

Original Research Article

Rereading the Development Challenges in the Urban Landscape of Natanz with an Emphasis on the Elements of Spatial Organization *

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Abstract | The urban landscape reflects the identity, history, culture, and spatial structure of each city, and spatial organization, the physical setting of the landscape, plays a key role in spatial perceptions and urban identity. Focusing on the historical city of Natanz, the present study attempts to reread the elements of its spatial organization, including territory, center, structure, and small wholes, to analyze how changes caused by contemporary development have affected the urban landscape. Natanz is an example of an Iranian city whose spatial organization has been formed in connection with the natural context, functional hierarchy, and socio-economic system. This study employed a qualitative approach and an analytical-interpretive method. For this purpose, the data were drawn from literature, historical texts, field observations, and map analysis. The findings show that the traditional elements of Natanz's spatial organization, including the side gardens serving as natural boundaries of the territory, religious and social centers at the heart of the spatial structure, and the organic network of paths and functional links, have an instrumental role in maintaining spatial coherence and giving meaning to the city landscape. However, developments in recent decades, including new construction, street construction, and unbalanced expansion of the city, have caused a disruption in spatial organization, weakening the historical center, loss of functional continuity, and reduced legibility of the urban landscape. The result of these changes has been the weakening of the city's historical identity and a decrease in citizens' attachment to historical spaces. Accordingly, recognizing and rearranging the elements of spatial organization, relying on the natural context and historical structure of the city, can serve as an effective strategy for guiding sustainable development and improving the quality of the urban landscape of Natanz and similar cities. This study attempts to provide a basis for place-based policies in the management of the development of historical cities by emphasizing the role of spatial organization in understanding the urban landscape.

Keywords | *Spatial organization, Urban landscape, Development, Natanz.*

Introduction | Urban landscape reflects the interplay between the physical structure, human activities, and the historical-cultural context of a city; a multilayered phenomenon that is shaped by the daily perceptions of citizens and is entrenched in the spatial structure of the city. Spatial organization, which regulates the physical components

of the city, plays a fundamental role in the formation and continuity of the urban landscape. In this framework, understanding the urban landscape requires identifying the elements of spatial organization, such as the center, structure, territory, and small wholes. These elements not only define the framework of movement, stillness, perception, and spatial experience of the city, but also shape its spatial identity. Contemporary urban development in many historical cities, especially small cities with coherent textures, has been carried out without paying attention to the traditional spatial structure and the characteristics of the historical landscape. The spatial

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organization of Natanz is the result of the historical interaction between humans, the natural context, and the social structure. This city, with its spatial hierarchy, topographic influence, presence of a socio-semantic center, and legibility of the physical structure, is considered an example of the spatial organization of an Iranian city. However, in recent decades, the process of physical development, especially new infrastructure, constructions incompatible with the context, and changes in uses, has caused a transformation in the spatial structure of the city, which has resulted in consequences such as spatial discontinuity, weakening of historical centers, and loss of semantic and visual continuity.

The significance of this issue is that the urban landscape is not just an aesthetic phenomenon, but rather a profound reflection of the historical identity, culture, and community of a city. The weakening of the urban landscape can lead to the weakening of the identity of the place, the reduction of citizens' belonging, and a break in collective memory. In such circumstances, analyzing how the elements of spatial organization change during contemporary development is not only a scientific necessity but also a strategic tool for guiding the process of development plans in order to preserve the values of landscapes and improve the quality of urban space. To review the challenges of contemporary development in the urban landscape of Natanz, this article attempts to analyze the current situation from the perspective of the elements of spatial organization. Many of the damages to the urban landscape of Natanz have resulted from ignoring or weakening the key elements of its spatial organization. Therefore, recognizing these elements and how they change during the development process can be effective in providing solutions for intelligent management of development and protection of the city's historical landscape. Based on library data on the spatial organization of the city and exploratory findings obtained from examining the effects of development on the spatial organization of the historical city of Natanz, this research seeks to answer the question: What are the main elements of the spatial organization of Natanz, and what role do they play in the formation of its urban landscape? Also, what effects have the development programs and physical and functional development patterns of the last few decades had on the spatial structure and landscape of the city of Natanz? And finally, how can we achieve solutions to preserve and enhance the urban landscape of Natanz by recognizing these challenges? Answers to these questions can provide a platform for rethinking development policies in similar historical cities.

Research Method

This study employs a qualitative method with an analytical-interpretative approach to provide an in-depth

understanding of the spatial structure and historical landscape of the city of Natanz. The required data was collected from historical documents and sources, texts related to the urban landscape and spatial organization. Moreover, field observations were carried out using a comparative approach between the past and the present. Physical-spatial analysis, using urban maps and field documentation, could help to identify and evaluate the main elements of the spatial organization of Natanz and their changes over time. The area under study is the historical context of the city of Natanz, which has signs of the city's historical spatial organization and changes resulting from contemporary development. The tools used in the analysis included maps, analysis of spatial relationships, reading physical structures, and examining semantic layers in historical texts, which simultaneously helped to understand the form and meaning of space.

Research Background

The literature reviewed for this research is divided into two general categories. The first category is the sources that have examined the city, its spatial organization, and its elements with a systemic and holistic approach. The book "Landscape Perspectives: The Holistic Nature of Landscape" (Antrop & Van Eetvelde, 2017) examined the multifaceted and holistic nature of landscape. The authors of this book introduce landscape as a complex, dynamic, objective, and mental phenomenon and consider its experience to require a multidimensional and multisensory understanding. In his book "Spatial Organization of Iranian Cities in the Islamic Period," Mansouri et al., (2020) defined spatial organization in Iranian cities, including Qazvin, Tabriz, Bushehr, Gorgan, and Yazd, using a systematic view and review of various historical documents and records, and introduced them based on four basic cornerstones: center, small wholes, structure, and territory. Abarghoui Fard and Mansouri (2021) extracted and summarized the characteristics and indicators for identifying and examining the elements of spatial organization in Iranian cities after Islam. In the course of examining the developments in the spatial organization of Mashhad, Nattagh, and Hosseinzadeh (2023) examined those elements and studied the effects of the development of the shrine on the historical fabric of the city. Later, Jiang et al. (2023) studied urban development plans, in addition to examining how urban heritage and urban development plans are separated, and also examined the link between urban landscape and development.

The second set of sources examined the history and development of the city of Natanz. In books such as "Nafhat al-Ans" (Jami, 1987), "Safarnameh Figueroa" (Figueroa, 1984), and "Misbah al-Hidayah and Miftah al-Kifayah" (Kashani Natanzi, 1946), the physical characteristics of the

city of Natanz and the historical, geographical developments and historical and cultural monuments of this city have been studied. Also, Mohammadi et al. (2021) studied the evolution and development of the neighborhoods of the city of Natanz in different periods using inscriptions on historical monuments during the Islamic era. In addition, Mahian (1995) studied the historical geography of Natanz in his master's thesis and studied the development and expansion of the city. In addition, Taghizadeh Ansari's book (1997) entitled "Natanz, Yesterday, Today, Tomorrow" is noteworthy. Although numerous studies have been conducted in various fields such as reading the spatial organization of cities, historical geography, analysis of historical texts and documents, and archaeological studies in Natanz, and these studies have a wide range of topics, most of them have not paid much attention to the development and evolution of the spatial organization of Natanz in relation to contemporary developments and how these processes have had an effect on the physical and functional structure of the city. The distinguishing feature of the present study, compared to previous studies, is its focus on reading the evolution of the spatial organization of Natanz from the past to the present, the trend of urban developments in Natanz, and the analysis of the effects of new urban developments on the historical spatial organization of the city. The novelty of this research is the study of the evolution of the spatial organization of the city of Natanz, relying on literature, historical documents, and field studies. Also, in this research, the role of natural, cultural, and physical factors in changing the spatial structure of Natanz has been examined, and the relationships between urban elements have been examined and analyzed in the context of temporal changes.

Theoretical Foundations

• The landscape approach to urban reading

Landscape is the scene of life carrying meaning (Spiere, 2008) in which we live and perceive it through our senses (Bell, 2007). According to the definition of the European Convention on Landscape, the urban landscape is considered a part of the environment that is perceived by the inhabitants of the city (Cappila Collado & Gómez-Pardo Gabaldón, 2018) and is the result of human interaction with the natural and historical environment that has been formed over time. This connection between nature and history is visible in the urban landscape, turning it into a dynamic phenomenon connected to the past and the present (Mansouri, 2005). The landscape approach to the city is a holistic approach that establishes a link between objectivity and subjectivity. In this approach, the urban landscape is revealed as an objective-subjective phenomenon in the interaction between humans and the environment. The perceptions

of citizens and the city body do not have meaning on their own and are only completed in interaction with each other (Zandieh & Goodarzian, 2014). In this approach, the city is defined in relation to temporal, historical, and natural factors. Because the landscape has the nature of a place, and throughout history, it has emerged as a result of the interaction of humans and the environment, by the hands of society within the framework of natural and historical requirements (Mansouri, 2010). One of the advantages of this approach is the consideration of temporal, spatial, and natural dimensions in understanding the city. As a result, the urban landscape only gains meaning through the connection between the body, mentality, and events, and the landscape approach, emphasizing the interaction of humans, the environment, and history, provides a holistic understanding of the city and transforms it into a living and dynamic phenomenon. The landscape approach in reading the urban landscape distances itself from mechanical concepts and seeks to understand the meaning and subjective experience of citizens of the city. The relationship between history, the experience of presence, and memory is a framework for reading the urban landscape that can narrate the urban experience at any moment in a system (Valibeig & Inanloo, 2021). In this perspective, the urban landscape is not simply a physical body or image; rather, it is the citizens' mental perception of the city, which is achieved through urban symbols and signs. This approach, with a holistic and systemic perspective, considers the city as an integrated whole with physical, cultural, and semantic dimensions. Emphasis on the interactions between these layers gives the urban landscape an independent and overall identity. The design and management of the urban landscape in this approach is based on a holistic perspective that examines all urban elements and layers in relation to each other and the entire complex (Mansouri & Farzin, 2019). In reality, a city is not just a collection of scattered elements, but rather a coherent whole whose meaningful connections between its components increase citizens' understanding and belonging to the environment. The more extensive these connections are, the stronger citizens' understanding of the city and its identity is (Adelvand et al., 2016).

• Reading the urban landscape via the elements of spatial organization

The urban landscape is the perception and experience of citizens of the city space, which is obtained through the observation and interpretation of the symbols in the city and, as an objective-subjective phenomenon, is part of the nature of the people of that city (Mansouri, 2004 & Qorbi, 2012). The city landscape is an interdisciplinary concept that emerged from the intersection of the perspectives of architecture, urban planning, geography, and culture, and, in the simplest sense, refers to the understanding,

experience, and representation of urban spaces by users and observers. The landscape, beyond being just the body of the city, has layers of meaning, memory, function, and history that are formed in the context of urban spaces and can be read (Rossi, 1982). The landscape, as an objective and subjective manifestation of the city, can be the context for analyzing social relations, the construction of power, lived culture, and the spatial structure of the city. Reading the urban landscape is an attempt to identify spatial structures, space-forming systems, and hidden layers in urban spaces. In recent decades, approaches such as “phenomenology of place” (Relph, 1976), “aesthetics of space,” and “morphological analysis of landscape” have enabled a more detailed study of the urban landscape. One of the effective approaches in this field is analyzing the urban landscape based on the elements of spatial organization, identifying and interpreting the role of physical and functional components in organizing the urban space. The spatial organization of the city is the result of viewing the city as an independent whole. It is an abstract concept equivalent to the order between the various elements that create a city (Mansouri et al., 2020, 43). Spatial organization is considered a concept derived from a systemic view of the city and its constituent parts, which considers the city to have a meaning beyond the algebraic sum of its physical components and attributes a meaning to the city derived from the system, relationship, and connection between the components (Abarghouifard & Mansouri, 2021).

Findings

• Systematic reading of the natanz city space organization

A city is not a collection of scattered components, but rather it is a whole, in which lies a unity of purpose and meaningful links between its constituent elements. The more wide these connections are, the stronger the citizens’ understanding of the city is and the greater they have a sense of belonging

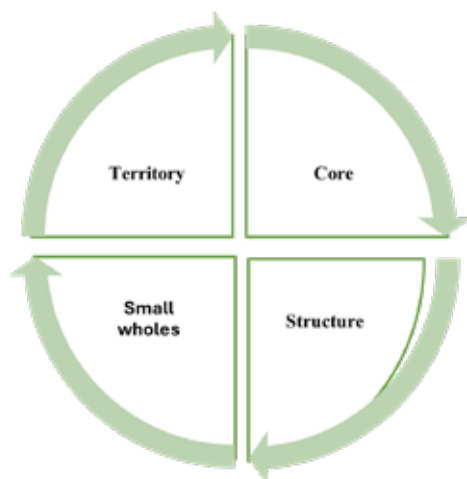


Fig. 1. Elements of Iranian city spatial organization. Source: Mansouri et al., 2020.

to the urban environment (Adelvand et al., 2016). Among the various approaches that deal with reading the city, the systemic approach sees the city not as a separate and unrelated collection of elements, but as a purposeful and integrated whole whose components are in meaningful interaction and connection with each other. Therefore, the city cannot be understood simply by analyzing its elements in detail; rather, it is only through a holistic and systematic perspective that an accurate reading of the city is formed (Mansouri, 2013). In a systemic view of the city, more important than preserving the various grains and forms of the city’s appearance are their relationships, which have systematically created the spatial organization of the city (Mansouri et al., 2020). The spatial organization of the city is a general concept that is seen in the real space of the city in the form of objective elements. These elements can be similar or different in each city or region (Fig. 1). In Iranian cities of the Islamic period, spatial organization consists of four parts: “territory”, “center”, “structure”, and “small wholes”. In the following, in order to identify the components of the spatial organization of the city of Natanz, using field observations and previous studies, each of the elements is examined separately. Natanz is a city subordinate to Isfahan province, located between the cities of Aran, Bidgol, and Kashan to the north and Isfahan to the south (Ghobadian, 2014, 41). According to Fig. 2, the city is located on the path of the Tameh and Ure rivers, and the path of water flow in the city of Natanz is one of the reasons for the formation of residential nuclei and neighborhoods and the precedence and delay in their formation (Mahian, 2015, 26). Other factors in the formation of Natanz are the shape of the land and its location in the middle of a mountainous area and a continuous expanse of gardens and agricultural lands. The geographical location of the city, along with water resources and fertile lands, has provided a suitable basis for the formation of a spatial system based on natural structure,

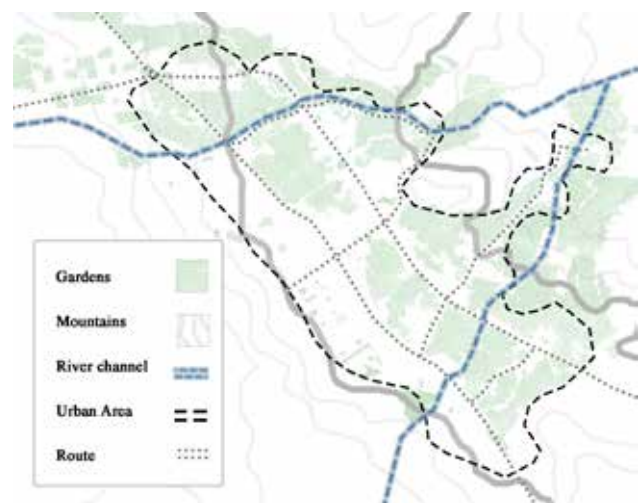


Fig. 2. Natural factors affecting the formation of the city of Natanz. Source: Authors.

in such a way that the historical fabric of the city has developed organically and hierarchically by following the topography and natural water flow paths. The formation of neighborhoods along the rivers and on the edges of gardens not only determined the spatial order of the city but also led to the consolidation of livelihood and physical patterns throughout history that can be traced to this day.

• **Territory: spatial organization through gardens and residential cores**

A territory is an edge that separates an area with specific features from its neighboring areas. This specific characteristic can include a specific attribute that can be perceived with sensory perception or the result of establishing a specific function that is different from outside the boundary of the territory. Recognizing and understanding a space area that a group of city residents develops a sense of belonging to is an important condition for realizing the overall concept of the city (Abarghoi Fard & Mansouri, 2021). Natanz has been noted for its natural geography, including vast plains and high mountains, which acted as its main defensive factor throughout the life of the city (Moghaddisi, 1982, 129). Also, "...the city of Natanz is limited to huge rocks from the west and south and to smaller mountains from the east and north, and the city is surrounded by mountains on all sides" (Figueroa, 1984, 282). According to Fig. 3, during the Sassanid era, the first defensive facilities of the city of Natanz were built on Mount Karkas, the remains of which are now known as

"Qala'è Vashak". Also, the "Baghbad" fortress was built in the Afushte neighborhood as a defensive facility for the city (Mohammadi et al., 2022). In the first step, the surrounding mountains, especially Mount Karkas, formed the first natural and defensive borders of the territory of the city of Natanz and played a fundamental role in determining its spatial boundaries. In later stages, gardens and rivers, as biological and productive borders, played a role in defining the urban territory of Natanz and helped stabilize the spatial structure of the city in its natural context. As the territory of the city of Natanz was in a belt of gardens around the central core of the city, through which the people of the city made a living (Javeri et al., 2022). Finally, with regard to the spatial organization of the city of Natanz, its territory in its natural and historical context is formed by a continuous network of gardens that, as boundary and structural elements, define and explain the functional boundaries of the city. These gardens not only play a decisive role in building the physical boundaries of the city, but also serve as an intermediary between the three residential cores and the components of the urban complex. In the course of the city's historical development, these gardens have gradually evolved from an agricultural and economic role to a space-creating element in defining the edges and legibility of the urban territory. Concerning the role of gardens in the spatial organization of the city, the continuity of life and the preservation of their organic structure have not only been effective in the

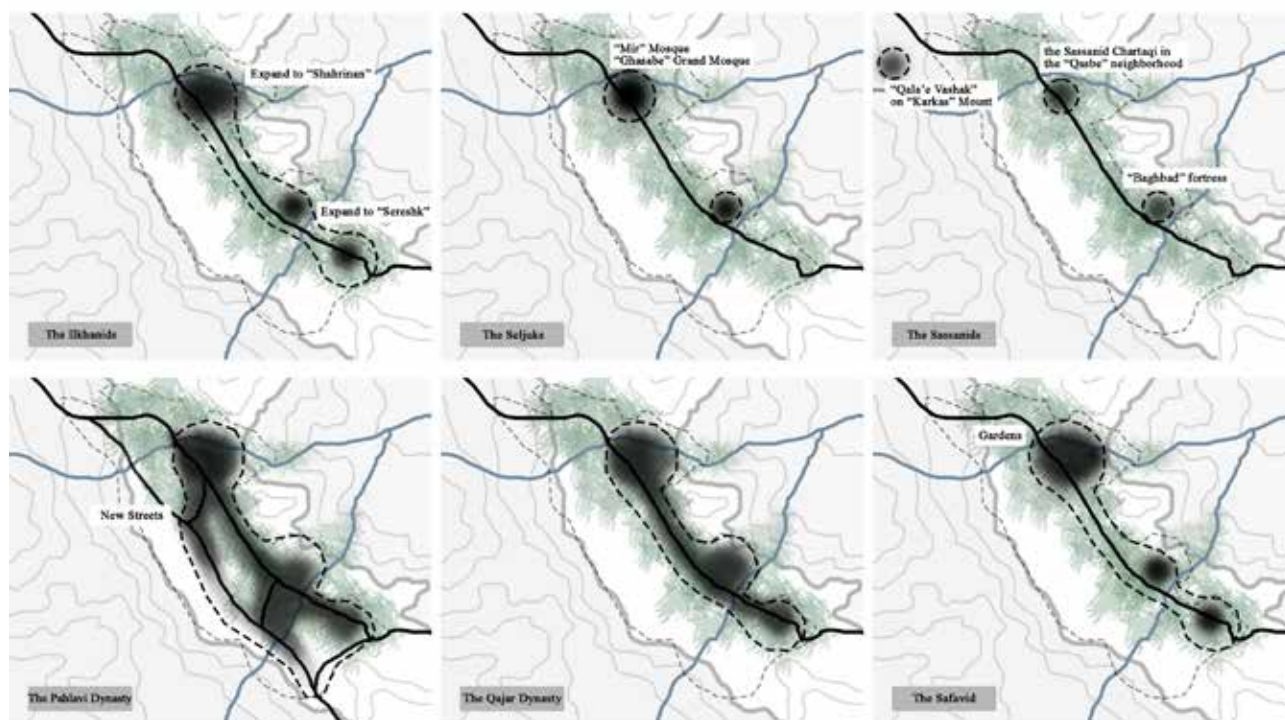


Fig. 3. The process of expanding the spatial organization and territory of Natanz city during different periods. Source: Authors.

spatial coherence between residential textures, but also in stabilizing the identity and historical boundaries of Natanz.

• Core: the place where the city is

The city core is a concept beyond a physical place and acts as an objective manifestation of the city's identity and historical essence. In the city of Natanz, the center, as the main focus of urban life formation, has always been defined by functions such as the gathering of important physical elements, such as mosques, bazaars, squares, and other public spaces, as well as social and political events. The center of intersection of physical elements is considered the only sufficient condition for the center, while the continuation of the life of the center requires the presence of social events that find meaning in the historical and cultural context of the city (Mansouri et al., 2020, 55). In Natanz, the remains of the Sassanid square in the Qasbeh neighborhood indicate the first urban core that was formed based on a religious and ritual background and its central position was established based on the geographical and political conditions of that era.

Historical developments in the city of Natanz have led to changes in the structure and location of the center in different periods. According to Fig. 4, the initial core of the city was formed in the Sassanid period with the defensive structures of Qala-e-Shak on Mount Karkas, the Baghbad Castle in the Afushte neighborhood, and the Sassanid Chartaqi in the Qasbe neighborhood. In the Islamic period, especially the Daylami and Seljuk periods, the Qasbe neighborhood was established as the main center of the city and prospered. With the Mongol invasion and the resulting destruction, the center was moved from the Qasbe neighborhood to the Sereshk area in the southeast of the city, and as a result, the urban center changed its location under the influence of security and natural factors, such as proximity to the Tama River (Jami, 1987, 428; Kashani Natanzi, 1964, 17). In the Ilkhanid period, while maintaining the Qasbe axis, the city expanded towards waterways and neighborhoods such as Sereshk and Shahrinan. In the Timurid period, the third urban core was formed again in Afushte. However, during the Safavid period and after that, the center was moved to the Qasba and Fareh areas, and neighborhoods such as Baghestan and Fareh Alley gained a special place in communication and government routes. This return was important not only from a physical perspective but also in terms of the integration of the city's spatial organization, such that other complexes were defined as smaller wholes around the main center and were placed in spatial and semantic relation with it. During the Qajar period, the city's central bazaar was formed, and with the annexation of the surrounding villages, the city's territory expanded. Finally, during the Pahlavi period, new street layouts caused



Fig. 4. Location of the initial nuclei of the formation of the city of Natanz. Source: Mohammadi et al., 2022.

a physical cut of the historical fabric and a change in the direction of the city's physical development towards the south, which disrupted the previous unified spatial structure (Mohammadi et al., 2021). These developments show that the center is not only the place where spatial organization is crystallized, but also the perception of the city's historical and cultural landscape is formed around it.

In the development process of Natanz, the historical center of the city, which in the past played a pivotal role in the spatial organization and daily life of the residents, has gradually lost its previous position and structure. Development in recent decades has often been formed without following the patterns of historical spatial organization and spatial continuity, in such a way that important urban functions and the concentration of activities have been dispersed and transferred from the historical center to marginal and emerging spaces. This has weakened the role of the center as a functional, cultural, and social focal point. In relation to the entire spatial organization of Natanz, the historical center of the city does not play a cohesive and guiding role as in the past. Unbalanced expansion and lack of place-based planning in the center have caused the spatial structure of the city to distance itself from functional and visual continuity. Also, due to the weakening of communication axes and visual continuity between urban components, the perception of the center's landscape has weakened, and its presence in the minds and experiences of citizens has diminished. In such circumstances, not only has the center's legibility in the overall context of the city decreased, but the possibility of its recovery faces a serious challenge.

• Structure: a connecting element in the perception of the city

The structure of Iranian cities, as a physical-functional axis, is the factor of connection between the main components of the city (Mansouri, 2020, 56), including the fence, the center, neighborhoods, and urban complexes. Without it,

the aforementioned elements are formed in a dispersed and unrelated manner and are unable to create a “general” concept of the city (Abarghoui Fard & Mansouri, 2021). The functional role of the structure as an element that establishes communication between different parts of the city, the hierarchy in access, the connecting factor between the main and important components and functions of the city in the form of a backbone and the formation of a continuous flow of life and urban life that gives a social role to the structure and organization of social life in the city (Mansouri, 2020, 56). The historical structures of the city of Natanz have expanded organically, influenced by natural, climatic, social, and cultural factors. Roads and communication routes have played a key role in spatial organization and the connection between urban components. In addition to creating access between the main elements of the city, such as the center, market, neighborhoods, gardens, and entrance gates, these routes provide a platform for the formation of urban life by following the slope of the land, the lines of the aqueducts, and natural axes. The network of Natanz structures has been formed based on spatial hierarchy, and thus the main structures connect the city center to the neighborhoods and their entrances to separate the secondary structures from the public space. This spatial order, in addition to its functional function, also had a social and cultural burden and gave meaning and identity to the spaces. Urban structures in Natanz, such as the Grand Mosque and the Sheikh Abdul Samad Complex, were directly linked to the road network and the surrounding context, and the axes leading to them acted as the backbone of the city. With the beginning of the contemporary period and the introduction of new urban development patterns, the historical structure of Natanz underwent a transformation. The physical expansion of the city towards the plain, the introduction of pedestrian-oriented street networks, the widening of traditional passages, and the break between old centers and new areas weakened the functional and social role of the historical road network and the hierarchical system of the past. As shown in Fig. 5, many traditional axes were removed from use or turned into marginal routes, and the pedestrian-oriented and human-scale structure gave way to a car-oriented system. On the other hand, unplanned and sometimes disproportionate expansion of the city has led to the interference of new structures with the natural and traditional system of the city. These changes have not only affected the physical and functional coherence of the city, but have also disrupted and deprived the spatial connection between the meanings of the historical components of the city

• **Small wholes; components of the integrated perception of the city**

With the growth and development of the city and the increase in the population, the center is no longer able to provide functional services to the entire city; in terms



Fig. 5. New urban structures with a machine-centered and non-human system. Photo: Saba Jafari, 2025.

of meaning, the city, instead of being limited to a simple concept and entity, only makes sense in the form of division based on distinctions and reduction of space to smaller-scale units. Small wholes cover the entire surface of the city and have existed in two forms: neighborhood and urban complex (Abarghoui Fard & Mansouri, 2021).

According to Fig. 6, the historical fabric of Natanz includes the historical neighborhoods of Qasbeh, Baghestan, Afushte, Rise, Vishte, Kunduz, Sereshk, Mazraa Khatir, Mazed Abad, Shoshad, and Rahn. The initial core and center of the city's development were located in the Qasbeh neighborhood, and different spaces have emerged along this path in accordance with the process of the city's formation and evolution in different periods. In fact, the existing historical fabric of Natanz city was formed in the late Qajar period and changed in the Pahlavi period. In the process of the city's development, the historical villages around the city were connected to the city body and today are part of the city's historical neighborhoods (Fig. 7).

In the late Qajar period, the surrounding villages joined the Qasbeh neighborhood, and the main market of the city was formed next to the Qasbeh Grand Mosque. The Seyyed Qasem Mosque in the Qasbeh neighborhood also dates back to 1280 AH, which indicates the formation of the Hajiha and Khajeh neighborhoods side by side during this period. In the second Pahlavi period and from the late 1920s and early 1930s, the first physical cut in the city's fabric occurred in the form of Malek Ashtar Street (northwest-southeast) and the square. Cross-shaped streets crossed the fabric of the central Qasbeh and the bazaar, causing a break between the Mir, Khajeh, and Hajiha neighborhoods and the bazaar, Qasbeh, and Baghestan neighborhoods.

• **Effects of expansion on the development of natanz spatial organization**

According to studies conducted, after the Pahlavi period, with the implementation of direct and interventionist street planning, the natural and gradual process of development of the city of Natanz, which was based on waterways, canals, and gardens, was disrupted and disrupting the cohesion



Fig. 6. Historical neighborhoods of Natanz city based on the Master Plan. Source: Authors using the Master Plan 88.

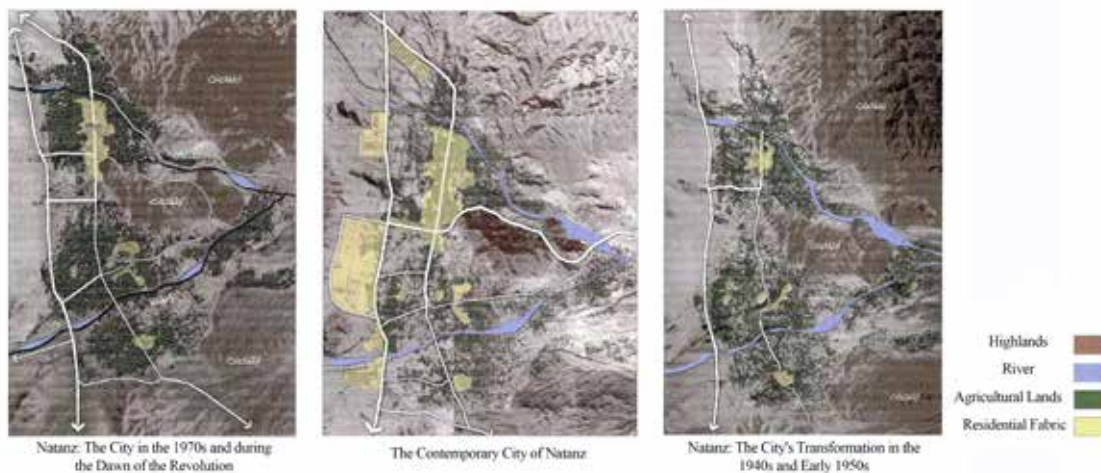


Fig. 7. Growth trend of small communities and neighborhoods in Natanz city. Source: Master Plan 88.

of the urban territory in physical, social, and functional dimensions. The horizontal and irregular expansion of the city has weakened the historical and natural boundaries of the city and led to the emergence of a pattern of dispersion. Before that, gardens, as elements of place and boundary production, shaped the structure of the urban territory, and

development was formed in accordance with the natural context. However, with the emergence of the two main street axes as the new skeleton of the city, spatial cohesion was disrupted, and the gardens between contemporary streets have become marginal spaces. Physical analyses of the Natanz texture show that new developments in many places

lack coherence and coordination with the previous texture. Buildings have been placed in opposition to the dense and systematic structure, causing spatial heterogeneity and loss of readability. Field observations in the northern and eastern areas of the city show that the expansion of modern construction has not only weakened the natural boundaries of gardens and the boundaries of the historical cores, but also created unstable and identityless transitional spaces.

In addition, the process of physical expansion has been mainly focused on access axes and peripheral areas, and in many cases has been carried out without adapting to the historical-spatial structure of the city and local patterns. These developments around the historical core and along new communication routes have led to breaks in the continuity between traditional textures and new urban spaces. Unbalanced physical expansion, the destruction of part of the gardens in the historical context, and the development of new uses have disrupted the historical pattern of spatial networking and weakened the spatial connection between the three residential cores of Natanz. Meanwhile, gardens, as interstitial elements, have been subjected to segregation

and incompatible uses, which have greatly diminished their role in defining the urban territory. According to Fig. 8, contemporary development plans have led to the production of residential nuclei discontinuous with the historical context, spatial discontinuity, and a decline in the perceptual quality of the urban environment, which indicates the need to review the physical development policies of the city of Natanz.

Discussion

The city of Natanz has experienced a development process different from other historical cities in Iran due to its specific natural features, topography, and physical conditions of the environment. The spatial structure of this city was formed from the beginning based on the garden city model, and this fundamental feature has played a decisive role in its spatial organization. Unlike many historical cities in Iran that have a centralized and interconnected development, Natanz has adopted a decentralized model by growing in three separate residential cores. These cores have been connected through a network of organic structures, gardens, and natural open

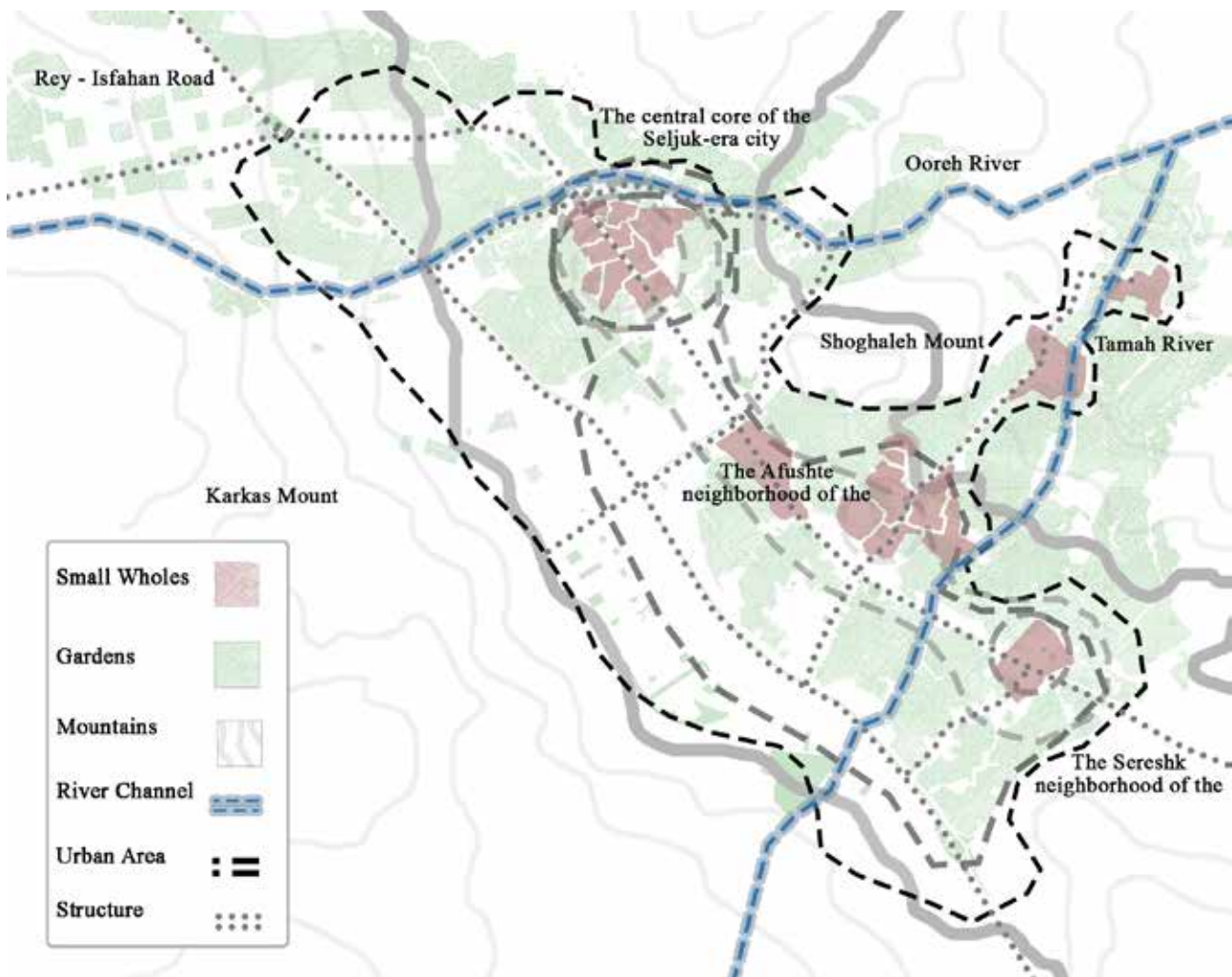


Fig. 8. Natanz City Space Organization. Source: Authors.

spaces, and this ecological and functional link has created a systemic coherence in the spatial structure of the city.

According to studies, in historical periods before the Pahlavi era, the development process of Natanz has had an organic and continuous nature. The main components of the city's spatial organization have been in a harmonious and systematic relationship with each other, and a kind of spatial coherence based on the relationship between man, the environment, and nature has dominated the city. However, with the beginning of urban development in the Pahlavi period and the introduction of modern approaches, changes occurred in the spatial system of the city that gradually took the structure and territory off its traditional path. During this period, the links between the components of the city's spatial organization weakened, and the garden city pattern, which served as a communication foundation between residential cores, lost its previous function. The result of these developments was the formation of spatial separation in which residential cores became separate and less connected units. As a result, not only did the overall structure of the city distance itself from the spatial coherence of the past, but also the communication, functional, and spatial patterns within the neighborhoods were disrupted. Accordingly, the garden city structure, which in the past was the connecting factor and spatial organizer of the city, gradually became a separating element lacking functional and physical integrity.

According to Fig. 9, after the Pahlavi era, the urban development process changed from the systemic and integrated model that had previously dominated the structure of cities to a sectoral and command-oriented development, and separation between the components of spatial organization began. During this period, urban planning was often carried out without considering the capacities of the context, spatial characteristics, and spatial organization of cities. This approach led to fragmentation between the components of spatial organization, weakening the connection between function and space, increasing social

disconnection, and reducing vitality and presence in urban spaces. As a result, an unbalanced and centralized development was formed, which, rather than improving the quality of urban life, led to an exacerbation of spatial inequality and the loss of urban cohesion.

- Territory is one of the fundamental components in the spatial organization of Iranian cities after Islam and plays a decisive role in defining the physical and conceptual boundaries of the city; in many cases, it has assumed a function to represent the totality and integrity of the city. In the city of Natanz, the city wall, as a factor in the integrated perception of the city, has had various natural (gardens), physical, functional (security), and semantic dimensions. In the Sassanid period, the establishment of the Vashak fortress on the heights of Mount Karkas and the Baghdad fortress in the Afushte neighborhood indicated the formation of functional territories with the aim of ensuring security. In subsequent periods, gardens have played a pivotal role in defining the territory, and the appearance of the wall has continued from a natural perspective and in connection with the city's livelihood and social structure. Accordingly, the formation and evolution of the territory in Natanz has been influenced by various political, livelihood, security, and socio-cultural factors, and in different periods, depending on the circumstances, one of these dimensions has become more prominent. Despite the changes in the intensity, form, and position of these components in different historical periods, the role of the fence in defining the physical and semantic boundaries of the city as an independent unit from neighboring contexts is key and undeniable (Table 1).

- The city center is formed in the Qasba neighborhood and in the vicinity of Bahram Square. The main components of this center include the Square, the Grand Mosque, the bazaar, and the plane trees in front of the Grand Mosque, which play a role in reading the spatial structure of the center and the overall organization of the city and its perception. Although the Qasba neighborhood is currently known as the main center of the city, due to the urban

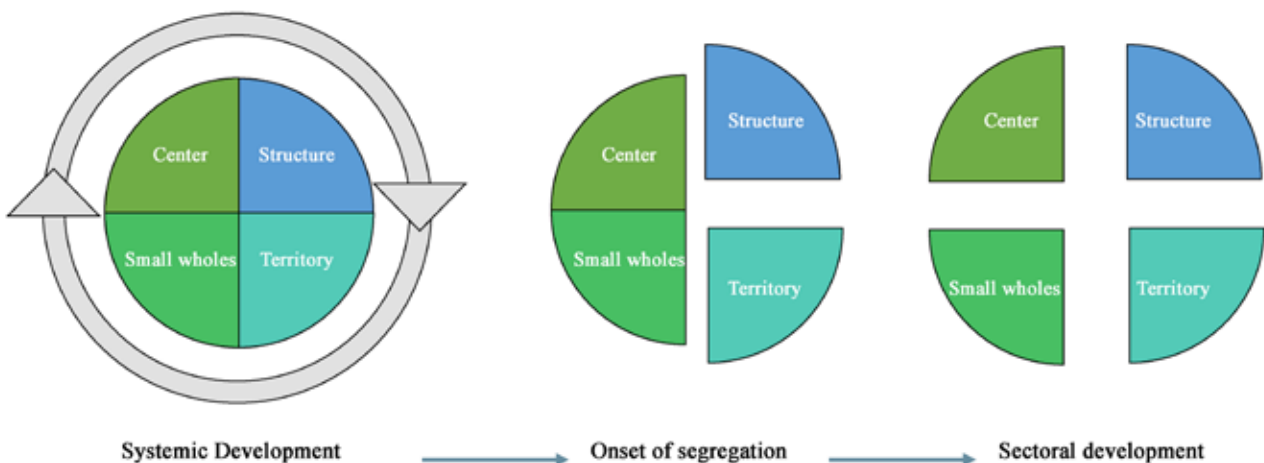


Fig. 9. The process of changing from systemic urban development to sectoral development. Source: Authors.

garden structure and in the process of physical development, two residential nuclei of Afushte and Sarshak have also been created in a decentralized manner in the city and are read as centers (Table 1).

- The structures formed in the historical context of Natanz city, as the backbone and connecting element of the city components, have been formed under the influence of the shape of the land, slope, and lines of the qanat. The connection between the center and the neighborhoods, as well as urban elements, is made possible through structures (Table 1). According to the documents, the bazaar is considered the most important structure of the city, and the roads branching off from it

are used to determine the neighborhoods and the value of the place in the city. Also, according to Fig. 10, at the intersection of the city structures, neighborhood centers, including sacred places (mosque, Husseiniyeh, Tekiye), and collective spaces have been formed. In addition to physical elements in defining the structure and landmarks of urban areas and neighborhoods, natural elements such as water ponds and plane trees also play an important role.

Conflict of Interest

The authors declare that there is no conflict of interest in the execution of this research.



Fig. 10. Neighborhood centers at the intersection of urban structures and physical (mosques and neighborhood centers) and natural (water and trees) elements. Photo: Saba Jafari, 2025.

Table 1. Indicators, role, and physical appearance of spatial organization elements. Source: Abarghoui & Mansouri, 2021; Mansouri, 2010, 63.

Spatial Organization Element	Main Indicators	Element of Spatial Organization	Physical appearance	Approach
Territory (city limits)	<ol style="list-style-type: none"> Prominent physical element; Determining the city boundary and ensuring the city's security; The basic element that gives meaning to the city as a whole. Representing the city as a whole and symbolizing civilization and power, Artificial and natural fences, a castle, and gardens. 	Representing the entirety of the city and serving as a symbol of civilization and power.	Artificial and natural fences, castles, and gardens.	Protective Perceptual Social Living
Centrality (meaning city)	<ol style="list-style-type: none"> The point of becoming a city. Markets, main squares, and public spaces. 	Equivalent to the functional and semantic totality of the city	The Grand Mosque, the tomb of Abdul Samad, the bazaar, the square, the Fareh Palace, the plane tree, and the water.	Ritual-religious Cultural Social Religious Economic Political
Structure (city relations)	<ol style="list-style-type: none"> The factor of reading the city as a whole; The backbone of the city and the connecting element of the city's components. Defining the hierarchy of access; Social institution. 	The factor that creates physical and semantic connections in the formation and understanding of the city as a whole.	Market, primary axis, main passage, alley.	Natural Accessible Functional Social
Small wholes (city material)	<ol style="list-style-type: none"> Independent social unit; Part of the city as a whole; Neighborhoods and urban complexes. 	The building block of the city's spatial organization and the means of its evolution and development	Neighborhoods and city centers, plane tree.	Social Economic Natural Activity

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