

# Exploration of Arabesque as an Element of Decoration in Islamic Heritage Buildings: The Case of Indian and Persian Architecture

Mohammad Arif Kamal

*Architecture Section*

*Aligarh Muslim University, Aligarh, India*

Saima Gulzar

*School of Architecture and Planning*

*University of Management and Technology, Lahore, Pakistan*

Sadia Farooq

*Dept. of Family and Consumer Sciences*

*University of Home Economics, Lahore, Pakistan*

**Abstract** - The decoration is a vital element in Islamic art and architecture. The Muslim designers finished various art, artifacts, religious objects, and buildings with many types of ornamentation such as geometry, epigraphy, calligraphy, arabesque, and sometimes animal figures. Among them, the most universal motif in ornamentation which was extensively used is the arabesque. The arabesque is an abstract and rhythmic vegetal ornamentation pattern in Islamic decoration. It is found in a wide variety of media such as book art, stucco, stonework, ceramics, tiles, metalwork, textiles, carpets, etc.. The paper discusses the fact that arabesque is a unique, universal, and vital element of ornamentation within the framework of Islamic Architecture. In this paper, the etymological roots of the term 'Arabesque', its evolution and development have been explored. The general characteristics as well as different modes of arabesque are discussed. This paper also analyses the presentation of arabesque with specific reference to Indian and Persian Islamic heritage buildings.

**Keywords** – Arabesque, Islamic Architecture, Decoration, Heritage, India, Iran

## I. INTRODUCTION

The term 'Arabesque' is an obsolete European form of rebesk (or rebesco), not an Arabic word dating perhaps from the 15th or 16th century when Renaissance artists used Islamic Designs for book ornament and decorative bookbinding [1]. The arabesque is described as a "vegetal design consisting of full and half palmettes, as an unending continuous pattern...in which each leaf grows out of the tip of another" [2]. In German the word denotes the foliage ornament of Muslim art; in a wider sense current since the Baroque period, it is applied to the ornament of that art in general [3]. Arabesque, which is known as *Tauriq* in the Gulf state, means foliage. Arabesque includes both types of ornamentation whether in stylized plant form or the form of geometric interlacing [4]. The arabesque pattern is composed of many units joined and interlaced together, flowing from the other in all directions. Each unit, although it is independent and complete and can stand alone, forms part of the whole design; a note in the general rhythm of the pattern [5].

The most common use of Arabesque is decorative, consisting mainly of a two-dimension pattern covering surfaces such as ceilings, walls, carpets, furniture, and textiles. Dalu Jones in his essay entitled "*Surface, Pattern and Light*" in the book '*Architecture of the Islamic World*' authored by George Michell summarizes six elements that make up Islamic decoration. They are Calligraphy, Geometry, Floral Patterns, Figures and animals, Light and Water. Unlike the strong tradition of portraying the human figure in Christian art, Islamic art is often associated with the arabesque style. Early Islam forbade the painting of human beings, including the Prophet Mohammad (PBUH), as Muslims believe this tempts followers of the Prophet to idolatry. A prohibition against depicting representational images in religious art, as well as the naturally decorative nature of Arabic script, led to the use of calligraphic decorations, which usually involved repeating geometrical patterns that expressed ideals of order and nature. It was used on religious architecture, carpets, and handwritten documents [6]. Jones notes that the arabesque or

geometricized vegetal ornament is "characterized by a continuous stem which splits regularly, producing a series of counterpoised, leafy, secondary stems which can, in turn, split again or return to be reintegrated into the main stem." Further, Jones writes that "This limitless, rhythmical alternation of movement, conveyed by the reciprocal repetition of curved lines, produces a design that is balanced and free from tension. In the arabesque, perhaps more than in any other design associated with Islam, it is clear how the line defines space, and how sophisticated three-dimensional effects are achieved by differences in width, color, and texture. Shapes left in the background contribute to this effect, as in geometric patterns, adding another dimension to the overall design."

## II. RESEARCH METHODOLOGY

In this paper, a qualitative analytical research method has been used. The research methodology comprises visual observations, case studies, mapping, documentation, data collection, and referring to published documents. The systematic literature review has been explored through the internet and secondary data from relevant published academic literature from journal articles and research papers. The data collected in the qualitative research are the data that comes from several case study examples that are described descriptively and are supported by illustrations and photographs to reinforce the arguments put forward. The study has been validated with the analysis of the application and presentation of arabesque with specific reference to Indian and Persian architecture.

## III. THE ART AND SCIENCE OF ARABESQUE

Although the arabesque style appears to be a fanciful and freely organized manner of artistic treatment, it is based on a very complex mathematical logic which is expressed through abstractionism. The Arabesque can also be equally thought of as both art and science, some say. The artwork is at the same time mathematically precise, aesthetically pleasing, and symbolic. So due to this duality of creation, they say, the artistic part of this equation can be further subdivided into both secular and religious artwork. However, for many Muslims there is no distinction; all forms of art, the natural world, mathematics, and science are all creations of God and therefore are reflections of the same thing (God's will expressed through His Creation). In other words, man can discover the geometric forms that constitute the Arabesque, but these forms always existed before as part of God's creation [7].

## IV. THE GEOMETRICAL ARABESQUE

The works of ancient scholars such as Plato, Euclid, Aryabhata, and Brahmagupta were widely read among the literate and further advanced to solve mathematical problems that arose due to the Islamic requirements of determining the Qibla and times of Salah and Ramadan. Plato's *Commentary on Euclid's Elements*, the trigonometry of Aryabhata and Brahmagupta as elaborated on by Muhammad ibn Mūsā al-Khwārizmī (ca. 780-850), and the development of spherical geometry by Abū al-Wafā' al-Būzjānī (940-998) and spherical trigonometry by Al-Jayyani (989-1079) for determining the Qibla and times of Salah and Ramadan, all served as an impetus for the art form that was to become the Arabesque [8]. Various studies have revealed that the three primary plane shapes (i.e. equilateral triangle, hexagon, and square) that independently fill a surface are basic space filling elements [9]. These filling elements divide a plane into different forms, including star-shaped regions, with a star comprising the main core and with two types of shapes surrounding it [10]. Distinguishing motifs of Islamic architecture have always been ordered repetition, radiating structures, and rhythmic, metric patterns. In this respect, fractal geometry has been a key utility, especially for mosques and palaces [11].

The underlying geometric grids governing arabesque designs are based on the same mathematical principles that determine wholly geometric patterns. This explains why a certain type of Islamic geometrical decoration has sometimes been called 'geometric arabesque'; although it does not always represent foliated designs. The term describes a specifically geometric architectural decoration based on the same principles of repetition and continuous self-multiplication as the arabesque [12]. From his study of 200 examples, Bourgoïn concluded that his style of art required considerable knowledge of practical geometry, which its practitioners must have had. In his view, Arabesque design is built on a system of articulation and orbiculation and is ultimately capable of being reduced to one of the nine simple polygonal elements. The pattern may be built up of rectilinear lines, curvilinear lines, or both combined, producing a cusped or foliated effect [13]. It is reported that Leonardo da Vinci found Arabesque fascinating and used to spend considerable time working out complicated patterns [14].

## V. SYMBOLISM AND TWO MODES OF ARABESQUE

There are two modes to arabesque art. The first mode recalls the principles that govern the order of the world. These principles include the bare basics of what makes objects structurally sound and, by extension, beautiful. In the first mode, each repeating geometric form has a built-in symbolism ascribed to it. For example, the square, with its four

equilateral sides, is symbolic of the equally important elements of nature: earth, air, fire, and water. Without any one of the four, the physical world, represented by a circle that inscribes the square, would collapse upon itself and cease to exist. The second mode is based upon the flowing nature of plant forms. This mode recalls the feminine nature of life-giving. Also, upon inspection of the many examples of Arabesque art, some would argue that there is a third mode, the mode of Arabic calligraphy [15]. Arabesque designs are symbols of cosmic discipline which create illusion and image in the mind of the visitors [16]. They reveal abstraction and supernatural order beyond the real world. Symbols such as these designs are a reflection of truth in Islamic art which are presented in a secret language. Professor Avani in his article says "...basically, symbolism is the foundation of creation and God inspiration, sacred art is based on symbolism that means every phenomenon is a cryptograph of a high truth" [17].

#### VI. EVOLUTION AND DEVELOPMENT OF ARABESQUE IN ISLAMIC ARCHITECTURE

The arabesque did not suddenly come into existence ready-made at the time of the rise of Islam. There was a continuity of artistic development from the pre-Islamic to the Islamic period. The Austrian art historian Alois Riegl discusses the vegetal arabesque rooted in the classical palmetto and tendril ornament [18]. Ernst Kuhnel traces the origins of the arabesque to late antiquity and noted that it had acquired its typical shape in the 9<sup>th</sup> century under the 'Abbāsids (749-1258 AD), becoming more fully developed in the 11<sup>th</sup> century [19]. In addition to this claim that the origin of arabesque is the classical palmetto and tendril ornament, another source of early Islamic ornament is Sasanid (226-642 AD) art. The possible origins of the arabesque in Persian art are the Sasanid wing motif. Over time the wing motif developed and was further stylized to the extent that it often lost its identity, being transformed into the arabesque shape which we recognize today. One of the best representations of wing motifs of the Sasanid type can be found in one of the first Islamic monuments is the Dome of the Rock (691-92 AD) in Jerusalem (Figure 1).



Figure 1. The earliest example of floral decoration in the Dome of Rock, Jerusalem

[Source: <https://www.khanacademy.org/humanities/ap-art-history/west-and-central-asia/a/the-dome-of-the-rock>]

With the fully developed arabesque, the Classical bits and pieces of vases and cornucopias from which scrolls and acanthus leaves emerge in the Classical and early Islamic prototypes (like those in the mosaics in the spandrels of the Dome of the Rock) often become abstract designs; they are transformed into leaves and entwining stems. Leaves represent a direct prolongation of the main stem; stalks grow through leaves, and leaves develop into new stems in an endless process of self-multiplication (Figure 2).



Figure 2. Floral and vegetal decoration in the ambulatory of the Dome of the Rock, Jerusalem.

[Source: [http://www.studiosaid.com/te\\_catalog/DOR\\_interior/image.jpg](http://www.studiosaid.com/te_catalog/DOR_interior/image.jpg)]

It is noted that the single most important factor that influenced the creation and evolution of Islamic Art is the Qur'an itself. One can find many verses in the Qur'an mentioning the beauty and abundance of Paradise with its exquisite gardens beneath which rivers flow. Thus, the depiction of foliage in its varied forms became a very prominent feature of Arabesque art. One can visualize a strong link between art and nature in Islamic monuments

where scrolling vines, surreal flowers and gracefully flowing leaves can be seen everywhere from the decoration of Qur'anic manuscripts to the grandiosity of architectural monuments. Such art does seem to evoke a feeling of heavenly grandeur although it is not a direct depiction of heaven [20]. Geometric artwork in the form of the Arabesques was not widely used in the Middle East or Mediterranean Basin until the golden age of Islam came into full bloom. During this time, ancient texts on Greek and Hellenistic mathematics as well as Indian mathematics were translated into Arabic at the House of Wisdom, an academic research institution in Baghdad. Like the later European Renaissance that followed, mathematics, science, literature, and history were infused into the Muslim Islamic world with great, mostly positive repercussions [21]. The development of the arabesque from Classical vine tendril to extreme stylization happened very early in the Islamic world. The stone carvings on the facade of the 8<sup>th</sup> century Umayyad palace of Mshatta consist of repeated triangular compartments enclosing curving vegetal scrolls; the motif here has already the greater intricacy, the denser in growing quality, and the symmetrical arrangement associated with the arabesque proper rather than with its immediate antecedents in Coptic Egypt, Greater Syria and Sasanian Mesopotamia (Figure 3).



Figure 3. Mshatta, earlier arabesque detail of the south facade of the Umayyad palace  
[Source: <https://ranasafvi2012.files.wordpress.com/2012/1069.jpg>]

By the 10<sup>th</sup> century, the continuous arabesque with ogee motifs, half-palmettes, and overlapping stems was well established in the stucco, marble, and mosaic decoration of the Great Mosque of Cordoba (Figure 4). By the 11<sup>th</sup> century, mature arabesque decoration was widely used in architecture in both Spain and Egypt. The classic arabesque of this period is that used in square panels on the facade of the Great Mosque of al-Hakim in Cairo, where interlacing is built upon geometric principles.



Figure 4. Marble and Mosaic decoration in the vault in the Great Mosque of Cordoba [Source: <https://i.pinimg.com/originals/75/13/14/jpg>]

It was in the 14<sup>th</sup> century that different superimposed planes of arabesque designs became more clearly differentiated and, in the eastern part of the Islamic world, Iran and Central Asia in particular, were used on a large scale to provide overall monumental decoration for the outer surface of domes and great facade panels. This use of the arabesque in a magnified version does not appear in western Islam, except the monochrome stone-carved decoration of some Mamluk domes in Cairo; these, however, cannot compare in dimension and polychrome complexity of tile work with eastern examples. It was in these regions too, that Chinese motifs were introduced into arabesque designs, perhaps copied from pottery or textile originals. Cloud bands, lotuses, and peonies were inserted along the continuous line of stems. Masks and protomes of animals were combined with arabesques in compositions, not unlike the grotesques of European architectural decoration. The arabesque long fascinated Europe and the term has come to be synonymous with complex foliated designs. Already in 1480, Giorgio Vasari had described a type of decoration very akin to the arabesque as being *alla damaschina*, that is, from Damascus and-' the Levant. Elsewhere, such designs were described as *a la facon arabicque*. The *'Moresques'* collected in pattern books, were the designs inspired by these Damascene prototypes. Immensely successful, engraved in countless

editions and used widely all over Europe by architects and craftsmen, the 'Moresques' and the 'knots' of the 16th century inspired a whole series of exotic designs and stimulated the imagination of many artists, in Italy, France, and Northern Europe. The notebooks of Leonardo da Vinci show his interest in this sort of design, particularly in the linear interlacing, which he would have known from the metalworkers established in Venice [22]. In the 16th century Europe the term 'Moresque' was used to describe any intricate pattern inspired by the East, even arabesque proper, as in the case of those used by Durer for the decoration of a celebrated ewer. A little later 'arabesque' became the term used for exotic designs in interior decoration, where figures were dressed in fanciful Eastern clothes and background and furniture were easternized in a manner very similar to that found in the more famous *Chinoiseries* of the time [23]. Figure 5 shows the four stages in the evolution of the arabesque.

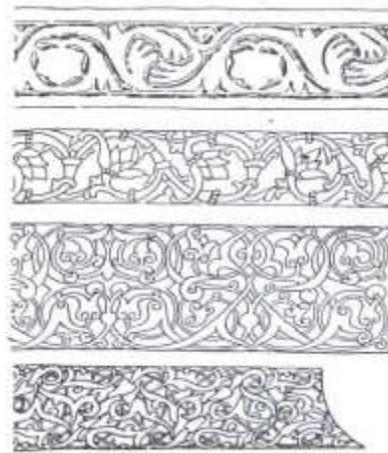


Figure 5. Four stages in the evolution of the arabesque. The decoration of the mosque of Amr at Fustat (top) is still close to the classical running spiral. An 13th-century panel of woodcarving from Egypt and detail from the mosque of Sidi 'Ukba at Qairouan show the basic pattern developing into the free and more serpentine forms. In the last example, an 15th-century Quran from Granada, it has become a mass of writhing lines in a complex arrangement of overlapping layers [Source: Jones, 1995]

#### VII. ARABESQUE ORNAMENTATION IN ISLAMIC ARCHITECTURE IN INDIA

The first example of arabesque in India is known around the 13<sup>th</sup> century in the Quwwat al-Islam in Delhi, combined with motifs from the Hindu tradition. It is one of the earliest finest examples of arabesque engravings on sandstone. On one hand, there is the beautiful, curvaceous Islamic calligraphy, the arabesque designs and then there are pillars with clearly pre-Islamic Hindu motifs. Hindu motifs, like tasseled ropes, bells, tendrils, leaves, and the lotus scroll in particular frolic all over the mosque (Figure 6). The screen of the central arch is beautifully carved with borders of inscriptions and geometrical and arabesque designs, but the hand of craftsmen used to Hindu motifs is clearly perceptible in the naturalistic representation of serpentine tendrils and undulating leaves of its scroll-work and even in the fine characters of the Quranic inscriptions (Figure 7).



Figure 6. Lotus scroll and motifs from Hindi traditions in Quwwatul-Islam Mosque in Qutub Minar, Delhi [Source: The Author]



Figure 7. Calligraphy and Arabesque carving in sandstone on the wall panel of Qutub Minar Complex, Delhi [Source: The Author]

The tomb of Itmad-ud-Daula completed in 1628 A.D. at Agra, built entirely of white marble and covered wholly by pietra dura mosaic, is one of the most splendid examples of that class of ornamentation anywhere to be found in Mughal Architecture (Figure 8). Itmad-ud-Daulah's tomb is a highly ornate edifice, which is looked upon as an imminent precursor of the Taj Mahal as far as elaborate carvings and inlay work are concerned. The tomb has exquisite inlaid marble patterns - pietra dura decoration depicting cypresses, wine glasses, and an amazing variety of geometrical arabesque (Figure 9).



Figure 8. Geometrical Arabesque In Pietra dura in the minaret of Itmad-ud-Daula's Tomb, Agra [Source: The Author]



Figure 9. Pietra dura decoration with geometrical arabesque designs in Itmad-ud-Daula's Tomb, Agra [Source: The Author]

The decoration in Mughal buildings reflects the same principles as those in Iran. The Persian-inspired style of vegetal arabesque, in the Taj Mahal, built by Shah Jahan in the 17<sup>th</sup> century, introduced an entirely new type of vegetal decoration (Figure 11). Both interior and exterior of the tomb are decorated with a continuous dado in low relief showing flowering plants growing naturally from a stem in the ground; the same motif is repeated in pietra dura inlay on the two cenotaphs for Shah Jahan and his wife and in red sand-stone on the structures surrounding the tomb itself (Figure 10). This type of naturalistic depiction was quite foreign to the Islamic tradition of conventionalized representation and arabesque. It was inspired by engraved illustrations found in European herbals that had been brought by Jesuit missionaries to India in the early 17<sup>th</sup> century [24].



Figure 10. Floral and vegetal Arabesque in Pietra dura on the entrance gateway of Taj Mahal, Agra [Source: The Author]



Figure 11. Floral and vegetal Arabesque in Pietra dura on a panel in Taj Mahal, Agra [Source: The Author]

#### VIII. ARABESQUE ORNAMENTATION IN ISLAMIC ARCHITECTURE IN IRAN

Decorating has always been one of the pillars of Iranian architecture. The plant ornament was considered of vital importance to the evolution of the Islamic – Persian style. Brickwork, stucco, tiles, carvings, wood carvings, mirror work, and among the decorations that have been more or less prevalent in all courses [25]. The earliest examples of arabesque ornament in Iran based on the wing motifs belong to the early Iranian dynasties, such as the Sâmânid (819-1005), the Bûyid (932-1002 and the Seljuq (1038-1194) periods. During these dynasties, a special attempt seems to have been made to decorate objects with arabesques [26]. Sassanian artists developed the split palmette enclosing some motif, either pomegranate or occasionally a rosette, arranged in several rows into unit patterns. The half palmettes were combined with vine leaves or 'lotus' motifs, appearing prominently in Sassanian ornamentation either arranged in a row or as part of a wavy scroll. A characteristic feature was that the half palmettes did not form a final motif but were an integral part of the scroll itself, with their ends reforming into other palmettes [27].

In Iranian architecture, there are numerous buildings in which vegetal, floral and geometrical arabesque have been used extensively. The two most prominent paradigms of Arabesque are The Imam Masjid and Lotfullah Masjid in Isfahan. The Masjid-i Imam, formerly known as Masjid-i Shah, was built in 1630 on the south side of Isfahan's maidan that had been built under Shah Abbas. It employed the new *haft rangi* (seven-color) style of tile mosaic (Figure 12). The entrance portal of the mosque displays the finest tile decoration in the building. It is entirely executed in a tile mosaic in a full palette of seven colors (dark *Persian* blue, light *Turkish* blue, white, black, yellow, and green). A wide inscription band with religious texts written in white 'thuluth' script on a dark blue ground frames the iwan. [28]. The ornamentation of the structures is traditional, as it recaptures the classic Iranian motifs of symbolic appeal for fruitfulness and effectiveness. Within the symmetrical arcades and the balanced iwans, one is drowned by the endless waves of intricate arabesque in golden yellow and dark blue, which bless the spectator with a space of internal serenity (Figure 13). The exterior of the main bulbous dome of the sanctuary is covered with a spiraling beige arabesque on a light blue background (Figure 10). The interior of the dome is ornamented with a sunburst at the apex from which descends tiers of arabesque. The eight domes in each of the prayer halls adjacent to the domed sanctuary are decorated with mosaic tilework of concentric medallions in floral motifs (Figure 14).

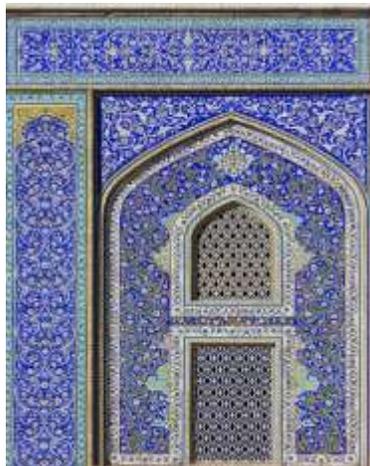


Figure 12. The arabesque pattern in glazed tiles in facade portal of Shah Mosque, Isfahan  
[Source: [https://hy.wikipedia.org/wiki/Iranian\\_Tiles\\_1.JPG](https://hy.wikipedia.org/wiki/Iranian_Tiles_1.JPG)]



Figure 13. The arabesque pattern in glazed tiles in the Iwan of Shah Mosque, Isfahan  
[Source: <http://www.at-tawhid.net/possibilit-de-prier-chez-un-ami-non-musulman-jpg>]



Figure 14. Arabesque in glazed tiles on the dome of Shah Mosque, Isfahan [Source: [https://archnet.org/sites/1622/media\\_contents/119802](https://archnet.org/sites/1622/media_contents/119802)]

Sheikh Lotfollah Mosque is one of the masterpieces of Iranian architecture, that was built during the Safavid Empire, on the east side of Naghsh-i Jahan Square, Isfahan (Figure 15). The construction started in 1603 and finished in 1619. On the interior side of the dome, the decoration seems to lead the eye upwards toward its center, as the rings of ornamental bands filled with arabesque patterns become smaller and smaller [29]. The dome is inset with a network of lemon-shaped compartments, which decrease in size as they ascend towards the formalized peacock at the apex (Figure 16). The *mihrah* in the west wall is enameled with tiny flowers on a deep blue meadow. Each part of the design, each plane, each repetition, each separate branch, or blossom has its somber beauty (Figure 17). The highlights are broken by the play of glazed and unglazed surfaces to rearrange themselves in countless shining patterns [30].



Figure 15. Arabesque in the interior of Sheikh Lotfullah Mosque, Isfahan [Source: [https://www.123rf.com/photo\\_70891875\\_isfahan\\_iran.jpg](https://www.123rf.com/photo_70891875_isfahan_iran.jpg)]



Figure 16. Lemon shaped Arabesque pattern in the inner side of the dome of Sheikh Lotfullah Mosque, Isfahan [Source: [https://en.wikipedia.org/wiki/Isfahan\\_Lotfollah\\_mosque\\_ceiling\\_symmetric.jpg](https://en.wikipedia.org/wiki/Isfahan_Lotfollah_mosque_ceiling_symmetric.jpg)]



Figure 17. Arabesque pattern on the Muqarnas on the entrance portal of Sheikh Lotfullah Mosque, Isfahan [source: <https://fineartamerica.com/featured/details-of-sheikh-lotfollah-mosque-in-isfahan-iran-mariusz-prusaczyk.html>]

#### IX. CONCLUSION

The objective of this study was to emphasize the relevance of Arabesque as a universal element of ornamentation in Islamic Architecture, which was defined by religious beliefs and cultural values prohibiting the depiction of living creatures including humans. The belief that science is an integral part of Islam led to many discoveries and advancements in the field of mathematics by Muslims. This had a very rich influence in Islamic Art which beautifully combined artistic foliage designs with geometric principles to create exquisite works of art unique only to the Islamic Cultural Heritage. The reason why Arabesque gained as much significance and popularity throughout the Islamic world is mainly because it has flexibly evolved and flourished regionally, while still retaining its original principles [31].

It is appropriate to regard the arabesque as a novelty of early Islamic art, but not all ornamentation in Islamic architecture can be considered as influenced by it. Arabesque designs itself varied throughout different regions because of religious and social conditions, local influence, availability of material, and temporal variation in

techniques of individual motifs. In today's context, the art of Arabesque is gradually being replaced by its blind and brash imitations which not only damage its relationship with its cultural context but also leads this unique element of ornamentation towards deformation and distortion with reference to its scale and proportions, thus paving way for extinction in future. It is a threat Arabesque might be facing in the future, particularly considering both the rapid transformation processes due to globalization in countries where Arabesque has been commonly and widely used. Arabesque has also lost its place in contemporary Islamic architecture due to the absence or decreasing number of masters or traditionally skilled craftsmen practicing this genuine building craft.

## REFERENCES

- [1] S. Blair and J. Bloom, "*The Grove Encyclopedia of Islamic Art & Architecture*", Oxford University Press, Oxford, pp. 68, 2009.
- [2] R. Ettinghausen, Grabar O. and Marilyn Jenkins, *Madina, "Islamic Art and Architecture- 650-1250"*, New Haven, Yale, pp. 66, 2003
- [3] E. Herzfeld, "*Arabesque*", in *Encyclopedia of Islam* (1) Leiden: E.J. Brill, 1938.
- [4] T. Burckhardt, "*Principles of Islamic art*", Trans & Edit by Amir Nasri. Tehran: Haghighat Publisher, pp. 111-112, 2007.
- [5] R. Al-Faruqi, *Islam and Art*, Studia Islamica, Volume 37, pp- 81-110, Larose, Paris, 1973.
- [6] D. Jones, "*Surface, Pattern and Light, Architecture of the Islamic World: Its History and Social Meaning*", edited by Michell G. & Ernst J., pp 170-172, Thames and Hudson, London. 2005.
- [7] "*Islamic Art*", retrieved on 27 July 2018 from <http://www.huntfor.com/arhistory/medieval/islamic.htm>, accessed November 12, 2018.
- [8] Ihsan Shanti, "*Islamic Architecture: Arabesque Moresque design and Decoration*", retrieved on 28 November 2019 from <https://req123.wordpress.com/>
- [9] K. Critchlow, "*Islamic Patterns*", Thames and Hudson, London, 1976.
- [10] El Ouazizi, A. Nasri, and R. Benslimane, "A rotation symmetry group detection technique for the characterization of Islamic Rosette patterns," *Pattern Letter*, No. 68, pp 111-117S, 2015.
- [11] Ihsan Shanti, "*Islamic Architecture: Arabesque Moresque design and Decoration*", retrieved on 28 November 2019 from <https://req123.wordpress.com/>
- [12] Anti Essays, "*Islamic Art*", retrieved on 28 July 2018 from <http://www.antiessays.com/free-essays/10171.html>, accessed March 15, 2019.
- [13] J. Bourgoïn, "*Les Arts Arabes*", Paperbackshop, USA, 1873.
- [14] M. S. Briggs, "*Muhammadan Architecture in Egypt and Palestine*". Clarendon Press, Oxford, pp. 178, 1924.
- [15] Wikipedia, "*Arabesque*", retrieved on 28 November 2018 from <http://en.wikipedia.org/wiki/Arabesque>.
- [16] T. Burckhardt, "*Principles of Islamic Art*", Trans & Edit by Amir Nasri. Tehran: Haghighat Publisher, 2007, P. 111, 112, 2007.
- [17] R. Avani, "*Philosophy and Mental Art*", Garoos Publisher, Tehran, pp. 77, 1998.
- [18] R. Alois, "*Problems of Style: Foundations for a History of Ornament*", Princeton Univ. Press, p. 237, 1992.
- [19] E. Kuhnel, 'Arabesque' in *Encyclopedia of Islam* (2), Leiden: E.J. Brill, pp. 561, 1960.
- [20] S. Shahnawaz, "*Arabesque*", retrieved on 18 November 2018 from <http://www.victorynewsmagazine.com/Arabesque.htm>, accessed March 15, 2010.
- [21] "*Islamic Art*", retrieved on 28 July 2018 from <http://www.huntfor.com/arhistory/medieval/islamic.htm>.
- [22] M. Greenhalgh, "*Marble Past, Monumental Present: Building With Antiquities in the Medieval Mediterranean*", Brill Publication, Boston, USA, 2009.
- [23] D. Jones, "*Surface, Pattern and Light', Architecture of the Islamic World: Its History and Social Meaning*", edited by Michell G. & Ernst J., pp 170-172, Thames and Hudson, London. 2005
- [24] S. Blair and J. Bloom, "*Islam: Art & Architecture*", *Islamic Ornament*, edited by Markus Hattstein & Peter Delius, Hfullmann Publishing, U.S.A., 2007.
- [25] J. Jafari and H. Bhdad, "What looked like a brick with a plaster management approach to the bottom of the Grand Mosque of Yazd." *Fine-arts magazine*. Vol. 17, No. 4, 1991.
- [26] M. Khazaie, "The Arabesque (*Islīmī*); Its Formation and Religious Devotion in Early Islamic Art of Persia," *Goya*, Vol. 49, No. 1, pp. 27-50, 2006.
- [27] S. Maurice, "Studies in Islamic Ornament: I. Some Aspects of Omayyad and Early'Abbāsīd Ornament," *Arts Islamica*, Vol. 4, 1937.
- [28] M. Hattstein and P. Delius, "*Islam, Art and Architecture*"; Gardeners Book, UK, 2004.
- [29] R. Savory, "*Introduction to Islamic Civilisation*" (10<sup>th</sup> edition), Cambridge University Press. UK, pp. 94, 1976.
- [30] R. Byron, "*The Road to Oxiana*"; Penguin Books Ltd., London, UK, p. 177- 78, 2014.
- [31] S. Shahnawaz, "*Arabesque*", retrieved on 28 November 2018 from <http://www.victorynewsmagazine.com/Arabesque.htm>, accessed March 15, 2019.