Journal of
Engineering Sciences
Faculty of Engineering
Assiut University
JES
مجلة
العلوم الهندسية
كلية الهندسة
جامعة أسيوط
journal homepage: http://jesaun.journals.ekb.eg

Attribution of Heritage Value in Islamic Architectural Features: A Data-Driven Approach Utilizing Expert Contributions

Received 3 June 2025; Revised 1 July 2025; Accepted 1 July 2025

Aya Atef Eltawil [1]
Alaa Mohammed Elaeshy[2]
Tarek Ibrahim Nasreldin [3]

Keywords
Islamic Architecture Features (IAF), Architectural Heritage Values, Expert Survey, Heritage-Based Design, Quantitative Heritage Analysis

Abstract: This study investigates the perceived correlation between Islamic architectural features (IAF) and architectural heritage values in Islamic architecture (AHVIA) via a systematic expert survey. The objective is to use statistics to see how different design features of Islamic architecture relate to important heritage standards, such as meaning, tradition, beauty, and historical importance. A purposeful sample of 50 specialists in architecture, restoration, and heritage assessed the relationships between 9 architectural elements and 14 categories of heritage value. Participants evaluated how nine different features of Islamic architecture—like the skyline, shape, traditional methods, and decorative designs—related to fourteen categories of heritage value. Responses were recorded using a four-point Likert-type scale, and the data were analyzed with simple statistics and charts to find common patterns of connection. The results show that people strongly believe some architectural features are closely linked to specific heritage values, emphasizing how Islamic architecture helps express cultural identity and shared history. By turning expert opinions into data that can be measured, this study provides valuable information that helps create design strategies focused on heritage in urban and architectural projects. The findings endorse initiatives that integrate traditional design principles with modern requirements in culturally significant manners.

1. Introduction

Islamic architecture is acknowledged for its visual richness as well as its symbolic and cultural significance. In modern design and conservation, it is crucial to comprehend how historic architectural elements contribute to or represent heritage values. The incorporation of legacy into architectural practice relies on a precise expression of these values and their connection to design elements.

[1] Assistant Lecturer, Dept. of Arch. Eng., Mansoura Higher Institute of Engineering and Technology, Egypt. ataweel@mca.edu.eg
[2] Associate professor, Dept. of Arch. Eng., Mansoura University, Egypt. arabeskal_arch@yahoo.com
[3] Professor, Dept. of Arch. Eng., Cairo University, Cairo, Egypt. Nasreldin77@yahoo.com

https://doi.org/10.21608/jesaun.2025.391740.1536

Theoretical frameworks frequently associate components like domes, arches, and decorative patterns with cultural identity; however, empirical validation of these associations is necessary. This paper examines how professionals interpret Islamic architectural features (IAF) as representative of heritage values in Islamic architecture (AHVIA). A systematic survey was conducted among a chosen cohort of specialists in the fields of academia, restoration, and urban heritage. Their replies were examined to discern perceived correlations between form and meaning. This research seeks to provide a data-driven basis for the preservation, reinterpretation, and application of Islamic architectural legacy in modern contexts.

1.1. Problem Statement:

Despite the frequent utilization of Islamic architectural features (IAFs) in historic preservation and modern architectural practices, there is a deficiency of empirical evidence regarding their relationship to the overarching architectural heritage values of Islamic architecture (AHVIA). The lack of systematic research connecting particular IAF elements to heritage values constrains our comprehension of how traditional forms express cultural significance and how this can influence heritage conservation, design education, and architectural practice.

1.2. The research hypothesis

posits a significant correlation between Islamic architectural features (IAFs) and the architectural heritage values of Islamic architecture (AHVIA), as assessed by architectural experts.

1.3. Research Question:

What is the perception of architectural experts regarding the correlation between distinct Islamic architectural elements and the diverse classifications of architectural heritage values within Islamic architecture?

Value is a multidimensional concept, referring to the significance, worth, or usefulness attributed to an object, idea, or principle. In philosophy, values are standards or principles that direct people's actions and assessments of what is good, desirable, or valuable. Values are frequently divided into intrinsic value (e.g., truth, beauty) and instrumental value, which is the value of a tool or money as a means to an end [1]. In a heritage and cultural context, values refer to the meanings people assign to places, buildings, or traditions, guiding decisions on what to preserve [2]. In the context of Islamic architecture, value also includes moral, religious, and spiritual aspects, reflecting principles like privacy, harmony, symbolism, and respect for community and nature [3]. Heritage is the culture, customs, and resources that have been passed down from one generation to the next. It also refers to the locations, artifacts, relationships, and historical narratives that we wish to save for the next generations [4]. Heritage is defined as the expertise and experiences of our ancestors, reflected in the traces they left and the values they instilled and which have been witnessed until our present era [3]. The most comprehensive concept of heritage is one that combines tangible and intangible inheritance. Tangible inheritance includes historical landmarks, collections of structures, or locations with "exceptional universal value from the perspective of history, art, or science." Intangible inheritance includes "Oral traditions and expressions, such as performing arts; social practices, rituals, and celebratory gatherings; knowledge and practices concerning nature and the universe; and traditional craftsmanship," as well as language as a carrier of intangible cultural heritage [5]. The heritage value of a historical place is personified in its character-defining elements represented in materials, forms, location, spatial configurations, uses, and cultural connections or meanings [6]. Heritage buildings that have been passed down from the past are an essential part of contemporary life. Historic, aesthetic, and architecturally significant buildings, structures, objects, and locations are all considered to be part of the heritage. These factors are the three criteria used to evaluate whether a site should be placed on the heritage list [7].

2. Literature Review

D.N. Awaliyah (2023) explored Islamic architecture as a symbol of cultural and religious identity. Using qualitative research, the study examines its design principles, cultural influences, and societal roles. The findings emphasize Islamic architecture's adaptability to modernity and regional cultures while preserving its identity and unity [8]. F.A.A. Hassanein et al. (2023) emphasize how Islamic heritage blends tradition with modern designs, preserving values while adapting to contemporary needs. It reflects stability, continuity, and cultural unity, showcasing spiritual, aesthetic, and intellectual values. The study highlights the need to integrate Islamic values into modern design to prevent spiritually lacking designs that fail to express Arab-Islamic identity [9].

F. Zahra et al. (2022) used semiotics to study how Islamic art conveys meanings of divinity, paradise, and the universe through geometric designs, arabesques, calligraphy, and motifs. Unlike fixed heritage art, Islamic decoration is a dynamic form, adapting to changing times and perceptions of space and time [10]. A. Gamal et al. (2021) examine the aesthetic and cultural significance of architectural openings in Islamic architecture, emphasizing their role in connecting interiors and exteriors while showcasing creativity. Elements like doors, windows, entrances, and Mashrabiyya are celebrated for their timeless designs and reflection of Islamic heritage. The study analyzes design variables such as shape, proportions, and decorations, recommending further exploration of Islamic architecture for its distinctive aesthetic values [11].

A. Bokhari et al. (2020) highlight that religious and spiritual values remain central to local architecture, even as societies evolve. It calls for integrating Islamic principles with modern requirements to balance local identity and contemporary design. Privacy, a key Islamic value, continues to shape architecture, adapting to different interpretations across cultures while remaining relevant in modern times [12]. A. Azad (2020) examines the origins and principles of Islamic art, showing how Islamic values shaped its unique aesthetic through geometry, calligraphy, arabesque, and Persian miniatures. Influenced by regional cultures, it left a lasting global impact. The study highlights Islamic art's adaptability and advocates for its evolution by blending modern developments with traditional values to stay relevant [13]. A. Elmansoury (2020) examines the influence of Islamic values and principles in contemporary architecture to create urban spaces that meet users' needs and foster belonging. It analyzes key design criteria to produce functional, aesthetic, and culturally significant environments. Using an inductive analytical approach, the research focuses on Umm Al-Qura University as a case study to evaluate its alignment with Islamic architectural concepts and its role in promoting cultural and educational values [14].

R. S. El Din et al. (2020) examine the architecture of Al-Aqmar Mosque, emphasizing its role in Fatimid heritage. The study identifies key architectural values and traces their influence across historical periods. It highlights the impact of materials, texture, color, shade, and light on design. The research concludes that bridging heritage and contemporary architecture fosters continuity and revival [15]. R. Baygloo (2018) examines the role of beauty and aesthetics in Islamic architecture, viewing beauty as a divine quality rather than a luxury. Unity is emphasized as a core aesthetic principle, forming the foundation of Islamic architectural language, with Paradise serving as an ideal model of aesthetics. Featuring unique ornamentation, colors, and engineering techniques, Islamic architecture spans both secular and religious designs, influencing construction from its origins to the present day [16].

Table 1 presents a synthesized overview of significant academic contributions that support the establishment of the IAF–AHVIA framework. The table illustrates, based on various studies of Islamic architecture and art, how Islamic Architectural Features (IAF)—including geometry,

mashrabiya, malqaf, decorative motifs, and other spatial features—embody both real and intangible heritage values. These values encompass spiritual symbolism, cultural identity, aesthetic cohesion, and adaptability to contemporary requirements. The approaches utilized in these studies—spanning semiotic and historical analysis to qualitative case studies—highlight the multifaceted character of Islamic architecture and affirm the need for a comprehensive evaluation model. This table directly informs the research approach by supporting the dual focus of the IAF–AHVIA framework: evaluating architectural characteristics as vessels of heritage values and correlating design aspects with profound cultural, religious, and social significances. It provides a theoretical and empirical basis for implementing the framework in the case study of the Wekala of Al-Ghuri, ensuring the model is contextually relevant and academically substantiated.

Table 1: Summary of Literature Review: Towards an IAF–AHVIA-Based Methodological Approach (created by the author)

Author(s)	Focus	Key Elements/Values	Methodology	Relevant Contribution to IAF-AHVIA
D.N. Awaliyah (2023)	Islamic architecture as identity	Design principles, adaptability, unity	Qualitative analysis	Highlights cultural and religious identity as core AHVIA dimensions
F.A.A. Hassanein et al. (2023)	Modern adaptation of Islamic heritage	Spirituality, unity, aesthetics	Analytical review	Urges embedding AHVIA in contemporary design to retain identity
F. Zahra et al. (2022)	Semiotic meanings in Islamic art	Geometry, arabesque, calligraphy, motifs	Semiotic analysis	Demonstrates how IAF expresses intangible values (divinity, paradise, cosmos)
A. Gamal et al. (2021)	Aesthetics of architectural openings	Doors, windows, Mashrabiyya, decoration	Design variable analysis	Identifies IAF as tangible expressions of timeless aesthetic heritage
A. Bokhari et al. (2020)	Integration of Islamic values in modern architecture	Privacy, local identity, cultural adaptation	Conceptual reflection	Shows continuity of spiritual and societal values across time and contexts
A. Azad (2020)	Origins of Islamic Aesthetics	Geometry, calligraphy, Persian influence	Historical-analytical	Supports dynamic evolution of IAF with enduring heritage value
A. Elmansoury (2020)	Islamic values in campus design	Belonging, function, culture	Case study (Umm Al-Qura Univ.)	Applies AHVIA to evaluate user-centered Islamic environments
R.S. El Din et al. (2020)	Fatimid architectural heritage	Materials, texture, light, form	Case study (Al-Aqmar Mosque)	Bridges historical AHVIA with contemporary interpretation
R. Baygloo (2018)	Beauty in Islamic architecture	Unity, ornamentation, and the Paradise model	Theoretical-philosophical	Reframes beauty as divine, linking IAF to spiritual dimensions of AHVIA

3. Theoretical Approaches to Understanding Heritage Values in Islamic Architecture Features

3.1. Architectural Heritage Values of Islamic Architecture (AHVIA)

Architectural value is the set of positive principles and characteristics that meet human intellectual, emotional, and physical needs, impacting the individual and society. This value is achieved through

the material and intangible elements of architectural formations within the urban fabric, contributing to the creation of an integrated and sustainable urban environment that meets the requirements of use, aesthetics, and cultural identity. Emotional, cultural, and usage values are the three categories into which architectural values can be separated (refer to Fig. 1); each category contains a set of values [3] that are defined in Table 2.

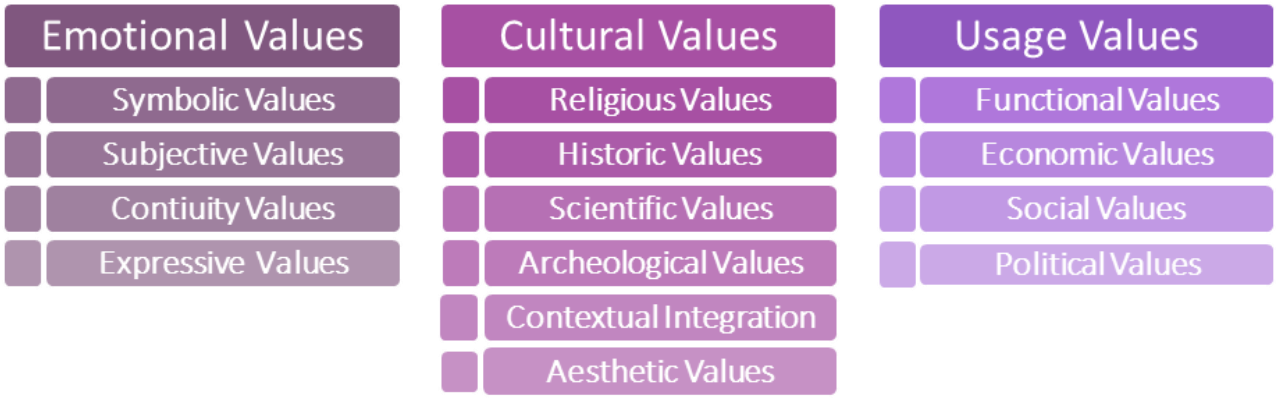

Fig. 1: Classification of Architectural Heritage Values (Illustration: Author)

The same architectural heritage values are included in the Islamic architectural heritage values (AHVIA); see Fig. 1. The following is a summary of each definition [17]:

3.1.1 Emotional values of Islamic architecture: The degree to which a viewer interacts with Islamic architecture in terms of perception, admiration, reflection, and identifying the dimensions and characteristics of form is a measure of the architecture's emotional values. Emotional values include symbolic, subjective, continuity, and expressive values.

3.1.2 Cultural values of Islamic architecture: They are what give Islamic architecture its individuality and character and are the product of the generations' thought. They are summarized in historical, documentary, archaeological, aesthetic, symbolic, scientific, and religious values and integration with the site.

3.1.3 Usage values of Islamic architecture: By designing an urban shape that strikes and preserves a functional balance between human demands, environmental considerations, and economic variables, the architect is able to create simplicity and balance. The economic, social, political, and functional value all reflect this advantage.

Table 2 presents the Concepts of Architectural Heritage Values of Islamic Architecture (AHVIA), with the left column listing the categories of heritage values and the right column explaining the conceptual significance of each value. These themes embody a cohesive comprehension of the integration of intangible cultural and architectural values within Islamic constructed heritage. These concise definitions were provided at the outset of the expert questionnaire to guarantee a clear and consistent comprehension of each historical value category. This allowed participants to assess the relationship between architectural attributes and heritage values with informed consistency and conceptual clarity. The table functions as both a theoretical framework and a methodological instrument that directed the expert-based evaluation procedure in this study.

Table 2: The Concepts of Architectural Heritage Values (AHVIA) ***(Created by the author)***

AHVIA		The Concepts of AHVIA
Emotional Values	Symbolic Values	The symbol evokes an emotional idea, focusing on meditation and reflection to connect with meanings one empathizes with [3]. Islamic architecture uses symbols and design elements to express spiritual concepts. Geometric patterns, central to Islamic art, often originate from a single point, symbolizing unity and reflecting the concept of Tawheed—the oneness of God in Islamic belief. Though the center itself is unseen, it represents the foundation and harmony in Islamic tradition [18].
	Subjective Values	Subjective values refer to architectural features that respect Islamic customs and traditional lifestyles as models of how people can cohabit with their built environment in a particular place and a specific historical period [19].
	Continuity Values	These values are reflected in how generations preserve the inherited values in heritage buildings, which serve as a society's unique stamp over time. It stands for the identity and changing cultural character of a society. Mosques and homes that are still in use today are examples of this continuity. Additionally, it ensures a unified and classic look by establishing smooth linkages between architectural parts, which promotes visual harmony [20].
	Expressive Values	The meanings, feelings, and cultural identity that are communicated through a heritage resource's physical form, artistic expression, or symbolic elements are known as expressive values. These qualities embody a place, structure, or element to express concepts, arouse admiration, or reflect the inventive spirit of a society or era [3]. The relationship between humans and location is split into gradual harmony (building shape and proportions) and functional harmony (form and function integrate efficiently). The crystallized beauty of the heritage structure, which is based on geometric relations and compatible proportions, along with the Muslim artist's ingenuity in creating an infinite variety of ornamentation and openings, expresses cultural values. Admiration for functionality occurs in the efficient and contained architectural space for social, economic, and climatic conditions. [21].
Cultural Values	Religious Values	Religious values have historically shaped city planning, influencing urban design and the social, cultural, and political fabric of communities. These values appear clearly in the social practice of homes, where the privacy of the Muslim person is preserved for his home and for others. The religious dimension of Islam also appeared in the prohibition of depicting and representing living creatures in sculpture, and as a result, Muslim artists created abstract Islamic motifs [22].
	Historic Values	Historic value includes all aspects of history, for example, the history of aesthetics, art and architecture, science, spirituality, and society. As a result, it frequently supports other values. A place may have historic value because it has affected, or has been affected by, a historical event, phase, movement, or activity; person; or group of people [23]. Historic value in architecture represents heritage significance that grows over time, either symbolically or temporally. Symbolism reflects a structure's connection to a specific era, culture, or event, while temporality depends on its longevity and preservation [24].
	Scientific Values	Scientific Values reflect the technology of the age through construction methods and building materials. In Islamic architecture, the integration of artistic and architectural ideas with scientific and mathematical concepts in the planning and construction is referred to as having scientific value. In addition to producing aesthetically spectacular architectural marvels, this integration expanded knowledge and techniques that still have an impact on architectural practices today [25].
	Archeological Values	This value appears in architecture and urban planning, as architecture becomes a relic with the passage of time due to the change in circumstances and influences and becomes a witness to past eras. Its archaeological value increases with the presence of the rarity factor, and it is a unique human creative product [26].

AHVIA		The Concepts of AHVIA
Usage Values	Aesthetic Values	Aesthetic value is the sensory and emotional response to a place, influenced by visual and non-visual elements like sound and smell. It reflects ideas of beauty shaped by cultural context and perception [23]. Aesthetic values may arise from deliberate design—reflected in composition (form, proportions, massing, silhouette, views, and circulation) with materials, planting, decoration, detailing, and craftsmanship—or develop organically over time within a particular cultural framework (e.g., urban forms or vernacular building relationships) [27]. Islamic architecture is realistic, unlike classical mythological and metaphorical interpretations. Thus, unity, proportion, abstract geometric composition, and geometric, vegetal, and calligraphic patterns express aesthetic values. Windcatchers, courtyards, mashrabiyas, qamariyas, and the strategic use of natural materials to improve environmental comfort and spatial harmony demonstrate aesthetic qualities in architectural responses to climatic conditions [3].
	Contextual Integration	A defining characteristic of Islamic architectural heritage is its harmonious integration with local materials, geography, and climate, resulting in a seamless relationship between built form and surrounding space. This contextual integration is manifested in the continuity of the ground plane and the predominance of horizontal urban configurations, rhythmically punctuated by domes and minarets that serve as visual focal points. Additionally, Islamic urbanism demonstrates a careful balance between family privacy and communal cohesion, reflecting a deep and contextually responsive engagement with the environment. [28].
	Functional Values	Functional value is related to economic value, as it involves the continuity of the original function or the initiation of a compatible use of a building or an area. The original functional value of a destroyed structure is gone, but a new one has been discovered in meeting programmatic needs for resource interpretation or as a location for events like the performing and visual arts [29]. In Islamic architecture, the functional value of the building lies in achieving each of safety, thermal comfort, privacy, and efficiency. it is demonstrated by adapting form to function [17].
	Economic Values	Economic value in relation to cultural heritage can be interpreted as a value produced by conservation efforts or by the heritage resource itself. Tourism, commerce, use, and amenities are the four possible revenue streams for economic values [29]. These values are reflected in the optimal use of sources and the ease of dealing with them environmentally to achieve the required spaces. Also, it refers to the tangible and intangible benefits that are derived from architectural designs and constructions. This does not include only the physical aspects but also the socio-economic, cultural, and environmental considerations [30].
	Social Values	A heritage resource's social value is correlated with both appropriate modern use and traditional social activities. It contributes to the development of social and cultural identity and enhances contemporary social interaction within the community [27]. The social value is demonstrated in providing privacy to the occupants of the house through interior and exterior building elements to achieve climatic, functional, and aesthetic comfort. It reflects the dynamic relationship between architecture, society, and individuals [25].
	Political Values	Political value is often associated with significant historical events connected to a heritage resource, reflecting its role within the broader political narrative of a region or nation [29]. These values have a direct impact on the structure of the fabric and civilized construction of society, especially in its urban formation [25].

3.2 Islamic Architectural Features (IAFs)

Buildings conceived in the Islamic architectural style are characterized by a distinctive array of features and elements that differentiate them from other architectural traditions. Based on previous studies, 22 unique architectural elements have been recognized as characteristic of Islamic

architecture. The existence and implementation of these features differ based on the building's characteristics and purpose, and it is not necessary for all features to be included in one structure. This study systematically classifies Islamic Architectural Features (IAFs) into eight main categories, arranged logically based on the visual and perceptual experience of the building, as follows:

- Urban Fabric.
- Skyline.
- Form Configuration (Unity & Diversity, Proportions & Proportionality, Human Scale).
- Entrance(s).
- Environmental Adaptation Methods (Orientation, Inner Courtyard, Air Catcher/Malqaf, Use of Landscape, Building Materials).
- Traditional Techniques (Arches, Al-Muqarnas, Domes, Minarets).
- Openings (formation & variety of openings, Mashrabiya, Shamsiya(s) & Qamariya(s), Rawashin).
- Islamic Motifs (Geometric patterns, Calligraphy Motifs, Floral & Arabesque Motifs).

The following outlines the key concepts of Islamic Architectural Features (IAF), as established in prior research.

3.2.1 Urban Fabric

The structure of the fabric and the urban construction of the societies affiliated with the Islamic civilization are affected in their urban formation by a group of determinants established by Islam, such as equality, justice, fairness, and freedom, in order to achieve harmony between the single building and its specific formation and the urban formation of the city as a whole [25].

3.2.2 Skyline

Islamic urbanism tends to be horizontal in height, where domes and minarets interrupt the continuity as visual constants. Islamic architecture prioritizes privacy by regulating building heights, typically ranging from 2 to 4 floors, with minimal height differences between adjacent structures. Openings are designed to avoid infringing on neighbors' privacy [31].

3.2.3 Form Configuration

a. Unity & Diversity: The unity and diversity of use of elements in Islamic architecture and decoration are achieved through the principle of organic unity, which is a strong and cohesive unity that links many diverse elements, shapes, and materials. This appears in the use of bricks with strong stone, in addition to carving and engraving on the stone, such as the presence of muqarnas intertwined with colored stones in the arches of the gates [32].

b. Proportions & Proportionality: Islamic architecture is characterized by a unified system of dimensions that includes noble proportions and a unified system of proportional relations that depends on the favorite relations that are based on the following [33]:

- Repetition: It involves the multiplication of a standard module to create structural continuity and expandability to ensure harmony and distinction in Islamic designs.
- Symmetry: It involves using pure geometric shapes organized around a central point or axis, following a consistent dimensional system.
- Balance: It is achieved by harmonizing dynamic shapes, like circles, with stable ones, like squares, within a consistent dimensional system, creating visual equilibrium.
- Gradation: It reflects a progression from secondary to principal elements, emphasizing strategic importance or exceptional scale. This approach integrates parts and the whole, highlighting elaborate relationships within the design.

The noble proportions prioritize 1:2 and 3:2 as ideal, followed by 1:3, 1:4, and their combinations. These proportions are seen as harmonious and significant in design; refer to Table 3.

Table 3: Noble Proportion of Dimensions

The Proportion	The Proportion Increase	The Proportion Decrease
1:1	1:1	1:1
3:4	1:1.33	1:0.75
2:3	1:1.66	1:0.6
1:2	1:2	1:0.5
4:9	1:2.3	1:0.42
3:8	1:2.6	1:0.37
1:3	1:3	1:0.33

c. Human Scale: The concept of "human scale" in architecture, including Islamic architecture, refers to the design and proportion of buildings and spaces in a way that is harmonious and well-suited to the human body and perception. Human scale is based on the golden ratio (1.618), which is regarded as one of the most significant numbers in human history. It is also one of the universe's beauty scales and dates back to ancient times [34].

3.2.4 Entrances

The entrances of public buildings, palaces, and mosques in Islamic architecture were characterized by their massiveness, as their height reached the height of the facade or more. Colored and interlocking arches, marble, stone, plaster decorations, and muqarnas were used in their decorations. The entrances were deep rectangular openings in the horizontal plan, with a depth of approximately half their width, which took an indirect axis to the inner courtyard in house design and took a direct access to the inner courtyard in the case of wekallat and public buildings [35]. Entrances in private houses adopt an indirect approach, guiding visitors through a carefully designed pathway before reaching the inner courtyard, ensuring privacy and seclusion. In contrast, entrances in public buildings follow a direct layout, providing an unobstructed passage that facilitates easy access to the inner courtyard, emphasizing openness and functionality.

3.2.5 Environmental Adaptation Methods

Islamic architecture deals with climatic conditions through some functional elements such as the inner courtyard, the air catcher (Malqaf), Mashrabiyat, Qamariyat, and the use of landscape.

a. Orientation: It is a reflection of the principles and values that represent Islamic architecture, highlighting the relationship between Islamic religious beliefs and the built environment. The most important elements of orientation include

- Qiblah: It is the primary factor in orienting mosques, and this emphasizes the spiritual importance of architectural design [36].
- Inner Courtyard: allowing the interiors of residential units to face inward towards the yard. This orientation promotes building cohesion and establishes the internal courtyard as a foundational element shaped by environmental and cultural conditions [31].

b. Inner Courtyard: It regulates the internal movement between the parts of the building and helps to reduce the temperature inside the house during the day due to the gathering of cold air layers in the courtyard during the night. The inner yard is the main outlet for vision, ventilation, and sun entry into the dwelling, and it is used as a private place where the family meets to practice its social activities. The courtyards in Islamic architecture included common and private courtyards [31].

c. Air Catcher/Malqaf: It is an air well that is installed on top of the building in the corner that is in the direction of the wind from the hall. It is used to cool the air in Islamic architecture. The air catchers may be clear on the roofs, or they may be figurative, such as the openings above the windows [37].

d. Use of Landscape: Islamic heritage buildings integrate natural and industrial elements, utilizing greenery and water features in inner courtyards to provide functional, climatic, and psychological comfort [38]. Water symbolizes purification and spirituality (e.g., the ablution fountains). It is utilized aesthetically to accentuate visual axes, mirror the surrounding environment, and optically double the neighboring building and its decoration (e.g., the reflecting ponds and watercourses at the Alhambra and General Life in Granada, Spain). In hot, dry locations, water features are practically employed to give coolness (e.g., the courtyard fountains and pools) [38]. The architectural landscapes reflect core principles such as privacy, neighborhood rights, social solidarity, moderation, equity, sincerity, and aesthetic values [36].

e. Building Materials: Islamic architecture is distinguished by its capacity to combine various styles and culturally influenced building materials [36]. Local building materials were commonly used in Islamic architecture, like wood, stone, and clay for construction, because it might have to do with people's aesthetic preferences. It also ensures that functional components adhere to climatic and environmental standards. Examples of this include [25]:

- Keeping noise out of rooms by using doors and partitions made of natural materials.
- Thick walls composed of organic materials like clay and leftover wood give excellent sound absorption between buildings.

3.2.6 Traditional Techniques

Islamic architecture contributed to advances in structural engineering, including the development of innovative construction techniques, such as Al Muqarnas (Stalactite Vault), the pointed arch, minarets, and the use of load-bearing domes [39].

a. Arches: The arch is an arched architectural element that depends on one or more pivot points and forms or surrounds building openings. The arch consists of several stones, each called a vertebra or a cymbal. Arches were used in Islamic architecture in different forms (e.g., triangular arch, pointed arch, pointed arch with two centers, straight pointed arch, pentagonal arch, compound arch, arch with lobes, and circular arch with one center) [40].

b. Al-Muqarnas: Muqarnas are a unique feature of Islamic architecture, serving both architectural and decorative purposes as three-dimensional embellishments. They are used to cover concave spaces and transitions between sharp surfaces, typically found in corners, ceilings, and under balconies in palaces and minarets. Notably, the muqarnas dome, made from stone, brick, stucco, or wood, exemplifies a structure unparalleled in other civilizations [35].

c. Domes: The dome, a distinctive feature in Islamic architecture, symbolizes the celestial sphere and God's transcendence. Its versatility in covering various spans, from small to large, adds to its architectural strength and modern appeal. The oldest dome in Islamic architecture is the Holy Dome of the Rock, which was constructed in Jerusalem (687-691 A.D.) by Abdelmalik ibn Marwan, the Umayyad king [41].

d. Minarets: The minaret is a tall and slender tower with small windows and an encircling staircase. It serves as a symbolic representation of Islamic identity and acts as a visual symbol of the presence of a mosque within a community [42]. It seems that symbolism revolves around this signpost function, allowing the minaret to symbolize the universe's axis in an esoteric sense [43].

3.2.7 Openings

a. Formation & variety of openings: Openings in Islamic homes are designed to be narrow on the outside and wide on the inside, enhancing viewing angles while allowing light in and blocking direct sunlight. Wide windows face inner courtyards, while narrow ones are on outer walls, serving climatic, religious, and social functions. Their placement ensures privacy, often covered by mashrabiya screens and elevated above the ground level. The facade features a variety of shapes and sizes, such as arched, rectangular, and circular openings [31].

b. Mashrabiya: It is a wooden panel made of round-sectioned balusters that distributes light and shadow. Typically larger than a standard window, it enhances light and ventilation while providing climate protection and privacy in Islamic homes, effectively filtering bright light [44].

c. Shamsiya/s & Qamariya/s: Shamsiya is a decorative window made of stone, marble, or plaster, featuring geometric, floral, or calligraphic patterns, often filled with colored glass. Qamariya is a narrow skylight that provides soft, moonlight-like illumination. Both elements are common in Islamic architecture, serving aesthetic and practical purposes, including insect prevention [44].

d. Rawashin (Facade Prominence): The Rowshan (singular of Rawashin) is a window style that characterizes houses in Islamic architecture. It is an area extending from the main mass of the building and is arranged in horizontal or vertical groups without any dominant side. These groups may be attached or detached and are constructed entirely of wood. This formation increases the area of the inner spaces in the upper floors (functional value). It gives shade to the outer sides, isolates the hot air, and works on the speed of the air movement (climatic function). It also helps in the free formation of interfaces and diversity (aesthetic value) [45].

3.2.8 Islamic Motifs

All decorative elements of Islamic art depend on the principles of abstraction, repetition, infinity, and symmetry. These guidelines created a uniform style of ornamentation across all Islamic art genres, even with the variety of materials and methods of production [46].

a. Geometric patterns: Islamic geometric patterns (IGPs) are based on squares and circles. These shapes are repeated, overlapped, and interwoven to form complex designs. The patterns are created by dividing geometric networks into identical parts arranged in regular order, enabling the enlargement or reduction of decorative schemes. IGPs evolved from simple stars and lozenges in the 9^{th} century to increasingly complex designs, incorporating 6- to 13-point patterns by the 13^{th} century and 14- to 16-point stars by the 16^{th} century [47].

b. Calligraphy Motifs: Arabic calligraphy is an artistic expression that blends aesthetic beauty with spiritual significance. Historically and today, it serves as a decorative element in Islamic art, particularly in architecture and ornamental designs [47]. Writings, including Quranic verses, hadiths, sayings, and poetry, were used in decorative designs. Various types of calligraphy were employed, such as Naskhi, Kufic**,** right-angled, braided, decorated, leafy, flowery, architectural square, and Thuluth, among others [46].

c. Floral & Arabesque Motifs: Arabesque is an ornamental style featuring stylized natural elements like floral and vegetal forms, arranged in structured, geometric patterns. Though it has naturalistic appearances, it doesn't mimic nature but reflects the essential rhythm and growth of plants. The style may be inspired by Quranic descriptions of paradise, symbolizing the beauty of this world and the afterlife, while reminding Muslims of life's spiritual purpose [28].

4. Research Methodology

The methodological approach is based on the need for empirical data that demonstrates professional experience, cultural understanding, and design literacy in the sector. Due to the intricate and interpretive aspects of architectural history, the research employs a systematic survey directed at experts in architecture, heritage conservation, and urban design. The study seeks to quantitatively evaluate the hypothesis that Islamic architectural features (IAF) are significantly associated with architectural heritage values (AHVIA) by converting expert insights into measurable facts. The diagram (Fig. 2) illustrates the methodology employed to test the research hypothesis, through which a sequential framework for the research process was defined, starting with survey design and expert

selection, progressing to the variables examined via the survey, and culminating in the methodologies for data analysis and interpretation.

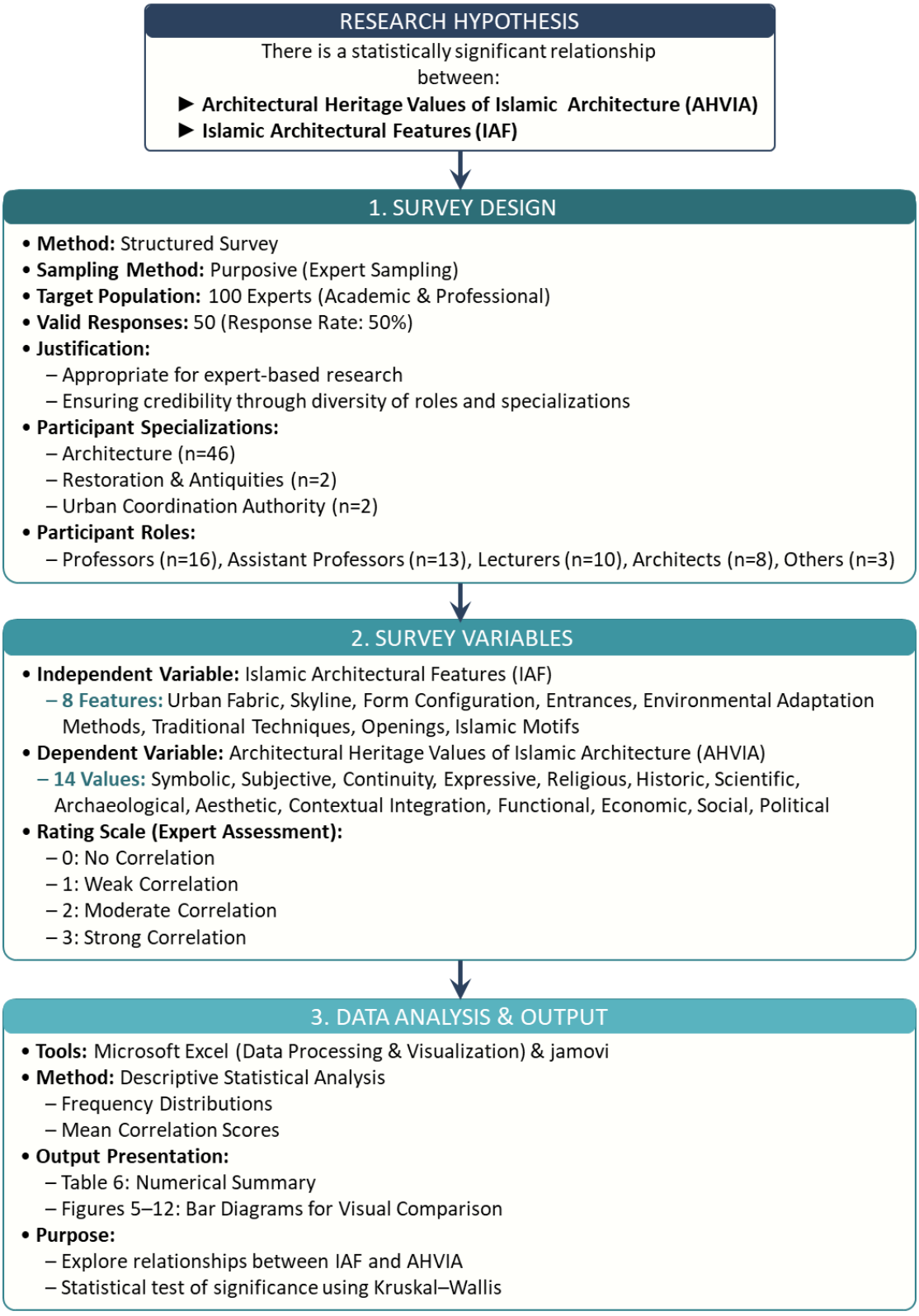

Fig. 2: Research Methodology Framework

4.1 Design of Survey Structure

The study utilized purposive sampling, focusing on experts with established proficiency in Islamic architectural heritage and design. Invitations were sent to around 100 specialists from academic institutions, architectural firms, and heritage organizations. Of these, 50 completed responses were

obtained, resulting in a response rate of 50%, deemed acceptable for expert-based surveys, particularly in specialized domains where participant availability is frequently constrained. This sample size aligns with the standards in architectural and heritage research that depend on expert judgment instead of general population sampling. Participating in the evaluation were 50 respondents (N=50) from a range of professional and academic institutions, including professors, assistant professors, and specialists in architecture, particularly Islamic and historical architecture. The survey targeted three key professional specializations: architecture, the restoration and antiquities sector, and the urban coordination authority. Table 4 presents the distribution of participants across these categories, with a total of 46 respondents from the field of architecture, 2 from the restoration and antiquities sector, and 2 from the urban coordination authority.

Table 4: Distribution of Survey Participants by Specialization

Professional Specializations	Number /50	percentage %
Architecture	46	92%
Restoration and Antiquities Sector	2	4%
Urban Coordination Authority	2	4%

Additionally, participants' job titles were classified into five groups: professors, assistant professors, lecturers, architects, and others. Table 5 details the distribution, with 16 professors, 13 assistant professors, 10 lecturers, 8 architects, and 3 participants from other roles. This diverse representation (refer to Fig. 3) ensures a comprehensive evaluation of perspectives from various professional backgrounds within the domain of Islamic heritage and architecture.

Table 5: Distribution of Survey Participants by Job Title

Participants' job titles	Number /50	percentage %
Prof.	16	32%
Assistant prof.	13	26%
Lecturer	10	20%
Architect	8	16%
Other	3	6%

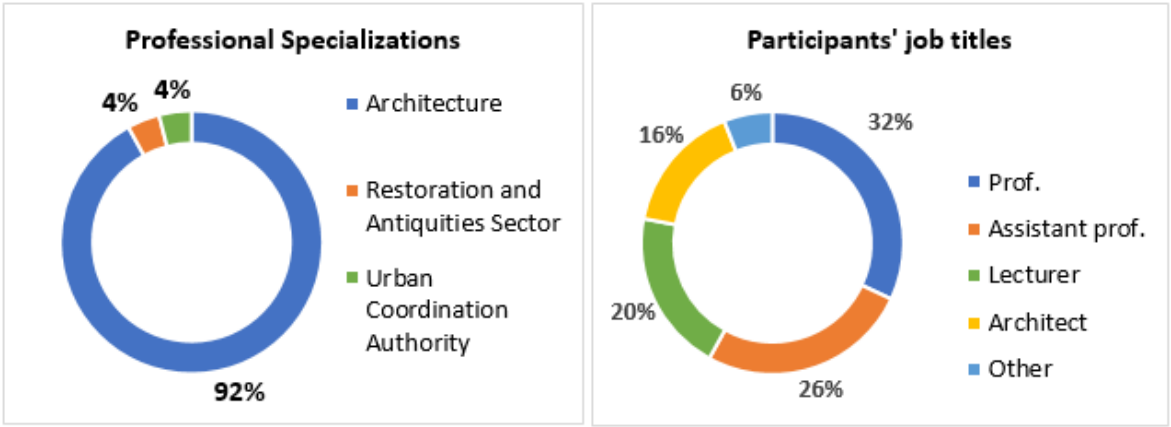

Fig. 3: Distribution of Survey Participants by Specialization and Job Title

4.2 Survey Variables and Rating Scale

The survey data was derived from expert assessments of 14 AHVIA categories, including symbolic, subjective, continuity, expressive, religious, historic, scientific, archeological, aesthetic, contextual integration, functional, economic, social, and political values. These were evaluated across 9

distinctive design features (IAFs), namely urban fabric, skyline, form configuration, entrances, environmental adaptation methods, traditional techniques, openings, and Islamic motifs. Each respondent was asked to assess the perceived degree of correlation between each AHVIA value and each IAF, using a four-point Likert-type scale:

- 0 = No Correlation (N.0)
- 1 = Weak Correlation (W.1)
- 2 = Moderate Correlation (M.2)
- 3 = Strong Correlation (S.3)

This quantifiable scale enabled the aggregation and statistical analysis of expert perceptions regarding the strength of the relationship between architectural form and heritage meaning. Fig. 4 illustrates samples of the digital survey form used to collect expert evaluations, which was disseminated electronically to participants identified through purposive sampling.

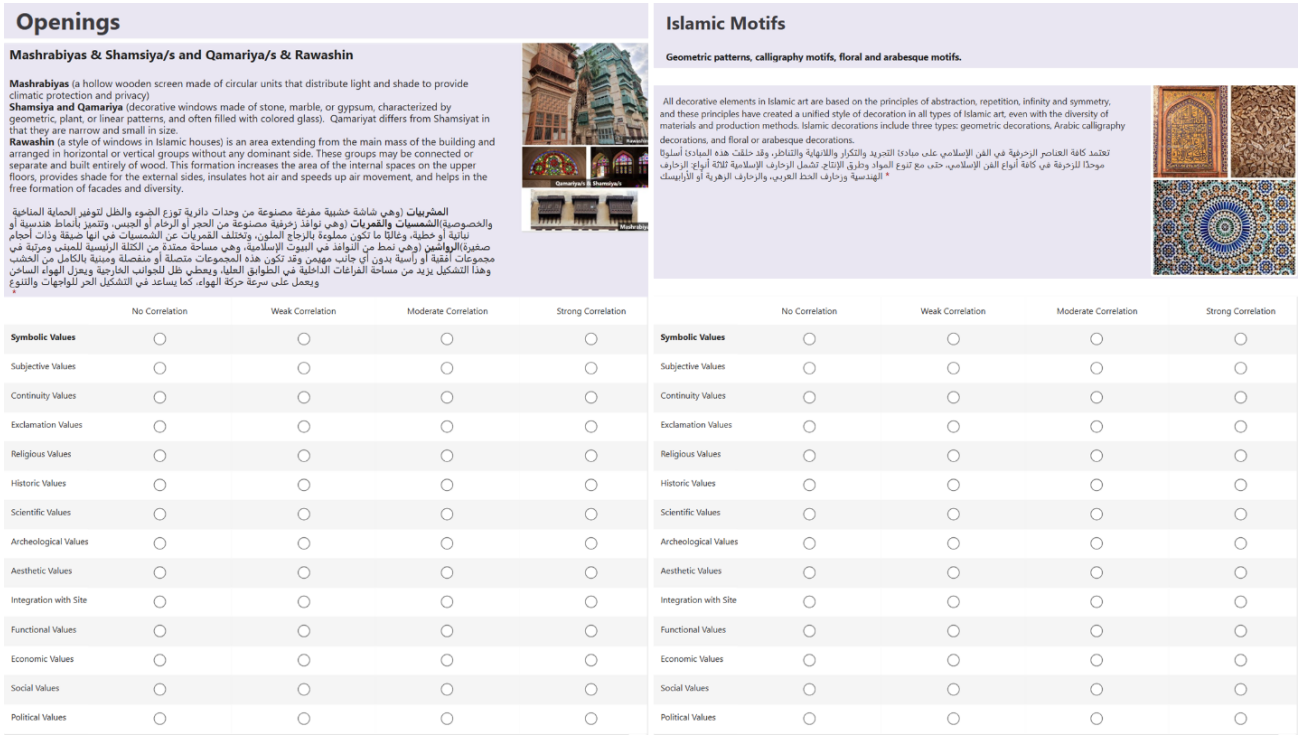

Fig. 4: Online Survey Form Distributed to Architectural and Heritage Experts

4.3 Data Analysis and Visualization

4.3.1 Descriptive Analysis of Survey Responses

The collected data were compiled and analyzed using descriptive statistical methods to determine frequency distributions, mean values, and correlation trends across IAFs-AHVIA pairings. Microsoft Excel was used to process and visualize the data, and the results were presented in Table 6, with supporting bar diagrams in Figures 5 through 12. These visualizations allow for a comparative understanding of how each design feature is perceived in relation to various architectural heritage values. The compiled responses provide empirical support for testing the study's hypothesis, offering insight into how specific Islamic architectural features contribute to or reflect core cultural and heritage values in contemporary design interpretations. providing empirical support for the study's broader investigation into the relationship between form and cultural meaning in Islamic architectural heritage.

Table 6: Distribution of survey responses across the four correlation levels between Islamic Architectural Features (IAFs) and Architectural Heritage Values (AHVIA)

IAFs	Graded scale of Correlation	Symbolic Values	Subjective Values	Continuity Values	Expressive Values	Religious Values	Historic Values	Scientific Values	Archeological Values	Aesthetic Values	Contextual Integration	Functional Values	Economic Values	Social Values	Political Values
Urban Fabric	N.0	2.0	0.0	0.0	4.1	0.0	0.0	2.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0
	W.1	10.2	8.2	6.1	10.2	8.2	8.2	16.3	12.2	14.3	6.1	6.1	8.2	2.0	6.1
	M.2	26.5	44.9	42.9	44.9	24.5	18.4	42.9	34.7	22.4	12.2	18.4	38.8	22.4	34.7
	S.3	61.2	46.9	51.0	40.8	67.3	73.5	38.8	53.1	63.3	81.6	75.5	51.0	75.5	57.1
Skyline	N.0	0.0	4.1	0.0	0.0	0.0	0.0	4.1	0.0	0.0	0.0	0.0	2.0	4.1	8.2
	W.1	10.2	14.3	12.2	16.3	14.3	8.2	18.4	14.3	12.2	6.1	14.3	16.3	14.3	26.5
	M.2	25.5	32.7	28.6	40.8	30.6	32.7	30.6	34.7	30.6	34.7	34.7	49.0	24.5	26.5
	S.3	65.3	49.0	59.2	42.9	55.1	59.2	46.9	51.0	57.1	59.2	51.0	32.7	57.1	38.8
Form Configuration	N.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	4.1	2.0	0.0
	W.1	2.0	4.1	10.2	14.3	8.2	8.2	18.4	10.2	6.1	8.2	14.3	16.3	12.2	16.3
	M.2	28.6	44.9	32.7	40.8	42.9	28.6	34.7	40.8	24.5	36.7	28.6	55.1	38.8	42.9
	S.3	69.4	49.0	57.1	44.9	49.0	63.3	46.9	46.9	69.4	55.1	57.1	24.5	46.9	40.8
Entrance(s)	N.0	0.0	0.0	2.0	4.1	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
	W.1	4.1	6.1	10.2	8.2	14.3	4.1	12.2	8.2	2.0	12.2	6.1	30.6	12.2	14.3
	M.2	14.3	36.7	30.6	44.9	24.5	14.3	42.9	34.7	22.4	34.7	28.6	40.8	38.8	30.6
	S.3	81.6	57.1	57.1	42.9	59.2	81.6	42.9	57.1	75.5	51.0	65.3	26.5	49.0	55.1
Environ. Adapt. Methods	N.0	4.1	0.0	2.0	0.0	10.2	4.1	0.0	2.0	0.0	0.0	0.0	4.1	2.0	14.3
	W.1	16.3	10.2	8.2	16.3	12.2	18.4	8.2	12.2	8.2	6.1	4.1	8.2	6.1	20.4
	M.2	24.5	22.4	28.6	38.8	20.4	20.4	24.5	30.6	22.4	12.2	8.2	44.9	16.3	28.6
	S.3	55.1	67.3	61.2	44.9	57.1	57.1	67.3	55.1	69.4	81.6	87.8	42.9	75.5	36.7
Traditional Tech.	N.0	2.0	2.0	2.0	2.0	4.1	0.0	4.1	0.0	0.0	6.1	0.0	6.1	6.1	12.2
	W.1	4.1	8.2	16.3	12.2	4.1	6.1	4.1	8.2	4.1	8.2	10.2	18.4	16.3	16.3
	M.2	16.3	32.7	30.6	34.7	26.5	14.3	30.6	22.4	16.3	30.6	22.4	36.7	30.6	30.6
	S.3	77.6	57.1	51.0	51.0	65.3	79.6	61.2	69.4	79.6	55.1	67.3	38.8	46.9	40.8
Openings	N.0	0.0	0.0	0.0	0.0	4.1	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	10.2
	W.1	4.1	4.1	8.2	14.3	10.2	6.1	6.1	14.3	4.1	6.1	2.0	22.4	4.1	22.4
	M.2	24.5	26.5	30.6	36.7	20.4	18.4	28.6	18.4	12.2	32.7	18.4	42.9	20.4	32.7
	S.3	71.4	69.4	61.2	4.9	65.3	75.5	65.3	65.3	83.7	59.2	79.6	34.7	75.5	34.7
Islamic Motifs	N.0	0.0	4.9	2.3	2.4	0.0	0.0	4.9	0.0	0.0	4.7	4.7	2.3	2.3	11.4
	W.1	4.8	2.4	7.0	9.5	11.6	2.4	12.2	9.3	2.3	9.3	18.6	20.5	25.6	20.5
	M.2	19.0	39.0	32.6	35.7	32.6	26.8	39.0	32.6	14.0	39.5	39.5	47.7	37.2	36.4
	S.3	76.2	53.7	58.1	52.4	55.8	70.7	43.9	58.1	83.7	46.5	37.2	29.5	34.9	31.8

4.3.2 Visual Representation of IAF–AHVIA Correlations

4.3.2.1 Urban Fabric

The survey results shown in Table 5 and Fig.5 demonstrate the perceived relationship between the urban fabric characteristic of Islamic architecture and different AHVIA. A substantial majority of respondents demonstrated a strong correlation (S.3) across multiple heritage value categories. Contextual Integration (81.6%), Functional Values (75.5%), Social Values (75.5%), and Historic Values (73.5%) exhibited the highest percentages in the strong correlation category. This indicates that urban fabric is considered crucial for preserving the functionality, contextual continuity, and social-historic character of Islamic architectural heritage. Aesthetic Values (63.3%), Religious Values (67.3%), and Continuity Values (51.0%) exhibited significant correlations, highlighting the urban fabric's contribution to maintaining visual harmony and spiritual context. Moderate correlations (M.2) were observed in categories such as scientific values (42.9%) and economic values (38.8%), suggesting a recognized, albeit less prominent, relationship in these areas. Marginal percentages indicated no correlation (N.0) across all value types, thereby reinforcing the overall significance of urban fabric in conveying and sustaining heritage values. The findings highlight the essential role of the urban fabric in both the tangible and intangible aspects of Islamic architectural heritage.

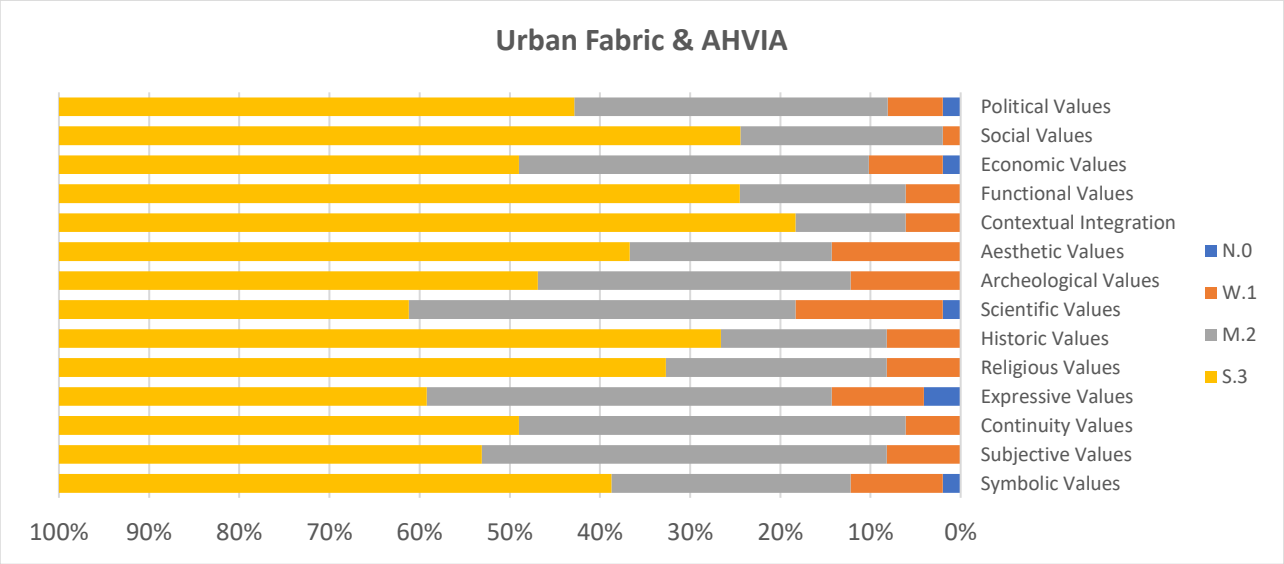

Fig. 5: Correlation Ratios between Urban Fabric & Heritage Values (AHVIA)

4.3.2.2 Skyline

The survey results indicating the correlation between Skyline and AHVIA, as presented in Table 5 and Fig. 6, demonstrate a predominantly strong perception of significance across multiple heritage value categories. The strongest correlations were observed in symbolic values (65.3%), continuity values (59.2%), historic values (59.2%), and contextual integration (59.2%). This suggests that the skyline is perceived as a crucial visual and cultural element that conveys identity, historic continuity, and urban coherence within Islamic architecture. Additional values exhibiting high correlation ratings are aesthetic values (57.1%), social values (57.1%), and religious values (55.1%), underscoring the skyline's visual and spiritual importance in influencing communal and aesthetic experiences. Moderate correlation (M.2) was evident, particularly in expressive values (40.8%) and archeological values (34.7%), indicating a recognized yet somewhat diverse perspective on the skyline's function in conveying cultural narratives and maintaining historical layers. Political values exhibited the weakest correlation, with merely 38.8% of respondents indicating a strong connection, while the highest proportion, 8.2%, reported no correlation (N.0). The data highlights the skyline's diverse

heritage value, especially in representing symbolic, historical, and aesthetic qualities within the urban Islamic context.

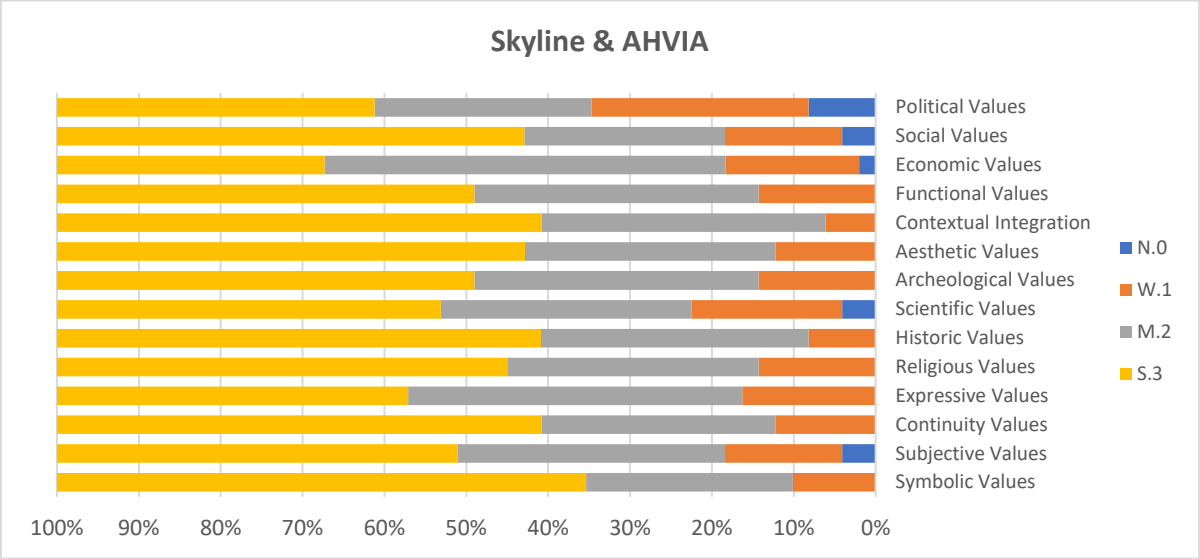

Fig. 6: Correlation Ratios between Skyline & Heritage Values (AHVIA)

4.3.2.3 Form Configuration

The survey results shown in Table 5 and Fig. 7 demonstrate a significant correlation between form configuration and the AHVIA. Strong correlations are observed in symbolic values (69.4%) and aesthetic values (69.4%), indicating that architectural form reinforces the symbolic meanings and visual harmony inherent in Islamic heritage. Historic Values (63.3%), Continuity Values (57.1%), and Functional Values (57.1%) exhibit strong correlations, indicating that form configuration plays a crucial role in maintaining historical character, cohesive design language, and practical functionality in Islamic architecture. Furthermore, values such as contextual integration (55.1%) and religious values (49%) suggest that architectural form plays a role in aligning with the environment and expressing spiritual identity. Moderate correlations (M.2) are prevalent in economic values (55.1%) and expressive values (40.8%), indicating that form influences both economic viability and creative expression, though to a lesser degree. The findings highlight the essential function of form configuration in preserving and augmenting the diverse heritage values linked to Islamic architectural identity.

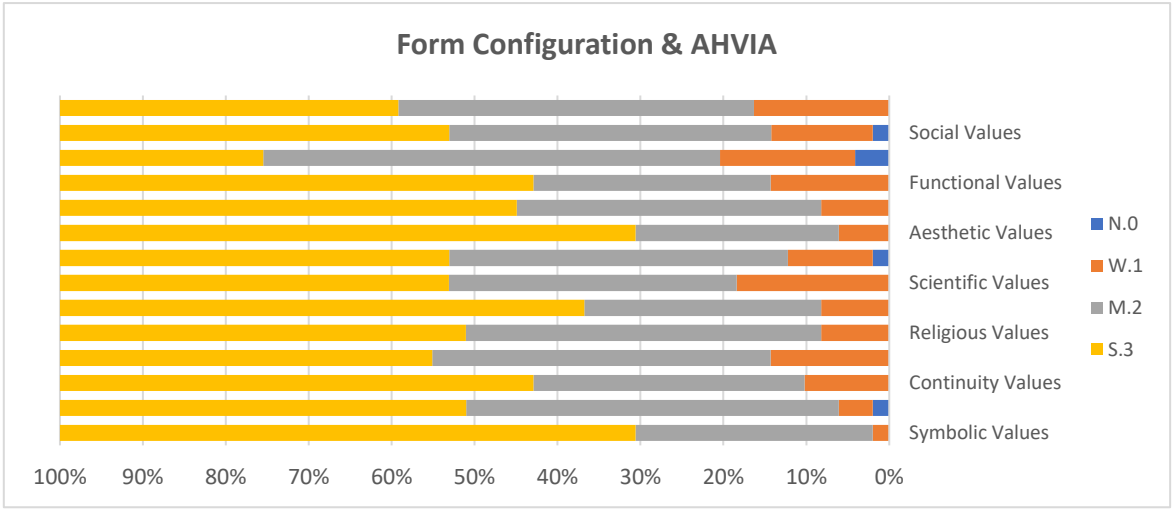

Fig. 7: Correlation Ratios between Form Configuration & Heritage Values (AHVIA)

4.3.2.4 Entrance(s)

The survey results presented in Table 5 and Fig.8 illustrate the correlation between architectural entrances and the AHVIA. The data indicates the highest percentage in the strong correlation category (S.3) with symbolic and historic values, both at 81.6%, reflecting the entrance's role in expressing identity and historical continuity. Aesthetic values demonstrate a notable S.3 presence at 75.5%, highlighting the visual and artistic importance of entrances in Islamic architectural heritage. This is followed by functional (65.3%) and religious values (59.2%), indicating the importance of entrances in both practical use and spiritual or cultural context. Moderate correlations are observed in economic values (40.8%), suggesting a lesser perceived influence of entrances on economic impact. Values like Scientific and Expressive show a more balanced distribution across categories but still lean toward moderate significance (M.2 and S.3). Overall, the analysis indicates that entrances in Islamic architecture are regarded as significant for their symbolic, historical, and aesthetic value, whereas their impact on economic and scientific aspects is relatively minimal.

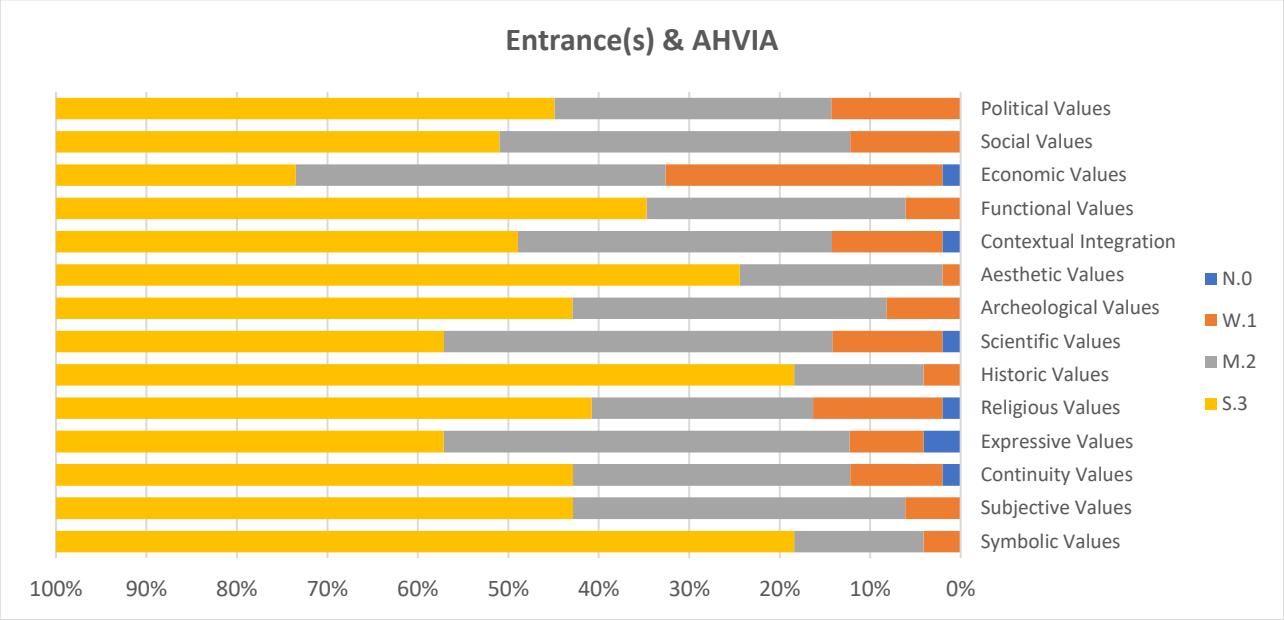

Fig. 8: Correlation Ratios between Entrance(s) & Heritage Values (AHVIA)

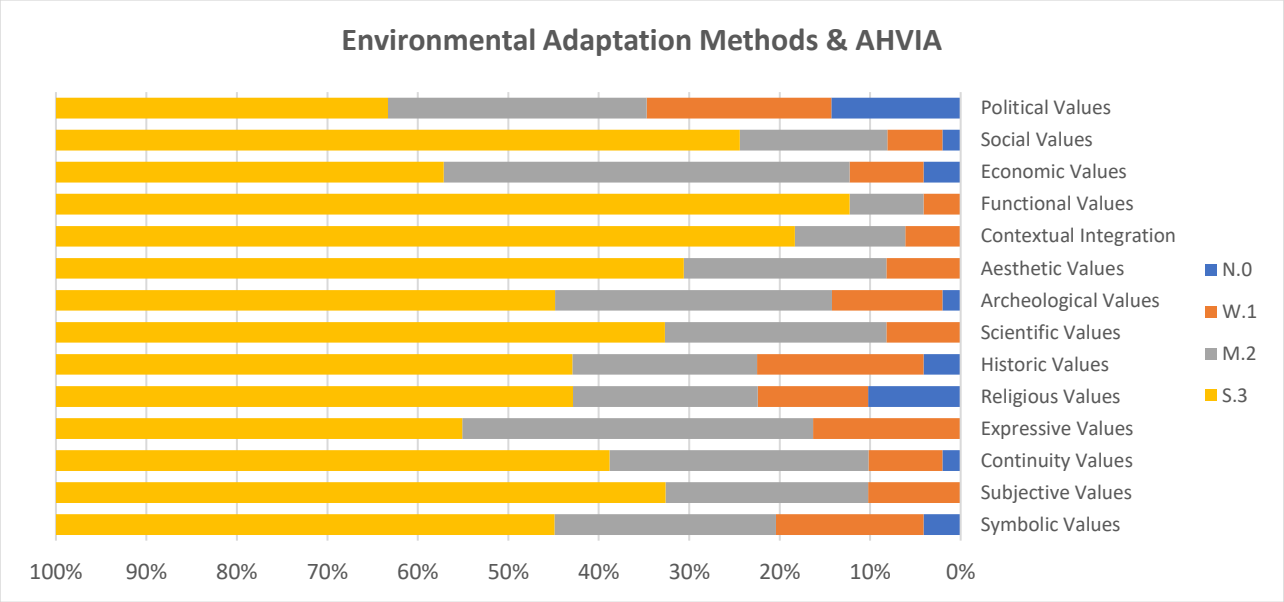

Fig. 9: Correlation Ratios between Environ. Adapt. Methods & Heritage Values (AHVIA)

4.3.2.5 Environmental Adaptation Methods

The survey results presented in Table 5 and Fig. 9 found a strong correlation between environmental adaptation methods and AHVIA. Functional values (87.8%) and contextual integration (81.6%) align best, highlighting how environmental strategies improve usability and harmony. Social (75.5%) and aesthetic (69.4%) values are also strongly correlated, showing how environmental adaptation can support communal identity and visual character. Subjective and scientific values score 67.3%, demonstrating personal and technical appreciation of green design. Religious, historic, and continuity values have moderate links (57–61%), while political and symbolic values have lower scores, suggesting that these aspects are less influenced by environmental approaches.

4.3.2.6 *Traditional Techniques*

The survey results in Table 5 and Fig. 10 indicate the highest percentages in the strong correlation category (S.3) between the utilization of traditional techniques and the AHVIA. The correlation with both historic values and aesthetic values is notably strong at 79.6%, underscoring the essential role of traditional methods in maintaining visual and historical authenticity. Likewise, symbolic values (77.6%) and religious values (65.3%) are significantly upheld by traditional techniques, thereby reinforcing their function in transmitting spiritual and cultural narratives. The data indicates a robust correlation with functional (67.3%) and scientific values (61.2%), demonstrating that these methods consistently provide practical and sustainable solutions. Contextual integration (55.1%) and subjective values (57.1%) exhibit moderate alignment; however, the comparatively lower correlations with economic (38.8%) and political values (40.8%) indicate that conventional methods are less influenced by economic efficiency or political symbolism, prioritizing their cultural, environmental, and heritage-preserving importance instead.

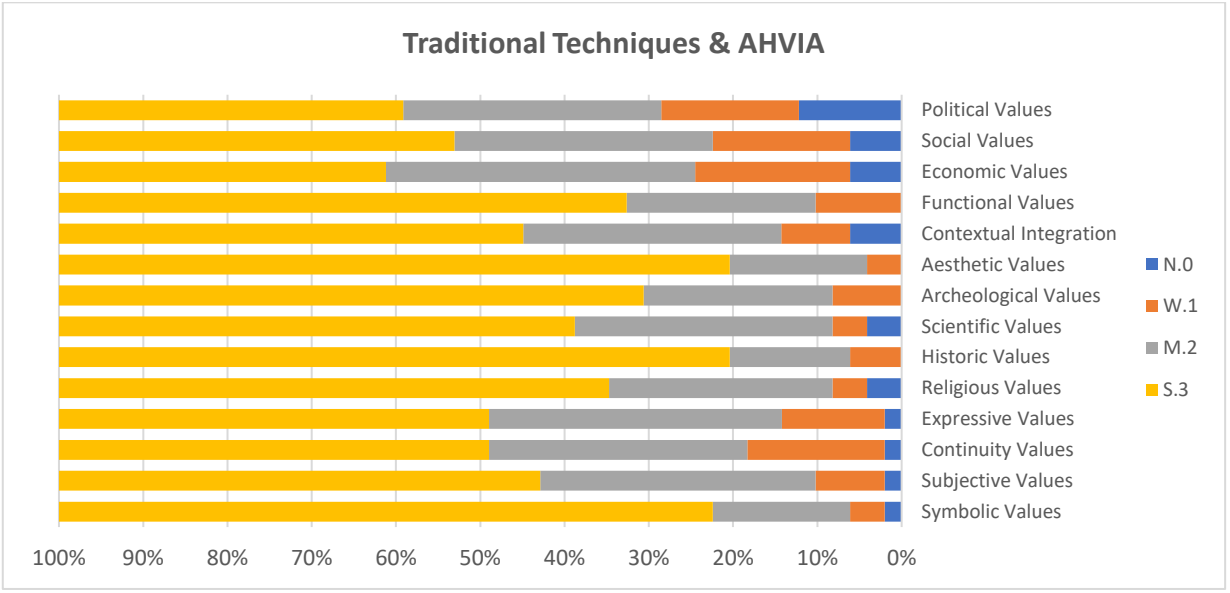

Fig. 10: Correlation Ratios between Adv. BLD Tech. & Heritage Values (AHVIA)

4.3.2.7 Openings

The survey findings, in Table 5 and Fig. 11, indicate a significant correlation between openings and the Architectural Heritage Values of Islamic Architecture (AHVIA), especially concerning cultural expression and environmental responsiveness. Aesthetic values exhibit the strongest correlation (83.7%), underscoring the visual and ornamental importance of openings in Islamic architecture. Functional (79.6%) and historic values (75.5%) closely follow, indicating that traditional openings are essential for both meeting climate and ventilation requirements and preserving historical

continuity. Significant correlations are noted with symbolic (71.4%) and subjective values (69.4%), indicating their function in representing identity and personal experience. Moderate correlations are observed with religious, scientific, and archaeological values, each at 65.3%, highlighting the spiritual, intellectual, and heritage significance of openings. Conversely, economic and political values exhibit markedly lower correlations (34.7%), suggesting that the design and positioning of openings are less governed by economic or political expression and more by aesthetic, environmental, and cultural factors within the Islamic architectural tradition.

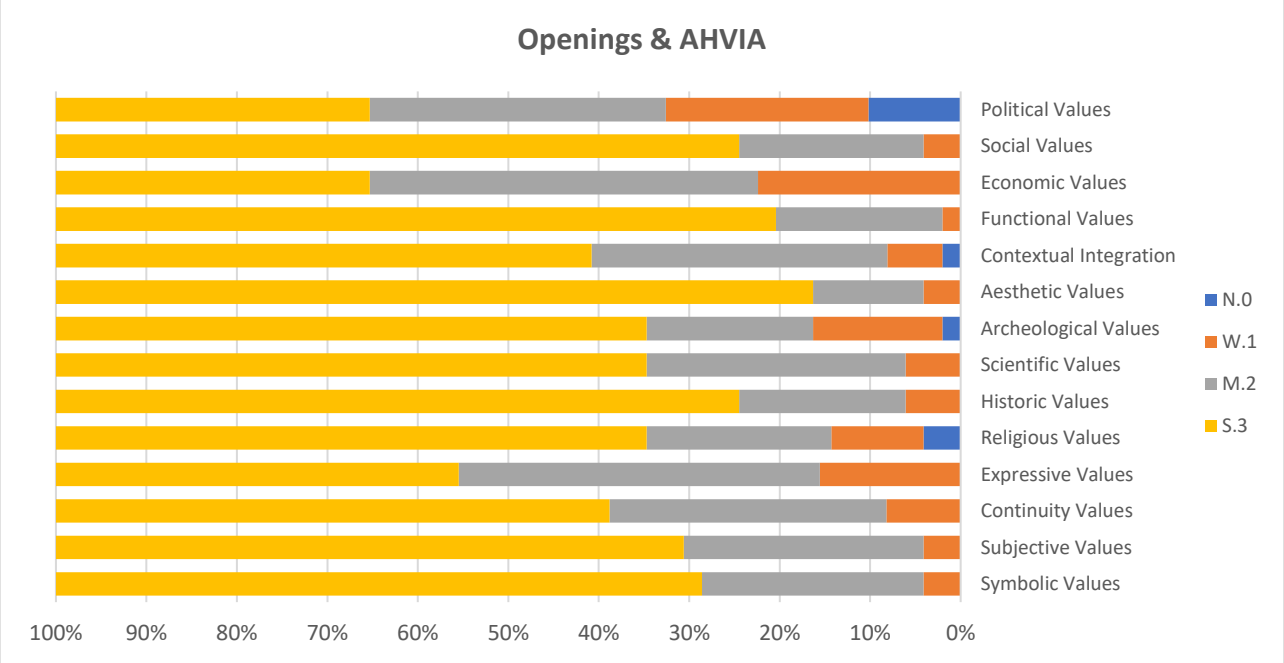

Fig. 11: Correlation Ratios between Openings & Heritage Values (AHVIA)

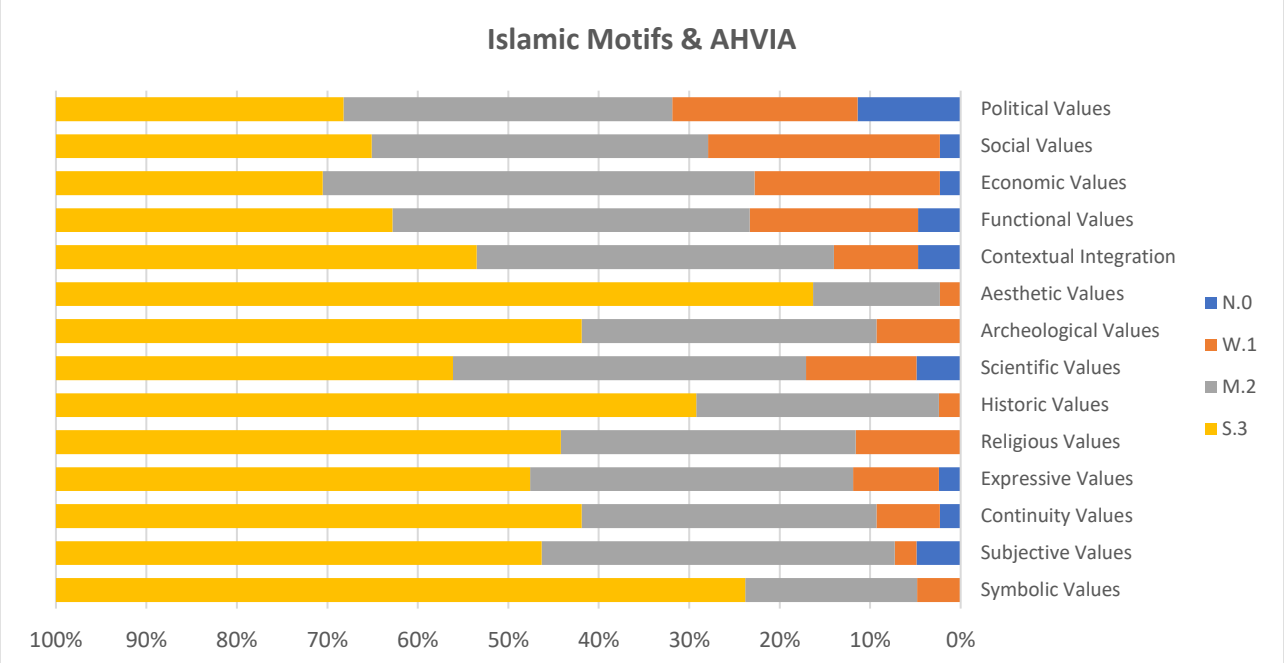

Fig. 12: Correlation Ratios between Islamic Motifs & Heritage Values (AHVIA)

4.3.2.8 Islamic Motifs

The survey findings presented in Table 5 and Fig. 12 demonstrate a significant correlation between Islamic motifs and AHVIA, especially concerning symbolic, aesthetic, and historical aspects. Aesthetic values are paramount (83.7%), underscoring the significance of motifs in the visual

opulence and embellishment of Islamic architectural tradition. Symbolic values demonstrate a strong correlation (76.2%), highlighting the representational and spiritual importance of motifs in expressing cultural and religious identity. Likewise, historical values demonstrate a robust correlation (70.7%), underscoring the significance of motifs in safeguarding and conveying historical narratives. Moderate correlations are noted with continuity, expressive, religious, and archaeological values (between 52.4% and 58.1%), signifying the motifs' significance in conveying cultural continuity, emotion, spirituality, and heritage. In contrast, diminished correlations with economic (29.5%), social (34.9%), and political values (31.8%) indicate that Islamic motifs are less affected by socioeconomic or political influences and are chiefly esteemed for their cultural, visual, and historical importance within the architectural identity of Islamic heritage.

4.3.3 Statistical test of significance using Kruskal–Wallis

The Kruskal–Wallis H test was employed to see if expert assessments of the relationship between Islamic Architectural Features (IAFs) and Architectural Heritage Values (AHVIA) differed significantly among various professional roles. This non-parametric test was chosen owing to the ordinal nature of the survey data, which utilized a rating scale from no correlation to strong correlation (0-3), and the division of participants into several independent groups (e.g., professors, assistant professors, lecturers, architects, and others).

The statistical analysis was conducted using Jamovi software, which provided the output values for the H-statistic (also referred to as χ^2 or Chi-square), the degrees of freedom (df), and the p-value.

- The **H-statistic (χ^2)** represents the test statistic, indicating the extent of difference among the medians of the groups' responses.
- The **degrees of freedom (df)** are calculated based on the number of comparison groups (df = k – 1) and are used to interpret the H-statistic according to the chi-square distribution.
  K refers to the number of comparison groups (participants' job titles).

$$df = 5 - 1 = 4 \quad \rightarrow \quad \chi^2 \tag{4}$$

- The **p-value** reflects the presence of statistically significant differences between functional categories in their assessment of the relationship between heritage values (AHVIA) and features (IAFs) under the null hypothesis.
  p-value < 0.05 indicates a statistically significant difference.
  p-value > 0.05 indicates no real difference between the groups.

Table 7 presents the results of the Kruskal–Wallis test (χ^2, P-value), evaluating the statistical association between various Islamic Architectural Features (IAFs) and categories of Architectural Heritage Values in Islamic Architecture (AHVIA). Each row represents an IAF, while the columns denote the different heritage values (AHVIA). The yellow highlighted values in the table refer to the statistically significant differences where the p-value is less than 0.05, indicating that expert professional background plays a role in how these heritage values are interpreted in relation to features.

Table 7: Statistical Correlation between Islamic Architectural Features (IAFs) and Heritage Values (AHVIA) Based on Kruskal–Wallis Test Results

IAFs	Kruskal–Wallis Test Results	Architectural Heritage Values of Islamic Architecture (AHVIA)													
		Symbolic Values	Subjective Values	Continuity Values	Expressive Values	Religious Values	Historic Values	Scientific Values	Archeological Values	Aesthetic Values	Contextual Integration	Functional Values	Economic Values	Social Values	Political Values
Urban Fabric	$\chi^2(4)$	12.18	7.21	6.87	2.75	3.02	3.99	6.17	11.86	7.34	1.86	3.62	2.02	5.37	8.83
	p-value	0.016	0.125	0.143	0.6	0.554	0.408	0.186	0.018	0.119	0.761	0.459	0.732	0.252	0.065
Skyline	$\chi^2(4)$	0.619	3.561	6.248	2.034	3.933	0.828	1.571	2.005	1.075	1.643	2.185	1.842	0.64	2.498
	p-value	0.961	0.469	0.181	0.73	0.415	0.935	0.814	0.735	0.898	0.801	0.702	0.765	0.959	0.645
Form Configuration	$\chi^2(4)$	1.811	7.735	3.02	3.459	0.626	1.598	4.504	2.769	3.359	3.371	3.76	1.616	3.717	1.522
	p-value	0.77	0.102	0.554	0.484	0.96	0.809	0.342	0.597	0.5	0.498	0.439	0.806	0.446	0.823
Entrance(s)	$\chi^2(4)$	2.109	7.407	3.877	4.913	9.55	6.254	4.105	1.809	4.398	4.372	0.934	5.425	4.907	1.608
	p-value	0.716	0.116	0.423	0.296	0.049	0.181	0.392	0.771	0.355	0.358	0.92	0.246	0.297	0.807
Environ. Adapt. Methods	$\chi^2(4)$	6.1	14.96	5.42	9.2	2.66	7.62	7.3	3.72	5.88	10.14	2.37	5.08	4.73	7.76
	p-value	0.192	0.005	0.246	0.056	0.617	0.107	0.121	0.445	0.208	0.038	0.667	0.279	0.316	0.101
Traditional Tech.	$\chi^2(4)$	5.27	7.32	5.71	1.3	1.97	2.33	6.63	3.07	3.32	5.23	8.66	9.56	3.07	4.89
	p-value	0.261	0.12	0.222	0.861	0.742	0.675	0.157	0.547	0.506	0.264	0.07	0.049	0.547	0.298
Openings	$\chi^2(4)$	6.94	8.03	4.07	3.87	6.32	8.52	6.72	1.74	6.5	2.86	1.25	7.79	4.94	5.58
	p-value	0.139	0.091	0.397	0.424	0.177	0.074	0.152	0.783	0.165	0.581	0.87	0.1	0.293	0.232
Islamic Motifs	$\chi^2(4)$	1.797	3.277	1.032	1.155	0.886	0.69	2.194	1.422	2.2	1.455	1.941	1.739	2.348	3.511
	p-value	0.773	0.513	0.905	0.885	0.927	0.953	0.7	0.84	0.699	0.835	0.747	0.784	0.672	0.476

Referring to Table 7, the Kruskal–Wallis analysis indicated significant disparities in expert evaluations of different architectural features (IAFs) and their corresponding heritage values (AHVIA). Statistically significant differences were observed in the perception of Symbolic Values ($\chi^2(4) = 12.18$, $p = 0.0161$) and Archeological Values ($\chi^2(4) = 11.86$, $p = 0.0185$) concerning the Urban Fabric, indicating that professionals from diverse backgrounds interpret these values through varying perspectives, likely shaped by their academic or practical experiences. Furthermore, perceptions of Religious Values exhibited notable diversity for Entrances ($\chi^2(4) = 9.55$, $p = 0.049$), signifying divergent perspectives on the spiritual or cultural symbolism inherent in entry design. Experts exhibited considerable divergence in their interpretations of Environmental Adaptation Methods, specifically regarding Subjective Values ($\chi^2(4) = 14.96$, $p = 0.005$) and Contextual

Integration ($\chi^2(4) = 10.14$, $p = 0.038$), potentially indicating varying priorities in environmental harmony and personal/user-related significances among practitioners. Moreover, substantial disparities were identified in the impression of Economic Values ($\chi^2(4) = 9.56$, $p = 0.049$) related to Traditional Techniques, suggesting varied opinions on the cost-effectiveness or economic sustainability of these practices. The lack of statistically significant variations in the other value-feature combinations ($p > 0.05$) indicates a general agreement among specialists, underscoring a common core understanding throughout the discipline despite disciplinary variation.

5. Comparative Analysis of the IAF–AHVIA Model within International Heritage Frameworks

To emphasize the study's added value and contextualize its results within the wider framework of international heritage protection, a comparative table has been created (refer to Table 8). This table delineates the principal differences and similarities between the existing research paradigm (IAF–AHVIA) and established frameworks such as the ICOMOS Guidelines (Burra Charter), Historic England Guidance, and Management Guidelines for World Cultural Heritage Sites. The table addresses the similarities and differences between each of these tools and the study in terms of: the types of heritage values they address, the methodology used, the focus on Islamic architecture, and the extent of the presence of a quantitative component. Although these international references establish crucial foundations for evaluating heritage values, they predominantly remain qualitative and generalized, without specific focus on architectural characteristics within Islamic contexts. In contrast, the current study presents a quantitative, feature-oriented correlation model specifically designed for Islamic architecture, thereby filling a significant methodological and contextual gap.

6. Results and discussions

The statistical analysis (refer to Table 6) reveals that the majority of the high correlations between Islamic Architectural Features (IAFs) and Architectural Heritage Values (AHVIA) fall within the strong-correlation (S.3) category. The diagram (Fig. 13) highlights how specific IAF categories—particularly Urban Fabric, Entrances, and Islamic Motifs—exhibit the strongest ties to AHVIA, with functional, aesthetic, symbolic, historic values, and contextual integration emerging as the most pervasive influences. It is noteworthy that political and economic values consistently show weaker correlations, indicating that they play a secondary role in heritage perception. As follows, the heritage values with the highest correlation ratios with IAFs:

Functional Values (87.8% S.3): A very strong correlation with environmental adaptation methods (87.8%) suggests that buildings designed with higher functional considerations (e.g., usability, efficiency) tend to incorporate more advanced environmental adaptation strategies (e.g., passive cooling, solar orientation). A strong correlation with openings (79.6%) indicates that functional priorities (e.g., natural lighting, ventilation, energy efficiency) significantly influence the choice of window designs (e.g., size, glazing, operability).

Aesthetic Values (83.7% S.3): The highest score (83.7%) was achieved with both Islamic motifs and openings, referring to the fact that the building's perceived aesthetic quality is greatly improved by the addition of Islamic motifs and carefully planned window types. In the design context under study, the identical correlation coefficient suggests that both components contribute equally to aesthetic appeal. Traditional tech showed a strong correlation (79.6%), highlighting the significance of elements such as arches, domes, and minarets in conveying the aesthetic values inherent in Islamic

architecture. These features serve not only functional roles but also embody the visual and symbolic expression that characterizes the Islamic architectural identity.

Table 8: Comparative Analysis between Study Results and Global Heritage Frameworks

Reference/ Framework	Types of Values Considered	Methodology Used	Focus on Islamic Architecture	Added Value / Key Distinction
Historic England Guidance (2015)	▪ Evidential value ▪ Historical value ▪ Aesthetic value ▪ Communal value: (Commemorative & Symbolic Value, Social value, Spiritual value)	Qualitative / Conceptual	✗ No	Emphasizes context and meaning but lacks architectural feature-level analysis.
Burra Charter (2013)/ ICOMOS	▪ Aesthetic value ▪ Historic value ▪ Scientific value ▪ Social value ▪ Spiritual value	Qualitative / Conceptual	✗ No	Emphasizes context and meaning but lacks architectural feature-level analysis.
Management Guidelines for World Cultural Heritage Sites (1993)	▪ Cultural values: (Identity value, relative artistic/technical value, rarity value) ▪ Use values, or contemporary socio-economic values: (Economic value, functional value, educational value, social value, political value)	Qualitative / Conceptual	✗ No	Emphasizes context and meaning but lacks architectural feature-level analysis.
This Study (IAFs–AHVIA)	▪ Emotional Values: (Symbolic, Subjective, Continuity, Expressive Values) ▪ Cultural values: (religious, historic, scientific, archeological, aesthetic values, and contextual integration) ▪ Usage Values: (functional, economic, social, and political values)	Quantitative (Survey + Statistical Analysis)	✔ Yes	Quantitatively links particular architectural characteristics with intangible values.

Contextual Integration (81.6% S.3): Scored highest with both urban fabric and environmental adaptation methods, indicating that the buildings that align with the existing urban fabric (e.g., matching heights, materials) are perceived as more contextually integrated. Also, techniques like passive cooling and local materials not only enhance performance but also strengthen environmental integration both aesthetically and functionally.

Symbolic Values (81.6% S.3): Achieved the highest score with entrances (81.6%), often serving as thresholds between sacred/profane and public/private, making them key to conveying cultural or spiritual meaning. Followed by traditional tech. (arches, domes, minarets, Al-Muqarnas) at 77.6%, indicating that these architectural elements are highly influential in conveying cultural, spiritual, and identity-related meanings in Islamic architecture. Islamic motifs also have a high percentage (76.2%) expressing spiritual concepts (infinity, unity).

Historic Values (81.6% S.3): Closely related to entrances (81.6%), revealing that building entrances act as the most powerful custodians of historic meaning in Islamic architecture and that their materiality (their proportions, ornamentation, and spatial sequences) embodies a generational design

intelligence. Also, historical values have a strong correlation with traditional techniques (79.6%), indicating that these techniques form a load-bearing framework for historical memory.

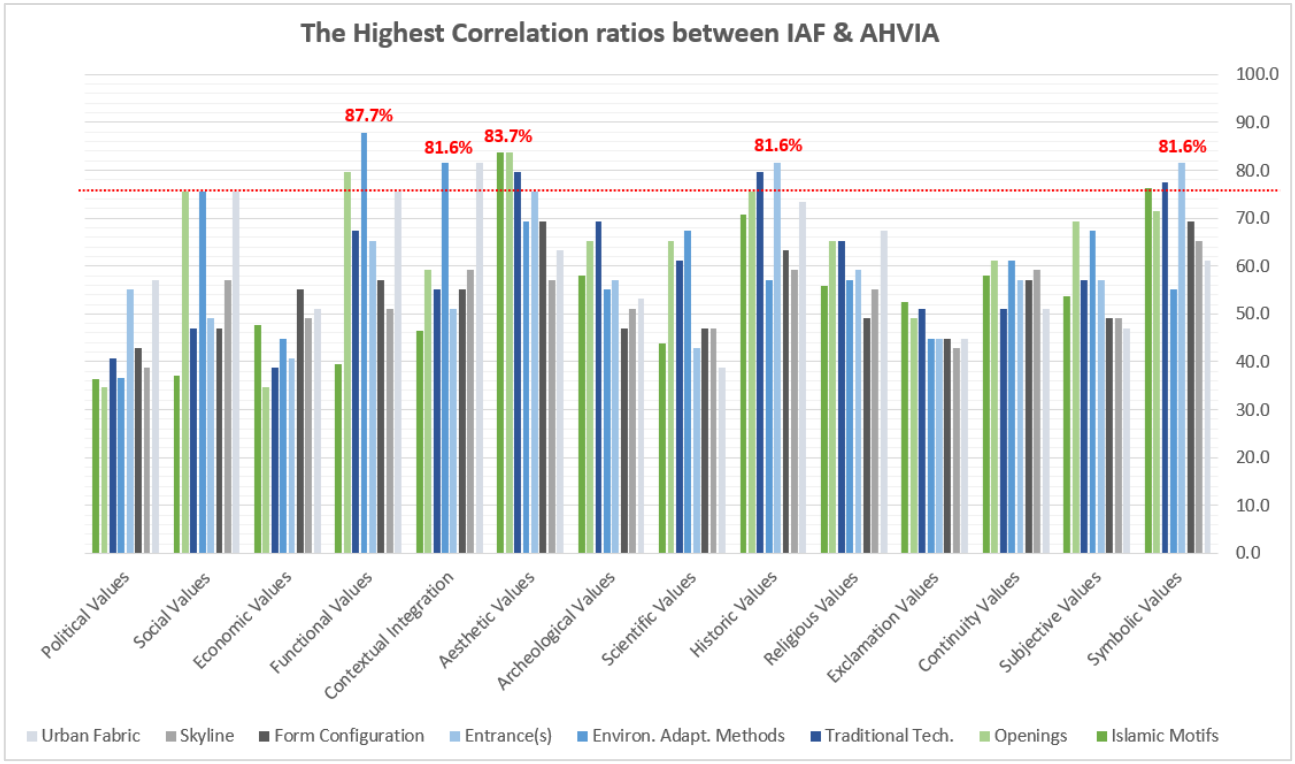

Fig. 13: A diagram of the highest correlation ratios between IAFs & AHVIA (Illustration: Author)

7. Conclusion and recommendations

This study investigates the correlation between Islamic Architectural Features (IAFs) and the Architectural Heritage Values of Islamic Architecture (AHVIA) through a structured survey conducted among architecture and heritage experts. The quantitative analysis of responses from 50 professionals revealed a distinct hierarchy of heritage values most strongly associated with IAFs. By calculating the average of the highest correlation ratios between each Architectural Heritage Value (AHVIA) and the eight categories of Islamic Architectural Features (IAFs), a clear hierarchy of the most prominent heritage values in Islamic architecture emerges. This hierarchy is visually represented in Fig. 14, highlighting the dominant values most strongly associated with the selected architectural features. Aesthetic values were the most prominent, followed by historic, symbolic, and functional values and then contextual integration, religious, and social values, with moderate representation of archeological and continuity values and lesser emphasis on political, economic, and expressive values. The study recommends the following:

- Implement the IAF–AHVIA Framework in Heritage Evaluation: Authorities and conservationists should use the IAF–AHVIA correlation model to assess Islamic architectural heritage. This method recognizes and preserves tangible and intangible values.
- Promote Heritage Buildings' Environmental and Climatic Design Lessons: Inner courtyards, air catchers (malqaf), and mashrabiyas are climate-responsive. These should be studied and adapted in modern architecture for energy-efficient and culturally relevant solutions.

- Record and Digitize Islamic Architectural Features for Educational Purposes: Modern 3D scanning and photogrammetry should be used to digitize Islamic features like muqarnas, arches, and inscriptions. Their protection, replication, and inclusion in architectural education are possible.
- Enhance Awareness of Islamic Heritage via Public Programs and Exhibitions: Heritage trails, exhibitions, guided tours, and school programs can teach Islamic architectural values, using Wekala Al-Ghuri as a model.
- Integrating the IAF–AHVIA Correlation Model into Architectural Education Strategies for Students and Researchers: This framework offers a structured approach for analyzing case studies, providing valuable support for student and research projects rooted in historical contexts.

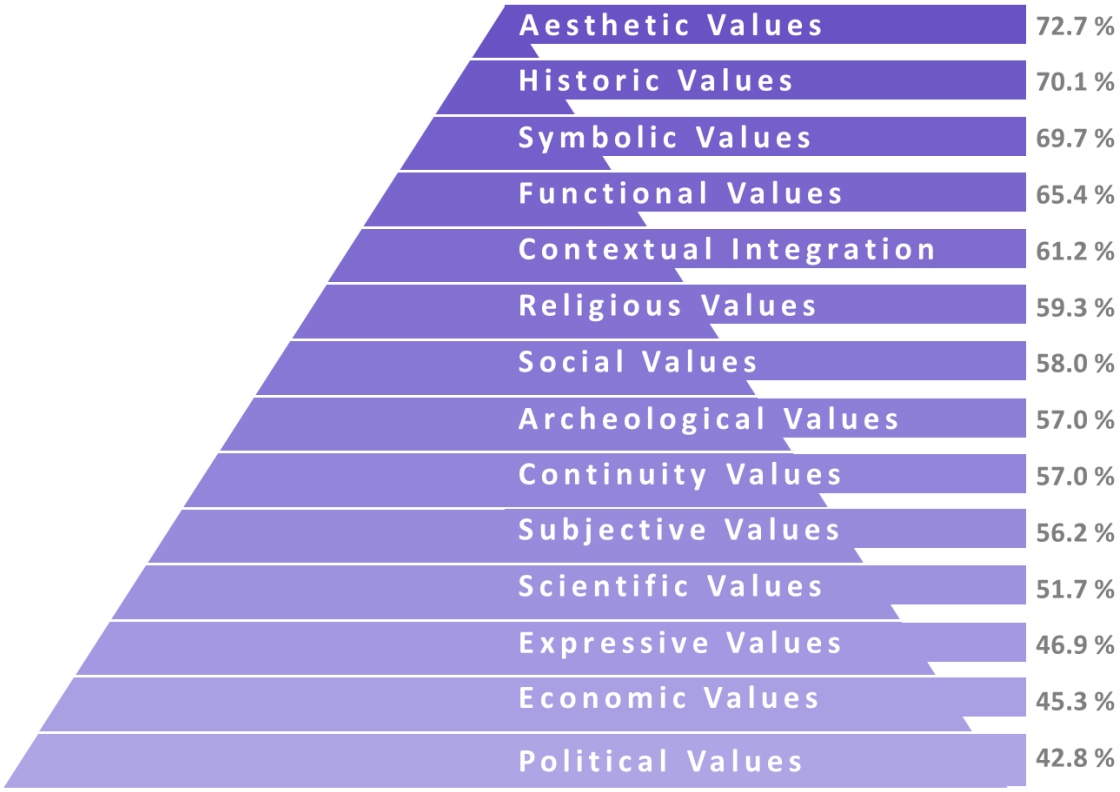

Fig. 14: **Hierarchy of the most prominent heritage values in Islamic architecture (Illustration: Author)**

While this study emphasizes Islamic architectural surroundings, however, the conceptual framework linking tangible attributes with intangible heritage values provides a versatile basis. The paradigm can be adapted for usage in other heritage frameworks with suitable modifications that align with the architectural language and cultural values of various traditions, like Pharaonic, Classical Greek, or Western architecture. This paves the way for subsequent research to evaluate and broaden the framework's applicability across various cultural contexts. Consequently, the study paves the way for future studies focused on altering and broadening the model's variables to accommodate the diverse architectural contexts, encompassing both formal characteristics and the related cultural and heritage values. Thus, the study's findings extend beyond the Islamic style, embodying a foundation that can be further expanded for wider uses.

List of abbreviations

AHVIA	Architectural Heritage Values of Islamic Architecture
IAFs	Islamic Architectural Features
Environ. Adapt. Methods	Environmental Adaptation Methods
Traditional Tech.	Traditional Techniques
N.0	No correlation
W.1	Weak correlation
M.2	Moderate correlation
S.3	Strong correlation

References

[1] "Stanford Encyclopedia of Philosophy," The Metaphysics Research Lab, Department of Philosophy, Stanford University, [Online]. Available: https://plato.stanford.edu/entries/value-theory/.

[2] Avrami, E., Macdonald, S., Mason, R. and Myers, D. eds., 2019, Values in heritage management: Emerging approaches and research directions, Los Angeles: The Getty Conservation Institute.

[3] Bioumi, A. (2002), Al-Qiymat Al-Mi'mariyah wa Al-Fann Al-Tashkili (Architectural Value and Fine Art), Dar Al-Ratib Al-Jami'iyah, Beirut, Lebanon.

[4] Assessing heritage significance, Guidelines for assessing places and objects against the Heritage Council of NSW criteria, 2023, Department of Planning and Environment.

[5] Bassily, V., Abufarag, T. and Goubran, S., 2022, "Heritage Buildings' Façades as Facilitators for Local Sustainable Development: The Case of Cairo's El Korba Area," *Heritage Journal, Vol. 5, No. 3, pp. 2689-2731.*

[6] A Federal, Provincial and Territorial Collaboration, Standards and Guidelines for the Conservation of Historic Places in Canada, 2010, 2nd Edition.

[7] Al-Sakkaf, A., Zayed, T. and Bagchi, A., 2020, "A review of definition and classification of heritage buildings and framework for their evaluation. Scientific Committee, p.194," in *2nd International Conference on New Horizons in Green Civil Engineering (NHICE-02), Victoria, BC, Canada*.

[8] D.N. Awaliyah, "Islamic architecture: Shaping cultural identity, fostering community cohesion, and promoting inclusivity," *Journal of Islamic Art and Architecture (JIAA), vol. 1, no. 1, (2023), pp. 11-19.*

[9] F.A.A. Hassanein, M.N. Mustafa, "Inherited Values in Islamic Architecture in Egypt," *Journal of Architecture, Arts, and Humanistic Sciences, vol. 40, no. 8, (2023), pp.762-781.*

[10] F. Zahra, S. Bin Shahir, "The Spiritual Aesthetics of Islamic Ornamentation and the Aesthetic Value in Islamic Architecture," *Journal of Islamic Thought and Civilization, vol. 12, no. 1 (2022), pp. 116-128.*

[11] A. Gamal, N. Farghlaa, A.K.H. Nasr, "Aesthetics of architectural openings in Islamic architecture," *Journal of Architecture, Arts, and Humanistic Sciences, vol. 30, no. 6, (2021), pp.18-34.*

[12] A. Bokhari, M. Hammad, D. J. A. M. E. L. Beggas, "Impact of Islamic values and concepts in architecture: A case study of Islamic communities," *Proceedings of Sustainable Development and Planning XI 241 (2020), pp. 9-11.*

[13] A. Azad, "Islamic values in Islamic art," *Astrolabe: A CIS Student Research Journal, vol. 1, (2020), pp.1-24.*

[14] Elmansoury, A. (2020), "An analytical study of the concepts and values of Islamic architecture with civilization continuity for Umm Al-Qura university Makkah Al-Mukarramah kingdom of Saudi Arabia," *Journal of Al-Azhar University Engineering Sector, Vol. 15 No. 56, pp. 886-903.*

[15] R.S. El Din, O. Hashim, A. Hussein, "Reviving the architectural heritage values of Al-Aqmar Mosque as an architectural inherited and a source of inspiration for contemporary interior design," *Journal of Design Sciences and Applied Arts, vol. 1, no. 1, (2020), pp.134-143..*

[16] R. Shaykh-Baygloo, "Beauty and Aesthetics in Islamic Architecture," *Socio-Spatial Studies, vol. 2 no. 3, (2018), pp.14-19.*.

[17] Hasan, M.I., Prabowo, B.N. and Mohidin, H. (2021), "An architectural review of privacy value in traditional Indonesian housings: Framework of locality-based on Islamic architecture design," *Journal of Design and Built Environment, Vol. 21 No. 1, pp. 21-28.*

[18] Al-Dein, H. (2022), "Semiotics as an approach to the analysis of symbolism in islamic architectural arts," *Architecture and Engineering, Vol. 7 No. 2, pp.3-19.*

[19] Nasser, N. (2022), "Beyond the veil of form: Developing a transformative approach toward Islamic sacred architecture through designing a contemporary Sufi centre," *Religions, Vol. 13 No. 3, pp.190-225.*

[20] Abuorf H. and Wafi, S. (2020), "Continuity of the Past in Contemporary Architecture: Investigating a Cultural Continuity," *International Research Journal of Advanced Engineering and Science, vol. 5 no. 1, pp.288-294.*

[21] El-Daghar, K. (2022), "Conserving Symbolism in Architectural Heritage: Case Study Eloquence in Depicting Philosophical Ideas Inspired by the Principles of Islam on Islamic Architecture Through Ages," in *Advances in Science, Technology & Innovation (ASTI), 2nd Edition*, Publisher: Springer, Cham (Springer Nature Switzerland AG), pp.109-124.

[22] Mahvash, M. and Arghiani, M. (2020), "Islamic architecture from viewpoint of religious science," *Journal of Architectural Thought, Vol. 4 No. 7, pp.1-13.*

[23] "Conservation principles: policies and guidance for the sustainable management of the historic environment," the Historic Buildings and Monuments Commission for England "Historic England", 2008.

[24] El-Aishi, A. (2006), Aesthetic Values in Heritage Architecture in Egypt (An Analytical Study of the Architecture of Mansoura City), PHD thesis, Department of Architecture, Faculty of Engineering, Mansoura University.

[25] Bokhari, A., Hammad, M. and Beggas, D. (2020), "Impact of Islamic values and concepts in architecture: A case study of Islamic communities," *Proceedings of Sustainable Development and Planning XI Vol. 241, pp. 9-11.*

[26] Hillenbrand, R. (1994), Islamic Architecture: Form, Function, and Meaning, Columbia University Press, New York.

[27] ICOMOS, A., 2013, "Understanding and Assessing Cultural Significance [Practice Note], The Burra Charter," Australia ICOMOS Inc., International Council of Monuments and Sites: Burwood, VIC, Australia.

[28] Azad, A. (2020), "Islamic values in Islamic art," *Astrolabe: A CIS Student Research Journal, vol. 1, pp.1-24.*

[29] Feilden, B.M. and Jokilehto, J. (1994), "Extracts from: Management guidelines for World Cultural Heritage," *ICOMOS Scientific Journal, Vol. 3, pp. 76-79.*

[30] Hassanein, F. and Mustafa, M. (2023), "Inherited Values in Islamic Architecture in Egypt," *Journal of Architecture, Arts, and Humanistic Sciences, Vol. 40 No. 8, pp.762-781.*

[31] Mansour, S. and Ahmed, D. (2020), "The Impact of Human Values on Islamic Architecture A Comparative study of Neighborhood rights and its impact on Islamic Architecture," *International Design Journal, Vol. 10 No. 1, pp.233-240.*

[32] Kalin, I. (2011), "Religion, unity and diversity," *Philosophy & Social Criticism, Vol. 37 No. 4, pp. 471-478.*

[33] Khalil, K.F. and Wahid, J. (2013), "The proportional relations systems of Islamic architecture," *International Journal of Scientific and Research Publications, Vol. 3 No. 1, pp.1-12.*

[34] Mahdy, H. (2020), "The human scale in Islamic civilization and its role in enriching society with spiritual and artistic values in light of cultural changes in the modern era," *Journal of Architecture, Arts, and Humanistic Sciences, Special Issue, pp.1143-1157.*

[35] Ashtawi, J. (2022), "Islamic Architecture," *Jerash Journal for Research & Studies, Vol. 23 No. 1, pp. 1849-1866.*

[36] Awaliyah, D.N. (2023), "Islamic architecture: Shaping cultural identity, fostering community cohesion, and promoting inclusivity," *Journal of Islamic Art and Architecture (JIAA), Vol. 1 No. 1, pp. 11-19.*

[37] ElSorady, D.A. and Rizk, S.M. (2020), "LEED v4. 1 operations & maintenance for existing buildings and compliance assessment: Bayt Al-Suhaymi, Historic Cairo," *Alexandria Engineering Journal, Vol. 59 No.1, pp. 519-531.*

[38] Dhannoon, A.A. (2021), "Water Elements in Islamic Architectures," *Internetional Trasaction Journal of Engineering, Manegment & Applied Sciences & Technologies, Vol. 12 No. 11, pp.1-13.*

[39] Faiella, G. (2005), The Technology of Mesopotamia (The Technology of the Ancient World), The Rosen Publishing Group, Inc..

[40] Almaimani, A. and Nawari, N.O. (2016), "BIM-Driven Library for Islamic Arch," in *Proc. of the 33rd CIB W78 Conference, Oct. 31st – Nov. 2nd,* Brisbane, Australia, p.8.

[41] Elkhateeb, A.A. (2012), "Domes in the islamic architecture of Cairo city: a mathematical approach. Architecture," *Systems Research and Computational Sciences, pp.151-176.*

[42] DIAB S (2020), "Elements of islamic architectural heritage: Minaret," *WIT Transactions on the Built Environment, 197, pp.167-178.*

[43] Shafiq J (2014), "Architectural Elements in Islamic Ornamentation: New Vision in Contemporary Islamic Art," *Arts and Design Studies IISTE, Vol. 21, pp.11-21.*

[44] Gamal, A., Farghlaa, N. and Nasr, A. (2021), "Aesthetics of architectural openings in Islamic architecture," *Journal of Architecture, Arts, and Humanistic Sciences, Vol. 30 No. 6, pp. 18-34.*

[45] Alhuseini, M.F., Altammam, G.A., AlSehaimi, B.R., Bettaieb, D.M., Alawad, A.A. and Tarim, K.J. (2023), "Conceptual inspiration from heritage: the design philosophy surrounding the Saudi Arabian Rowshan," *City, Territory and Architecture, Vol. 10 No. 1, p.20.*

[46] Shafiq, J. (2014), "Architectural Elements in Islamic Ornamentation: New Vision in Contemporary Islamic Art," *Arts and Design Studies IISTE, Vol. 21, pp. 11-21.*

[47] Fouad, S., Mandour, A. and Mohammed, S. (2021), "The development of the principles of the Elements of Islamic architectural by using parametric algorithms," *Engineering Research Journal, Vol. 170, pp.104-122.*