

Original Research Article

The Role of Aligning the Objective-Subjective Scale of “Industrial Development” with Its “Underlying Spatiality” in the Collapse of the Spatial-Semantic Organization of the City (Case Study: Garden City (Baghshahr) of Natanz, Isfahan Province)*

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Received: 14/09/2025

Accepted: 27/12/2025

Available online: 21/10/2026

Abstract | Natanz, one of Iran's oldest desert settlements, is a city with a spatial organization based on the garden city (Baghshahr) concept, which has lost its vitality for various reasons, including its distance from the new eastern Isfahan highway, drought, climate change, and non-spatially planned industrial development driven solely by economic profit. The present study, aims to examine the reasons for the incompatibility of development with its hosting context through library-based document analysis, field visits, and open interviews with experts, citizens, and urban managers. The findings indicate that sustainable and balanced industrial development is achievable only when the scale of industrial development is aligned with the scale of the context's potentials and capacities, including both the physical-material capacities of the context and the local community's mental readiness to accept development, as one of the main pillars of place-based development. Otherwise, development will inflict irreparable damage on its hosting context, as observed in Natanz, where this misalignment led to the destruction of gardens and, consequently, the Baghshahr-based spatial organization of the city.

Keywords | *Industrial Development, Economic Development, Place-Based Development, Landscape Approach, Natanz.*

Introduction | Natanz, as one of the oldest cities of Iranian civilization in the heart of the central desert, possesses valuable historical and civilizational heritage that attests to its sustained prosperity from ancient times to the present and indicates that it has never ceased to exist throughout any historical period. This claim can be substantiated by the presence of historical monuments such as the Natanz Fire Temple (Sassanid), the Afoushteh Historical Complex (Timurid), Natanz Grand Mosque, and the tomb of Sheikh Abdolsamad Esfahani

*This article is derived from the research project “Development Incompatibilities with the Placeness of the Context (Case Study: Natanz Region and Surrounding Villages)” was conducted under the supervision of Dr. Seyyed Amir Mansouri at the Nazar Research Center for Art, Architecture, and Urbanism in 2025.

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(Ilkhanid and Al-Buwayh), along with other historical buildings (Vakilzadeh, 2024; ... مجموعه تاریخی, 2018).

Alongside these valuable ancient elements that demonstrate the city's longevity and continuous prosperity throughout its civilizational history, the emergence of notable figures such as Badi' al-Zaman Adib Natanz, Abolfath Mohammad ibn Ali Natanz, Noor al-Din Abdolsamad Aref Natanz (Sheikh Abdolsamad), Major General Karim Aqa Bozorgmehri (the fifth mayor of Tehran), Majid Sharif-Vaqefi (one of the prominent revolutionary martyrs, after whom Sharif University of Technology was named), Dr. Morteza Safari Natanz (member of parliament and former ambassador to Spain, Hungary, and Kazakhstan), among other luminaries (قدمت شهر نطنز, n.d.), further supports this claim. Cultural,

historical, artistic, economic, and social works in various and usually uninterrupted works show that these works cause the city's prosperity to be high, because in the absence of population prosperity, one cannot witness the demonstration of the city's superiority.

The primary reason for the prosperity of this city, as in many other cities, can perhaps be attributed to two main factors: one related to geography and the other to its strategic position. The formation of Natanz in a bed formed by the Karkas mountain range has given the city the blessing of abundant running water and a favorable climate, making it a place to live in the heart of the scorching central desert. Therefore, due to its unique geographical position, the city is not only livable but also highly pleasant, providing the conditions necessary for both settlement and gardening.

The city also possesses a unique strategic position. Natanz was one of the cities located along the Silk Road. Its access to transportation routes connecting other cities, ports, points of entry and exit for goods from or to other regions, and, more generally, its location along trade and transit routes, has given Natanz a distinctive strategic significance, which contributed to its prosperity in ancient times. This condition persisted until 2020 (1399 in the Iranian calendar), when the main national highway connecting Isfahan and Qom still passed near the city, maintaining Natanz as a key destination.

However, with the construction of sections one and two of the Eastern Isfahan Bypass Freeway (constructed in 2020), the city was bypassed by the main route, weakening its accessibility and significantly impacting its economic vitality. Consequently, Natanz's historical and civilizational prosperity, which had relied on both favorable geographic conditions and accessibility, had made the city highly significant -a status no longer observed in recent years.

This study, conducted as part of the research project "Incompatibilities of Development with the Placement of Context" by the Nazar Research Institute, seeks to examine the incompatibilities of development in the context of Natanz and some surrounding villages from the perspective of "economy and industry." Therefore, it is necessary first to become more acquainted with development, its approaches, and its advantages and drawbacks in the context and local community of Natanz through a critical-analytical perspective aligned with field observations. Following the diagnosis of what has occurred in Natanz, an appropriate approach can be proposed at the intersection of industrial and economic development with the place and hosting context of the city.

Statement of the Problem

The city of Natanz is a city with a long history, a favorable geographical location with abundant running water and a pleasant climate in the heart of the central desert of Iran, with convenient accessibility to the country's main transportation

routes and the great Silk Road, with the continuity of civilization in different historical periods, a treasure trove of civilization rich in places, events and prominent historical figures. This city, Natanz, has experienced a rich heritage of historical sites, events, and notable figures. The favorable climate and conditions of Natanz provided a foundation for gardening. Gardens were so deeply rooted in the city that they became an integral part of its spatial organization, transforming Natanz into a Baghshahr.

Over time, with changes in lifestyle and livelihoods under the influence of major industrial transformations driven by macroeconomic policies, this city, like many others in the country, has undergone significant changes. However, what is evident in Natanz is that, Contrary to the likely assumption that the positive and negative effects of industrial and economic development would lead to positive developments for the benefit of the city and its citizens, this city has been swallowed up by the power of industrial development, and in addition to the huge profits that accrue to the owners of industries, the city and its citizens have not received the benefits they deserve and deserve, and have even brought them hardships. In a way, the scale of hardships for the citizens and the city is much heavier than the benefits and benefits for the local community and the city. While substantial profits accrue to industrial owners, the city and its residents do not receive the expected or deserved benefits, and in fact, they have faced adverse consequences. In this regard, the balance of hardships for the citizens and the city heavily outweighs the advantages and benefits for the local community and urban space.

Research Question

How has the neglect of the contextual placement in the process of industrial-economic development led to the collapse of the Baghshahr-based spatial organization in Natanz?

Research Hypothesis

If development is not compatible with its host context (i.e., development is not place-based), the resulting incompatibility can destroy the city in favor of the interests of a few, leaving nothing but stagnation and decay for its context and its citizens. The mismatch between the scale of industrial development, with its exclusive focus on the economic aspect of growth, and the capacities and contextual placement of the Baghshahr of Natanz has led to the collapse of the city's physical-economic structure derived from gardening. Therefore, the research hypothesis posits that the misalignment between the "scale of development" and the "scale of its context" produces development incompatible with the context, which in this case has resulted in the destruction of the city's Baghshahr-based spatial organization and, consequently, the degradation of the city as a whole.

Research Objective

This study seeks to identify the meaningful relationship between industrial and economic development and the Baghshahr structure of Natanz. In this process, a landscape approach was employed to gain a comprehensive understanding of the interaction between national and local scales of development and to analyze the resulting impacts due to the absence of development aligned with the spatial and contextual potentials.

Research Methodology

This study, relying on certain theories of place, landscape, development, and place-based development, aims to examine its hypothesis. Accordingly, part of the research involves library-based data collection addressing these theories. The main component of the hypothesis investigation was based on field visits (research trip), while open-ended interviews with urban management officials, experts, and citizens were verified and supplemented with library documents. Finally, the hypothesis was examined through analysis and reasoning using a descriptive-analytical method.

Theoretical Framework

• Industry and industrial development

The importance of industry and industrialization in an era where relying solely on the raw export of natural resources and mines is insufficient is evident to all. Moreover, even if a country intends to focus solely on raw exports or agriculture, as one of humanity’s oldest primary settled industries, and bases its only source of income on it, it would still be compelled, in the competition to sell its products, to utilize modern industry to enhance productivity, extraction, or production to offer its products to the world with higher quality, quantity, and speed. Therefore, industrial development is a necessity in today’s competitive world. In this regard, Saeed Shojaei (2025), Deputy of Planning, Innovation, and Smartization at the Ministry of Industry, Mining, and Trade, stated in an interview that, except for a few countries whose economies are based on oil and natural resources, throughout history, no country has been able to follow the path of development without industrialization. He also believes, citing the opinions of many experts, that the main factor in the growth of countries, especially after World War II in recent decades, has been the adoption of an industrial development strategy.

The attention to the importance of industry in Iran can be observed in Islamic Council. Seventh Five-Year Development Plan (Program implementation timeframe: 2023–2027) (The Research Center of Islamic ..., 2024) as the country’s most recent mandatory development program, particularly in Clause “T” of Article 48 of this statute, in which the Ministry of Industry, Mining, and Trade is required to prepare

a document entitled “National Strategic Document for Industrial Advancement and Enhancement of the Country’s Value Chains”.

Therefore, the importance of industrial development, especially in Iran -which possesses rich primary resources and a strategic geopolitical position in the Middle East, West Asia, and the world- should be regarded as an opportunity and given special attention at all levels and scales within the country. It is noteworthy that advancing industrial development requires the integration of international knowledge alongside its localization, since mere localization and attempting to reinvent the wheel from scratch while closing off knowledge exchange with the world wastes time, human energy, and resources. On the other hand, complete reliance on foreign knowledge and technology, and importing foreign technology without acquiring its underlying science, would only compromise the country’s scientific and technological independence and create dependency on external sources, yielding no benefit for Iran.

Now that the necessity of industrial development has become evident, the issue that arises is that, like any other phenomenon, industrial development undoubtedly carries disadvantages alongside its numerous benefits, which can be traced throughout the history of this event worldwide. The birth of what is today called “industrialization” was a remarkable transformation in human civilization that turned it into one of the turning points in history, in such a way that it was named with the prefix “revolution”. The industrial revolution brought ease to human life: transportation became simpler, factory production became more precise, higher in quality, more abundant, and faster. It also brought significant changes in architectural structures (construction of buildings known as “factories or industrial workshops”), urban planning (development of “residential and dormitory satellite towns” near industrial centers), and social structures (such as egalitarian movements like “feminism,” the emergence of the social class of “industrial workers,” rural migration to industrial cities in search of better work and life, the rise of labor civil movements, the emergence and intensification of communist and justice-oriented ideologies, and greater attention to leisure). These transformations were so profound that human life can arguably be divided into periods before and after the Industrial Revolution.

Industry facilitated human life, but alongside this, it endangered the environment through the excessive and non-renewable consumption of primary resources and the production of pollution affecting soil, air, and water, thereby threatening the health of humans and other living beings. Consequently, with the continuation of environmentalist movements, humanity developed a new set of stringent laws and a redefined concept of development, which came to be known as “sustainable development.” At the inception of

industrial development, in addition to enhancing the quality of life for humans as consumers of products or beneficiaries of services, it generated substantial economic capital for industry owners; thus, industrial development grew primarily based on the “economy.” In sustainable development, however, emphasis is placed on two additional dimensions, “environment” and “human society,” alongside economic considerations. Although these two new dimensions often act as obstacles for industrial owners, offering nothing but reduced profits, adherence to sustainable development principles has consistently faced shortcomings. The environment and the human society that inhabit it, mutually influencing each other, can be regarded as two pillars emerging from the context and place, and they maintain a close relationship with it. In this regard, development must always pay special attention to the context and “place” (which embodies the environmental and social dimensions of sustainable development) in which it occurs or from which it benefits. Therefore, the concept of “place and context” is one of the neglected pillars in the discussion of industrial development.

• Place and landscape

Attention to the context in which development -particularly industrial development (the focus of this research is on industrial development)- is to occur is important for several reasons. These include access to primary resources and the reduction of extraction and transportation costs to industrial units, access to transportation systems for distributing and delivering products to target markets, availability of local human resources and reduced costs for employee accommodation and commuting, and the capacity of the context to accommodate the industry. These represent only a portion of the significance of considering the context in site selection and feasibility processes for industrial development. Therefore, the emphasis of this research, as a topic within the field of landscape and urban planning, is based on the concept of “place.”

To clarify the concept of place, one must first distinguish between concepts such as “environment,” “place,” and “landscape.” As Lawton (1982) defines environment, from his perspective, the environment is essentially a physical and spatial situation that serves as a context, encompassing elements but lacking meaning or any value derived from human experience. What is notable in this definition is the absence of meaning as well as the lack of influence from values resulting from the human mind’s interpretation, and these two keywords are the distinguishing factors that separate the concept of “place” from a mere context or environment.

Place is a complex and multifaceted concept (Relph, 2009), and numerous theories have been proposed regarding it. In contemporary theories, this concept has evolved from a one-dimensional and primitive idea into a rich concept, which, according to Mansouri (2010), is a physical-semantic phenomenon that arises from the appearance of an

event somewhere and manifests dual characteristics that cannot

be separated”. Therefore, in addition to a physical environment, a place also possesses a social environment and constitutes a combination of human activities, roles, and their relationships with one another (Williams, 1999; Tuan, 1977). For this reason, Williams considers place as a physical and corporeal location that is imbued with value and meaning. (Williams, 1999). Tuan (1977) argues that what transforms a space from an undefined location into a defined place is the meaning that an individual assigns to that environment. Therefore, what can be deduced from these definitions is that in order to transform a space into a place, it is necessary for the audience to associate meaning with that space, or in other words, for the space to be given meaning by the individual.

The product of this meaning-making, the perception of those meanings, and the individual’s judgment of their relationship with the place is the sense of place (Altman, 1992), which determines the depth of that connection. In this way, in the concept of place, both its physical form and the type and depth of the observer’s perception of it are highly important for its quality. Now that the concept of place has been examined and it has been determined that in this concept, the context in its various aspects and the audience that identifies it (who is considered its user in a way) are considered, a concept is presented below that will look at development with a place-based (or place-oriented) approach. Before that, it is necessary to address the concept of “landscape,” because the approach that landscape brings to development is inherently a place-centered development approach.

As Mansouri (2010) explains, landscape is considered a type of place, which Augustine Berque (2008) views as the product of human-environment interaction in the outdoor space. Mansouri & Farzin (2016, as cited in Hosseinzadeh et al., 2024, 27) argue that landscape is a new branch of science that analyzes the human living environment from a perspective based on non-polar interpretation (opposed to the Cartesian view) of worldly phenomena, in which the definition of meaning shifted from the “intrinsic content of matter” to a systems-based perspective. In this regard, Hosseinzadeh et al. (ibid.) assert that what distinguishes landscape from other space-related approaches is the synthesis and superimposition of the two components, _physical form and meaning_ viewed through a holistic perspective.

• Place-based development

Development is a necessity of life, and this applies to cities as well. When a city faces population growth or requires renewal, it undergoes development and enhancement. Development should meet the current needs of the city’s residents while also taking into account the city’s future growth, allowing for expansion in the coming years without

conflict with existing urban areas. This principle applies to all aspects and dimensions of the city; therefore, the city must provide services in a balanced manner for both current and future residents. Such development, in which services and facilities are allocated across the city's geographic context in a balanced yet demand- and capacity-oriented manner so that all residents can benefit, is called "balanced development." This form of development is closer to social and urban justice, aiming to make the city livable for everyone while respecting citizens' rights to access urban development.

Attention to current users while considering future users of the city in development evokes the concept of sustainable development. Sustainable development, as defined by Khatoonabadi (2005), refers to a development process that is economically productive and dynamic, socially just, environmentally non-destructive, and technologically desirable. Yousefinejad (2001) defines sustainable development as the process of protecting the planet and its ecosystems, which leads to a just and desirable form of human development.

If development is to be balanced, the first step must be to examine the deficiencies and needs of each part of the city, and then compensate for these gaps through the balanced distribution of facilities across the city. Therefore, attention to the context, its needs, strengths and weaknesses, threats and opportunities, potentials, and capacities is essential and must receive special consideration. Consequently, balanced development cannot be achieved unless two principles are observed: (1). the city must be viewed holistically, and infrastructure and facilities should be distributed throughout the entire city; (2). the capacities, needs, deficiencies, and potentials of the context must be considered in the allocation and placement of facilities. On the other hand, to achieve sustainable development, current resources must be identified, the needs of present citizens specified, and, based on the anticipated needs of future residents, a portion of these resources must be reserved for current citizens. Therefore, in sustainable development as well, attention to the context, its potentials, and capacities constitutes the first critical step.

Development in which a holistic consideration of the context is a prerequisite for decisions in subsequent stages is called "place-based or place-centered development." In this type of development, the primacy is given to the "place" and its capacities and potentials. Therefore, neither balanced development nor sustainable development can occur unless it is of the nature of place-based development -that is, grounded in the values, needs, potentials, and capacities of the place. It is noteworthy that the term "place-centered" is used instead of "space-centered" because the mentioned potentials and capacities are not solely physical or material; they are also related to the capacity of citizens' minds to accommodate

development, just as landscape and place are objective-subjective phenomena.

With the definitions of place-based development, place, and landscape, it can be stated that the holistic perspective of landscape -which adopts an objective-subjective approach to phenomena and recognizes the interconnections of components as much as the components themselves- is a novel approach that can view place and development in a place-based manner. Therefore, development must pay attention to its place, a point that has often been neglected in most development projects in Iran. This neglect has frequently resulted in irreparable consequences for the environment, local communities (society), social and spatial justice in access to urban facilities, and even in economic efficiency and achieving optimal profit (using fewer resources, higher profit, faster production, and greater output), distancing development from sustainability and balance.

A point worth noting here is the hazard created by neglecting place-centeredness in development. This hazard not only damages the place and its context -such as resource depletion and environmental pollution- but, according to Maria Vittoria Giuliani (2003), a prominent psychologist and researcher in environmental psychology, a mismatch or misalignment between the individual's needs (citizens, residents, and users of the context) and the physical and social resources that the development is expected to provide -or when the development itself destroys this alignment- can weaken the individual's attachment to the development and, consequently, to the place. In more severe cases, it may drive citizens away from the place, thereby exacerbating migration by breaking the strong bonds of attachment between individuals and their environment, making it easier for them to detach from the place. In other words, from an evolutionary perspective, the functional value of attachment is to ensure stability of residence as long as this stability continues to be rewarding. Therefore, place-based development can also help strengthen individuals' attachment to the environment and the place-making that emerges from it.

Literature Review

In a study titled "Industrial landfill site selection using Analytical Hierarchy Process (Case study: Razi industrial town of Isfahan-Iran)" conducted by Hashemi et al. (2017), it is evident that one of the most prominent manifestations of the challenges of industrial development- namely, the disposal of industrial waste -has also become a concern in Natanz. This study applied a decision-making approach using the Analytic Hierarchy Process (AHP), evaluating seven environmental and logistical criteria (including distance from industrial areas, wind direction, groundwater direction, soil permeability, and other environmental factors) over a 20-year planning horizon, focusing on forward-looking site selection

for industrial waste management in Natanz city, Shojaabad district, and Ureh district in Isfahan Province. However, the study did not examine historical perspectives and offered little reference to the relationship between the city and industry. Additionally, prior land uses and their recent changes were not addressed. Ultimately, the findings emphasized the importance of integrating environmental considerations into industrial infrastructure planning, particularly regarding the suitable siting of industrial waste disposal facilities.

In multiple studies focusing on the impact of industry and industrial development on the spatial organization of cities in Iran, comparing traditional and modern urban structures, it has been noted that industrial development preserved the organic patterns and ecological networks of urban gardens and natural resources in traditional cities (Kheirabadi, 1991; Kermani & Lawton, 2009; Assari et al., 2011). In contrast, in modern cities, infrastructure has been adapted in favor of automobiles through street expansion and new urban plans, resulting in fragmented urban areas and disrupted spatial coordination (urban spatial organization) and historical fabric (Kermani & Lawton, 2009; Bahrami et al., 2012).

Another impact of development on cities, their spatial organization, and urban components is the reduction of central commercial cores in contemporary cities compared to traditional ones. These centers historically had strong social functions in addition to their commercial role. Therefore, modern legal and developmental pressures have led not only to a reduction in cultural centrality but also affected economic significance (Bahrami et al., 2012; Nejad Ebrahimi, 2015).

Other adverse effects of poorly managed modern industrial development, which are also evident in fragmented ecological landscapes, include increased pollution and the loss of contiguous green spaces (Bahrami et al., 2013). Overall, studies indicate that while traditional Iranian cities emphasized the organic integration of physical, cultural, and ecological features, modernization has reconfigured these elements into fragmented urban landscapes with different functions. This reflects a lack of a holistic approach, resulting in development that is significantly distant from sustainability and balance.

The research highlighted in this section includes Kheirabadi (1991), who examined the logic behind the physical structure and spatial patterns of traditional Iranian cities, emphasizing the role of qualitative environmental factors from a historical perspective prior to modernization. Bahrami et al. (2012), focusing on a historical city transitioning to a modern city (Tehran), addressed topics such as urban ecological landscape design, the transition from Baghshahr to modern city, and the impact of industrial and technological development using qualitative methods, historical document analysis, and an ecological-historical perspective. Nejad Ebrahimi (2015) studied the traditional historical city

of Isfahan using a qualitative and interpretive-historical approach, emphasizing the protection of historical values and the challenges of balancing development and preservation after the Industrial Revolution. Kermani & Lawton (2009) examined Kerman city, analyzing the impact of modernization (street widening and automobile access) on the traditional urban fabric and bazaar using a qualitative, case-study approach with an economic perspective. Assari et al. (2011) analyzed the historical and traditional cities of Isfahan and Tabriz, addressing comparative market sustainability, urban development effects on cultural heritage, and urban elements using a mixed-methods approach (qualitative observations and quantitative data).

Natanz Baghshahr: Spatial Organization Based on Horticulture

As previously noted, Natanz, due to its geographical characteristics and access to flowing water, generally enjoys a favorable climate and fertile soil. This has made the city suitable for cultivating trees and plants, leading to its close integration with gardens. The city's agricultural and horticultural products include saffron, pear, quince, and various vegetables, among which saffron cultivation ranks first in Isfahan Province (... نطنز رتبه اول, 2020), and the province produces one-sixth of the country's quince output (... ۲۰۰, 2019). However, Natanz is most renowned for its high-quality pears, earning it the title "Natanz's Gift" (Mehr, 2019). This explains the abundance of pear orchards throughout the city.

The spatial organization of a city is an abstract order that emerges in the mind of the observer from the arrangement of the city's elements and materials. Among the indicators that form this order, the "urban structure" is one of the most fundamental. The urban structure, in a sense, functions to connect the city's components to one another (Mansouri et al., 2020). This connection is not merely a physical or continuous link, such as the main streets of the city or the linear and covered bazaars of traditional Iranian cities; rather, a recurring element can be considered a unifying factor for the city's components. In other words, just as the city's main thoroughfare can act as a "physical connector" linking discrete urban units like a string of beads, the presence of a recurring element may serve as a "semantic connector," which, through a Gestalt perception by the observer, guides the understanding of the components as a coherent whole rather than a mere collection of parts.

In Natanz, the numerous gardens integrated within the city can be considered this semantic connector, contributing to the formation of a meaningful whole known as a Baghshahr. Therefore, Natanz is a city with a Baghshahr structure. However, questions remain: Has the city retained its Baghshahr structure? As previously mentioned, has

the industry intervened to support Natanz horticulture and increase productivity? Has industrial development contributed to enhancing the garden-based economy of the city? These questions require a detailed analysis of Natanz's industries to be answered.

Development and Industry of Natanz: Revenues and Challenges

This section addresses the industries related to Natanz in three categories. The first category (A), concerns development that is indirectly affected by the marginalization of Natanz. The second category (B), refers to the three main emerging industries located in Natanz. The final category (C), pertains to the horticulture industry, which has been one of the oldest occupations of Natanz residents and has currently lagged in the course of industrial development.

• A. National road development

Before discussing industrial development in Natanz, one of the most influential aspects of Natanz's development should be introduced, which has had a great impact not only on industries but also on the prosperity of the city. Prior to 2020, Natanz was situated on the Silk Road as one of the major ancient transit routes. This location on a main route (the old Isfahan-Tehran road) continued until 2020, and this accessibility to the road has been one of the primary reasons for the city's long-standing prosperity. When the new Isfahan-Tehran road, known as Sections One and Two of the Eastern Bypass Freeway of Isfahan (construction began in 2003), was inaugurated in 2020 (Baghban, 2020), Natanz was removed from the main route. This reduced accessibility to the primary intercity road within the national transportation network (the country's north-south national route) led to a decline in the city's prosperity. Therefore, it can be inferred that in this example of road development, the scale was national (the country's transportation system) rather than local (Natanz province). With national development prevailing over local development, this effectively resulted in negative and destructive development for Natanz (a decline in prosperity due to detachment from the national access system).

• B. Industrial development of Natanz

Contrary to what would be expected from place-based development and attention to regional capacities in sustainable development, the level of progress in the horticulture sector has not been satisfactory compared to other, more recently emerging industries. These emerging industries, which have a much shorter history than horticulture, are relatively recent phenomena, yet they currently play a very significant role in Natanz. The most important of these industries include the iron and steel industry, the stone industry, and the nuclear industry, which are briefly examined below.

- Iron and steel industry of Natanz

According to the history of the Natanz Steel Company,

the origins of this enterprise date back to the late 1960s on Pamenar Street in Tehran. The Natanz Steel Company was established in 1999 under the title of Steel Products Development, and Phase One of the factory located in Natanz was constructed in 2003 (شرکت فولاد نطنز, 2020). This history indicates that the initiation of this activity occurred outside its current location, and its products are now available for the entire country. However, for the local community, like other steel industries, it has brought significant challenges.

One of the greatest challenges posed by industries such as steel in the country is related to their improper placement in the desert, which creates issues for water access necessary for industrial cooling. In addition to reducing regional water availability, these industries also affect water quality. For example, the steel and iron smelting factory in Natanz has directly contributed to drought in villages in the Natanz and Ardestan regions. One of the sustainable resources that enabled life in the heart of the desert is the groundwater of villages such as Milajer, Nasran, and Mahabad in Ardestan County, specifically the Baba-Haji spring, which, instead of being allocated to the watershed of these settlements and plains, has been diverted to the steel industry, creating serious problems for local habitation (قنات‌هایی که ... , 2021).

The Natanz Steel Factory, along with unauthorized wells, has led to over-extraction of water, causing the drying of the 3,000-year-old qanat of Mahabad in Ardestan (Asgari, 2021). Some sources even cite its age as 2,000 years. The drying of the Mahabad qanat, along with the destruction of orchards and farmlands, forced the migration of 3,000 residents from the 6,000-person population of Mahabad (Moradzadeh, 2022). This represents only a part of the industry's impact, where profits benefit the owners, products serve consumers across the country and potentially global markets, while the negative consequences are borne by the local scale-cities and villages of Natanz and Ardestan, and ultimately, Isfahan Province.

- Stone industry of Natanz

The presence of numerous mountains in this region, containing stones suitable for the stone industry, has led to a thriving mining sector. The Karkas mountain range in Natanz County, after the Zayandeh Rud, is the second source of freshwater in Isfahan and has now become a site for the exploitation of natural resources. The first mining permit was issued in 1981, and currently, more than 60 granite and travertine mines are in operation.

The Karkas mountain range, with an area exceeding 300,000 hectares, is one of the most important geographical factors that has enabled the development of Natanz and its surrounding villages in this desert region, as it provides water and habitats for numerous, and even rare, animals and plants such as the Zarrin plant. Therefore, the Karkas area, due to its diverse fauna and flora, is considered a protected habitat; however, it is now continually being eroded through stone mining.

Alongside the reduction in water supply, the destruction of plant and animal life, and the disruption of the region's balanced climate -which has made this area habitable- the sound of mining explosions, the movement of heavy vehicles, the disposal of mining debris, and air and soil pollution represent only part of the developmental challenges. These impacts not only disregard the well-being of the local community but also threaten the region's ecosystem (کوهخواری زیر چتر ...، 2021; Gholamzadeh Natanzi, 2022).

The development of the stone industry in this region initially appears to be place-based, as the extraction industry is located in the correct sites where granite and travertine mines exist. However, in the definition of place-based development, the mere presence of development raw materials in a location is not sufficient to qualify as truly place-based. If other regional potentials are ignored and extraction and productivity limits are not aligned with the site's capacity, the sustainability of development is compromised, and one cannot expect sustainable development without considering environmental and social capacities, and, more broadly, the place-based nature of the initiative. Therefore, although the products of this industry reach consumers across the country, it brings numerous hardships to the local community. This pattern is observed in most industries.

- Nuclear energy industry of Natanz

Nuclear energy is one of the most controversial yet highly beneficial industries in Iran and worldwide. This industry can contribute to electricity generation, desalination of seawater for drinking purposes in areas with saline water, production of radiopharmaceuticals, medical imaging, highly precise measurements of various scientific quantities, and other applications, making it a valuable sector. Like any other industry, however, it also poses environmental risks, including the generation of nuclear waste, potential radioactive leaks in the event of a malfunction, and harmful effects on animals, plants, water, air, and soil in the surrounding area, all of which require rigorous and continuous monitoring.

The Natanz Nuclear Energy Site is considered one of Iran's strategic locations, dedicated to this field of science. What can be noted about this site is that the personnel working there must be specialists, a number of whom are limited nationwide; therefore, the chance of employing Natanz residents within this system is very low. It can thus be inferred that this industry, alongside the challenges it poses to the local community, does not alleviate local employment, and, unlike conventional or small-scale industries, its placement in a city cannot be expected to generate ancillary local jobs dependent on the industry.

Another important point is that the outputs of this industry are not intended for the Natanz community but for the entire country; hence, its products have a national scale. The challenges affect the local community and its immediate

surroundings (Natanz and its vicinity), while the benefits of production extend to the whole nation. This site has even exceeded the national scale and is recognized internationally, being one of the longstanding contentious issues concerning Iran.

• C. The absence of horticultural development

As previously mentioned, horticulture -particularly pear cultivation- has historically played a significant role in the livelihood and life of Natanz residents, to the extent that it was considered a hallmark of the city. The abundance of orchards, due to the favorable climate, transformed the city into a Baghshahr and shaped its spatial organization. For various reasons, horticulture, which itself constitutes a type of industry (by the definition of industry as economic production) and a unit of economic output, has not been strengthened in the present era and has declined, with the city's industrial development favoring other industries.

This situation, combined with droughts resulting from climate change and, particularly, the emergence of water-intensive industries due to improper and non-optimal siting, has led to the destruction of the city's orchards. Consequently, the orchard-based spatial organization has also disappeared, and Natanz, as a Baghshahr -a value-added feature of the city- has become like other ordinary cities, undermining the Baghshahr concept in its urban spatial structure.

Conclusion

Now that some of the most important and effective industries in Natanz have been introduced, it can be clearly seen that the developments that have entered the arena with the slogan of progress have, due to a lack of adequate and correct understanding of the place and context in which they were formed, suffered from widespread misunderstanding or selfish profiteering, which easily leads the local community and its ecosystem to destruction. These developments easily push the local community and its ecosystem toward destruction. In this regard, either there is no legal framework to counteract these effects, or no enforceable guarantees have been established, so that evidence indicates the power of industries outweighs the corrective force of development laws, leaving no capacity for effective opposition.

Perhaps one of the most important reasons for these challenges is the mismatch between the scale of the industry and the scale of the potential and capacities of its location. For example, the limited capacity of rivers, springs, qanats, and underground water tables in the desert to cool industrial operations clearly demonstrates the incompatibility between the scale of industrial development needs and the capacity of the host location. Therefore, aligning the scale of an industry -whether in terms of its resource requirements, its operational outputs and production, or even the cultural capacity of the local community to accommodate it- with the scale of its

location is one of the most crucial, yet often overlooked, aspects of industrial development management in Iran, from micro to macro levels.

This alignment of scale is a fundamental pillar of "place-based development." Consequently, development -whether for sustainability and balance (a responsibility that development owes to others) or even for enhancing productivity, efficiency, output speed, higher quality, and shorter production times- must be place-based. One of its essential conditions is the assessment of the compatibility between the scale of industrial development and the capacity of the host location.

Therefore, one of the most important factors contributing to the inefficiency of industrial development in the context of Natanz (regardless of the profit gained by the industry owner, since an industry is considered successful only when there is a balance between increasing benefits for its owner and society simultaneously, while minimizing harm to itself, others, and the environment) is the lack of attention to the scale of the "guest industry-host location" relationship, and consequently, the absence of place-based industrial development. A holistic spatial perspective considers space as place, which transforms the host site of the industry from a mere provider of raw materials (passive) into an active and influential "place" that

shapes development. This approach guides development toward a more sustainable and balanced trajectory (an outcome that cannot be achieved without recognizing the place-based nature of development).

Therefore, as a final finding, it can be stated that achieving sustainable and balanced development requires adopting a holistic and place-based development approach. One of the main prerequisites and pillars of this approach is attention to the "alignment of the guest industry's scale with the host location of that industry." This alignment of scale is not only physical-material, encompassing the potential and capacity of the site to supply raw materials and its ability to mitigate associated challenges, but also mental. The local community's mindset must be receptive to this progress and development, and the mental and cultural scale of industrial development must correspond with the mindset of the local population (for example, establishing the most advanced industries in a primitive society without cultivating the cultural capacity to host that industry would be ineffective).

Conflict of Interest

The author declares that there is no conflict of interest in the execution of this research.

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**HOW TO CITE THIS ARTICLE**

Sartipi Isfahani, M. (2026). The role of aligning the objective-subjective scale of “industrial development” with its “underlying spatiality” in the collapse of the spatial-semantic organization of the city (Case Study: Garden city (Baghshahr) of Natanz, Isfahan Province). *Tourism of Culture*, 6(23), 32-41.

DOI: 10.22034/toc.2026.547082.1206

URL: https://www.toc-sj.com/article_239439.html?lang=en

