rasmi, Majedi Hamid*, Zahra Sadat Saeideh Zarabadi

Department of Urban Development, Science and Research Branch, Islamic Azad University, Tehran, Iran

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ABSTRACT

Mental images and cognitive maps are considered a means of achieving the internal representation of the environment, which has experienced a variety of methods and methods of extraction in the past few decades. It is this variety that makes the comparative examination of mental-cognitive image extraction methods and their comprehensive knowledge, especially their strengths and weaknesses. The main purpose of the research is to explain the influential components of urban identity in the concept of a mental image about its topological representation, which has raised questions such as the validity and mechanism of the influence of topological mental images. It is interpretive-historical research carried out through a case study. The required data are collected using library study and observations. In the present study. The method of data collection is a literature review, as well as field collection using environmental impressions, as well as the use of interviews, and questionnaires. According to the framework of the research, the central block of region 1 of Kashan city was selected based on the use of the evaluative mental image method, cognitive map extraction, and based on the triple topological representation extracted from the proposed model, in the form of a Likert scale of valuation and score. Finally, the selected block with a score of 2.31 in the course of typology has more dominance as a performance-oriented species. In future research, in addition to the development of the method, morphological science with a palmistic approach to urban tissues can also be used.

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*Corresponding Author:

Email: majedi_h@yahoo.com

Phone: +989121114998

ORCID: <https://orcid.org/0009-0002-5374-5669>

1. Introduction

The social life of people and their identity as citizens is due to the survival and durability of the society, and social identity is necessarily superior to the identity of individuals (Tavakoli, 2013). This type of identity can have an origin that happened in a person's mind as a result of living in a body for a long time (Najafi & Shariff, 2011). A structure that includes an urban body in which there is a kind of imagination and reading (Deely, 2003). From a social point of view, cities are suitable places for the formation of social institutions and the promotion of cultural values, the expansion and consolidation of social relations and relationships, and the protection of human values and identities. They are national and local. Identity is a normative and value category and is considered to mean a sense of belonging and this identity with the environment, and criteria such as a sense of security, memorableness, sense of belonging, and dependence are used to evaluate it (Mirmoqtadai and Talebi, 2015). Identity is considered to mean the feeling of belonging and sameness with the environment, and criteria such as a feeling of security, memorableness, sense of belonging, and depending on the landscape and evaluation of identity have been developed and used (Danshpour, 2004). Christopher Alexander considers identity as the physical embodiment of nameless qualities in buildings, with qualities that are the main basis of the life and soul of every human being, city, building, or pristine nature, but cannot be named (Mahdoinejad et al., 2009).

The lack of identity, disharmony, and disharmony that is present in the cities today and is expanding day after day, has not only created an unpleasant image and an unfamiliar environment for the residents but has overshadowed all aspects of social and environmental life in urban communities. (Habib, 1387) Therefore, it is always necessary to mention a spectrum where on one side, identity is in the lowest meaning, i.e. The name of an object or a person, and on the other side of the spectrum, the endless meaning of identity, and all discussions of identity, regardless of suffixes, In addition, they are located on this spectrum (Habibi, 1995). According to the common definition, "identity" is the feeling of belonging to a material and spiritual set whose

elements are already formed (Nofel et al., 2008). It is a process-oriented structure that leads to a self-aware phenomenon. (Carrier, 2004) For the first time, Hanachy and Sardorod (2006) provided a detailed definition of mental image, which included two components: personal characteristics and image. Pakdaman (1997) also introduced the factor of location as the inevitable principle of mental image, and people such as Mashhadi Zadeh (1995) introduced mental image in the sense of place. (Martens & Reiser, 2017) Mental image as a type of destination image is a general symbolic system mixed with historical, architectural, cultural, and ritual works, which is referred to as a mental perception product. (Zhao & Fu, 2019) Therefore, destinations as the end point of the road are considered by citizens as a clear example of a mental map (Vinyals, 2019) and it is the only mental phenomenon that can be politicized exclusively by each person as a cognitive strategy to improve the environment (Uysal, 2013) mental images and cognitive maps are considered to be the means of achieving the internal representation of this phenomenon in the environment, which has experienced a variety of methods and methods of extraction in the past few decades. It is this variety that makes the comparative examination of mental-cognitive image extraction methods and their comprehensive knowledge, especially their strengths and weaknesses, important. In this research, using a combined strategy, including qualitative strategy and classification of the resulting data, they were typified and finally analyzed and evaluated in an interpretive strategy with an inferential approach. The literature related to the subject has been reviewed and analyzed critically, and the aspects of the subject have been tried to be fully but briefly examined and pointed out.

Cognitive maps are important theoretical concepts and methodological tools that enable the acquisition of information from mental images of the environment. The topic of cognitive maps has been used by cognitive scientists, psychologists, neuroscientists, etc. (As well as researchers of cultural and social issues) as the main reference for the mental images of space or space metaphors, and for this reason, numerous

interpretations and methods Diversity is seen in the use of cognitive maps. But so far, no research has been observed that has independently examined the psychology and pathology of these methods in a comprehensive way, and also a way of representing the environment as a comprehensive method of extracting mental and cognitive images has not been defined. The typology of the concept of mental-perceptual maps, despite the different definitions, “there are some differences in the definition of a mental map that all definitions are derived from a general concept. In a very simple way, the term mental map means creating a map in the mind” (Ashraf, 1974). a mental map is an image created in the mind of a large object - to the extent that it is not possible to grasp its entirety through a single cognition as an internal representation (Danesi, 2007). Although “mental images” do not play an essential role in spatial behavior, their role in creating “mental maps” as a tool for creating and maintaining individual awareness is very important (Behzadfar, 2010) and this is important in Islamic cities with a background of the urban fabric. It has had a historical appearance. (Donboli and et al., 2019) Mental maps as a manifestation of consciousness, is an image of a place or environment, more in the body of the analysis of the mentioned methods in the whole representation of the landscape and the urban environment in terms of the methodology of the combination of “mental maps” and introduces “conceptual maps” and considers the extraction of cognitive maps to achieve a “general cognitive map” from the representation of the environment to be faced with harm; First, the “weakness of the process” which has led to the elimination of the drawing quality of the elements and their details, and the second is the “weakness of the graphic system” which is limited to Lynch’s five elements, and finally the “impossibility of comparing the results in different methods”, especially the methods Evaluation and drawing that cannot be used parallel to each other due to nature and methodology. Therefore, the use of new technology tools such as the global communication networks of the Internet and media and computer software and simulation and the like will be formed shortly as a primary

tool and then as a new method, which today shows signs of it in people’s preference studies. Is visible. However, the studies of this research show that these tools and methods are still not used in research.

Mental images, cognitive maps, landscape, environment, methodology, typology, the survey of research in the field of city landscape from the 1960s until now (the course of evolution from objective approaches) shows cosmetic-decorative (to mental-perceptual) (Golkar, 2001) the old fabric of the Kashan city is one of the contexts that currently, due to physical wear and tear, lack of facilities and equipment, infrastructure, access within the neighborhood and the inability to respond to the needs of today’s life, with the escape of the resident native population and the replacement of rural immigrants and the lower classes of the urban society, Afghans, etc. Go through the process of stagnation and destruction. In addition, due to the outflow of capital and the decrease in economic value, we have seen that a large part of the urban area, which on the one hand have cultural-historical values and on the other hand have significant potential for urban development, is being isolated day by day. And by leaving the circle of active urban life, they lag behind the development cycle. The old structure of the historical fabric of Kashan was made up of the main structure of the fabric (organic network) and a special spatial organization (Qarache Draghi, 2010). Each neighborhood was considered an administrative, social, cultural, economic, and religious unit of the city (Birshek 1375). In general, the change in the physical-spatial structure of the old fabric of Kashan city, started at the beginning of the century with the collapse and the breaking of the city wall. It was completed by drawing cross streets a little before the 40s, but basically, the physical development and functional changes of the city should be considered seriously from the 40s onwards. The importance of any research can be mentioned in the first place to the role and position of the research topic in different fields and the specific field under study and its necessity in solving the current issues and problems of the society that are related to them. A mental map is an image that a person makes of a phenomenon in his mind. What is worthy of consideration is the

commonalities and distinctions of cities. What is imagined as an image in people's minds is a result of knowing and understanding the structure and components of urban identity to preserve the values hidden in cities. And we explain the role and position of identity in the meaning of perception and mental images and cognitive roles of means of achievement. In general, the mental image of the whole is derived from a person's emotional and sensory perception of the environment as well as the result of event-oriented social interactions based on the individual's collective or group activities, which can be made in addition to the human and natural factor, the basis of the man-made factor, which in the body of the city is hidden. This issue originates from environmental psychology in the person and remapping the sensation and perception of citizenship and finally its personalization in the city. (Figure 1)

From this point of view, the methodology of obtaining mental images and accordingly cognitive maps will be a key issue in environmental research. Mental images and cognitive maps are important topics in the fields of urban design

and contemporary urban planning and have recently become one of the important axes of landscape architecture. Examining each of the methods of extracting people's mentalities from the natural and man-made environment is an effort to criticize the methods and explain more comprehensive methods to be used in future research. Of course, there is no doubt that any method of extraction based on the ultimate goals of the definition research and the type and quality of the resulting information is also dependent on it. Both landscape architects and urban designers have benefited from a variety of ways of representing the environment. Therefore, according to the expansion of interdisciplinary fields that rely on the points of commonality that are growing rapidly, dealing with the phenomenon of environment representation using mental-cognitive image extraction techniques can be an important common thread in the promotion of the field of landscape architecture or urban design. The main purpose of the research is to explain the influencing components of urban identity in the concept of the mental image about

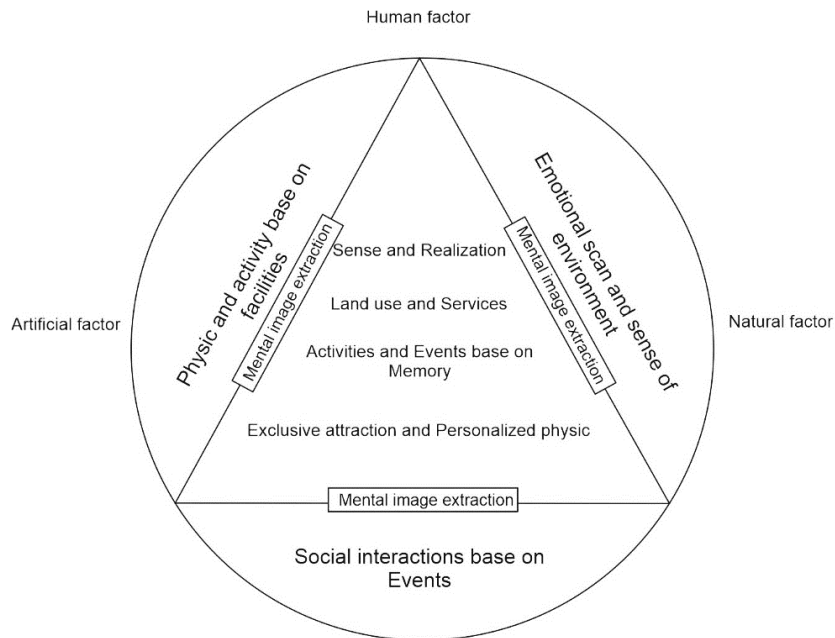


Figure 1: The conceptual mechanism of the mental image based on the influential components in the form of environmental psychology

its topological representation so that questions such as the quality of the influencing components of urban identity in the concept of mental image and also how the mechanism of the influence of topological mental image on the reconstruction of urban identity in the local model. It was suggested that the presented model is mainly based on the principle of concavity of the concepts and also the theoretical examination.

2. Materials and Methods

The current research is analytical-descriptive in terms of structure, which is the main goal. It is a type of applied and developmental research that can be done. Also, due to the lack of previous research on the subjective concept of topological representation, it is expressed methodically in the specialized branch of design science and urban psychology. The method of data collection will be library and field extraction using environmental impressions as well as interviews and questionnaires. At first, according to the main components of the city's identity, medical sub-components will be explained, and in the next layer, the concavity of these sub-components will be explained according to the concept of the mental image. The characteristics evaluated according to the conceptual understanding of the mental image in the urban identity and the suggested indicators are also expressed in this structure, which ultimately typological and representation method can lead to the achievement of the goal.

2.1. Research Background

In the review of the research background, in the position of mental image and cognitive maps based on urban identity, so far, no research has been observed that has independently examined the psychology and pathology of these methods in a comprehensive way, and also a way of representing the environment as a comprehensive method of extracting images. Mental and cognitive are not defined. But in the dimension of urban identity and focusing on the concept of mental image as one of the understandable examples of identity in the city, the following can be mentioned:

3. Findings and Discussion

To investigate a case study of Kashan city, district one has been selected as a central district with a valuable fabric, especially with a historical market complex, in which, according to the structure of zoning, the selected zone is because of having things such as; The core of the fabric and having a high level of urban signs, a high level of user lines, as well as a connection to the market complex and a high number of historical houses is examined to check the mental image.

3.1. Representation process

According to the background of the research mentioned, as well as the explanation of the theoretical foundations and also the general principles used in the fourth chapter, representation as a method requires its style and structural principles. According to the presented techniques, the evaluative mental image presents a psychological structure, which includes subjective evaluations of feelings about the environment. This means that the evaluative image includes two types of variables; Visual aspects of city form and human evaluative reactions. In this regard, visual features act as independent variables. On the other hand, human evaluative reactions are also among the dependent variables. A place has a pleasant evaluative image if it seems good to ordinary people (those who have experienced the place regularly). Based on this, the area in question can be proposed according to Lynch's cognitive elements based on the structure of the spatial organization in the area in question as follows:

Based on the results of the questionnaire to extract the image of the citizens of Region 1, focusing on area number 2, the dominant activity and sign in their mental map can be expressed and categorized as follows:

Therefore, at a glance, the cognitive map of the citizens of the target area can be matched with the researched evaluative mental image, so that this evaluative mental image is confirmed in the mental structure of the citizens. To find out the amount of pinning of elements in the mental image, the necessary compatibility with the combined representation method should

Table 1: Research background

Researchers	Year	Type of studies Results presented	Methodology	Field of study	Results presented
Lynch	1960		Drawing a mental map (30 people as a sample), structured interview	Urban information	Citizens organize the urban environment in their minds and measure legibility with elements such as signs, roads, nodes, edges, and areas.
De Jonge	1962		Drawing a semi-structured mental map and interviewing 20 experts and 100 non-experts in the next step	Urban information	A study of mental maps in three Dutch cities based on Lynch's results
Dalton & Bafina	2003		Evaluation of simulation software	Urban information	Examining readability and visualization in connection with the city based on Lynch's views regarding Space Syntax
Nowak	2003		Interviewing 60 people (30 families and 30 teenagers), drawing cognitive maps	Urban information	The study of Lynch's method in the city of Ty in Poland showed that readability is not a function of the physical structure of the city, but it exists in the minds of teenagers as a spatial connection.
Al-Gilani	2005		Interviews and questionnaires (face-to-face with 117 people and the use of context-oriented theory in the results of content analysis)	Urban information	Evaluating the quality and mechanism of the mental image of an Islamic city
Police et al.	2005		Closed questionnaire based on a Likert scale of 1291 people and maps of the region	Anthropology	Sloven's mental image study shows the percentage of people who believe that mental images should be divided into geographic maps
Smith	2005		Content analysis and logic in interpretation	Urban information	Studying the mental image of post-industrial citizens of Barcelona and creating a theoretical framework based on the variables of the modern city
Mannarini, Tartaglia, Fedi and Greganti	2006		Questionnaire of soldiers in three big cities (1031 people) in Italy	Urban information	Content analysis of people's response in a relationship between the mental image of the neighborhood and social sense
Martinez et al.	2007		Semi-structured interviews (12 people) and questionnaires to 623 people	Urban information	The study of 9 variables of the city of Granada, shows the presence of important architectural elements, the individual contributions of citizens, social problems, and pollution, which are important variables.
Long and Xiang	2007		Sketching, cognitive maps, and interviews	Urban information	Expressing the relationship between human cognitive representation by Space Syntax in the subject of readability
Boland	2008		Content analysis and logical interpretation	Anthropology	The result shows the importance of the media such as radio, television, and written media that lead to the image of the city
Yu-ling Benni	2009		Viewing and studying sample cases	Urban information	Assessing the quality of designs to enhance the visualization of Hong Kong streets in a landscape-oriented approach
Hoppers	2010		Logical interpretation	Urban information	The results show the mental image of citizens in the concept of urban business
Zhu et al.	2015		Content analysis and qualitative assessment	Urban information	The results focused on how mental images of metropolises are created in shaping the globalization process of Chinese cities
Daneshmand	2018		Questionnaire and evaluation by Depthmap software	Urban information	The results show that physical, cognitive, and perceptual aspects can be changed based on physical solutions

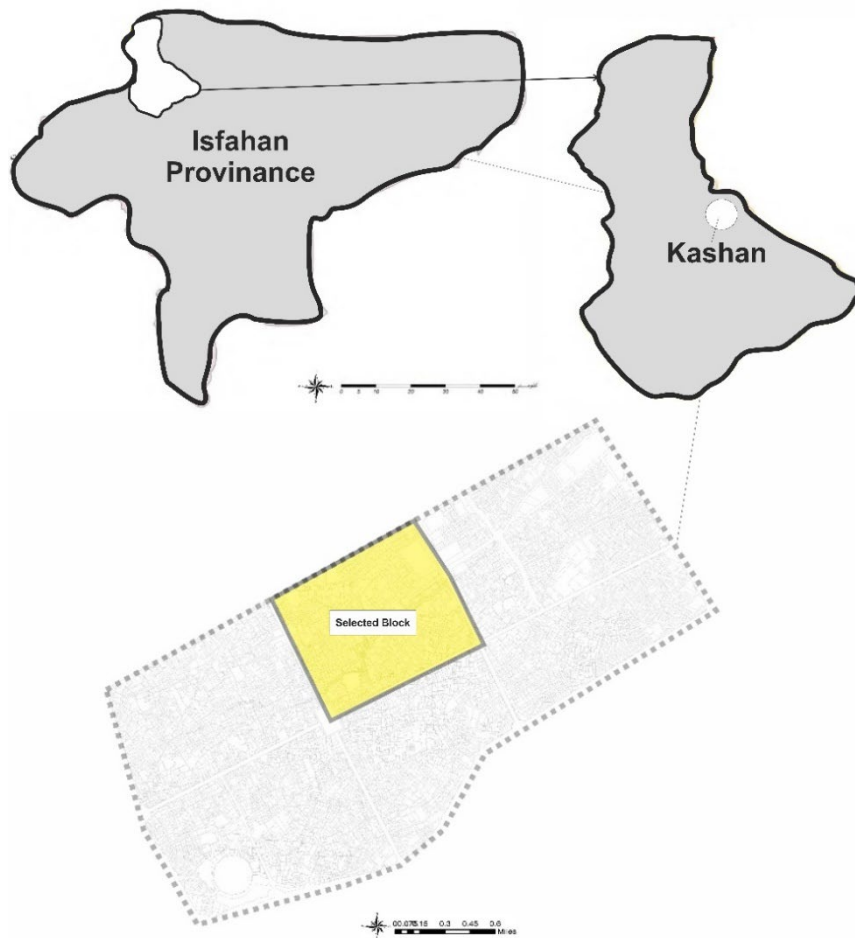


Figure 2: district one in Kashan city

Table 2: Evaluative mental image elements in the Lynch map of the studied area of one Kashan region

Axis	Shahid Rajaei, Madani, Baba Afzal, Bab al-Hawahj, Mohtsham, Abazar, Mir Emad streets
Sign	Darvaze Dolat, Mir Emad Mosque, New Caravanserai, Hammam Khan, Raste Mesgarha, Soltani School, Derb Zanjer, Bakshi Caravanserai, Abanbar Khan
Area	Rate bazaar, Darb Zanjer, Kilimiha, and Haj Jamal neighborhoods
Edge	-
Knot	Kamal al-Mulk Square, Faiz Square

be stated. This method of representation can be expressed typologically when there are specific representatives based on the dimension of identity in the physical-spatial form. For this purpose, to explain the presented concept, there

is a need to present the resulting recognition model:

Based on this, the representation method can be presented in a specific typology to evaluate the mental image by specifying the species code:

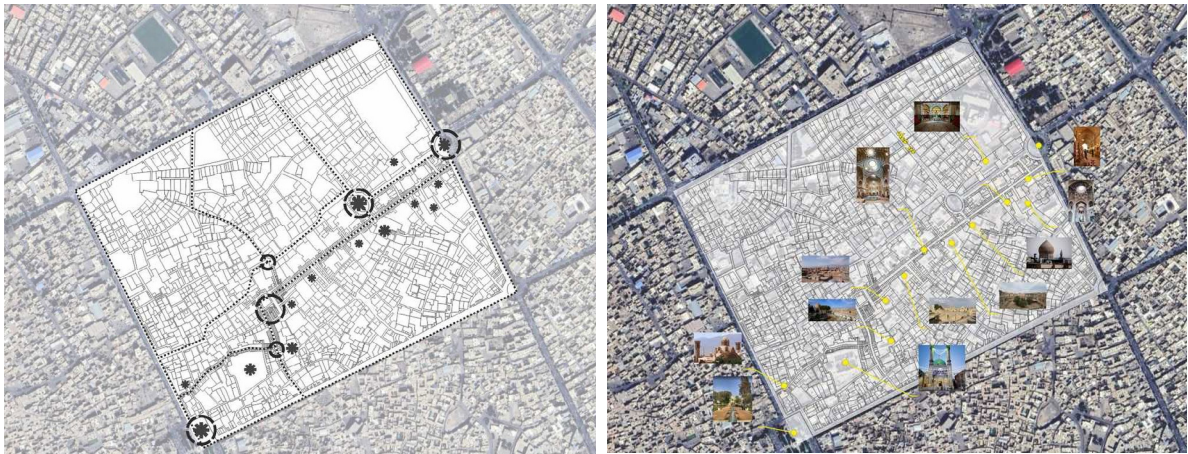


Figure 3: The right image: the neighborhood map of the selected area and showing the elements of the left image: the cognitive map of the selected area, taking into account the node, sign, and road elements

Table 3: Questionnaire results

Mental image indicators	Questionnaire results		
	Street name	The dominant activity they remember	The dominant sign that they remember
The mental image of the residents of Zone No. 2 in the district of Kashan	Shahid Rajaei	Carpet and confectionery markets, office buildings, and banks	Sardar Bazar-Darvaaze Dolat- Darvaaze Dolat Square
	Madani	Golab market, Carpet market, and Services	Ameri Building Complex - Mosque and Bank
	Baba Afzal	Carpet-retail exchange	Mosque-school
	Bab al Havaej	Retail guilds and handicrafts	Sar Dar Bazaar - Bank - Water and Wastewater Department
	Mohtasham	Retail industry	Bank, school, and mosque
	Abazar	Carpet sales branch - the government uses - retail sales	Imam Square - 15 Khordad Square and Darvaze Dolat Square - Darvaze Dolat Square - Sardar Bazaar
	Mir Emad	Retail trades	Mir Emad Mosque-Emadi Complex-Hammam and Emadi Mosque
Cognitive maps of residents of the area	Examples of items mentioned in residents' cognitive maps: Mosques, historical monuments, banks, squares, and market square		

- The meaning-oriented type (based on the semantic perception of citizens) code number 1
- Performance-oriented type (based on function and facility dimension) code number 2
- Form-oriented type (based on the form structure in the urban body and architecture)

code number 3

Based on this, according to the type of symbolic valuation, each of the items is specified in the order, in the sense of non-existence to the highest extent, it is used to compare and analyze the effectiveness of each index ●◐◑○

Table 4: Questionnaire results

Mental image representatives	Questionnaire results
Residents' sense of belonging	34% due to easy access to the city's important roads
	22% due to good neighborly relations
According to the questionnaire, 74% of the residents of Zone No. 2 of one Kashan region like their residential neighborhood, and they stated the reasons as follows:	6% due to neighborhood security
	6% because of the relaxing environment
	6% due to the existence of important local active activities and uses
The sensory richness of the streets of District No. 2	Move-in the market
	The concave point of religious and ritual ceremonies
	<ul style="list-style-type: none"> • Mir Emad St • Madani Street • Abazar St • Khaiyan Baba Afzal • Mohtsham St • Bab Al Hawaj St

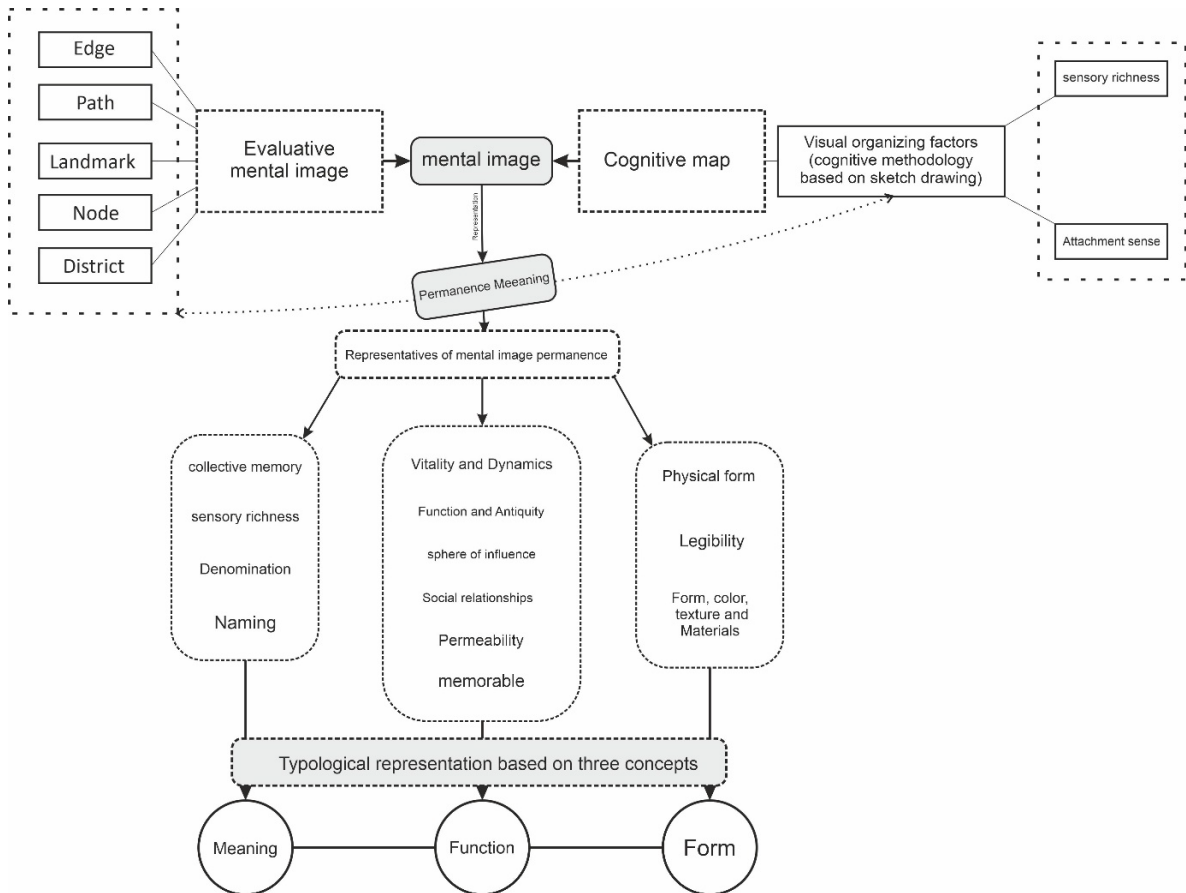


Figure 4: cognition model in mental image

Table 5: Score

Lynchian element	Item name	Likert scale score for valuation	Index number	Dominant species code
Way	Shahid Rajaei St	1.4	5	3
	Madani St	2.2	5	2
	Bab al-Hawhaj street	1	5	2
	Mohtsham Street	0.8	5	2
	Mir Emad St	2.2	5	1
Sign	Darvaze dolt	2.66	3	2
	Mir Emad Mosque	3.66	3	2
	New caravanserai	3	3	1
	Hammam Khan	2.33	3	2
	Coppersmiths Market	4	3	3
	Soltani School	2.66	3	1
	Darb Zanjir	0.3	3	3
	Bakhshi Caravanserai	3.66	3	2
	Khan Reservoir	1	3	2
	Intersection	Kamal al-Mulk square	3.5	4
Faiz Square		3.5	4	1
Area	Rate bazaar neighborhood	1	5	1
	Darb Zanjir neighborhood	1.2	5	1
	Haj Jamal neighborhood	1.4	5	1
Edge	-	-	-	-

4. Result and Conclusion

Based on the findings of the evaluation of the mental image can be seen in the above table, it is possible to present the mental image of the range based on the topological representation of three types by emphasizing the repetition of the specified number of codes in each of the line statements. To the type of valuation, the Likert range is assigned from 1 to 5, and in the case of the type, the maximum repetition is set as the criterion.

Based on this, it is possible to rank each of the species for the items on the faq table:

In the following, it is possible to achieve a species that dominates the entire area of the case sample by calculating the average of each species:

As a result, according to the average score of each of the species, the dominant species in area No. 2 as a case example is the performance-oriented species.

According to the structure of the research as well as the multi-stage research method, the following can be explained as the results of the findings:

1- The elements of the evaluative mental image as a cognitive manifestation of an educated

moderator have a methodical relationship with the mental map of the citizens, in other words, no matter how much the researcher can do this evaluation correctly, there is a latent essence in the type of response of the audience. As can be seen, the results of the questionnaire based on the indicators of the mental image that are emitted from the citizens' sketches also show the evaluative interpretation of the mental image. In this regard, the missing link between these two procedures lies in the permanence index of this image, which, in addition to the hidden indicators in the psychological field of urban design, can also be effective in social sociology.

2- According to the doctrine presented in the thesis that the factors of the visual organization are somehow structured in the cognitive map of the mental image and are compatible with the evaluative mental image style, it should be noted that the representatives of the permanence of the mental image are mainly affected by the outcome of both of them. In any case, this result exists in the typology of form, function, and meaning in a central way, which emphasizes relativeness rather than absoluteness.

3- The research results in the methodology

Table 6: Score

Kind	Item name	Score	Rank
Meaning oriented	Faiz Square	3.5	1
	New caravanserai	3	2
	Soltani School	2.66	3
	Mir Emad St	2.2	4
	Haj Jamal neighborhood	1.4	5
	Darb Zanjir neighborhood	1.2	6
	Rate bazaar neighborhood	1	7
Performance-oriented	Mir Emad Mosque	3.66	1
	Bakhshi Caravanserai	3.66	2
	Kamal al-Mulk square	3.5	3
	Darvaze dolt	2.66	4
	Hammam Khan	2.33	5
	Madani St	2.2	6
	Khan Reservoir	1	7
	Bab al-Hawhaj street	1	8
	Mohtsham Street	0.8	9
Form oriented	Coppersmiths Market	3.5	1
	Shahid Rajaei St	1.4	2
	Darb Zanjir	0.3	3

Table 7: Species dominance

Area	The average score of the meaning-oriented species	Average performance-oriented species score	The average score of the form-oriented species
Zone number 2	2.13	2.31	1.73

show that to achieve a methodical style about the urban identity and mental image that is accompanied by topological representation, there is a need for a funnel way of a mechanism that can, as a necessity, go from the whole to the except to examine the studied sample, as mentioned in the limitations of the research, this issue cannot have a stable method as a coherent whole at first.

In the study of the case sample, it was also determined that the mental image items as urban elements in the spatial organization have different values in the minds of the citizens based on their structure and organization, and in the examined sample, each item has its score and rank in three types. Has received. For this purpose, about the investigated area and its generalization to the whole city of Kashan, some things can be mentioned:

- The evaluation results show the type of central performance of the area, which can be generalized in other areas as a pilot. Based on

this, the area that has the highest score in the structure of the identity ranking has a special type of mental image.

- The specific characteristics of each area in the discussion of representation can be unique in its way, but in a general view, it is possible to understand the maximum number of factors affecting urban identity in the subject of a mental image.

- It is not possible to generalize the character of a species mainly in terms of the results for the whole city, and the only way to achieve this concept is to examine all urban blocks area by area. Considering that in the cities of Iran, there are historical contexts in the central urban cores, the entire historical area can be selected to carry out the process. The main problematic issue is in the middle and new contexts, which mainly have modern urban planning and architectural elements of the second Pahlavi period.

Finally, this mechanism can be tested for each

urban block and for conducting future research simultaneously, in addition to the development of the method, morphological science with a non-palmistic approach to urban tissues can also be used.

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