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EXPLORING TIMURID ARCHITECTURE AS ARCHITECTURAL AND GENEALOGICAL REFERENCE FOR MUGHAL ARCHITECTURE

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ABSTRACT

The Mughals, as genuine Timurids, embraced their Timurid heritage and led a cultural renaissance. They honored their Timurid lineage through artistic expressions like painted genealogies, dynastic portraits, and calligraphic inscriptions on art and precious stones. This research paper investigates the architectural and genealogical connections between Timurid and Mughal architecture. The primary objective is to examine Mughal genealogical references in art and architecture. Further, it explores the Timurid architectural practices that served as a foundation for Mughal architecture. The methodology employed includes a historical-interpretative approach to analyze secondary data and virtual case studies of Timurid and Mughal buildings. This method allows for a qualitative comparison of architectural styles, focusing on spatial configurations, design principles, and aesthetic elements. Case studies of Timurid structures, such as Gur-i-Amir and the Tomb of Ulugh Beg, were analyzed in relation to Mughal buildings, particularly Humayun's Tomb, to trace the transmission of architectural elements. The findings decipher the influence of Timurid architecture on Mughal structures, characterized by the use of geometric patterns, symmetrical compositions, and monumental designs. Key Timurid concepts like the hasht-bihisht plan and the use of double domes were incorporated into Mughal buildings, demonstrating the Mughals' celebration of their Timurid heritage.

Keywords: Timurid Architecture, Mughal Architecture, Mughal Genealogy, Timurid Renaissance

1. INTRODUCTION

1.1. THE TIMURIDS AND THE MUGHALS: INTRODUCTION

According to (Dale, 1998), there were three main groups of Timurid heirs: the Mughal emperors of India, who were genuine Timurids and fervently embraced Timurid legitimacy while overseeing a Timurid renaissance; and the Uzbek and Ottoman States. He further explained that Twenty years later after departure from Herat, Babur launched a deliberate Timurid renaissance in South Asia, where Timurid culture was not only replicated but also transformed within a new cultural context that was markedly different from its original steppe environment. Conferring to (Golombek & Koch, 2017), The Mughals came to India as Timurids. In 1507, Babur, a proud descendant of Timur and Chinggis Khan, sought new opportunities in India after being driven from Samarqand by the Uzbeks and exiled to Kabul. Golombek and Koch (2017) mentions Babur (1996), Balabanlılar (2012), Zayn Khan (1982) that in 1526, he defeated the last Lodi sultan, literally holding the Zafarnama (Book of Victory, Timur's official history) in his hands. Mughals always considered them as genealogical descendants of Timur (Figure 2) and related with Timurid legacy as mentioned by Inayat Khan

(1990) that Shah Jahan, a fifth-generation descendant of Babur, would still have the Zafarnama read aloud to him at night. The Mughals celebrated this lineage through painted genealogies, dynastic group portraits, and calligraphic inscriptions on art objects and precious stones. (Golombek & Koch, 2017). In her book Mughal Architecture: An Outline of Its History and Development, 1526-1858, Koch notes that the Mughals were direct heirs to the Timurids, the foundational elements of their architecture, particularly during the early period, were Timurid. This influence is evident in the perfect symmetry of the plans, which is consistently reflected in the elevations, as well as in the intricate patterns of the vaults. (Koch, 1991).

2. INTENT AND METHODOLOGY OF THE RESEARCH PAPER

The objective of this chapter is to enquire into the Mughal genealogical references to Art & Architecture. Further, this research explores the Timurid architectural practices which acted as the references for Mughal Art and Architecture.

Methodology adopted in this research are Historical interpretative for secondary data study. For primary data study, case studies were identified for Mughal and Timurid (online) buildings. Historical interpretative research in architecture involves the systematic study/analysis of architectural structures, styles, and movements of the Timurid architecture which aims to uncover, interpret, document the historical context and identifying the significance of built forms. Since the data studied from the case studies is qualitative in nature, therefore findings from the case studies follows the analytical or theoretical generalization rather than statistical generalization. Findings from the Timurid case studies will get analyzed in context of Mughal buildings.

3. THE TIMURIDS, THE MUGHALS AND OTHER EMPIRES: A TIMELINE

The attached timeline, figure 1, presents a comparative overview of various significant empires and dynasties (contemporary to Mughals), highlighting their periods of dominance and their temporal relationships.

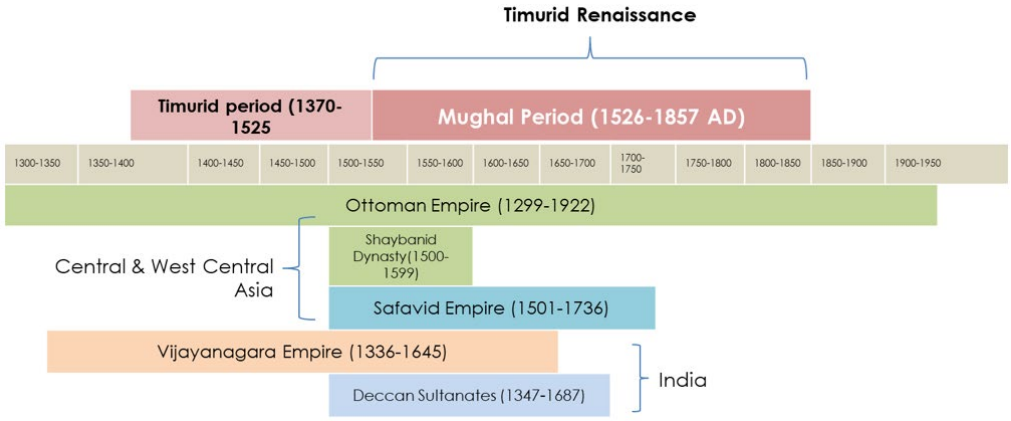

Figure 1 Empire Contemporary to Mughal Period: A Timeline

Source: Author

The Mughal Empire's interactions with these other empires were marked by a blend of conflict, cooperation, and cultural exchange, shaping South Asian history. The timeline effectively highlights the interconnected nature of these empires, showing how the Mughals synthesized elements from diverse influences into a unique identity while contributing to and being influenced by a broader cultural and political environment.

4. TIMUR-MUGHAL GENEALOGICAL FAMILY CHART

The following genealogical chart (figure 2), outlines the lineage from Timur, the founder of the Timurid Empire, to Babur, the founder of the Mughal Empire. Starting with Timur (1336-1405), who ruled from 1370 to 1405, the chart traces the succession of his descendants. His son, Shah Rukh (1377-1447), ruled the Timurid Empire from 1407 to 1447.

The chart detail out various Timurid rulers, including Miran Shah, Umar Shaikh, and Muhammad Sultan, among others, who governed different regions like Samarkand, Herat, and Kabul over the centuries.

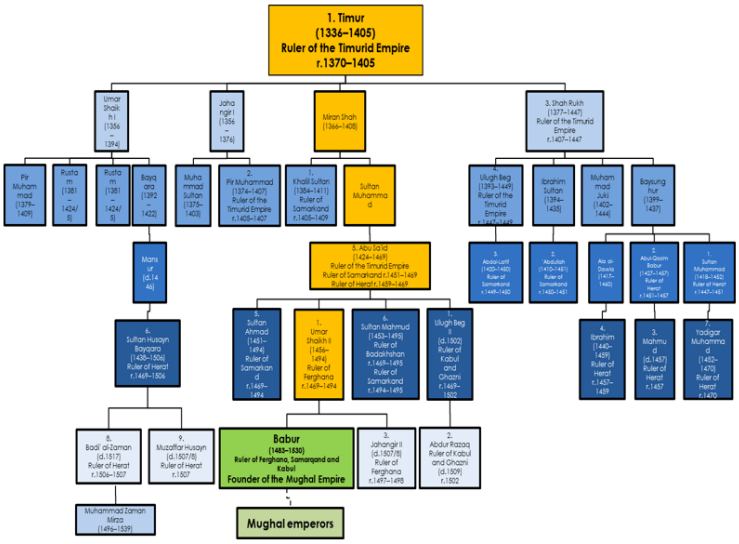

Figure 2: Timur-Mughal Genealogical Family Chart

This genealogical depiction highlights the continuity from the Timurid to the Mughal dynasty, illustrating the ancestral connections and the transfer of power across generations that shaped the historical and cultural landscapes of Central Asia and the Indian subcontinent.

5. GENEALOGICAL SEAL OF MUGHALS: AN EVIDENCE TO TIMUR-MUGHAL RELATIONSHIP

The genealogical seal of the Mughals (figure 3 and figure 4), is a significant emblem that encapsulates the lineage and legitimacy of the Mughal dynasty. This intricate seal meticulously traces the Mughal emperors' ancestry back to Timur, also known as Tamerlane, the illustrious founder of the Timurid Empire. The genealogical seal of the Mughal emperors of India was a powerful symbol of Mughal imperial authority. Its distinctive design featured a central circle with the name of the ruling emperor, surrounded by a series of smaller circles, like orbiting satellites, each containing the names of his ancestors up to Timur (Gallop, 1999).

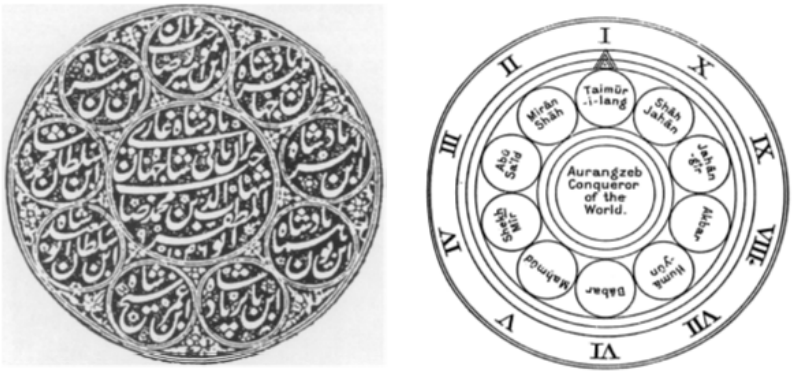

Figure 4: Seal of Shah Jahan, by Annabel T. Gallop (1999), Seal of Awrangzib, by Manucci (1907:2.389)

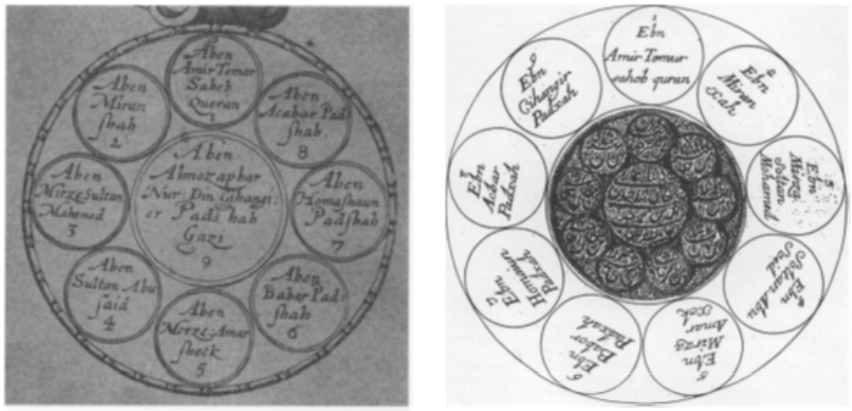

Figure 4: Seal of Jahangir, on a map by William Baffin, 1619 British Library, Seal of Shah Jahan, by Tavernier (1678:107)

The inscription is intended to be read starting with the name of the current ruling emperor in the center. From there, it moves to the outer circle, beginning with the name of his immediate predecessor at the 1 o'clock position. Continuing clockwise, the sequence concludes with Timur, who is always prominently placed at the top of the seal. In Gallop (1999) examination, the genealogical seal is also seen as a tool of political persuasive, designed to assert the Mughal emperors' sovereignty and their connection to an admired lineage. It played a crucial role in the court's ceremonial and administrative functions, emphasizing the divine right and the historical continuity of the Mughal rule. Therefore, the genealogical seal of the Mughals is more than just a family tree; it is a powerful symbol of dynastic legitimacy, historical continuity, and political authority, intricately tied to the renowned Timurid ancestry.

6. TIMURID EMPIRE (1370 AD-1525 AD)

In an essay on 'The Legacy of the Timurids', Stephen F. Dale said that the term "Timurid" generally refers to all descendants of Timur who ruled or vied for power in western Turkistan, Iran, and Afghanistan during the century spanning from Timur's death in 1405 to the death of Sultan Husayn Bayqara of Herat in 1506. (khazaee, 2015), drawn a timeline (figure 5) of Persian Islamic Architecture to locate the Timurid:

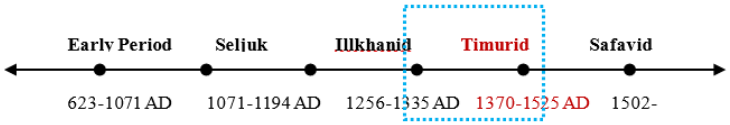

Figure 5: Timeline of Persian Historical Period, Source: Khazaee, M. (2015)

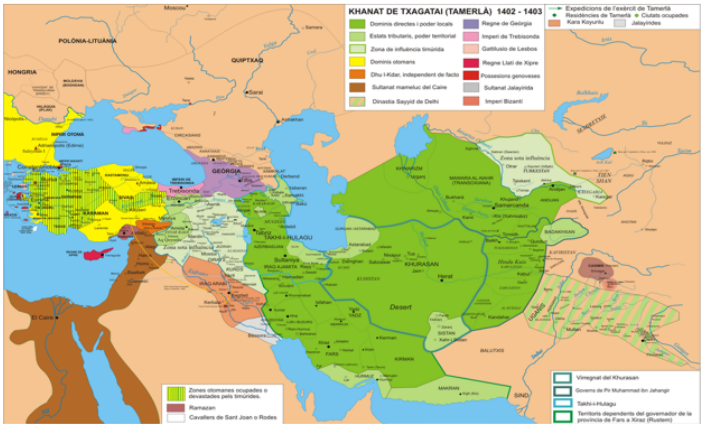

Figure 6: Detailed map of the Timurid Empire with its tributary states and sphere of influence in Western-Central Asia (1402-1403),

Source: https://en.wikipedia.org/wiki/Timurid_Empire

7. TIMURID ARCHITECTURE: CLASSES, CONCEPTS, COMPONENTS, PRINCIPLES AND CONFIGURATIONS

Timur's reign marked a golden age of cultural and artistic patronage, with architecture playing a central role in showcasing the empire's power and prestige. The Timurids built on architectural traditions from the Seljuks, Mongols, and Abbasids, while introducing new innovations and stylistic elements. Here, (Tabibian, 2012), mentions Bayani (1967) that Timurid architecture, emerged when Timur ascended to the throne, and introduced a new style compared to earlier ones. She further discussed, during that period, architectural decorations took on unique forms and new methods of decoration were developed.

7.1. CLASSES

Komaroff & (Golombek & Wilber, 1988) mentioned that the architecture of the Timurid period can be categorized into three functional types: residential, commercial (and industrial), and charitable. The residential category encompasses both grand palaces and small urban dwellings. The commercial category includes all trade-related structures, such as caravansaries, khans, timchehs, bazaars, shops, chahar su (domed street crossings), baths, mills, bakeries, ironworks, sugar factories, weaving and dyeing establishments, potteries, and other industrial facilities. The charitable category comprises major monuments like mosques, madrasahs, khanaqahs, various types of mausoleums, libraries, hospices, hospitals, and various water-supply systems.

7.2. CONCEPT DESIGN

On concept design of Timurid Architecture, Komarof & (Golombek, and Wilber, 1988) identified different components of Timurid buildings divided in two categories namely: 1. Space Making Components and 2. Specialized Components. Every Timurid building, whether a palace, mosque, or bath, comprises one or more fundamental components. Specialized components have been used for specific kind of functions. Space making components are court, ivan, arcade, Dome chamber, hypostyle hall, four-alcove room, alcove hall, small room, and galleries and Specialized components may include Minarets, wind tower, staircases, crypts etc.

7.3. ORGANIZING PRINCIPLES AND CONFIGURATION

Timurid architectural structures adhere to fundamental principles of design, which encompass various approaches. They are often conceptualized as either: 1. Additive units, 2. emphasizing linearity, the basic unit is a domed square or rectangle, with additional units added over time. 3. Centered on a courtyard with bilateral symmetry. Alternatively, they may revolve around a central dome. 4. emphasizing radiality, or be structured on a grid layout to facilitate infinite expansion. 5. Infinite Expandability, the bay, which is characterized as a space bordered by free-standing supports (pillars, columns, or piers), is the fundamental unit of this style.

7.4. CONFIGURATION

Komaroff, Golombek, and Wilber (1988), explaining the configuration of Timurid Architecture, certain recurring configurations are evident, defining the layout and organization of buildings. The court facade, often featuring arcades in single or double stories, is combined with two- or four-axial ivans, with emphasized axes through the projection of ivan screens. The entrance portal, or pishtaq, serves as an imposing entrance passage, often larger and more massive than court ivans and may be flanked by minarets. Entrance facades typically incorporate a combination of pishtaq, blind or open arcades, and corner towers, particularly common in madrasahs. Additionally, many court-centered buildings include an entrance complex, where passage from the pishtaq leads into a vestibule (dihliz) before entering the iwan opening onto the court. Tabibian (2012) identifies the style and features of Timurid architecture include: the exterior and visible grandeur of buildings as a key characteristic of the period, decorative work distinct from the structural framework, prominent porches and minarets, extensive use of azure in tile work, innovations in arch and dome designs along with tall drums, the application of gold or gold accents in painting and tiling, and the introduction of unique patterns in tile work, plasterwork, and painting.

8. SIGNIFICANCE OF GEOMETRY

Geometry has played a significant role in the development of Art and Architecture in any civilization belonging to any time period/era on the time line. Komaroff, Golombek, and Wilber (1988) said that the geometric basis of Timurid design is apparent in many facets of the architecture: in the proportions of spatial design, in the creation of three-dimensional geometric "objects" (stellate vaults and muqarnas), and in two-dimensional surface decoration. Further elaborating on the design process in architecture, there are two processes: 1. Analytic and 2. Geometric, were used for the designing of any building project by the Timurid Architects.

Discussing the significance of the Timurid design system, Komaroff, Golombek, and Wilber (1988) said that it is a system of proportions based on a limited number of geometric progressions, but with wide-ranging additive qualities, giving it great flexibility. Further mentioned that the Islamic system of proportions, which utilizes irrational numbers, is based on the geometric properties of the square, the double square, the equilateral triangle, and the pentagon. Geometric Systems are:

1) The square (System 1) and its derivatives, most important of which were the diagonal ($\sqrt{2}$), its half and its double, and the side of an octagon (V2 - 1).
2) The equilateral triangle (System 2-3) and its derivatives, such as side and height ($\sqrt{3}/2$), were often combined with square geometry, creating rectangles with $\sqrt{2}$:$\sqrt{3}$ proportions. The side of an equilateral triangle, with a height half the length of the generating square, was frequently used for niche widths in dome chambers, supported by intersecting arches ($1/\sqrt{3}$) (System 3).

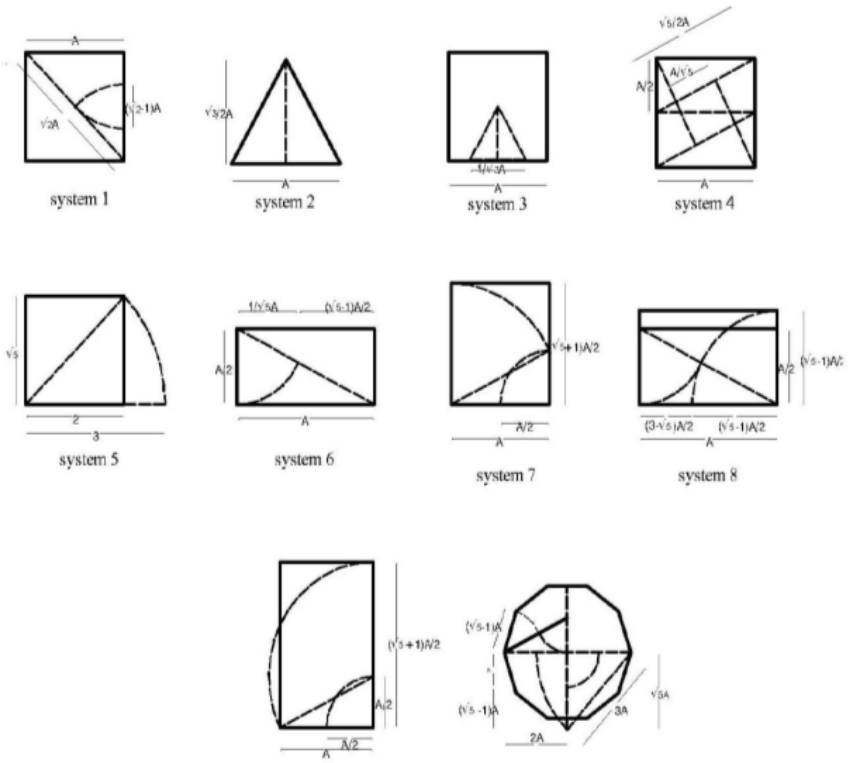

Figure 7: Islamic System of Proportions used by Timurid Architects

Source: Golombek et al 1988

3) The semi square (System 4-7), usually formed by dividing the square of a room into halves: By drawing the diagonals of the two sets of semi squares, one arrives at a small square in the center, whose side is $1 / \sqrt{5}$ (System 4). The diagonal itself ($\sqrt{5}/2$) plays an important role, particularly in determining elevations (System 7). Another method of obtaining a rectangle of the same proportions is with a triangle with ratio 2:3:$\sqrt{5}$ (System 6). A

common figure associated with the semi square was the triangle formed by the diagonal and the two sides, which could be used to measure off proportional line segments of $1/\sqrt{5}$ and $(\sqrt{5} — 1)/\sqrt{5}$ (System 5).

4) The root five rectangle (System 8-10): Using the semi-square, the base can be divided using the "mean-extreme" ratio known to the Greeks, which contributes to the "golden section." This involves marking an arc along the hypotenuse equal to the height, then drawing a second arc from the smaller angle through the hypotenuse. The intersection of this arc with the base divides it into two segments: a larger one $[(\sqrt{5} - 1)/2]$ or M, and a smaller one $[(3 - \sqrt{5})/2]$ or m (System 8). A decagon inscribed in a circle with a radius of 2 has a side of $\sqrt{5} — 1$ (System 10). The "golden rectangle" could be formed by adding the unit 1 to the larger section M $[(\sqrt{5} + 1) / 2:1]$. The rectangle is easily drawn using the semi square as base (System 9).

9. ARCHITECTURAL INFLUENCE OF TIMURID ON MUGHALS: IDENTIFYING THE RELATIONSHIP

The Mughals celebrated their Timurid heritage through various means, including painted genealogies, dynastic portraits, and calligraphic inscriptions. They looked to the Timurids as a source of inspiration and sought to honor their legacy through their own artistic and architectural endeavors. (Golombek & Koch, 2017) identifies the Monumentality and rationality, prominent characteristics of Timur's buildings were given a new and spectacular Mughal expression. Also, the chahar-bagh and the Timurid centralized plan of nine parts (nine-fold plan), the concept hasht-bihisht were another important aspect of Timurid architecture. A prime example of the Timurid hasht-bihisht plan is found in the mausoleum of ʿAbd al-Razzaq b. Ulugh Beg b. Abu Saʿid, who served as governor of Ghazni and Kabul from 1501 to 1502 (Golombek & Wilber, 1988). These characteristics are present in many of the Mughal structures like Fatehpur Sikri, Akbar's Tomb, Taj Mahal. But the first structure considered to be built on these characteristics with influence from Timurid architecture is Humayun's Tomb.

The Mughals admired and emulated Timurid architectural styles, incorporating elements such as geometric patterns, dome and vault technology, use of minarets (started from Jahangir and Shahjahan period) and decorative motifs into their structures. The large domed mausoleum on a podium was constructed by the architects of the young Akbar (Humayun's son and successor) as a response to Timur's tomb in Samarkand, and simultaneously as a counter to the Delhi sultans' tombs. Another noteworthy Timurid reference during Mughal period is made in the main zanana (harem) building of Akbar's palace fort in Agra, called misleadingly "Jahangiri Mahal" (late 1560s to 1570s) (Golombek & Koch, 2017). Drawing the parallels with Timurid architecture, Golombek and Koch (2017) mentions Koch (1991) as relating the ground floor plan of the said mughal structure with the funerary shrine complex Timur built for Ahmad Yasavi in Turkestan (1397–1399).

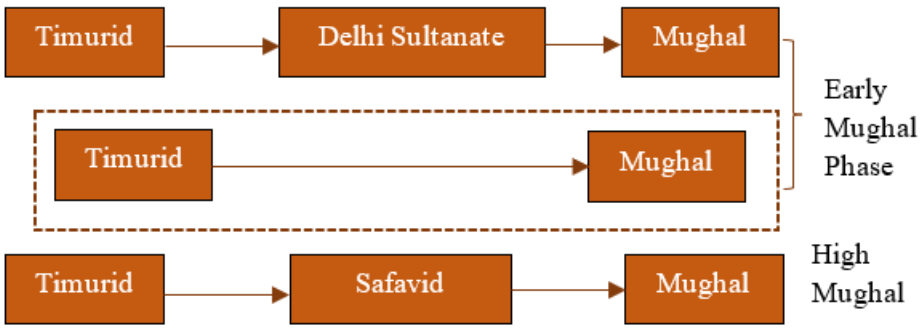

Figure 8: Propositions for Timurid architectural influence to Mughal buildings (Khazaee M. et al 2013)

(khazaee et al., 2013) identified possible ways of Timurids influence in Mughal Architecture (figure 8): The first possibility considered is the influence of Indian dynasties contemporary with the Timurid era, such as the Delhi Sultanate (1193-1554 AD) and the Deccan Sultanate (1347-1678 AD). The second is the direct influence of the Timurid dynasty on Mughal architecture. The third possibility is the impact of the Safavid connection with the Mughals. But in the further study part of 1st proposition (influence of Timurid via Deccan sultanate) was not found correct and therefore concluded with the 1st and 3rd propositions were found correct based on evidences presented.

10. CASE STUDIES (ONLINE): TIMURID ARCHITECTURE

Online/virtual case studies of Timurid architectural structures were also conducted to identify the relationship and influence of Timurid Architecture on Mughal Architectural Practices. Timurid case studies were identified in response to one of the first Mughal structures, Humayun's Tomb. Therefore, case studies selected are: 1. Gur-i-Mir and 2. Tomb of Ulugh Beg-II. By examining these structures, we can trace the transmission of architectural elements, such as the use of geometric patterns, monumental portals, and domes, which were also prominent in Mughal architecture.

10.1 GUR-I-AMIR

Gur-i-Amir, is one of the most significant architectural monuments of the Timurid era. It is located in Samarkand, Uzbekistan. This mausoleum complex is the final resting place of the great conqueror Timur (Tamerlane), his sons, and grandsons, including the distinguished astronomer Ulugh Beg. It was originally intended to house the body of Timur's favorite grandson, Muhammad Sultan (1375-1403), who was buried there after his death during one of Timur's campaigns (Dickens, 1990). Being completed in 1404 AD, Gur-i-Amir stands as a testament to the Timurid dynasty's architectural innovation, artistic grandeur, and cultural significance.

Figure 9: Location Map showing the remains of Madrasa & Khanqah & Overall built form/Towering dome as an element of exclamation of Timurid Architecture, Source: https://www.orientalarchitecture.com/

The original complex consisted of the mausoleum itself (to the south), a madrasah (to the east), and a khanaqah (to the west), all three structures arranged around a square courtyard. There was an entry doorway on the court's north side. Every corner of the courtyard had a minaret. In present context, the only parts of the complex which remain intact are the mausoleum, the other entrance portal, and one of the minarets while Khanaqah and Madarsah is present only in remains as shown in Figure 9, the present location map.

The exterior of the built form is octagon shape while the interior is square as shown in figure 10 & 12. Its interior is a square measuring 10.2 meters on each side, with a rectangular bay in each wall, while the exterior features an octagonal design. Ulugh Beg added a gallery along the eastern side of the structure. A towering drum supports the massive dome that covers the main hall. The transition zone is completed with squinching. Although the inner dome has a sharp inclination, it is, as usual, shallower than the outer dome. The outer dome, which reaches 37 meters above ground at its apex, was largely destroyed and rebuilt in the 1950s before being redecorated.

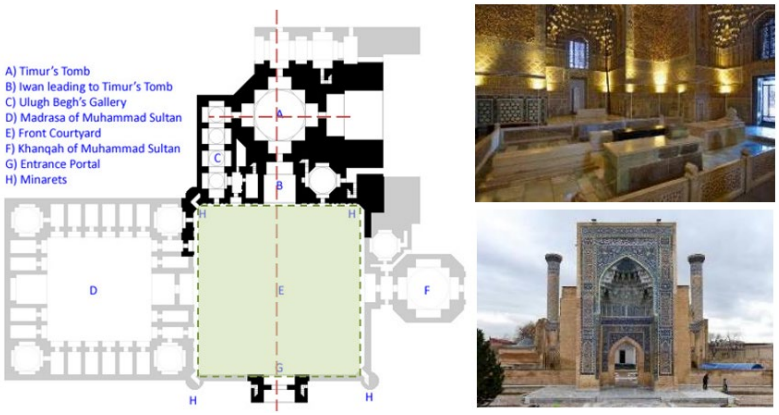

Figure 10: Plan of Gur-i-Amir, the interior of the tomb chamber (Top Left) and composition of Pishtaq with Minaret (Bottom left), Source: https://www.orientalarchitecture.com/

Figure 11, provides a sectional analysis of the mausoleum, highlighting its key architectural components. This sectional diagram may be divided into several distinct zones, each with unique characteristics and functions: 1. Double dome, 2. High drum, 3. Central chamber, 4. Side Niches, and 5. Grave zone.

ANALYSIS:

Double dome is the uppermost part of the structure, consisting of an inner and outer dome. This double dome system is a symbol of Timurid architecture, providing both aesthetic grandeur and structural stability. The inner dome is usually shallower compared to the outer dome, which can reach impressive heights, enhancing the visual impact from the exterior. This inner dome maintains the internal proportions of the central chamber. High drum is acting as the structural elements supporting the double dome. The high drum elevates the dome, making it more prominent and visible from a distance. It also helps distribute the weight of the dome more evenly, reducing the load on the walls below. Central dome chamber is comprising the cenotaphs or sarcophagi grave stones of Timur and other family descendants. It embraces the richly decorated interior with intricate patterns, tile work, and inscriptions, reflecting the significance and sanctity of the space. Side niches are smaller spaces flanking the central chamber. These niches provide additional structural support and are often used for decorative purposes or small subsidiary tombs. They help in balancing the composition and enhancing the spatial experience within the mausoleum. Grave zone is the lower part of the structure, where the actual graves or burial crypts are located. This zone is typically more private and less elaborately decorated than the upper parts of the mausoleum. It serves the primary purpose of interment and is often accessible only to certain visitors or during specific ceremonies.

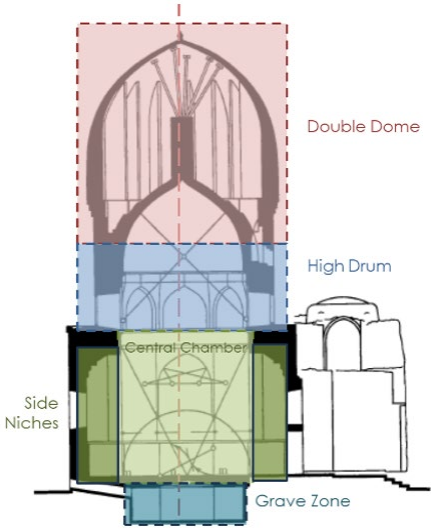

Figure 11: Section showing the characteristics of Mausoleum, Source: Analysis (Author) Drawing, Bulatov (1978)

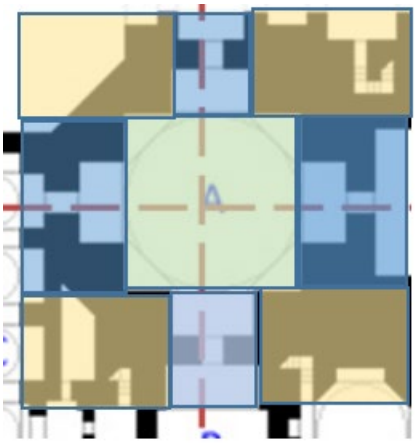

Figure 12: Plan of Mausoleum showing the footprints of Hasht-Bihisht Geometry, Analysis: Author

Figure 11 illustrates the complex interplay between different architectural elements that define the grandeur and functionality of the mausoleum. Figure 12, shows notional illustration of Hash-Bihisht concept seems to be used in the geometrical development of the tomb structure. This analysis emphasizes the complexity and ingenuity of Timurid architecture, where each element serves both a practical and an aesthetic purpose, contributing to the monument's enduring legacy.

10.2. TOMB OF ULUGH BEG-II (1469-1502)

Ulugh Beg bin Abu Sa'id, the son of Timurid Sultan Abu Sa'id, was the ruler Ghazna and Kabul from 1460 until his death in 1501-1502. The Mausoleum was constructed to the east of Ghazna in a village called Rowza, situated on a hill overlooking the ruined palace of Mas'ud III (figure 13). According to (Hoag, 1968), this mausoleum was constructed by Ulugh Beg bin Abu Sa'id.

The mausoleum as shown in figure 13, is characterized by a radially symmetrical layout, featuring a square structure measuring 20 meters on each side. It is supported by four circular corner towers and four imposing pishtaqs. Each pishtaq is nine meters wide and ten meters tall, protrude three meters beyond each facade. They are connected to the corner towers through diagonal archways that house five-sided niches. Raised on a square plinth containing a vaulted crypt, the mausoleum is aligned towards the qibla in the southwest direction.

Figure 13: Location, Tomb of Ulugh Beg also known as Abur Razaq Mausoleum

Source: https://www.archnet.org/

ANALYSIS:

A square domed chamber (as shown in figure 14) is connected to four square, domed antechambers, each with polygonal apses. The southeast antechamber, notable for its niches, links to square corner rooms that form a quincunx with the central hall's dome. The south corner room features a mihrab, likely serving as a small prayer hall. The southwest and northeast antechambers connect only to the west and north corner rooms, with the western room also containing a mihrab. The northwest antechamber connects solely to the central hall. Beneath the mausoleum, a high-quality exposed brick crypt mirrors the plan of the rooms above and includes four apertures aligned with the entrances. Although no access stairs remain, it is likely that stairs were originally located in the southeast antechamber.

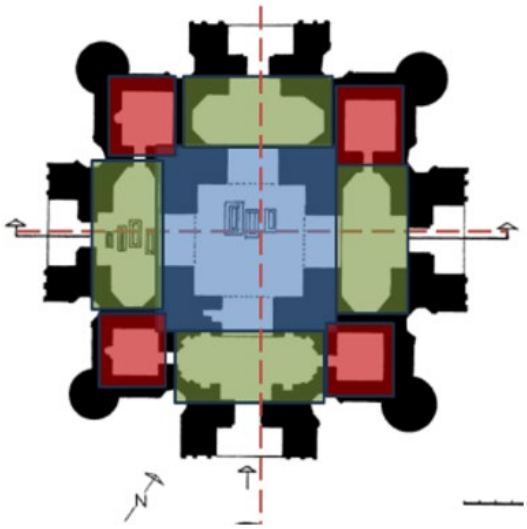

Figure 14: Plan, Tomb of Ulugh Beg and Abdu Razzaq, Ghazni

Source: Hoag, J. D. (1968) (adapted from Bruno, East and West, xiii (1962), 99-185)

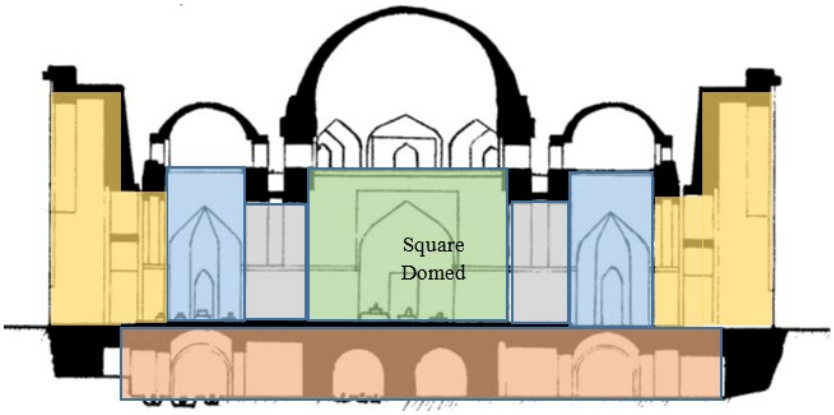

Figure 15: Figure 24: Section, Tomb of Ulugh Beg and Abdu Razzaq, Ghazni,

Source: Hoag, J. D. (1968) (adapted from Bruno, East and West, xiii (1962), 99-185,

The mausoleum, made entirely of baked brick, has simply decorated pishtaqs with blind niches and brick molding. The interior, plastered with earth and straw (coghel), lacks painted ornamentation. The central hall features plaster-carved blind archivolts and muqarnas squinches, while fragments of alabaster wainscoting remain in the western corner room.

The tomb is symmetrically designed in both elevation and plan. Four pishtaqs frame the iwan portals, each flanked by a pair of five-sided niches angled back at forty-five degrees and arched similarly to the iwans (Hoag, 1968). The building's corners feature four cylindrical buttresses with a pronounced batter, possibly intended as bases for unbuilt

minarets. The mausoleum features a total of eight domes in addition to the central cupola. Four lower domes cover the corner rooms, while four higher domes with two windows each sit above the antechambers. The central cupola is well-lit with four windows.

Discussing about the decoration, this mausoleum structure is very simple. Molding provided on the pishtaq could have been to support an encrustation of tile mosaic but no remains or evidence found today as reported by Hoag (1968). As images of the structure itself shows the open brickwork with a layer of coghel at the squinches of the central chamber, their archivolts, and the net-vault patterns.

11. INFLUENCE ON MUGHAL ARCHITECTURE: FINDINGS AND DISCUSSION

Architecture, as a reflection of cultural heritage and artistic innovation, often carries the imprint of historical influences across regions and epochs. Timurid architecture had a significant influence on the growth of Mughal architectural traditions in South Asia. Emerged and flourished under the patronage of Timur and his descendants in the 14th and 15th centuries, Timurid architecture elaborated grandeur, intricate ornamentation, and a sophisticated synthesis of turkish, Central Asian, and Islamic architectural traditions. In India, this influence traveled with Babur, the descendant of Timur and the founder of the Mughal Empire, as he established his rule in India, laying the foundation for a remarkable fusion of styles that defined Mughal architecture. This architectural synthesis combined elements from their Central Asian heritage with local Indian traditions, resulting in some of the most iconic structures (like Humayun's Tomb, Itmad-ud-Daula Tomb, and Taj Mahal etc.) in the world. Following are the key aspects of influence:

11.1. USE OF SIMPLE GEOMETRIC FORMS

Timurid architecture preferred the simple geometric shapes (figure 16) such as squares, rectangles, and circles and their respective derivatives. These forms were employed in the layout of buildings, the design of facades, and the organization of interior spaces. For example: Form of Gur-e Amir mausoleum in Samarkand, Uzbekistan, Mausoleum of Khoja Ahmad Yasawi, Kazakistan, tomb of Ulugh Beg-II, Kabul, Ishrat Khaneh, Samarkand etc. are characterized by their cubic massing and symmetrical proportions.

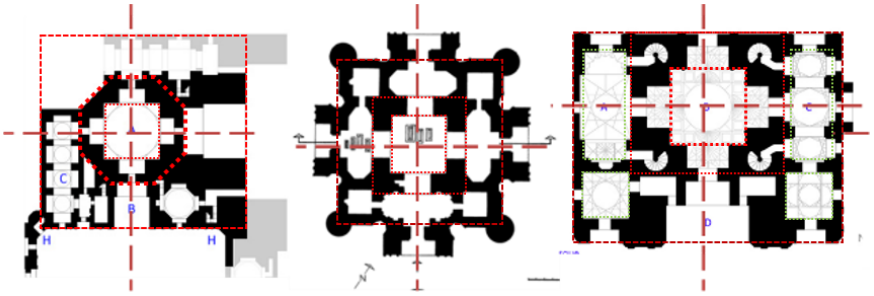

Figure 16: Plans of Gur-i-Amir, Tomb of Ulugh Beg-II, Ishrat Khaneh: Elaborating symmetry, overlay showing the use of forms, Overlay: Author & Drawing. Source: Hoag, J. D. (1968)

11.2. FONDNESS FOR SYMMETRY GEOMETRICAL PLANNING

The Timurid emphasis on symmetry and geometric planning profoundly influenced Mughal architectural principles. Timurid's architectural symmetry adopted in both built forms and unbuilt spaces also. Timurid buildings (Figure 16) and gardens (Figure 17), designed with meticulous attention to symmetry and axial alignment, inspired the Mughal built forms and gardens (charbagh: four-part garden) layout. The symmetrical layout, with water channels and pathways dividing the garden into four equal sections, creates a sense of balance and tranquility. This approach not only contributed to the visual harmony of the structures but also conveyed a sense of stability and order, reflecting Timurid aspirations for imperial grandeur and cultural prestige.

Figure 17: Roses Garden and Garden, Gur-I Amir, Samarkand, Source: Gholipour, S., & Heydarnattaj, V. (2016). & orientalarchitecture.com

Figure 18: Plan, Tomb of Ulugh Beg-II, Ishrat Khaneh: Elaborating Hasht-Bihisht concept, overlay presenting concept: Author & Drawing Source: Hoag, J. D. (1968)

11.3. USE OF CONCEPT HASHT-BIHISHT

The hasht-Bihisht concept literally refers to the Eight Paradise interpretation in Timurid architecture which used to be applied in various Timurid tomb, palaces structures and unbuilt spaces like gardens. The concept of eight paradise symbolizes the eight levels of paradise in Islamic cosmology and is meant to evoke a sense of heavenly order and balance. According to this concept, architectural plan of built form features a central domed chamber surrounded by eight smaller rooms or spaces, often arranged in a symmetrical pattern. This Hasht-Bihisht plan emphasizes strict axial symmetry, creating a balanced and harmonious design. Examples of this concept in Timurid Architecture may include (figure 18): Ishrat Khanah, Tomb of Ulugh Beg-II, Gur-i-Amir. Timurid palaces and examples from thereafter from Mughal Architecture are (figure 19): Humayun's Tomb, Itamad-ud-Daula Tomb, Jahangir's Tomb, Taj Mahal etc. The Charbagh concept of Mughal architecture is also based on Hasht-Bihisht of Timurid architecture.

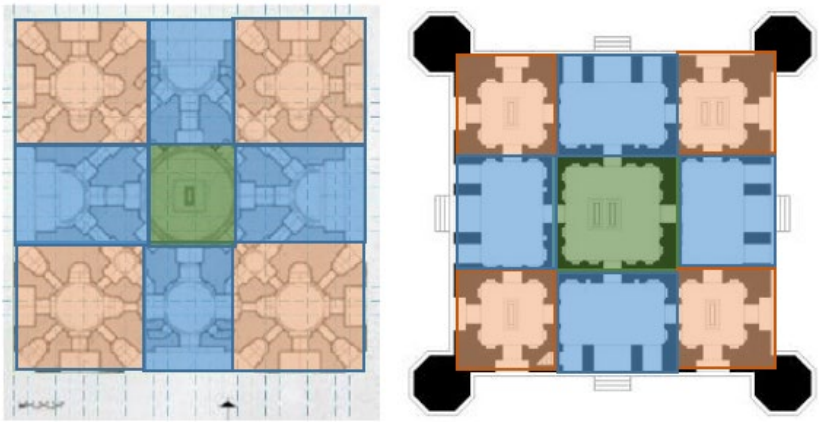

Figure 19: Plan, Humayun's Tomb, Tomb of Itmad-ud-Daula: Elaborating Hasht-Bihisht concept, overlay presenting concept: Author & Drawing Source: Lowry, G. D. (1987), orientalarchitecture.com

11.4. FIXED DEFINITION FOR ARCHITECTURAL ELEMENTS

Timurid Architecture follows the fixed definition for Proportions and Arch templates for the entrance portal (Pishtaq), arcade, domes and the minarets (the corner towers) which is quite evident from the images (Figure 20).

Figure 20: Timurid Architecture exemplifying Fixed Definition, Overlay by author, Image **Source:** architectureofcities.com

11.5. TIMURID DOMES AS SIGNATURE ELEMENTS

One of the most prominent aspects of Timurid influence on Mughal architecture is the use of large, domed structures. Timurid architecture is renowned for its grandiose and elegant domes, which the Mughals adopted and further elaborated. The use of double domes (figure 21), a symbol of Timurid architecture, became a feature in Mughal architecture, evident in Mughal structures such as Humayun's Tomb in Delhi and the Taj Mahal in Agra. The double dome technique, which involves constructing a second inner shell to support the outer dome, allowed for greater height and stability, creating a more impressive skyline and composition.

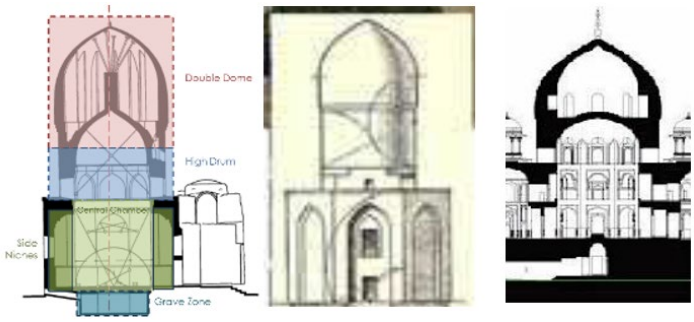

Figure 21: Section & Elevation showing the Double Domes, Source: Bulatov (1978), Paskaleva, E. (2012) & Lowry, G. D. (1987)

11.6. THE CONTRAST

There is very strong contrast observed between the height of the entrance iwan and the flanks of the façade (figure 22) which is very much evident in almost all the Timurid architectural structures.

Figure 22: Contrast in Timurid's Architecture Facades, Source: architectureofcities.com

12. CONCLUSION

The Mughals celebrated their Timurid heritage through various means, including painted genealogies, dynastic portraits, and calligraphic inscriptions. They collected Timurid artworks and manuscripts, showcasing a deep appreciation for their cultural lineage. The Mughals continued the tradition of geometric patterns, symmetrical compositions, and architectural innovations that were characteristic of Timurid architecture.

The attached figure 23, provides a visual representation of the profound influence of Timurid architecture on Mughal architecture. It summarizes the relationship, demonstrating how the architectural styles and principles of the Timurid architecture were foundational to the development of Mughal architecture. The diagram identifies the four main categories: Cultural Heritage, Continuation of Traditions, Monumentality & Rationality, and Use of Design Concepts of influences based on the study of this chapter which are as follows:

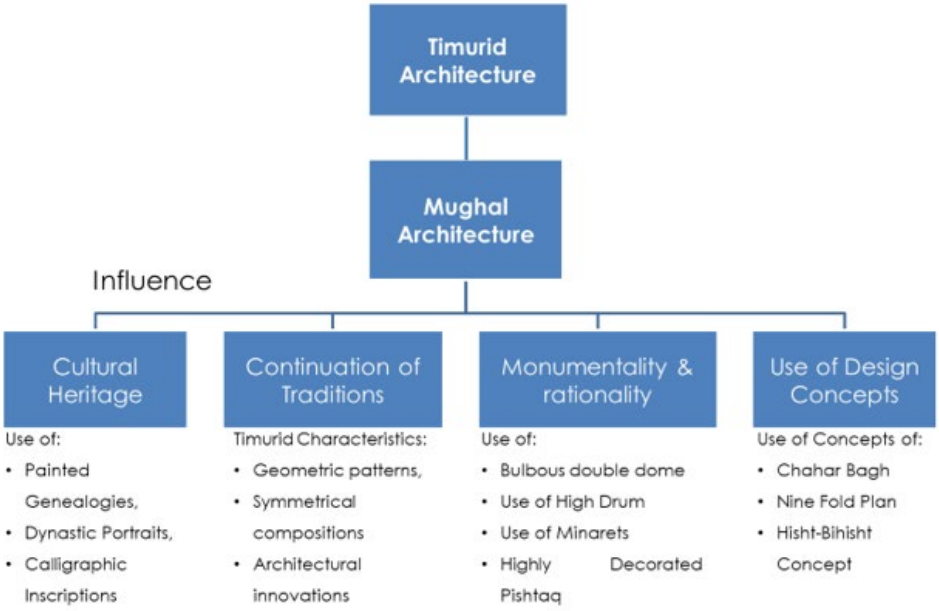

Figure 16: Influence of Timurid Architecture on Mughal Architecture

Source: Author

The findings of the research paper reveal a strong architectural and genealogical influence of Timurid architecture on the Mughal architectural tradition. Following a historical-interpretative methodology and virtual case studies, the paper identifies key architectural elements, such as symmetry, geometric patterns, and structural configurations, that the Mughals adopted and adapted from Timurid precedents.

The Mughals incorporated the hasht-bihisht plan, a prominent Timurid design that structures spaces around a central chamber with surrounding smaller rooms, as seen in Mughal monuments like Humayun's Tomb and the Taj Mahal. Additionally, they adopted the Timurid preference for double domes, monumental entrance portals (pishtaq), and symmetrical layouts. These design principles, first celebrated in Timurid structures, were not only inherited but creatively adapted by the Mughals, resulting in iconic structures such as Humayun's Tomb and the Taj Mahal. The study highlights that Mughal architecture is not merely a continuation of Timurid styles but an enriched, syncretic form that reflects both a respect for lineage and a regional innovation. Ultimately, this amalgamation of Timurid and local Indian influences exemplifies the Mughal emperors' desire to solidify their legitimacy and create an enduring cultural inheritance, evident in the refined and monumental architecture that continues to define their historical identity.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

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