

The Philosophy of Space and Place in Geography: Analyzing the Historical Urban Development of Kerman City Through the Spatial Distribution of Mosques

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Abstract

This article aims to examine the significance, status, and role of mosques in Kerman city, and the meaningful correlation between mosques during different urban periods and the identity of urban development. It seeks to demonstrate the potential identity of mosques in the city, showcasing the primary role they play in Kerman's development. Using various analytical methods and tools, the study will illustrate the role and standing of mosques in the urban development of Kerman. Therefore, this research is analytical and based on field surveys, which can also be categorized as applied methods in this field. The tools employed in the research process include Geographic Information Systems (GIS) and spatial analysis tools to demonstrate the spatial development trends of the city. The results indicate that mosques have had effective programs for urban development during the examined periods, and the spatial distribution of mosques serves as a close proxy for urban development. Therefore, locational data for places of worship, which is often readily available and accessible, can be utilized to extract historical urban development over a specific timeframe.

Keywords: Urban development, mosques of Kerman city, Geographic Information System, spatial analysis tools, Kerman city.

Introduction

The meaning of space and place in geographical knowledge extends beyond the mere consideration of “where” in explaining “how” and “why” phenomena occur. It also explores the intricate ways in which location is significant (Anderson, 2016; Granados-Sánchez & Reid, 2025; Holloway & Hubbard, 2014). Space and place, often conflated, are distinct concepts in comprehending geographical phenomena (Agnew, 2011; Tally Jr, 2018). Space is viewed as an abstract, universal dimensional context in which objects and events are positioned (Curtis, 2016; Duff, 2007). Conversely, place holds significance, specificity, and individuality, embodying a portion of space that is qualitatively distinct and intertwined with the social, cultural, and environmental factors that shape it (Grenni et al., 2020; Kühne, 2018; Movahed & Jafarpour Ghalehtemouri, 2019). This distinction is vital as it reflects broader intellectual discussions in geography: between abstract spatial analysis that simplifies places to points on a universal grid, and concrete environmental analysis that perceives places as dynamic environments that impact and alter processes (Blaschke et al., 2018; Kuhn, 2012; Kwan et al., 2015). For instance, Fernand Braudel’s geometric interpretation of the Mediterranean as a spatial center contrasts with Peregrine Horden and Nicholas Purcell’s emphasis on the region’s micro-ecologies and local customs. These divergent perspectives highlight the ongoing debate on whether geography should prioritize universal spatial principles or the unique attributes of specific places (Ghalehtemouri et al., 2024; Golestani et al., 2024; Kamran et al., 2020; Olson & Sayer, 2009; Scott et al., 2013).

Religion deeply influences and is influenced by the interplay of space and place as a cultural and social phenomenon (Burchardt et al., 2023; Hopkins et al., 2012; Knott, 2010). Sacred spaces like temples, churches, or pilgrimage sites are not just locations on a map; they hold spiritual significance, historical memory, and communal identity. (Hamilton & Spicer, 2016; Shamaei & Jafarpour Ghalehtemouri, 2024). Places are unique portions of the terrestrial surface that resonate strongly with religious practices, often seen as portals to the divine or embodiments of sacred history (Dyas, 2020; Lilley, 2004). For instance, Varanasi in India is more than a city; it is a place of profound religious importance for Hindus where physical and spiritual dimensions converge. Religious experiences are rooted in sensory and emotional connections to specific environments, aligning with the phenomenological understanding of place as a lived space

(Eyles & Williams, 2008; McDaniel, 2019; Winchester & Pagis, 2022). However, the modernist focus on abstract space has marginalized the role of religion in shaping geographical knowledge, overlooking how religious practices create and sustain meaningful places (Amini et al., 2024; Collins-Kreiner, 2010; Sheppard, 2002). Religion offers a lens to explore the tension between space and place, showing how human experience’s “where” is intertwined with the “how” and “why” of cultural and spiritual life in a globalized world.

Mosques have been integral to cities throughout history, serving not only as places of worship but also as hubs for social, educational, and commercial activities (Ash-Shalabi, 2015). Adorned with intricate architectural elements, mosques were strategically located within cities, reflecting their cultural significance (Ajili et al., 2018). They have played a pivotal role in shaping the cultural and social fabric of cities worldwide (Shaari et al., 2015; Ward, 2017). Mosques have been central to Islamic urbanism, embodying civic identity and community cohesion (Hamzehnejad & Rahroui, 2019; Karimi, 2018). Studying the historical development of cities through mosque locations offers insights into their cultural and religious evolution (Hall, 2017; Moosavi, 2018). It has been suggested that urban development can be understood through simple laws derived from computer simulations (Ahmed, 2018; Sharbatly Foundation, 2020).

Historical records on mosque locations vary, with sources like maps, archives, archaeological findings, and scientific research shedding light on urban development (Mohandees, 2016). Maps and city plans reveal spatial transformations and mosque distributions over time (Radio Dabanga, 2020). Archives provide legal and ownership details related to mosque construction (Course Hero, 2020), while archaeological discoveries offer insights into ancient mosque locations (Alsammarae, 2019; Hays, 2020). Analyzing Islamic architectural history and urban planning can offer interpretations of urban development based on mosque locations (The Baitulfutuh Mosque in London, 2020). The historical development of a city based on mosque locations can be understood through urban eras, urbanization trends, social and cultural changes, and economic processes (Britannica Encyclopedia, 2021; Mustafa el al., 2018; 2021; Yamamura & Lassalle, 2019). This article focuses on the significance of mosques in Kerman, exploring their role as identity markers and their impact on the city’s development. By analyzing mosque locations, the study aims to uncover Kerman’s urban evolution and demonstrate mosques’ importance

in shaping the city's identity. The research question is: How has Kerman's development unfolded across different historical periods? The hypothesis posits that mosque distribution can indicate developed urban areas in a predominantly Muslim city.

Theoretical foundations

The importance and role of mosques in urban development

The establishment and growth of Islamic cities are closely linked to the presence of mosques. Mosques in Islamic culture serve as hubs for communal activities and religious practices (Archnet, 2021). When a new Islamic city was founded or an existing city was converted to Islam, the initial step often involved constructing a mosque at its center (Asim & Ando, 2020; Ministry of Culture, Information, 2021). This central mosque typically became the focal point of the city's layout, with key buildings and public spaces surrounding it. As the city expanded, additional mosques were built in different neighborhoods, serving as social hubs (Cappelletti, 2020; Hammond, 2020). While these neighborhood mosques were smaller than the central mosque, they still played a significant role in the daily lives of residents (Ronald & Mark, 2021; Tobin, 2020). Apart from their religious functions, mosques also played a crucial role in the economic and social fabric of Islamic cities (Harsritanto et al., 2019; Šuman & Kuhta, 2020). Many mosques housed markets and educational institutions, contributing to the city's vitality and growth (Ratnasari et al., 2020).

Mosques have historically been integral to the development and cohesion of Muslim communities in urban settings. They serve various roles and hold significance in urban development (Totonchi, 2020). Firstly, as religious centers, mosques offer a peaceful space for spiritual connection in urban environments (Afnarius et al., 2020). Secondly, as social centers, mosques foster community ties and combat urban isolation (Raden Risang Haryo et al., 2020). Thirdly, mosques provide moral guidance and promote social values within the community (Al Muhsin & Ahmad, 2020). Additionally, mosques offer social support through charitable activities and community initiatives. Lastly, the architectural beauty of mosques contributes to the cultural identity and heritage of urban areas, symbolizing Islamic culture and its societal contributions (George, 2017; Kamarudin et al., 2020).

The importance of mosques in urban development is multifaceted and encompasses social cohesion, social services, architectural significance, and spiritual importance (Adamson, 2019; Adraoui, 2019; Dikici, 2021;

Gehrke, 2020). Factors influencing the development of cities around mosques include accessibility, proximity to residential areas, mosque size, local zoning regulations, and cultural and social significance (Mitchell & Sparke, 2020; O'Grady, 2018; Reuters, 2020). Ultimately, the location of mosques has significantly influenced the emergence and evolution of Islamic cities, shaping their social, economic, and religious landscapes (Williams, 2020).

The role of the mosque and its centrality in the spread of Islamic culture

The mosque is the central place of worship and gathering for Muslims and plays a significant role in the spread and preservation of Islamic culture. Mosques are not only religious sites but also social, political, and cultural centers for Islamic communities around the world (Yanasmayan & Kasli, 2019; Yener-Roderburg, 2020). In addition to serving as places for prayer, mosques are used for social activities such as education and charity work and provide a space for discussing religious and political issues (Tamimi et al., 2020; Azmi et al., 2021). One example of the centrality of the mosque in the spread of Islamic culture can be seen in the history of the Prophet's Mosque in Medina. This mosque functioned not only as a place of worship but also as a center for Islamic knowledge and social gatherings in the early days of Islam. Throughout history, especially during the Islamic Golden Age (from the 8th to the 13th centuries), mosques played a crucial role in cities such as Baghdad, Cairo, Damascus, and Cordoba (Azmi et al., 2020; Guo et al., 2020). Mosques often served as the focal point of urban architecture and planning, with markets, schools, and other important buildings constructed around them to create vibrant social spaces. Mosques also served as social and cultural hubs where people gathered for prayer, attended lectures, and participated in social events (Ahmad et al., 2024). Outside the Islamic world, mosques have also played important roles in cities like Istanbul and Hyderabad (Tartarini et al., 2020). In Iran, mosques have been significant in the spread of Islamic culture and are regarded as the focal points of Muslim communities. Historically, they have served as essential venues for cultural activities such as religious education, social gatherings, political discussions, and intellectual exchanges (Ahmad, 2020; Delaney, 2020). The sermons delivered by clergy and students within mosques have also had a significant impact on shaping Islamic culture in Iran (Hewidy & Lilius, 2018; 2021). These sermons, often focused on promoting Islamic ethics and values, have served as a means to educate and inspire Muslims to lead more religious lives (Kuppinger, 2019; Mack, 2019).

Furthermore, many eminent figures in Iranian Islamic history, including scholars, poets, artists, and philosophers, had a close relationship with mosques. Therefore, these institutions formed a strong bond with the cultural identity of Iranians and remained an inseparable part of the nation's religious and cultural heritage (Pauha & Konttori, 2020; Simonsen et al., 2019). During the Safavid era (1501-1736 AD), mosques played significant roles in the urban development of Iran (Verkaaik, 2020). The Safavid rulers constructed grand mosques and other architectural buildings that operated as centers of culture, religion, and society. These buildings were also used for displaying the power and wealth of the. Religious cities in Iran, such as Mashhad and Qom, have had a great influence from mosques in their evolutionary process due to their importance in Islamic culture. Mosques occupy a central place in the urban context of Iranian cities, and religious leaders often play a role in guiding the development of these cities. However, the degree of obedience of religious cities to the location of mosques in their evolutionary process may vary depending on factors such as history, geography, and economy (Monica, 2020). It is necessary to note that the evolution of these cities occurs under the influence of cultural, social, and economic factors in addition to the religious context. In the urban evolution of Iranian cities, including Kerman, Yazd, and Isfahan, mosques played significant roles (Haddad, 2021; Karmic, 2019). In many cases, mosques were among the first buildings constructed in these cities, and their design and location often influenced the layout and development of the surrounding areas (Muhammad Ayoub, 2022; Latief, 2016). For example, in Isfahan, the famous central square known as Naqsh-e Jahan was designed with the main mosque (Shah Mosque) on one side and a smaller mosque (Sheikh Lotfollah Mosque) on the other side. The location of these two mosques helped define the spatial organization of the entire city (Haddad, 2020; Albayan, 2020). Similarly, in Yazd, the congregational mosque is located in the heart of the old city and has been a gathering place and center for centuries. The layout and architecture of the mosque also influenced the design of neighboring buildings and public spaces. In Kerman, the congregational mosque (Jameh Mosque) is one of the oldest and most significant buildings in the city. Its construction dates back to the 14th century and has undergone restructuring and additions over the centuries, indicating the evolution of architectural styles in the region (Ruta Clair et al., 2021).

background research

The development of cities in relation to mosque locations has been a recurring theme in urban studies, particularly in regions with significant Muslim populations. Research across different parts of the world has explored how the spatial distribution of mosques influences social, cultural, and urban growth. Some scholars argue that positioning mosques at the heart of a city creates a symbolic and spiritual center, fostering community cohesion (Carmona, 2021). As Mustafa Osbilgin notes, "The mosque, both as a physical structure and a gathering space, has historically played a pivotal role in shaping the urban fabric of Islamic societies" (Albarazy, 2020). However, debates persist regarding the potential consequences of mosque concentration in certain areas, with some scholars warning that it may inadvertently reinforce socio-spatial divisions (Frenkel et al., 2022). A study in the *Journal of Environmental Psychology* suggests that while mosque distribution strengthens Muslims' sense of belonging, it may also heighten perceptions of exclusion among non-Muslim communities. Nevertheless, the role of mosques in urban development varies widely across the Muslim world, influenced by factors such as local governance, socio-economic conditions, and historical context (Asahi Shimbun, 2020; Kelman, 2020).

Islamic urban planning has long emphasized the integration of religious and social life, with mosques serving as focal points for community interaction. Historical cities such as Cairo, Istanbul, and Fez (Fas) provide compelling case studies, demonstrating how mosque placement and architectural design have shaped urban expansion, neighborhood organization, and land use patterns. Beyond their spiritual function, mosques influence mobility and accessibility, affecting transportation networks, pedestrian movement, and commercial activity. Research in this field has examined how mosque-centric urban layouts contribute to economic vitality and social dynamics, reinforcing their role not just as places of worship but as catalysts for broader urban development. By analyzing these historical and contemporary examples, scholars continue to uncover the complex interplay between religious spaces and city growth, offering valuable insights for urban planners and policymakers.

Akash (2014), Professor of Architecture at Adelaide University in Australia and author of "Cosmology and Architecture in Islam: Architectural Readings of Mystical Themes," studies the relationship between Islamic

architecture, including mosques, and the principles of cosmology. Nizar Al-Sayad (2007), Professor of Architecture, Planning, Urban Design, and Urban History at the University of California, Berkeley, has researched Islamic urbanization and the impact of mosques on urban development. Holud (2018), Professor of Islamic Art and Architecture at the University of Pennsylvania, has conducted extensive research on Islamic urbanization and the role of mosques in shaping urban spaces. Mohammad Ghori Pour, Professor of Architecture at Morgan State University and author of "Sacred Sites: Religious Architecture of non-Muslim communities throughout the Muslim world," has examined the architecture of mosques and its impact on urban development. (Rizvi, 2014) focuses on the intersection between Islamic art, architecture, and urbanism, including the study of the mosque's location and its impact on urban development.

Notable researchers in this field include Akash, Nizar Al-Sayad (Beekers & Tamimi Arab, 2016; Mirhosseini et al., 2018; Gravelle et al., 2021; Khanzadeh, 2024). Their studies shed light on the role of mosques in shaping urban spaces and the social fabric of cities. While there may be differences in emphasis and perspective among Iranian, European, and American scholars, they all recognize the significance of mosque location in urban development. Common findings among researchers include the role of mosques as community centers, their cultural and architectural importance, and their contribution to multiculturalism and social cohesion. Iranian scholars view mosque placement as a reflection of Islamic culture and identity, emphasizing unity among residents. In contrast, European and American researchers focus on cultural diversity, architectural heritage, and the integration of diverse religious practices in urban settings. Overall, studies in this field aim to deepen our understanding of how religious institutions influence the physical and social aspects of cities, highlighting the diverse perspectives and insights offered by scholars from different regions.

The development perspective of Kerman city and the position of mosques in the city

Kerman, located in southeastern Iran, has a rich historical and cultural heritage. As for the city's development landscape, it is focused on preserving historical architecture and promoting tourism. The mosques located in Kerman are also an integral part of the development landscape. Mosques in Kerman are strategically located in central areas, often near markets or other high-profile buildings. This location has several

goals. First, it allows mosques to be easily accessible to residents and to ensure they can serve as a gathering place. Secondly, it raises the visibility and prominence of mosques, turning them into symbolic landmarks that help identify the city and attract tourists. Kerman mosques have also played a significant role in the formation of the social fabric. "They are not only places of worship but also centers for training and social interaction. Many mosques in Kerman have madrassas or madrassas where students can learn Islamic and other subjects. This educational aspect contributes to the intellectual development of society and helps preserve the city's heritage. Regarding the architectural design, Kerman mosques display unique characteristics of Islamic Iranian architecture. They are decorated with intricate tiles, lines and geometric patterns depicting Iran's artistic heritage. The architectural design of mosques in Kerman has been carefully considered to ensure their integration with the urban landscape and to create a harmonious blend of religious and cultural elements. In general, the position of mosques in the development of Kerman city represents the prospect of development of the city in the maintenance of historical architecture and promoting tourism. Mosques, as important places of community, educational institutions, and symbolic symbols, can help the cultural identity of the city.

Methodology

This research utilizes an analytical-survey methodology that combines library-based and field-based approaches to conduct a thorough investigation. The data collection is based on the documentary method, which involves a detailed examination of books, academic journals, and reputable scientific databases to gather pertinent theoretical and historical information. This process also includes systematic notetaking, categorization, and summarization of materials to consolidate key findings and develop a strong theoretical framework.

The field study component utilizes a survey-based approach, incorporating direct observation and structured interviews to collect empirical data. These techniques allow for a comprehensive examination of the subject matter, capturing both qualitative and quantitative dimensions. To ensure a representative sample, the research adopts a cluster sampling method, segmenting the study area into distinct zones before selecting specific cases for analysis. The process begins by tracing the urban development of Kerman city across different historical

periods, identifying key growth patterns and spatial transformations. Historically significant mosques, chosen based on their alignment with Kerman’s primary developmental axis, are carefully selected for further study due to their notable architectural and cultural heritage.

For data processing and spatial analysis, the study leverages Geographic Information Systems (GIS) alongside advanced spatial analysis tools. These technologies enable the mapping of urban expansion, identification of historical preservation zones, and assessment of spatial relationships between selected mosques and the city’s evolving structure. By combining historical documentation, field observations, and geospatial analytics, this research provides a multidimensional understanding of Kerman’s architectural evolution, ensuring both methodological rigor and practical applicability in urban heritage studies. The integration of these diverse techniques enhances the reliability and depth of the findings, contributing valuable insights to the fields of urban history, architectural conservation, and spatial planning.

Results and discussion

This study explores the urban development of Kerman by analyzing the spatial distribution of mosques. We consider mosques as a key indicator of urban growth in a predominantly Muslim city. Our research is based on historical data of mosques in Kerman and urban maps from various time periods. The evolution of cities is influenced by political, economic, and environmental factors, with each period reflecting the government’s policies and societal changes. Urban planning plays a crucial role in shaping cities. Kerman, established during the Sassanian era, has expanded from its original center at Ardeshir Castle and Dokhtar Castle towards the west over time. The city grew northward during the Ghaznavid, Qarakhanid, Muzaffarid, and

Timurid periods, and expanded westward in the Safavid, Zand, and Qajar eras. By the Qajar Period, Kerman had become a significant city in terms of size and population (Figure 1).

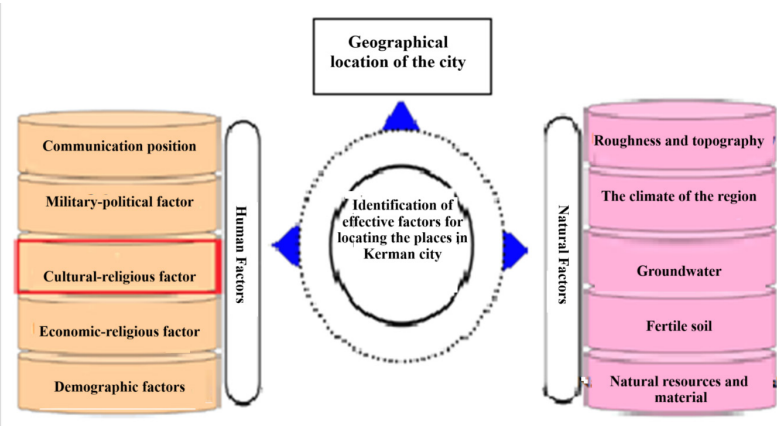


Figure 1. Effective factors in the relocation of the primary core of Kerman city

The construction of mosques over the centuries, from the first to the eighth century of the Islamic calendar, was a common practice in Kerman, and apparently most of them were located outside the city walls of the old town. In contrast to many ancient cities where mosques were established within the town and served as central points in urban design, where important thoroughfares converged, there was no effort to establish such institutions in the core of the city. Instead, they followed the model of the Friday Mosque outside the town (inside the walls). Mosques like the Jameh Mosque of Malek and the Jameh Mosque of Muzaffari were located within the town walls during the expansion of the city, following the medieval Islamic period and the mid-Qajar period, respectively. According to Table 1, Kerman has grown under the influence of various factors and mechanisms, and based on the aim of this research, we seek to examine and analyze the role of cultural and religious factors, primarily mosques, in the development of Kerman city (Table 1).

Table 1. Physical Development Stages of Kerman from Beginning of Genesis to 1300 (A.D.)

Physical changes	Reconstruction		Agent	Year	Development stage	Evening	Period
	Append	Repair					
Qal'eh Dokhtar	*	*	-	-	First	Achaemenid dynasty	Pre-Islamic
Qal'eh Dokhtar	-	*	Haftvad	-	-	Parthian	
Qal'eh-ye Ardeshtir	*	-	-	-	Second	Sasanian Empire	
Kohandej, Sharestan and Rabadh	*	-	-	-	-	Sasanian Empire	
Development of Kerman Plain	*	-	Abdullah ibn Amer	29A.Q	Third	Islam	After Islam
Fourth Reconstruction of Kerman Castle	-	*	Abu Ali Muhammad ibn Ilyas	332Hijri	Fourth	Islam	
First Military Town (King Adel)	*	-	Malek Qaverd	484Hijri	Fifth	Islam	
City neighborhood	*	*	Malek Dinar Ghaz	584Hijri	Sixth	Islam	
Khaja Atabak neighborhood	*	-	Atabak-e Mohammad Wazir	-	-	Seljuq dynasty	
Turkabad neighborhood (west of the city)	*	-	Terkan Khatun	-	Seventh	Qarakhtayan	
Mozafari complex (Jame mosque, bazaar, etc.)	*	*	Sultan Mohammed Muzaffar	750Hijri	8th	Al Muzaffar	
Building a strong fence around the city	*	*	Sultan Shahrokh	819Hijri	Ninth	Timurid dynasty	
Ganj Alikhan complex and Badaghabad neighborhood	*	*	Ganj Ali Khan	34-1005Hijri	Tenth	Safavid dynasty	
Severe destruction of the city	-	-	Aqa Mohammad Khan	1208Hijri	-	Qajar	
Ibrahim Khan collection	*	*	Zahirdola	40-1218Hijri	Eleventh	Qajar	
Vakil Complex, Bagh Nazar, Hospital and Headquarters Center	*	*	Mohammad Esmail Khan and Morteza- Qoli Khan	1277Hijri	-	Qajar	

Kerman has long been a witness to the formation of ancient civilizations. However, what is certain is that the city of Kerman has been recognized as a military center in the southeast of Iran since the reign of Ardashir Babakan. Evidence for this claim, in addition to what is mentioned in historical texts, includes the ruins of two fortresses at top the southeastern heights of present-day Kerman: the Dokhtar Castle and Ardeshtir Castle. It seems that Qaleh Dokhtar served as a sanctuary for Nahid and had a ritual function, while Qaleh Ardashir can be considered the ancient citadel of Guashir (Kerman).

City development during the Seljuk period

Kerman experienced an increase in trade during the Seljuk period (1037-1194) and became a center for commerce and transportation in Iran. Documentation indicates that Kerman was an important center for silk production, which was exported to other parts of the Islamic world. The Seljuk sultans also constructed several notable architectural structures in Kerman, including the Jameh Mosque and the Ganjali Khan Bathhouse, which remain as prominent examples of medieval Iranian architecture today. The remnants of small and large settlements and fortresses on the outskirts of today's villages and cities in

Kerman indicate that this land, in the heart of southeastern Iran, was not only the site of the first human gatherings but also one of the important centers of civilization and governmental territory that played a role at the dawn of human civilization. Due to various reasons, including gradual changes in climate, drying of nature's temperament, reduction of river water, and distance from maritime waterways, these centers of human gathering have become more introspective. During the Seljuk period, the city of Kerman was a major center of Islamic culture and art in Iran. This city had several prominent mosques at that time, including the following:

1. Jameh Mosque of Kerman: One of the oldest and largest mosques in Kerman, built during the Seljuk period using local materials such as adobe and plaster. This mosque features a unique architecture with a dome and two minarets and is famous for its intricate decorative elements.

2. Ganjali Khan Mosque: This mosque was established in the early 17th century by Ganjali Khan, the governor of Kerman. The building is a beautiful example of Islamic-Iranian architecture and is characterized by its blue-tiled entrance and large courtyard.

3. Moshtaqiyeh Mosque: Built in the 12th century during the Seljuk period. The mosque has been renovated over time, but it still retains many of its original features, including beautiful plaster decorations on its walls. Overall, these mosques in Kerman are fundamental examples of Seljuk architecture and highlight the city's cultural and artistic contributions to Islam (Figure 2 and Figure 3).



Figure 2. Development map of Kerman city during the Seljuk period

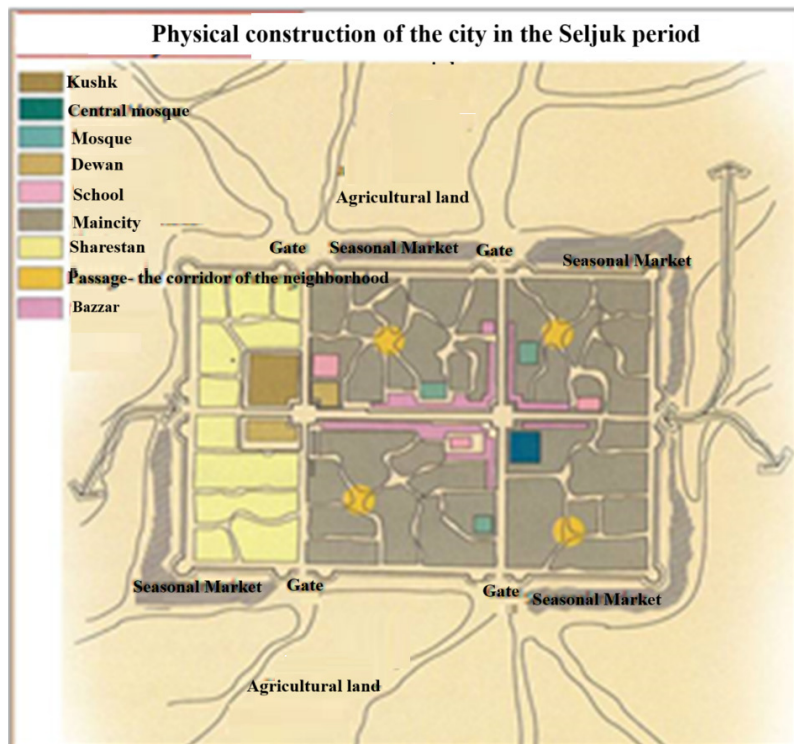


Figure 3. Physical construction of Kerman city during the Seljuk period



Figure 4. Development map of Kerman city during Ghaznavid period

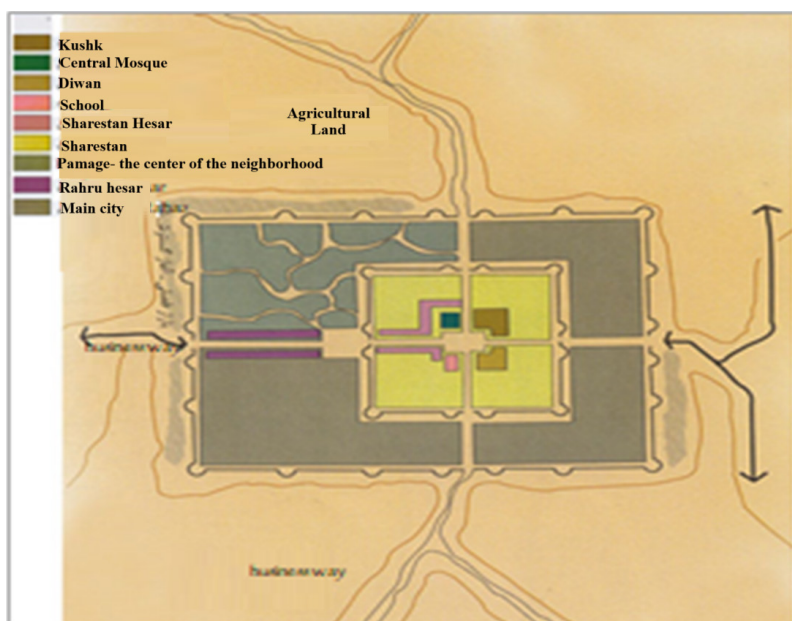


Figure 5. Physical construction of Kerman city during Ghaznavid period

City development during the Ghaznavid period

During the Ghaznavid period in the late 6th century AH, Kerman, a province in Iran, underwent substantial growth and development. The Ghaznavid dynasty, a Muslim Turkic ruling family that governed parts of present-day Iran, Afghanistan, and Pakistan from the 10th to the 12th centuries AD, played a key role in this progress. Kerman emerged as a vital center for agriculture and trade, specializing in the production of silk and wool textiles, as well as the cultivation of pistachios, almonds, and other crops. The city of Kerman became a pivotal trading hub connecting the eastern and western regions of the Islamic world. The Ghaznavids also made significant investments in infrastructure, constructing mosques, bazaars, canals, and fortifications in Kerman. They established a local governance system with appointed officials overseeing taxation, justice, and administrative tasks. This period marked a time of remarkable growth and prosperity for Kerman, with increased trade, agricultural output, and infrastructure development benefiting the city and its surroundings. The Malek Dinari Mosque, along with sixteen other mosques, served as focal points for the population, highlighting the significance of mosques during the Ghaznavid era compared to the Seljuk period. The construction and embellishment of mosques in Kerman during this time reflected a blend of Iranian and Ghaznavid Turk cultural influences (Figure 4 and Figure 5).

City development during the Karakhtian period

During the 11th to 12th centuries, the city of Kerman thrived under the rule of the Qarakhanid dynasty. This period saw significant advancements in architecture and culture, with the construction of mosques, caravanserais, and public buildings. The Jameh Mosque of Kerman, a UNESCO World Heritage site, stands as a testament to the artistic and religious influences of the era. Kerman also became a hub for ceramics, textiles, and carpets production, thanks to the Qarakhanids' support for these industries. The dynasty's efforts extended to fortifying the city and improving its water supply, recognizing its strategic importance along the Silk Road. The Qarakhanid period marked a time of prosperity and growth for Kerman, shaping its architectural, cultural, and economic landscape for years to come (Figure 6 and Figure 7).

City development during the Al Muzaffar period

The city of Kerman experienced significant development during the period of the Muzaffarids, which lasted from 1314 to 1393 in the Iranian calendar. The Muzaffarid dynasty was a local Iranian dynasty that ruled over the Kerman region during the Ilkhanate and Timurid periods. During this time, Kerman became a center of trade, commerce, and culture. The city's infrastructure improved with the construction of roads, bridges, and new buildings. The Muzaffarids also built many public works such as water reservoirs, qanats, and irrigation systems that helped improve the production and distribution of food. In addition to infrastructure development, Kerman was also an important center for Persian literature, music, and art. Many prominent poets, scholars, and artists emerged during the Muzaffarid period, including the famous poet Saadi, who was from Shiraz but spent much of his life in Kerman. Overall, the



Figure 6. The map of the development of Kerman city during the time of Karakhtians

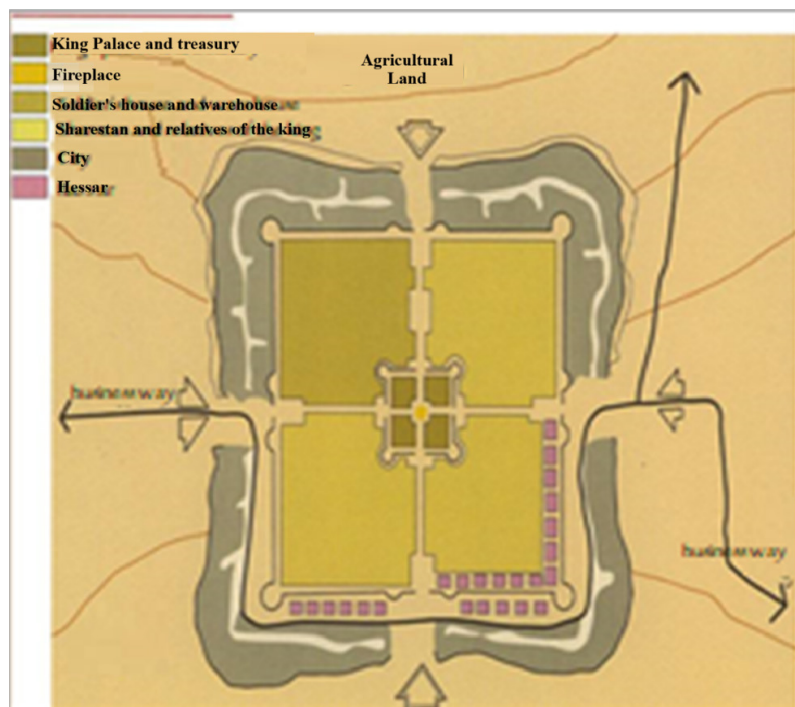


Figure 7. The physical construction of Kerman city during the Karakhtian period

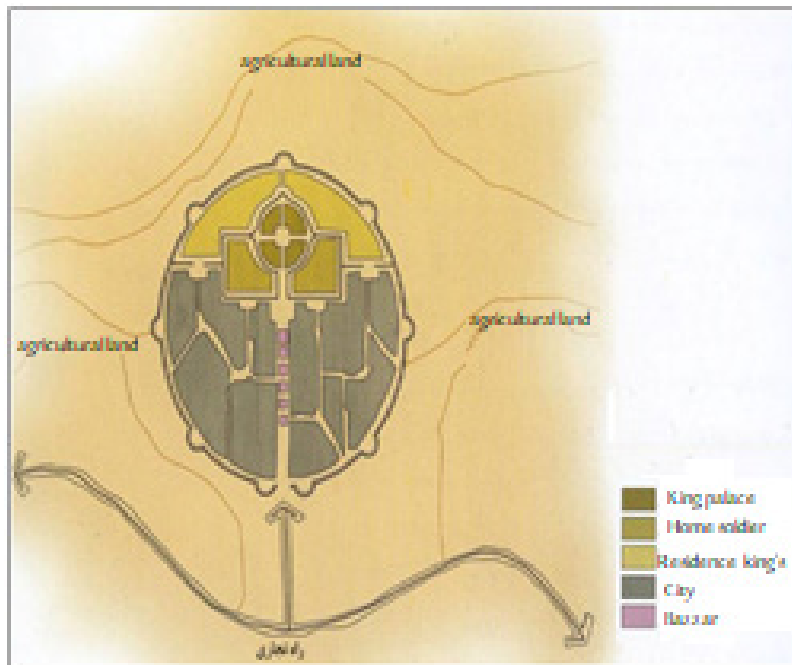


Figure 8. Development map of Kerman city during the time of Al-Muzaffar

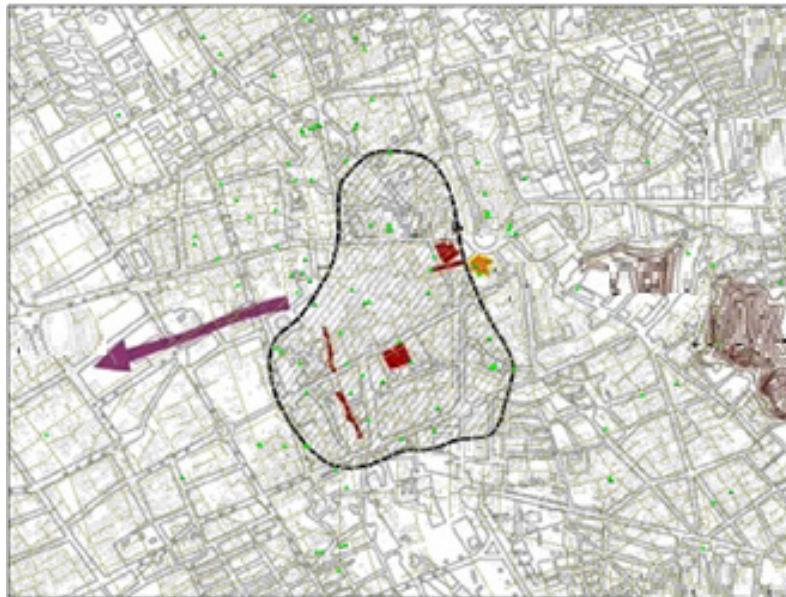


Figure 9. Physical construction of Kerman city during the time of Al-Muzaffar

Muzaffarid period was a time of notable growth and development in the history of Kerman, contributing to its status as an important cultural and commercial center in Iran. During the Muzaffarid period, several mosques were built in Kerman. The most famous of these is the Jameh Mosque, also known as the Friday Mosque of Kerman, which was constructed in the 14th century. Other significant mosques built during this period include the Sang-i Mosque and the Ganj Ali Khan Mosque. These mosques are renowned for their intricate tile work and other decorative features, and they remain important religious and cultural landmarks in Kerman to this day (Figure 8 and Figure 9).

City development during the Safavid period

Kerman was historically a significant city in Iran and remained a major hub of trade, art, and culture during the Safavid era. The Safavids, who ruled Iran from the sixteenth to eighteenth centuries, played a key role in Kerman's development. During this time, Kerman gained renown for its silk production, with its products becoming popular among European merchants. Safavid governors encouraged local entrepreneurs to produce high-quality goods, leading to a rise in demand for Kermanian Silk and boosting the city's economy. The Safavid dynasty also undertook numerous architectural projects in Kerman, such as the Ganjali Khan complex, which included markets, mosques, caravanserais, and baths. These structures were built to cater to the needs of travelers and locals and continue to attract tourists today. Overall, the Safavid era transformed Kerman into a thriving center for commerce, textiles, and architecture in Iran.

Under the patronage of Shah Abbas I, Kerman experienced a cultural and architectural renaissance in the 16th and 17th centuries. The city saw the construction of new mosques, caravanserais, public baths, and markets, many of which have been preserved as architectural gems from the Safavid period. Additionally, the Safavids bolstered Kerman's defenses by constructing new fortifications to safeguard the city from external threats, given its strategic location near the Afghan border. The Safavid era marked a pivotal period in Kerman's growth and development, leaving a lasting impact on its culture, architecture, and economy. During this time, several mosques were built in Kerman, including the following notable examples:

1. Jameh Mosque: This historic Friday Mosque, one of the oldest in Kerman, dates back to the Seljuk period and was reconstructed during the Safavid era.
2. Ganj Ali Khan Mosque: Constructed in the mid-seventeenth century by Governor Ganj Ali Khan, this mosque is renowned for its distinctive architectural elements, such as a brick dome with spiral steps inside. These mosques not only showcase remarkable architectural and aesthetic qualities but also hold significant historical and cultural value in the region (Figure 10 and Figure 11).

City development during the Timurid period

Kerman city in southeastern Iran underwent significant transformation during the Timurid period. Descendants of the Mongol Empire ruled over parts of Asia and the Middle East from the fourteenth to the fifteenth centuries. Kerman became a vital trade and commerce hub due to its location on the Silk Road. The Timurids promoted industries like textile and ceramic production, boosting the city's economy. The era also saw a flourishing



Figure 10. Development map of Kerman city during Safavid period

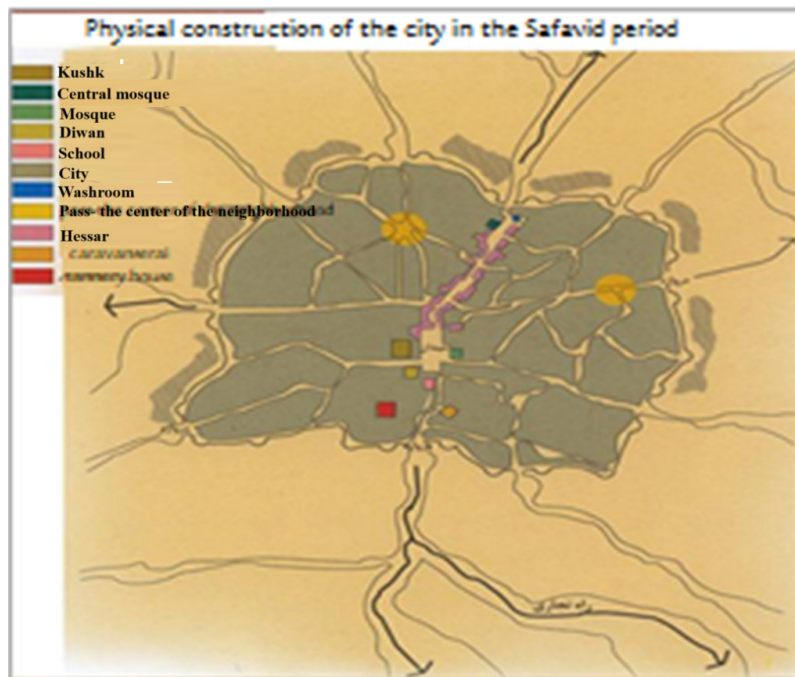


Figure 11. Physical structure of Kerman city during Safavid period

of culture and art in Kerman. Timurid rulers prioritized art and architecture, commissioning beautiful buildings such as mosques, schools, and shrines. Kerman thrived as a trade center during the Timurid era, fostering architectural and cultural development. Its strategic position on the Silk Road facilitated the exchange of goods and ideas between Asia and Europe. Kerman merchants traded in various goods like carpets, textiles, precious stones, and spices. Despite its prosperity under the Timurids, Kerman faced attacks and looting. Timur himself plundered the city in the late 14th century, and it was targeted by Uzbeks and Afghans in the 16th and 17th centuries. Despite these challenges, Kerman continued to grow as a cultural, commercial, and educational center. Notable mosques, including the Great Mosque of Kerman, were constructed during the Timurid period, showcasing intricate Islamic Iranian architecture with visible turquoise domes (Figure 12).



Figure 12. Development map of Kerman city Timurid period

City development during the Zandiyeh period

During the Zandiyeh dynasty, Kerman experienced significant development in infrastructure and culture. The city became a major trade hub due to its location on the Silk Road, with Zand rulers investing in new markets, baths, and caravans to support trade. One notable project was the renovation of the Ganjali Khan Complex, which included baths, bazaars, mosques, and schools. Originally established during the Safavid era, the complex saw substantial improvements during the Zandiyeh period. Kerman also flourished as a center of arts and literature, with support from rulers for prominent poets and artists, enhancing the city's cultural reputation. Overall, the Zand period marked a period of significant economic and cultural growth for Kerman. In Iran's Zandiyeh period (1751-1794), significant architectural developments, including mosque constructions, took place. Kerman, a major city in southeastern Iran, saw the building of several important mosques during this time. The Jameh Mosque of Kerman stands out as a remarkable example, extensively renovated and expanded in the Zandiyeh era, featuring intricate tiling and architectural details with elaborate engravings on walls and ceilings. Another notable mosque from the Zandiyeh period is the Bagh-e Laleh Mosque, commissioned by Kerman's governor Mohammad Khan Qajar, known for its grand domes, minarets, and decorative tiles. The mosques from the Zandiyeh era in Kerman display a wealth of cultural and artistic heritage, showcasing exquisite Islamic architecture and design that still fascinate us today. Expansion to the north aims to access water resources and fertile agricultural lands, while the westward direction is influenced by the road leading to Fars province, and the southern expansion is driven by the road to Hormuz (Figure 13).

City development during the Qajar period

Kerman, a city in southeastern Iran, experienced a revival during the Qajar era (1781-1925) following the devastation caused by the Mongol invasion and previous dynastic rule. It emerged as a hub for silk production during this period, with royal workshops producing high-quality silk textiles. Kerman is renowned for its traditional handicrafts, including rugs and jewelry, which are exported to various parts of Iran and neighboring countries. Despite facing social and economic challenges, such as poverty and famine, during the Qajar period, Kerman saw the renovation and development of many mosques. One of the most prominent mosques in Kerman is the Central Mosque, originally built during the Seljuk period and later restored and enhanced in the Qajar era. Known for its intricate mosaic work, impressive dome, and minarets, the Central Mosque stands out as a significant architectural landmark. Another notable mosque from the Qajar era is the Great Mosque of Kerman, constructed during the reign of Fath Ali Shah. Featuring a grand arch, courtyards, and ornate prayer decorations, this mosque showcases exquisite ornamentation. Additionally, smaller mosques like the Khaje Khedhr Mosque, built in Kerman during the Qajar period, exhibit simpler designs and served as places of daily prayer for the local community (Figure 14).

The images show that urban growth and development in Kerman have been shaped by geographical location, economic conditions, and political and social factors, leading to multiple relocations. The city has shifted from higher elevations to flat, fertile lands, primarily to the north and eventually to the west, resulting in significant expansion in the flat plain of Kerman. Northward expansion has been driven by access to water resources and fertile agricultural land, while westward growth is influenced by its position along the route to Fars, and southward expansion is due to its location along the Hormoz



Figure 13. Development map of Kerman city Zandiyeh period



Figure 14. Development map of Kerman city Qajar period

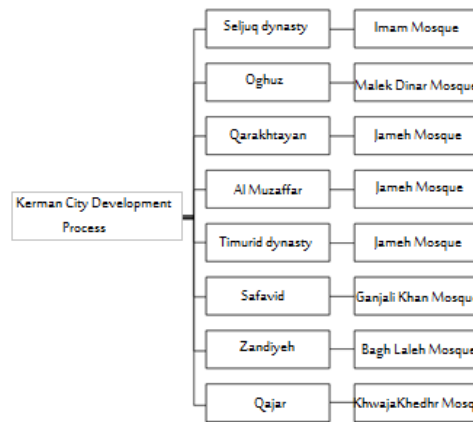


Figure 15. The historical development process of Kerman city and the mosques of the center of development in each period

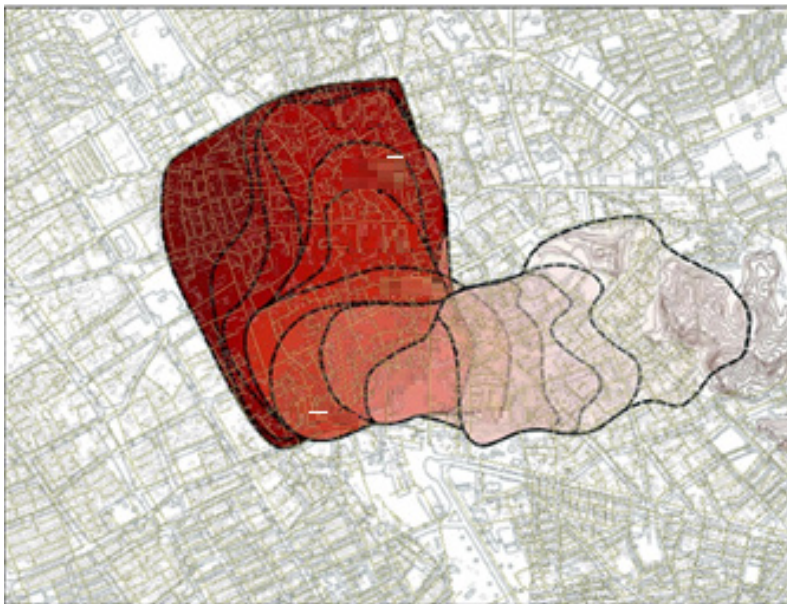


Figure 16. Map of the development process of Kerman city from Sasanian period to Qajar period

Table 2. Distribution of frequency of mosques in each period

Construction period	Number	Percent
Seljuq dynasty	10	%3
Oghuz	16	%7
Qarakhtayan	30	%9
All muzaffar	41	%13
Timurid dynasty	56	%16
Safavid	55	%16
Zandiyeh	59	%18
Qajar	60	%18

road. Initially, the city's expansion was slow and scattered, but since the Safavid era, there has been substantial growth, prompting continuous relocation of city walls. Governance systems have played a significant role in shaping urban growth and development, leaving lasting legacies in Kerman. The Seljuk, Ghaznavid, and Safavid periods marked periods of peak growth and cultural flourishing, with valuable artifacts originating from these times. Growth continued during the Afshar, Zand, and Qajar periods, with development also directed towards the west (Figure 15).

The main goal of this research is to analyze the growth pattern of Kerman city through the lens of its mosques. Throughout its history, mosques have played a central role in attracting and uniting the city's residents. By identifying key mosques that have influenced the city's development and population in different eras (as shown in Chart 1), we aim to study the city's evolution. Through Geographic Information System (GIS) analysis, we will explore how the positioning and distribution of mosques have shaped the development trajectory of Kerman over time (Figure 16).

Historical evidence indicates that the earliest settlement in Kerman dates back to the Taq-e Bostan, Castle Dokhtar, and Castle Ardeshir. The city was strategically located on the edge of the Kerman plain, providing ample land for agriculture. During the Parthian period (250 BC to 244 AD), a castle named Castle Dokhtar was situated on a hill in present-day Kerman. After Ardeshir Sasanian took control of the city, the castle was renamed. Castle Dokhtar likely served as the ancient core of Kerman, suggesting that a habitat and governance center existed at the foothills of this mountain. The exact location of the habitats within the fortress remains unclear (Table 2).

In Iran, cities evolve over time due to a variety of internal and external factors. The central area of a city, known as its heart, typically features administrative and religious landmarks. The layout and design of Iranian cities have been shaped by political and social systems. In ancient times, cities in Iran were organized in a way that aligned with the governing and social structures in place. During the Median period, cities were often fortified citadels located on elevated positions, with residential areas surrounding them. These cities served as symbols of power and authority. In the Islamic era, cities initially maintained a similar structure to the Sasanian period. However, over time, new influences led to changes in city planning, resulting in the development of key features such as grand mosques within the urban landscape.

During the Abbasid Caliphate, the Islamic city featured key elements like the grand mosque, bazaar, neighborhood, alley, gate, tower, and wall, experiencing changes in its first century. In the post-Islamic era, Kerman lacked an independent central government for an extended period, serving as a subordinate province. Due to instability and the absence of a strong centralized authority, historical records do not offer a clear view of the city's scientific centers before the Seljuks' rule in Kerman. The establishment of the Seljuk government in Kerman brought a focus on education and scholars, with schools being set up during this period. Toran Shah, responding to complaints from the locals about Turks in their homes, designated three areas for his tomb, a grand mosque called the "Mosque Malik," and a neighborhood for the Turks, complete with a school, khanqah, and caravanserai. The mosque Malik became a central point of population concentration, with nine other mosques also present at that time.

Figure 15 illustrates the historical development of Kerman city across various historical periods. It originated from the southern part of the city, encompassing the Castle of Ardeshir and the Castle of Girl during the Sasanian era. The development then followed a specific route around the historical fabric and city center at the Naseriyyeh Gate on Qaleh Street, expanding towards the north and west, ultimately reaching its peak during the Qajar period. The study revealed that the city's growth in each era revolved around one or more main congregational mosques. These mosques, along with the bazaar, played a significant role in shaping the urban landscape, serving as focal points for population concentration and urban advancement (Figure 17).

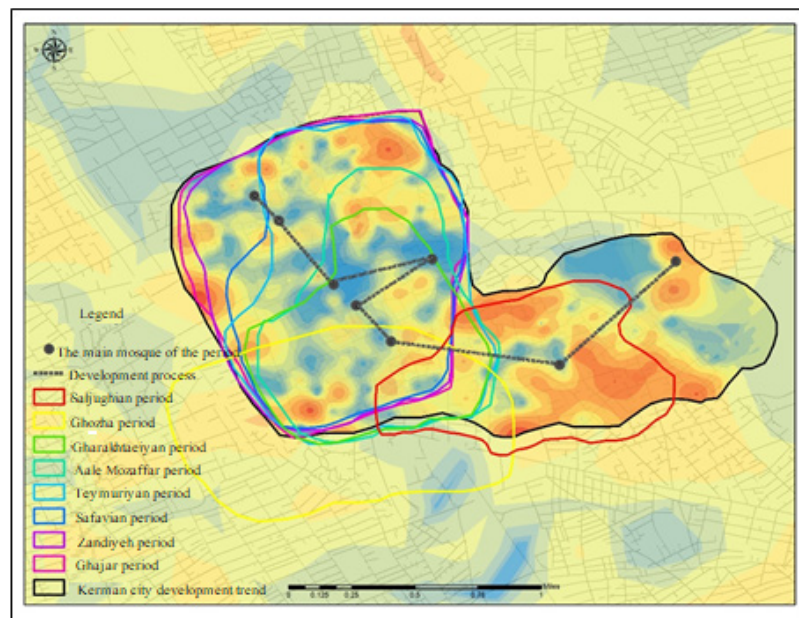


Figure 17. Historical development process of Kerman city based on mosques

Conclusion

Kerman has long served as a vital link in the chain of civilizations across Iran's southern plateau, bridging the cultural and commercial networks of eastern Iran and the Indus Valley with the great centers of Mesopotamia and Khuzestan. Archaeological evidence—such as decorated pottery, seals, and other artifacts—reveals a dynamic exchange of motifs and symbols, underscoring Kerman's role as a cultural and economic intermediary in antiquity. Excavations confirm that the region was deeply connected to both eastern (Indus Valley) and western (Khuzestan-Mesopotamia) spheres, facilitating the emergence of a distinct cultural zone in southern Iran.

The city's urban structure began taking shape during the Seljuk period, with the establishment of the Shah Adel neighborhood and its central Melik Mosque (Imam Khomeini Mosque), which anchored the city's northward expansion. Subsequent developments under the Qarakhanids, including the Delgoshay High School, a monastery, and a hospital—likely clustered around the Jameh Mosque—further reinforced this northern growth. A pivotal shift occurred during the All Mozafar period, when the construction of the Mozafari Jameh Mosque and an east-west bazaar reoriented the city's commercial axis, contrasting with the older north-south bazaar and shaping Kerman's future urban layout.

The Timurid era saw the addition of new city gates, such as the Sultan Gate in the west and the Nasiriyeh Gate in the northeast, indicating further expansion along the central bazaar route. However, the most transformative phase came during the Safavid period, particularly under Ganjali Khan, whose monumental complex in western Kerman restored balance between the declining eastern districts and the revitalized western sector. His square and bazaar reinvigorated economic activity, compensating for the diminished importance of the Khorasan-Hormuz trade route.

Kerman's urban growth has been shaped by geography, economics, and political shifts, prompting multiple relocations—from elevated terrains to flat plains, then northward toward water sources, and finally westward along the Fars trade route. While early development was slow and sporadic, the Seljuk, Ghaznavid, and Safavid reigns marked peaks of prosperity, leaving behind enduring architectural and cultural legacies. Later periods (Afsharid, Zand, and Qajar) saw continued westward expansion, reflecting the city's adaptive resilience.

Ultimately, Kerman's urban fabric is a testament to its strategic position, political patronage, and economic networks, with mosques and bazaars serving as the dual engines of its growth. The city's layered history—from ancient crossroads to Safavid renaissance—demonstrates how religious, commercial, and governance structures have collectively forged its unique urban identity. This legacy offers valuable insights for understanding the interplay between space, power, and community in Islamic urbanism.

CRedit Authorship Contribution Statement

Mohammad Reza Rezaei: Conceptualization; Software; Validation; Formal analysis; Supervision. **Kamran Jafarpour Ghalehtemouri:** Methodology; software ; Validation; Investigation; Resources; Writing – original draft; Writing – review and editing. **Tahereh Nasr:** Software; Validation; Visualization; Supervision. **Moslem Ghasemi:** Conceptualization; Methodology; Software.



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