

Urban Design

The Characteristics of Distinctive Urban Elements in Citizens' Cognitive Maps (Case Study: The City of Isfahan)

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Abstract

Over the last few decades, some newly developed areas in the city of Isfahan have had serious problems in providing such urban design qualities as legibility, and this has led to various problems for the citizens like difficulty in way-finding, orientation or addressing. In order to solve this problem and enrich the legibility of newly developed areas, planners and designers should utilize appropriate principles extracted from the inhabitants' cognition and expectations. This paper attempts to understand how people form their cognitive maps in urban areas and find their way within urban places. Hence, it tries to identify and evaluate different kinds of urban elements (the most important elements which provides legibility) by using casual-comparative methods on the basis of such factors as the reason of being distinctive, the type, context, function, adjacency, heritage value and type of the adjacent route that residents of Isfahan have used in shaping their cognitive maps. The findings of this research showed that the most important characteristics which affect the distinctiveness of urban landmarks in the citizens cognitive maps include: Having distinctive form in their surrounding environment; being located along the urban main streets or near the junctions; being established in a central area or having heritage value; having such urban functions or land uses as tourism, commercial, leisure, religious or transportation.

Keywords: Cognitive map, Urban elements, Legibility, Isfahan.

1. INTRODUCTION

The usability of human-built structures and environments, the issues of orientation and finding one's way and having a sense of where one is located can all be seen as some of the most important concerns [1-2]. Human beings need the wayfinding ability to perform tasks within large-scale environments [3] and to satisfy other higher level goals [4]. It is one of the most important skills for a citizen to navigate inside urban environments. To create a clear image and a legible environment for the residents of each city or part of it, we need to enable its residents to identify the components and environments easily and to correlate them in their mind in the form of a consistent relationship to each other. But nowadays, some qualities of urban design such as legibility are not sufficiently considered and due to lack of attention to the citizens' cognitive maps or decline in the supply of components of these maps, these plans do not have enough practicality to

create legible cities and urban environments and to increase the sense of orientation.

The lack of sense of orientation in urban areas can lead to serious consequences. It can cause mental and physical exhaustion, stress, anxiety, fear and frustration [5-7] which may make people avoid or leave a place [8] and limit their mobility [9]. One of the best ways to overcome this shortage is using people's mental desires and interests as well as benefiting from the success of urban mental elements that have been able to record themselves in citizens' cognitive maps.

In this study, the authors have attempted to identify the typology of urban elements which the residents of Isfahan have used in shaping their cognitive maps. In fact, the main objective of this research is identifying the factors which affect the distinctiveness of these urban elements in the minds of citizens. In this regard, we tried to use the interview technique to extract the citizens' mental image of the key elements of the city of Isfahan. Accordingly, the citizens of Isfahan were asked to identify the main elements of the city within a sketch or croquis. Afterwards, the most frequently named elements were extracted and the specific characteristics of these elements were determined.

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Therefore, the key research questions are as follows:

- What are the distinctive elements which are fixed in the mental image of the citizens of Isfahan?
- What is the reason for the distinctiveness of these elements in the minds of the citizens?

2. COGNITIVE MAP

People are in a mutual interaction with environment; not only with physical properties but also psychological properties. Space is central to the experience of urban design and has its own perceptual presence [10]. It means that there is a bilateral process between people and environment which helps them to move through their cities much easier. In the ‘space to place’ transformation process, perceiving any space by users, reading it as a text, then having some images in the brain related to this space, loading meanings to it, evaluating the space and finally acting with these evaluations (cognitive behaviors) is considerably important [11]. If this happens, the users can have a legible image of urban areas.

In order to understand and define the urban space image and then enhance its legibility, visual, cognitive and perception-based study is commonly necessary on the first stage and this generally comes up with cognitive mapping [12]. The credit of creation of "cognitive map" is given to Edward Tolman. He used this term in his studies on rats. In his experience, he studied rat's behaviors in a maze and how they looked for food in a maze [13]. Three decades later, John O'Keefe and Lynn Nadel made the equally bold proposal that this map was mediated by the rat's hippocampal formation. They defined cognitive map as the robust, flexible spatial knowledge acquired in unrewarded situations that affords multiple routes to a goal, and along with other researchers they have pursued the neural mechanisms that could support it [14]. In contrast with a single representation of space, other authors have proposed that cognitive maps that develop with the navigator's age or experience [15-17] incorporate representations at different spatial scales [18], are hierarchically organized

[19], may involve systematic distortions, or are described by weaker geometries. However, Gallistel (1990) defends the construct of an euclidean map, defining it as “a record in the central nervous system that encompasses the geometric relations among points by means of metric position vectors so that any such relation is in principle recoverable” [20].

The concept of cognitive map is now widely used as a framework for hippocampal function [21]. Cognitive maps or mental maps are a type of mental processing composed of a series of psychological transformations by which an individual can acquire, code, reserve, recall, and decode information about the relative locations and attributes of phenomena in their everyday or metaphorical spatial environment [22]. Simply put, cognitive maps are a way we organize and store spatial information, and we use them to let our mind's eyes shape images and scenes in order to increase the mental capacity to promote the information learning and recalling.

A cognitive map is a mental model that encompasses the internal processes which enable people to acquire and use information about physical environments. Information in cognitive maps is not as it is in the two-dimensional cartographic maps. “Instead, cognitive maps are complex, highly selective, abstract, generalized representations in various forms” [23]. Sketch maps, as the externalization of cognitive maps, reflect distortions, abstractions, and schematizations that originate in cognitive maps. Typical distortions include: distances between near spatial objects are considered relatively farther than distances between more distal ones; ordinary buildings are judged closer to landmarks than the other way around; routes are judged longer with more turns and intersections or more clutter (such as intervening cities) [24]. As mentioned before, the environmental image is a two-way process. It is a complex process which results from an interaction between the observer and environment; so the image is built by association [25]. “City order is related to the way in which people perceive or read and understand the environment” [26].

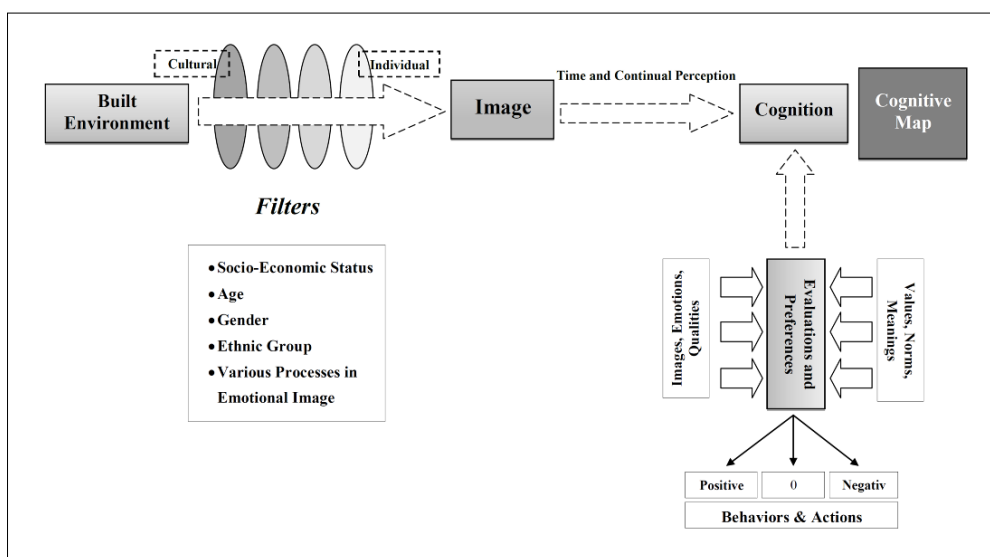


Fig. 1 Basic evaluation process of urban environments

Notwithstanding the caveats that cognitive mapping is metaphorical and error prone, it is generally accepted that cognitive maps are composed of basic geometric features such as points, lines, areas, and surfaces [26]. Lynch divides environmental elements into moving elements (such as people, their activities) and stationary physical parts. Way-finding in his theory is related to two things: physical elements and a map drawn in peoples' mind; this map is what Lynch named mental map or cognitive map [25]. He introduced the concept of imageability and the identification of the city elements that citizens use to form their cognitive maps. He believes these elements are paths, edges, nodes, landmarks, and districts. Like other mental processes, cognitive mapping develops over time. Developmental psychologist Jean Piaget found that environmental perception and cognition are different in children than in adults: "The cognitive processes are not constant but undergo change with age (or development) and use (or learning). Similarly, a cognitive map is an abstraction which refers to a cross-section, at one point in time, of the environment as people believe it to be" [23].

3. LANDMARK

In his study, Lynch (1960) used the mental mapping technique to capture the visitors' mental images with regard to the places they experience. He introduced the term "landmark" and its concept. According to his book "the image of the city", landmarks are external points of orientation, usually an easily identifiable physical object in the urban landscape. they are visible from far away by an observer and function as a guide in way-finding [25]. Shuhana (2011) believed that a landmark can be a three dimensional object that is prominent or conspicuous to the observers. With the contrast from its background, clear form and prominence of spatial location, a landmark can become more identifiable [27].

Hasanudin (2003) defines a landmark as any urban landscape feature that is different from its contextual characteristics, with manifested or inherent attributes. It is also physically or spiritually unique, influential and impressive. This shows that a landmark must not necessarily be a vertical or three-dimensional object. Hassanudin has categorized landmarks into four groups, namely natural landmarks, constructed landmarks, distant landmarks and local landmarks [28].

According to Najafpour et al. (2017), determining a user's position in an urban environment could be possible by relying on the position of existing landmarks. Thus, the special feature in urban landmarks could be a supporting factor for people navigation [29].

Cornell & Heth argued that the roles of landmarks are to facilitate the way-finding direction and path memory [30]. Allen (1999) highlighted that the level of familiarity of users with urban environments is one of the main factors for diverse respond of their way-finding. In addition, the landmarks may or may not be chosen by people, and this depends on the environment that is being navigated. Furthermore [31], Ruddle et al. (1998) opined

that different landmarks in the same environment could be chosen by different urban users [32]. They expressed that during the way-finding process people comprehend and remember routes by "chunking" routes into a set of discrete path segments, decision points (turns), and landmarks that are located at decision points or along that route. Sorrows and Hirtle (1999) investigated the role of sex in way-finding strategies and environmental knowledge acquisition, and found that unlike men, women prefer the use of landmarks rather than being given route directions [33]. Gender differences in way-finding strategies were studied further by Lawton and Kallai (2002), who stated that men are more likely to be accurate in landmark location and use cardinal direction, whilst women are more reliant on their memory to identify landmarks [34].

People may use landmarks to remember and recognize the paths they used or are going to use. As a result, the role of landmarks is to facilitate the way-finding direction and path memory [30]. In case of regional navigation, many parts of way-finding tasks highly depend on the familiar landmarks and have an important role to orient the target place and generate directions for the regional community [35]. A landmark is a place, building or location that has a salient feature, which is composed of visual, historical, or cultural factors [36].

According to the reviewed researches, landmarks are cognitively prominent, distinctive features in the urban environment. They have a central role in citizens' spatial cognition. Landmark knowledge has been shown to be the first level of mental map a person develops through interaction with a new area.

4. MATERIALS AND METHODS

4.1. Research method

In terms of the objectives, this is an applied research using survey and casual-comparative methods. The interview technique was utilized to identify the citizens' mental image of the distinctive elements of the city of Isfahan. Accordingly, the citizens were asked to identify the distinctive elements of the city within a sketch or croquis. Afterwards, the most frequently named elements were extracted and the specific characteristics of these elements were determined and analyzed.

4.2. Case study

The city of Isfahan was selected as the case study of this research; an ancient city in Iran with about 495 km² surface area and a population of about 1,756,000.

Isfahan is known as a popular tourist destination and the major cultural and economic center of Iran. It is the most beautiful city in Iran and one of the most beautiful cities in the world. It features numerous tree-lined boulevards and flower gardens, miles of beautiful parks along the Zayandehrud River, covered bazaars, squares, bridges, palaces, gardens, mosques, and minarets. The city attracts hundreds of thousands of visitors from all over

Iran and around the world each year. It may also be well-known for its beautiful historical Islamic architecture.

4.3. Participants

The statistical population of the present study included the citizens of Isfahan, and specifically the citizens in Naghshe Jahan Square (an ancient square in central Isfahan). Considering the uncertainty of the size of the population and based on Cochran formula with a margin of error of $d=0.1$, a significance level of 95%, $p=q=0.5$, the sample size was calculated as 96, but due to the probability of the loss of some answers, 100 was finally determined as the sample size. In addition, sampling was done using convenience sampling method.

The participants' age ranged from 15 to 66 years. These participants were selected from among the citizens who had lived the whole or most of their life in Isfahan, and had enough familiarity with this city.

4.4. Questionnaire

In order to achieve each participant's cognitive maps, they were asked to sketch a summary map of Isfahan on an A3 paper.

The content and face validity of the interview was confirmed by the professors of Yazd University.

Some of the most important questions and points which

were asked in this interview are as follows:

- 1- Please describe Isfahan in one or two sentences.
- 2- Please draw a summary map of Isfahan.
- 3- Please do not ask for help and draw it (a simple map) by yourself.
- 4- Imagine that you are drawing the map for a stranger, who has not met this city yet.
- 5- Please start from Naghshe Jahan Square as a primary point of your drawing.
- 6- Draw all of districts and neighborhoods of the city; please draw the border as accurate as possible.
- 7- Draw the most significant and important elements, places and buildings on your map.
- 8- Please trace north on your map.

Each interview took almost about 45 to 60 minutes.

4.5. Evaluation criteria

As stated before, cognitive elements are components in urban environment due to having key features and prominent and distinctive situation in the residents and other people's minds. So what makes this distinction of elements in people's minds is a collection of physical and functional factors that have promoted salient characteristics of these urban elements.

In his study, Montazerolhodjah summarized the most important criteria for the identification and assessment of urban elements as the table below:

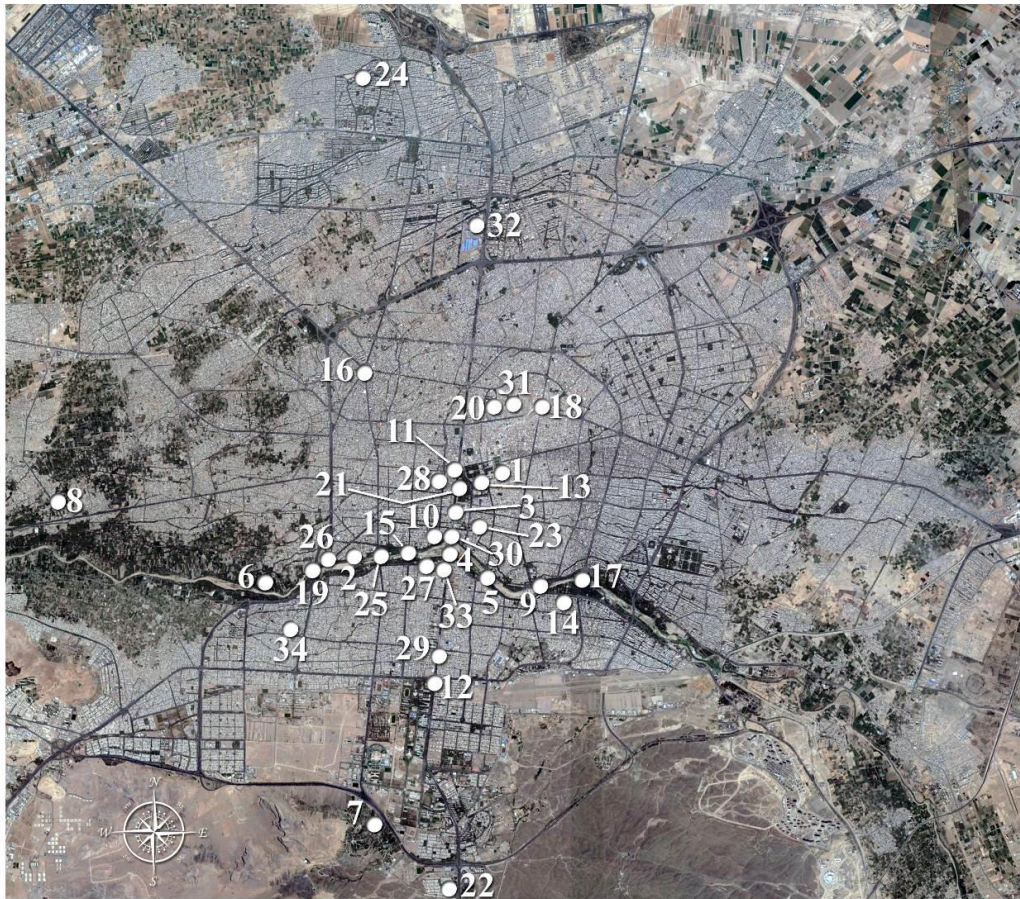
Table 1 The criteria for evaluation and their description [22]

No.	Criteria	Description
1	Number of Element Repetition	The number of each element repetition in citizens' cognitive maps.
2	Types of Element	Type of each element that has been detected in cognitive maps.
3	Element context	The context that each element is located in and includes two type; natural or man-made.
4	Function	The urban function or land use of each element.
5	Distinction Reason	Why each element is distinctive for the participant, is it due to its form, function, or both of them?
6	Physical Distinction with Surroundings	Does each element have physical distinction with its surroundings?
7	Being Historic	In order to determine the historical background of elements.
8	Type Adjacency	Is the element attached to its adjacent buildings or is it detached?
9	Location based on type of the adjacent route	The kinds of routes which element is next to.

5. FINDINGS

After conducting the interviews and investigating the cognitive maps, all such typical elements as routs, districts,

junctions and buildings which were considered as a cognitive element in the cognitive maps of the citizens were selected. The specifications of these elements are as follows:



- | | | |
|---------------------------|---------------------------|-------------------------------|
| 1- Naghshe Jahan Square | 12-Darvazeh Shiraz Square | 23-Abbasi Hotel |
| 2- Zayanderud River | 13-Chehel Sotoun | 24-Malek Shahr Amusement Park |
| 3- Charbagh | 14-Abshar Amusement Park | 25-Azar Bridge |
| 4- Si-o-seh Pol Bridge | 15-Felezi Bridge | 26-Marnan Bridge |
| 5- Khaju Bridge | 16-Jomhuri Square | 27-Kowsar Hotel |
| 6- Birds Garden | 17-Shahrestan Bridg | 28-Naghshe Jahan Mall |
| 7- Mount Soffeh | 18-Imam Ali Square | 29-Park Mall |
| 8- Menar Jonban | 19-Vahid Bridge | 30-Sepahan Mall |
| 9- Flowers Garden | 20-Jameh Mosque | 31-Allame Majlesi Monument |
| 10-Enqelab Square | 21-Shahid Rajae Park | 32-Kaveh Terminal |
| 11-Darvazeh Dowlat Square | 22-City Centre Mall | 33-Kowsar Mall |
| | | 34-Emamzadeh Mohsen |

Fig. 2 Location of the extracted landmarks in Isfahan

Table 2 Derived elements characteristics

No.	Element	Number of Repetition	Type of Element	Element Context	Function	Distinction Reason	Physical Distinction with Surroundings	Being Historic	Type of Adjacency	Adjacent Route
1	Naghshe Jahan Square	100	Node	Man-Made	Tourism Commercial Religious	Visual & Functional	Yes	Yes	Attached	District distributor
2	Zayanderud River	100	Edge	Natural	Leisure	Visual & Functional	Yes	Yes	Detached	-
3	Charbagh	100	Path	Man-Made	Tourism Commercial	Visual & Functional	Yes	Yes	Attached	Regional distributor
4	Si-o-seh Pol Bridge	97	Path	Man-Made	Tourism	Visual & Functional	Yes	Yes	Detached	Regional distributor
5	Khaju Bridge	96	Path	Man-Made	Tourism	Visual & Functional	Yes	Yes	Detached	Regional distributor
6	Birds Garden	94	District	Natural	Tourism Leisure	Functional	Yes	No	Detached	Collector

7	Mount Soffeh	93	District	Natural	Tourism Leisure	Visual & Functional	No	No	-	Highway
8	Menar Jonban	91	Construction	Man-Made	Tourism	Visual & Functional	Yes	Yes	Attached	Regional distributor
9	Flowers Garden	88	District	Natural	Tourism Leisure	Functional	No	No	Detached	Regional distributor
10	Enqelab Square	86	Node	Man-Made	Commercial	Functional	No	No	Attached	Regional distributor
11	Darvazeh Square	84	Node	Man-Made	Commercial	Functional	No	No	Attached	Regional distributor
12	Darvazeh Shiraz Square	73	Node	Man-Made	Commercial	Functional	No	No	Attached	Regional distributor
13	Chehel Sotoun	72	Construction	Man-Made	Tourism	Visual & Functional	Yes	Yes	Detached	Collector
14	Abshar Amusement Park	71	District	Man-Made	Leisure	Functional	No	No	Detached	Regional distributor
15	Felezi Bridge	69	Path	Man-Made	Transportation	Functional	No	No	Attached	Regional distributor
16	Jomhuri Square	68	Node	Man-Made	Commercial	Functional	No	No	Attached	Regional distributor
17	Shahrestan Bridge	67	Path	Man-Made	Tourism Leisure	Functional	Yes	Yes	Attached	Regional distributor
18	Imam Ali Square	67	Node	Man-Made	Tourism Commercial Religious	Visual & Functional	Yes	Yes	Attached	District distributor
19	Vahid Bridge	58	Path	Man-Made	Transportation	Functional	No	No	Attached	Regional distributor
20	Jameh Mosque	58	Construction	Man-Made	Tourism Religious	Visual & Functional	Yes	Yes	Attached	District distributor
21	Shahid Rajaaee Park	51	District	Natural	Leisure	Functional	Yes	No	Detached	Regional distributor
22	City Centre Mall	47	Construction	Man-Made	Commercial	Functional	Yes	No	Detached	Highway
23	Abbasi Hotel	46	Construction	Man-Made	Accommodation Tourism	Functional	Yes	Yes	Attached	Regional distributor
24	Malek Shahr Amusement Park	44	District	Man-Made	Leisure	Functional	Yes	No	Attached	Regional distributor
25	Azar Bridge	43	Path	Man-Made	Transportation	Functional	No	No	Attached	Regional distributor
26	Marnan Bridge	41	Path	Man-Made	Tourism Leisure	Visual & Functional	Yes	Yes	Attached	Highway
27	Kowsar Hotel	39	Construction	Man-Made	Accommodation Tourism	Visual	Yes	No	Attached	Regional distributor
28	Naghshe Jahan Mall	36	Construction	Man-Made	Commercial	Visual	Yes	No	Detached	Regional distributor
29	Park Mall	36	Construction	Man-Made	Commercial	Functional	Yes	No	Attached	Regional distributor
30	Sepahan Mall	35	Construction	Man-Made	Commercial	Functional	No	No	Attached	Regional distributor
31	Allame Majlesi Monument	26	Construction	Man-Made	Religious	Functional	Yes	Yes	Attached	Collector
32	Kaveh Terminal	25	District	Man-Made	Transportation	Visual & Functional	Yes	No	Detached	Regional distributor
33	Kowsar Mall	24	Construction	Man-Made	Commercial	Visual & Functional	Yes	No	Attached	Regional distributor
34	Emamzadeh Mohsen	21	Construction	Man-Made	Religious	Visual & Functional	Yes	Yes	Attached	Regional distributor

5.1. Number of element repetition

In order to obtain the number of element repetition, all the elements that were in the cognitive maps were

selected. The number of each element repetition has been shown in Fig. 2. Most of the elements that are in the central area of the city or have a historical and valuable antiquity have been repeated more than the others.

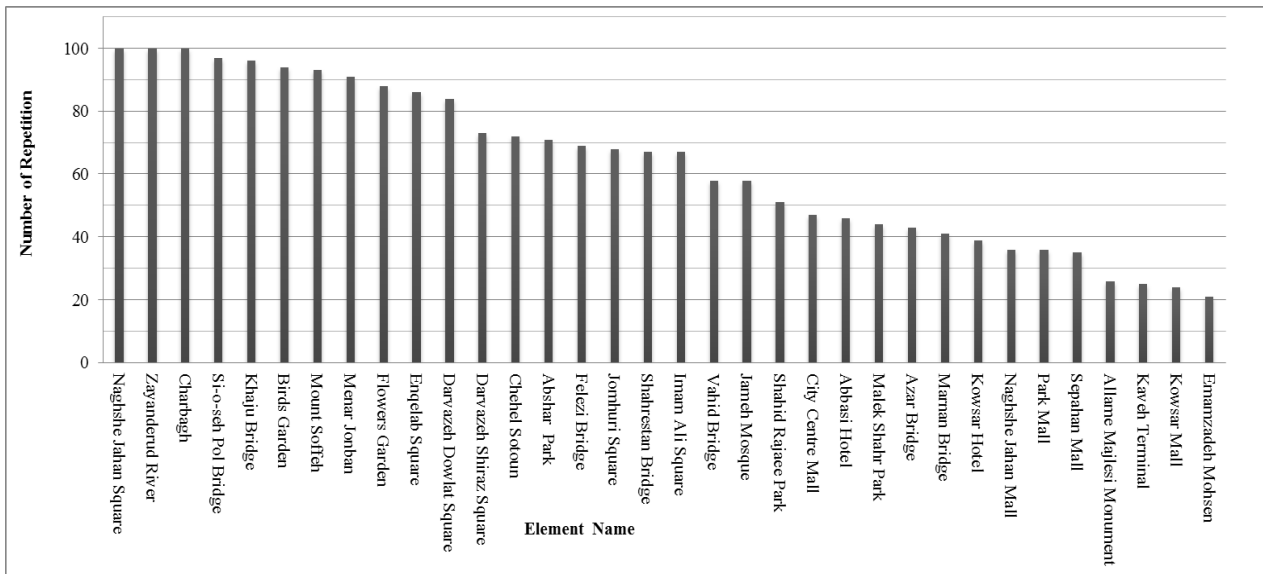


Fig. 3 Number of repetition of each derived element

5.2. Type of element

The type of elements that citizens keep in their mind is a considerable criteria to enhance the legibility of urban areas. In this study, five kinds of elements have been identified from the participants' answers. Constructions are the most frequently mentioned spaces with about 35% of the overall answers, followed by paths (23%), districts (21%), nodes (18%) and edges (3%).

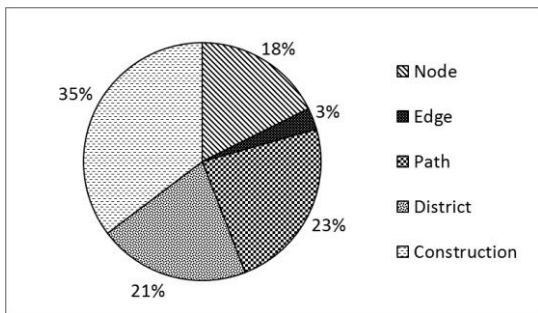


Fig. 4 Type of the elements

5.3. Element context

The context of element refers to the type of its ambience. According to the answers of the participants, about 85% of the elements were in a man-made context and the remaining 15% were in a natural context.

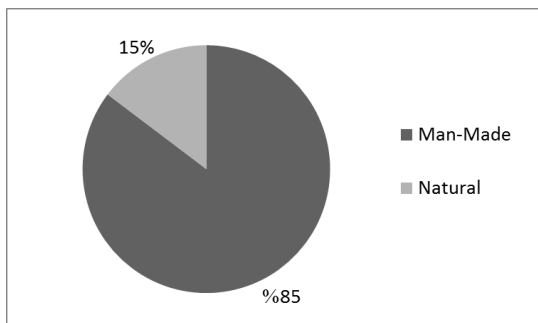


Fig. 5 Type of element context

5.4. Function

Function is one of the most effective factors on an element distinction for citizens and their mental image.

The functions of the selected elements were generally within the 6 categories of urban functions. It should be noted that some of these elements are multi-functional and in order for a more accurate evaluation, their various functions have been studied in separate categories. As evident in Fig. 4, 15 elements had tourism function, followed by commercial (12 elements), leisure (9 elements), religious (4 elements), transportation (3 elements) and accommodation (2 elements) functions.

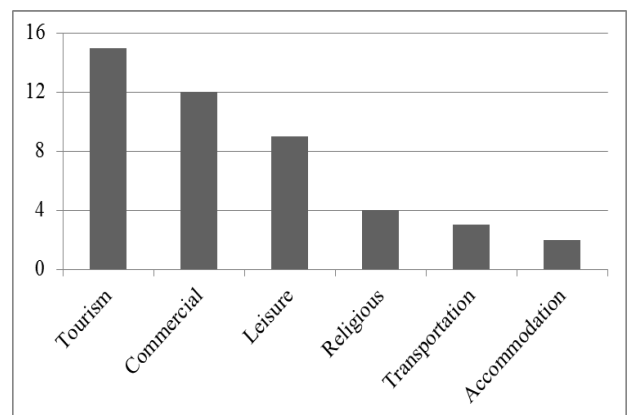


Fig. 6 Type of element function

5.5. Distinction reason

More than half of the selected elements in this research had functionally distinctive characteristics for the participants. About 41% of the elements had visually and functionally distinctive characteristics and about 6% had visually distinctive characteristics for the participants.

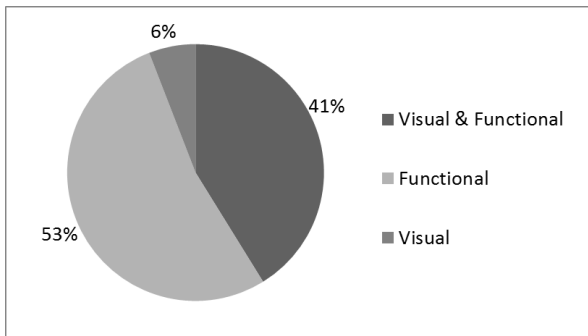


Fig. 7 Reason of being distinctive

5.6. Physical distinction with surroundings

Having distinctive form in their surrounding environment is another important factor in determining the importance of the elements in the city. Nearly 68% of the selected elements had a more distinctive form than their surrounding buildings and areas. Only 32% of them didn't have any distinctiveness in comparison with their surroundings.

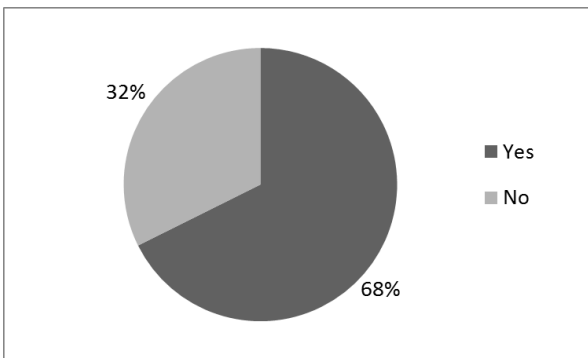


Fig. 8 Having distinctive form in their surrounding

5.7. Having heritage value

More than 41% of the elements had heritage value due to their historical background and the citizens' perception of this background. The historical, architectural and religious values of these elements which increase by time have the same effect on people's minds. This is why these prominent features manifest themselves as key elements in the formation of the cognitive structure of the city of Isfahan.

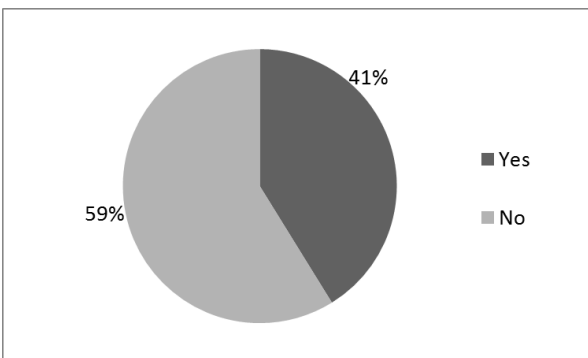


Fig. 9 Having heritage value

5.8. Adjacency of type

Although being detached can be treated as an important factor for an urban building to be categorized as a mental element, the situation is not necessarily so in the case of Isfahan. In this study, over 67% of the selected elements were attached to their surroundings. This fact shows that the mode of standing is not necessarily the only important factor in creation of distinctiveness for a building to upgrade it into an important element in the citizens' mind.

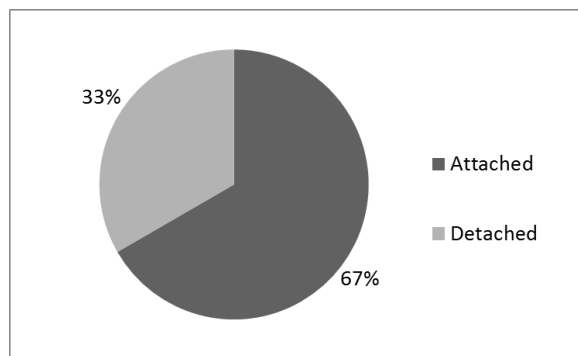


Fig. 10 Type of elements adjacency

5.9. Type of the adjacent route

One of the most important factors that can be effective on the quantity of eternity and reminiscence of cognitive elements is the type of accesses that provide accessing to them or pass forby them. As can be seen, most elements in this research were adjacent to the regional distributors that form an important part of the main access network of the city. The rest of them were adjacent to the highways, district distributors or collectors.

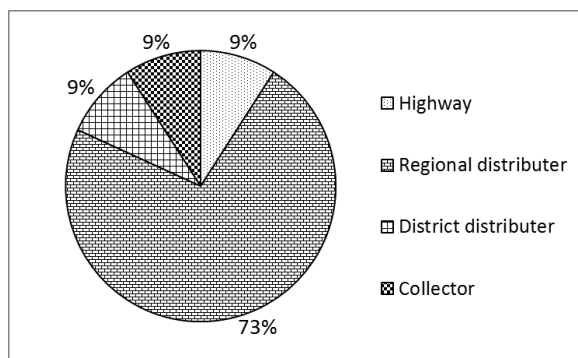


Fig. 11 Type of adjacent route that provide accessing to elements

6. DISCUSSION

The results of this study provide important points and criteria that represent the physical aspects which have main roles in upgrading the buildings from being tyypical to becoming urban landmarks. According to the reviewed agents that have been derived from the cognitive maps of the citizens of Isfahan, these results can be expressed as:

The most frequently selected elements from the Isfahani citizens' cognitive maps are historical buildings that are established in central texture of the City. This reveals the

importance of historical elements that prompt people's cognition of their city and marks their cognition of their city by these elements. Visual aspects are not the only reason to create urban elements. As observed in this study, most urban elements have functionally distinctive features for Isfahani residents. In this study, land use and urban function of the elements have more variety than the other evaluated subjects. The selected elements in this study have an urban function or land use such as tourism, commercial, leisure, religious or transportation or accommodation.

The establishment of nearly half of the landmarks in central texture of Isfahan indicates that the central areas and their elements have a particular pertinence for the city settlements. On the other hand, the statistics in this study show that new urban textures which have been formed during the recent decades were not able to have a legible cognitive structure for the citizens. Manifesting more distinctive form than the surroundings is one of the most significant factors that can bring about distinctiveness to the urban buildings. About 70% of the derived elements in Isfahan had a typical form than their surroundings for the citizens.

Although the establishment of cognitive elements detachedly can lead to putting more emphasis on them and thus making them more distinctive, in this study about 67% of them are attached to their surrounding texture. Accordingly, this shows that some premier factors other than the formal distinctive ones affect the citizens' cognition. The placement of elements along the main streets or in street junctions leads to increasing their importance. Therefore, these elements can be site selected considering the main streets of the city.

According to the present study, the distinctive elements were distributed along the natural axis of the city, Zayanderud River and the main historical street of the city, Chaharbagh Street. These two axes cover the city of Isfahan from east to west and from north to south, and practically provide adequate access for the entire population, as shown in the following map.

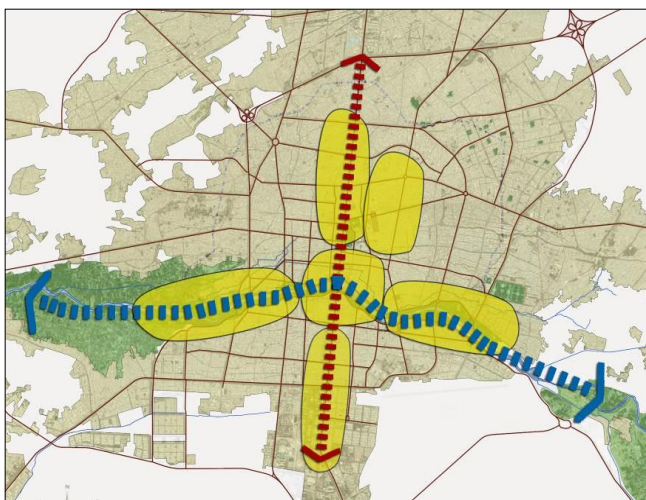


Fig. 12 Distribution of landmarks in Isfahan

7. CONCLUSION

In the present research, we tried to derive the main

elements in the citizens' mental image of Isfahan, and then the specific characteristics of these elements were identified and analyzed. The results indicated that 34 natural and man-made elements were the most distinctive elements in Isfahani citizens' point of view. The analysis of the characteristics of these elements suggests that some common physical and functional criteria affect the distinctiveness of these elements in the mental maps of the citizens and users.

The situation is one of the most significant indicators of urban landmarks, which, of course, is reinforced in interaction with the urban access system. In other words, convenient and easy access of all citizens to an urban element can be considered as one of the important factors in distinction of that element. In this regard, if the situation of a particular element is simultaneously in the neighborhood with the main elements of the city's structure, its significance will be multiplied. In the meantime, the availability of public transportation facilities to access the landmark, including the subway and bus systems, can promote the landmark situation.

Another important factor is the historical background of the element and its durability over time; in other words, time and durability (socio-economic interaction of the element with people over time) is one of the important factors in defining urban landmarks. The functional characteristics of the elements also play a significant role in marking them as landmarks. The results of this study showed that tourism, commercial and leisure functions (on an urban scale) have the greatest potential for becoming a city landmark.

The distinctive form of a building, in relation to its surrounding environment, enhances the visual perception of the visitor and over time, it can be a factor in establishing this form as a landmark in the minds of citizens. This important factor has been emphasized by such scholars as Lynch (1960) and Shuhana (2011).

Regarding the conditions of the current cities and their being away from nature, the presence of natural elements such as rivers, mountains and parks in and around the cities can act as a platform for the emergence of various functions and the creation of an environment for the development of social interactions, therefore playing an important role in influencing the formation and promotion of the landmarks in the minds of citizens, so that these elements are themselves considered to be the most important landmarks of the city.

Each of the above-said factors alone can be used to create landmarks. But studies have shown that, in many cases, the combination of two or more of the mentioned factors has strengthened the position of the landmark in the citizens' cognitive map. In other words, in order to create a landmark, for example in new cities, consideration of all these factors as much as possible (more than one factor) will result in greater success of that landmark.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

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