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ARCHITECTURAL AND STRUCTURAL CHARACTERISTICS OF MİMAR SİNAN MOSQUES: A CLASSIFICATION STUDY

MİMAR SİNAN CAMİLERİNİN MİMARİ VE YAPISAL ÖZELLİKLERİ: BİR SINIFLANDIRMA ÇALIŞMASI

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Abstract
In the 16th century, when Ottoman architecture reached its most glorious age, it was seen that the idea of creating a clear space by getting rid of the closed pitches shaped around the central dome used in Seljuk architecture was put into practice. Mimar Sinan immortalized the most brilliant political period of the Ottoman Empire with his architectural works. The centralized construction developed with Mimar Sinan and reached the highest point with Selimiye Mosque. The subject of this study is the domed mosques built by Mimar Sinan. Within the scope of the study, firstly, a list of mosques designed and built by Mimar Sinan was prepared and a literature review was conducted. The 48 mosque structures identified were evaluated typologically regarding construction dates, plan types, last congregation features, the number of minarets and minarets, and construction materials. These buildings were also analyzed in terms of their structural features, and transition elements to the dome and upper covers. In this way, it is aimed to typologically associate the mosques designed and built by Mimar Sinan. Providing numerical data on the spatial development and structural system of all mosques attributed to Mimar Sinan makes this study significant.

Keywords: Ottoman, Mimar Sinan, Mosque, Typology, Islamic Architecture.

Öz
Osmanlı dönemi mimarlığının en görkemli çağına ulaştığı 16. yüzyılda, Selçuklu mimarisinde kullanılan merkezi kubbe etrafında şekillenen kapalı sahınlardan sıyrılarak net mekan oluşturma fikrinin uygulamaya geçtiği görülmektedir. Mimar Sinan, Osmanlı Devleti'nin en parlak siyasi dönemini, mimarlığını yaptığı eserler ile ölümsüzleştiren kişidir. Merkeziyetçi kurgu Mimar Sinan ile gelişim göstererek Selimiye Camii ile en üst noktaya ulaşmıştır. Bu çalışmanın konusunu, Mimar Sinan tarafından inşa edilen kubbeli camiler oluşturmaktadır. Çalışma kapsamında öncelikle Mimar Sinan tarafından tasarlanan ve inşa edilen camilerin listesi hazırlanmış ve yapılara ilişkin bir literatür taraması yapılmıştır. Tespit edilen 48 adet cami yapısı inşa tarihleri, plan tipleri, son cemaat özellikleri, minare ve şerefe sayısı, yapım malzemeleri açıdan tipolojik olarak değerlendirilmiştir. Bu yapılar ayrıca strüktürel özellikleri, kubbeye geçiş elemanları ve üst örtüleri açısından ele alınmıştır. Bu şekilde, Mimar Sinan tarafından tasarlanan ve inşa edilen camilerin tipolojik olarak ilişkilendirilmesi amaçlanmıştır. Mimar Sinan'a atfedilen tüm camilerin mekânsal gelişimi ve strüktürel sistemi üzerine sayısal veriler sunması bu çalışmayı önemli kılmaktadır.

Anahtar Kelimeler: Osmanlı, Mimar Sinan, Cami, Tipoloji, İslam Mimarisi.

INTRODUCTION

As in the Masjid al-Nabawi, early Islamic mosques were multi-pillared, domeless structures with courtyards that could be expanded depending on population growth. Later, new structural forms and space typologies from different geographies were tried and adapted to this initial scheme. With the influence of ancient religions in Central Asia, the iwan and central dome were preferred in mosques (Frishman, 1997; Grabar, 1987). The first attempts to create a central space with multiple support systems in Turkish architecture begin with the Karakhanids. The domes dominating the harim with different structural systems in the Hazar Degaron and Talhatan Baba mosques constitute the first steps in this direction (Altun, 1988). The next development of the central space approach with a domed style in Anatolian Turkish architecture is seen in the 14th-century Principalities Period. The courtyard Manisa Great Mosque (Yetkin, 1955, p. 39-43; Acun, 1999) of the Saruhanogullari Principality dated 1375 and the Diyarbakır Saha Mosque Sözen, 1982), built by Uzun Hasan in 1453-1478 during the Akkoyunlu Period are examples of this period. The experiments with domed spaces based on a multi-pillared system continued in the Early Ottoman Period. In this period, the most important building towards a large and collective space was the Edirne Üç Şerefeli Mosque, built by Sultan Murad II in 1447 (Akçıl, 1992). We encounter Mimar Sinan's enthusiasm and experiments in creating a central space in classical Ottoman architecture.

During the Ottoman Empire, all kinds of official construction and repair work were carried out by the Hassa Architects Guild. Young people, mostly selected from within or outside the palace from the Janissary Corps, were trained in the Hassa Architects' Guild and trained in a master-apprentice relationship (Güneş, 2014, p. 377; Hersek 1990, p. 43). Although it is unclear when the organization was founded, it is known to have existed before 1525. The head of the guild, subordinate to the Şehremini, was the Chief Architect of Hassa (Pakalın, 1971). The Hassa Architects' Guild continued for approximately 350 years until it was merged with the Şehreminliği in 1831 (Orgun, 1938, p. 333; Turan, 1964, p. 178). Mimar Sinan is one of the greatest architects trained in the Hassa Architects' Guild. Mimar Sinan started his architectural life as a carpenter in the Hassa Architects' Guild and became the chief architect of Hassa in 1538. He served as the chief architect for 49 years during the reigns of Suleiman the Magnificent, Selim II, and Murat III.

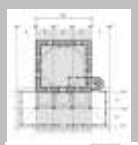
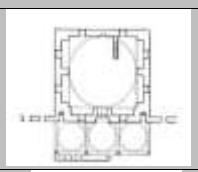
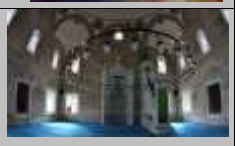
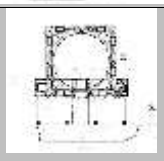
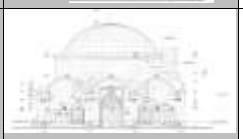
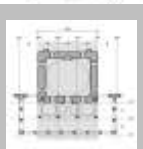
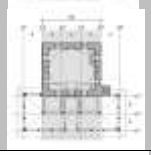
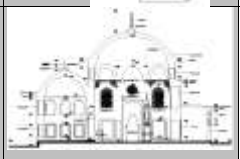
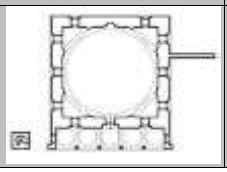
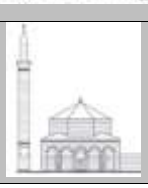
Mimar Sinan started from a simple square planned space and designed hexagonal and octagonal plans with domes and half domes. These structures, with dome diameters between 10 m and 30 m, are directly related to space organization. Mimar Sinan had to solve structural problems in these design processes according to the space size (Günay, 2006, p. 178). In his mosques, Mimar Sinan gave a new identity to the dome tradition, a structural and symbolic cover, and created a unique style in this building style. Dominating the interior space, the dome also shapes the exterior mass in Sinan's buildings (Kuban, 1988). Mimar Sinan's centrally planned buildings are shaped according to the dome structure, and dome compositions shape the space and mass (Sözen, 1975, p. 123). Sinan used many different dome variations in his mosques and treated the dome and, thus, the space differently in each mosque. In his designs, where structural principles predominate, the dome is the main element of the space. In mosques designed by Sinan, a domed baldachin shapes the core of the space. The baldachin substructure, a structural system, is a spatial organization formed by the dome covering the space, sitting on different bearers (feet, piers, columns, corner walls, and wall piers) (Tuluk, 2006, p. 276). Mimar Sinan created different spatial typologies in this system, allowing for a rich spatial organization. Using multiple support systems such as four, six, and eight supports ("baldachin") in the dome structure, Mimar Sinan designed the plan around this system in the domed buildings he created with this support system.

There are books on Mimar Sinan and his buildings written by Aptullah Kuran, Ali Saim Ülgen, Doğan Kuban, Oktay Aslanapa, İbrahim Hakkı Konyalı, Reha Günay, and Gülru Necipoğlu. Tuluk (2006), in his study titled "Square-Based Baldaken Variations in Ottoman Mosques in terms of Spatial Setup (15th-17th Century)", analyzed Mimar Sinan mosques in terms of spatial setup. Alev Eraslan (2018-20), "The Relationship between Carrier, Cover, and Space in Mimar Sinan's Mosques with Hexagonal Baldaken System" and "Mimar Sinan's Mosques with Octagonal Baldaken System in the Process of Creating Central Space" studied the structures in hexagonal and octagonal baldaken systems. Alioğlu

and Orbeyi (2011), in their study titled ‘Modular System in Mimar Sinan Mosques’, questioned the existence of modular system as a result of their analytical studies on Mihrimah Sultan Mosque, Süleymaniye Mosque, and Kılıç Ali Paşa Mosques. Nil Orbeyi (2016), in her study titled "Modular System in Sinan Mosques with Double Porticoes", discussed the issue of double porticoes in Mimar Sinan mosques. Akyürek (2024) derived an ideal form by identifying a correspondence between Mimar Sinan's mosques and the chain model; it was then transformed and optimized according to the requirements of the wood (CLT) folding plate envisaged to be applied on a small scale. In the study by Günay (2006), the structures built by Mimar Sinan, classified as four-pillared, six-pillared, and eight-pillared, were discussed. In the study conducted by Tuluk (2006), six types of space constructions were revealed in line with the development of the central space in 15th-17th century Ottoman mosques. As stated by Tuluk, in baldachin structures, half dome or vaulted spaces, courts, and galleries, which were sometimes placed only on both sides and sometimes on all four sides, both structurally supported this carrier system and contributed to the spatial expansion of the area determined by this central dome. However, no study provides numerical data on the spatial development and structural system of all mosques attributed to Mimar Sinan. The limitation of this study arises from the fact that the mosques built by Mimar Sinan are in various regions of Anatolia, the Balkans, and Syria, making it impossible to examine all of the structures on-site.

The main source on Mimar Sinan's upbringing, life, and buildings is the biographical work Tezkiretü'l Bünyan, written by his young friend Nakkaş Sai Mustafa Çelebi in conversation with Mimar Sinan. The other work, which we can call an autobiography since Nakkaş Sai Mustafa Çelebi says that he wrote it from Sinan's mouth, is Tezkiretü'l Ebniye (Saatçi, 2014). Tezkiret'ül Bünyan and Tezkiterü'l Ebniye give similar information about Mimar Sinan's life and works with minor differences. The list of buildings in Tezkiretü'l Ebniye is longer and slightly longer in Tufetül-Mimarin (Kuran, 1988, p. 175). The subject of this study is the typological and structural characteristics of the mosques designed and built by Mimar Sinan. 81 mosques are mentioned in Tezkiretü'l Bünyan, 84 in Tezkiretü'l Ebniye, and 103 in Tuhfetü’l Mimarin, and the total number of mosques mentioned in the three treatises is 107. Of these, 79 are mentioned in three sources, 3 in two, and 25 in a single source. According to the determination made by Kuran (1988), of the 107 Sinan mosques recorded in the three main sources, six are unknown or unidentified, Mimar Sinan did not design 16 but only repaired, 13 have not survived, and 16 have lost their original form completely or to a great extent. Kuran (1986) categorizes the remaining 56 mosques into masonry domed and roofed (sakıflı). This study excludes the wooden-roofed mosques labeled as sakıflı and focuses on 48 masonry domed mosques (
Table ***1***).

Table 1. List of Mosques[1]

Name	Exterior View	Interior View	Plan	Section/Elevation	Constructed by / Location / Date
Bolvadin Rüstem Pasha Mosque					Rüstem Pasha /Bolvadin/1553
Mosque(Karagöz bey)-Mostar Hacı Mehmet Pasha					Hacı Mehmet Pasha/Mostar/1558
Cenabı Ahmet Pasha MosqueAnkara Ulucanlar					Cenabı Ahmet Pasha/ Ulucanlar/1566
Defterdar Mustafa Pasha Mosque-Edirne					Defterdar Mustafa Pasha/Edirne /1575
Lala Mustafa Pasha Mosque-İlgın					Lala Mustafa Pasha/IlgınKonya/1577
Havsa Sokullu Mosque-Kasım Bey Mosque					Sokullu Mehmet Pasha/Havsa /1577
Şam Süleymaniye Mosque					Kanuni Sultan Süleyman/Damascus/1555
Ferhad Pasha Mosque-Çatalca					Ferhad Pasha/Çatalca/1597
Şemsi Ahmet Pasha Mosque-Üsküdar					Vezir Şemsi Ahmed Pasha/Üsküdar/1580
Hadım Ali Pasha MosqueDiyarbakır					Vali Hadım Ali Pasha/ Diyarbakır/1537

[1] The visuals and drawings in Table 1 were prepared using Ülgen (1989), Kuran (1986), Günay (2006), Necipoğlu, (2013, Sönmezer (2003), Orbeyi (2016), archives of the authors and various web pages.

Table 1. (cont.)

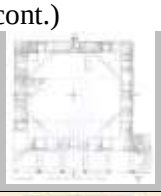
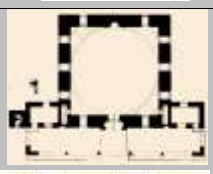
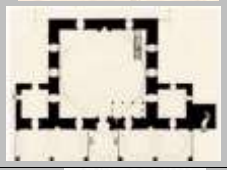
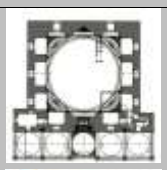
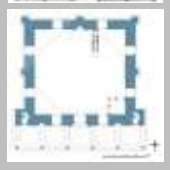
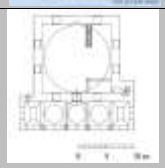
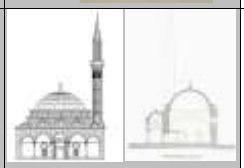
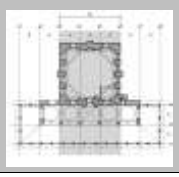
Köse Hüsrev Pasha Mosque-Van					Van Beylerbeyi Hüsrev Pasha/Van /1568
İskender Pasha MosqueDiyarbakır					Diyarbakır Governer İskender Pasha /Diyarbakır /1551
Hüsrev Pasha Mosque-Halep					Vezir Deli Hüsrev Pasha/Halep /1536
Haseki Mosque-İstanbul					Kanuni Sultan Süleyman (for Hürrem Sultan) /İstanbul/1539
Hadım İbrahim Pasha Mosque-Silivri					Hadım İbrahim Pasha/Silivri /1551
Karapınar Sultan Selim Mosque					Sultan Selim /Karapınar /1563
Firdevs Bey Mosque-Isparta					Isparta Governer Firdevs Pasha/Isparta/1561
Lala Hüseyin Pasha Mosque-Kütahya					Lala Hüseyin Pasha/Kütahya/1570
Habeşi Mehmet Ağa MosqueÇarşamba İstanbul					Dârüssaâde Ağası Habeşi Mehmed Ağa /Çarşamba-İstanbul/1585
Rüstem Pasha Mosque-Tekirdağ					Rüstem Pasha/Tekirdağ/1553

Table 1. (cont.)

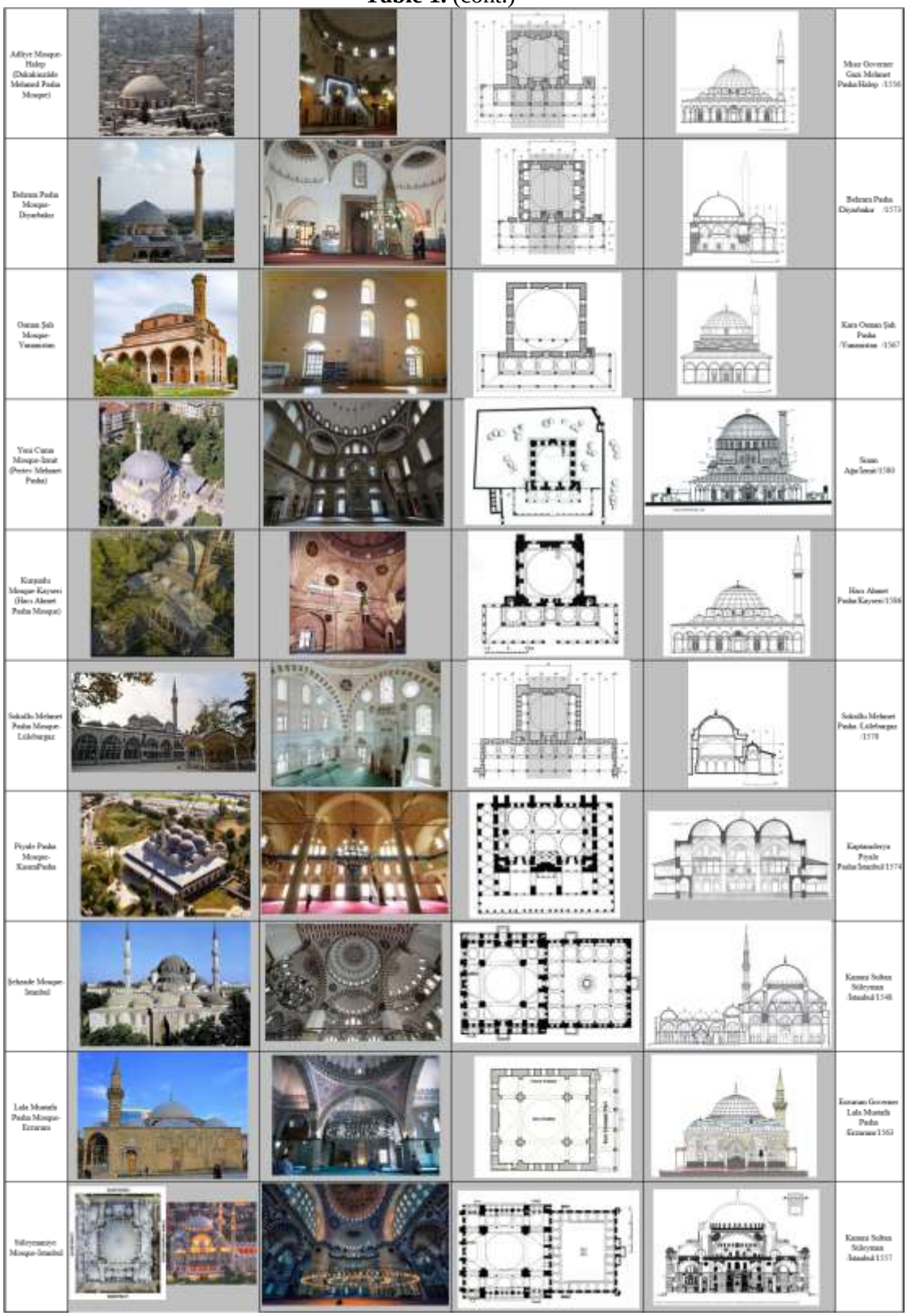


Table 1. (cont.)

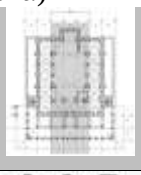
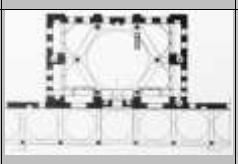
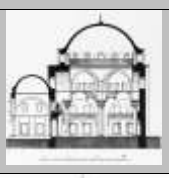
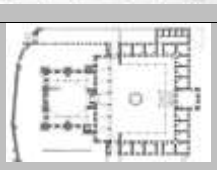
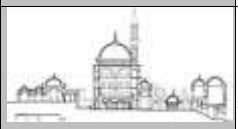
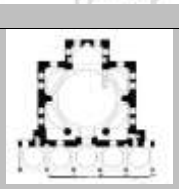
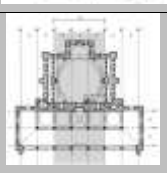
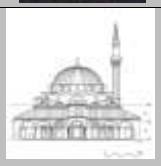
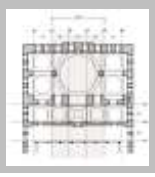
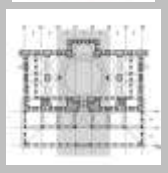
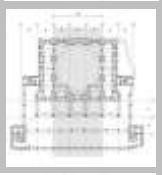
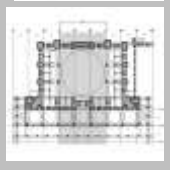
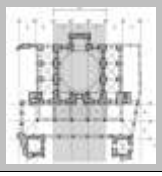
Kılıç Ali Pasha Mosque-Tophane					Denizci Kılıç Ali Pasha (Uluç Ali)/Tophane /1581
Topkapı Kara Ahmet Pasha Mosque					Sadrazam Kara Ahmet Pasha/Topkapı/1558
Kadırga Sokullu Mehmed Pasha Mosque					Sokullu Mehmet Pasha-İsmihan Sultan /İstanbul-EminönüKadırga/1572
Fındıklı Molla Çelebi Pasha Mosque	 				Anadolu kazaskeri Mehmed Vüsuli Efendi /İstanbul-Fındıklı/1589
Babaeski Semiz Ali Pasha Mosque					Veziriazam Semiz Ali Pasha Mosque /Babaeski/1569
Sinan Pasha Mosque- Beşiktaş					Kaptansderya Sinan Pasha/Beşiktaş/1556
Atik Valide Mosque-Üsküdar					Nurbanı Valide Sultan (mother of III. Murad) /Üsküdar/1577
Rüstem Pasha MosqueTahtakale					Rüstem Pasha/İstanbul/1562
Mihrimah Sultan MosqueEdirnekapı					Mihrimah Sultan /Edirnekapı/1565
Mesih Mehmet Pasha Mosque-Fatih					Veziriazam Hadım Mesih Mehmed Pasha/Fatih /1586

Table 1. (cont.)

CHRONOLOGICAL ANALYSIS OF STRUCTURES

It is seen that Mimar Sinan started to investigate space in his early works under the Early Ottoman tradition. Despite the 1545 dated foundation inscription above the door of the mosque, which is part of the Hüsreviye Complex he built in Aleppo on behalf of Hüsrev Pasha, the Beylerbeyi of Damascus, Aslanapa (1988) dates the building to 1536/37, as Hüsrev Pasha became the Beylerbeyi of Rumelia in 1538 (Aslanapa, 1988, p. 8). Diyarbakır Hadım Ali Pasha Mosque is also dated to 1537. The single dome of the square-planned building is covered with a pyramidal roof from the outside. To the northeast of the mosque rises an independent minaret with a square base and a cylindrical body. Mimar Sinan's first work in Istanbul is the Haseki Complex, which he built for Haseki Hürrem Sultan between 1538/39 and 1551 (Cantay, 2002, p. 66). With its inscription dated 1539, the mosque has a single dome on a square plan. With its five-domed last congregation place, it is a work in which Sinan started his spatial research by connecting to the tradition of single-domed mosques in Iznik, Edirne, and Bursa. The oyster-grooved squinches in the Gebze Çoban Mustafa Pasha Mosque are repeated in the building. In 1612, Sedefkar Mehmet Ağa added a dome to the east side, connected it with pointed

arches resting on two columns, removed the wall between them, and turned it into a transversely rectangular space by placing the mihrab in the center (Aslanapa, 1988, p. 14).

At the end of ten years, from 1538 to 1548, when Mimar Sinan became the Hassa Architects' Guild architect, he built the Şehzade Mosque, which he called his apprenticeship work and first major structure. The mosque, built by Suleyman the Magnificent for his son Şehzade Mehmet, who died at 21 in Manisa, was built between 1544 and 48. In this mosque, where he addressed the problem of half domes for the first time, Mimar Sinan surpassed the plan schemes of Hagia Sophia and Bayezid Mosque and created an ideal central structure with four half domes. In the Şehzade Mosque, Mimar Sinan broke away from the influences of the early Ottoman period and paved the way for a new architecture with his style (Aslanapa, 1988, p. 14). When we look at the building from the outside, a different superstructure system draws attention, such that the main dome rising in the center is integrated with half domes and weight towers in this mosque and becomes an integral part of Sinan's 'pyramidal superstructure' (Ercağ, 1990).

Mimar Sinan built the Üsküdar İskele (Mihrimah Sultan) Mosque during the years when the Şehzade Mosque was to be completed. Mihrimah Sultan, daughter of Suleyman the Magnificent and wife of Rüstem Pasha, one of the famous grand viziers of the period, was the patron of the mosque (Kuban, 1994). Compared to the pyramidal superstructure of the Şehzade Mehmet Mosque, softened by exedras and weight towers, the square cube-shaped dome base of the Mihrimah Sultan İskele Mosque bears traces of the old system inherited from Hagia Sophia. Kuran attributes the difference between the two mosques, both completed in 1548, to Sinan's stylistic chronology and suggests that the Üsküdar Mihrimah Sultan Mosque may have been planned before the Şehzade Mosque (Kuran, 1986, p. 48).

In the last years of the Kanuni period, Mimar Sinan built a mosque for İskender Pasha and Behram Pasha in Diyarbakır. No inscription of the İskender Pasha Mosque has survived to the present. Considering a 1565 dated endowment of the İskender Pasha Foundation, it is thought that the mosque was built earlier. Researchers generally date the mosque to 1551 (Sözen, 1971; Goodwin, 1993, p. 310; Kuran, 1986, p. 282). Compared to the pyramidal vaulted Hadım Ali Pasha Mosque in the same city, the İskender Pasha Mosque is closer to Mimar Sinan's style with its hemispherical dome. Its dome with a diameter of approximately 15 m (Polat, 2020) is supported by a sixteen-sided pulley with eight windows (Necipoğlu, 2013, p. 622).

Built in 1551 by Mimar Sinan in Silivri, Istanbul, the square-planned, single-domed mosque of Hadım İbrahim Pasha with oyster grooved squinch was enlarged with deep rectangular niches towards the sides and the entrance. With the abutments formed by the wall piers separating the niches, this mosque is the pioneer of the eight-pillared mosques (Aslanapa, 1988, p. 53; Kuran, 1986, p. 238). Reha Günay groups it among the four-pillared mosques (Günay, 2006, p. 42). Completed in 1552, Gözleve Tatar Khan Mosque is the most spectacular mosque of Crimea in terms of architecture. In this work, Mimar Sinan repeated the plan of Istanbul Old Fatih Mosque with a five-domed last congregation place without a courtyard, with a central dome on four pillars, a half dome of the same diameter on the mihrab side, and three small domes on the sides (Aslanapa, 1988, p. 47). It is not clear whether Sinan the Architect travelled to Crimea or not; probably he did not go there himself, and the constructions were carried out by a journeyman and local craftsmen according to his instructions (Ferrari, 1997).

The two mosques completed one year later are Bolvadin Rüstem Pasha Mosque and Tekirdağ Rüstem Pasha Mosque. Uysal (1985) states that the building mentioned as Bolvadin Rüstem Pasha Mosque in the book titled 'Foundation Works in Turkey- I' is Bolvadin Lala Sinan Pasha Imaret Mosque. Mimar Süreyya (1932) wrote that the mosque built by Mimar Sinan on behalf of Rüstem Pasha in Bolvadin was destroyed by an earthquake, and not even a trace remains today (Mimar Süreyya, 1932, p. 113). In another source, it is stated that instead of the domed mosque built by Mimar Sinan, the new mosque built by the mosque building society founded by Osman Hulusi Efendi, the mufti of Bolvadin, to the architect Georgios Parmakyan from Afyon was opened for worship in 1904 (URL 1). In the Tekirdağ Rüstem Pasha Mosque, it is seen that Sinan returned to the dome with a drum (Aslanapa, 1986). The

first double portico application outside Istanbul was made in the Rüstem Pasha Mosque in Tekirdağ (Necipoğlu, 2013, p. 427).

The Süleymaniye Mosque (Aslanapa, 1988, p. 82), which was built by Suleyman the Magnificent in Damascus in 1555[2] (Necipoğlu, 2013, p. 303) for the use of pilgrims, was designed with an outer portico with sacrifices, an inner portico with domes on the sides, and a barrel vault in the center, with muqarnas on the outside and phyllo pastry-like capitals on the inside (Tanman, 2010, p. 119). Necipoğlu (2013) states that it is possible that Sinan, who was busy with the Süleymaniye Mosque in Istanbul at the time of the construction of this complex, drew the plan of this small provincial complex without traveling to Damascus.

Aleppo Adliye Mosque was built before 1556 (Tekin, 2014, p. 109). Necipoğlu (2013) gives this date as 1566. The mosque, which is built entirely of cut stone with a single dome and has the classical Ottoman architectural features of the 16th century, has regional features in terms of ornamentation (Gümüşsoy, 2011). Sinan Pasha Mosque, built by Mimar Sinan in Beşiktaş, Istanbul, was completed in 1555-56, two years after the death of Sinan Pasha (Müller-Wiener, 2001, p. 459). In this building, Sinan adapted the plan of the Edirne Üç Şerefeli Mosque to a small extent (Aslanapa, 1986, p. 59). The 12,60 m wide dome covering the transversely developed rectangular harim is placed on six piers and the transitions to the dome are provided with pendants. Two of the pillars are hexagonal and free in the east and west, while the ones in the north and south are inside the wall (Gündüz, 2009). It is the first example in Istanbul of the scheme combining a mosque with a U-shaped madrasah, which Sinan had previously tried in Sofu Mehmet Pasha's complex in Sofia (1547-48) (Necipoğlu, 2013, p. 563).

Suleyman the Magnificent started the construction of the Süleymaniye Complex after the completion of the construction of the Şehzade Mosque, which he had built upon the death of his son Şehzade Mehmet (Mimar Süreyya, 1996, p. 41). According to the inscription on the main entrance gate in the Süleymaniye Mosque of Istanbul, which was started on 13 June 1550 and completed on 15 October 1557[3], Mimar Sinan returned to the plan with two half domes and fully developed the experiment in the Bayezid Mosque. The 6.20x5.10 m rectangular piers are located at the four corners and support the dome. At the same time, a total of four large solid pillars placed between them in the east and west carry the dome arches (Aslanapa, 1988, p. 34). Two half domes support the main dome from the sides. An exedra supports the base parts of the half domes. There are five domes of various sizes on the sides, but there are no half domes (Aslan, 2016). Situated in a dominating position against the skyline of Istanbul's inner harbor, the Golden Horn, the Süleymaniye, with its four minarets in the corners of its rectangular forecourt, is virtually an icon of Istanbul (Uluhanlu, 2017, p. 122).

Mostar Hacı Mehmet Pasha (Karagözbey) is dated to 1558. The square-planned building is covered with a dome with a high octagonal pulley. Tromps, filled with muqarnas, provide the transition to the dome (Ljubovic, 2001, p. 403). In the endowment (waqf) deed of Veziriazam Kara Ahmet Pasha, registered shortly before his drowning in 1555, different construction dates[4] have been put forward for the complex, the location of which is not specified. In the Topkapi Kara Ahmet Pasha Mosque, Mimar Sinan wanted to reach a more advanced design than the Edirne Üç Şerefeli Mosque and Beşiktaş Sinan Pasha Mosque by adding squinches to the hexagon. An interesting aspect of the plan is that a polygonal dome rests on independent pillars, and the last congregation place of the mosque has five large domes (Günay, 2006, p. 86).

For the construction date of Isparta Firdevs Bey Mosque, Kuran (1986) gives the date 1561, and Necipoğlu (2013) gives the date 1569/70. The mosque, which has a square plan and a single dome, has a five-domed last congregation place in the north and a minaret in the northwest corner (Duymaz, 2022, p.61). During the reign of Suleyman the Magnificent, Mimar Sinan made the first attempt at the

[2] Necipoğlu (2013) gives 1558-59 as the date of completion, p. 303.
[3] Celalzade states that the dome of the building was closed in 1556. Barkan, however provides the date as October 15, 1557.
[4] The date differs due to various sources Goodwin (1971): 224, 1553-55; Goodwin (1993):46-47, 1561-62; Aslanapa (1986): 222, 1554-59; Kuran (1987): 111, 558-60; Günay (1998): 68-69, 1558-60; Kuban (1997); 96-97, at the end of 1550; Konyalı (1950): 18, 1558

original eight-pillared/supported dome in the Eminönü-Tahtakale Rüstem Pasha Mosque. Some architectural historians assume that it was completed before the death of the grand vizier in 1561, while others accept 1562 as the completion date.[5] The Rüstem Pasha Mosque in Istanbul has the largest dome, Mimar Sinan, built for the grand viziers in the capital (Necipoğlu, 2013, p. 432). Rüstem Pasha Mosque, located close to the sea, is one of Sinan's three important monuments crowning the city from the shore. The others are Üsküdar Mihrimah Sultan and Şemsi Ahmet Paşa Mosques (Sözen, Rüçhan and Kozan, 1975, p. 175). Erzurum Lala Mustafa Pasha Mosque is dated to 1563. The Lala Pasha Mosque is part of a group of mosques with a square plan and a central dome. At its center, a main dome rests on four octagonal stone columns, supported by half-domes and buttresses on each of the four sides (Kocaman et al., 2019).

Karapınar Selimiye Mosque/Sultaniye Mosque was started during the first princedom of Sultan Selim II, and the construction inscription gives 1563-64 as the completion date (Müderrisoğlu, 1993, p. 474-475). Aslanapa and Necipoğlu write that the building was completed in 1569 when the Selimiye Mosque construction began in Edirne (Aslanapa, 1988, p. 109; Necipoğlu, 2013). The symmetrical layout of the complex, whose construction was carried out by the architect Cemaleddin of Aleppo, probably based on Sinan's plan sent from the capital, was made possible by the width of the flat plot (Kuran, 1986, p. 157-161; Eyice, 1965). Sinan further developed this right-angled scheme in the Lüleburgaz, Havsa, and Payas complexes built by Sokullu Mehmet Pasha in the late 1560s and early 1570s, marking the intersection of the two axes with a prayer dome (Necipoğlu, 2013, p. 319).

Edirnekapı Mihrimah Sultan Mosque and Complex, built on a hill at the end of Divanyolu, stands out with its sultan-specific location in the city skyline and monumental and aesthetic features. The building was built after the death of Mihrimah Sultan's mother and husband when Mimar Sinan was at the peak of his profession. The construction date of Mihrimah Sultan Mosque is not certain. Kuran dates the completion of the complex to 1566, based on the appointment of a madrasah instructor in 1568-69 and the registration of Mihrimah's foundation/endowment in 1570 (Kuran, 1986, p. 123). The building dates to 1562-65 by Sözen and Konyalı and 1563-70 by Necipoğlu. Based on various sources, Kuban states that the building should be accepted as completed in the 1560s (Kuban, 1988, p. 128). Mihrimah Sultan Mosque, which is a pruned and simplified version of the domed baldachin of Süleymaniye Mosque, is pierced with a record number of 204 windows, and the interior of the mosque shimmers with the light pouring in through its baldachin and high body walls) (Necipoğlu, 2013, p. 416).

The inscription on the entrance door of Cenabi Ahmet Pasha Mosque indicates that it was started to be built by the Anatolian Beylerbeyi of the period, Cenabi Ahmet Pasha, and completed in 1565-66 after he died in 1561 (Dağlıoğlu, 1942, p. 213). Cenabi Ahmet Pasha Mosque is important as it is the only work Mimar Sinan has built in Ankara. The mosque is shown as one of Mimar Sinan's works, titled Tuhfet'ül- Mimarin (Kuran, 1986). The square-planned building has a single dome and a last congregation, and the sides of the last congregation space are open and have three domes. The dome in the center is higher and larger than the side domes (Öney, 1971). The Osman Shah Mosque in Greece is dated to 1567 by Kuran. Necipoğlu dates the building to 1570. The building with five porticoes is built of alternating stone and brick. The minaret, made of cut stone is in the northwest corner of the mosque.

Van Köse Hüsrev Mosque is dated to 1568. Built with two colored cut stone, the mosque's square-shaped harim, and drum is covered by a large dome with reinforcing buttresses (Eyice, 1999, p. 50). Mimar Sinan built a complex in Babaeski for Grand Vizier Cedid or Semiz Ali Pasha between 1561-64[6]. In the mosque with six pillars/supports, the arches were connected to the hexagonal corners with exedras. The dome was extended towards the sides (Aslanapa, 1988, p. 76). The mosque overflows outwards in the mihrab part and this part is covered with a half dome, and the main dome dominating

[5] Those who accepted 1562: Sözen (1975): 178; Konyalı (1950): 205-6; Kuran (1986): 135; Kuban (1997): 102; Günay (1998): 79, those who accept 1561: Aslanapa (1986): 58; Müller-Wiener (1977): 454.

[6] Necipoğlu (2013) states that the mosque was built between 1569-75, when Mimar Sinan built the Selimiye Mosque, and that the first expense book is dated 1574, p. 520.

the harim space is expanded with 5 half domes, including four half domes on each side (Küçükkaya and Canıtez, 2019, p. 94). Semiz Ali Pasha is the only baldachin-type mosque designed by Sinan outside the capital and differs from the other range complexes, including simple domed cube-type mosques (Necipoğlu, 2013, p. 523). Kütahya Lala Hüseyin Pasha Mosque is dated to 1570. It has a square plan and single dome.

Like the Havas and Payas complexes, the Lüleburgaz Sokullu Complex is the largest range complex. There is no inscription on the mosque. However, on the gate of the mosque courtyard opening under the Prayer Dome, there is an inscription dated 1569-70 belonging to the mosque and madrasah (Cezar, 1985). In the mosque, thick towers with ten corners supporting the dome from four corners are covered with ten-slice domes, making the octagonal dome look flatter. Arches join the towers with stairs (Aslanapa, 1988, p. 93). In the interior space, the dome's weight is transferred to strong corner piers located at the four corners within the square plan, supported by deep arches. Two side galleries running along the east and west walls connect these piers, which bear the load from the dome, linking them like a beam through a cohesive structure of columns, arches, and vaults (Sönmezer and Ögel, 2004).

The Kadırga Sokullu complex, organized in levels on a sloping terrain, was built in 1571-72 in the name of İsmihan Sultan, wife of Sokullu Mehmet Pasha and daughter of Selim II. The mosque was extended south with six pillars and two exedras towards the sides (Aslanapa, 1988, p. 120). Although the mosque, with its single-balcony minaret and medium-sized dome, resembles the monuments of the grand viziers, it reflects İsmihan's dynastic position with sultanic signs. In contrast to the five-domed porticoes of Rüstem Pasha and Kara Ahmet Pasha, there is a seven-domed portico like the Edirnekapı Mihrimah Sultan Mosque (Necipoğlu, 2013, p. 455). Aslanapa (1988) interprets this mosque as Mimar Sinan's most successful work in terms of the richness and harmony of the tile and hand-made decorations (*kalemişi)* and the revitalization of the architecture.

Aslanapa (1988) describes the Diyarbakır Behram Pasha Mosque as one of the most remarkable examples of mosques with squinch/*tromp* domes. This mosque, begun in 1564, was completed in 1572. The harim is extended on all sides with deep niches that function as hidden buttresses (as in the Silivri Hadım İbrahim Pasha, Aleppo Dukakinzade Mehmet Pasha and Kayseri Hacı Ahmet Pasha mosques). The upper mahfils, which surround the mosque on three sides, are reached by four stairs passing through the walls (Necipoğlu, 2013, p. 623).

One of the artifacts of Mimar Sinan, which he tackled at the same time as the Selimiye Mosque, is the mosque he built in 1573/74 for Captain Derya Piyale Pasha in Kasımpaşa, Istanbul. Since the mosque is only mentioned in Tufetü'l Mimarin and deviates from the typical style of Mimar Sinan, it is attributed to another special architect and the personal taste of its builder.[7]

Mimar Sinan was 80 years old when he started the Selimiye Mosque in Edirne, just after Lüleburgaz. Built in 1569-75, the eight large pillars supporting the dome rise without capitals and are fluted (Aslanapa, 1988, p. 97). Selimiye's interior integrity is completely fused with its exterior mass under the absolute dominance of a single dome, with no other structural elements competing with it. The pyramidal silhouette of small domes and half domes with vertical masses, previously developed in the Şehzade Mehmet and Süleymaniye mosques, was abandoned here, and the gigantic single-shell central dome was reinforced (Necipoğlu, 2013, p. 328). The central dome is 31.30 m in diameter and 42.25 m in height, resting on eight hexagonal pillars, six of which are free in the harim, two of which are located at the corners of the mihrab section in the south direction. Two of the six free pillars are in the north and four of them are closer to the walls on the sides, and the large area in the middle is gathered under the central dome without being divided (Mülayim and Vefa, 2009).

Edirne Defterdar Mustafa Pasha Mosque, like Selimiye, is dated to 1575. By order of Sultan Selim II,

[7] Those who attribute the mosque to Sinan: Aslanapa (1988): 125; Tanman (1989). Others: Goodwin (1971): 276-77; Kuban (1997): 118; Kuran (1987): 126.

Sokullu Mehmet Pasha built a range/menzil complex in Payas. Sokullu established a small city here. The five-line Turkish inscription on the caravanserai gate gives the date 1574-75 (Aslanapa, 1988, p. 114). The complex construction, which Mimar Sinan undoubtedly designed, was probably carried out by local craftsmen working on the construction works of the vizier in Aleppo (Necipoğlu, 2013, p. 476). Ilgın Lala Mustafa Pasha Complex, which was built as a range complex on the Konya-Akşehir Road, was built by Lala Mustafa Pasha, the vizier of Murat III, according to the inscription of the mosque, to Mimar Sinan in 1576-77 (Çobanoğlu, 2003).

After completing the Selimiye Mosque, the complex in Havsa was built in 1576-77 by the Grand Vizier Sokullu Mehmet Pasha for his son Kasım Pasha. Only the mosque survived, and its last congregation, the portico, was demolished (Aslanapa, 1988, p. 117). Mimar Sinan, who was building the Selimiye in Edirne then, may have supervised the laying the foundations of the complex in Havsa in 1573. However, he probably assigned one of his trusted private architects to the construction of this project. The main feature distinguishing the mosque attributed to Sinan from generic examples of the same plan type is the unusually monumental service block for the comfort of travelers. The interconnection of these two sections with the *arasta* and the prayer dome was the common denominator of the complexes designed by Mimar Sinan for Sokullu Mehmet Pasha in Payas and Lüleburgaz (Necipoğlu, 2013, p. 599).

One of the great complexes built by Mimar Sinan after Selimiye is the Atik (Eski) Valide Mosque in Üsküdar Toptaşı, Istanbul. According to the inscription of the Darülkurra[8], it was started in 1577 and completed in 1583 when Nurbanu Valide died. Necipoğlu (2013) states that the first edict regarding the building is dated 1571 and gives the completion date of the mosque as 1577-78. However, the construction of other buildings within the complex continued after this date. Later, by order of the sultan, between January 1584 and March 1586, the mosque was expanded by adding domes on both sides, two-story *mahfils* were added inside, and a courtyard was built in front of it (Necipoğlu, 2013, p. 383). The central dome is carried by six pointed arches resting on two wall piers (body walls) on the south and north, and one brown somaki column each on the west and east. The columns are connected to the piers behind them by small arches (Aslanapa, 1988, p. 142).

In the mosque he built for Sokullu Mehmet Pasha in Azapkapı in 1577-78 (Ayvansayarı, 2001, p. 431), Mimar Sinan replicated the plan of the Selimiye Mosque in Edirne on a smaller scale two years later (Aslanapa, 1988, p. 130). The curtain walls' abundance of windows is a precursor to the architect's "post-classical" style. A unique feature of the mosque is the last congregation place covered with a sloping roof instead of the traditional domed portico, which gives the main façade a palatial air (Necipoğlu, 2013, p. 48).

After this, Sinan built the smallest complex for the vizier Şemsi Ahmet Pasha on the seaside in Üsküdar (Aslanapa, 1988, p. 142). The construction of the mosque was completed in 1580, the year of the death of its founder. Şemsi Ahmet Pasha was buried in the same year in the tomb adjacent to the northeast wall of the mosque (Ayvansayarı, 2001, p. 602). Kuran considers this complex of Şemsi Paşa as one of the most noteworthy works of Sinan. In this building, Sinan departed from the classical geometrical boundaries. Instead of a U-shaped madrasah plan, he designed an asymmetrical L-shaped design that opens to magnificent views, a striking example of his mastery of organically fusing architecture with the natural environment (Kuran, 1987, p. 199; Cansever, 2005).

In 1580, the Pertev Paşa complex in İzmit was completed, constructed following the testament of the Pasha after his demise (Aslanapa, 1988, p. 135). Zal Mahmud Pasha, one of the viziers of the reign of Sultan Murad III (1574-1595), and his wife Şah Sultan, the daughter of Selim II, commissioned Mimar Sinan to build the Zal Mahmud Complex in Eyüp district. Some researchers have dated the complex to early 1550 based on the misread inscription. Others who find this date early in terms of style date the

[8] Arabic term that translates to "house of recitation" or "school of Quranic recitation".

building to the 1560s. Others date the complex to the 1570s[9] because they think the Pasha died in 1580. Kuran (1986) estimates that the complex was built between 1575 and 1580 and assumes that the fountain is an addition made in 1589-90, which does not belong to Sinan's original structure. Necipoğlu (2013) states that the building was constructed between 1577-90. This mosque is like a return to the past for Sinan, who brought the idea of a central dome rising on pyramidal substructures to its peak. For this reason, some researchers emphasize the possibility that the building belonged to one of Sinan's apprentices.

In 1580-81, Mimar Sinan completed the Kapudan Derya Kılıç Ali Pasha complex in Tophane, Istanbul, consisting of a bath, fountain, mausoleum, madrasah, and mosque (Aslanapa, 1988). In this building, which was the last mosque built by Mimar Sinan in Istanbul, the dome is supported by four pillars and the central dome is supported by two half domes, reminiscent of the architecture of Hagia Sophia (Cansever, 2005). Although Sinan is mentioned in all works describing his buildings, some researchers find it inconceivable that the architect returned to this in-depth plan type after realizing the Edirne Selimiye Mosque with a full central plan. Therefore, the mosque is attributed to one of Sinan's journeymen, and its plan is interpreted as a personal request of Kılıç Ali Pasha (Kuran, 1986, p. 214-215; Kuban, 1997; p. 111), who consciously adopted the Hagia Sophia model. Like Goodwin (1971), Necipoğlu (2013) emphasizes that the architect and Kılıç Ali Pasha had jointly chosen the Hagia Sophia model.

Mehmet Aga Mosque was built in the Çarşamba neighborhood of Fatih, Istanbul, in 1584-85. The name of the mosque built for Darüssaade Aga Mehmet Aga is mentioned only in Tuhfetü'l Mimarin. Although Mimar Sinan approved the plans for the building, it was built by Mimar Davut Aga. Mimar Davut Aga realized a small-scale implementation of his master Mimar Sinan's eight-pillared mosques (Aslanapa, 1988, p. 158). Mimar Sinan built the Muradiye Mosque and its complex in Manisa for Murat III. According to the inscriptions in the two cells on the sides of the mosque gate, the mosque was built in 1583-85. After planning the mosque, Mimar Sinan appointed Mimar Mahmut Aga, but upon his unexpected death, Sedefkar Mehmet Aga took his place (Aslanapa, 1988, p. 150). Muradiye is a single-space building with the characteristics of a classical period *selatin* mosque. Even if the 15th-century iwan mosque model is not returned, the Üsküdar Mihrimah Sultan Mosque, a product of the early Sinan period, is taken as a basis. The three-barrel vaulted plan of the mosque resembles the mosque of Üsküdar Mihrimah Sultan, whose central dome is surrounded by three half domes (Bilir, 2020). To further strengthen the integrity of the space, the small domed units that complete the rectangle in Mihrimah Sultan were not built in Muradiye, and the Mihrab protrusion emerged because of this.

While the construction inscription of the Kurşunlu Mosque, commissioned by Hacı Ahmed Pasha in Kayseri, indicates the completion date as 1585-86, some sources, relying on the endowment deed mentioning the donation of a garden and a bathhouse and the existence of the complex, accept the finishing date as 1581-82 (Aslanapa, 1988, p. 159; Necipoğlu, 2013, p. 608). Built in 1586 in Fatih, the name of the Grand Vizier Mesih Pasha Mosque is not mentioned in Tezkiret'ül Bünyan, which was written before this date, but is recorded in Tezkiret'ül Ebniye and Tuhfet'ül Mimarin (Kuran, 1986, p. 225). This mosque is attributed to Mimar Davut Ağa (Aslanapa, 1988, p. 159). The mosque, consisting of a central dome and two-storeyed side wings with three domes each, is the first porticoed fountain courtyard applied in a vizier mosque other than the fountain courtyard-selatin mosques without madrasah rooms on three sides (Kuran, 1986, pp. 226-227). The main dome is supported by eight pillars, which bear high, pointed arches. This structural system is also visible externally through eight polygonal weight towers encircling the dome (Erzincan, 2004, p. 311).

The inscription of the Nişancı Mehmet Paşa Mosque in Karagümrük, İstanbul indicates that the foundations of the mosque were laid in 1584-85 and completed in 1588-89 (Necipoğlu, 2013, p. 447). Although some researchers accept that a skilled special architect must have carried out the mosque's

[9] Goodwin (1971): 257, adopts Eyice's dating of the mosque between 1560 and 1566. The date 1566-68 and the view that the fountain was added later in 1589-90, (Aslanapa (1986): 242)

construction, they attribute the sculptural integrity of the central space to Mimar Sinan (Aslanapa, 1986, p. 307). Kuran, who considers it unrelated to Sinan, considers it "one of the most interesting vizier mosques" of the 16th century. Based on its similarity to the Cerrah Pasha Mosque built by Mimar Davut in 1593-94, he concluded that both buildings were the same architect's work (Kuran, 1986, p. 227,229). The mosque was built with an octagonal baldachin system and covered with a central dome resting on an octagonal base formed by eight pillars on a square"space formed in the projection of the dome (Ersoy, 1989).

The mosque built by Mimar Sinan for Kazasker Mehmet Efendi, known as Molla Çelebi, in Fındıklı, Istanbul, is dated to 1561 by Erzen in her book "Mosque Facades of the Mimar Sinan Period" (Erzen, 1981), and to 1589[10] by Afife and Selçuk Batur in their academic study listing Sinan's buildings (Batur and Batur, 1967). The same building was dated between 1570-84 by Necipoğlu. Mimar Sinan freed only the two baldachin pillars on the entrance wall, while the other pillars slightly protrude from the body walls. The freed pillars have octagonal cross-sections, and the other pillars are in the form of half octagon, these pillars relate to tromps and a quarter dome (exedra) with muqarnas (Bilgili, 2015). Çatalca Ferhat Pasha Mosque is dated to 1597-98. Necipoğlu (2013) dates it to 1575-88. The mosque has a square plan built of cut stone and is covered with a dome with a pendentive transition on an octagonal drum (Eyice, 1995, p. 385). To summarize, when the buildings subject to the investigation are evaluated chronologically, three are dated to 1530s, 2 to 1540s, 11 to 1550s, 9 to 1560s, 12 to 1570s, 10 to 1580s and 1 to 1590s (Figure 1).

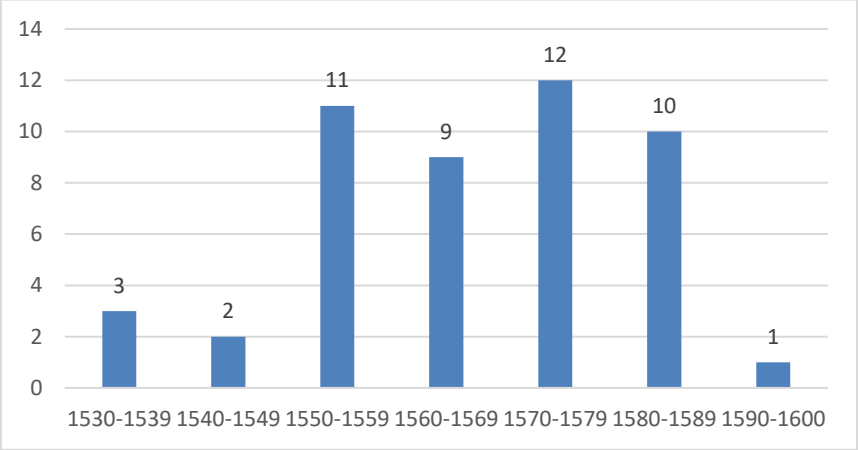


Figure 1. Number of Mosques Due to Dates.

After examining the mosques designed by Mimar Sinan from a chronological perspective, the plan features, dome diameter, and height of these structures were compared (Table 2). This comparison reveals that neither the plan layouts, the structural system features, nor the dome diameter and height of the mosques designed by Mimar Sinan show any change over the years. It is observed that the single-dome and multi-dome structures (consisting of a central single dome, semi-domes in other directions, quarter domes, and smaller domes) designed by Mimar Sinan were used in different periods without a specific sequence or order. Similarly, buildings utilizing structural systems with four, six or eight pillars were also constructed in various periods without following a particular pattern. However, it is evident that in mosques built farther from the center, simpler designs in terms of layout and structural systems were preferred. This aligns with the fact that Mimar Sinan himself was not consistently present at the construction sites of buildings constructed far from the center. If we evaluate the buildings in terms of dome diameter and height, it is seen that there is no ranking according to years in this respect. It is determined that Istanbul Şehzade, Istanbul Süleymaniye, and Edirne Selimiye Mosques, which are defined as the works of apprenticeship, journeyman, and mastership of Mimar Sinan, have the largest value in terms of dome diameter and height.

[10] This date was given by Aslanapa (1986): 224, Konyalı (1950): 182-83, Kuran (1986): 288. Necipoğlu (2013):642, on the other hand, states that the mosque should be dated between 1570 and 1584 and that it was completed in 1584.

Table 2. Changes in Building Characteristics by Years.

Date	ID	Name	Dome	Plan Type	Dome Radius	Dome Height	Number of Carrier Feet
1536	13	Hüsrev Pasha Mosque-Halep	Single	Square Plan	18,5	8,75	
1537	10	Hadım Ali Pasha Mosque-Diyarbakır	Single	Square Plan	14,4	0	
1539	14	Haseki Mosque- İstanbul	Single	Square Plan	11,3	4,25	
1548	28	Şehzade Mosque- İstanbul	Multi	Square Plan	19	7,75	Four- pillared
1548	41	Mihrimah Sultan Mosque-Üsküdar	Multi	Transverse Rectangle Plan	11,4	4,75	Four-pillared
1551	12	İskender Pasha Mosque-Diyarbakır	Single	Square Plan	14,5	6,5	
1551	15	Hadım İbrahim Pasha Mosque-Silivri	Single	Square Plan*	12	5	
1552	42	Gözleve(Kırım) Tatar Han Mosque	Multi	Transverse Rectangle Plan	11,5		
1553	1	Bolvadin Rüstem Pasha Mosque	Single	N/A	13,87		
1553	20	Rüstem Pasha Mosque-Tekirdağ	Single	Square Plan	13,28	4,75	
1555	7	Şam Süleymaniye Mosque	Single	Square Plan	10	3,25	
1556	21	Adliye Mosque-Halep (Dukakinzâde Mehmed Pasha Mosque)	Single	Square Plan	15,4	7	
1556	36	Sinan Pasha Mosque- Beşiktaş	Multi	Transverse Rectangle Plan	12,6	3	Six-pillared
1557	30	Süleymaniye Mosque-İstanbul	Multi	Square Plan	26,2	10,75	Four- pillared
1558	2	Mosque(Karagözbey)-Mostar Hacı Mehmet Pasha	Single	Square Plan	10,65	5,25	
1558	32	Topkapı Kara Ahmet Pasha Mosque	Multi	Transverse Rectangle Plan	12	5,5	Six-pillared
1561	17	Firdevs Bey Mosque-Isparta	Single	Square Plan	13	5,5	
1562	38	Rüstem Pasha Mosque-Tahtakale	Multi	Transverse Rectangle Plan	15,2	4,5	Eight-pillared
1563	29	Lala Mustafa Pasha Mosque-Erzurum	Multi	Square Plan	10,56	4,75	
1563	16	Karapınar Sultan Selim Mosque	Single	Square Plan	15,8	6,25	
1565	39	Mihrimah Sultan Mosque-Edirnekapı	Multi	Transverse Rectangle Plan	18	6	Four- pillared
1566	3	Cenabı Ahmet Pasha Mosque-Ankara Ulucanlar	Single	Square Plan	12,83	7,33	
1567	23	Osman Şah Mosque-Yunanistan	Single	Square Plan	18	7,5	
1568	11	Köse Hüsrev Pasha Mosque-Van	Single	Square Plan	14,84	5,5	
1569	35	Babaeski Semiz Ali Pasha Mosque	Multi	Transverse Rectangle Plan	14	5,5	Six-pillared
1570	18	Lala Hüseyin Pasha Mosque-Kütahya	Single	Square Plan	12,46	4,5	
1570	26	Sokullu Mehmet Pasha Mosque-Lüleburgaz	Single	Square Plan*	12,35	4,75	
1572	33	Kadırga Sokullu Mehmed Pasha Mosque	Multi	Transverse Rectangle Plan	13	8	Six-pillared
1573	22	Behram Pasha Mosque-Diyarbakır	Single	Square Plan	15,9	6,75	
1574	27	Piyale Pasha Mosque-Kasım Pasha	Multi	Transverse Rectangle Plan	9	9	multi domed
1575	46	Selimiye Mosque-Edirne	Multi	Transverse Rectangle Plan	31,22	14,4	Eight-pillared
1575	4	Defterdar Mustafa Pasha Mosque-Edirne	Single	Square Plan	12	5,25	
1575	47	Payas Sokullu Mehmet Pasha Mosque	Multi	Cross Plan (atypical)	8		
1577	5	Lala Mustafa Pasha Mosque-Ilgın	Single	Square Plan*	11,95	5,28	
1577	6	Havsa Sokullu Mosque-Kasım Bey Mosque	Single	Square Plan	11,45	5,27	
1577	37	Atik Valide Mosque-Üsküdar	Multi	Transverse Rectangle Plan	12,7	4,5	Six-pillared
1578	45	Azapkapı Sokullu Mosque	Multi	Transverse Rectangle Plan	11,8	4,75	Eight-pillared
1580	9	Şemsi Ahmet Pasha Mosque-Üsküdar	Single	Square Plan	7,5	3,15	
1580	24	Yeni Cuma Mosque-İzmit (Pertev Mehmet Pasha)	Single	Square Plan*	16,39	7,75	
1580	43	Zal Mahmud Pasha Mosque-Eyüp	Multi	Transverse Rectangle Plan	12,4	4	Four-pillared
1581	31	Kılıç Ali Pasha Mosque-Tophane	Multi	Longitudinal Rectangle Plan	10,4	3,75	Four- pillared
1585	19	Habeşi Mehmet Ağa Mosque-Çarşamba İstanbul	Single	Square Plan	11,8	5	
1585	44	Muradiye Mosque-Manisa	Multi	Transverse Rectangle Plan	10,6	4,5	
1586	25	Kurşunlu Mosque-Kayseri (Hacı Ahmet Pasha Mosque)	Single	Square Plan	12,3	5,5	
1586	40	Mesih Mehmet Pasha Mosque-Fatih	Multi	Transverse Rectangle Plan	12,8	4,75	Eight-pillared
1589	48	Nişancı (Mehmet Pasha) Mosque-Karagümrük	Multi	Cross Plan	14,2	6,5	Eight-pillared
1589	34	Fındıklı Molla Çelebi Pasha Mosque	Multi	Transverse Rectangle Plan	11,8	5,75	Six-pillared
1597	8	Ferhad Pasha Mosque-Çatalca	Single	Square Plan	9,2	3,5	

TYPOLOGICAL ANALYSIS OF STRUCTURES

Kuran (1988) analyses Mimar Sinan mosques under two main headings: single-domed and multi-domed. Under these main headings, he subdivides the single-domed ones according to the upper cover of the last congregation space (3 or 5-sectioned portico) and the multi-domed ones according to their plan features (transverse/longitudinal rectangle plan, square or cross plan). Günay (2006) grouped the mosques designed by Mimar Sinan in terms of plan typologies as four-pillared and single dome, four-pillared and half dome, six-pillared, eight-pillared and multi-pillared and multi-domed mosques. However, a limited number of mosques (only 20 mosques) were evaluated in these groupings. In general, the mosques considered as single-domed mosques by Kuran (1988) were not included in the evaluation. These groupings do not change the conclusion that the mosques designed by Mimar Sinan were centrally planned.

26 are classified as single-domed, 21 as multi-domed, and one as multi-unit mosque type of the 48 mosques that constitute the subject of this study (Table 3). Almost all of the single-domed mosques have square or nearly square plans. Bolvadin Rüstem Pasha Mosque is generally considered indeterminate in terms of typological characteristics due to the uncertainties about the structure in the sources. In the Ilgın Lala Mustafa Pasha and Silivri Hadım İbrahim Pasha mosques, the square space was enlarged transversely with the pillars placed on the two side walls. The square-planned Haseki Mosque was enlarged in 1612 and made with two domes. In Lüleburgaz Sokullu Mehmet Pasha Mosque, the central space was enlarged by creating side courts. In Izmit Pertev Mehmet Pasha Mosque, the space was enlarged longitudinally with the outrigger pillars in the north direction. Piyale Pasha Mosque in Kasımpaşa is the only example of a multi-unit (multi- and co-domed/ early Ottoman grand mosque type) mosque built by Mimar Sinan. Of the multi-domed mosques, 3 have square plans, 1 has a longitudinal rectangular plan, 15 have a transverse rectangular plan, and 2 have an inverted T plan (cross plan) (Figure 2).

Of the 26 single-domed mosques, 8 are mosques with 3-sectioned, 17 with 5-sectioned congregation spaces, and the last congregation features of 1 of them are unknown. Among the multi-domed mosques, 5 of them (Şehzade Mosque, Süleymaniye Mosque, Topkapı Kara Ahmet Paşa Mosque, Kadırga Sokullu Mehmet Paşa Mosque, Selimiye Mosque) are integrated with a domed courtyard, Edirnekapı Mihrimah Sultan Mosque has a 7-sectioned last congregation space, Piyale Paşa Mosque, and Azapkapı Sokullu Mosque have closed last congregation spaces, 13 of them have 5-sectioned and 1 of them has 3-sectioned last congregation spaces (Figure 3). In terms of plan features, another striking feature of the buildings based on the study is that some of them have double porticoes.

Table 3. Features of Mosques.

ID	Name	Dome	Plan Type	Last Congregation Place	Material	Minaret Number	Minaret Balcony Number
1	Bolvadin Rüstem Pasha Mosque	Single	N/A	N/A	Cut Stone	1	1
2	Mosque(Karagözbey)-Mostar Hacı Mehmet Pasha	Single	Square Plan	3 Sectioned Portico	Cut Stone	1	1
3	Cenabı Ahmet Pasha Mosque-Ankara Ulucanlar	Single	Square Plan	3 Sectioned Portico	Cut Stone	1	1
4	Defterdar Mustafa Pasha Mosque-Edirne	Single	Square Plan	3 Sectioned Portico	Almaşık*	1	1
5	Lala Mustafa Pasha Mosque-Ilgın	Single	Square Plan*	3 Sectioned Portico	Cut Stone	1	1
6	Havsa Sokullu Mosque-Kasım Bey Mosque	Single	Square Plan	3 Sectioned Portico	Cut Stone	2	1
7	Şam Süleymaniye Mosque	Single	Square Plan	3 Sectioned Portico	Cut Stone	2	1
8	Ferhad Pasha Mosque-Çatalca	Single	Square Plan	3 Sectioned Portico	Cut Stone	1	1
9	Şemsi Ahmet Pasha Mosque-Üsküdar	Single	Square Plan	3 Sectioned Portico	Cut Stone	1	1
10	Hadım Ali Pasha Mosque-Diyarbakır	Single	Square Plan	5 Sectioned Portico	Cut Stone	1	1
11	Köse Hüsrev Pasha Mosque-Van	Single	Square Plan	5 Sectioned Portico	Cut Stone	1	1
12	İskender Pasha Mosque-Diyarbakır	Single	Square Plan	5 Sectioned Portico	Cut Stone	1	1
13	Hüsrev Pasha Mosque-Halep	Single	Square Plan	5 Sectioned Portico	Cut Stone	1	1
14	Haseki Mosque- İstanbul	Single	Square Plan	5 Sectioned Portico	Almaşık*	1	1
15	Hadım İbrahim Pasha Mosque-Silivri	Single	Square Plan*	5 Sectioned Portico	Mixed	1	1
16	Karapınar Sultan Selim Mosque	Single	Square Plan	5 Sectioned Portico	Cut Stone	2	1
17	Firdevs Bey Mosque-Isparta	Single	Square Plan	5 Sectioned Portico	Cut Stone	1	1
18	Lala Hüseyin Pasha Mosque-Kütahya	Single	Square Plan	5 Sectioned Portico	Cut Stone	1	1
19	Habeşi Mehmet Ağa Mosque-Çarşamba İstanbul	Single	Square Plan	5 Sectioned Portico	Mixed	1	1
20	Rüstem Pasha Mosque-Tekirdağ	Single	Square Plan	5 Sectioned Portico	Cut Stone	1	1
21	Adliye Mosque-Halep (Dukakinzâde Mehmed Pasha Mosque)	Single	Square Plan	5 Sectioned Portico	Cut Stone	1	1
22	Behram Pasha Mosque-Diyarbakır	Single	Square Plan	5 Sectioned Portico	Mixed	1	1
23	Osman Şah Mosque-Yunanistan	Single	Square Plan	5 Sectioned Portico	Mixed	1	1
24	Yeni Cuma Mosque-İzmit (Pertev Mehmet Pasha)	Single	Square Plan*	5 Sectioned Portico	Cut Stone	1	1
25	Kurşunlu Mosque-Kayseri (Hacı Ahmet Pasha Mosque)	Single	Square Plan	5 Sectioned Portico	Cut Stone	1	1
26	Sokullu Mehmet Pasha Mosque-Lüleburgaz	Single	Square Plan*	5 Sectioned Portico	Cut Stone	1	1
27	Piyale Pasha Mosque-KasımPasha	Multi	Transverse Rectangle Plan	Closed	Mixed	1	1
28	Şehzade Mosque- İstanbul	Multi	Square Plan	Courtyard	Cut Stone	2	2
29	Lala Mustafa Pasha Mosque-Erzurum	Multi	Square Plan	5 Sectioned Portico	Cut Stone	1	1
30	Süleymaniye Mosque-İstanbul	Multi	Square Plan	Courtyard	Cut Stone	4	3
31	Kılıç Ali Pasha Mosque-Tophane	Multi	Longitudinal Rectangle Plan	5 Sectioned Portico	Cut Stone	1	1
32	Topkapı Kara Ahmet Pasha Mosque	Multi	Transverse Rectangle Plan	Courtyard	Cut Stone	1	1
33	Kadırga Sokullu Mehmed Pasha Mosque	Multi	Transverse Rectangle Plan	Courtyard	Cut Stone	1	1
34	Fındıklı Molla Çelebi Pasha Mosque	Multi	Transverse Rectangle Plan	5 Sectioned Portico	Cut Stone	1	1
35	Babaeski Semiz Ali Pasha Mosque	Multi	Transverse Rectangle Plan	5 Sectioned Portico	Cut Stone	1	1
36	Sinan Pasha Mosque- Beşiktaş	Multi	Transverse Rectangle Plan	5 Sectioned Portico	Mixed	1	1
37	Atik Valide Mosque-Üsküdar	Multi	Transverse Rectangle Plan	5 Sectioned Portico	Cut Stone	2	1
38	Rüstem Pasha Mosque-Tahtakale	Multi	Transverse Rectangle Plan	5 Sectioned Portico	Cut Stone	1	1
39	Mihrimah Sultan Mosque-Edirnekapı	Multi	Transverse Rectangle Plan	7 Sectioned Portico	Cut Stone	1	1
40	Mesih Mehmet Pasha Mosque-Fatih	Multi	Transverse Rectangle Plan	5 Sectioned Portico	Cut Stone	1	1
41	Mihrimah Sultan Mosque-Üsküdar	Multi	Transverse Rectangle Plan	5 Sectioned Portico	Cut Stone	2	1
42	Gözleve(Kırım) Tatar Han Mosque	Multi	Transverse Rectangle Plan	5 Sectioned Portico	Mixed	2	1
43	Zal Mahmud Pasha Mosque-Eyüp	Multi	Transverse Rectangle Plan	5 Sectioned Portico	Almaşık*	1	1
44	Muradiye Mosque-Manisa	Multi	Transverse Rectangle Plan	5 Sectioned Portico	Cut Stone	2	1
45	Azapkapı Sokullu Mosque	Multi	Transverse Rectangle Plan	Closed	Cut Stone	1	1
46	Selimiye Mosque-Edirne	Multi	Transverse Rectangle Plan	Courtyard	Cut Stone	4	3
47	Payas Sokullu Mehmet Pasha Mosque	Multi	Cross Plan (atypical)	3 Sectioned Portico	Cut Stone	1	1
48	Nişancı (Mehmet Pasha) Mosque-Karagümrük	Multi	Cross Plan	5 Sectioned Portico	Mixed	1	1

In the history of architecture, porticoes have spread from residential architecture in hot climates. This space was preferred for protection from the sun rather than rain and wind. The practice, which started with a portico at the entrance of residential architecture, has become a style-defining element in Islamic architecture (Mülayim, 2008). This tradition, which continued during the Sinan period, was applied differently. The double portico is one of them. Although there are opinions that Sinan was not the first to use the double portico in design, it has been identified with him and has become widespread[11]. Sinan used the double portico in many buildings in and outside the capital. The first

[11] If the outer portico of the Çorlu Süleymaniye Mosque of 1512-13 was not built later, it was constructed before the Üsküdar Mihrimah Sultan Mosque, the first mosque where Sinan used the double portico (Kuran, 1986).

double portico application in Istanbul was made in Üsküdar Mihrimah Sultan Mosque. After Mihrimah Sultan Mosque, double porticoes were used in the Tahtakale Rüstem Pasha Mosque in Istanbul (Orbeyi, 2016, p. 213). The first portico application outside Istanbul was made in Tekirdağ Rüstem Pasha Mosque (Necipoğlu, 2013, p. 434). 18 Sinan mosques that have survived to the present day have double porticoes. Of these, 3 of them are single domed. The last congregation has three double porticoes (Damascus Süleymaniye, Mostar Sofu Mehmet Bey, Çatalca Ferhat Paşa mosques), 6 of them are single domed, and five double porticoes (Tekirdağ Rüstem Paşai Aleppo Adliye, Diyarbakır Behram Paşa, Greece Trikkale Osman Şah, İzmit Pertev Pasha, Kayseri Kurşunlu Mosques), Lüleburgaz Sokullu Mehmet Pasha Mosque with nine sectioned, seven mosques with five sectioned and double porticoes (Üsküdar Mihrimah Sultan, Beşiktaş Sinan Pasha, Tahtakale Rüstem Pasha, Babaeski Semiz Ali Pasha, Atik Valide, Kılıç Ali Pasha and Mesih Mehmet Pasha mosques). The 7-eyed Edirekapı Mihrimah Sultan Mosque has a double portico.

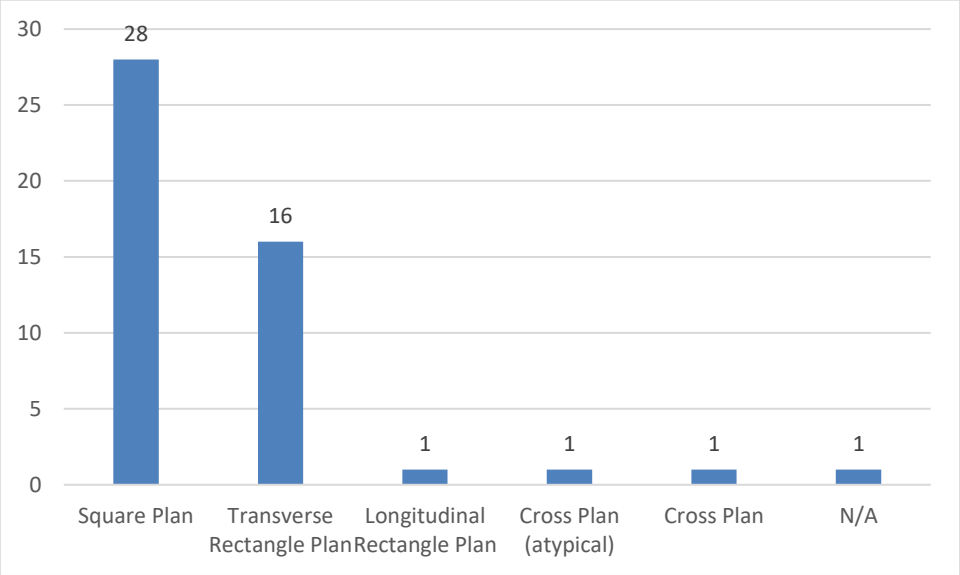


Figure 2. Number of Mosques Due to Plan Type.

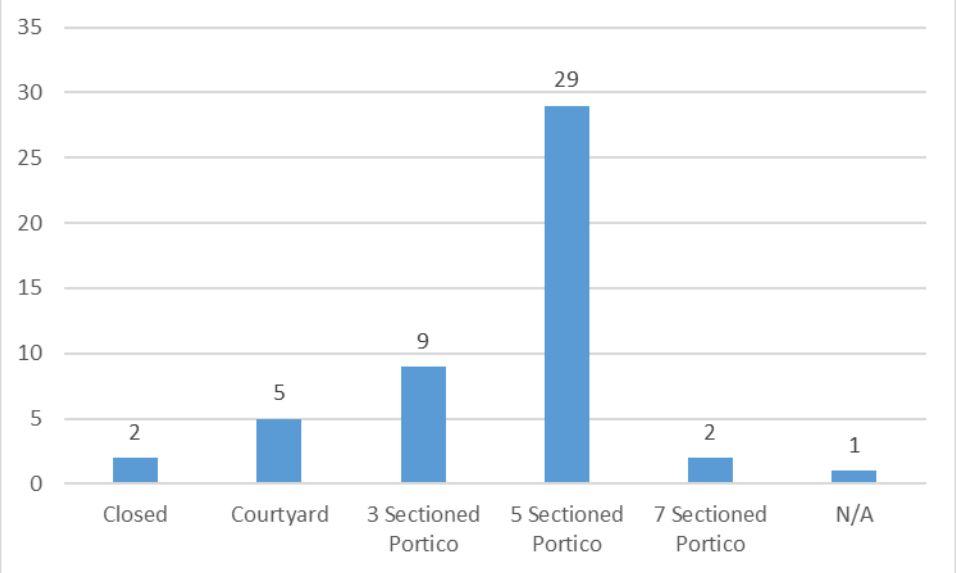


Figure 3. Number of Mosques Due to Last Congregation Place.

When the buildings are evaluated in terms of the materials used, it is seen that there is the use of

almaşık[12] system, cut stone, and 2-coloured cut stone. Istanbul-Haseki Mosque, Edirne-Defterdar Mustafa Pasha Mosque, Greece Osman Şah Mosque, Istanbul-Çarşamba Habeşi Mehmet Ağa Mosque, Silivri Hadım İbrahim Pasha, Eyüp Zal Mahmud Pasha Mosque and Beşiktaş Sinan Pasha Mosques, seven mosques were built with stone and brick in an almaşık system. Two colors of cut stone were used in 4 mosques, namely Diyarbakır Behram Pasha Mosque, Hadım Ali Pasha Mosque, Van Köse Hüsrev Pasha Mosque, and Diyarbakır İskender Pasha Mosque (Figure 4).

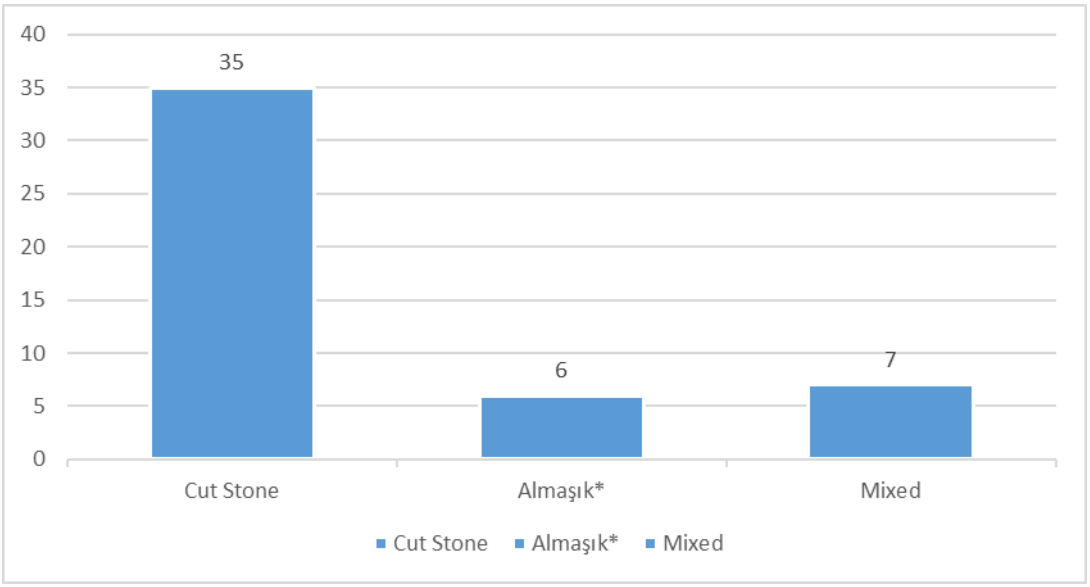


Figure 4. Used Materials.

27 analyzed buildings were built outside Istanbul, and 21 were built in Istanbul. The Ottoman sultans Suleyman the Magnificent, Murat III, and Selim II built six of the mosques. One was built by the Crimean Khan Devlet Giray I. Haseki Sultan Mosque in the name of Hürrem Sultan, and Atik Valide Mosque in the name of Nurbanu Valide Sultan, the mother of Murat III. Edirnekapı and Üsküdar Mihrimah Sultan mosques were built for Mihrimah Sultan, daughter of Suleyman the Magnificent. Eyüp Zal Mahmut Pasha Mosque was built by Selim II's daughter Şah Sultan and her husband (Vizier) Zal Mahmut Pasha, and Kadırga Sokullu Mehmet Pasha Mosque was built by Sokullu Mehmet Pasha and Selim II's daughter İsmihan Sultan. Among the mosques built by Mimar Sinan, the number of those built for Grand Vizier Sokullu Mehmet Pasha and Rüstem Pasha is seven (including Bolvadin). Apart from these, five mosques were built for viziers, 2 for Captains Piyale Pasha and Sinan Pasha, 5 for governors, and 16 for pashas who held various positions (beylerbeyi[13] (governor), defterdar[14], kaptan-ı derya (sailor), lala, etc.) (Figure 5).

The influence of the *bani*[15] on the plan features of these mosques should not be ignored. Although it appears in all of Mimar Sinan's autobiographies, some researchers find it inconceivable that after realizing the Selimiye Mosque in Edirne, the architect 'returned' to this in-depth plan type, which 'contradicted the spatial conception of Ottoman classical architecture' (Kuran, 1986, p. 214-215). Therefore, the mosque is generally attributed to one of Sinan's journeymen, and its plan, which consciously adopted the Hagia Sophia model, is interpreted as Kılıç Ali Pasha's 'personal request' (Kuran, 1986, p. 214-215; Kuban and Emden, 2007, p. 111). The mosque built in Kılıç Ali Pasha's name allowed the architect to update the archaic Byzantine church-type plan of the Hagia Sophia Mosque by translating it into Ottoman architectural forms (Necipoğlu, 2013, p. 573). Piyale Pasha

[12] The meaning of "almaşık" is "a wall formed by a series of different materials (brick and stobe as examples) arranged consecutively from bottom to top".
[13] The person responsible for the administration of a province during the Ottoman Empire.
[14] Head of the financial department
[15] Builder (person), founder

Mosque in Kasımpaşa is also an interpretation of the archaic plan type and has six domes with multi-units in the style of the great mosques of the Early Ottoman period. Since the mosque is mentioned only in Tuhfetü'l Mimarin and deviates from the typical style of Mimar Sinan, it is usually attributed to another special architect and the personal taste of its builder.[16]

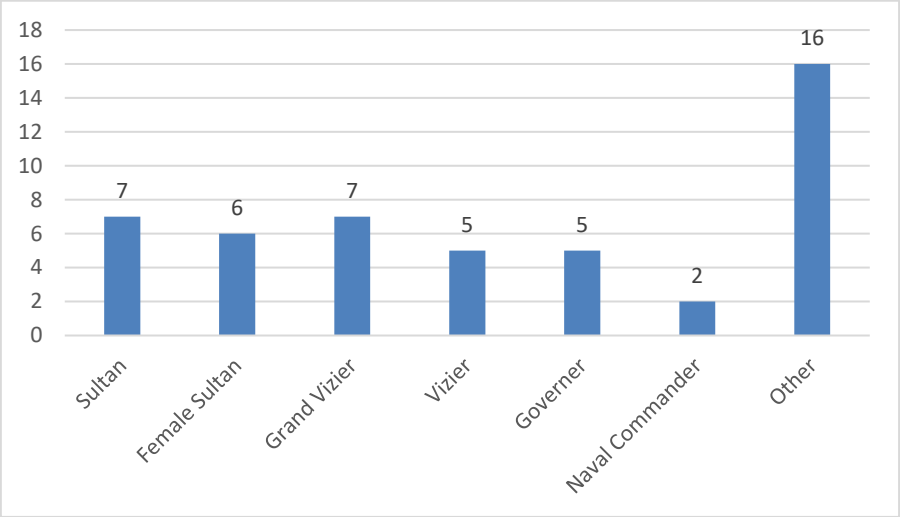


Figure 5. Mosques' Number Due to Constructed by.

The minaret, an integral part of the mosque structure of the classical period, rises on both sides of the building in sultan mosques, which is important in balance. Since it is against the tradition to build two or more minarets except for sultans, the asymmetrical façade layout created by a single minaret was a problem that Ottoman architects sought solutions to. Of the mosques built by Mimar Sinan, 36 have a single minaret with a single balcony in the northwest direction, and 3 have a single minaret with a single balcony in the northeast direction. Kasımpaşa Piyale Mosque is an exception and has a single minaret with a single balcony in the north direction on the central axis. Among the five mosques with two minarets and a single balcony, Damascus Süleymaniye, Karapınar Sultan Selim, and Manisa Muradiye Mosques are mosques built in the name of sultans. The Üsküdar İskele Mosque, built in the name of Mihrimah Sultan, and the Atik Valide Mosque, built in the name of Nurbanu Valide Sultan, wife of Selim II and mother of Murat III, have two minarets. However, the sultans themselves did not build them. Şehzade Mosque has two minarets with two balconies, Süleymaniye Mosque has two minarets with two balconies and two with three balconies, and Selimiye Mosque has four minarets with three balconies (Table 4). It is thought that the Edirnekapı Mihrimah Sultan Mosque was originally planned to have two minarets, but the second minaret was not built (Kuban, 1997). Goodwin speculates that Sultan Selim II deprived his jealous sister of the privilege of using a double minaret (Goodwin, 1993, p. 49). Necipoğlu (2013) interprets this issue as Mihrimah's declining official status, now the sister of the reigning sultan, may have necessitated a renegotiation of etiquette. The mosques Sinan would later build for Selim II's daughters, Ismihan Sultan and Şahsultan, also lack double minarets. This can also be interpreted as reflecting the diminishing importance of the lady sultans as their number increases.

[16] Sources attributing the mosque to Mimar Sinan: Aslanapa (1986): 278-81; Tanman (1989). Others exclude this mosque from the Sinan corpus: Goodwin (1993): 276-77; Kuban (1997): 118; Kuran (1987): 126

Table 4. Distribution Due to Minaret Property.

Minaret Number	Number of Mosques	Minaret Balcony Number	Number of Mosques
1	39	1	45
2	7	2	1
4	2	3	2

EXAMINATION OF THE STRUCTURAL ELEMENTS

By observing the structural system in Mimar Sinan's mosques, it is seen that the main issue again focuses on whether the buildings are single-domed or multi-domed. As the name suggests, the upper cover is shaped as a single dome in single-domed mosques. In multi-domed mosques, it is seen that the main domes, half domes, small domes, and exedra (dome piece) come together in different variations and numbers. In addition, although it is seen that the load is transferred only to the walls in some mosques, some of them have load-bearing columns/pillars. In this system, which is called baldachin[17], the harim space has developed around this structure. The mosques in this group are grouped as four, six, and eight-pillared. Silivri Hadım İbrahim Pasha, Edirnekapı Mihrimah Sultan, Eyüp Zal Mahmud Pasha mosques have four pillars and a single dome, Üsküdar Mihrimah Sultan, İstanbul Şehzade, Süleymaniye and Tophane Kılıç Ali Pasha mosques have four pillars and half domes, Erzurum Lala Mustafa Pasha Mosque has four pillars and a vault. Beşiktaş Sinan Paşa, Topkapı Kara Ahmet Paşa, Fındıklı Molla Çelebi, Babaeski Semiz Ali Paşa, Üsküdar Atik Valide Mosque and Kadırga Sokullu Mosques are six-pillared mosques and Tahtakale Rüstem Paşa, Edirne Selimiye, Azapkapı Sokullu, Üsküdar Şemsi Ahmet Paşa, Karagümrük Nişancı Mehmet Paşa and Fatih Mesih Mehmet Paşa mosques are eight-pillared mosques (Figure 6).

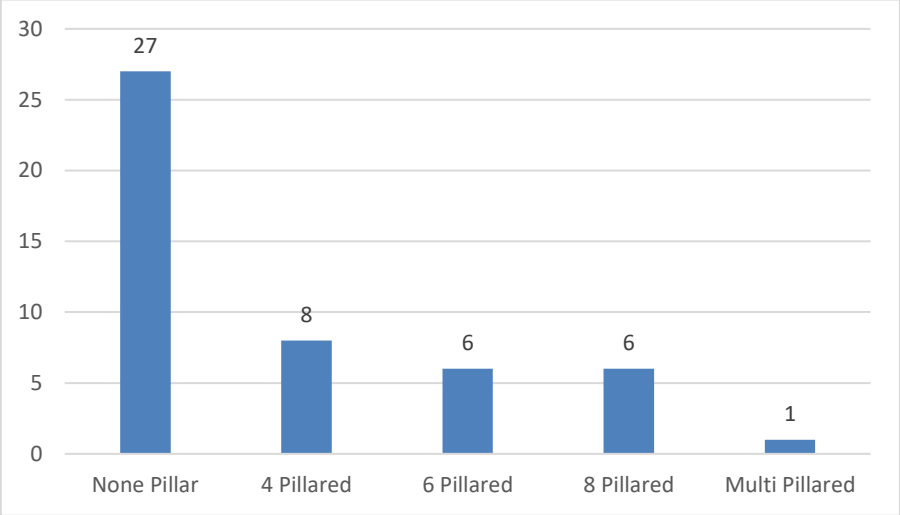


Figure 6. Pillar Numbers.

Another issue that can be evaluated on the load-bearing system is the transition elements to the main dome. In early Ottoman architecture, the transition from the main-body walls to the dome was usually made with the Turkish triangle, and the round dome was placed on 16 or more angular bases formed by triangles. In this period, triangular elements were used to transition from square to octagonal; sometimes tromps/squinches were benefited, but pendentive was rarely used. In the classical period,

[17] Baldaken/baldachin is the most important structural system forming the core of Classical Period Ottoman mosques. This system was formed by placing the main dome on the structure formed by the pillars connected to each other by suspension arches.

triangles were replaced by pendentives. The pendentive is the transition system that transfers the load of the dome to the corners of the square cube. Therefore, the most rational use of the pendentive is the four-arched baldachin that rests on the pillars at the corners. For this reason, the most striking example of a building system with pillars is in Edirnekapı Mihrimah Sultan Mosque. Here, the non-bearing walls are pierced like tulle with windows, the four large arches shouldering the dome are beared in front of the walls, and the baldachin is indicated (Kuran, 1986, pp. 92-3). In the examined mosques, sometimes only pendentives were used in the transition to the main dome, and in some cases, squinches and pendentives were used together. The transition system of Bolvadin Rüstem Pasha Mosque is unknown. There are 15 mosques with four pendentives and no squinch in the main dome (Konya Ilgın Lala Mustafa Pasha, Damascus Süleymaniye, Çatalca Ferhat Pasha, Konya Karapınar, Isparta Firdevs Bay, Kütahya Lala Hüseyin Pasha, Greece Kara Osman Şah, Kayseri Hacı Ahmet Pasha, Lüleburgaz Sokullu Mehmet Pasha, Erzurum Lala Mustafa Pasha, Edirnekapı Mihrimah Sultan, Gözleve Tatar Han Mosque, Eyüp Zal Mahmut Pasha, Manisa Muradiye and Payas Sokullu Mehmet Pasha mosques). The number of mosques with four squinches and eight pendentives on the main dome is 21 (Mostar Hacı Mehmet Pasha, Ankara Cenabı Ahmet Pasha, Edirne Defterdar Mustafa Pasha, Havsa Sokullu Mehmet Pasha, Üsküdar Şemsi Ahmet Pasha, Diyarbakır Hadım Ali Pasha, Van Köse Hüsrev Pasha, Diyarbakır Köse Hüsrev Pasha, Diyarbakır İskender Pasha, Aleppo Hüsrev Pasha, Istanbul Haseki, Silivri Hadım İbrahim Pasha, Çarşamba Habeşi Mehmet Ağa, Tekirdağ Rüstem Pasha, Aleppo Adliye, Diyarbakır Behram Pasha, İzmit Pertev Mehmet Pasha, Tahtakale Rüstem Pasha (4 exedra), Fatih Mesih Mehmet Pasha, Azapkapı Sokullu Mehmet Pasha, Edirne Selimiye and Karagümrük Nişancı Mehmet Pasha mosques). The number of mosques with four squinches (exedra) and four pendentives in the main dome is 3 (Istanbul Süleymaniye, Tophane Kılıç Ali Paşa and Üsküdar Mihrimah Sultan mosques). The number of mosques with four squinches and six pendentives is 2 (Topkapı Kara Ahmet Pasha and Kadırga Sokullu Mehmet Pasha mosques), and the number of mosques with six pendentives without squinches is 4 (Fındıklı Molla Çelebi, Babaeski Semiz Ali Pasha, Beşiktaş Sinan Pasha and Üsküdar Atik Valide mosques). In the Şehzade Mosque in Istanbul, the main dome has eight squinches (exedra) and four pendentives. In Piyale Pasha Mosque, a co-domed structure, there are four pendentives in each dome (Figure 7).

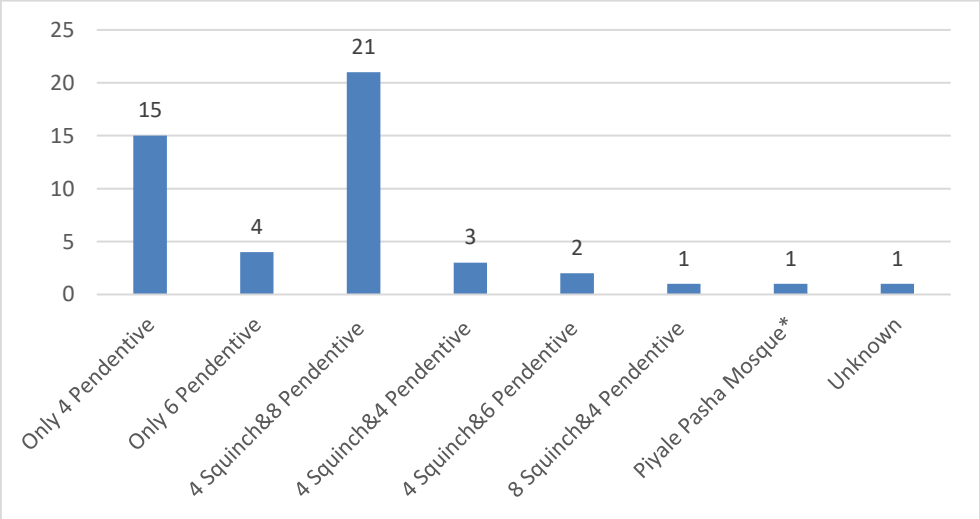


Figure 7. Dome Transition.

CONCLUSION

The great master Mimar Sinan, who left his mark on the Ottoman classical period, designed nearly 400 different types of buildings such as mosques, baths, caravanserais, madrasahs, imaret, darüşşifa, aqueducts and fountains in the 50 years he worked as a chief architect. The most decisive factor in the spatial and plan organization of mosques, which constitute the most important of these building groups, is the load-bearing properties of the domes. The dome, which is a structural and symbolic cover, matured in the hands of Mimar Sinan and gained a new meaning/identity. This study shows that

Mimar Sinan made different compositions and structural experiments in each of his buildings. Using single dome or multiple support systems such as quadrangular, hexagonal, and octagonal baldachin, Sinan constructed the plan of the building within the framework of these systems. In the buildings outside Istanbul, where he could not supervise the construction process, it is seen that Sinan rationally favored simplicity. He used this method in the Damascus Süleymaniye complex, the construction of which was carried out by a foreman and local architects.

Unlike the madrasahs and baths in the same complex/structure group, almost all mosques were built with cut stone. Especially in some mosques where local styles are predominant, buildings are built with a two-colored stone or stone-brick interlocking system. In the Payas Sokullu Mehmet Pasha Mosque, the black-and-white two-colored interlacing of the uniform ashlar walls is attributed to the Zengi and Mamluk traditions.

The asymmetrical façade layout caused by the minaret, an important part of Ottoman classical period mosques, was a problem that Mimar Sinan sought a solution to. The Kasımpaşa Piyale Paşa Mosque is the only example where the minaret is located on the central axis, and in the remaining mosques, it is located in the northwest or northeast direction. Piyale Pasha Mosque is the only example of the co-domed selatin mosque type, which occupied an important place in the early Ottoman period, built by Mimar Sinan.

Sinan started with a simple square plan and designed domes, half domes, and exedras as coverings on four, six, and octagonal plans. In Sinan's first masonry domed mosques, imitation based on tradition is seen at the forefront rather than innovation-oriented creativity. The best example is the Haseki Sultan Mosque, which repeats the Gebze Çoban Mustafa Pasha Mosque. As for the Üsküdar Mihrimah Sultan Mosque and the Şehzade Mosque, which were completed on the same date, it can be argued that the Mihrimah Sultan Mosque was planned earlier, but due to the interruption of the Şehzade Mehmet Tomb and mosque by order of Suleyman the Magnificent, the Mihrimah Sultan Mosque was completed in a longer period than necessary. When the two mosques are compared, it is suggested that Mihrimah Sultan is closer to the architecture of the Bayezid II period than the Şehzade Mosque. This study shows no clear order in Mimar Sinan's design line regarding plan schemes and that the master tried one scheme, switched to another scheme, and then went back and tried a different version of the previous scheme. The Kadırga Sokullu Mehmet Mosque is closer to the Ottoman classical architectural ideal than the Kara Ahmet Pasha Mosque, which was designed according to a hexagonal scheme, because here the interior pillars of Kara Ahmet Pasha were omitted, and the covering system formed by the central dome fed by four half domes was directly mounted on the main-body walls. The removal of the internal carriers increases the sense of spatial integrity. Instead of four half domes in Kara Ahmet Pasha and Kadırga Sokullu Mehmet Pasha, a new form was attempted with five half domes in Fındıklı Molla Çelebi and Babaeski Semiz Ali Pasha. Molla Çelebi's half dome covering the mihrab projection is deeper than the other half domes. In the Babaeski Semiz Ali Pasha Mosque, the five half domes were built in pairs.

Sinan, who built the Şehzade Mosque, which he called his apprenticeship work, the Süleymaniye Mosque, which he called his foreman work, and the Selimiye Mosque, which he called his master's work, built the Kılıç Ali Pasha Mosque, where the linear position of the central space, which was extended in the direction of the qibla with half domes on both sides, was further emphasized with the addition of the mihrab projection. Kılıç Ali Pasha is indeed the closest Ottoman Mosque to Hagia Sophia. It is seen that Sinan, who made great efforts to achieve spatial unity in mosque architecture, went to an arrangement that divides the space with column rows in Kılıç Ali Paşa Mosque, and that a master who, starting from Şehzade Mehmet Mosque, softened the corners of the cubic base on which the central dome sits and gradually passed the superstructure to the body walls, 35 years later returned to the heavy and sharp-cornered dome system of Hagia Sophia and used the Hagia Sophia plan scheme once again without bringing new interpretations. This situation can be attributed to the fact that the mosques built in Mimar Sinan's last periods have traces of his journeymen, and some of the buildings were even built directly by his journeymen. Although the mosques of Çarşamba Mehmet Aga, Mesih Pasha, and Nişancı Mehmet were completed while Sinan was still alive, all three of them are the

works of Davut Aga, who was appointed as chief architect after Sinan.

In this study, 48 domed mosques built by Mimar Sinan were analyzed and typologically evaluated based on various architectural and structural features. It is thought that this study will make an important contribution to the field in terms of reaching various numerical data by considering this type of structure built by Mimar Sinan as a whole. Afterward, it is considered that it will be possible to analyze the structural features and elements of these buildings in quantitative methods or frameworks.

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