Research Paper

A Review of mental urbanscape using map-based methods (Case study: Tehran Ferdowsi square)

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Abstract

As a medium between people and the city, urbanscape makes a mental connection between individuals and their surroundings. It is usually difficult to conceive this mental relationship and its corresponding processes with usual methods. This study seeks to address the mental aspects of urbanscape and highlight its role and importance by using an innovative method. In this study, map-based methods have been examined as one of the most effective tools for studying citizens' urbanscape. Indeed, using maps provides a tangible model of the city and its spatial imagination by mapping people's perceptions. In order to achieve the hidden layers of people's perceptions, a combination of map-based methods have been examined in the study of Ferdowsi Square in Tehran. First, 50 questionnaires in which interviewees were asked to draw remarkable element of the area were conducted (cognitive map). Second, people were asked to mark the places that are meaningful for them in a provided map of the area and describe the reason (narrative map). Finally, the results of the former step as evaluative meaning were measured in investigated area (evaluative map). As the result, collective images completed by narrative maps and 4 categories of meanings attributed to the space have been recognized, collective, individual, physical-functional and sensory-emotional concepts. Moreover, the locations of detailed meanings and the intensity of each meaning or concept have been determined and located on the map. Through analyzing and comparing these maps; it is concluded that by developing map-based methods and combining them with other techniques and methods, deeper layers of individuals' perception about spaces are revealed. So, spatial distribution of concepts and assessments of individuals that have been provided by these methods in this study seems to be very helpful in analysing mental urbanscape. In this context, moving from traditional and structured methods to more evaluative and flexible ones that focus on deeper layers of individuals' perception is extremely useful.

Keywords: Urbanscape, Map-based methods, Narrative maps, Evaluative maps, Meaning, Ferdowsi square.

1. INTRODUCTION

In basic definitions, urbanscape has been explained as the first layer of confrontation with the environment and its deep roots in hidden layers of the human mind has not been far from researchers' eyes. The complexity of similar concepts (landscape, cityscape, townscape, urban landscape) has been evident to researchers and those interested in decoding the outward image of cities. Considering human beings as active and effective part of the process of perceiving the environment is the essential driving force behind objective studies and unilateral analyses of the image of city toward another type of approach with multidimensional human-based vision.

Through this approach, urban landscape has been formed in a time continuum, which in a dynamic interaction with the objective structures of the city, human experiences, individual and social differences and mental and cultural backgrounds, forms the urbanscape concept.

The importance of the human role in urbanscape perception shows the complexity of the concept since human beings react both to surrounding elements and components and to the combination and organization of these elements. In other words, human beings respond not only to the organization of elements but also to their own interpretation of the organizational possibilities of those elements. However, the human role in the perception of urbanscape is even more complex since individuals provide variable responses according to their past experiences and current situations [1].

This definition of urbanscape with an emphasis on the central role of observers, leads to laboratorial procedures

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and psychological constants to be left out, and social complexities and individual differences in urbanscape studies are more emphasised. Although, frameworks defined by psychologists are helpful in understanding people's visual perception of the environment, they often neglect the interpreting layer of human mind and they mostly fail to explain behavioural reactions to the environment or emotional bonds between people and their surroundings. Many studies have focused on the relationship between visual perception and behavioural- emotional responses by people and have tried to analyse and evaluate these responses through mental interpretation and experimental function. [2, 3, 4, 5].

What seems to be evident here is considerable difference between urbanscape analysis methods in terms of objective, formal and structural approaches, compared to new interpretive and social approaches. There are various methods and tools for analysing and conceiving urbanscape, among them map-based methods are introduced here where two-dimensional images and maps are mediums to show how people perceive the environment. These images produced by people to map their perception act as a basis for future analyses.

In this research, the goal was to change attitudes toward urbanscape as an interactive concept between people and the environment, using innovative map-based methods (compared with conventional map-based methods) and analysing them in a case study.

2. SUBJECTIVISM IN URBANSCAPE STUDIES

There are two approaches related to urbanscape: "objectivism" and "subjectivism". Each approach has its followers, although the subjective approach to urbanscape is more recent. Objectivism takes an instrumental approach to urbanscape predicting it with more certainty. With a physical-psychological view, this approach seeks to measure urbanscape qualities. However, the subjective approach is based on debate and with a special look at the audience, it tries to find the landscape qualities of the mind of the beholder. [6]

Studies by "Augustin Berque" helped the issue of urbanscape to be clearer and solved the duality of this concept. Berque investigated the subject of landscape in different cultural contexts, especially Eastern cultures. He believed that, beyond its objective and subjective features, urbanscape has social and cultural roots in urban societies. Human senses about nature (in general), and human senses about other kinds of views (in particular), are mainly a product of learnable cultural development processes [7]. It is evident that urbanscape has been defined with the extension of human being's knowledge and understanding of the surrounding world [8]. Berque believes that sensory tools are common among people and nearly all of them have similar abilities in distinguishing environmental data. This fact has been proven scientifically. The subject is not essentially physiological, but it is a cultural interpretation of environment. This interpretation is influenced by time and is result of a specific lifestyle at a specific point in history [7].

Rapoport is another researcher who has concentrated on the impact of culture on people's perception of the built environment [2]. New studies on cultural urbanscape constitute a large part of urbanscape researches during the recent decades, emphasizing the important role of human beings as opposed to formal and natural elements on individuals' perception from urbanscape. [9, 10].

On the other hand, experience, especially personal experience, has had a determining role in changing the concept of urbanscape toward subjectivism. Environmental experiences influence meanings received from the environment with a significant effect on the individual's perception of the environment and their desires and motivations [11]. Environment goes beyond a location and it contains multiple meanings based on experiences. If environment is meaningful, it does not necessarily have similar meaning for all people [12]. Therefore, urban spaces are personal collections of space experiences [13]. Lynch[1] believes that a three-dimensional image is formed in the minds of people by direct effects of memories, relations, experiences, dreams and demands [14].

A large part of recent studies on landscape consider the role of daily life and corresponding elements on the formation of subjective urbanscape giving the main role to these elements. Berberich et al consider the role of life, experiences, memories and different arts in the formation of urbanscape. [15]

Knowing the influences of social conditions, cultural contexts, memories and individual and group experiences on the perception of urban structures moves methods and concepts related to urbanscape toward mental and interpretive dimensions. In the following section, among variable methods for studying mental urbanscape, map-based methods and techniques are suggested.

3. MAP - BASED METHODS IN URBAN STUDIES

One of the common methods of mapping people's perception is using maps that provide a tangible model of the city. These kinds of maps were originally developed by Tolman[2] in 1948 as cognitive maps [16] and represent the mental expression of the environment. The images obtained in this way include the main experiences of people about a place, information perceived, location structure and their relative values [17] and they are actually mental images of distances and orientations formed in an individual's memory [18]. In a broader concept, these maps are defined as abstract schema created and used by individuals, groups, organizations and communities to observe, perceive and represent world phenomena [19].

Kevin Lynch has developed this method as city image and investigated the imageability and legibility of the city by analysing structural elements (paths, edges, districts, nodes and landmarks). Lynch's work on American cities introduced this method and provided a basis for many studies that have been conducted since then [20]. Peter Gould and Rodney White used a similar method, named mental maps, to consider individuals' space preferences on

surfaces [21] and other researchers such as Golledge have considered these maps as cognitive maps, which focus on the priority of places in people's drawings and then on the connections between these places [22].

In recent studies, cognitive maps have been used to evaluate people's perception of form and structure of the city or analyse the effect of environmental (not necessarily subjective) indicators on the formation of these maps, for example, the speed of transportation on mental maps [23].

Although, in addition to form and physical attributes and cognitive processes including representation and routing, most researchers emphasize on the effect of semantic factors such as social and individual differences, cultures, events and time on the formation of these maps, due to complications, these factors are less mentioned in studies, so that most researchers after Lynch (even his own) consider his work to be reducing the importance of the relationship with the environment to cognitive knowledge about city form, and imposing an imaginative order on the urban fabric. They believe that the meaning of the environment sought inside individuals and thoughts should be considered when describing and portraying the analytical landscape of city [24]. Nasar also believes that although a correct arrangement of elements can increase a city's visualization capability, to make form, identity and urban structure, visualization is not sufficient. One should also take people's evaluation of a city, the concepts they perceive and their evaluative image into consideration [25].

Today, by developing these maps and adding to their semantic and evaluative layers, scientists believe that developed maps can reveal a large portion of hidden semantic layers, provide us with extensive information on routing and represent people's demand and preferences.

In new definitions, maps and images from the communication between human beings and the environment, which include mental awareness by an individual from the environment, are considered very practical in analysing the mutual relationship between human beings and the environment and they are used to converge the vision of the observers and the users of environment [26].

- **Evaluative Maps**

Evaluative maps method is based on the premise that different places on the map may contain different meanings. Here, participants are asked to mark places with special meanings to them. Once responses are collected, a map is provided showing concepts of each place and their intensity. These responses may be changed into computer data or marked on hybrid maps on which the intensity of colours shows the intensity of concepts defined [27].

The method can be applied in variable scales, from buildings and neighbourhoods to countries and continents, with some software to add, reduce or mark areas. The method is in fact a spatial display of major semantic differences [27].

For instance, Gould and White tried to find space priorities and location desirability using map-based studies in which students from different universities in the U.S were asked to mark places appropriate for residence on the map. Maps derived from this study were put together, showing "collective preference for a crowd". Lines obtained

represented the collective perception of an area [28].

Nasar, was also among the first researchers who tried to evaluate concepts and physical values based on map-based methods. He studied likable and dislikeable districts in two cities [4]. For this, he chose samples from two groups: residents and visitors. Residents were interviewed on the phone and visitors were interviewed face to face. They were asked to identify up to five areas they liked and disliked visually and to describe the physical features accounting for their evaluations. A map was provided from each interview and then personal maps were overlapped. Using evaluative maps, he found most desirable and undesirable district in each city and their physical features [4].

Brown [29 & 30] developed a map-based method in which, to measure concepts, individuals were asked to mark determined places on the map (from 1 to 12) in terms of specific concepts such as beauty, conservation, health, naturalness, diversity, originality, spirituality and so on. The intensity of each concept in a particular point is obtained according to counting. The result is a map displaying the distribution of concepts and their intensities in a district.

More recently, methodological approaches to landscape and urbanscape valuation have involved users' perspectives by participatory mapping. Such methods include paper maps in postal surveys, electronic maps on the Internet, structured interviews and facilitated group activities.

In order to find landscape values in a touristic area in the Alps, Scholozi et al use a compound method based on asking interviewees (tourists in the area) to use a colorful tag (for each concept) on the map. Then, for further analyses, ideas, various classification of values were studied in GIS [31].

Images provide appropriate tools for evaluating places, making perception of place easier and more practical for individuals and researchers and they lessen the abstraction of methods. Combined with other methods like "narrative analysis", these methods can provide analytical understanding of place meaning. Additionally, this tool can be useful for recognizing the manner of understanding concepts in other variable ways including individuals' participation in drawing designs and images and expressing their feelings toward places in the form of informal dialogues [32].

- **Narrative Maps**

Narrative maps are more qualitative maps that include the meaning of places. The method of analysing narration is the most qualitative one [27].

The data of narrative maps are different from mental maps, although both display experiences and observations by individuals narrating a story. However, the data of mental maps are inherently spatial and tangible while the data of narrative maps is not necessarily spatial and material. In a research, Watts drew narrations related to Los Angles riots on the map using three narrations and after extracting the main concepts from them, he displayed those concepts on Los Angles maps by GIS [33].

In recent studies, to draw narrations on maps, new methods such as cyber methods have been used whereby,

in addition to narration and its location, the relationship between location and time parameters are also marked on the map. New software in this field provide a new vision on the perception of place meaning (related to narrations) various fields of fiction, local knowledge, personal experiences and collective memories [34].

In fact, the method of analysing narration does not impose a pre-determined structure on information, which is why meanings are obtained in more descriptive and detailed form compared to methods in which open questionnaires and deep interviews are used. The method cannot be considered as totally open because to some extent, narrative-generating questions can refine the issue under investigation. In addition to this, experiences defining and forming place meanings are extracted only by obtaining people's narrations.

Generally using a map-based method with respect to the engagement of the main users of space can be effective for mapping the perception of environmental features. Many researches have been conducted in this field all of which consider urban issues in recent approaches such as participation, recreation, place production and so on. For example, Thwait et al carried out broad researches as "Experimental landscape" using map-based methods. In multi-aspect studies, in addition to interviews, they asked individuals (different groups such as children and women) to identify concepts (main concepts of perception) on the maps and then draw an image of their desired future for the area. The images were analyzed and shown on the map separated by respondents. They believed that this method helps reveal many place experiences [35].

In the following, these kind of methods are analysed in term of interpreting mental urbanscape. Ferdowsi square and its surroundings were selected considering features described in the following.

4. CASE STUDY (FERDOWSI SQUARE AND ITS SURROUNDINGS)

As mentioned before, the formation of citizens' mental urbanscape is based on human factors more than physical form and construction of the environment, it depends on experiences, historical backgrounds, socio-economic composition of urban areas and so on. Due to containing mentioned variable factors, Ferdowsi Square in Tehran and its surroundings provides an appropriate context to study in this field.

Ferdowsi square is located at the intersection of three main routes of Tehran; Enghelab (east-west), Ferdowsi (south along the square) and Gharani (north along the square). According to primary interpretations (collecting mental maps from people) the perceived borders of the place are determined. Ferdowsi square is a major place in formation of Tehran history located in border of city developments. It's located on Enghelab Street (former Shahreza) which is actually a result of destroying the historical Wall of Tehran. It has undergone two urban developments in its northern and southern parts. The

southern square was shaped in late Qajar[3] and early First Pahlavi[4] eras and the northern part was shaped as a result of developments during First Pahlavi era (early modernism in Iran). The southern part includes elements of the historic center of Tehran and its northern part includes modern neighbourhoods. The southern part has been the location of governmental, administrative and diplomatic centres of the city with a combination of residential and commercial areas, while the northern part has been allocated to wealthy and modern households. Continuing developments especially after the Iranian Revolution (1979) the difference in mixed use is observable between the two parts, despite the dominance of commercial and service areas in both. The square itself, has been a memorial of the great Iranian poet[5], witnessing many historic events and happenings. Today it is one of the most important business and service centres in Tehran and it is also one of the main nodes in the urban transport structure. The square has become the main focal point for leather products and currency exchange and a subway station and a BRT[6] station are also located in this area. Many important buildings and streets are located around this area, which contain many different activities.

5. RESEARCH METHOD AND STRUCTURE

In order to examine map-based methods and compare them in a metropolitan area, field studies were carried out using questionnaires and map-based interviews.

In order to do this, a compound three-step method was used based on individuals' participation in map drawing and perceiving narrations. The analysis method helped the authors produce analytic maps from narrations and extract meanings and concepts from interviewees.

First, mental maps then narrative maps and finally, according to individuals' narrations, the participants' evaluations of the environment are received in the form of evaluative maps. The research steps are described in detail below:

- First, questionnaires were provided (50 questionnaires) in which interviewees were asked to draw buildings, streets and important localities of Ferdowsi square as far as they remembered (cognitive map). Some of these images include:

The images were collected and studied in the form of a cognitive map including paths (and their importance in people's minds), nodes, landmarks, edges and districts.

Next, a map of Ferdowsi square was provided and the participants were asked to mark the places that were meaningful for them or were a reminder of a special subject, event or feeling. They were then asked to describe the reasons behind this meaningfulness (narrative map). Then, narrations by individuals were recorded to be analyzed in next steps. Following this step, maps were collected, the results were studied and they were compared with results from cognitive maps. By analyzing the contents of narrative interviews, the main concepts noted by people were extracted.
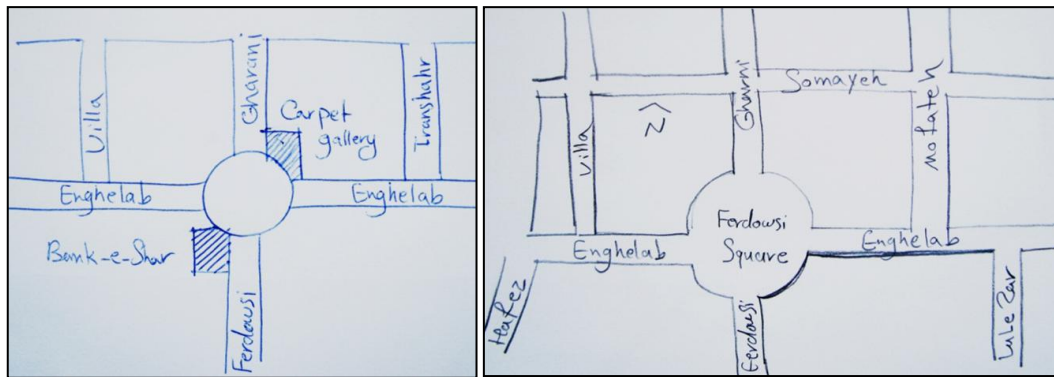
Fig. 1 cognitive maps in Ferdowsi square (Maps by participants)

These main concepts were classified into four groups and they were drawn on the maps. More detailed and precise concepts and meanings were extracted in the form of place evaluations in order to generate evaluative place maps from individuals.

Finally, evaluative meanings from the former steps were measured in the investigated area. Evaluative maps were obtained from place assessments results. By allocating different colours for different meanings people marked their ideas on the map (a coloured circle for each idea). In this step, maps were analyzed according to the relationship between Ferdowsi square and its landscape features and results from each step and each map were compared with those from previous steps.

- **Primary Findings**

The following points are presented based on interviewees' collective images from Ferdowsi square (Fig. 2):

- In the mental map method, people's formal perception and recognition are reflected more than any other mental dimensions (although mental dimensions and concepts are influential in forming images). In Ferdowsi square (according to Lynch's maps), people include points, lines and areas in their own images.
- Ferdowsi square has been considered as a main node by all respondents. After that, "Iranian Artists Forum"[7], Istanbul crossing[8], College Bridge[9] and Koushk crossing[10] were mentioned as the other main nodes.
- Prominent landmarks around Ferdowsi square included Ferdowsi sculpture, subway station, Shahnameh building[11] and carpet gallery.
- Main routes marked were Enghelab[12], Ferdowsi, Gharani and Iranshahr streets in order.
- In most responses, a tangible border is identified between southern and northern part of the square.
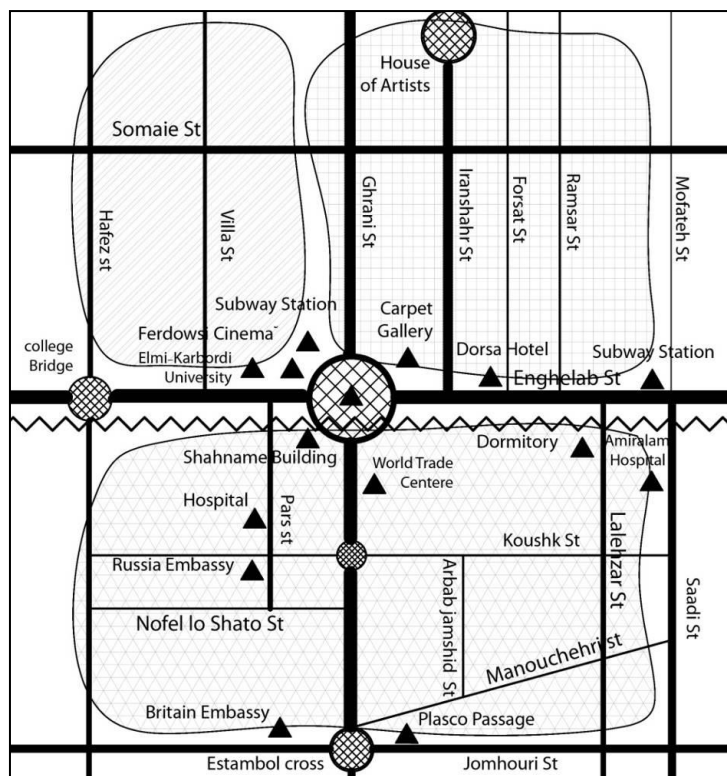- Iranshahr, Villa and Ferdowsi neighbourhoods are the main districts identified in the area.

Fig. 2 Collective mental image (Created by the authors)

As seen above, in their maps, individuals tag streets, important squares, main neighborhoods, buildings and outstanding elements (more appearance of these elements on these maps). Besides, practical elements and gatherings places (such as The Iranian Artists Forum) are noted, as well (second degree of importance of social indicators and on these maps). Narrative maps were obtained by analysing maps from the second step, which include maps containing locations with meaning and explanations by interviewees.

It is worth noting that maps have been recovered by the authors. In other words, narrations by individuals have been analysed and classified in four main groups and abstracted ones related to that group have been displayed on a different map. So, they include a meaning layer based on location. The following results were obtained from analysing these maps and the responses of interviewees:

- People attribute four forms of meanings to locations they are related to:

a) **Collective meanings:** these meaning are related to memories, events and common experiences of a community or group of people. Common experiences form the base of these meanings. About Ferdowsi square, demonstrations before and after the Iranian revolution, historical atmosphere and historic events are among the phenomena narrated by people. Fig. 3 is the narrative map demonstrating this dimension of meaning in Ferdowsi Square.

b) **Emotional meaning:** these meanings are formed based on people's perception of space and in relation to the five senses forming a basis for many assessments by people. About Ferdowsi square, emotions like the smell of leather from leather stores in Ferdowsi Street, voices and shouts of dollar sellers, historic nature of southern square and irritating traffic were mentioned by people (Fig. 4).

c) **Functional-physical meaning:** they are usually attributed to tangible spatial features such as current activities and buildings' structure. Locations such as currency exchanges around the square, leather stores, antique shops of Manouchehri street, office machines market in Forsat street and prominent or old buildings existing in the area are among the place mentioned in Fig. 5 in the form of a narrative map

d) **Personal meanings:** a major part of meanings is the result of personal experiences by people which influences their evaluations of their environment. About Ferdowsi square, cases such as seeing a play in the House of Artists, shopping memories, local cafés, work places or universities were noted with negative and positive feelings (Fig. 6).

Fig. 3 Narrative map of Ferdowsi square (Collective meaning), (created by the authors)

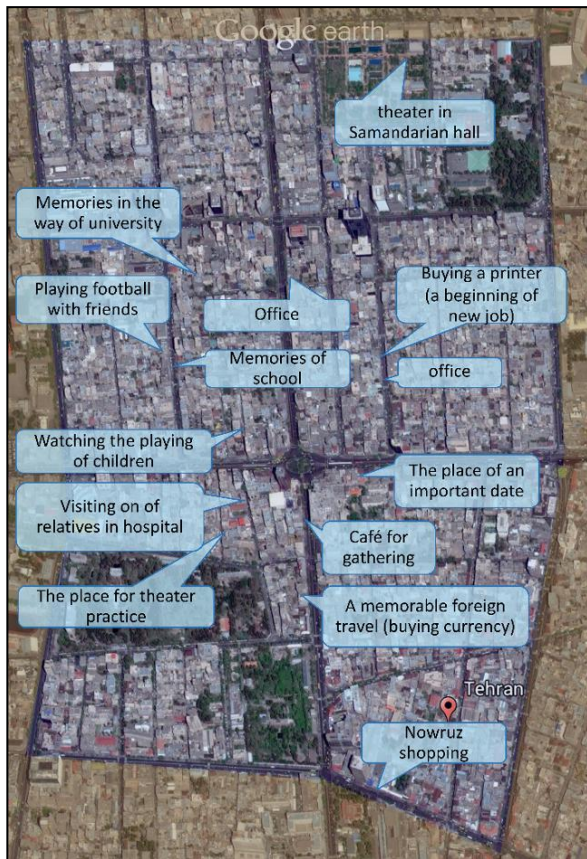**Fig. 4** Narrative map of Ferdowsi square (Emotional meaning), (created by the authors)

Fig. 5 Narrative map of Ferdowsi square (physical-functional meanings), (created by the authors)
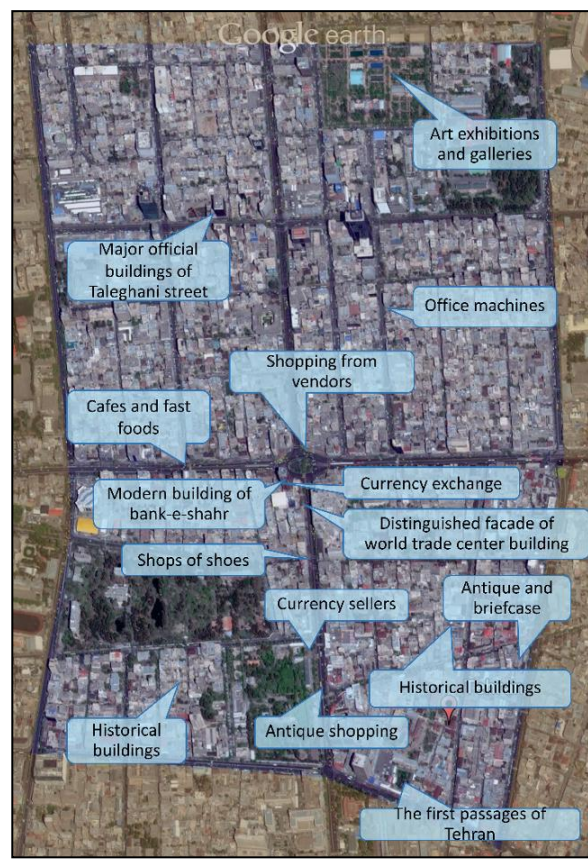

Fig. 6 Narrative map of Ferdowsi square (personal meanings), (created by the authors)

- Studying maps and comparing them with cognitive maps show that narrative maps add a semantic and even evaluable layer providing useful information on the individuals' perception of urban spaces and the reasons for the formation of special images or preferences.
- Eight evaluative features (meanings) were extracted from analysing narrations by people including:
- Modernity
- Historic nature
- Memorability
- Event taking
- Calmness
- Crowdedness
- Being active (in economic terms)
- Being prominent

In the next part of this research, evaluative meanings were analysed in the context of Ferdowsi Square where each response is displayed by a coloured circle and each colour represents an evaluation criterion on the map. It is evident that the predominance of a particular colour in an area shows the predominance of a particular meaning in that area:

- Ferdowsi square is a location for the development of a set of meanings. Memorability, event taking and being prominent are the main assessments by people in the area.
- In southern part of the square, especially around Jomhouri and Lalezar Streets and the south part of Russian Embassy, historic nature is the dominant meaning, while in northern part especially about Taleghani Street, modernity is more prominent.
- Enghelab Street is an event taking area (protests and demonstrations) and its memorability and crowdedness have secondary importance.
- The Iranian Artists Forum is considered a prominent, memorable and event taking location in relation to Ferdowsi square. The tranquility of the Forum is also noted.
- Commercial streets such as Forsat, Lalezar, Ferdowsi, Sa'adi and Jomhouri are considered active streets.
- Crowdedness is usually related to heavy traffic in streets and crossings. As a result, College crossing, Somayeh Street, Mofateh juncture and Enghelab Street have the most association with crowdedness as a meaning.
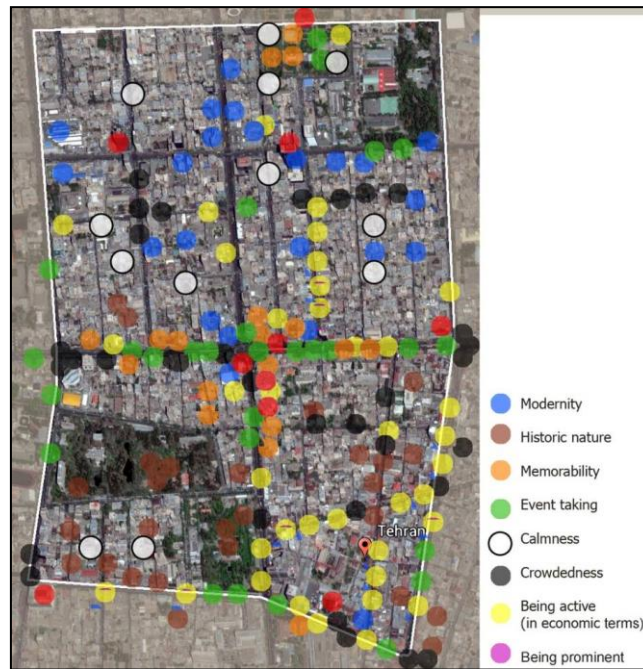
Fig. 7 Distribution map of evaluative meanings in Ferdowsi Square (Created by the authors)

6. CONCLUSION

In this study, the mental perspective of citizens has been studied using map-based methods in order to arrive at the hidden layers and aspects of individuals' perception from urbanscape using innovative and flexible methods. Findings about the case study (Ferdowsi square) show that cognitive maps often provide an image of the physical dimensions and structural perception of urbanscape. Maps from different individuals' narration of a place provide us with a deeper and more complicated layers of concepts (in this case, collective, individual, physical-functional and sensory-emotional concepts) and they are measurable using the individuals' evaluations of maps, concepts, meanings and their intensity in place. It is therefore concluded that the flexible application of map-based methods and their combined use with each other or with other methods, makes it possible to use such a methodology in variable research fields with variable purposes. Thus, by moving from traditional and structured methods to newer ones with greater freedom, deeper layers of individuals' perception about spaces are revealed.

Considering the focus of recent studies on human and social aspects of landscape, the correct and systematic use of these methods and providing new innovations in this field can significantly help mental landscape studies.

NOTES

1. Kevin Lynch, 1960
2. Edward C. Tolman
3. The Qajar dynasty was royal family which ruled Iran from 1785 to 1925
4. Refers to the first king of Pahlavi dynasty who ruled Iran from 1925 until 1941
5. Hakim Abu l-Qasim Ferdowsi (935–1025 CE)

6. Bus Rapid Transit
7. One the main art and cultureal and artistic centres of Tehran
8. One of the oldest trade centers of modern Tehran in the diplomatic, commercial and administrative zone of the city
9. One of the important traffic and functional nodes. An American college was formerly located in this place.
10. One of the centres of old Koushk district. It's currently a traffic and functional node.
11. Tallest building around the square with trade function.

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