

Geography of the Distribution of Orchin Domes and Factors Affecting Their Proliferation

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Abstract— This study investigates the distribution and characteristics of Orchin domes, also known as pineapple domes, in southern Iran. These domes represent a distinctive regional variation within Islamic-Iranian architecture, characterized by their stepped, conical form. Using a descriptive-analytical approach drawing on both library sources and extensive field studies, this research documents over 40 Orchin dome sites across seven Iranian provinces—Lorestan, Ilam, Kohgiluyeh and Boyer-Ahmad, Khuzestan, Bushehr, Fars, and Hormozgan—with additional examples identified in Iraq. The findings reveal that the highest concentration occurs in Khuzestan and Bushehr provinces, areas historically connected to Persian Gulf trade networks. Analysis suggests that the proliferation of these domes resulted from multiple converging factors: climatic adaptation to the hot and humid conditions of southern Iran, inspiration from natural forms such as palm trunks and pineapple fruits, continuity of ancient symbolic traditions emphasizing ascension, and cultural-commercial interactions with East Asian countries, particularly India. The similarity between Orchin domes and Indian temple architecture reflects the role of maritime trade routes in facilitating architectural exchange. These domes, often serving as tombs, represent the distinct cultural and historical identity of their regions while demonstrating how architecture mediates between cultural influence, environmental context, and symbolic expression.

Keywords— Iranian architecture, Orchin domes, Persian Gulf, cultural influences, natural elements, architectural geography.

I. INTRODUCTION

Architecture is considered one of the most important aspects of civilization in every era. Iranian architecture after Islam has seen four stylistic developments: the Khorasani style, the Razi style, the Azeri style, and the Isfahani style. This does not mean that all the architectural heritage of Islamic Iran absolutely follows one of these four styles. Rather, the interplay of styles within these four main categories has also created sub-branches in the architecture of this land. An example of this has occurred in areas of Iran that have been more exposed to other civilizations for some reason. The basis for this borrowing in the field of architecture was probably provided by the conquests and territorial expansion of the Islamic Caliphate, climatic similarities, and trade relations.

One of these areas is the Persian Gulf region. This region has long been a center of international trade. In proportion to the radius of influence of the traders and residents of the northern Persian Gulf, extensive contact occurred between the people of this region and other areas. The main commercial destinations of the inhabitants of this region were parts of South and Southeast Asia, especially India. Based on this and according to initial evidence, aspects of the architecture of the northern Persian Gulf region can be seen as different from the general principles governing the architecture of Islamic Iran.

One of the main elements of buildings is the dome. Domes are divided into two categories in terms of appearance: Nar domes and Rak domes. Orchin domes are considered a type of Rak dome. These domes represent aspects of architecture that differ in form from other domes located in the northern and central regions of Iran. In a preliminary observation, if we consider a hypothetical triangle in southwestern Iran with its vertex at the city of Shushtar and its base along the line connecting Kharg Island and Borujerd, we can say that the points within this triangle contain Orchin domes. The number of these domes is small and they appear only in Iran—specifically in southern and southwestern locations—with a number also in Iraq, and this is what makes these domes unique.

Despite their distinctiveness, the extent of the distribution of this type of dome has not yet been thoroughly investigated. While previous studies have examined the formal and structural characteristics of Orchin domes, a comprehensive geographical analysis of their distribution and the factors governing their proliferation across different regions remains lacking. This lacuna hinders a full understanding of their significance as a regional architectural phenomenon. This study addresses this gap by investigating the distribution of Orchin domes, documenting their locations and characteristics, and analyzing the reasons for their concentration in specific geographical areas. Specifically, this research seeks to answer the following questions: In which regions of Iran were Orchin domes most frequently used, and what factors contributed to their proliferation in these areas?

II. RESEARCH BACKGROUND

In architectural books, limited attention has been paid to Orchin domes, providing restricted information to researchers in this field. Therefore, the present study addresses this existing necessity. The relevant literature can be organized around several key themes.

Foundational Documentation: Ahmad Eghtedari (1996) in his book *Historical Monuments and Monuments of Khuzestan* provides essential documentation of historical structures in Khuzestan, including valuable information on Orchin domes. His fieldwork-based approach established a foundation for subsequent studies, though his work focuses primarily on description rather than analytical comparison across regions.

Historical and Architectural Analysis: Salehi Kakhki and Sepidnameh (2013), in an article titled "An Archaeological Research on the History and Architecture of Mudras Domes in Iranian Architecture," examine the historical development of these domes. Their research traces chronological patterns but does not adequately address the geographical distribution that would explain regional variations. Similarly, Saeedian et al., in "The Evolution of the Orchin Dome Based on Factors Effective in the Formation of an Architectural Symbol" (2012), investigate the origin, geometric structure, and formative factors of Orchin domes. While their work provides important insights into symbolic meanings and structural principles, it does not achieve a complete understanding of how these factors varied across different geographical contexts.

Structural and Typological Studies: Majidi and Fardin Mehr (2013) offer a comprehensive classification of dome types in traditional Iranian buildings, situating Orchin domes within the broader Rak dome category. Zamrashidi (2008) provides detailed analysis of arch and dome construction techniques, including specific attention to Orchin dome construction methods. Tabrizi and Yadegari (2017) apply fractal geometry perspectives to understand the geometric properties of Orchin domes, offering novel analytical tools for understanding their formal logic.

Regional Studies: Several scholars have examined Orchin domes within specific provincial contexts. Qaed Sharaf et al. (2015) conducted comparative studies of Orchin domes in Bushehr Province, while Sobhani Nejad et al. (2015) examined examples in Kohgiluyeh and Boyer-Ahmad. Hadinejad Dashti (2017) documented shrines in Dashti County, providing valuable local context. These regional studies, however, remain fragmented and have not been synthesized into a comprehensive geographical analysis.

Symbolic and Cultural Interpretations: Saeedian et al. (2011, 2012) have explored the symbolic dimensions of Orchin domes, linking their stepped form to concepts of ascension and the connection between earth and sky. Mahmoudi and Ranjbar (2020) examined factors affecting the formation of specific examples, contributing to understanding of cultural significance.

Despite these contributions, no study has systematically mapped the geographical distribution of Orchin domes across their entire range or synthesized the multiple factors—climatic, cultural, historical, and technical—that explain their proliferation in specific areas. The present study addresses this gap by integrating field observations with existing scholarship to create the first comprehensive geographical analysis of this distinctive architectural form.

III. A LOOK AT DOMES: STRUCTURE, TYPES, AND THE PLACE OF ORCHIN DOMES

Domes and domed roofs in Iran were created partly due to the lack of long and strong timber, which is the main element of roof covering in many other traditions (Pirnia, 2004). Iranians considered the dome as a means of separation from the earth and connection to the sky. It should be noted that they were among the first peoples to present innovative ways of building domes on quadrangular ground, using them in mosques, tombs, and other buildings.

The history of domed buildings dates back to the third millennium BC in the Mesopotamian region. An example of these early domes can be seen in the ziggurat of Chogha Zanbil. Dome-building became popular during the Sassanid era, which likely inherited Mesopotamian dome-building traditions. During this period, the method of doming evolved to such an extent that its influence continues to the present day. The special ideological position of the spherical shape and the materials available to the architect can be reasons for the continuous use of the dome form in Iranian architecture.

Structurally, domes are divided into two groups: Nar domes and Rak domes. Nar domes are the most common type in Iran and are also considered the main roof covering of mosques. In terms of shape and form, this dome is spherical. Examples include the dome of the Imam Mosque and the Allahverdi Khan Mosque in Isfahan and the Agha Bozorg School in Kashan.

The Rak dome, structurally different, is pyramidal or conical and is often placed on a cylindrical or prismatic base. The Rak dome has been used more on the shores of the Caspian Sea because, climatically, it is more suitable than the Nar dome—it removes atmospheric precipitation faster and better from the building and bears great resemblance to the sloping roofs of houses in that region. The most famous example is the Qaboos Dome in Mazandaran Province, considered one of the finest architectural works of the 4th century AH.

The Rak dome has various types, including:

- **Orchin Dome:** exemplified by the Daniyal Nabi Dome in Susa
- **Khorstuk (conical) dome:** exemplified by the Mil Radkan Dome in Quchan
- **Pyramidal dome:** exemplified by the Abu Lulu Domes in Kashan and the dome of the Khanqah of Haj Abdul Samad in Natanz
- **Sarvuk Dome:** exemplified by the domes of Shah Cheragh and Ali Ibn Hamza in Shiraz
- **Combinations of Rak and Nar**

Regarding the parts that make up the dome structure, the structure consists of three parts: the dome house (the ground of the dome), the Beshen or Heikal (the part that rises above the base in cube form, with one or two sides open), and finally the Chapire (meaning "gathering").

Domes are also divided into three categories based on construction technique:

1. **Single-shell domes:** The simplest type, used for ordinary buildings that are often small in scale and less expensive than double-shell domes. Stone domes of this type are often found in Sassanid buildings, cisterns, and neighborhood mosques.
2. **Double-shell domes:** Composed of two shells—the parietal or inner shell and the outer shell. This type is divided into three subtypes according to how the outer shell is placed on the parietal.
3. **Three-shell domes:** In addition to the two inner and outer shells, these also have a middle shell, which usually has a structural role and may be used for decoration (Majidi & Fardin Mehr, 2013).

IV. EXAMINING THE STRUCTURE AND FEATURES OF THE ORCHIN DOME

During the Seljuk period, which represents one of the peaks of Iranian art and architecture, dome construction in tomb buildings in southern Iran developed a special style distinct from the types of domes in other parts of the country. A new type of dome—the Orchin dome—emerged during this period (Saeedian et al., 2012; Zamrashidi, 2008).

Orchin domes are similar in external shape to conical Rak domes but are distinguished by their stepped construction with successive levels. These domes are used primarily for tombs and shrines and are usually taller than other domes, which some scholars interpret as symbolizing the gradual ascent toward God's kingdom (Zamrashidi, 2008). Orchin domes are known as "pineapple domes" in English and "dômes alvéolés" in French.

The main characteristic of these domes is that they are tiered and stepped: in each step or floor, the plan of the main base of the dome is repeated with smaller and smaller dimensions. The construction method is as follows: first, the top of the roof was molded in the shape of a cone with wood; then, behind the mold, bricks were laid on the inner base of the dome (the main base), while the outer base was fashioned in the desired shape—star-shaped or polygonal. In this manner, the dome was raised floor by floor, relying on the mold (Eghtedari, 1996; Saeedian et al., 2011).

Most Orchin domes are constructed of brick, with the notable exception of the Tuil dome in Dezful, which is made of stone. The domes are often covered with a layer of plaster and lime, but the Suleiman bin Ali dome in Ganaveh, due to the large size of its lateral surfaces, features light blue tiles.

Orchin domes are divided into two groups based on base plan:

Domes with a Star-Shaped Base: In this type, there is a precise architectural relationship between the external and internal plans. The main origin of the external star-shaped structure is influenced by the geometric relationship between the internal sides of the dome. This geometric relationship causes the base of the dome to be star-shaped externally and regular polygonal internally. The relationship of the inner base of the lower floor with the upper floor is such that connecting the midpoints of the polygonal sides of the lower floor to each other forms the polygon of the upper floor. Domes with star-shaped bases are rarer, with only five known examples: the Imamzadeh of Shirmard Mamasani, Imamzadeh Abdullah in Shushtar, Mir Mohammad Hanafiyeh in Kharg, Sultan Zubaideh in Baghdad, and Imam Dur in Samarra (Eghtedari, 1996; Saeedian et al., 2012).

Domes with a Polygonal Base: Iranian architects considered the more symbolic nature of these domes, their greater stability against climatic factors, and most importantly, their elevated position for creating an impressive effect on the urban landscape and skyline—particularly to highlight their value and social status. In this type, the base of the domes is a regular polygon, with each floor representing a cross-section with a polygonal base. Examples include the dome of Imamzadeh Jafar in Borujerd, the dome of Daniyal Nabi in Susa, the dome of Sheikh Omar Suhrawardi in Baghdad, the dome of Sulayman ibn Ali in Ganaveh, and the dome of Yaqoob Laith Safari in Dezful (Eghtedari, 1996; Saeedian et al., 2012).

Several factors have been proposed as contributing to the emergence of Orchin domes in southern and southwestern Iran: the lack of necessary technology and techniques for constructing Nar domes; seasonal rains and humidity causing building erosion; the desire to highlight buildings through tall domes; the symbolic meaning of movement from earth to heaven; and the need to prevent direct sunlight from striking the building (Qaed Sharaf et al., 2015; Mahmoudi & Ranjbar, 2020).

V. GEOGRAPHICAL DISTRIBUTION OF ORCHIN DOMES

If we consider a hypothetical triangle in southwestern Iran with its vertex at the city of Shushtar and its base along the line connecting Kharg Island and Borujerd, we can say that the points within this triangle contain Orchin domes (Sobhani Nejad et al., 2015). Orchin domes in Iran are limited to the south and southwest of the country, and their relatively small number makes these domes distinctive. A number of similar domes are also found in Iraq.

Based on extensive field studies and library research, the present study has documented Orchin domes across seven Iranian provinces: Lorestan, Ilam, Kohgiluyeh and Boyer-Ahmad, Khuzestan, Bushehr, Fars, and Hormozgan. The highest concentration occurs in Khuzestan and Bushehr provinces, areas with direct historical connections to Persian Gulf maritime trade. Table 1 summarizes the distribution by province.

TABLE 1
 DISTRIBUTION OF DOCUMENTED ORCHIN DOMES BY IRANIAN PROVINCE

Province	Number of Documented Sites	Key Examples
Khuzestan	25+	Daniel Nabi, Pir Ruband, Imamzadeh Abdullah, Yaqub Laith Safari
Bushehr	7	Imamzadeh Sulayman ibn Ali, Mir Mohammad Hanafiyeh, Sheikh Mansour Khazai
Kohgiluyeh and Boyer-Ahmad	3	Lishtar Dome, Imamzadeh Baba Ahmad, Imamzadeh Pir Ghazi
Hormozgan	3	Two-Domed Tomb of Kohard, Sheikh Hassan Ali, Kholos Mausoleum
Fars	3	Pir Darvish Ali, Imamzadeh Baba Monir, Imamzadeh Shir Mard
Lorestan	1	Imamzadeh Jafar
Ilam	2	Imamzadeh Seyyed Salah al-Din Muhammad, Jaber's Tomb

A study of the geographical distribution of Orchin domes shows that this type of dome is significantly concentrated in the southern and southwestern regions of Iran—areas located primarily in warm and relatively humid or warm and semi-arid climatic zones. The concentration of examples in these provinces, as well as their limited presence in Iraq, indicates that this architectural form was developed and sustained in response to specific environmental and cultural conditions of these regions.

From a climatic perspective, the aforementioned regions are characterized by intense solar radiation, high temperatures, seasonal and sometimes heavy rainfall, and significant relative humidity in areas close to the Persian Gulf. In such conditions, the Orchin dome form, with its stepped structure, exhibits a different and more adaptive function than smooth, monolithic domes. The successive breaks in the dome surface reduce direct sunlight hitting the building shell and help moderate the temperature in the space below. In addition, these breaks facilitate faster drainage of rainwater and reduce moisture persistence on the dome surface—a factor that plays an important role in reducing material erosion in hot and humid climates.

Spatial analysis of the documented examples shows that the highest density of Orchin domes is observed in provinces that are either directly adjacent to the Persian Gulf (Bushehr, Hormozgan, Khuzestan) or located along the transitional areas from the southwest to the central plateau (Lorestan, Ilam, Kohgiluyeh and Boyer-Ahmad, and parts of Fars). This dispersion pattern, on the one hand, strengthens the connection of these domes with the warm climate of the south and, on the other hand, reveals the role of historical communication routes in southwestern Iran for the spread of this architectural form.



Distribution Map of Orchin Domes

VI. DOCUMENTED ORCHIN DOMES BY PROVINCE

The following sections present the documented Orchin dome sites organized by province, based on field studies and available documentation.

6.1 Lorestan Province:

6.1.1 Imamzadeh Jafar Mausoleum:

Located in Borujerd County, Lorestan Province, this building dates back to the Seljuk period. The dome of Imamzadeh Jafar is a stepped dome with 18 floors. The complex includes the main tomb attributed to Imamzadeh Jafar, the tomb of the two sisters, porches, an entrance gate, and a public cemetery. This monument was registered as a national monument on May 5, 1997, with registration number 1855 (field study).



6.2 Ilam Province:

6.2.1 Imamzadeh Seyyed Salah al-Din Muhammad:

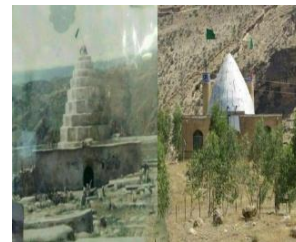
Located in Abdanan County, Ilam Province, this shrine dates back to the 7th and 8th centuries AH. An old cemetery adjacent to this shrine remains in use. The dome is double-layered with a polygonal plan and exceeds 15 meters in height. This building was registered as a national monument on March 8, 2003, with registration number 7975 (Sobhani Nejad et al., 2015).

6.2.2 Jaber's Tomb:

Located in the village of Jaber, Dareh Shahr County, Ilam Province, this building dates back to the early Islamic centuries. According to local beliefs, the tomb belongs to Jaber bin Abdullah Ansari. The original dome was of Orchin type with 10 octagonal floors, reaching 16 meters in height from tomb floor to dome apex. It should be noted that the current dome is of a different type with a cylindrical neck, built on a four-arched structure after the original was destroyed. This work was registered on January 20, 2007, with registration number 16930 (field study).



Imamzadeh Seyyed Salah al-Din Muhammad



Jaber's Tomb

6.3 Kohgiluyeh and Boyer-Ahmad Province:

6.3.1 Lishtar Dome:

Located in Gachsaran County, Kohgiluyeh and Boyer-Ahmad Province, this dome takes its name from the rural district in which it is situated. The building dates back to the Timurid period and is constructed in a conical, stepped style. The function of the Lishtar Dome is not precisely known; local residents believe it was originally an imamzadeh, while others suggest it was built over the grave of a notable figure from the Timurid era. On December 6, 1997, this building was registered as a national monument with registration number 1935 (Sobhani Nejad et al., 2015; Salehi Kakhki & Sepidnameh, 2013).

6.3.2 Imamzadeh Baba Ahmad:

Located in Bahmai County, Kohgiluyeh and Boyer-Ahmad Province, this imamzadeh is traced back to Imam Musa ibn Jafar (AS). The building dates back to the Qajar period. The dome has 13 floors and exceeds 12 meters in height. This monument was registered on October 24, 2003, with registration number 10580 (Salehi Kakhki & Sepidnameh, 2013).

6.3.3 Imamzadeh Pir Ghazi (Jafar):

Located in Dehdasht, Kohgiluyeh and Boyer-Ahmad Province, this tomb has a square plan with beautiful muqarnas on the interior. The dome is of Orchin type, and the building stands alone. The architecture dates back to the Seljuk period. This work was registered on March 15, 2001, with registration number 3561 (Salehi Kakhki & Sepidnameh, 2013).



Lishtar Dome



Imamzadeh Baba Ahmad



Imamzadeh Pir Ghazi (Jafar)

6.4 Khuzestan Province

6.4.1 Dome of Daniel the Prophet:

Located in Susa, Khuzestan Province, this is one of the most famous Orchin domes in Iran. The dome has 25 steps, is double-shelled, and rests on a circular base with two spires above the entrance doors. The current building was constructed in 1870 by order of the Shiite cleric Jafar Shushtari and built by Hajj Mullah Hossein Memar, following the destruction of the previous building by flood. This building was registered in 1931 under number 51 as a national monument (Eghtedari, 1996; Saeedpour et al., 2011).

6.4.2 Pir Ruband Tomb (Sultan Seyyed Ali Siahpoosh):

Located in the Rudband neighborhood of Dezful, adjacent to a public cemetery, this tomb derives its name from local tradition that Sultan Seyyed Ali, an enlightened Sayyid, controlled the Dezful River and protected the city from flooding. Three inscriptions are found in this tomb: one from the period of Shah Abbas Safavi, an illegible tombstone inscription, and one from the Qajar period containing prayers and greetings. The tomb consists of a quadrangular room with an octagonal roof imitating Seljuk architecture. The dome is a Rak-type dome with 20 floors (Eghtedari, 1996; Saeedpour et al., 2011).

6.4.3 Imamzadeh Abdullah Mausoleum:

Located in Shushtar County, Khuzestan Province, this imamzadeh's lineage goes back to Imam Zain al-Abidin (AS). According to historical documents, this building dates from the era of the Abbasid Caliph Al-Mustansir Billah and was rebuilt in the 7th century AH. Interior decorations include stone inscriptions and stucco work from the Seljuk, Safavid, and Qajar periods. The dome is double-layered with an exterior Rak-type facade and interior covering. The mausoleum originally included a guest house, school, library, kitchen, and other facilities that have gradually disappeared. This work is registered as number 364 in the National Monuments List (Eghtedari, 1996).



Dome of Daniel the Prophet



Pir Ruband Tomb



Imamzadeh Abdullah Mausoleum

6.4.4 Tomb of Khadmagh Khidr (Khidr Nabi):

Located on the road from Shushtar to Masjed Soleyman, this tomb is also known as Khwajeh Khidr and Maqam Khidr. The architecture reflects Seljuk period influence, though evidence suggests later renovations. The dome is of Orchin type, similar to other Khuzestan monuments (Eghtedari, 1996).

6.4.5 Tomb of Yaqub Laith Safari (Shah Abul Qasim):

Located on the Dezful-Shushtar road near the village of Islamabad, this building is the tomb of Sheikh Abul Qasim bin Ramadan Balkhi Jozi, known as Shah Abul Qasim, whose lineage traces back to Musa bin Jafar (AS). The tomb is also locally known as the tomb of Yaqub Laith Safari. The dome is of Orchin type with 19 floors (Eghtedari, 1996).



Tomb of Khadmagh Khidr



Tomb of Yaqub Laith Safari

6.4.6 Additional Khuzestan Sites:

The following buildings represent additional examples of Orchin domes in Khuzestan Province:

- Tomb of Abbas ibn Ali and Imamzadeh Zain al-Abidin in Haft Tappeh
- Tomb of Pir Isaq
- Tomb of Qadamgah Abolfazl
- Tomb of Amir Hazer
- Tomb of Imam Reza Deimi
- Tomb of Pir Habash
- Tomb of Seyyed Muhammad (Mahmud) and Imamzadeh Tuil in Dezful
- Tomb of Saleh Peymber
- Tomb of Shah Najaf
- Tomb of Sar Bakhsh
- Maqam Hussein, Maqam Seyyed Saleh
- Tomb of Pir Fath
- Tomb of Ali, Tomb of Abbas Kechike
- Tomb of Bibi Do Khairun
- Tomb of Pir Changpa
- Tomb of Sheikh Mohammad Sawar
- Tomb of Seyyed Qutb al-Din
- Tomb of Seyyed Hassan, Tomb of Seyyed Naser al-Din
- Tomb of Nabi Allah
- Tomb of Sozposh Do Peiron
- Tomb of Amir al-Momenin Do Peiron
- Tomb of Ali Gotvand
- Tomb of Shahrason

- Tomb of Muhammad ibn Zaid
- Tomb of Bushran
- Tomb of Sultan Ibrahim
- Tomb of Morteza Ali
- Tomb of Ali Kam Dardeh
- Tomb of Shoaib Nabi
- Tomb of Soufan Ali
- Shi Nishan and Dar Aghili tombs in Shushtar
- Seyyed Hossein Zahedon tomb
- Chahar Piroon tomb
- Pir Alamdar tomb
- Abbas bin Ali tomb in Ramhormoz
- Irahim Khalil tomb in Hoveyzeh
- Imamzadeh Hamzeh in Mahshahr

6.5 Bushehr Province

6.5.1 Imamzadeh Hassan (AS) Mausoleum:

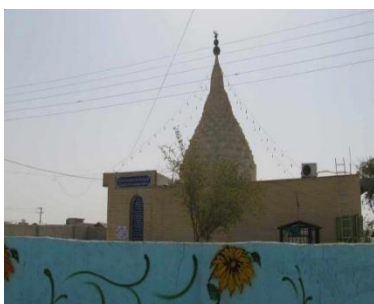
Located in the Imam Hassan district of Deylam County, Bushehr Province, this imamzadeh's lineage traces back to the seventh Imam, Hazrat Musa ibn Jafar (AS). The building materials include stone and plaster, and the structure dates back to the Ilkhanid period. The present mausoleum has three rooms, with the dome located over the second room and the third room serving as the burial place. The dome follows the Orchin style similar to those in Khuzestan Province. This monument was registered in the National Monuments List on March 16, 2008, with registration number 22169 (field study).

6.5.2 Tomb of Imamzadeh Sulayman ibn Ali (AS):

Located in Ganaveh, Bushehr Province, this imamzadeh's lineage goes back to Imam Zain al-Abidin (AS). The building dates from the Safavid and Qajar periods, though the dome is newer, constructed approximately 70 years ago. The dome is stepped with a polygonal base decorated with light blue tiles. The base is circular with six floors. This building was registered nationally on January 31, 2000, with registration number 2576 (Eghtedari, 1996; Qaed Sharaf et al., 2015).

6.5.3 Dome of Mir Mohammad Hanafiyeh:

Located on Kharg Island, Bushehr Province, this tomb honors the son of Imam Ali (AS), as confirmed by an inscription. The tomb features a 15-story, star-shaped dome and a small circular dome. The interior is decorated with star and octagonal inlays from the Mughal era, with tiles bearing the date 1337 AH. The primary construction material is brick. This tomb was registered on December 7, 1998, with registration number 2205 (Qaed Sharaf et al., 2015; Al-Ahmad, 1982).



Imamzadeh Hassan (AS) Mausoleum



Tomb of Imamzadeh Sulayman ibn Ali



Dome of Mir Mohammad Hanafiyeh

6.5.4 Sheikh Mansour Khazai Mausoleum:

Located in the village of Ziarat, Borazjan County, Bushehr Province, this building dates back to the Timurid era. The structure consists of three parts: the dome chamber, the tomb room, and a porch. Construction materials include brick, rubble, and plaster. The dome is an Orchin type with a polygonal base, featuring 16 floors and 24 sides, reaching over 8 meters in height. The floors are simple and undecorated. Local tradition suggests this complex may have functioned as a caravanserai, with traces of mosque columns visible on the northern side supporting this interpretation. A public cemetery surrounds the mausoleum and remains in use. The tomb was renovated by the Cultural Heritage Organization in 2001 and was registered nationally on November 25, 2000, with registration number 2881 (Qaed Sharaf et al., 2015).

6.5.5 Tomb of Abd al-Limam (Prince Zayn al-Abidin):

Located in the village of Ziarat Saheli, Dashti County, Bushehr Province, this tomb's lineage is variously attributed to descendants of Imam Baqir (AS), Imam Sadiq (AS), or Musa ibn Jafar (AS). The original building dates back to the Ilkhanid period, with later renovations. The dome is a single-shell Orchin with a star-shaped plan, constructed from local coral stone and plaster mortar (Hadinejad Dashti, 2017; Nistani & Hagiri, 2016).



Sheikh Mansour Khazai Mausoleum



Tomb of Abd al-Limam

6.5.6 Tomb of Shah Abdul Azim (Safa Anizim):

Located in Dashti County, Kaki District, Bushehr Province, there is disagreement regarding the lineage of the buried person—some consider him a descendant of Musa ibn Jafar (AS), others of Imam Hassan Mujtaba (AS), and some consider him the brother of Shah Reza in Isfahan. This tomb dates back to the Ilkhanid era, and its dome is of Orchin type. Construction materials include stone and plaster. This tomb was registered as a national monument in 2007 with registration number 22182 (Hadinejad Dashti, 2017).

6.5.7 Imamzadeh Bibi Zuleikha Mausoleum:

Located in the village of Chah-Kotah near Bushehr, this mausoleum features a stepped dome with three floors. The building dates back to the Qajar period and was registered nationally on March 16, 2008, with registration number 22176 (Encyclopedia of the History of Architecture and Urban Planning of Iran).



Tomb of Shah Abdul Azim



Imamzadeh Bibi Zuleikha Mausoleum

6.6 Hormozgan Province:

6.6.1 Two-Domed Tomb of Kohard:

Located in Bastak County, Hormozgan Province, this building houses the tombs of several local elders and celebrities, including Haj Sheikh Abdol Rahman Bozorg, Judge Haj Mullah Hussein, and Haj Mullah Abdul Wahid. The name derives from the presence of two Orchin dome structures adjacent to each other. The building dates back to the Afshari period, and the domes feature star-shaped plans. The architect was Haj Mohammad Sharif Kazem. The two-domed tomb was registered as a national monument on February 16, 2004, with registration number 10927 (field study).

6.6.2 Tomb of Sheikh Hassan Ali:

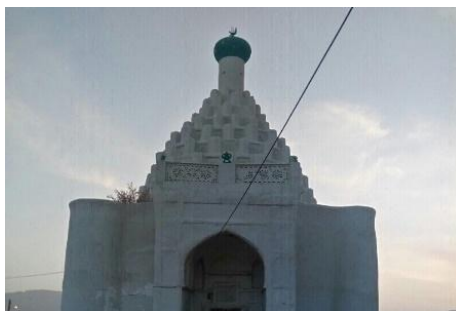
Located in Bastak County, Kohij District, Hormozgan Province, this tomb honors Sheikh Hassan Ali, a scholar residing in Kohij. The building dates from the Safavid period with later Pahlavi-era renovations. Construction materials include stone and local plaster coating, with the last renovation in 1993. The dome is of Rak type. The building was registered on June 7, 2006, with registration number 15398 (field study).

6.6.3 Kholos Mausoleum:

Located in Kholos village, Bastak County, Hormozgan Province, this mausoleum is the burial place of Mullah Ali Mollahi. The dome is of Orchin type and was restored approximately 20 years ago (field study).



Two-Domed Tomb of Kohard



Tomb of Sheikh Hassan Ali



Kholos Mausoleum

6.7 Fars Province:

6.7.1 Tomb of Pir Darvish Ali:

Located in Larestan County, Fars Province, two kilometers from Latifi City, this building dates back to the Islamic era. It was registered as a national monument on August 10, 2005, with registration number 12694 (field study).

6.7.2 Imamzadeh Baba Monir:

Located in Mamasani County, Fars Province, this building is constructed of stone and plaster with a Rak-type dome. This monument was registered in 2001 with registration number 4543 (field study).

6.7.3 Imamzadeh Shir Mard:

Located in Mamasani County, Fars Province, this building dates back to the Safavid era and forms a small complex consisting of the older main building and later extensions. Construction materials include stone and plaster, with an octagonal plan. The dome is double-layered of Orchin type. Two stone lions flank the entrance, likely explaining the name ("Shir Mard" meaning "Lion Man"). It was registered as a national monument on March 15, 2001, with registration number 3068 (field study).



Tomb of Pir Darvish Ali



Imamzadeh Baba Monir



Imamzadeh Shir Mard

6.8 Iraqi Examples

In addition to Iranian sites, similar domes can be traced in Iraq, including:

- Imam Dur in Samarra
- Sheikh Omar Suhrawardi in Baghdad
- Imam Hassan Basri in Basra
- Azgil al-Peegham in Kifal

VII. FACTORS INFLUENCING THE PROLIFERATION OF ORCHIN DOMES

The dome is a symbolic element with relatively common meanings across many cultures, allowing identification of shared concepts between different traditions. A building with a square base and a dome atop it—particularly in the Orchin form—represents the connection between heaven and earth; the transition from square to circle symbolizes the transition from the material world to the heavenly realm (Saeedian et al., 2012). The Orchin dome draws upon multiple sources of inspiration that have shaped its development within different stylistic frameworks and regional contexts. These sources, formed within natural, cultural, and religious contexts, provide the basis for the continuity and evolution of this architectural element across different periods and lands.

7.1 Ancient Civilizational Background:

Among the sources of inspiration for Orchin domes are Mesopotamian palaces, temples, and ziggurats. The ziggurats used in the facades of palaces and temples carried symbolic meaning and were considered a means of connection between heaven and earth, embodying both divine descent and human ascent. The elongated, solid, and stepped nature of these ziggurats, reminiscent of Orchin domes in form, had fundamental roots in the religious traditions of these civilizations. Ziggurats—the word means "high place"—refer to multi-story, cube-shaped buildings that decrease in size as height increases. This stepped and ascending structure, with diminishing dimensions and upward movement, can be interpreted as a source of inspiration for Orchin domes.

In addition to their architectural function, ziggurats held symbolic value, with each floor dedicated to rituals for different gods. The Chogha Zanbil ziggurat in Susa exemplifies this simultaneous structural and symbolic significance. Furthermore, elements such as Achaemenid fire altars, the steps of Persepolis, the motifs on Darius's tomb, the tomb of Cyrus in Pasargadae, the tomb of Mandana (Cyrus's mother) in the Bazpeh plain, and motifs on coins from Seleucid and Sasanian periods represent additional sources of inspiration. The common feature among these examples is the presence of tiered, diminishing structures embodying gradual movement from bottom to top.

Accordingly, it can be concluded that Orchin domes have religious and ritual roots, their formation closely linked to religious beliefs, symbolic concepts of ascension, the connection between earth and sky, and ancient traditions of pre-Islamic civilizations (Eghtedari, 1996; Saeedian et al., 2012).

7.2 Natural Inspiration:

Nature has always been one of the most important sources of inspiration in architectural thought and practice throughout history. In traditional societies, where construction knowledge was primarily based on experience, observation, and oral transmission, natural patterns played a fundamental role in forming architectural forms and construction systems. Orchin domes can be considered a clear example of this link between nature and architecture.

The logic of Orchin dome formation is based on the repetition of layers, each placed upon the lower layer with smaller dimensions. This pattern bears significant resemblance to natural structures such as the trunk of a palm tree, a star, a dahlia flower, a pine cone, and a pineapple—structures in which repetition and gradual reduction of components result in balance and coherence of the overall form.

In the historical context of architecture, this imitation of nature can be analyzed not as mere copying of external forms, but as deep understanding of the logic of growth and stability in natural elements. By observing these patterns, traditional architects developed construction methods that allowed covering openings and creating domed spaces without relying on complex engineering tools. From this perspective, the Orchin dome represents the combination of historical experience, observation of nature, and functional needs—a form in which nature served not only as a source of visual inspiration but also as a conceptual guide in architectural development (Tabrizi & Yadegari, 2017).

7.3 South Asian Connections: The Indian Influence

In addition to ancient and natural sources of inspiration, the formation and construction of Orchin domes appear to have been influenced by cultural and architectural traditions beyond the Persian Gulf. Examination of the plan and structure of these domes reveals significant similarities with the towers of Indian temples.

In Indian temple architecture, the plan of the main structure is repeated in smaller dimensions in the upper floors—a solution that is not merely structural but carries symbolic meaning. In this system, the gradual ascent of floors and reduction of dimensions represent the human soul's aspiration for union with the divine, while the descent from the upper point expresses the divine desire to connect with the mortal world. Similar symbolic approaches appear in Chinese architecture, where tiered roofs represent stages of spiritual journey, with the final tier symbolizing heaven.

This conceptual and formal similarity strengthens the possibility of mutual influence among Asian architectural traditions. Lieutenant Colonel Louis Pauly, in his reports, mentioned the existence of temples in the port of Genaveh and stated that these buildings, resembling Hindu temples, had Orchin-type domes made of spiral brick or stone. According to his observations, the architecture of these temples in Genaveh, as well as in neighboring ports and cities, preserved clear evidence of Hindu presence in the region until later periods.

The village of Kholos in Hormozgan Province is particularly noteworthy in this context. The inhabitants of this village were originally Indians who migrated to Iran before the advent of Islam. It is possible that the Kholos Shrine was originally built as a temple for their religious rites—a possibility reinforced by the building's clear similarities with Indian temple architecture, though its function changed in later periods. A similar example of this presence and influence can be seen in Bandar Abbas, where Indian merchants built a temple for their religious rituals (Zanganeh, 2002; Zamrashi, 2008; Eghtedari, 1996; Movahed, 2005).

Thus, it can be inferred that the tradition of dome-building in India, particularly in the form of tiered and stepped temple towers, influenced the formation of Orchin domes in southern and southwestern Iran. This influence developed within the context of commercial, migratory, and cultural interactions between the Persian Gulf coasts and the Indian subcontinent, reflected in the architecture of this region.

VIII. DISCUSSION: A MULTI-FACTORIAL MODEL FOR ORCHIN DOME PROLIFERATION

The evidence presented in this study supports a multi-factorial explanation for the proliferation of Orchin domes in specific regions of Iran. Rather than resulting from a single cause, the concentration of these domes in southern and southwestern provinces reflects the convergence of several distinct but interrelated factors.

Climatic Adaptation: The stepped form of Orchin domes provides functional advantages in hot and humid climates. The tiered surfaces reduce solar heat gain by creating self-shadowing, while facilitating rapid drainage of seasonal rainfall—a significant improvement over smooth domes in which water runoff can be slower and moisture penetration more problematic. This climatic efficiency helps explain why Orchin domes predominate in the warm provinces of Khuzestan, Bushehr, and Hormozgan, while other dome types prevail in central and northern Iran.

Symbolic Continuity: The stepped form carries deep symbolic resonance in the cultural history of southwestern Iran, connecting to ancient Mesopotamian and Elamite traditions of ziggurat construction as well as Achaemenid stepped tombs. This symbolic continuity—the association of ascension with sacred architecture—provided a conceptual framework within which the Orchin form could be meaningfully deployed for religious structures, particularly tombs and shrines.

Natural Prototypes: The resemblance of Orchin domes to palm trunks, pine cones, and pineapples suggests that traditional architects drew upon observed natural patterns. This biomimetic approach is consistent with broader patterns in traditional architecture, where forms are often derived from intuitive understanding of natural structures rather than abstract geometric principles alone.

Trans-Regional Exchange: The similarity between Orchin domes and Indian temple architecture, combined with historical evidence of commercial and cultural exchange across the Persian Gulf, points to Indian influence as a significant factor. Maritime trade routes that connected southern Iran with the Indian subcontinent facilitated not only the exchange of goods but also the transmission of architectural ideas and forms. The concentration of Orchin domes in port cities and their hinterlands—Bandar Abbas, Bushehr, Genaveh, Kharg Island—supports this interpretation.

Chronological Patterns: While precise dating of many structures remains challenging, available evidence suggests that Orchin domes appear primarily from the Seljuk period onward, with continued construction through the Safavid and Qajar eras. This temporal distribution aligns with periods of intensified trade and cultural exchange across the Persian Gulf.

The interaction of these factors created conditions under which the Orchin dome form was not merely introduced but was sustained and reproduced over centuries. Climatic suitability ensured its functional viability; symbolic resonance provided cultural meaning; natural prototypes offered intuitive design logic; and trans-regional exchange supplied formal models and perhaps technical knowledge. In this interpretation, the Orchin dome represents a regional architectural type shaped by the particular environmental and cultural conditions of southern Iran, yet connected to broader networks of exchange spanning the Indian Ocean world.

IX. CONCLUSION

According to the findings of this study, Orchin domes, as distinctive architectural features of southern and southwestern Iran, are distributed across the provinces of Lorestan, Ilam, Kohgiluyeh and Boyer-Ahmad, Khuzestan, Bushehr, Fars, and Hormozgan, with the highest prevalence in Khuzestan and Bushehr provinces. Limited examples of this dome type are also observed in Iraq. This relatively limited geographical distribution makes Orchin domes a distinctive and regionally focused element in Iranian architecture.

Analysis of the distribution patterns reveals that the presence of these domes is concentrated in areas that historically experienced sustained cultural, commercial, and migratory interactions across the Persian Gulf. Direct and continuous commercial connections with the lands of East and Southeast Asia, particularly the Indian subcontinent, played an effective role in strengthening and stabilizing this architectural form. The tradition of dome-building in India, especially in the tiered and stepped forms of temple architecture, was transmitted to southern and southwestern Iran through these interactions and is reflected in the formal characteristics of Orchin domes.

In addition to external influences, the coexistence of architecture and nature is evident in the similarity of these domes to elements such as palm trunks, pineapple fruits, and pine cones, indicating direct influence from the natural environment on form generation. These similarities have not merely aesthetic significance but also reflect the development of structures well-adapted to the climatic conditions of southern Iran, including intense sunlight and high humidity. Climatic and structural efficiency can thus be considered a primary factor in the adoption and continued use of this dome type.

Furthermore, historical and cultural influences from ancient times have played an important role in the formation and consolidation of Orchin domes. Architectural elements such as ziggurats, Mesopotamian temple facades, the tomb of Cyrus, and the steps of Persepolis all feature stepped and ascending structures formally and symbolically similar to Orchin domes. This historical background provided a foundation upon which the stepped form could carry meanings related to ascension, sanctity, and the connection between earth and sky.

In summary, the proliferation of Orchin domes in southern and southwestern Iran resulted not from any single factor but from the convergence of multiple fundamental influences: climatic and technical adaptation, inspiration from local nature, continuity of ancient symbolic traditions, and reinforcement through trans-regional connections, particularly with India. This combination of factors enabled the Orchin dome to become established as an efficient, meaningful, and identity-forming architectural type in these regions, sustaining its reproduction over centuries.

Future research should focus on comparative architectural analysis with Indian temple forms to more precisely identify specific points of correspondence and divergence. Detailed chronological seriation using material analysis techniques could refine understanding of temporal patterns in Orchin dome development. Investigation of the roles played by specific Sufi

orders, merchant communities, or craft guilds in transmitting architectural knowledge across the Persian Gulf would further illuminate the social mechanisms underlying this distinctive architectural tradition.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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