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TYPOLOGY OF HISTORIC NEIGHBORHOOD CENTERS IN ISFAHAN

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ABSTRACT

It is important to pay attention to Isfahan City as the main center of Isfahan school in architecture and urbanism to protect and model urban elements. So, to provide appropriate guidelines on how to intervene in historical places, it is adequate to investigate and consider them at various scales, from local to urban. In most studies on Isfahan City, neighborhood centers, as one of the significant functional spaces, have been usually neglected. These elements, which are functionally one of the smallest urban spaces and typically provide services in neighborhoods, have faced severe threats due to changes in the structure of Iranian urbanism, including widening of streets, physical changes, etc., after the arrival of modernism in Iran and no serious attempts have been made to maintain them. Therefore, the present study aims to document them and explain their spatial, physical, social, economic, and environmental characteristics to help today's designs on the local scale. Moreover, it is attempted to typology neighborhood centers, especially morphologically, to examine various forces playing a role in their formation. Research findings indicate religion, economy, and climate have tangibly influenced the formation of these neighborhood centers. Moreover, it can be said that the typology aims to explain the indicators affecting the physical typology on the middle scale and also to identify the primary type of neighborhood centers in Isfahan according to land use, enclosure, access, and geometry indicators. The samples are also selected using field studies and the typo-morphology technique.

Keywords: *Morphology, Typology, Neighborhood Centers in Isfahan, Dominant Type*

1. INTRODUCTION

Iranian cities have always consisted of urban structure (main part) and urban texture (subpart). The urban structure refers to the arrangement of land use in urban areas, i.e. how services, facilities, and main uses are set out at the urban level. The urban texture mainly includes neighborhoods. This structural system has been established on the urban and neighborhood scales. Each neighborhood has consisted of one or more neighborhood centers with a critical role in meeting local needs, connecting the neighborhood to the urban structure, and establishing intra-neighborhood connections. The structure (main part) always represents the city's stability, durability, and identity [1]. So, any unplanned change in the structures causes severe damage to the identity of cities and neighborhoods. In 1921, the construction of streets in the Iranian cities, according to Haussmannian urbanism has weakened and even destructed the traditional structure of many cities, leading to the disconnection between neighborhoods and between them and the main structure of the city. Moreover, another reason for the deterioration

of historic fabrics of Iranian cities due to new developments has been inadequate knowledge of the formal and functional nature of urban spaces in these historic fabrics of Iranian cities, because the developers have had insufficient documents for the analysis of textures, on the one hand. On the other hand, the values of the diverse texture have not been revealed to developers, city managers, and the public [2]. Therefore, it can be said that it is inevitably necessary to know the urban and local structures of historic fabrics to revitalize and restore them, and according to Muratori, such knowledge can be obtained through urban analyses only considering the historical course of buildings and based on the typology of buildings [2]. The present study aims to examine the morphology of the historic neighborhood centers in Isfahan City as structural elements in the neighborhoods and typologies them considering indicators influencing the form of this urban space, such as access, enclosure, land use, geometry, and materials. The typology aims not to describe the state of the neighborhood centers, but to determine the influence of the proposed indicators on the different types and also to identify the dominant type according to each indicator to examine various social, economic, environmental, etc. reasons for the formation of the dominant class in future research and also to model the formed types in today's designs. Moreover, it is also attempted to identify the extent to which the proposed indicators can be applied as comprehensive and systematic indicators in the typology of historic neighborhood centers.

2. Theoretical foundations

2.1. Urban form

Morphology is the study of urban form to investigate the causes of its formation, physical evolutions, the continuation of these evolutions, or changes to plan and design its future form [3]. Examining urban form is one of the main pillars of urban design, and urban form is considered a container of activities [1]. Therefore, it is of great importance to study the various elements of cities to know their physical and spatial features. In this regard, Weber defined urban form as a place with biological networks and adapted spaces that physically accommodate activities [1]. Kevin Lynch defines urban form as "the spatial order of the people who are working; it is the result of the spatial movement of people, goods, information, and physical properties that change space in proportion to that activity." On the other hand, geographers have a physical view of form and deal with only the urban morphology in their definition of urban form in such a way that, according to them, morphological studies deal with the form of human settlements. Therefore, it can be said that the easiest way to study urban form from the perspective of geographers is urban morphology [4]. The main problem in recognizing and studying the urban form is the lack of a direct relationship between urban form and functions [1]. Therefore, systematic methods and tools are significantly required in research on urban form. To this end, Lynch and Rodwin have proposed six criteria for the systematic study of the city, including element types, quantity, density, grain, focal organization, and spatial distribution of elements [5]. In this regard, various methods have been proposed to investigate the urban form, such as Hillier and Hanson's space syntax [6], Conzen [7] & Kropf's morphological analysis [8], and Lynch's mental maps.

2.2. Urban morphology

The term morphology is a makeup of morph-, and –ology, which means the logic of understanding the form. In many fields, morphological studies have been carried out to address the physical characteristic, structure, proportions, and deformation of objects and their constituent elements [9]. Madanipour defines urban morphology as the systematic study of the form, shape, map, structure, and functions of the built textures of cities and the origin and evolution of these textures over time [10]. On the other hand, morphologists emphasize that the urban form results from social and economic forces over time [11]. So, urban morphological studies implicitly include the study of human values forming the city [12]. The primary purpose of morphological studies is to identify the original and identifiable layers of urban textures [13]. It can be very effective to consider the elements of the physical organization, including streets, grains, blocks, texture orientation, and other factors relevant to morphology, especially in historic textures, to maintain their identities. Various researchers have classified the main elements of urban form differently according to their views. For example, Kropf, who pays special attention to the issues of urban identity and morphological identity, classifies the critical elements of the urban form as follows: 1. Buildings and settlement pattern; 2. Plot and plot subdivision pattern, 3. Street network, 4. Urban block, 5. From a pragmatic perspective, urban texture, while Consent classifies the main elements of the urban form into functions and activities, structure of buildings, plot subdivision pattern, and street network pattern [13]. Morphological knowledge is based on three schools: English, French, and Italian, which provide various methods for analyzing urban form and urban space over time [9]. These methods allow urban designers to be aware of local development patterns and changes [13]. Italian researchers such as Aymonino, Aldo Rossi, and Muratori have developed specific urban analysis techniques by emphasizing the importance of the relationship between urban form and building typology. This methodology has been called the architectural typology and analysis of urban form. This urban morphology technique seeks to discover the primary forms in each historical period and their physical development over time [2].

2.3. Typology

In Persian, the term type means a specific group of people or things having a given characteristic or sign. In fact, in Persian, there is no precise definition for this term since there are various interpretations for it and like the terms space and form, it is interpreted according to the user's perspective. Although it has a definite definition in English and can be called a representative of a group of objects with common features, the definition of "feature" can be changed depending on its interpretation [14]. These different interpretations have led to different typologies. For example, one can refer to the differences between the typologies of squares presented by Rob Krier and Paul Zucker. Zucker divides squares into 5 categories: closed, dominated, nuclear, grouped, and amorphous [15] while Krier divides squares into 4 categories in terms of their forms: triangular, circular, square, and a combination of them [16]. These different typologies of squares indicate different indicators considered by researchers, leading to different categories. Typology is an attempt to place a collection of complex objects in a regular set to achieve greater generality for cognition and planning. Although the comprehensive usefulness of typology is questionable, it can be considered useful for three purposes. First, it is a tool to describe the urban structure in terms of various features; Second, it is a tool to analyze and relate environmental

and socio-economic data to different types defined; And third, it is a planning tool providing a deep understanding of urban types to pave the way for more appropriate planning and design at the micro and macro levels [3]. According to Muratori, typology does not only relate to buildings, but also to all walls, streets, gardens, urban structures, and anything that plays a role in determining the urban form in a given period of time. On the other hand, Rossi tries to relate the type of buildings to the urban form. So, it can be said that urban typology includes various levels, which can include the typology of parts of buildings such as entrances or slopes, typology of buildings, typology of urban parts and buildings, and typology of texture, and a desirable typology is a typology that can be studied at different levels and also refer to the upper or lower level as much as possible while being focused on a given level. To describe a referable typology, Saroukhani has proposed some principles:

1- The principle of perspicuity: the boundaries between types must be clear and carefully defined;

2- The principle of reciprocal exclusion: an element should not be placed in two types according to one criterion (the basis of that typology);

3- The principle of inclusive: any type should be defined in such a way that it fully accommodates its facts; and

4 - The principle of comprehensiveness: if a group of people or a set of social phenomena is typologized, all of them, not part of them, should be considered in the typology [17]. On the other hand, Rapaport points to two conflicting principles in the typology that the researcher face. First, the researcher wants a typology that has as much information richness as possible, so, the number of types increases dramatically. Second, to reduce the perceptual burden and to recognize any type as a suitable set and make decisions on them, the researcher needs as few types as possible [3].

2.4. Typo-morphology

In urban design, the typo-morphology of urban textures refers to dividing the urban texture into homogeneous and integrated areas by selecting the appropriate elements of urban form as criteria for texture analysis. The typo-morphology maps are prepared with different resolutions based on the project goal, leading to the production of different typo-morphs in the texture [18]. The most important feature of typo-morphological studies is that they focus more on the relationship between buildings and the spaces surrounding them than on the building forms and their architectural styles. Thus, when using this method, urban design experts consider that buildings and their complementary open spaces are interconnected spatial units that form the urban texture [19]. Kropf considers three fundamental components for typo-morphology: 1. Position of the plot, 2. Surrounding environment design, and 3. The layout of elements in the plot [8]. Therefore, using these components, one can understand the evolution of urban textures and the relationships between buildings and types of plots, building blocks, and streets are created, leading to the formation of a specific urban form and structure. Such an approach enables urban designers to coherently evaluate and identify the features of the form created. This, in the later stages of the urban design process, will be a resource for developing rules and regulations to control them [4].

2.5. Explaining the position of the neighborhood center in the neighborhood structure

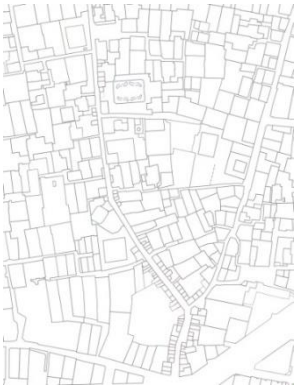
Neighborhood, by its definition, is a limited physical-social unit of the city and the most miniature urban planning and management unit with specific boundaries (objective or subjective) and its relatively limited functions on the pedestrian scale provide face-to-face communication and thereby the residents' sense of belonging and collective identity while meeting residents' daily needs [20]. Accordingly, the needs of residents on a human scale, an increase of social interactions by strengthening and improving the physical space of the neighborhood, sense of place and place attachment, economic self-reliance, compact development, mixed uses, diverse housing, walking, and diverse transportation [21], in addition to calmness and intimacy, coziness, vitality and dynamism, safety, flexibility, and presence, are among the local qualities and thematic expectations of the neighborhood [22]. The fixed and structural elements of the neighborhood include road, neighborhood center, entry, and edge. Neighborhoods were connected to the urban bazaar through the main road or a road leading to the bazaar, and the city center and the neighborhood centers were connected [23]. Each neighborhood center includes spatial elements that distinguish neighborhoods from each other. The spatial organization usually takes place at the intersection of the main passages. It contains elements such as Ab Anbar (cistern), mosque, Hussainiyah, Tekyeh, bazaar, and Bazaarcheh (small bazaar), Saqqakhaneh, school, and other required local uses [24]. Sultanzadeh physically classifies traditional neighborhood centers in Iran into two types: 1. Raster (shop lines) or passage was slightly more comprehensive than other social and commercial spaces passages, and 2. A small square was often located at the intersection of several roads or next to the neighborhood's main street. The residents required several shops to supply daily and weekly essential goods of the neighborhood [25].

3. Introduction of study areas

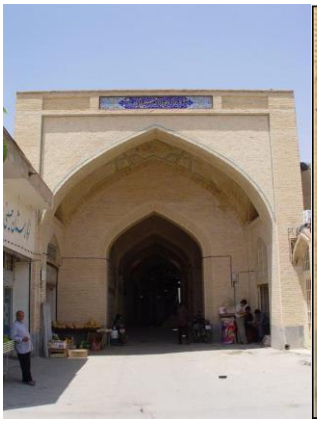
In the present study, the study areas are the historic fabric of Isfahan. They are Districts which has different neighborhoods. The historic fabric includes the centers of Ali Gholi Agha, Rahim Khan, and Shater Bashi neighborhoods, Sonbolestan, Shahshahan, Domenar Dardasht, Darb-e Imam, Hassanabad, Imamzadeh Jafar, Haj Soleiman, Zand-e Kermani, Ibn Sina School, Hakim, Chaharsooq Naghashi, Khajoo neighborhoods, Sharif Vaghefi, Sichan, Jolfa, and Sangtarash-ha neighborhoods.

3.1. How to identify the neighborhood center

In the present study, the neighborhood centers were identified and selected using field studies and the typo-morphology technique. To this end, considering the issues raised in the typo-morphology approach, the subdivision, geometry, and orientation of lots, etc., in the textures were paid attention to, and significant differences between them were realized. Next, the distinct points identified in the textures were examined using field studies to ensure their selection. For example, it can be said that in the neighborhood centers, the lots are smaller in area than other lots in texture or have different geometries. These differences indicate changes in the textures. Therefore, each distinct point can be examined in the evolution of form and function according to the criteria for typo morphology.



Hassan Abad neighborhood center Shater Bashi neighborhood center



Hassan Abad neighborhood center Shater Bashi neighborhood center

4. Indicators used in the typology of neighborhood centers

Physical organization refers to how the mass and space are arranged to conceptualize the sense of place and configure the urban form pattern [13]. So, the indicators appropriate to the arrangement and mass-space relationship can be discussed at three levels: the first level includes the typology of the most minor elements, including building and lots, the second (middle) level deals with the typology of streets, blocks, and open spaces within the block, and the third level includes typology at the neighborhood scale [3].

Many researchers have known the middle level as an acceptable level due to the ignorance of building elements and emphasis on quantitative indicators [26] [27]. Therefore, the indicators are explained considering the level of typology.

4.1. Geometry and proportions of space in the plan

Each of the proportions and sections of the space in the plan induces a different feeling of the environment [13]. The narrowness and wideness of the space can lead to the user's different reactions and make space static and dynamic.

4.2. Enclosure

The enclosure indicator has the most significant psychological impact on the observer and is significantly related to the sense of place. In addition to the aspect ratio, this indicator is influenced by other factors such as physical cohesion, transparency of the wall, the prominent elements, and being covered or uncovered. So, the aspect ratio alone is not a suitable indicator for expressing the enclosure degree [13]. On the other hand, this physical indicator has different effects in terms of intensity according to cultural and ethnic conditions. For example, considering climatic conditions, an Iranian user is accustomed to a higher degree of enclosure than a western user [28].

4.3. Land use

The land use indicator is a factor for the spatial organization of urban activities and functions. So, it is one of the main elements forming the urban form [1]. The predominant land use of urban space can represent the main activity of that space. So, it can be effective in the formation of dependent spaces. On the other hand, land uses can affect the form, and forms create appropriate architecture according to the functional needs of the land use.

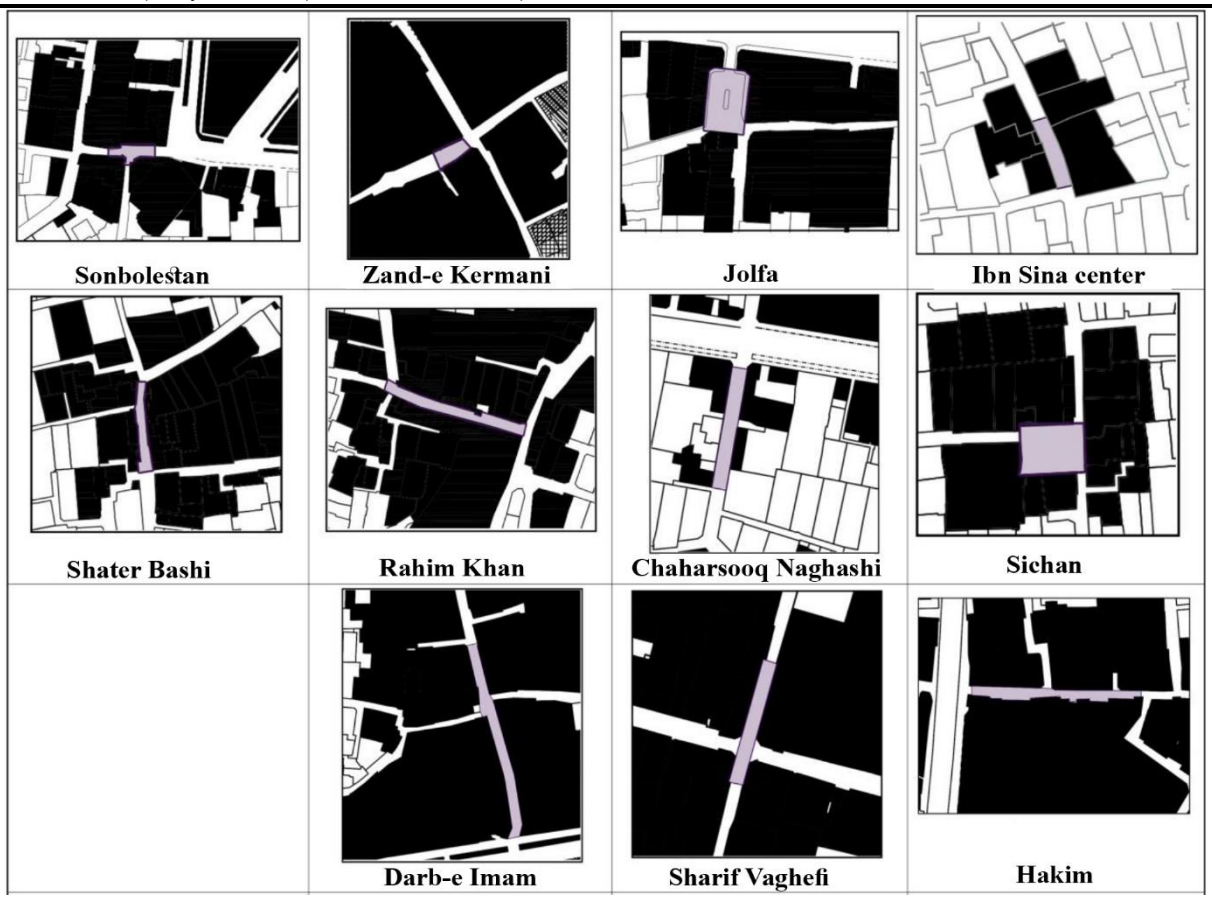
4.4. Access

The access indicator can influence the urban form in various dimensions. The location of access and its connection with the neighborhood centers can effectively define the neighborhood center space. Also, it strengthens or weakens the spatial territory by increasing or reducing enclosure. In his typology of squares, Rob Krier has well described the role of access in creating different forms and has shown the differences between the accesses connected to squares in conditions such as corners, etc.

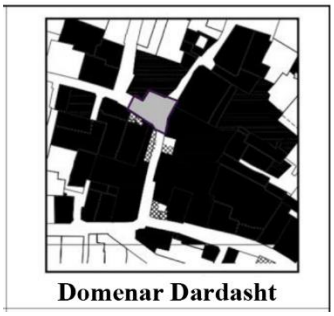
5. Typology of Historic Neighborhood Centers

5.1. Typology based on Geometry and proportions of space in the plan

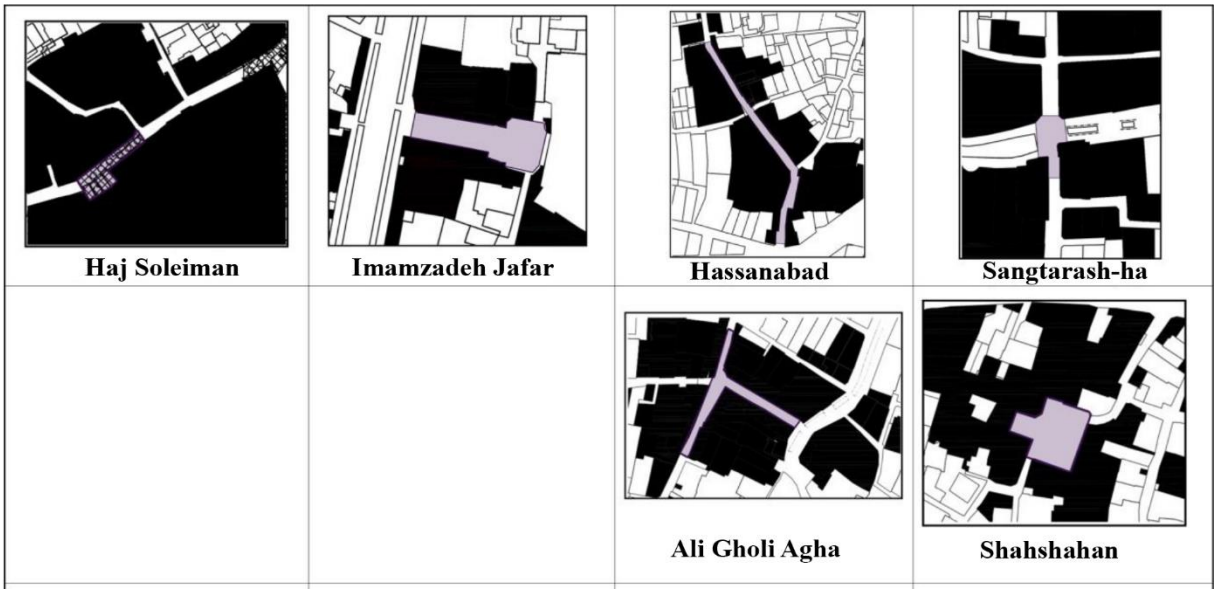
A) First type: centers with regular geometry



B) Second type: centers with irregular geometry



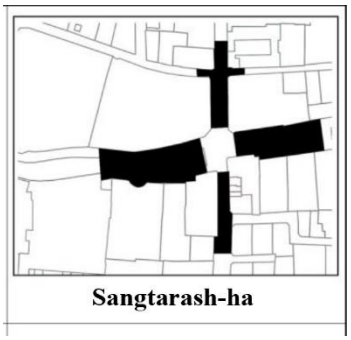
C) Third type: centers by combining a set of regular geometries



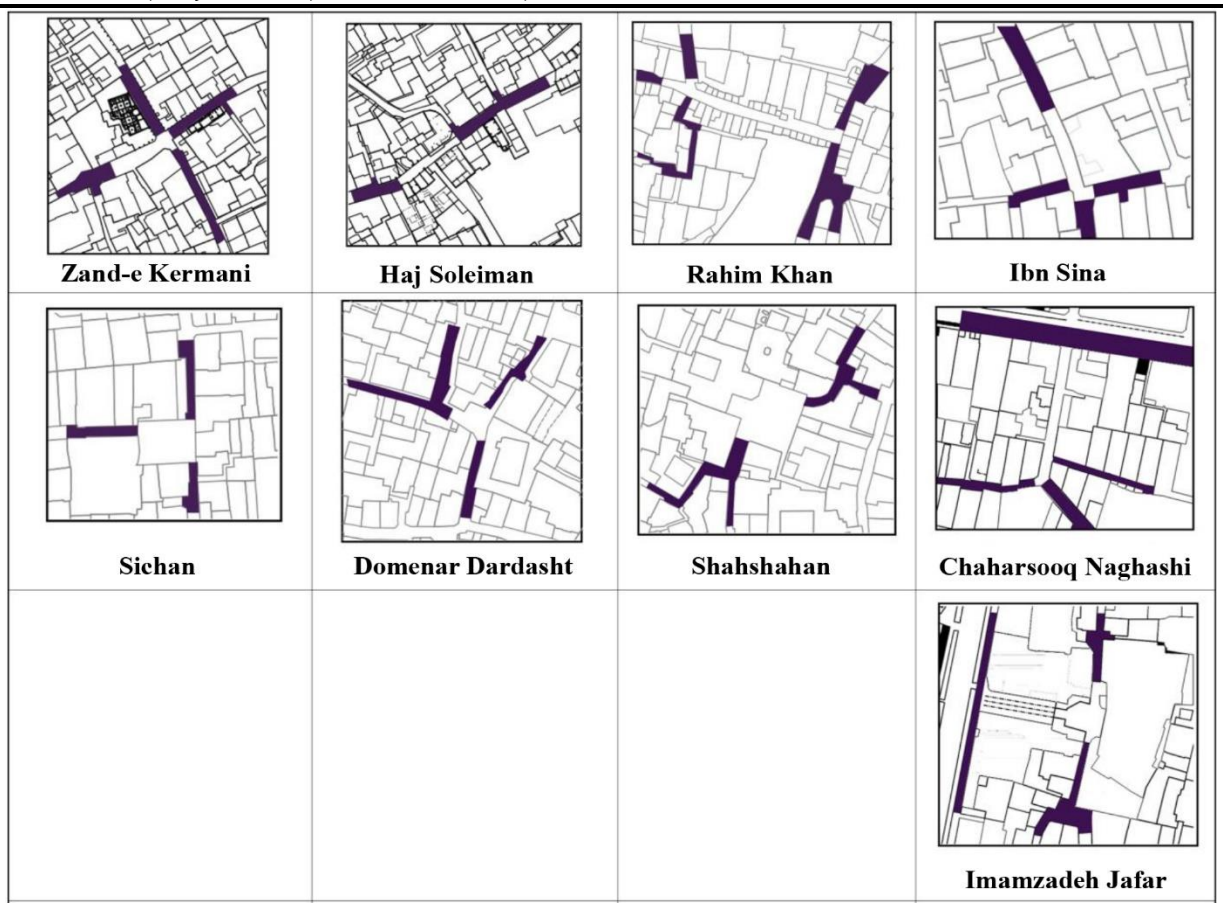
As it is clear in the classification of the neighborhood centers on the geometry index, most of the neighborhood centers of Isfahan have a regular and of course linear geometry, so that even the ratio of length to width of this geometry can be stated as more than 1 to 3, which means. The geometry of the neighborhood centers is part of the path and does not create a static space like a square.

5.2. Typology based on access index

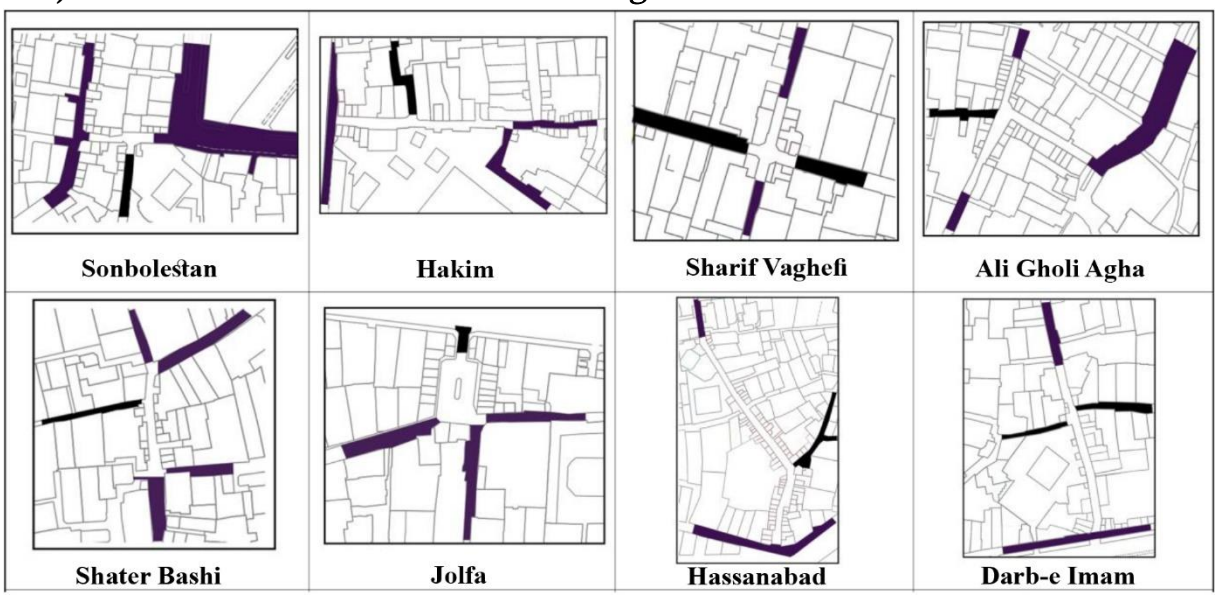
A) First type: Connect access from the middle to the neighborhood center



B) Second type: Connect access from the corners to the neighborhood center



C) Connect both from the middle and the neighborhood corner

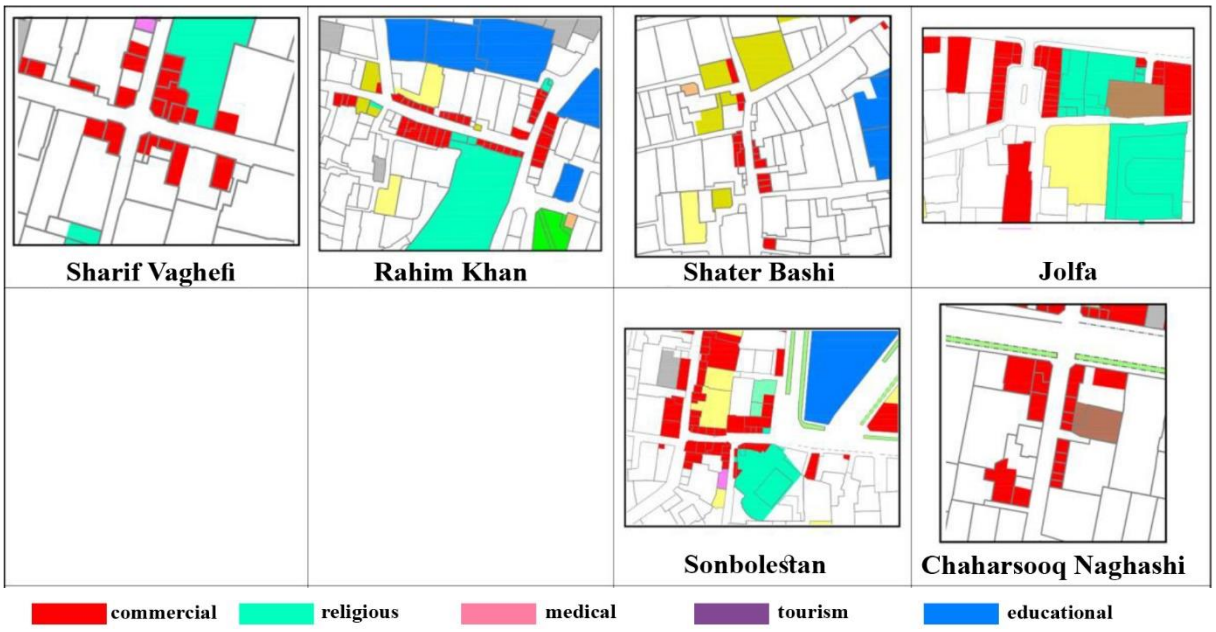


According to the typology based on the connection of accesses, it can be said that generally the connection of access to the neighborhood centers is from the corners or the beginning and end

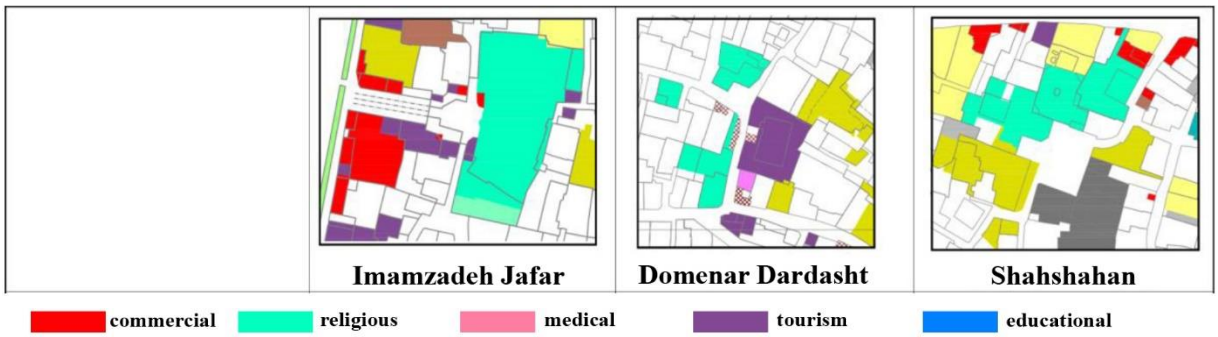
of an axis this indicates that most neighborhood centers are in the direction of the path. On the other hand, this factor is effective in creating spatial cohesion and increasing the enclosure of the neighborhood center.

5.3. Typology based on Land use and space performance

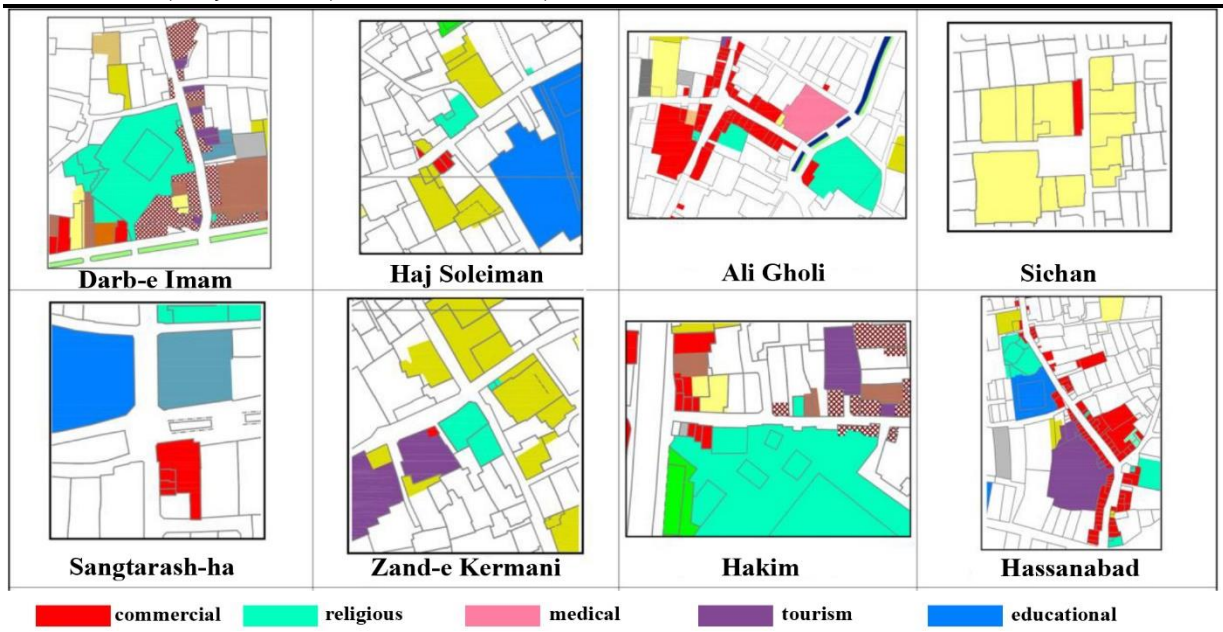
A) First type: neighborhood center with commercial land use or commercial space performance



B) Second type: neighborhood center with religious land use



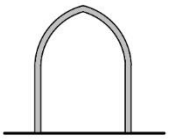
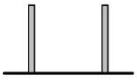
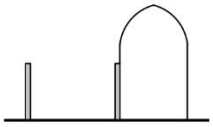
C) Third type: multi-functional neighborhood center (religious-commercial-tourism-medical, etc.)



5.4. Typology based on spatial enclosure indicator

A) The first type includes neighborhood centers with a high degree of enclosure (they are covered and have an aspect ratio of 2:1 or 1:1 or a prominent element)

Domenar Dardasht neighborhood center - Sonbolestan neighborhood center - Hakim neighborhood center - Ali Gholi Agha neighborhood center - Shater Bashi neighborhood center - Rahim Khan neighborhood center – Darb-e Imam neighborhood center - Hassan Abad neighborhood center - Imamzadeh Jafar neighborhood center - Chaharsooq Naghashi - Sharif Waqefi neighborhood center

Typology				
spatial enclosure and proportion	covered	2/1	1/1	prominent element
neighborhood center	Sonbolestan Ali Gholi Shater Bashi Rahim Khan Hassan Abad Imamzadeh Jafar Chaharsooq Naghashi	Darb-e Imam	Hakim Sharif Waqefi	Domenar Dardasht

B) The second type includes neighborhood centers with a moderate degree of enclosure (they are uncovered and has an aspect ratio of 1:2 or 1:3)

Sichan neighborhood center - Shahshahan neighborhood center - Haj Soleiman neighborhood center – Sangtarash-ha neighborhood center - Jolfa neighborhood center

Typology		
spatial enclosure and proportion	**1/2**	**1/3**
neighborhood center	**Sichan** **Shahshahan** **Haj Soleiman**	**Sangtarash-ha** **Jolfa**

C) The third type includes neighborhood centers with a low degree of enclosure (they have an aspect ratio of above 1:3)

Zand Kermani neighborhood center - Ibn Sina tomb

Typology	
spatial enclosure and proportion	**1/3 <**
neighborhood center	**Zand Kermani** **Ibn Sina**

Given the typology of the neighborhood center considering the enclosure indicator, it can be said that most of them have a high degree of enclosure, which is strengthened not only by the aspect ratio but also by being covered. Moreover, in addition to spatial contrast between the center and other spaces in the neighborhood, this factor plays a more effective role in increasing shading and enhancing climate comfort.

6. Conclusion

Emphasizing the physical dimension of urban design, the present study has addressed the typology of the neighborhood center as one of the most vital social and service centers on the neighborhood scale. The physical dimensions of the neighborhood center can be analyzed from different aspects, and the role of each of the social, climatic, economic, etc., factors in the formation of the dominant type can be assessed in a detailed study. According to the research findings, it can be said that the dominant neighborhood center type in Isfahan has a regular order and even linear geometry. This can be due to being located on the sides of the neighborhood's main streets. Of course, climatic factors such as reduced sunlight influence the formation of this geometry. The high degree of enclosure, which was strengthened mainly by the roof on the neighborhood center, has led to the spatial contrast between the neighborhood center and other neighborhood parts. Also, it has enhanced climate comfort by reducing sunlight, leading to the formation of a place more suitable for gathering. The accesses are mainly connected through corners, and various commercial, religious, historical, and tourism uses and other local services are together to meet local needs. Moreover, it should be noted that the economy and religion play a fundamental role in forming neighborhood centers, so many of these neighborhood centers have become small bazaars. These features of the dominant neighborhood center type in Isfahan can be used in future research to historically study them to find their initial cores. It is a method emphasized in the morphological studies of the Italian school. On the other hand, this study provides a ground for comparing the dominant neighborhood center types in Isfahan and other cities to find the contextual differences between them. According to the research findings, it can be said that local squares or neighborhood centers in Isfahan are mainly part of a route that is considered the neighborhood center due to the influence of land uses and changes in an enclosure. One can observe the dynamics of local roads in them. On the other hand, it can be said that the indicators used can indicate physical differences well on two-, and three-dimensional scales, as well as in activities making the urban form. Finally, the following question can be raised: What efficient indicators can be added to those mentioned for the typology of neighborhood centers to use in mid-scale morphological evaluation?

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