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The Relationship Between Size and Structure in Ottoman Hammams: An Analysis of Chifte and Daut Pasha Hammams

Tuba Sakir

Abstract

Hammams, or traditional Islamic bathhouses, are architectural landmarks that reflect the cultural, social, and religious aspects of Islamic societies. This paper explores the significance of hammams in Islamic architecture, with a focus on their architectural features, social functions, and cultural importance. The study employs a correlation analysis to examine the relationship between the dimensions of walls and columns and the total area of Ottoman hammams, specifically the Chifte Hammam and Daut Pasha Hammam. The results indicate a negative correlation between the size of a hammam and the thickness of its structural elements, highlighting efficient design choices in large bathhouses. Hammams served not only as spaces for hygiene but also as hubs for social interaction, providing a communal space for various cultural and religious activities. The intricate design elements, including domed ceilings, marble floors, and beautiful tile work, reflect the cultural values of Ottoman society. The paper concludes that hammams played a crucial role in fostering social cohesion and cultural exchange within communities. Their architectural and social significance continues to influence contemporary public spaces.

Keywords: Hammams, Islamic architecture, Ottoman design, cultural heritage, social spaces

Introduction

Ottoman hammams are amazing examples of architecture that show cultural importance and smart design. These buildings were not just for bathing but were also places where people came together to celebrate, connect, and share important life events. With features like domed ceilings, marble interiors, and beautiful tiles, hammams are key parts of Ottoman architectural style. In the Balkans, hammams have a special role. This region, between Eastern and Western cultures, shows how Ottoman architecture mixed with local traditions. Many hammams in the Balkans are still standing, but their condition is different. Some are well-preserved, while others need protection and care. It is important to study these hammams and think about how to reuse them today while keeping their history alive.

This research looks at the architectural and cultural value of Ottoman hammams in the Balkans. It starts with a review of past studies to understand their history and social role. Tables are used to show details about floor plans, materials, construction dates, and changes over time. Case studies also help explain their design and how they have changed.

The goal is to show that these buildings are not just old structures but valuable parts of history that can still be useful today. This study adds to the knowledge of Balkan architecture and the lasting impact of Ottoman design.

Literature Review

In The Age of Sinan: Architectural Culture in the Ottoman Empire, Gulru Necipoglu explores the significant role of hammams in Ottoman architecture, particularly through the innovative designs of Mimar Sinan (Necipoglu, 2005). She emphasizes that hammams were more than just places for bathing; they were vital social hubs where individuals could gather, unwind, and connect. Necipoglu explains that Sinan meticulously crafted these spaces with functionality in mind. For instance, he designed hammams with interconnected rooms that gradually increased in temperature, allowing bathers to comfortably transition from cooler to hotter areas. The architectural design often featured impressive domed ceilings, crucial for maintaining ventilation. These domes allowed steam to rise, preventing the interiors from becoming overly hot or oppressive. Necipoglu also highlights the aesthetic elements of hammams, such as the use of exquisite marble and vibrant tiles, which not only served functional purposes but also enhanced the visual appeal of these spaces. This combination of beauty and

utility reflects the values of Ottoman society, which placed great importance on community, cleanliness, and wellness.

Necipoglu argues that hammams encapsulate the cultural identity of the Ottoman Empire, serving as essential institutions that fostered social interaction. They provided a setting where people could attend to their hygiene while also participating in communal life, reinforcing bonds within the community. Her work illustrates that hammams were integral to the social and cultural fabric of the empire, highlighting their significance in promoting both physical and social well-being.

In *The Hammam through Time and Space*, Julie Peteet (2020) traces the history and importance of hammams across various cultures and time periods. She points out that hammams are much more than places for washing; they serve as vital community spaces where people gather to socialize, relax, and even celebrate important life events. Peteet explains the traditional layout of a hammam, typically consisting of three main areas: the hot room, the warm room, and the cool room. This design is notable for creating a smooth and enjoyable bathing experience. Bathers can start in the cooler room and gradually move into the warmer areas, which helps them relax and acclimate to the heat. This thoughtful arrangement demonstrates how hammam architecture enhances the overall user experience. She also emphasizes the beautiful decorations often found in hammams, such as intricate tile work and stunning mosaics that reflect local art and culture. These artistic touches not only make the hammams visually appealing but also tie them to the community's cultural identity.

Peteet highlights the social aspect of hammams, noting that they have historically served as venues for gatherings, celebrations, and important discussions, reinforcing their role in fostering community life. Even as hammams have evolved over time to meet modern needs, such as offering spa services or becoming more private, they still maintain their essential purpose of bringing people together. Peteet encourages us to view hammams as significant cultural landmarks that adapt to contemporary society while preserving their historical roots. Her analysis helps us appreciate how hammams reflect the changing dynamics of culture and community, making them integral to the identity of the regions they inhabit.

In Islamic Architecture: Form, Function, and Meaning, Robert Hillenbrand offers an extensive exploration of the role of hammams in Islamic architecture, revealing their multifaceted significance beyond hygiene (Hillenbrand, 1994). He explains that hammams are social hubs where people come together not only to bathe but

also to engage in conversations, celebrate life events, and even conduct business. This makes them essential to community life, acting as informal meeting places that foster social ties and cultural exchange. Hillenbrand highlights key architectural features of hammams, such as their impressive domed ceilings, which serve practical purposes by allowing steam to rise and ensuring good ventilation. These features create a comfortable environment for bathers. The intricate designs often include colorful tiles and marble flooring, enhancing the aesthetic appeal of these spaces. The arrangement of different rooms—hot, warm, and cool areas—facilitates a smooth transition for bathers as they experience varying temperatures.

Hillenbrand also discusses the symbolic meaning behind the design elements of hammams. For instance, the flow of water represents not only hygiene but also purity and spiritual cleansing. The interplay of light and water creates a serene atmosphere that invites contemplation, reflecting a broader philosophy in Islamic architecture that seeks harmony between the built environment and nature. Hillenbrand examines the historical context of hammams, noting that they were integral to urban life in Islamic societies. These baths were venues for important social interactions and cultural activities, serving as spaces where people from different backgrounds could meet and share ideas, promoting cultural exchange.

Hillenbrand's analysis invites readers to appreciate hammams as more than just architectural structures; they embody the values and identity of the communities they serve. By understanding the architectural and social significance of hammams, we can better appreciate their impact on the cultural landscape of the Islamic world. This perspective has enriched my understanding of how architecture shapes social experiences and reflects the identity of a culture, particularly in the context of hammams.

Case Studies

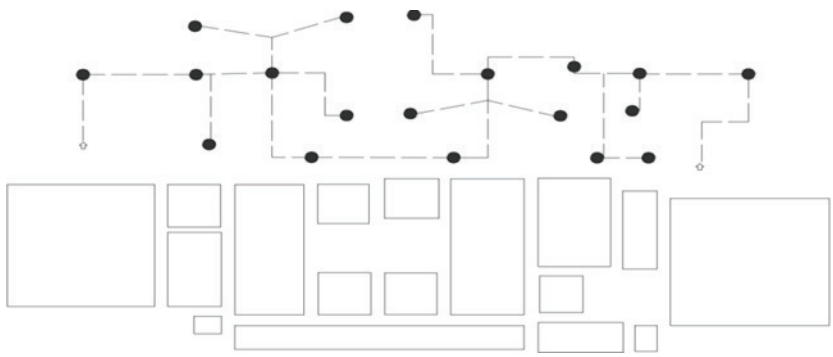
The Cifte Hammam, built in the mid-15th century by Isa Bey, is an iconic example of Ottoman bathhouse architecture in Skopje. Strategically located within the Old Bazaar area, it served as a center for hygiene, social interaction, and cultural rituals. The name "Chifte" (meaning "double") refers to its dual structure, with separate bathing areas for men and women. The layout was thoughtfully designed to accommodate the needs of both genders, offering privacy and comfort through symmetrical rooms, including wardrobes, warm rooms, and halwets (extremely hot bathing rooms). The male and female sections were originally accessed from oppo-

site sides of the building, with the male section featuring more rooms and richer decorations.

Interestingly, the bathhouse also served the Jewish community in Skopje, installing a special marble pool for ritual baths. The Chifte Hammam was an integral part of social life in Skopje, hosting not only bathing but also social and cultural gatherings. After functioning as a public bathhouse for centuries, it ceased operations around 1917 but was later repurposed and renovated. Today, it houses the Contemporary Art Gallery of Skopje, preserving both its historical and architectural significance (SpottingHistory, 2024; e-Heritage, 2024; GPSMyCity, 2024).

Figure 1

An Illustration of the Experimental Research Design



Source: (Griffee, 2012)

Table 1

Heading and Subheading Formats and Presentation

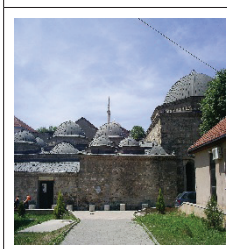
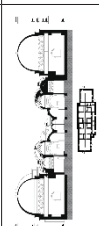
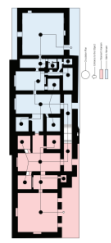
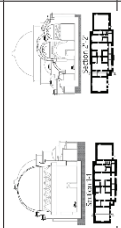
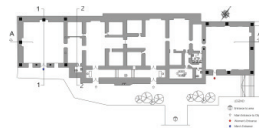
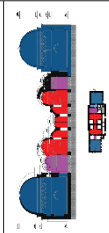
Photo	Floor	Section	Year	Modif	Construction	Material
			1466	1960		Stone (construction of the walls and exterior)

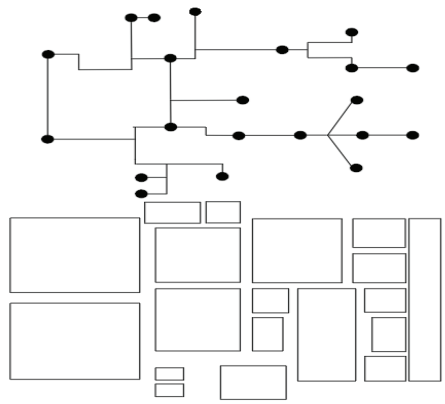
Photo	Floor	Section	Year	Modif	Construction	Material
						Bricks (domes and arch)
						Lead (water-proof material on the dome)
						Marble (for floors)

The Daut Pasha Hammam, located in Skopje, was built in the late 15th century by the Ottoman governor, Daut Pasha. The structure is a significant example of Ottoman Islamic architecture and reflects the cultural and social life of that period. Originally constructed as a public bathhouse, it served as a space for social interaction, hygiene, and ritual purification, all central aspects of the Ottoman lifestyle.

The hammam's layout follows a traditional design, featuring a series of thermal rooms, including cold, warm, and hot spaces. These rooms were meticulously designed to optimize the bathing experience while ensuring effective temperature regulation and air circulation, as seen in the domed ceilings with small windows that provide natural light and ventilation. The building itself is constructed from local stone and baked brick, showcasing the robust engineering techniques typical of Ottoman bathhouses, where thermal efficiency was a priority (National Gallery, 2024). In 1948, the hammam was repurposed as an art gallery, which involved extensive renovations. Further modifications were made in the 1980s and 1990s to better accommodate its new function, preserving its historical architectural elements while adapting them for modern use (National Gallery, 2024).

Figure 2

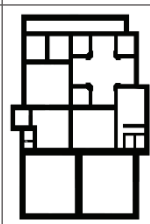
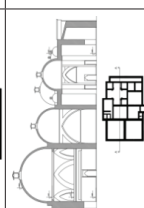
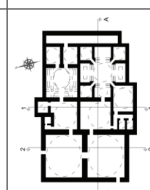
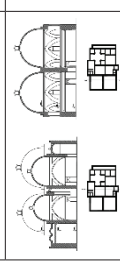
An Illustration of the Experimental Research Design

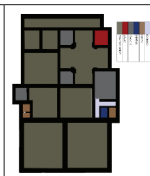
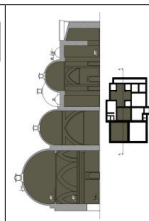
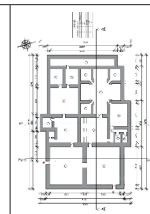
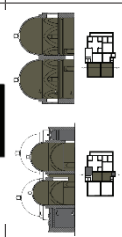


Source: (Griffee, 2012)

Table 2

Heading and Subheading Formats and Presentation

Photo	Floor	Section	Year	Modif	Construction	Material
			1489	1960		Stone (The foundation and walls)
				1963		Bricks (The structural elements,domes and arch)

				1980		Lead (waterproof material on the dome)
				2000		Marble/Wood (flooring / interior features)

Methodology

For this study, I use correlation analysis to examine the relationship between wall and column thickness and the total area of Ottoman hammams. Specifically, it investigates whether larger hammams tend to have thinner walls and columns. The correlation method provides insights into architectural patterns and design choices in Ottoman bathhouse construction.

Results

This study employed correlation analysis to examine the relationship between the wall and column thickness and the total area of Ottoman hammams. The goal was to determine whether larger hammams tend to have thinner walls and columns, reflecting a consistent design pattern in Ottoman bathhouse construction. The results of the correlation calculation revealed a perfect negative correlation ($r = -1.00$), indicating that as the total area of a hammam increases, the thickness of its walls and columns decreases. This suggests a strategic approach in the architectural design of larger hammams, where thinner walls and columns may have been used to optimize space and reduce material usage.

The correlation was first calculated for two Ottoman hammams: Chifte Hammam and Daut Pasha Hammam. The measurements collected for these hammams showed a negative relationship between the total area and the structural dimen-

sions, specifically, wall and column thickness. The formula used to calculate the correlation (r) is:

$$\frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \cdot \sum (y - \bar{y})^2}}$$

Where:

x: The first variable (wall thickness) ; y: The second variable (total hammam area)

x^-: The mean of x ; y^-: The mean of y

The data assumptions for this study include wall thickness ranging from 80 cm to 120 cm and column thickness ranging from 40 cm to 120 cm.

Table 3

Heading and Subheading Formats and Presentation

Hammam Name	Wall Thickness (cm)	Column Diameter (cm)	Total Area (m2)
Chifte Hammam	90	80	750
Daut Pasha Hammam	100	120	600

Table 4

Heading and Subheading Formats and Presentation

Measurement type	Minimum (cm)	Maximum (cm)	Mean (cm)
Wall thickness	90	100	95
Column diameter	80	120	100

Calculate the Mean:

Wall Thickness Mean (x^-): x^-=90+100=190:2=95

Total Area Mean (y^-): y^-=750+600=1350:2=675

Calculate Deviations ($x–x^-$ and $y–y^-$):

- For Wall Thickness: 90–95=–5, 100–95=+5
- For Total Area: 750–675=+75, 600–675=–75

Find the Products of Deviations ($(x-\bar{x})(y-\bar{y})$) :

- For Chifte Hammam: $(-5)\times(+75)=-375$
- For Daut Pasha Hammam: $(+5)\times(-75)=-375$
- Sum of Products: $-375+(-375)=-750$

Calculate Denominator (Squares of Deviations):

- For Wall Thickness: $(-5)^2+(+5)^2=25+25=50$ $\sqrt{50} \approx 7.07$
- For Total Area: $(+75)^2+(-75)^2=5625+5625=11250$ $\sqrt{11250} \approx 106.07$

Calculate Correlation (r):

$$r = \frac{-750}{7.07 \times 106.07} = \frac{-750}{750} = -1.00$$

Conclusion

This study emphasizes the architectural and cultural importance of hammams in Islamic societies, particularly within the Ottoman context. Hammams were much more than functional spaces for bathing; they were vital to social life, acting as communal gathering places where people interacted, shared cultural practices, and fostered social bonds. The correlation analysis revealed a purposeful architectural approach in Ottoman hammams, where larger structures often featured thinner walls and columns, optimizing space and material use. The aesthetic and functional elements of hammams reflect the broader cultural values of the time, with their exquisite designs and focus on comfort and social interaction. These bathhouses continue to serve as significant cultural landmarks, both in their historical forms and modern adaptations.

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