

Original Research Paper

# Investigation of Changes in the Structure of Isfahan City in Ancient Texture, Iran

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**Abstract:** The structure of a city can be affected by many factors, such as environmental, economic, social, political, dominant intellectual parties and urban patterns of the world. Textural-spatial structure of the city is resultant of all forces that causes a settlement forms or constructed and has objective and subjective impressions. Development of the city had a descending and ascending trend, due to various events in all historical periods. Today, knowledge about spatial structure of the city and the reasons were dominated on its spatial expansion are needed to control its expansion and is one of the important effective factors on success rate of urban planners and designers. Textural- spatial structure of the Isfahan city which is formed quit and slowly during the different historical periods following the climatic, social, economic and intellectual parties in its own time; since the 1300 H.S, for many reasons, it has been undergoing evolution and transformation and then there have occurred various problems in the urban system. In such a way that, the Isfahan city which in olden times by having compact pattern was benefited from the social, economic and environmental advantages of this pattern, but along with the development of the city, it gradually getting away from this pattern. This paper with purpose of identifying factors affecting the textural-spatial structure of cities, is looking for analysis and identify the historical trend of expansion of Isfahan city and determines effective factors on it during the time using descriptive-analytic and historical research method and applying the qualitative-descriptive factors analysis. The results of this research show that, at first, natural factors, especially climatic conditions were among the most influential factors on the growth and development of Isfahan. But in subsequent periods, social, economic, political factors and especially dominant intellectual parties had a significant effect on the textural-spatial structure of the city.

**Keywords:** The Structure of the City, Urban Structure, Urban Development, Isfahan, Ancient City

## Introduction

The city is local-spatial phenomenon, which is created at a particular point, growths and evolves during the time and changes its quantitative changes to qualitative changes required by its era.

So dealing with the problem of city, urban space and its texture to fulfill Immediate and future needs of residents, requires a process that is started from the philosophy of the city, grows and develops in local – time and ends to space by Scientific-practical research. This is the end of beginning of other scrutiny.

Cities of Iran which during the historical period, relying on national endogenous creativity and initiatives, were grown and evolved, gradually entirely changed over the decades and lost their textural characteristics, Cultural values, social, artistic and historical features. Gradual changes started from Constitutional Revolution, but the process of urbanization and urbanism of Iran since the 1300 S.H entered a new level, by acceptance of modernity and following the Western patterns of urban planning, which can be called the stage of evolution and transformation (Habibi *et al.*, 2011: 1390). From the beginning of the nineteenth century, attention to urban issues took on a newer form. Because the growth of industry and technology has increased the size of cities and in this way, the textural development of cities was influenced not only by natural factors, but also by human factors (Qadami and Yousefian, 2014: 1393). The textural-spatial structure of a city or, generally, any settlement can be affected by many factors. In fact, the spatial system is the resultant of all mankind, natural and human-made forces, which have both objective and mental aspects. The growth manner of the city is under the influence of several factors, such as natural and its facility constraints, politics of programmers, how to using the land and many other factors. Hence, today being aware of the spatial structure and shape of the city is one of the major influencing factors on the success rate of the urban programmers and planner and assists to improve the urban environments (Qadami and Yousefian, 2014: 64).

Today, by pervasive negative consequences of the horizontal expansion of cities in the different textural, social, environmental and economic aspects, controlling the excessive textural extension, is among important cases that should considered meticulous, with accuracy by urban programmers and Decision makers. Because that the unbridled and accelerated development is a double threat for the quality and unique character of the old section of the city (Thaitakoo, 2006; Hobson, 2003), For this purpose, investigation the textural- spatial structure and pattern of the city and reasons which dominated on its spatial development manner in different periods, is necessary to avoid and control the existing textural, social, environmental and economic problems and insufficiencies in cities. At present, the dispersion of urban elements and public activities in Isfahan has changed the structural pattern of the public centers and the sections of the city. City using which often was evolved in the limited central areas of the city at various stages, by the prosperity of urban lands and the service section, due to the lack of correct policies of development and disturbance of urban using

distributions, caused disintegrate and rupture of the main infrastructure of the city, which once time had unity, integrity and suitable linkage.

So this article discuss this question that: What changes are applied to the textural-spatial structure of Isfahan city during its historical continuity and what factors have influenced this growth and development? According to these questions, the paper aims to by achieving the following goals to find answers for discussed question: (a) studying and reviewing the development and evolution manner of the Isfahan city with emphasis on its spatial- textural structure, to identify and explain the effective factors on textural-spatial structure of Isfahan city in order to control its spread and preventing the textural, social, environmental and economic problems and insufficiency arising from unbridled and scattered growth of cities.

## Research Methodology

In the first part of this article, which a section of the growth process of Isfahan city in the past is studied and aims to extract the quality and quantity of the textural-spatial changes in the structure of the Isfahan structure, the descriptive and historical research methods have been used. The framework and theoretical foundations of the research have been designed and presented to provide the possibility of identify the effective factors on textural-spatial structure changes of the city by using different theories related to effective factors on transitions of the city. Required information and data in this step are provided with two methods:

(a) Documentation (library), using historical texts, authoritative compilations of historians, investigating the urban development projects of Isfahan such as Comprehensive and Detailed plans and (b) field acquisition. In the next step, based on the collected data, the urban development process will be analyzed and the effective factors on the textural-spatial structure changes of Isfahan will be explained, which qualitative descriptive analysis method has been used.

## Theoretical Foundations

### *Spatial Structure of the City*

The spatial structure is one of the key common concepts in the field of the urban planning and design. Because it has involved with all the structural elements of the city and illustrates how these elements are deployed and functioning in the city. Several component are involved in the field of spatial production, such as-economic, social, environmental components and.... which all of these factors are gathered and ultimately appears in the form of urban morphology (Wiedmann *et al.*, 2012).

The existing theories about spatial structure of the city mainly describe the modality of the order of the spatial structures in the regions.

Basically, the theories of the city construction are involved in the textural and functional view of the settlements and provide a framework for land use and spatial arrangement of the elements and components of urban constituents. The spatial structure of cities is one of the most important urban subsystems.

Such a structure, is a collection consists of different elements and components and on the other hand, acts under cover of a larger system beyond itself, named urban system, which can't exist apart from other urban subsystems. So, according to the system theory, the urban planners and programmers should use different approaches to study and analyze the effective factors on formation and evolution of the spatial structure of cities.

In general it can be said that, the spatial organization of the Human, urban and district habitats, is direct result

of the social, economic, political and institutional processes.

### *Effective Factors on the Evolutions of the Textural-Spatial Structure of City*

Cities are constantly growing and developing and this evolution happens in the nature of the spatial elements and spatial layout, too (Zekavat, 2011: 117). Ziyari believes that the spatial structure of cities depend on the different and reciprocal relationships of all forces and existing factors in the city. These factors can consist of market forces, activity, urban Infrastructure and various services which always had a complex and reciprocal relationship (Ziyari, 1999: 36). Slow gradual processes are regarding to the Technical - Economic paradigms, including structural changes in the global economy, demographic changes and the introduction of new technologies. Rapid processes include the stream of communication (which can happen seconds to seconds in the digital world) and the Daily cycles of an urban travel.

**Table 1:** Definitions and components of spatial structure of the city from the perspective of researchers

Researchers	Definition
Bertaud (2002)	Alan Bertaud introduces the spatial structure of the city as combination of two components 1- spatial distribution of population and 2- traveling pattern of people from residential locations to destinations and various places which an important social activity or interacting takes place, such as work place, shopping centers, schools and places of social gatherings.
Cheng <i>et al.</i> (2006)	Spatial structure of the city shows discipline and the relationship between textural and functional elements in town.
Rodrigue <i>et al.</i> (2009)	spatial structure refers to a set of communication resulted from urban formation and aggregation, transportation, stream of product and information
Erickson (2002)	Spatial system is a set of textural and functional elements which form the spatial configuration and arrangement of the city, these elements are include: 1- public spaces 2- movement structure 3- mixing of the performance and activity 4- public building 5- Ecological environment and facilities 6- hierarchy.
Nazarian (1991)	The spatial structure of the city is patterns of land use, form, shape and layout of the urban fields and distribution plan of activities, elements and components of the city.
Hamidi <i>et al.</i> (1997)	Spatial structure of the city is a set composed of a backbone and network of interconnected users and the various urban elements which correlate the city in its integrity and encompasses every area of city until its last component, namely neighborhood districts.
Shokouie (2000)	The spatial structure is, in fact, the arrangement of urban elements and relation between them in communication frameworks and certain geographic framework in relation to each other. Spatial structure, is arrangement and organization of the phenomenon on the ground that caused by the human physical act or processes.
Ziyari (1999)	The spatial structure of the city is the pattern of land use, shape and layout of urban fields and distribution pattern of activities, elements and components of the city.
Qalibaf <i>et al.</i> (2010)	The spatial structure of the city is the pattern of land use, shape and layout of urban fields and distribution pattern of activities, elements and components of the city. The spatial structure of the city is the relatively sustainable way to form the elements and factors of the city which arranges how they deploy and how they communicate with a certain degree of discipline and functional capacity.
Habibi <i>et al.</i> (2011)	The meaning of the spatial organization is the network that its elements are composed from urban centers (mixed trade, official, cultural centers, in the scale of whole city and its territories), the important communication paths (main roads and subway lines), the important functional and major use (on a scale of cities and its territories)
Zekavat (2011)	Zekavat believes that the city as a unitary totality has the mechanism of elements, or in other word, is the internal discipline that is in the interactive interaction in the minds of the inhabitants. This inner discipline has been introduced as spatial system, according to his beliefs, spatial- conceptual system of discipline and the relationship between the set of independent structural elements forms the framework of the city.

From the point of view of land use and urban performance, the effective processes on the spatial structure of cities are considered as medium-term processes, which include positioning of factories, business centers and residential areas. These processes depend on both dynamic and faster processes (like travel patterns which affect accessibility) and slower process (such as economic changes which affect the dominant forms of production in the different urban periods) (Smith, 2011; Wegener, 2004). The spatial structure of city is the result of historical processes and evolving economic, social and political conditions, as well as natural - environmental factors, which are described in detail in the following (Table 1).

#### *Natural-Environmental Factors Influencing the Textural-Spatial Structure of City*

Natural - environments factors are from the factors that affect the spatial structure of city, that can point to the main factors of the positioning of settlement. Such as access to water, fertile lands, the needful security, proper access to the communication roads and..... For example, on the effect of the access to water factor in positioning of any settlement, it can be said that in warm and dry areas due to lack of water and using the wells and qanats, the shape of settlements will be centralized around same well or string of qanats in a compact manner; but in areas where access to water is from the river or the coast, the settlement will take a linear shape. However, the manner of effectiveness of these factors and forces are depend on characteristic background of environmental infrastructure and ecological structures more than anything else, but the main driver in this process is the set of motives which reveals in human groups for answering the basic needs, in different forms.

Hence, different forming, various placing and at last positioning of human settlements are realized in different forms as a result of effectiveness and objectivity of these motivations and thereupon, settlements are appeared in different forms from one region to another, in both structural and functional points of view. Another effective climate factors on textural-spatial structure of cities are the sun radiation and its angle, wind and dominate direction of wind blow, which specifically affect the formation of paths and their directions.

#### *Social Factors Influencing the Textural-Spatial Structure of the City*

In general, the space and the texture of the city and governing social and cultural system are in direct

interaction with each other. Whereas the textural structure of the city and the manner of placing urban elements will have some effects on the social and cultural system, in contrast to urban texture, social relations will have profound effects (Yousefi Far and Mohammadi, 2009: 144).

Reviewing the comments of sociologists and geographers are verifier of this proposition that the process of social and economic development and its spatial form are inseparably interweaved. And so, the both of them should be considered as complement each other in urban planning or in the design of the environment (Abbas Zadeh *et al.*, 2012: 49-48 quoted by: Jamshidi, 2003: 23). In George zimmel's view, there is a reciprocal relationship between the pattern of spatial arrangement and social processes. Durkeim believes that the concentration and density of communities and emerged spatial shapes from it, are caused by social relationships which have casual effect on social relationships (Afrough, 1998: 37).

Jane Jacobs believes that, the city is a social organism consisting of living units. He ascribes the dynamics and a sense of the liveliness of a city to the complex, dense and crowded urban centers which must profit their positive effects by establishing order and organizing their totality. So by this counting, it can be find out that social factors and urban texture has mutual effects on each other.

Social-demographics changes such as increased immigration of village - urban and also immigration of - center-suburbs, integration of villages in the city, social segregation due to grounds of ethnic, racial and religious reasons which cause the formation of various districts in the city, are the effective social causes on formation and evolution of textural- spatial structures of cities.

#### *Cultural Factors Influencing the Textural-SPATIAL Structure of the City*

Ems Rapaport believes that the cultural factor and especially the religious beliefs of the people, is the basis for ordering the human settlements. He ascribes the foundation of ordering the settlements to the religion and the sanctities of people which takes place in a symbolic manner. The city and structure of city is the cause for creation of value, tendency and specific behaviors and in the words, a lifestyle with a special form and culture. Lewis Worth and Robert Field are pioneers in this theory (Zimmel, 1993: 64).

Ziyari, also in a research entitled by "The impact of culture construction of the city" implies that the culture is one of the influencing factors in the construction of the city at any time. Different cultures

create different economic systems and are capable to change the economic and political purposes of a society; So It can be said that the culture of a society, type of the economy and the economy of that society, determine the type of technique, construction and textural structure of that society (Ziyari, 2003: 97).

Khalidian regarding to effect of religion and denomination on the cities believes that Islam indirectly and at first influenced the social organization and the urban life structure of Iran and as a result of this great change, Urban indexes have been changed, which are effective in construction of spatial organization of cities. In fact, the things that historic cities of Iran had during past times as textural characteristic were valuable architectural-urban spaces and elements caused by the governing culture of the citizen's life.

These architectural and urban elements were formed and evolved over time according to everyday needs of city residents and in response to transformation of the urban community. Evidences of this claim are urban spaces of old texture such as the bazars, Water reservoirs, mosques and Karvansaras, the network of passages and..... Which, in addition to its physical form and remarkable textural characteristics, the cultural, social and historical values are hidden in it.

#### *Economic Factors Influencing the Textural- Spatial Structure of the City*

One of the components, which is intertwined with the spatial structure of cities and their evolution, is component of the economy. Increasing of liquidity in the society and inflation in the land and housing section, makes this field as an appropriate base for huge investment in construction of large scale projects and role of merchant activities becomes more intense in this regard. According to the fact that the suburbs are the most suitable area of the city for construction, It cause to expand the city in suburbs; and capacities of inner and central texture of the city are neglected and at last lead to unbalanced spatial development in the city (Khair-o-Alddin *et al.*, 2013: 18).

Weber considers that, spatial subjects and social and economic relations with together are required to genesis an urban community (Weber, 1990: 87). Spatial organization theory of is based on the formation of a central core as a focus template of trade and activity center. In the view of Alan Berthaud, the spatial pattern of the city in the form of single core or multi cores, before everything is affected by transport interactions, the distribution of the activity place and the economy of the place.

Specifically, economic developments in the form of merchant and stock exchanges of land and housing, forming the centers of work and trade, changing the role of city and... are among other economic factors that influence the evolution of the textural - spatial structure of the city.

#### *Political- Managerial Factors Influencing the Textural- Spatial Structure of the City*

Qalibaf believes that in a political approach to the city, the city is manifestation of inequality in power relations. These elementary type relationships (tribe, batch, group to more developed form of government) in different periods of urbanization and urbanism of world, had profound impact on the growth and concentration of population and creation of urban spaces from formation point of cities to organizing and continuity of their life, as elements and activities in different points of the cities (Qalibaf *et al.*, 2010: 153).

Also, political factor in the form of government and affiliated organizations role and their policy can be effective in developing of the city, such as decisions of -government to create a highway, construction of railway and metro, displacement of the population settlements, changing the location of trade centers and the transport systems; respectively, from top to the bottom are Occurrence of revolution, Changing the system of government, national and regional politics.

Decisions of urban management in huge scale, proceedings and urban planning have influences in the form of the preparation and implementation of urban projects, approving and application of urban rules and regulations, applying the local policies (town councils), distributing and transferring of land among the people by the government, the implementation of some temporary projects Cross sections like Maskane Mehr, Efficiency of administrating Management of city in forming and textural- spatial structure of the city.

#### *Human Factors, Intellectual Rituals and Technological Developments Influencing the Textural- Spatial Structure of the City*

Zekavat believes that, in the past, cities had a clear spatial order; the evolutions of modernism and postmodernism have caused complexity and disturbances in their textural- spatial discipline. Technological developments like the transportation system, stations, travel exchange, etc. and the type of encounter and culture of the consumer with them in the city, caused the changes in spatial organization of

modern cities. In particular, during these evolutionary developments and consequently social and cultural developments, public fields of the city are evolved according to origin of citizenship, Implementation and Sustainability of ecological environment.

Consequently, new elements such as club station of TOD, centralization clubs of work and employment, altitudinal emphasis in gateway focus of the center of city, the restoration and stability of the Natural organs and more important than others, sidewalks and mixed axis of activity and Mixed use activity are added to spatial organization of the city and created a fundamental development in the of public fields.

The scale of the urban signs are changed their nature from memorial pillar in the square of cities to the ‘BT Tower’ Telecommunication towers And the indicating high towers of ‘Iconic Building’ with 100 to 200 floors - (Zekavat, 2011: 116). Generally, development of technology especially in transportation, doctrines and intellectual movements (modernism, postmodernism, Isfahan doctrine, Tehran doctrine and...) and evolution of needs and tendencies of people are mentioned as effective human factors influencing the changes in the textural - spatial structure of cities.

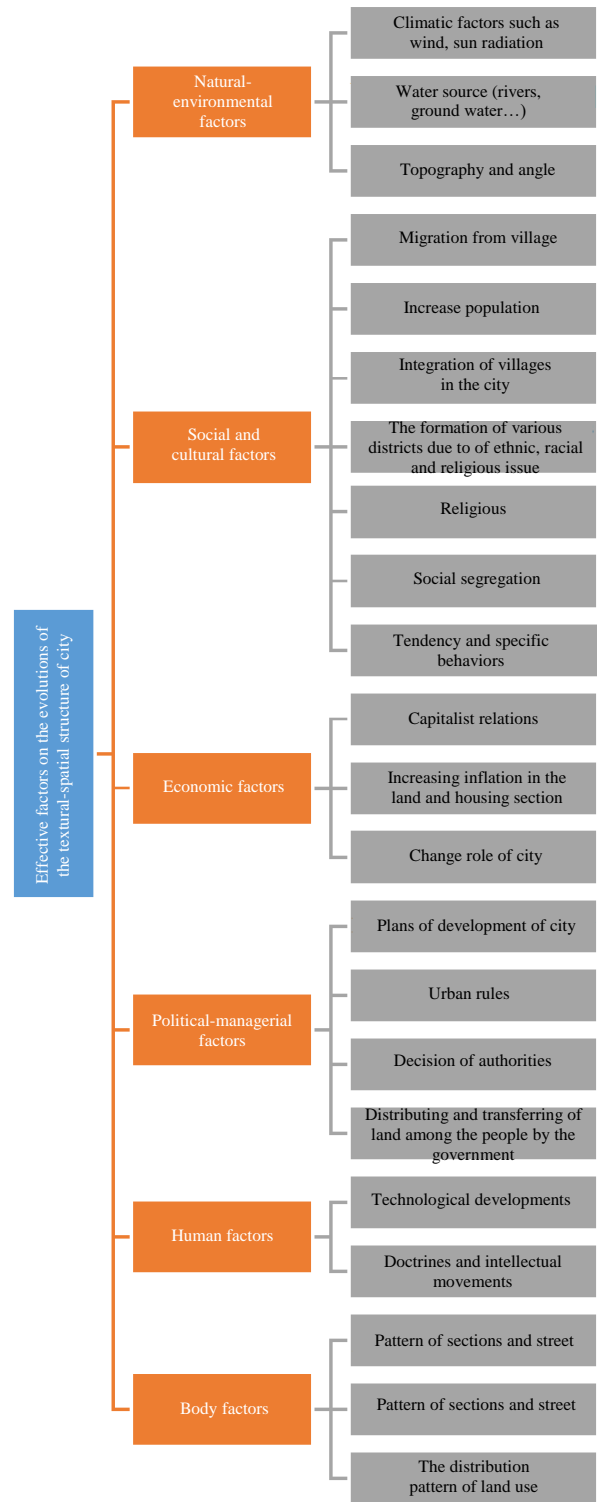
*Textural - Functional Factors Influencing the Textural-Spatial Structure of the City*

Various textural factors such as the pattern of passage networks, the distribution pattern of land use and their positioning, urban operation and activities, urban structures, building structures, pattern of parts, public spaces and others, affects the formation manner of the spatial- textural of cities. According to, the morphological discipline of the passage networks is one of the determinant factors in the space interconnection and arrangement of space (Zekavat, 2011: 107).

In 1960, Kenzen mentions the items like land use, building structures, pattern of sections and street as most important components of morphology of the city. He also emphasizes the difference in the sustainability of these elements. Buildings and especially land users which are placed in them, are commonly as the elements that show the least reaction.

Despite of high sustainability, design patterns change during time, such a way that individual patterns are mixed together or departed to smaller components. Maps and patterns of streets, also considered as the most stable elements of the morphology of city. Generally, the effective factors on

textural - spatial structure of cities are shown briefly in Fig. 1.



**Fig. 1:** Effective Factors on the evolutions of the textural-spatial Structure of City. Source: The authors, the adoption of above content

## The Emergence and Development of the Textural -Spatial Isfahan City in Different Times

The spatial structure arranges the location of the city elements and how they relate in the frameworks of communication axes, geography or geography (Rodrigue *et al.*, 2009: 54). Transformation in the spatial structure of cities are in two types of single-core and multi-core probabilistic models (Bertaud, 2002; Hall and Pain, 2006). The study of the trend in the spatial structure of the Isfahan city illustrates that the city follows a multi-core model. According to available documents, the history of the Isfahan city dates back to the Sassanid period. So, the history of Isfahan city can be divided into two general periods, including before Islamic era and after Islamic era, which is classified in seven periods namely: early Islamic period to the 4th century A.H, Buyid dynasty, Mongol era, Safavid period, Qajar period, Pahlavi period and present era.

## The Emergence and development of the Textural -Spatial Isfahan City in Pre-Islamic Era until Present Era and the Analysis of the Factors Affecting it

### *Isfahan in late Sasanian*

Isfahan has been amongst whether important cities or capital of the government throughout its history, however, there is a very small knowledge about it from the pre-historic period to the late of Sassanid era. Two architectural capitals belonging to that period in Isfahan are obtained, which both have reliefs. The place that these Sassanid capitals being discovered is unclear and now one of them has been transferred to the Ancient

Iran Museum in Tehran, while the other one, which has one broken corner, is in Chehelsotoun of Isfahan (Honarfar, 1971). Also, Atash-ghah structure (Fig. 2), which was most likely the foundation of a Persian Fire Temple and the Shahrestan Bridge (Fig. 3) are two monuments which show the antiquity of the city. However these signs and Information are not enough to reconstruction the initial urban development pattern. The name of Isfahan belongs to the Parthian period and originates from the Pahlavi term.

## Isfahan in Islamic Era

### *Early Islamic Period Until the Fourth Century A.H*

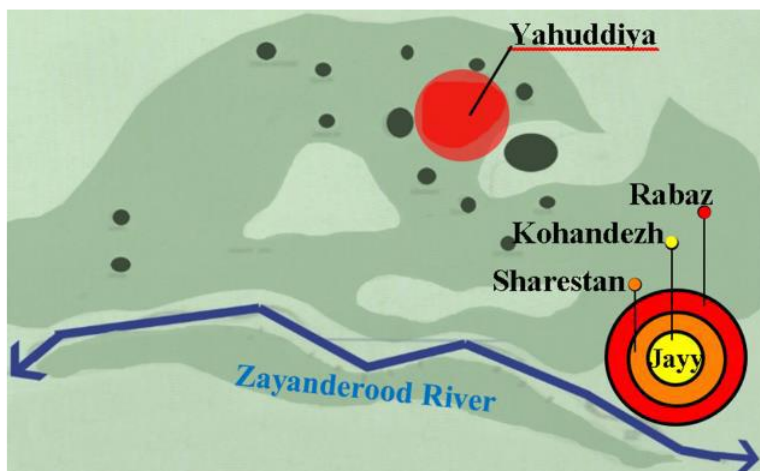
From the early Islam until Daylamites period (1 to 316 A.H), Isfahan was consist of two distinct units Jayy (Shahrestan), Diakonoff wrote about Mad history: The Paratacana Center is the city of Gabai or Gayy (the Dehkhoda, 1956: 2784), which is Jayy now (Honarfar, 1971) and Yahuddiya. Jayy played a significant military role. After the Arab invasion to Persia, the Yahuddiya region developed and evolved and created current Isfahan (Mafroukhi, 2006; Isfahani, 1961; Abunaim Isfahani, 1997; Honarfar, 1971; Shafaghi, 2003). The researchers, including Dr. Lawrence Lockhart (Honarfar, 1971), believe that from the beginning of the Islamic period to around 150 A.H, Isfahan was divided into two main cores, namely Jayy, near the river and Yahuddiya, two miles in the northwest of Jayy. Each one was surrounded by their own villages (Fig. 4). It seems that the entrance of Muslims to the zone (from 21 to 23 A.H) did not have many effects on urban development until the second century A.H (Mafroukhi, 2006; Isfahani, 1961; Abunaim Isfahani, 1997; Honarfar, 1971; Shafaghi, 2003).



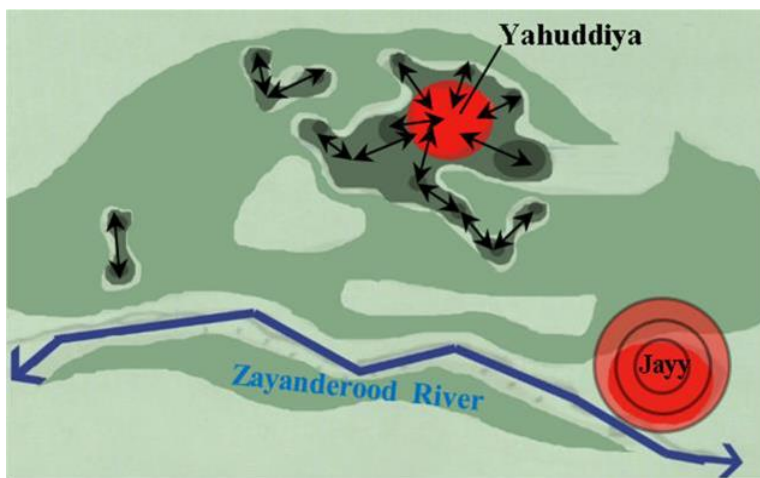
Fig. 2: The Shahrestan Bridge Source: Ayatollah-Zadeh-Shirazi, 2013, p. 33



**Fig. 3:** Atash-ghah structure. Source: writers, 2011



**Fig. 4:** Isfahan, A little before the Islamic era. Source: Ayatollah-Zadeh Shirzai (Writers Coloring), 2013, p.33.



**Fig. 5:** Isfahan, Early Islam. Source: Ayatollah-Zadeh Shirzai (Writers Coloring), 2013, p. 33

According to the general construction of Sasanian cities, the core of Jayy which is as a castle (due to its position and defensive requirements) consists of three main parts: Creation of Rabaz, Sharestan and Kohandezh (Mashhadi Zadeh Dehaghani, 1994: 225; Shahr, 2007: 3).

Until the beginning of the 4th century A.H, Isfahan was governed under the Caliphs. In 319 AH, Mardavij Ziyari stood up against the caliphs and after conquering some of their territories, selected Isfahan as capital (Isfahani, 1961; Abunaim Isfahani, 1997; Honarfar,



1971; Shafaghi, 2003). From the second to the fourth century A.H, the massive social and political movements that took place throughout Iran, were reflected in the Isfahan development, which resulted in the integration and connection of the surrounding villages to the centers (Naficy, 1955;) (Fig. 5).

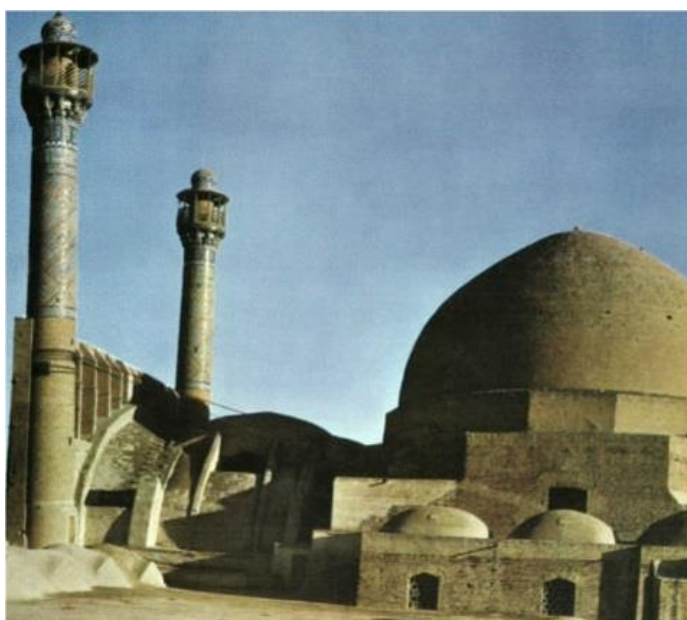
### Buyid Period

In Ziyarid and Buyid (319-447 A.H.), Isfahan was selected as capital by one of the famous men of this dynasty who was called Hassan “Rukn-al-Dolleh”. He

ordered to build the surrounding wall around the Isfahan, which the perimeter of this wall was 21,000 steps and until recently, there were some effects of it from outside of the Tuqchi gateway toward the Joubareh gate (Honarfar, 1971; Shafaghi, 2003; Jaberi Ansari, 1943). Also, the Jorjir Grand Mosque (Fig. 6) is one of the most famous works of this period during Sahebn-Obad ministry (326-385 AH), a great example of the art of architecture and chalking of Dyalame period, which only its magnificent facade of Entrances is remained. The Tabarak fortress is other monument of this period.



**Fig. 6:** Entrance facade of the Jorjir Grand Mosque, 4th Century A.H. Source: Ayatollah-Zadeh-Shirazi, 2013, p. 41



**Fig. 7:** Nezam O-Mulk's dome in Isfahan Grand Mosque. Source: Ayatollah-Zadeh-Shirazi, 2013, p. 54.

After the periods of Ziyarid and Buyid, it was the turn of the Ghaznavids (351 to 582 A.H). In this period, Isfahan did not develop. But during the Seljuq dynasty (429-590 A.H), Malek Shah selected Isfahan as his capital by encouraging Khajeh Nizam-Mulk. In his ruling period, Isfahan was one of the most important cities in the world. Many constructions including palaces and gardens were built by his order and the most important of them was Karan garden with two palaces, one of them dominant on the Zayande roud River and another prospect of the city. Khajeh-Hafez-Shirazi also mentioned this garden in one of his ghazals:

*Although one Hundred Rivers are in my Eye Constantly*

*Remember Zayanderoud River and the Karan Garden*

And other important remaining works from Malek Shah Period in Isfahan are Nezam O-Mulk's dome (Fig. 7) in the south of the Isfahan Grand Mosque and the Taj-Ol-Molk in the north of the Mosque (Honarfar, 1971; Shafaghi, 2003).

The core of the city in this period was the Kohneh square (Atiq Square). The oldest evidence regarding to the square is the Travelogue of Sir Chardin, Kaempfer and writes: "The city has many squares which the most well-known is the Kohneh square. The characteristics of it, which is quadrilateral and three hundred steps long and one hundred steps width, is workshops, shops of artists..." (Chardin, 1966; Kaempfer, 1981; Shafaghi, 2003).

Pirnia (1993) believes that Isfahan was amongst the most important cities in the Seljuq dynasty (Pirnia, 1993).

In the fourth century A.H, Iran regained its political independency and its reflection was the revival of the economic, social and cultural situation. In the first half of the fourth century, the most populous part of Isfahan was surrounded with a wall, Nasser Khosrow confirmed the existence of this wall (Khosrow, 2011). The urban cores located outside the wall, including the Lonban in the west, Jayy in the east and the agricultural lands between them, were placed in a crescent shape in north of the river (Shafaghi, 2003) (Fig. 8).



Fig. 8: Isfahan, Buyid Fence. Source: Sarraf (Writers Coloring), 2010, p.91.

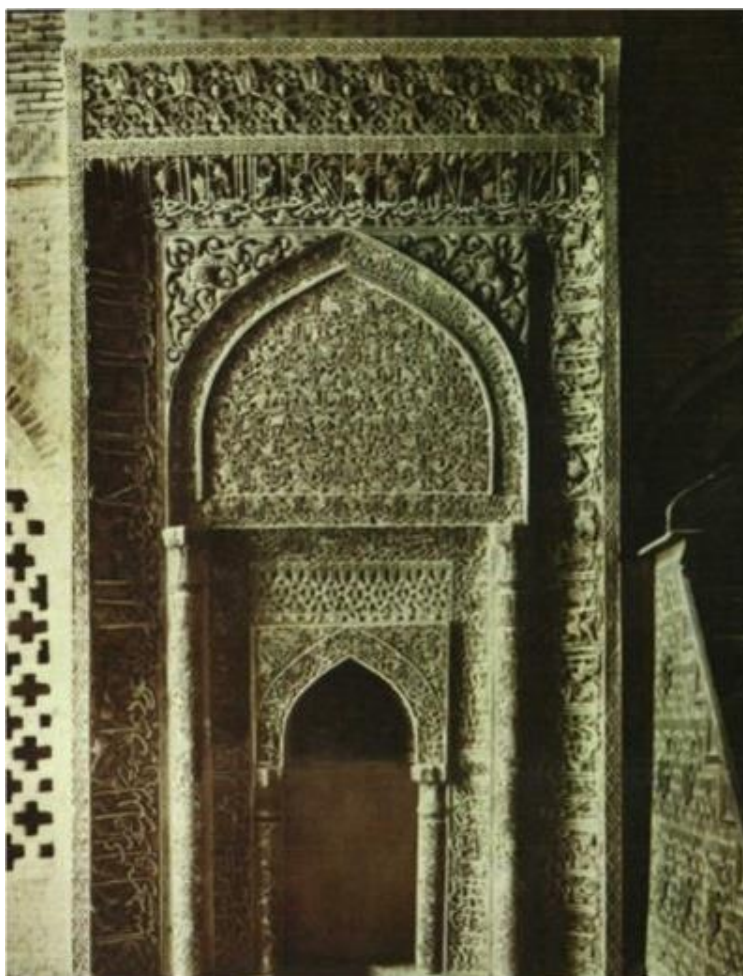
## Mongolian Era and their Remaining

Until the year 633 A.H, Isfahan was protected from aggression of Mongols. However, Due to the discrepancy between the two famous clans, Saedi (with the Hanafi religion) and Khojandi (with the Shafi'i religion), it was ruined. But with peace in the Ilkhanate period, Mongol Muslims such as Ghazan, Auljaito and Abu Saied Bahadaran, an opportunity provided for this stricken city to be restored and reconstructed; and new artworks, such as Oljaiyto Altar of the Grand Mosque of Isfahan (Fig. 9), were built by the Iranian Minister of Aljaito, Mohammad Savi. With the advent of Amir Timur Gurkan, another sheet of disaster was added to the history of Isfahan, but after the death of Timurin the 807 A.H, the period of his successors is amongst the most brilliant periods of Iran, wonderful architecture, tiling, stucco, calligraphy, painting and miniatures are appeared in this era. The Beit-O-shata of the Grand Mosque of Isfahan, by Amir Emadibn Mozaffar Varzaneh and Darulamare of Rostam-ibn-Amou Sheikh Teimuri

(Teimuri Hall) and Nasr Abad's Monastery are examples of the architectural construction of this period (Honarfar, 1971; Shafaghi, 2003).

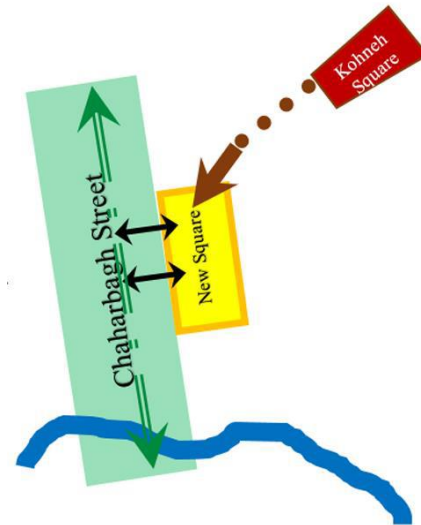
## Safavid Period

When Shah Abbas I, in 977 S.H (1006 A.H/1598 A.D), selected Isfahan as capital, he intended to add new architectural elements and replace them with ancient body of city. Elements which mainly belonged to the Seljuq dynasty and formed around the main square of the city, the Kohneh square. Shah Abbas I, decided to expand the city to the environs instead of destroying the old Isfahan texture. He found that the most suitable development direction is toward the south, namely Zayande rud River. The Naghsh-e-jahan square, the Abbasid Grand Mosque, the street among the gardens called Chaharbagh, as well as the two covered bridges, because of absolutely geometric combinations were new symbols in the city, which are the witnesses of human abilities in monitoring the environment.

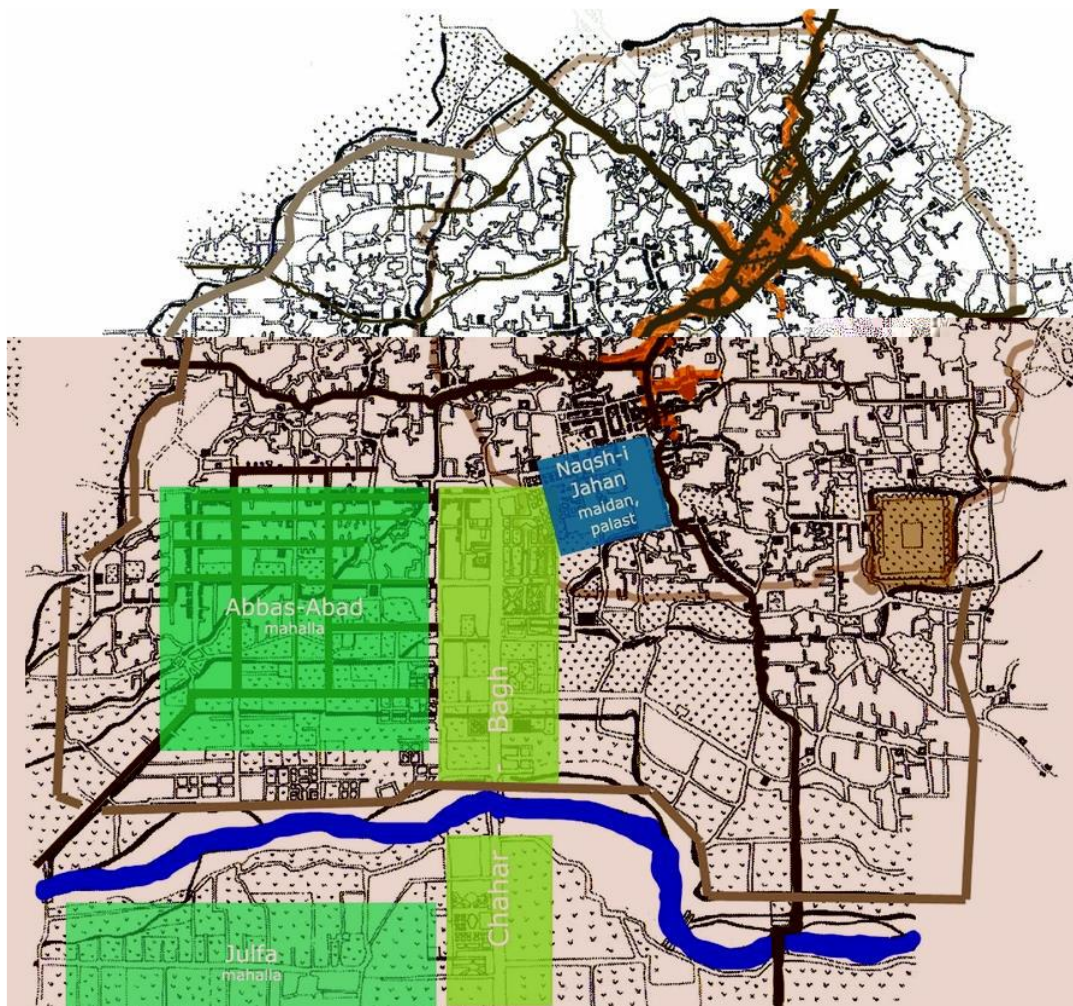


**Fig. 9:** The Oljaiyto Altar of the Grand Mosque of Isfahan Source: Ayatollah-Zadeh-Shirazi, 2013, p. 59

After this period, the main development of city was around the Chahar bagh Street, the Naghsh-e-jahan square and to the south and toward the Zayande rud River (Benno Volvo, 2010). It is noteworthy that commanders, settlers and elders had also imitated the character of the Shah and created other works in Isfahan, including the Si-O-Se-pol Bridge by Allah-Verdi-khan, who was one the greatest commanders of Shah and the Maghsud Beyg Mosque (Honarfar, 1971). Isfahan, in the 11th and 12th centuries A.H, reached to its highest level of development in throughout its history. According to a pre-planned scheme, to regulating the urban growth, the grid network of south section without critical changes in structure, connected to the river side lands that placed out of the city. This development was carried out by two axes of the river (East-West) and axis of Chaharbagh Street (North-South) - the artificial geometric axis (Fig. 10 and 11).



**Fig. 10:** Growth of the city towards the river in course of time. Source: Writers



**Fig. 11:** The comprehensive plan of the Isfahan city during the Safavid period. Source: Sarraf (Writers Coloring), 2010, p.91

As it was mentioned, the Naghsh-e-jahan square, as a pre-designed plan, is one of the architectural feats in this era, which according to Chardin, in addition to an open space political and religious affairs, the square as a public area was the location of many ritual ceremonies including acting, puppetry, drama, fireworks,... (Chardin, 1966); Jean-Baptiste Tavernier, a French globe trotter, writes on this subject: "Friday for Isfahanian people is like Sunday for Europeans, the square being full of people and villagers brought their handicrafts to there..." (Tavernier, 1957). Another spectacular place in Isfahan was the Chaharbagh Street, which PietroVallaulah, an Italian traveler, written about it: "There is a street that is currently outside the city, but when the new districts are joined to each other, it will be completely centered. The length of this street is two - three miles. There is a long stream that flows on a stony bed and traverse all length of street from its middle and pours into pools in front of the gardens. The pavements are stony and different flowers are planted". He also writes: "One of entertainments of women of Shah's Haremand other women of city is walking Chaharbagh and Si-O-Se-pol Bridge on Wednesdays (Della Valle, 1991). Chehel-sotoon palace, Haft-Dast palace, Aeineh-Khaneh, Kashkool, Namakdan and other palaces in Saadat-Abad garden and royal structures in south of Zayand-e-Rood, Si-o-Se-pol bridge, Khajuo bridge were among the works of Shah Abbas II period. His Succulent, was Shah Soleiman who was an epicurean King. The most notable works in his era were Hasht-Behesht palace and religious schools. After him Shah Sultan Hossein was the king, in spite of his incompetence in administrative affairs of country, he had strong interest in construction, development, building gardens and palaces. The worthy relics of his period are Glorious structure of Chahar-Bagh school and construction of the beautiful city of Farah-Abad in south-west of capital and in foothill of Kooh-Sofeh (Honarfar, 1971).

## Qajar Era

After safavid era, Afshar (1148-1218 A.H.) and Zandiye (1163-1209 A.H.) ruled Iran. No structures are founded in Isfahan from those eras. In 1209 A.H., Qajar dynasty was founded and continued until 1344 A.H. The completeness annihilation of Isfahan was in governing period of Zello-Soltan, who was Naserdin-Shah's son. In this era rich people immigrated to Tehran and Shiraz and population of Isfahan city decreased (Honarfar, 1971; Shafaghi, 2003). As Eugene Flandin writes about the glorious Naghsh-e-jahan square: "most parts of square are deserted and ranchers have taken their animals to parade and the square has not its before brightness and..." (Flanden, 1945). Dieulafoy, the french tourist, writes also about Char-Bagh street in Gajar era: "At returning to the south we passed throgh great street of Char-Bagh, while it is pathetic and deserted, but in evening which caravans move south a short movement is appeared in there, however the traffic of a few muleteer and poor peoples, is not comparable with the glorious and crowded street in two hundred years before. According to paintings of Chehel-sotoun it can be deduced that wealthy individuals of that time put on brocade clothes ..." (Dieulafoy, 1992). The only important and valuable work from Qajar era is Chahar-Bagh-khajuo Street which was made by Haj Mohammad Hossein Khan Aminodolle Isfahani, prime minister of Iran during Fath-Ali Shah, which should not forget its notable urban principles and Abdollah Khan Amin-dole, his son, followed his father's constructive work and built a school which was named Sadr School. In fact, these two structures are imitations of Chahar-Bagh-Abassi Street and shah- Soltan-Hossein's mosque (Chahar-Bagh school) respectively. Comparison of these two urban units shows the differences between Safavid and Qajar architectural styles (Fig. 12) (Honarfar, 1971; Shafaghi, 2003).



Fig. 12: Isfahan during theQajar period. Source: Sarraf (Writers Coloring), 2010, p.91

## Pahlavi Era

Until Pahlavi era, Isfahan was only consisted of the historical texture and two main streets which were Chahar-Bagh-Abaasi Street (from Si-o-Se-Pol Bridge to Darvaze- Dolat) and Chahar-Bagh-khajuo Street (from Khajuo Bridge to Naghashi intersection). Other street and trafficable intersections are from first Pahlavi era. In other words, changes after Seyed Reza Khan's map in 1923 until first years after revolution are related to Pahlavi era, which included administrative and governmental structures. The new streets and transformations altered the historical and organic texture of Isfahan and with a heterogeneous composition without study, completely ruined the historical aspect of the city. In this period, city developed from four directions which in turn increased the population and led to relative economic development. After the Islamic revolution, the process became stronger significantly and this growth, certainly transformed face and texture Isfahan more than ever (Badri-Zadeh *et al.*, 1995). According to the information which "Seyed Reza Khan" provided with first map of Isfahan in the new era, changes have occurred in historical texture of city during the years 1921 to 1923. He also writes: "Mirza Hassan Khan Jaber Ansari", more and less, has reported the aforesaid changes in 1928, 1929 and 1932. In this map, the city has three main streets and few bystreets, the name of them are listed below:

- There is a street from the south Navagheli and above the Hezar-jarib street and Hezar-Darreh street, being passed straight forward through Chhar-Bagh-Bala and arrives to Darbe-Kooshk (currently, it is called Darvaze-Dolat) and the Homayoun garden (currently, it is called Takhti)
- The streets are eastern-western which are arrived from small Chahar-Sough Square till Chahar-Sough-Shirazi Square and next to Chehelsotun enters the Naghsh-e-jahan square and connects to Hafez and Ahmad-Abad streets
- The third street is a street around the city, which its western axis is from Darvaze-Tehran square to the Maranan bridge and bank of river and eastern axis is from near the Shahrestan bridge site, namely Troskan and Mehr-Abad and its northern axis from Ahmad-Abad Square (former Seyed Ahmadian) to Marnan bridge and Darvaze-Tehran square and of course, each point has a different name
- Continuous bystreets also include Chahar-Bagh Sadr, which is continue of Chaharbag-Khaju to

Toghchi square where joints to Hatef Street. Other streets are Sheikh Bahaei street, Abbas-Abad street, Kamal-Ismael street, Seyyed-Alikhan street, Nazar street, Julfa street and a street that goes from the Hezar-Jereyb street to Hossein-Abad street and Dast-jerd and its eastern side gets to the Takht-e-poulad Cemetery. The present information also indicates that, by the early 1950s, Hakim-Nezami, Jamal-o-ddin Abdul Razzaq, Masjed-Seyyed Street and Metal Bridge were among the changes that have been created in urban texture

What can be understand from these developments, illustrates the cross sectional cutting, namely the connection line of the historical texture of Isfahan has planned and performed, which destroyed a part of the texture and valuable structures (Fig. 13) (Khan, 1984).

### *Textural-Spatial Development of the Isfahan City after the Islamic Revolution (Islamic Republic of Iran, 1357 to Present)*

After the Islamic Revolution of Iran, over the past two decades, the development of new settlements such as Shahin-Shahr, Kouye Imam Jafar Sadegh, Kouye Sepahan, Sepahan Shahr, Baharestan, Poolad-shahr and Majlesi around Isfahan, was pre-planned program for balancing and adjustment of population, however these new towns also faced some problems. The distance of some of them to the metropolis of Isfahan, such as the Majlesi; the problem of transporting from new cities to the metropolis; lack of urban services; the lack of cultural, welfare and commercial spaces are among the most important challenges facing these cities. In spite of the present problems in these towns such as Baharestan, Khane-Isfahan, Sepahan-Shahr, housing price is not significantly different with some parts of Isfahan. Considering issues like transportation problems and the lack of some infrastructure in new towns, they will not be able to achieve their initial goals for reducing the burden of the metropolitan city problems. Also, the positioning of the City Center near Sepahan Shahr, the Isfahan's development continues southwards (Fig 14).

With victory of the Islamic Revolution and the beginning of the eight-year war in Iran and the emergence of some impasses, There was no a clear plan for the urban and urbanization and there was not any Supervision on building process and street creation. Network grid of interior streets and ring belts, which were added up their counts day by day, indicated that modernism has expanded over the city completely.



At the beginning of the 21st century, the aspect of Isfahan changed completely. Except the small number of important houses where architectural art is used in them and maintained or restored by some architects or local people, the core of the city is rapidly destroying (same: 142). In other words, the growth of the Isfahan city took new form after the Islamic revolution; a growth that may be called the discontinued or disrupted growth from the city and its consequence was breakdown of homogeneous and balanced spatial organization of the city. During this period, the unbalanced growth and development of the space, which was started from second Pahlavi's era, intensified following the arrival of the rural migrants wave and war evacuees, ratification the laws of urban land, appendage of some areas to the city through the approved plans and assignment of lands, In such a way that disassembled overall balance of the infrastructure network and urban services.

The dominant direction of the physical development in this period intensified by forming the towns in city margins at the in the north and south, southwest directions, as well as the integration of the villages in the urban texture. In this period, ways and communication paths are expanded and out of town and inland urban transport in the northwest and southwest region are heavily influenced the development of the city (Arman Shahr, 1386: 18). In the lately quarter of

the last century, the legal limits of the city are extended and in several stages, extensive lands are located in the range of the Isfahan city (Saraie, 2007: 78). To expand the streets - and boulevards, fresh districts where are the place of personal houses, Governmental buildings and trading structures, was pulled out from the town and its result was nothing more than a geometric extension which hadn't any advantage of history, culture and artistic interconnection.

Among these proceedings which influenced this horizontal, rapid and unbalanced growth of the spatial structure (from 1362 to 1372, the growth that the city achieved in 2000 years, tripled in 10 years), are as follows: The offer and growth of the new towns like Shahin shahr, Imam Jafar Sadiq district, Sepahan district, Sepahan shahr, Baharestan, Poolad shahr and Majlesi Around the Isfahan in two past decades was a planned movement with purpose of balancing the urban population and moderating the population overflow in Isfahan, However, these new towns are faced some problems. And adding them to the legal area of Isfahan (Current general plan of the Isfahan city, 1386), positioning and placing Maskane-Mehr projects at the boundaries of city or even outer sections of the city which are not considered in urban legal and services.

Figure 14 shows the most important towns that added to the surrounded city in the post-revolution period.

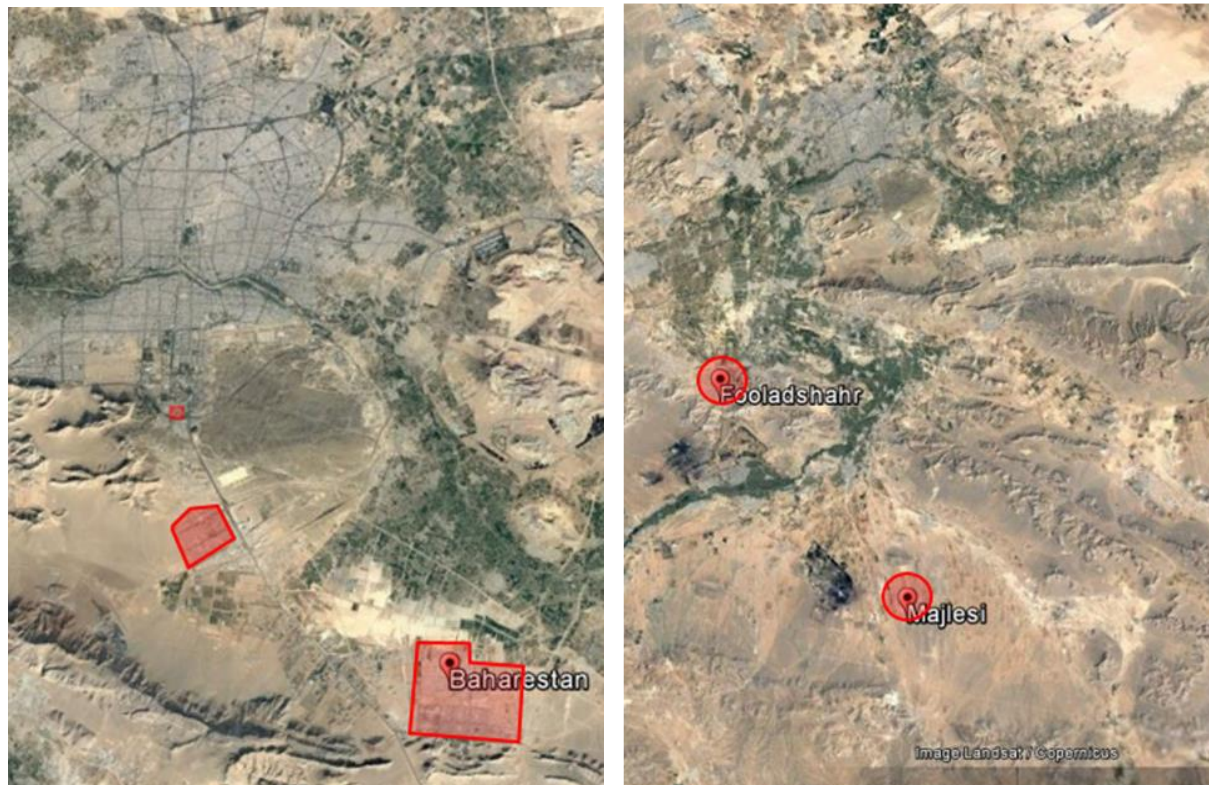


Fig. 14: New Towns in Isfahan. References: Writers



## Conclusion

In addition to having valuable texture and a large number of monuments, from aspect of beautifulness and functional urban infrastructure, the Isfahan city is most prominent city in Iran and is among the most famous cities in the world. The strength of this infrastructure is high as despite many inadvertence regarding to urban and architecture, could retain old infrastructure until present. The present structure is the result of the influence of Seljuq architecture basis on the Safavid urbanization thought, which its organic growth extends along the Chahar-bagh axis (development axis) in a grid network. Therefore, the city did not have significant growth until Safavid era, however afterward, with construction of Naghsh-e-jahan square in vicinity of bazar axis and building the Chahar-bagh axis, the direction of the city stretches toward south. With new settlements growth, such as Jolfa, the development of the

city continues to the south. After the Safavid era, due to the transfer of the capital from Isfahan, as well as the subjecting under industrial revolution and modern urbanization, Isfahan did not have clear and stable center and residential districts form the main structure of the city in this era. After the Islamic Revolution, the growth of settlements around the city continued its development towards the south. Also, rapid physical changes in present time had a negative impact on the spatial structure of the historic city of Isfahan. In Isfahan, the effects of hasty changes in the Pahlavi era were so high, which led to gradual erase of the old infrastructure. According to the results of this research, Investigation and Analysis of effective Internal and External Factors on textural- spatial Structure of the Isfahan city, which shows in Table 2 and 3 illustrates Summary of the changes in the textural-spatial structure of Isfahan city and the factors that influence it in the various historical periods.

**Table 2:** Investigation and Analysis of effective Internal and External Factors on textural- spatial Structure of the Isfahan city

Internal factors	External factors		
<b>Strength</b>	<b>Weakness</b>	<b>the opportunity</b>	<b>Threat</b>
<ul style="list-style-type: none"> <li>- existence of a commercial role for Isfahan (economic)</li> <li>- existence the Zayande rood river and subsurface water (natural)</li> <li>- prosperity of trade and the formation of the market and its expansion (economic)</li> <li>- The formation of dynamical - trading axes in Isfahan (textural- economic)</li> <li>- development of the city to the south and southwest (natural)</li> <li>- formation of neighborhood system (textural, human)</li> <li>- Construction of new functions (textural, human)</li> <li>- immigrability of Isfahan city (social)</li> <li>- Natural growth of population (social)</li> <li>- development of communication networks (textural)</li> </ul>	<ul style="list-style-type: none"> <li>- domination of private transport and increasing in town trips (technological, human)</li> <li>- Lack of clear and coherent policy and strategy of government in controlling and guiding the urban spatial development (management)</li> <li>- lack of coordination and alignment of decision maker organs in the process of management (management)</li> <li>- Splitting the city into two new and old parts (textural)</li> <li>- Integration of villages in the city (management, textural)</li> <li>- Development of industrial activities in the city (economic)</li> <li>- Disparate distribution of facilities and services in the city (management, textural)</li> <li>- plans and programs of urban development (management)</li> <li>- the policies of the government and municipal laws and regulations (political)</li> <li>- immigrability of Isfahan city (social)</li> <li>- the Assignment of land by the organs of government in city (political -management)</li> <li>- Desire to exchange of ground around the city (economic)</li> </ul>	<ul style="list-style-type: none"> <li>- positioning the city in main transit routes of the country ( textural, natural)</li> <li>- increased trend of conversion of desirable agricultural lands to industrial and residential spaces (textural)</li> <li>- Government support for rebuilding and construction in the old and central textures (management)</li> <li>- Iran joining to the global market (economic)</li> <li>Evolution in technology (technological, human)</li> </ul>	<ul style="list-style-type: none"> <li>- non- thinking constructions in city (management, textural)</li> <li>- erosion and destruction of natural facilities and functions (natural)</li> <li>- instability in city due to scattered horizontal growth and large expansion of the city (textural)</li> <li>- Growth of immigration and the phenomenon of immigration (social)</li> <li>- population leaving of old texture and its Exhaustion (textural, social)</li> <li>- increased costs resulting from the construction of the infrastructure (economic)</li> <li>-ecological threats, including the pollution (natural)</li> <li>- changes in lifestyle and demand for suburban habitation (social)</li> <li>- exchange game and land trading in the national level (economic)</li> </ul>

**Table 3:** Summary of the changes in the textural-spatial structure of Isfahan city and the factors that influence it in the various historical periods

Development direction	The main factors influencing the growth and development of the city	Urban texture	Structural pattern of the city infrastructure	The main elements of the city	Indexing factors affecting the spatial system	Period
South	Environmental- natural factors: Existence of Zayandeh Rood near Jay region Textural factors: Appropriate location in terms of accessibility	Initial form of the city as a castle (due to its position and defensive requirements) - Formation of Sharestan residential areas in the southern region of Rabaz - Organic texture and coincided to the natural conditions of the environment and cultural structure	Harmonic construction and consonant with ecology system and concentric form	Palace and monument of Atashgah and Sharestan bridge	Two main cores of Jay and Yahudia: Creation of Rabaz, Sharestan and Kohandehz	Early Islamic period (Sasanian)

**Table 3:** Continue

Development of the northern part	Environmental-natural factors: Desert climate and Zayandeh Rood water resources Textural factors: Native trading roads	Compressed with an introverted pattern	Spread centrally with yahudea neighborhood as center	Neighborhoods	Joining and connecting the villages around the Yahudea core	Early Islam
Development of the northern part	Textural factors: Native trading roads	Compressed with an introverted pattern		Fence, central Mosque of jurjir and Tabarak Castle	Creating a fence around the city, building towers, building gateways, construction of a new network of passages around the city	Al-Ziar and Buyid dynasty
Development of the northern part	Textural factors: The East-West communication routes and wayes	Organic and have many squares which the best known is Kohne square	Core-linear pattern: Centered around kohne square toward the Jameh mosque	Karan garden, the dome of Nezam-olmolk and Taj ol-Molk, the Kohne	Many mansions from palaces and gardens. The core of the city is square Indexed architectural works	Seljuq era (429 to 590 AH.) Ilkhanate period
South	Environmental-Natural factors: Expanding the city towards Zayandeh Rood Textural factors: Establishment of the Square of the Naqsh-e-jahan complex, including the Mansion, Mosque, School and Bazar, the construction of trade axes between the old and new centers The governing Intellectual party: The Birth of a New Style of Urbanism in the Safavid era called the Isfahan school	Based on pre-designed geometric plan, grid network	This development was carried out by two axes of the river (East-West) and the chaharbagh axes (North - South) axis.	Naghsh-e-Jahan Square, Abbasi Jame mosque, Charbagh Street, Si-o-Se pol bridge, Chaharbagh school	Urban elements of square, street, bridge, new town of Jolfa	Safavid
South and southwest	Economic factors: Due to the immigration of the riches to Tehran, Shiraz and other cities during the Zandieh and Afsharie period, there is no works in Isfahan The governing Intellectual party: Coincides with the Industrial Revolution and governing the Zel-o-Alsoltan, demolition of Safavid Ruins Textural factors: development by establishing the Chaharbagh Khaju Street			Chaharbagh Khaju Street and Sadr School	Demolition of Safavid monuments, construction of a new street	The Afsharie, Zandie and Qajar
Expand in all directions	Textural factors: construction of new streets in the old texture, vicinity of south core with mail roadsl, railway station and bus terminal The governing Intellectual party: Modernism Technological factors: entrance of cars to cities		Construction of streets and new changes in the historical and organic texture of the city	North-South Street, east-west street, Third Street, Street around the city	Construction of streets	Pahlavi
South and southwest	The Intellectual party: Accelerated and Inclusive modernization Social factors: Migration and displacement of population Political- management factors: The accession of districts to city in the planes, approving the laws of urban land and assignment of the lands to the people by government, maskane-e- Mehr project, weaknesses in implementation and preparation of urban plans and programs Economic factors: Cheapness of the land on the borders of the city, the expansion of capitalism relations in Iran, the development of industrial activities, new functions assigned to the Isfahan in the current century as an important point in the urban network of the country Environmental-natural factors: Expanding the towns to Sofeh Mountain Textural factors: Communication paths, vicinity of the villages to main city and their joining into the city during growth process Development of technology	Unbalanced spatial growth	Expansion in all directions, especially in the south and southwest	Street, apartments commercial, official and medical centers	Construction of streets and growth of towns and introducing the streets as an economic edge	After the Islamic revolution

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## Author's Contributions

All authors equally contributed in this work.

## Ethics

Isfahan Branch (Khorasgan, Islamic Azad University), Isfahan, Iran Approved the study.

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