

Understanding Adaptation of Structural Configurations: Case-study of Early Temple and Mosque Architecture of Gujarat

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Abstract

In Gujarat, places like Patan, Siddhpur, Dilmaal, Taranga, Ahmedabad and Dholka has temples and mosques built in 10th -14th century (before Ahmedabad became the capital of Gujarat). In spite of having such diverse religions in terms of culture and philosophy, their architectural expressions have a lot of similarities. This research intends to throw light on these similarities through the documentation of how mosques of early sultanate architecture of Gujarat have borrowed configurations of post and beam construction system from classical Hindu temple mandapa and have made it integral to the notion of an Islamic space of the mosque. The research further focuses on the understanding of assembly of post and beam construction system in Maru-Gurjara temples and Sultanate mosques of Gujarat built within the time period of 942 CE and 1411 CE which generate the space of the mandapa & hypostyle hall of mosques; the structural configurations of the mosques; depiction of fusion of the Sultanate architecture of Gujarat and the Maru-Gurjara construction system; and the different and distinct spatial configurations of monuments constructed by the same construction systems.

Key Words: Maru-Gurjara temples, Sultanate mosques of Gujarat, hypostyle hall, structural configurations, fusion, Garbha-griha, Mandapa, Qibla, Zanana, Hauz

1. Introduction

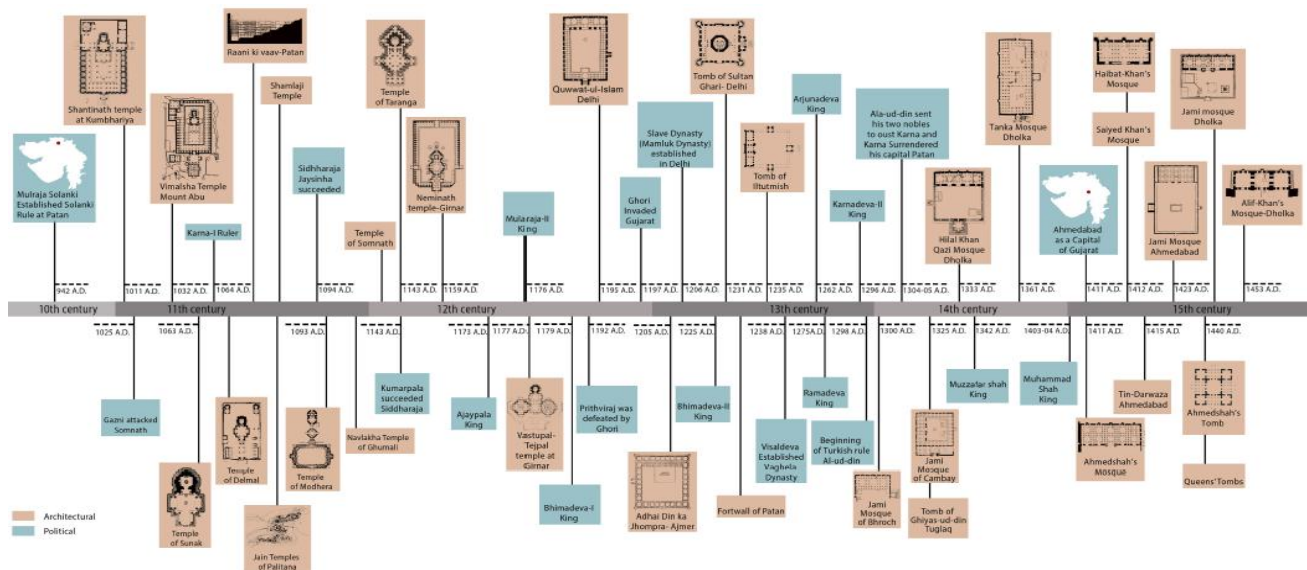


Figure 1 Timeline of political and architectural events

The timeline starts with the establishment of Solanki dynasty in Gujarat when the development of culture, technology and hence architecture. The Hindu kings established their landmarks in the region of Gujarat such as the temple of Kumbhariya, temples of Girnar, the step-well at Patan, Vimalasha temple at Abu, the small temples of Sunak, Sander, Delmal near Patan and Sun-temple at Modhera. Later in 13th century, the establishment of Slave (Mamluk) dynasty led to the construction of mosques in Delhi and Ajmer which led the Muslim community to migrate further South and settle in Bharoch, Cambay and Dholka regions of Gujarat. This led to the construction of mosques which incorporated a few elements of temples in these regions¹.

2. Hinduism and Temple Architecture

A typical Hindu temple consists of a Garbha-griha (sanctum, shrine or womb chamber) where deity is placed, another is the mandapa from where deity is worshipped and the shikhara, which is a crowning element of the temple. Garbha-griha is generally octagonal circular, square or rectangular form crowned by Shikhara and surrounded by Pradakshina-path (circumambulation path). Hindu temple architecture has evolved from a rock-cut linga to well-articulated and ornamented temples. Since the 8th century, mandapas have an increasingly mandala-like character, reflecting that of the shrine itself. Open mandapas of a scale which is greater than shrine and a porch were quite dominant. Indian temples follow two major typologies, Temples found in the Northern India are Nagara style and those found in the South follow Dravida style of architecture. Each style was developed regionally and had its own identity. Both styles were different in terms of organization, architectural features, decorations of columns, shape of elements and construction systems.

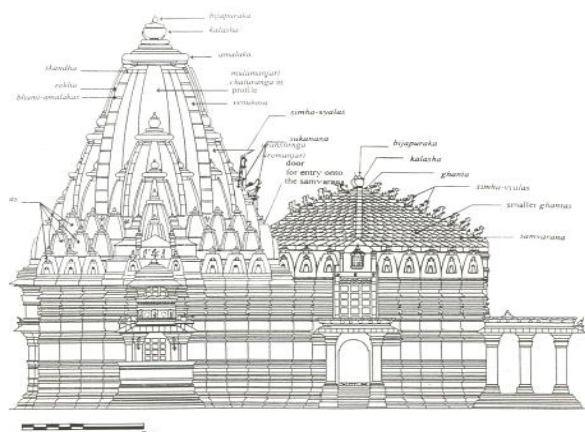


Figure 2 Elements of Nagara shikhara and mandapa, Jain temple of Taranga, Gujarat

The initial Nagara temples had Garbha-griha and a pillared-porch without shikhara, which later came in picture as a crown-like element of the temple.

Temples of Rajasthan and Gujarat made after 7th century are Maru-Gurjara temple architecture which is a faction of the Nagara style of architecture. The Jain temples were mostly made out of white marble while the Hindu temples were sandstone. A very interesting feature in Maru-Gurjara style temples was an octagonal shaped beams supporting the mandapa dome. The beams were supported by carved brackets. The use of decorative Jalis (lattices) in windows is prominent too.

3. Islam and Mosque architecture

Islamic architecture focuses on concepts of “centre” and “symmetry”. Mosques are worship places while the tomb is a repository for the remains of dead persons. Besides worship place, mosques have been a central place for public gatherings and religious education also to settle community problems.

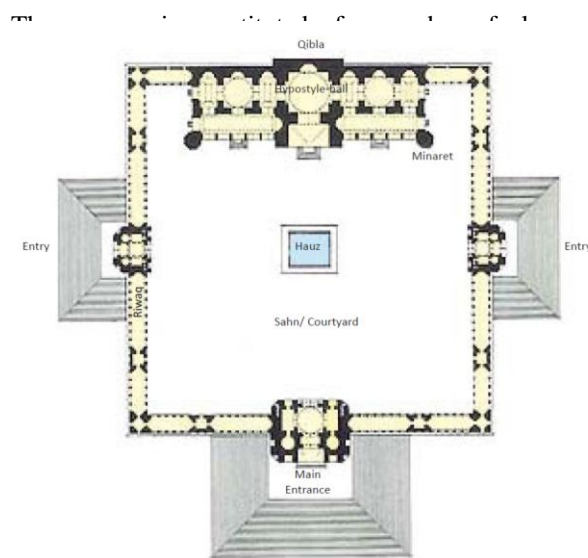


Figure 3 Plan showing elements of mosque

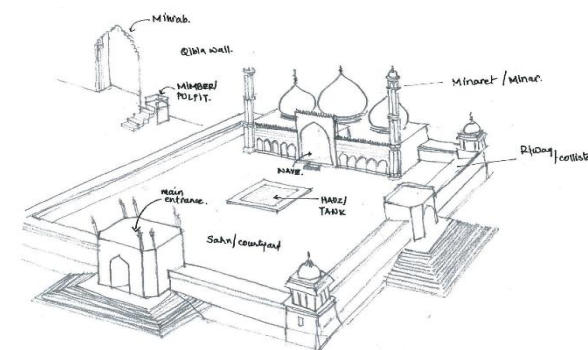


Figure 4 Elements of mosque

There is no one style to unify the Islamic architecture. However, the building typology and functions remained same as Islamic beliefs but the construction methods and some details had a touch of local architecture of the region. The earliest appearance of Islamic architecture in India, and referred to as the "Imperial style". With the establishment of capital at Delhi, Muhammadan architecture started to take shape in India. The ruler's first attempt was to build Qutb Mosque in 1195 A.D. which is also known as Quwwat-ul-Islam. They erected the mosque on the spacious substructure of a Hindu

intensive high arched masonry wall becomes an identical element of mosque here.

4. Analysis

The analysis includes four case-studies of temples and mosques each according to timeline. The study starts with the analysis of temples mainly including structural configurations of mandapa in terms of structural-grid of mandapa, assembly of structural elements, organisation of the temple plan.

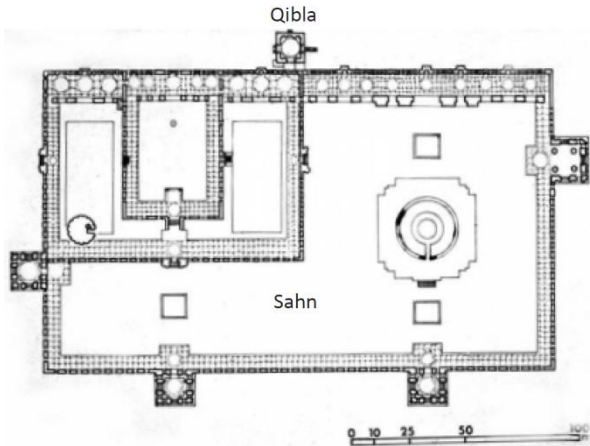


Figure 5 Plan: Quwwat-ul-Islam Mosque, Delhi temple¹. But it had aesthetics like those of the early mosques of Iran.

4.1 Temple of Shantinath at Kumbhariya

The Jain temple of Shantinath lies in Northern part of Gujarat near Ambaji. The plan of the temple has one main entrance and two secondary entrances. Garbhagriha stands in center it has small mandapa attached to it then comes main large prayer-hall which is covered by dome.

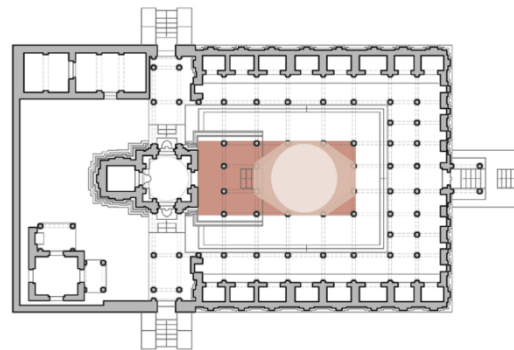


Figure 7 Mandapa of Kumbhariya Temple

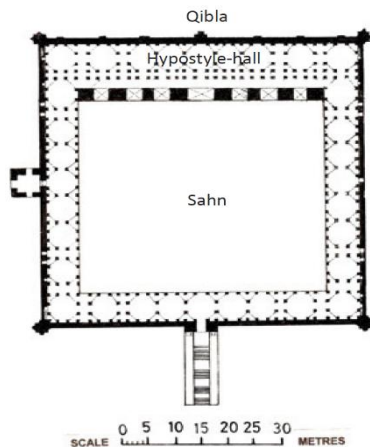


Figure 6 Plan: Arhai Din ka Jhopra, Aimer

After Delhi, Qutub-ud-din made another mosque in Rajasthan which is Arhai-din-ka Jhopra. The plan has carried out same systems as Qutb Mosque. The

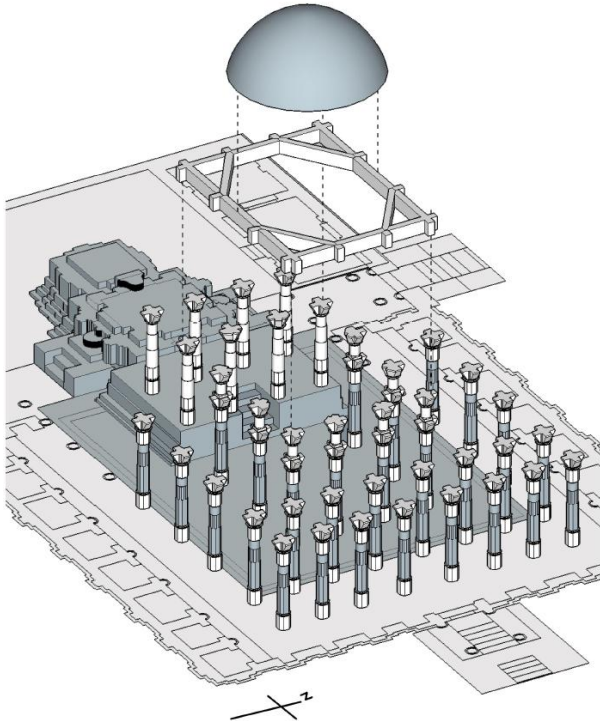


Figure 8 Schematic Diagram showing arrangements of elements in mandapa, Kumbhariya temple.

Figure 8 shows the arrangements of elements of construction in mandapa of temple. The dome is supported by octagonal beam system kept on brackets having five facets. The beams are supported by twelve columns of white marble made of five solid stone pieces. The multiple sub-shrines around the temple also have nagara-style shikhara on each and every sub-shrine. The column is a combination of stone pieces placed on each-other. The height of column has been increased by putting one more piece of stone on bracket.

4.2 Temple of Limboji Mata, Delmal

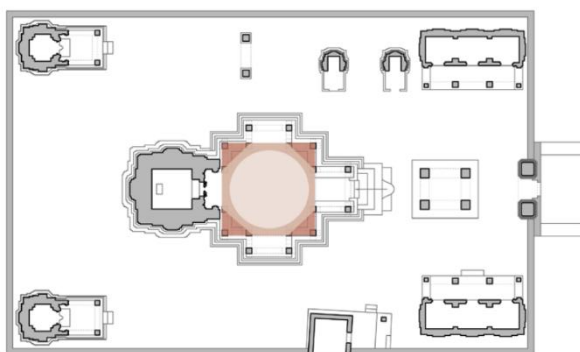


Figure 9 Mandapa of Delmal Temple

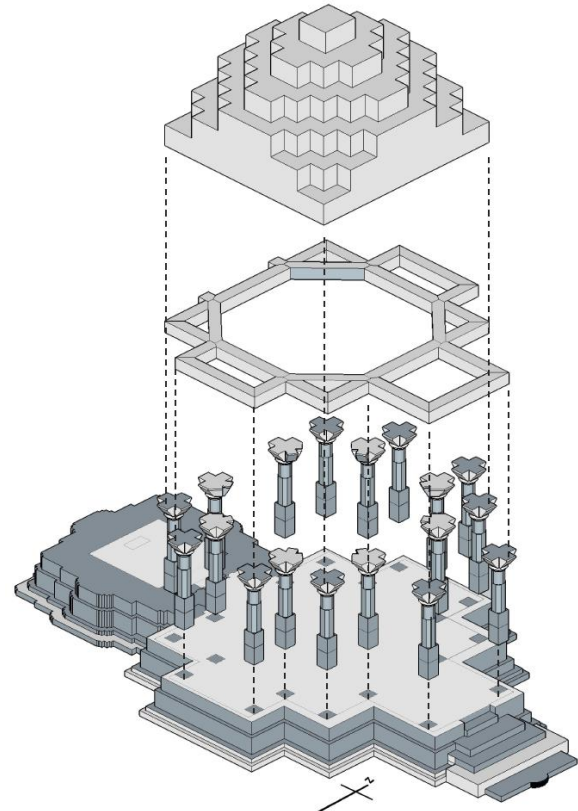


Figure 10 Schematic diagram showing arrangements in mandapa of temple, Delmal

The temple complex of Delmal was built by the Solanki dynasty in 11th century. This temple complex has a main temple in center and the sub-shrines around the main temple. There exists a havan-kund in front of the main temple which is expected to be made after 11th century. The main temple has garbha-griha and mandapa attached to it and entrance which works as a transition space between mandapa and outside. The temple complex has a self-standing torana at entrance which was introduced later on in Maru-Gurjara style.

Figure 10 shows basic arrangements of prefabricated stone pieces in mandapa. The dome is supported by octagonal beam and the beam is supported by main eight columns with five faceted brackets. The brackets supporting dome are different from other brackets. The main temple in center is quite similar to temple of Sunak. Systems of construction, decorations of brackets, chajjas, ceilings, porch, shikhara, mandapa were more or less similar. Whole temple is decorated with idols of Gods, dancers and musicians. Brackets at havan-kund have carvings of human figures. A small shrine on one side of the temple has decorative jalisi as an element. Details carved in jalisi were geometric patterns and, in some cases, natural forms like flowers and leaves.

4.3 Temple of Nilkanth Mahadev, Sunak

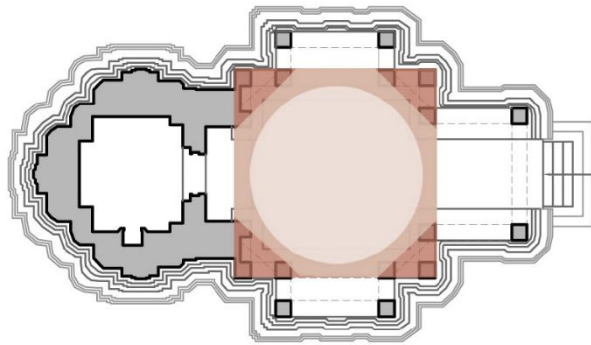


Figure 11 Mandapa of Sunak Temple

The temple of Sunak contains Linga of the God Shiva. The temple was made during the reign of Karnadeva-I. The roof of the hall is supported by sixteen columns in which, the twelve columns support dome and the other four are projecting outside. The porch has two columns creating a welcoming space to enter. The Nagara style shikhara, semi-open mandapa, the richly carved ceiling with human engraved brackets and chajjas projecting outside are the proof of that time period's glory and highly impressive skills of craftsmen.

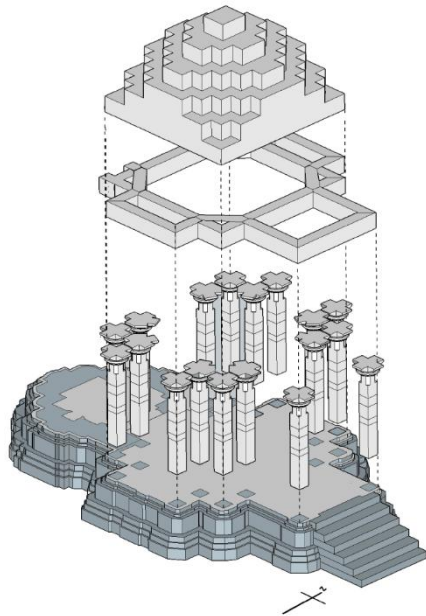


Figure 12 Schematic diagram showing arrangement of stone pieces in mandapa of Sunak temple

Schematic diagram shows arrangement of stone members which are quite similar to main shrine of Delmal temple. As the diagram shows, the dome is providing a larger space to worship as the mandapa is a place where God and devotee are connected. Dome is supported by octagonal shaped beams. Beams are

supported by columns which are made of solid sandstone pieces.

Stone members of dome are staggered and supported by human shaped carved brackets which behaves as a decorative element. Decorations of ceiling are abstraction of natural element like flower and repetitively used in a circular form.

4.4 Sun-temple of Modhera

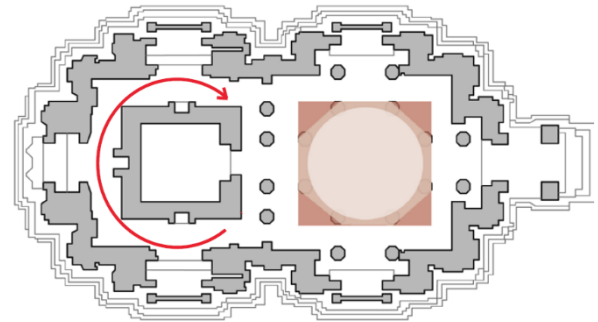


Figure 13 Mandapa of temple of Modhera

Sun temple of Modhera is a refined and evolved version of Maru-Gurjara style temples. The temple complex built in 1026 A.D. by Bhimadeva-I of Solanki dynasty. The temple is a dedication to Sun God. The plan of temple is in three parts: the main temple with mandapa and garbha-griha, the nritya-mandapa and the tank.

All three elements are located on one axis. The main temple and nritya-mandapa stand on high platform-like plinth while the tank is on ground. There exists a self-standing torana between the tank and nritya-mandapa. Nritya-mandapa is a pavillion-like structure which is a transition space between main temple and tank.

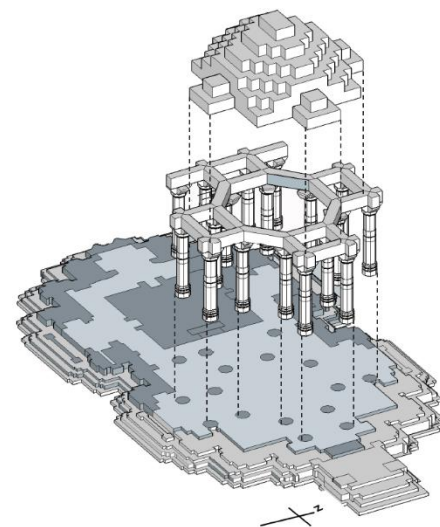


Figure 14 Schematic diagram showing arrangements of stone pieces in mandapa of Sun-temple of Modhera

As the mandapa is closed, some details of beam arrangement change in this case. The decorations of column are also quite different than previous cases. The shikhara of the temple was demolished when Mohammad Gazni attacked Gujarat, but the arrangement of stone pieces remains same as temple of Delmal and Sunak.

Nritya-mandapa behaves like a pavilion beside the tank. It has very well-articulated details of torana with chajja and four faceted brackets. The detail of supporting torana by brackets coming out of column is implemented here which is similar to temple of Kumbhariya. The concept keeping small-shrines around the temple has been shifted to tank here.

4.5 Hilal Khan Qazi Mosque, Dholka

When mosques started building in Gujarat in 14th century, the craftsmen of Gujarat already knew construction of post and beam systems. Muslims had their own perception about typology of mosque and rituals to be performed in it. But, due to lack of resources like labour and material, the agenda of making a mosque which existed in Persia before 13th century was not fully achieved. The mandapa of temple was used in a repetitive way along the length to achieve long prayer-hall which looked like hypostyle-hall in plan because the direction was important. Also, spatial qualities were not similar even though the module of mandapa remained same. These four mosques before Jami of Ahmedabad are example of this fact.

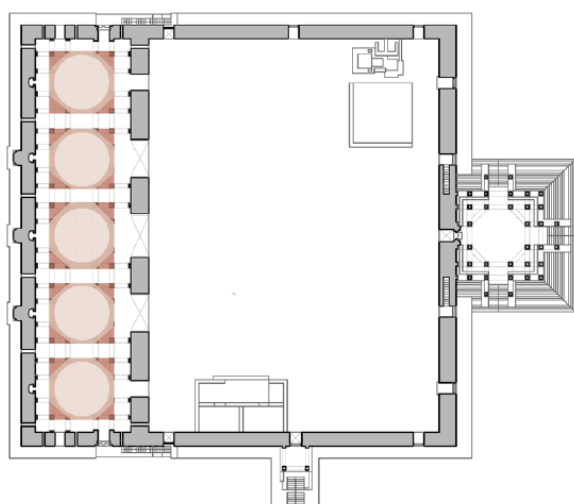


Figure 15 Prayer-hall of Hilal-Khan Qazi Mosque

Hilal-Khan Qazi Mosque was built in 1333 AD, when Gujarat was experiencing reactions from central power at Delhi. The plan of mosque is squarish with very well-articulated entrance porch. The front facade has three

large arched openings which is in a way very Islamic style. Hypostyle-hall has one small part kept for ladies which is called 'Zanana'. There is a Jali wall between hypostyle-hall and Zanana.

The outer walls are made of masonry systems which is typical of Islam while the internal structure is post and beam.

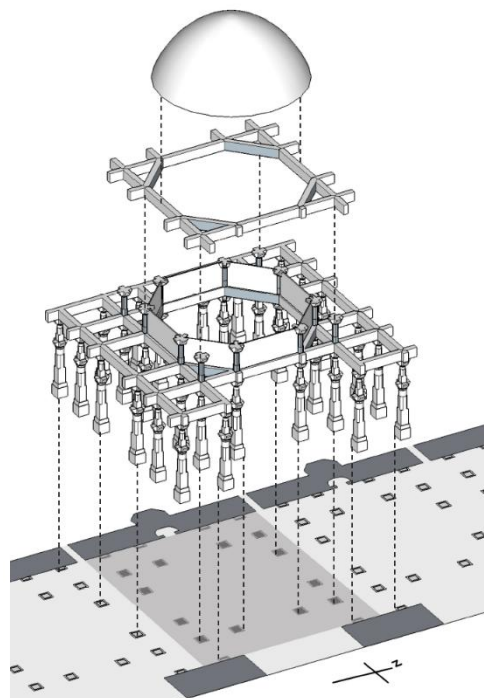


Figure 16 Schematic diagram showing arrangements of stone members in hypostyle-hall of Dholka mosque

Schematic diagram shows how the post and beam construction has been carried out in hypostyle hall as one repetitive module. The module remains same as used in Hindu temples. The joineries of beams, decorations of brackets, articulation of details, carvings of ceilings, size of beam is similar to previous cases.

All five modules are attached through beam to each other. Central module is higher than other four modules to give importance to central aisle and to bring more light in and hence the spatial experience becomes totally different than the temple. Initially the intention of minaret was to climb up on a tower and call for prayer timings. But here, the minaret is used as a symbolic element of Islam.

Central aisle has mihrab as carved niche in stone beside that on right there is a mimbar element which is for saints to sit and deliver prayer during group prayers.

4.6 Ahmedshah Mosque, Ahmedabad

After Ahmedabad became capital of Gujarat, Ahmedshah's mosque was built in Bhadra citadel before Jami Mosque of Ahmedabad was made. The former is in same tradition as Jami of Cambay. The mosque was used to be private mosque for those who belonged to royal house-hold. The plan of mosque has a long hypostyle-hall with large number of columns. Outer walls of hall are made of masonry construction systems while the internal structure is post and beam construction.

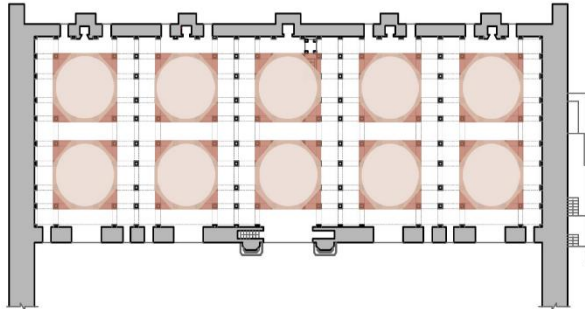


Figure 17 Prayer-hall of Ahmedshah mosque

Schematic diagram shows the volume of hypostyle-hall has been increased by putting one column on another and creating double volumetric space. The brackets used to support beams are similar as Hindu temples. All the brackets are four faceted except brackets taking load of dome through octagonal beam. As a concept of Persian architecture, central door-way is higher and wider than other four. While the height of all aisles from inside is same.

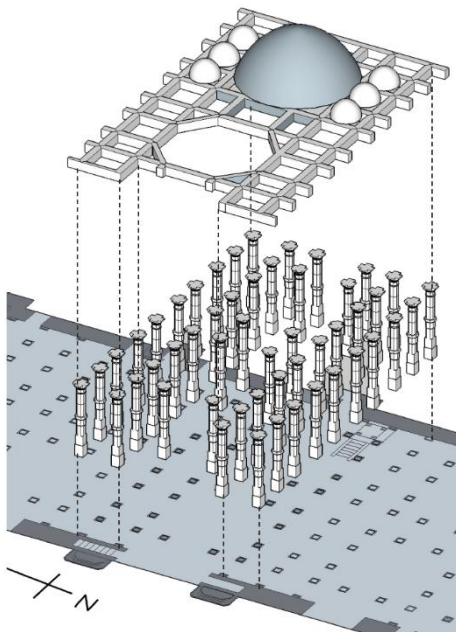


Figure 18 Schematic diagram showing arrangements of stone members in prayer-hall

This is a smaller version of arrangements of dome support systems. The circular form becomes rectangular eventually by increasing faces and decreasing number of stone pieces supporting them.

4.7 Haibat-Khan Mosque, Ahmedabad

Mosque of Haibat-Khan is a small mosque also built before Jami Mosque of Ahmedabad in 1412 A.D. The mosque is an example of early sultanate style of Gujarat.

The plan of mosque is very simple with three domes attached to one-another in a row as a roofing element of prayer-hall. The central dome is higher than other two which creates more volume in central aisle. The walls of mosque are sand-stone masonry, while the interior structure is post and beam construction.

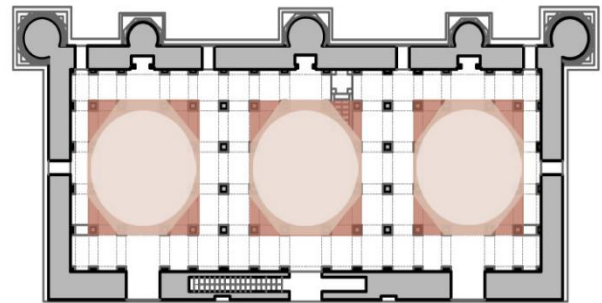


Figure 19 Prayer-hall of Haibat-Khan Mosque

The front wall has staircase inside to reach up to terrace to call for prayer. The schematic diagram shows pieces of stone making one single column and the center

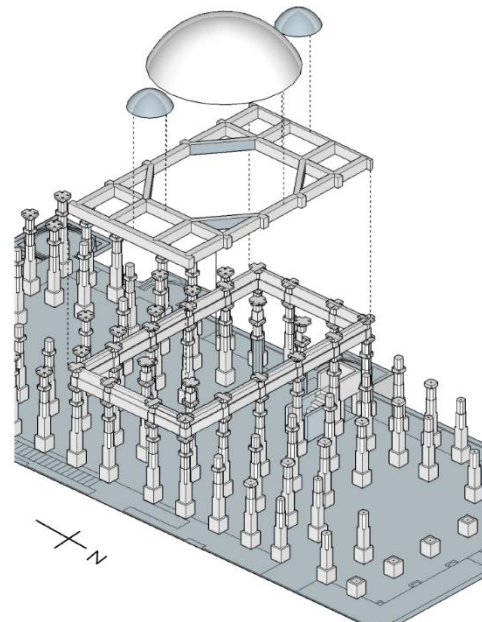


Figure 20 Schematic diagram showing arrangements of stone members in Haibat-Khan Mosque, Ahmedabad

module here is slightly raised than other two modules.

The front porch at entrance has 12 columns supporting and dome as a roof. The details of porch like carvings of brackets, patterns of ceiling, articulation of chajja are quite similar to temples of Sunak and Delmal.

The pillars of hypostyle-hall are very different of each-other having emblem and ornamentation of Hindu style temples.

4.8 Qutb-E-Alam Mosque, Vatva

Qutb-E-Alam Mosque at Vatva is in a Qutb-E-Alam Roza complex. It is also known as Vatva Dargah. Initially only mosque was there then other structures of the complex were built. The mosque is flat without entrance facade or minarets. But in another part of complex, there exists an arched pavilion, a tomb and also a dome raised very high where arches take the place of beam. The mosque has a direct access from the courtyard. The qibla wall also can be seen from outside. The prayer-hall is covered by small and large two kinds of domes.

The systems of mosque are simpler than previous cases

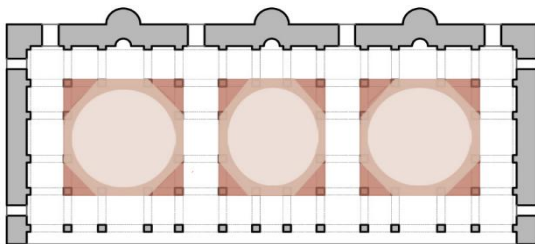


Figure 21 Prayer-hall of Qutb-E-Alam Mosque, Vatva

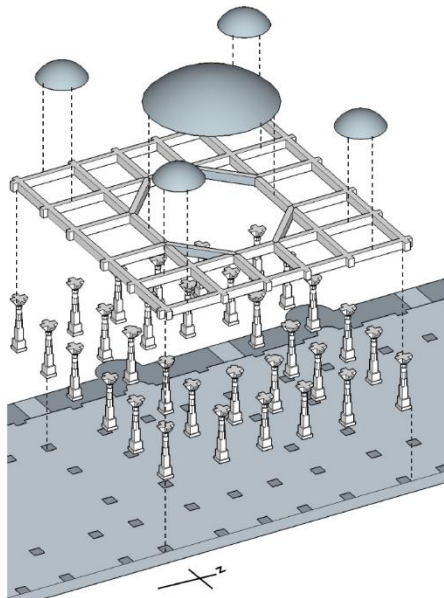


Figure 22 Schematic diagram showing arrangements of elements in prayer-hall of Qutb-E-Alam Mosque, Vatva

of mosques. It has three repetitive modules of twelve pillars each covered by a dome. The three modules are connected through beams and that part has smaller domes on top. The systems are octagonal shaped beams supporting dome and the beams and are supported by columns through five faceted brackets. The central aisle has a mihrab niche which is seen from outside also. Previous mosques had a masonry wall as an element of Islamic architecture while this mosque does not have it. So, in a way, the mosque is an example of Indo-Islamic architecture which is a fusion of Hindu and Islamic architecture.

5. Conclusion

5.1 Mandapas of Maru-Gurjara style temples

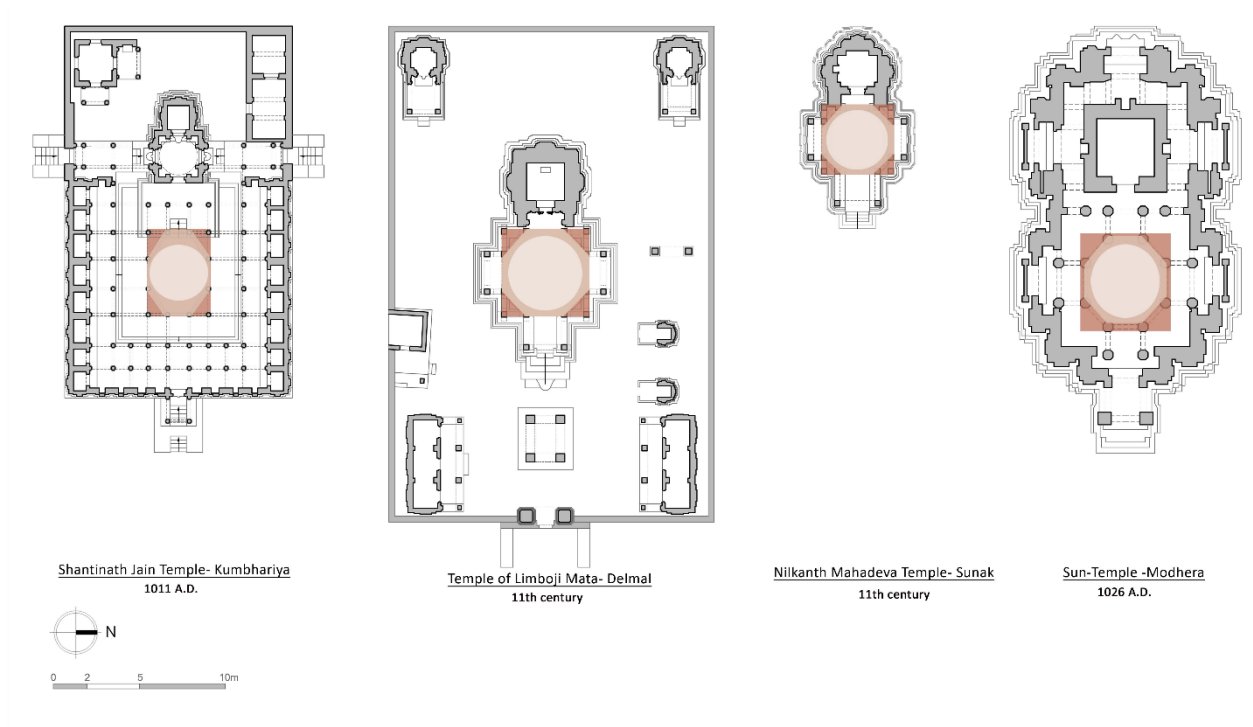


Figure 23 Comparison of placement and repetition of a module of all case-studies

Mandapa, the prayer-hall of a temple is a module with different structure grid. The whole structure supporting the dome is similar according to arrangement of stone pieces. The module is with rectangular base with twelve columns which becomes octagon when we reach up to beam and circular by increasing faces of octagon. This system is being repeated in all four cases with different heights, proportions in plan and as a space however it stands in the center of temple.

5.1 Hypostyle Hall of mosques

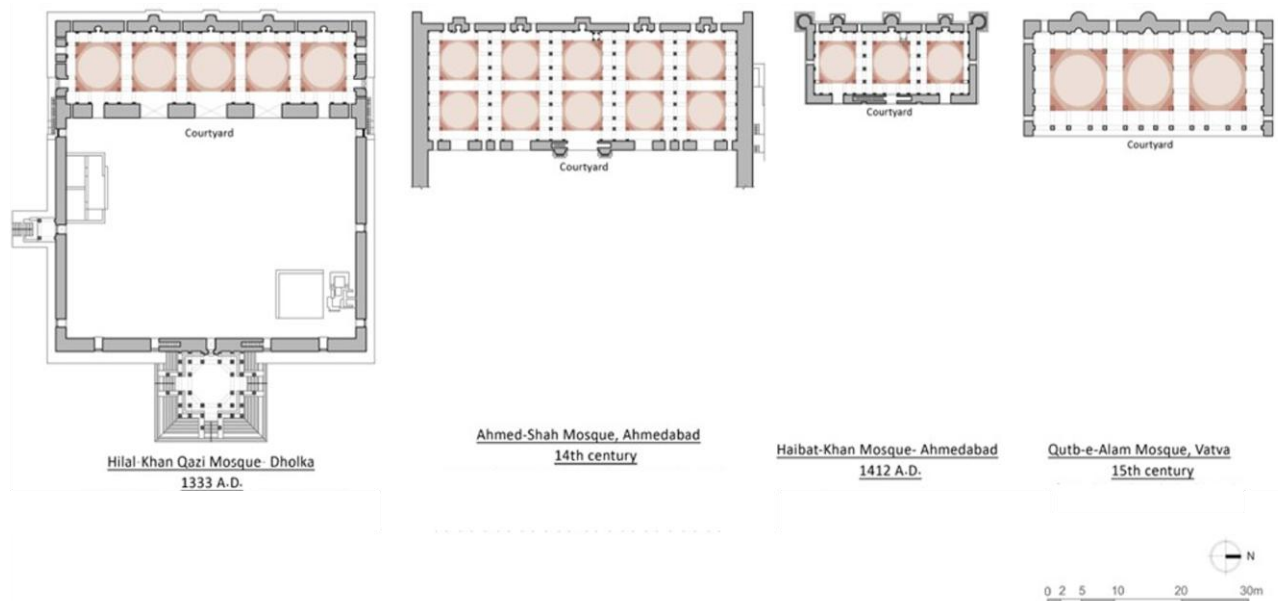


Figure 24 Comparison of placement and repetition of a module of all case-studies

Modules which have been used in temples to support domes in mandapas, are used in repetitive way in hypostyle-hall of mosques. These four cases have that module in different numbers and proportions. Hilal-khan Qazi Mosque of Dholka has the module five times in a row attached to one-another. The whole row of five modules behaves as one hypostyle-hall. In Ahmedshah mosque, there are two rows of five-five modules so as a whole, the module is used for ten times and hence, the two rows of five-five modules behave as one space. In Haibat-khan mosque, the module is used for three times in a row and making one large hypostyle-hall. In the same way Qutb-e-Alam also has three modules in a row making a large hypostyle-hall. These modules have been modified according to each case for purpose like light or in some cases to give importance to central aisle. In all cases, odd number of modules are used in a row, so that there exists a central bay which becomes strong and also helps creating symmetrical facade towards the court.

Repetition of spatial mandapa inspired module is aimed at achieving covered rectangular hypostyle-hall for offering prayers. The longer sides of the rectangular hall towards the west forms the qibla wall and towards the east create an interface with the open courtyard.

Prayer-hall for both typologies, temples and mosques, behaves as a place where one finds connection with God. But spatial elements for both are very different.

Two religions had their own beliefs and concepts which decided the form of a worship place for them. These concepts could rarely meet at one plane but architecture of both these religions had its own limitations in terms of resources and techniques. So, in a way the similarities between these two typologies are reflection

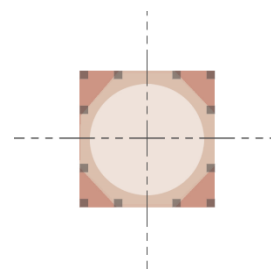


Figure 25 Schematic diagram showing axis of mandapa module of a temple

of this fact.

Mandapa in temple is a module with twelve columns, octagonal beams above the columns and dome on the top. The axis of this module remains open from all four sides. So, it is a rectangular space which is accessible from all four sides. Mandapas are not meant for large gatherings but the space is an open columnar hall which is a direct access to garbha-griha.

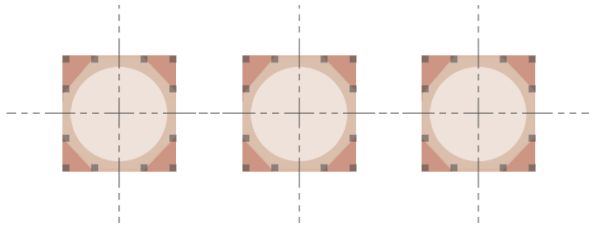


Figure 26 Schematic diagram showing axis of hypostyle-hall of a mosque

In hypostyle-hall, the module is repeated along a linear axis so, one axis is merged for all repeated modules while the other axis is open from both the sides which is the qibla wall and the courtyard. The mosque has an enclosed columnar hall which is accessible from only one side. The hypostyle-hall is meant for public gatherings as the religion believes in collective prayer.

The column grid generated to support the dome, projects itself outwards in a plan to generate rhythm of columns, spans and modules in plan and elevation.

The two typologies studied in the document are example of how two different spaces are generated by using one module/system.

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