

SULTAN HASSAN MOSQUE: AN ISLAMIC ARCHITECTURAL WONDER ANALYTICAL STUDY OF DESIGN AND ITS EFFECT ON ISLAMIC CAIRO

Kareem Adel Mohamed Kamal Ismail

Master of Urban and Regional Planning Holder
International Islamic University Malaysia
Postal: 49 El-Rabi El-Gizy Street, 12211, Cairo, Egypt
e-mail: kimoeg2002@yahoo.com

Abstract

Cities in 21st century are losing identity due to globalization and rapid urbanism. However, great architectural buildings like Sultan Hassan Mosque Complex show us that great architectural wonders can keep this identity and can affect positively in society's life. The simple aim of this study is to investigate the relationship between architectural features and Islamic meanings in modern world through studying the past. The study is mainly based on two main sources of data, literature review regarding historical part and site visit dealing with discussion of architectural features, uses and effect on surroundings society. Based on these sources, analysis was made based on matrix relationship between two sets of criteria, architectural parts (design, usage, location, artistic features), and mosque significance in Islam (prayer house, community center, center of knowledge, meeting place for *shoura*). Findings proved the existence of consequent relationship between Islam and architecture, as Islamic principles affect the design of the mosque in religious, social, and service aspects. Alternatively, architectural building satisfies all Muslim needs. This dual effect situation shapes recommendations like enhancement of the multidimensional use of the mosque, strengthen the community service role of the mosque, and developing design of modern mosques to fulfill Muslim requirements with 21st century measures and also endorse Islamic values through architecture.

Keywords: Sultan Hassan Mosque, Islamic Cairo, community development

Abstrak

Kota di abad ke-21 kehilangan identitas akibat globalisasi dan urbanisme yang sangat cepat. Walaupun begitu, karya-karya besar seperti kompleks Masjid Sultan Hassan menunjukkan bagaimana arsitektur bisa menjaga identitas dan memberi pengaruh positif dalam kehidupan masyarakat. Tujuan sederhana dari penelitian ini adalah menyelidiki hubungan antara fitur-fitur arsitektural dengan makna-makna Islami di dunia modern dengan mempelajari masa lalu. Penelitian ini terutama didasarkan pada dua sumber data utama, yaitu tinjauan pustaka mengenai bagian dari sejarah, dan survey lapangan yang berhubungan dengan diskusi tentang fitur-fitur arsitektur, penggunaan dan pengaruh pada masyarakat sekitar. Berdasarkan data tersebut, analisis dibuat berdasarkan hubungan matriks antar dua set kriteria, bagian-bagian arsitektural (desain, penggunaan, lokasi, fitur-fitur artistik) dan signifikansi masjid di dalam Islam (tempat sholat, pusat masyarakat, pusat pengetahuan, tempat rapat dan bermusyawarah). Temuan penelitian ini membuktikan adanya hubungan yang konsekuen antara Islam dan arsitektur, sejalan dengan pengaruhnya prinsip-prinsip Islam terhadap desain masjid dalam aspek-aspek keagamaan, sosial dan pelayanan. Sebagai alternatif, bangunan arsitektural memenuhi semua kebutuhan Muslim. Situasi efek ganda ini memberikan beberapa rekomendasi, yaitu peningkatan penggunaan multidimensional masjid, penguatan peran pelayanan masyarakat oleh masjid, dan pengembangan desain masjid modern untuk memenuhi kebutuhan kaum Muslim di abad ke-21 dan juga pendukung berkembangnya nilai-nilai Islam melalui arsitektur.

Kata kunci: Pengembangan masyarakat, Masjid Sultan Hassan, Cairo islami

Introduction

In this changing world, where rapid urbanization has made huge cities lost their own identity, globalization has affected most parts of our life including the design of our houses, workplaces and religious places like temples, churches and mosques. Nowadays, this lost of identity has also affected most Muslim countries, including the way they design their mosques, which mostly adapted the uses and needs of modern people with huge worldly activities. Thus mosques' function become limited to religious

ritual use only. These changes were also affected in the changes of some architectural aspects of those mosques.

Therefore, it is important to rediscover the real role of mosque in Muslims' life. Through analysis of a great example mosque, we can discover the multidimensional uses of the mosque. A trail is made to analyze the Sultan Hassan Mosque Complex, which is considered to be one of the most important mosques in Islamic Cairo for the last 700 years, which shows a magnificent outcome of Islamic

civilization in Egypt in the field of architecture and planning.

The paper began by historical preview of the mosque and its importance in terms of its location within old Islamic Cairo, followed by literature review which is focused in two aspects. First, the importance of mosque in Islam based on verses of holy Quran and glances of mosque role in time of the Prophet pbuh and early Islamic civilization. Second, the fast review of development of mosques design generally, and in Egypt especially. The description is continued with the analysis phase where different parts and features of the mosque are discussed and compared with the main role of mosques in Islam. This is to investigate how the design and other architectural features have helped in achieving the functions of mosque efficiently, and to investigate how it affected people's life in the past and present, in order to take lessons for the future of mosque architecture in the 21st century.

A historical mosque like Sultan Hassan Mosque Complex is a challenge for any researcher, as the data collection process has to be managed differently, where the main source of data is the literature review from books and articles. In addition, the author made some site visits to the mosque to collect data through photographs and to make a more detailed comparison between the master plan with the existing parts of the mosque.

In order to identify this qualitative relationship between the mosque as a building and its spiritual - social role in Muslims life, analysis is based on two main sets of criteria. An architectural set is based on the design, the efficiency of its usage, the image including artistic features, and the significance of the place. The second set is the religious set which is based on the multifunctional uses of the mosque in Islam as the prayers place, center of community service, center of knowledge, and the meeting place as *el-Shoura* or consulting meeting.

The relationship between these two sets of criteria is the main core of analysis. Figure 1 is a matrix of the achievements of all the functions of the mosque through the different features of architecture.

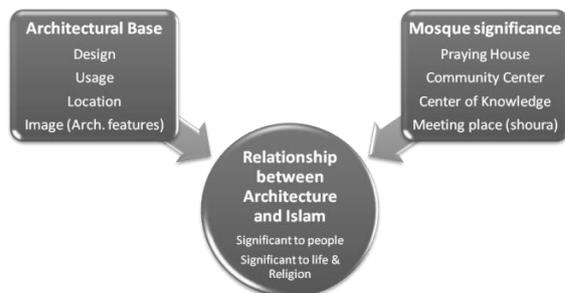


Figure 1. Analysis matrix between architectural and religious criteria sets

Role of Mosque in Islam

Islam through its five main pillars, explanation of the Holy Quran and the hadith of the prophet Mohamed pbuh, has established a way of life for all Muslims. One of the main parts of this way of life is the five times prayers which are considered as one of the main pillars in Islam. This regular activity requires an efficient place to gather Muslim people together in order to perform prayers in *jama'ah*. This place, which is well-known as mosque (*masjid*), is also needed to facilitate the meeting of Muslim people in order to discuss, to learn about Islam, and other activities related to *ibadah*.

Many verses of the Holy Quran encouraging Muslims to build mosques, and explaining its different role to religion and to society, like verse in Surah al-Tawbah as follows:

*"The Mosques of Allah shall be visited and maintained by such as believe in Allah and the Last day, establish regular prayer and practice regular charity and fear none at all except Allah, It they who are expected to be on true guidance."*¹

From the above verse, it is obvious that mosques are built, not only as a prayer place, but also to serve Muslims as a community center through charity and other services. It is also noted in the Prophet's hadith that the builder of mosques which serves Muslims will be granted blesses from Allah, as follows in the hadith narrated by Al-Bukhari, *"Whoever builds and develops a mosque with the intention of obtaining Allah's blessings, verily Allah will raise for him a similar structure."*²

The guidance of charity and helping society, which is closely related to the functions of mosques is vastly encouraged in Islam as noted in one of the hadith narrated by Muslim, *"If any Muslim plant any plants and a human being or animal eats of it, he will be rewarded as if he had given much in charity"*.³

Furthermore, another role of mosques in Islamic society is as the meeting point for Muslims, especially in Friday prayer, which is considered as a weekly meeting for Muslims to be aware of religion and life matters through Friday speech. This weekly occasion can also be considered as one of the implementation of *al-Shoura* or consultation principle, as it is noted in the Holy Quran as follows:

"O ye who believe, when the prayer is proclaimed in Friday, hasten earnestly to remembrance of Allah and leave business that the best if you knew, and when the prayer is finished they may disperse through the land and seek the bounty of Allah And celebrate the Praises of Allah often they may prosper".⁴

Moreover, those functions above are not the only roles of mosque in Islam. As Islam is the religion of knowledge, Muslims are encouraged to build mosques as knowledge centers, where lessons in religion are given to students by Sheiks. This is a fundamental part of the Muslims' mission on earth to

be maintained and developed, as they are *khalifah* of Allah on the earth, which was noted in the Holy Quran, “Who has made for you the earth like a bed and has made for you roads therein, in order that you may find your way”.⁵

Development of Mosque in Islamic Civilization

As a place for performing *ibadah*, mosques have become a great part in Islamic civilization since the time of Prophet Mohamed pbuh. Since the early time of the development of mosques, the construction of the buildings have always related to the surrounding environments and its available materials. In time of the Prophet pbuh the construction materials were Palm trees. The mosque is designed in a very simple way as a square directed towards Mecca, where the Prophet pbuh as the *imam* stood at the front leading prayers and giving speech to Muslims. Bilal, the Prophet’s *muadheen*, used to climb up the mosque wall to call for prayer before the invention of minarets.

This simple design soon had been developed with the expansion of the Islamic empire, especially when Egypt was conquered in time of Amr Ibn El-As. He built the first mosque in Egypt and all over Africa which were included in one of the earliest mosques built in Islamic history. His mosque in Cairo or Fustat that time was built in the same characteristic of simplicity. Figure 2 is the plan of his mosque in Fustat, capital of Egypt before Cairo. The mosque consists of an open courtyard and simple one shaded corner for prayer named *iwan*. Through ages, four *iwans* were built within the mosque. Thus it became the second largest mosque in Egypt.⁶

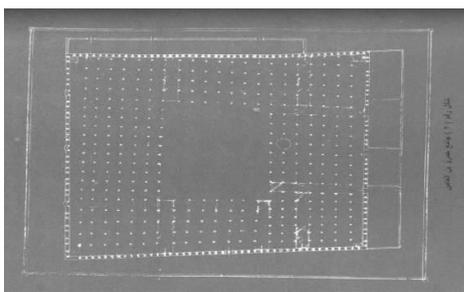


Figure 2. Masterplan of Amr Ibn El-As Mosque in Fustat, Egypt (Source: Abu Lughod⁷)

As the Islamic empire expanded to the new countries, new styles of art and architecture had been added to the design, usage and the image of mosques all over the empire, especially in Egypt as the central and significant country in the region. Due to this importance, Cairo has been converted as the center of knowledge and civilization in the Islamic world, thus has affected the design of the main mosques of this era.⁸

Al-Azhar mosque is clearly one of evidence of this shining era in the history of Islamic Cairo, where the mosque which was built by the Fatimids was intended as the spreading center for the Shia sect. It was firstly built only as a small area building, yet after Ayyibud era and afterwards it became the first Islamic religious university. These changes required a huge development in its design. Therefore, many *iwans* were added to the original design. And throughout ages, many parts were also added to accommodate the increasing number of students from all over the Islamic world until it reached its recent structure (Figure 3). As the rise of *madrassa*, each corner of the mosque is dedicated to one *madhab* in Islam and each column is dedicated to one sheik.

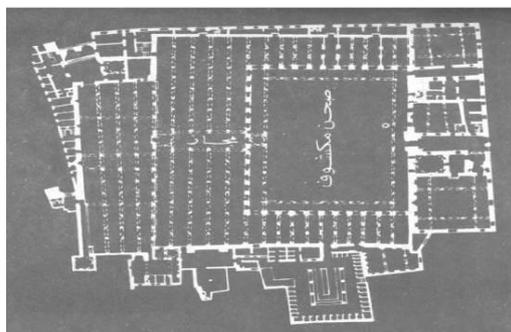


Figure 3. Masterplan of Al-Azhar Mosque (Source: Abu Lughod⁹)

This development leads to the concept of cross-shaped mosques in the Mamluk era, where every mosques has four *iwans* and accompanied with four buildings for teaching Shafite (Shafi’i), Malakite (Maliki), Henefite (Hanafi) and Hambelite (Hanbali) *madhabs*. The design became so popular during the era like Qulwaon, Barkok, Sultan Hassan, and Brasbai complex in Islamic Cairo center.

The location of these mosques has also affected their design. The design were evolved from free space in time of Amr Ibn El-As in el-Fustut capital, then into controlled space within the walls of Cairo in time of Fatimid era such as Al-Azhar and El-Hakim mosques, and later into limited space which require innovative mosques design, such as mosques in Mamluk era, where mosques were built either near by the citadel (the ruler place) or within the main street of Cairo like EL-Moaz street. Mosques in this era were also built for pure memorial and religious reasons, such as Khanikas in the suburbs of Cairo which is known as the great Mamluk cemetery.¹⁰

Historical Background of Sultan Hassan Mosque

Since the establishment of Cairo by the Fatimid Caliph Muizz Al-Din through his army leader Jawhar

the Sicilian in 969 AD, the city has continued to be of great importance to the whole country. Cairo served as the main capital of Egypt and has been expended tremendously. Its role has changed from being a royal city full of palaces during the Fatimid era, into the center of governance after the construction of Saladin citadel in the Ayyubid era, and finally being converted during the Mamluk era into the capital of the East and the center of knowledge in the Islamic world in the 14th century.¹¹

All developments in Islamic Cairo has encouraged sultans as the rulers of Egypt to build great mosques within the city as prayer places and also as their future tombs or mausoleums in order to carry their names eternally as the servants of God. One of those sultans was Sultan Hassan, the son of the great Mamluk Sultan, Al Nasser Mohamed Ibn Qalawoun. Sultan Hassan actually ruled Egypt twice. The first time was in 1347 AD as 13 years old teenager. Because of his young age he was pull out of throne by the other Mamluk princes and generals.¹² His second rule of Egypt lasts for around six continuous years from 1356 until 1361 AD. Historical sources mentioned that he was not a powerful sultan, but rather a character which was easily manipulated by powerful *amirs*. Eventually, in 1361 AD Sultan Hassan was murdered, where some historians thought that those princes (*amirs*) where responsible for his murder, as his body was never found nor buried in his mausoleum within the complex.¹³

According to historical references, the construction of this mosque begun in 1356 AD, after clearing the site from an old Mamluki palace. It is built under the supervision of prince Hohammad Ibn Baylik Al-Muhssani. There were some doubts about the funding source of the construction, whether it was funded by the state budget or not. It was proven that the construction cost \pm 20,000 dirham each day for five years, which is a huge amount even in the modern world's measurement.¹⁴ **Error! Reference source not found.**

It was reported that Sultan Hassan, though abandoned the project because of its huge budget and an unstable political condition, was affraid that he will be ashamed of the incompletion of this building. However, he finally succeeded in building this great complex which preserves his name for eternity in the history of Islamic history. The complex was fully completed two years after his death, and was opened by one of the Sultan's functionaries named Bashir Al-Gamdar.¹⁵

Architectural Description of Sultan Hassan Complex

The complex referred by many historians and architects as the finest ancient mosque in Cairo, and

has been praised as one of the major monuments of the Islamic world. It consists of a school (*madrasa*), a congregational huge mosque for Friday prayer, a hospital (Mustashfa or Bemarkistan) on the western side, and a mausoleum. All these components presented in mosque plan (Figure 4).

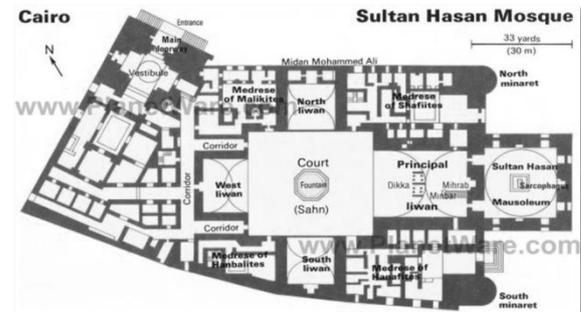


Figure 4. The masterplan of Sultan Hassan Complex

The whole complex area is around 7906 square meter, with three façades, the largest length is around 150 m. The fourth façade on the western side has a large commercial complex and other dependencies belonged to the *waqf* of Sultan Hassan which financed the foundation. The original rounded dome of the mausoleum was built of wood and covered with lead as in the dome of Imam Shafi'i.¹⁶

According to historians like Maqrizi, the architecture of the whole mosque has been influenced by the Anatolian architecture especially by some great examples there, such as *Gok madrasa*. That is due to the participation of craftsmen from all over the world in construction process of this great complex. The sign of this influence is indicated by the existence of medallions nearby the stalactite vault in the complex corridor, the carved bands framing it, and the panels filled with geometric patterns in the entrance area.

The Mosque

The mosque building is considered as one of the largest in Egypt. It is a massive structure with 150 meters long and 36 meters high. Its tallest minaret is 68 meters tall. It was meant to house four hundred students.

The entrance of the mosque is the largest portal of any pre-modern Cairene Mosque-Madrasa complex in Egypt (Figure 5). The portal itself is offset from the center of the façade (Figure 6), about thirty degrees from the rest of the wall. It is dominated by a cascade of dripping stalactites surmounted by a fluted half dome. The tremendous height of the portal is emphasized by the spiral cut pilasters, as well as by the vertical panels on each side of the porch.

The carved bands adorning the portal are not continued above, and the stages of work can thus be

seen. The carvings below are completed and the patterns above them are incised but not carved out, showing that the work began on the lower part and moved upwards. The uppermost part of the portal is lack of decoration. There is a narrow, very curious carved panel with architectural designs such as a Gothic portal and a domed structure with gabled roof of Western, probably Byzantine origin, to the right of the entrance. It may even represents a type of craftsman's signature.



Figure 5. Mosque Main Entrance



Figure 6. The main mosque façade

The main entrance's huge door is not its original one. It was taken by Al-Mu'ayyad to be used in his own mosque near Bab Zuvelia. However, the entrance part is full of decorations from the Mamluk era, including verses of Holy Quran in Khafi writing, and a huge inlaid marble inscription and two marble niches inlaid with geometric designs. The conchs are decorated with stalactites as in Anatolian prayer niches. The vestibule contains a large stone bench that may have been used by Quran readers. Above it are medallions with inlaid geometric patterns and carved stone niches.

The interior of the mosque's entrance hall is quite remarkable with its dark red and brown Mamluk decorations. The dome is also amazing and very high and rich with ornaments. There were the influences of the workmanship of artists which came from Anatolia and Western Persia (Tabriz) in the first

half of the 14th century. The lantern hung on the ceiling is truly amazing.

At the left side of the vestibule, there is a corridor with its double bended passageway, which empties into the magnificent *sahn*, the open courtyard. This passage runs beneath the students' living quarters.

The Madrasa (School)

One of the main reasons that Sultan Hassan built the complex was to host the teaching of all madhabs of Sunni Islam. However, the *madrasa* was not very popular for a while. This is because the building is surrounded by the closure due to some security reasons.

Each of these *madrasa* can be entered from a doorway between the individual *iwans* which is noted with its *ablaq* courses of black and white marble, the colored mosaic decoration, the joggled voussoirs on arches and lintels, and the dripping stalactites on the cornice (Figure 7). In the inside, each *madrasa* has its own courtyard with an ablution fountain, a *qibla* oriented iwan, and four or five stories of rooms, a number of latrines are included in the living quarters. Interestingly, most of the rooms in these schools have windows with the street view to ensure lightening and ventilation.

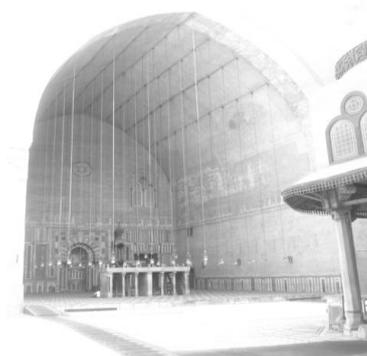


Figure 7. Madrasa Entrance & Its Iwan



Figure 8. The main Iwan (*Qibla*)

The Hanafi *madrasa* is the largest school at the right of the *qibla*, meanwhile the next largest

madrasa was that of the Shafi'i on the left side of the sanctuary. The main eastern *iwan* (Figure 8), known as the *Qibla Iwan*, is not only the largest of the *iwans*, but also the largest vaulted hall of the medieval Muslim world. The *Qibla Iwan* was always dedicated to the strongest *madhab* in Egypt with the more followers, which was either the Henebite or the Shafi'i *madhab* in the Mamluk era.

The Courtyard (*Sahn*)

Although the exterior of the building is of stone, the interior is of brick covered with stucco, except for the stonework finishing details. Here, the magnificent manipulation of voids and solids give the courtyard its soaring thrust towards the sky. The area measures 34 meters long and 32 meters wide and completely paved with beautiful decorative marble patterns. In the center is a large ablution fountain that was completed in 1362 AD, and then renovated in the Ottoman period (Figure 9).



Figure 9. The ablution Fountain

It is covered by a wooden dome which is supported by the marble columns. Around the base of the dome is a band of inscriptions from the Quran. The dome of this fountain, which is supported by eight marble columns, is a rounded shape, and might be a replica of the missing original dome of the mausoleum.



Figure 10. The courtyard with two iwans

On the each side of the *sahn* are recesses with arched supports known as *iwans* which open upon the courtyard (Figure 10). Each of the four *iwans* represents one school (or legal rite) of Sunni Islam,

consisting of Shafite (Shafi'i), Malakite (Maliki), Henebite (Hanafi) and Hambelite (Hanbali) sects. The floor of each *iwan* is covered by carpets of different color to differentiate them. The walls of the *sahn* and the *iwans* are marvelously ornated with the hanging lamps looming far above. Nevertheless, in these *iwans* Sheikhs taught students the principles of each *madhab* in a rounded shape forum. These *iwans* are also decorated by polychrome marble paneling, with the mixture of soft colors and the deep relief carvings of the inscriptions.

The Mausoleum

The mausoleum, which is one of the largest in Cairo with its 21 square meter dome, is located behind the *Qibla Iwan*, which is unusual in Islamic architecture as Muslims do not perform prayers towards tombs. However, the architect designed it in such way to dedicate all prayers in the mosque to the soul of the founder. The Mausoleum was intended to be the tomb of Sultan Hassan (Figure 11), yet it contains the bodies of two of his sons, named Al-Shehab Ahamd and Ishmael. Sultan Hassan was not buried here because his body was never found.



Figure 11. Sultan Hassan intended tomb

The decorations inside the mausoleum are mostly the Quran inscriptions. The verses written on the walls above the marble paneling are in Thuluth script (Figure 12). The high dome of the mausoleum is constructed with bricks, like one in the entrance hall of the mosque. At the corners, wooden stalactite pendentives with niches of lavishly gilded and painted decorations support the dome.



Figure 12. The mausoleum wall decorations

Each façade of the mausoleum has two rows of windows. The upper ones are inserted in the recesses, crowned with stalactites which in turn are surmounted by a shallow conch in a similar fashion to the portals. Like the medallions, interlaced bands also decorate the conch. Once adorned with faience mosaics, with traces still evident, the lower windows are inserted into recesses that have a stepped pyramidal profile. The traces of mosaics indicated that the craftsman who were imported from Tabriz during the reign of Sultan Hassan's father must have stayed for several decades in this country.

Architectural Features

The *mihrab* (direction to Mecca) is beautifully decorated with golden decoration making it an excellent example of the finest Mamluk (Figure 13, left). Meanwhile, the marble *minbar* (pulpit) where the *imam* stands to deliver Friday speech has a small bronze door that leads to the staircase. The *minbar* also have some golden verses of the Quran inscribed along its upper edge with a carved bulb dome at its top (Figure 13, right). There are also some beautiful decorated bronze doors leading to the mausoleum.



Figure 13. The Mosque Mihrab and Minbar

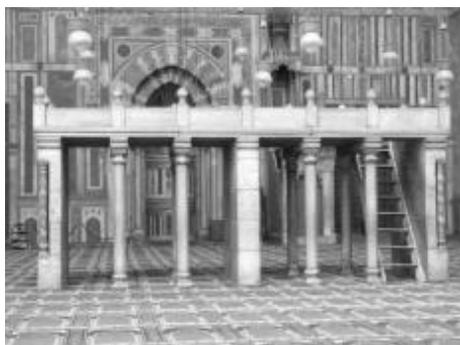


Figure 14. The Dikka Al-Muballigh

There is also a high *mastaba*, known as a *dikka* (*dikka al-muballigh*) (Figure 14) with shining gold plating, where the reciters of the Quran would sit. It is adorned with remarkable columns composed of different colored stone. Also on the walls of the

Qibla Iwan are monumental Kufic letters quoting a verse from Surah 48 in the Holy Quran, executed in stucco with a Chinese lotus blossom background with fine (Figure 15).



Figure 15. The Decorations on iwan wall



Figure 16. Mosque's two minarets

The original plan of the complex included four minarets which is suppose to be built on each corner of the building. However, after the collapse of one of the minarets during the construction, the plan was replaced by constructing two minarets only (Figure 16). One of those minarets was rebuilt in Ottoman era, where the original existing one is 84 meters height and characterized by its octagonal shape (Figure 17). Both of the minarets were decorated with geometric patterns made of stone, and its top is composed by a bulb on eight columns.



Figure 17. Mosque original minaret



Figure 18. Hospital corridors

The hospital part has a complete design with corridors, open spaces, and cells used for doctors and patients (Figure 18). Evidences say it was a highly used hospital by the surrounding community. The shops are also found at the other side of the complex (Figure 19). These shops were used as *waqf* to fund the complex maintenance. It was built outside the mosque in order not to disturb the prayers.



Figure 19. The shops complex (*waqf*)

Analysis of Architectural Base

The multidimensional role of the mosque in Islam was developed throughout ages. As the Islamic empire expands and the Muslims' number increases, it was considered as essential to build great mosques to accommodate this rapid increase of Muslims and scholars. The circumstances directly affected the design, image, usage, and the location of mosques, which considered as the main points of analysis of adaptation between religion and architecture.



Figure 20. The main analysis scheme

In order to ease the analysis process of this great Islamic building, it has to be divided into parts. According to the functional typology of religious structures made by the School of Built Environment in Massachusetts Institute of Technology (MIT), the Complex of Sultan Hassan could be divided into five main parts based on its role, as follows:

- a. Structures for prayer including the congregational mosque (*jami* or *masjid jami*)
- b. Structures for religious education including the religious college (*madrasa*)
- c. Memorial structures including mausoleum (*qubba* or *turba*) with charitable functions attached
- d. Structure for services including the hospital and the attached *wakif* buildings
- e. Fifth part which could be added in the case of Sultan Hassan Complex, is the introductory part including the inclined entrance at the end of the mosque, the vestibule, and the corridor.

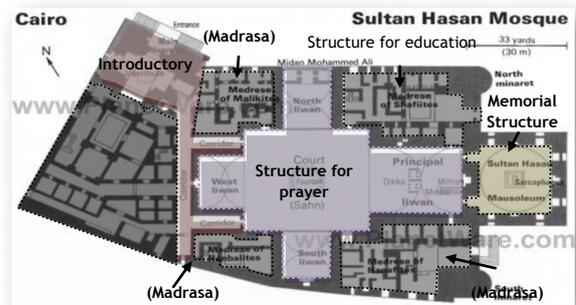


Figure 21. Main parts of Sultan Hassan Complex

1. Design

The design of the mosque, as explained in architectural description, is unique. Each part is related to physical and spiritual function, as follows:

- a. The introductory area, which is designed to give appropriate spiritual preparation to the visitor before entering God's house and performing prayer in the *sahn* (courtyard).
- b. The praying hall (courtyard or *sahn*), including the ablution fountain at its center. This is considered as the main mosque area, where prayers take place. Its huge scale, wide space, and high walls emphasize on spiritual feeling of meeting the Greatness of Allah, increasing sense of humbleness of human being within God's kingdom. Its existence at the end of the corridor strengthen the tight relationship between the entrance and the prayer hall. Yet, at the same time ensure a smooth transfer between both areas spiritually and physically.
- c. The *madrasa* area, as its doors are located in the *sahn* area, creates a direct relationship between education areas in *iwans* and the prayer place. At same time, these doors plays role of separation

between schools administration offices, students hostels as one part, and the praying hall, so there would not be any sign of conflict between the usage of these two area. Also schools are placed at the four façades of the complex to ensure natural lighting and ventilation for the students' dormitory and for the schools' internal courtyard.

- d. The services part begins with the hospital area which is partly related to the mosque entrance. There are also other entrances for it nearby the residential area. The partial connection maintain the relationship between the mosque and the hospital. However, it separates the usages between both areas.
- e. The last part is the mausoleum located in front of the *qibla*. It is designed outside the main part of the mosque. Although the place is a non-preferable form of religious aspect, but it gives a good spiritual effect of not forgetting life after death, encouraging Muslims to make good deeds in this life through helping their communities. The shops area is also smartly designed outside the mosque near the entrance in order to separate shopping from praying and alternatively give a glance to users of the complex that there are some shops nearby the complex.

The relationship between the complex parts in relation to design and usage (Figure 22) is shown as follows:

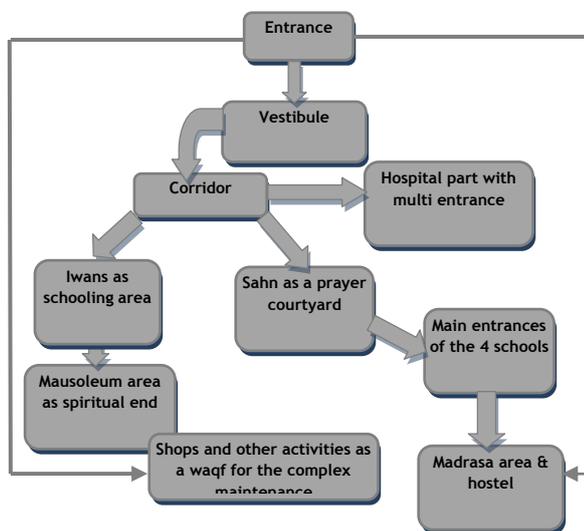


Figure 22. The design relationship between different parts of the complex

2. Usage and Efficiency

Based on the above classification, it is noticed that the usage is directly related to design with the following order, as follows:

- a. The entrance part is marked by the small set of steps at the entrance and in the vestibule. The use of the set of steps is encouraged by the

architect so that poor people and Quran reciters could sit there to get charity from the *jamaah* or from the students. The corridor has two air ducts to ensure that the students' rooms are provided with a natural lighting and ventilation. The air ducts also preserve a nice weather all over the mosque in hot summer and cold winter. In addition, the existence of two entrances to the hospital area, for the students and the users of the mosque, are apart from the main hospital's entrance at the other side of the complex nearby the residential area.

- b. The prayer hall, with its wide scale, helps the mosque to accommodate more amounts of Muslims for regular prayers or Friday prayer. Also, the existence of the ablution fountain in the center of the *sahn*, ease the ablution process for Muslims and for students of every school. Another point is the placement of *dikkat al-muballigh* at the end of the main *iwan* gives opportunity for the voice of *imam* to be repeated clearly by the repeater (*al-muballigh*) if the mosque is full of *jamaah*.
- c. The *iwans* are smartly designed as multiple-used spaces for schooling and at same time as the additional spaces for the prayer hall, relating physically and functionally between religion in the mosque and knowledge in the *madrasa*.
- d. The hospital, on the other hand, was related to the outside where this part is designed to fulfill the needs of patients, doctors, and visitors. The separation ensures a full separation between praying hall and hospital, yet still linked through doors and windows in the *iwans*.
- e. The *mausoleum* is the most infrequently used part of the complex. It is located near the citadel square with the huge walls and the closed doors. The design ensures the preservation of the quietness and secure mode of mausoleum. It is also meant to enlarge the respect feelings for the concept of death and for the buried person. Moreover, they also built a high doom above the tomb. This is to emphasize the Mamluk tradition which built dooms over the tombs of holy men. In the same respect, they built a small *minbar* inside the mausoleum to bury the dead person towards *qibla* and to give visitors a spiritual feeling, encouraging them to plead for his mercy and quietness in the afterlife.

3. Image

The mosque is not only famous by its marvelous design and efficient usage, but also with its inspiring image which affects any user, researcher, or even common visitors in spite of his/her background. This image is began from the introductory part, which is distinguished by its beautiful decorations showing verses of Quran as a welcoming phrase in mosque

entrance, such as “We awarded you great victory, so that God forgive your sins”, the holy testimony, and the name of prophet and his followers, as shown in the above picture. All these decorations was the design characteristics of mosques entrance in the Mamluki era.

The magnificent twenty rows of *mucarnaiats* located at the top of the high entrance are also increasing the sense of greatness of God’s house. Likewise, the usage of voids and air ducts also give an image of a journey between the worldly life outside and the spiritual preparation inside the mosque to meet God through prayer.

The prayer hall is signified by its open courtyard which ensures that the whole mosque area and its four *iwans* will be lighted by natural sunlight and equiped with a high quality of ventilation. This open courtyard also gives a good image in terms of light and its reflection on objects.

In addition, the archs of the *iwans* are made in a very unique and efficient way. The main *iwan* is also considered as the biggest arch in the Islamic world. The flooring decorations of the courtyard and the position of ablution fountain in the center simply imitate the sun and planets which move around it. The beautiful plant decorations on the wall which include a verse of Quran, and its carving outside the wall with the usage of Gibson, increase the beauty of the main *iwan* and distinguish it from other *iwans* in the courtyard.

Furthermore, although all the *madrasa* entrances are located inside the *iwan*, but the architect used the black and white marble rows to differentiate the entrance from the rest of the *iwan*. The idea of designing the internal part of the *madrasa* like the entrance part with vestibule, corridor, and *iwan* ensures the privacy of the school and avoiding any conflict between schooling and praying area.

The hospital area, through its internal design, tried to satisfy users’ needs and ensured the preservation of the image of charity hospital to serve the surrounding community. With an open courtyard, the design of this hospital allows a natural healthy sunlight to lit the patients’ rooms and ensures the quality of natural air as part of the healing process.

The mausoleum is the ideal example of the usage of architectural features to express the feeling of afterlife. It maintain the feeling of holiness and quietness through the usage of only light bulbs (*maskats*) as the lighting. The natural lighting were also controlled with the colored imbedded glass windows near the dome. The golden decorations carved around the tomb in the mausoleum walls were also increase the feelings. This golden decorations also preserve history of this place with the throne verse of Quran, which is always used in tombs that time.

4. Location within Cairo Historical Capital

The location of the mosque has an effect upon its design. In its time, Sultan Hassan Complex is located near the Citadel, at the outlying area of Cairo. Some historical sources believe that Sultan Hassan wanted to be able to see the mosque from his offices in the Citadel. However at the later times because of its strategic location, many other Mamluk leaders use the complex to hide and staged attacks on the Citadel. It is recorded that the complex was used twice as a fortress at Sultan Barquq’s time (1391) and Sultan Jaqmaq’s time (1500).¹⁷

Therefore, due to these attacks, both Sultans closed or occupy the complex to avoid rebels from taking it, or even trying to destroy it. Yet, because of people’s criticism, the destructive actions was stopped, and the complex is preserved until now. Furthermore, because of its location, the complex was hit by cannons by Ottoman army in 1517 AD, when it was served as a refuge for the fugitive Tumanbay, the last Mamluk sultan. These attacks on the complex during the Ottoman era has affected badly to the structure. The dome had to be rebuilt together with one of the minarets around 1671 AD. For security reasons related to the stability of the political situation in Egypt in those times, this marvelous complex was being closed for some long periods.¹⁶

Evaluating a mosque as a architectural building is a very qualitative process. However, the process is still an important part of analysis. The evaluation (Table 1) shows the main aim of architectural building in relation to the four main parts of the complex, where a numeric value out of 100 is given for achieving each goal through every part of the complex based on site visit and historical references.

Table 1. Evaluation of the Complex as an Environmental Friendly Building

Evaluation Criteria Complex parts	Efficiency of Usage	Environmental Design	Energy Consumption	Artistic Image & Appearance
Structures for prayer	85 due to its huge area, but it is far a bit from City center	100 due to open space of the sahn, solid & void change	100 Using natural light and small candles.	100 As huge space, preparation corridor & light for the sahn.
Structures for religious education	85 Due to unused for a while cause of security reasons	90 Air ducts for schools & rooms on the facades.	100 No artificial use of energy. All natural light & ventilation	85 Schools are isolated with less decorative style & image
Services structures	100 As serving community with quality services	90 open squares for natural air flow	85 Using lightening oil & water system	70 focus on job than image, more corridors

Memorial structures	70 As tomb was not good placed and usage was limited	85 Not a good air circulation, and limited lightening	85 Lightening with Candles, increase heat & oil consuming	100 Controlled lightening, huge doom & decorations.
Introductory part	100 As preparation for entering complex	85 A good air circulation and lightening	100 Using natural light & normal ventilation	100 Entrance with attractive image
Total achievement of each criteria	440 over 500	450 over 500	470 over 500	455 over 500

Based on the above result, it could be said that the Sultan Hassan Mosque Complex was designed in an environmental-friendly way with minimum energy consumption. It is also designed to perform a very artistic image and a highly efficiency in the usage.

The Findings

This paper has many qualitative dimensions. Thus, the findings are mainly related to two main aspects. First, evaluating Sultan Hassan Mosque Complex from the environmental design perspective and how every part worked within this mechanism. Second, the achievement of the mosque's roles mentioned in the literature review through the architectural criteria, as both aspects signify the relationship between Islamic principles and architectural bases through Sultan Hassan Complex.

Based on Table 1, the complex is smartly designed as a highly efficient buildings in terms of its usage within all of its parts although it was built around 750 years ago. The complex is an environmental-friendly building. With all the air ducts and the open courtyard, the design of the building is in harmony with the Egyptian hot desert weather. Some green area near the hospital were also designed as the balance of the structure. In terms of energy consumption, the building decrease the used of energy by using natural sunlight for daylighting and a huge number of bulb candles in night.

Regarding the appurtenance of the building, the complex is considered to be one of the most beautiful mosques in Cairo with its huge entrance, well designed schools, decorated *iwans*, planned hospital, beautiful ablution fountain and courtyard, and finally marvelous mausoleum.

In the second aspect, by revising the whole study, the relationship between Islamic principles and architecture is very close, where as the Islamic principles are more clarified when those principles were being practiced in the great architectural buildings. On the other hand, architectural buildings

is affected by Islamic principles and activities, like prayers and charity, which can be traced in the design and the appearance of these buildings.



Figure 23. The relationship between Islam and architecture

Therefore, the four main points of analysis have shown the tight relationship between architecture and Islam (Table 2).

Table 2. The achievement of mosque's role through architecture

Roles of Mosque / Analysis criteria	Praying place	Community service center	Center of Knowledge	Meeting place for Shoura
Design	Achieved through preparatory corridor, sahn open design, central ablution fountain, Iwans as double use place, controlled accessibility to Madrasa and services	Existence of hospital to serve community as attached place to the complex, with some shops in complex as waqf	Existence of madrasa to teach 4 aspects of Islam, related to the mosque through the sahn and with staying and medical facilities	The combination of sahn and iwans to relieve more Muslims for weekly meetings in Fridays, consulting with sheiks and scientists
Usage	Achieved through wideness of the Sahn space, Centralized ablution fountain & existence of dikkat al-muballigh	Controlled linkage between hospital & mosque, existence of additional entrances nearby community	Smart utilization of iwans space for schools relating it with prayers, establish schools related to 4 madhab of Islam	The sahn space related, also the space of Iwans added to this meeting, and the spaces of madrasa also used.
Image	The open space of the Sahn significant to relation to God, huge entrance as entering God's place	The image of charity in the entrance steps, relating hospital visually with the mosque	Using same design of the complex with the internal school structure, identification of entrance	Positioning of dakkat Al-Mubillghial within the sahn in relation to the Minbar.
Location	Located near the citadel, mosque serves more residents in the area of el-ramella square, part of a new neighborhood then	The location in Ramella area, make residents depend on the hospital and on the shops near the complex	The Madrasa used, but closed for a while due to location, then as near to residents it became popular	Proximity to citadel make it a great place for gathering either for rebels, escapers or normal Muslims

Conclusion

Through the previous parts of this study, the close relationship between architecture and Islam has been revealed through some aspects like implantation of Islamic principles and mosque's roles through architectural buildings. This connection has a great positive impact on the life of Muslims in the past, present, and in the future.

To insure that this impact could reach all Muslims, a total change of our way of building our mosques has to be changes, from being only a place of prayer, into a center of civilization. This concept could be achieved through some recommendations such as the enhancement of multidimensional use of the mosque as a community center, offering services to the surrounding society, encouraging children and youth to serve their cities in term of environmental protection, eliminating literacy, and eradicating poverty through simple summer projects. To be a center of knowledge, mosques should put more strength to educational programs, especially for children like championship in art, science, and sport.

Furthermore, it is also important to design mosques in such an innovative way which satisfies the needs of Modern Muslims and give space for other activities. Designing an environmental-friendly mosques which maintain and preserve environment through the minimum energy consumption is also one of the strategies. A simple beautiful image, an efficient usage, and a priority to social services part like medical centers, sports complex, and cultural center are the next important strategies in designing mosques.

The existence of such activities in mosques area will definitely increase the importance of the mosque and allow it to restore its original importance in the heart of Muslim people. In time, it will allow the increase of awareness of young Muslims about their community problems. Thus, they worship God through prayers for the afterlife and through working to help their communities for this life. Finally, the world's perception towards mosques will be corrected and people will see its real roles as the center of knowledge, culture, and civilization.

References

- 1 Abdullah Yusuf Ali. 1983. *The Holy Qur'an: Translation and Commentary*. Surah al-Tawbah: 18. Maryland: Amana Corporation
- 2 Hadith Al-Bukhari & Muslim
- 3 Hadith Al-Bukhari & Muslim
- 4 Abdullah Yusuf Ali. 1983. *The Holy Qur'an: Translation and Commentary*. Surah al-Jumu'ah: 9-10. Maryland: Amana Corporation
- 5 Abdullah Yusuf Ali. 1983. *The Holy Qur'an: Translation and Commentary*. Surah az-Zukhruf: 10. Maryland: Amana Corporation
- 6 Shehata Essia Ibrahim. 1999. *Cairo, General Egyptian Book Organization*. Cairo: GEBO press.
- 7 Janet Abu-Lughod. 2004. *Cairo, an Islamic Metropolis in Cairo, Revitalising a Historic Metropolis*. Umberto Allemandi & C. Turin, Italy.
- 8 Mohamed Abdullah Anain. 1998. *Islamic Egypt and History of Egyptian Plans*. General Egyptian Book Organization. Cairo: GEBO republished.
- 9 Janet Abu-Lughod. 2004. *Cairo, an Islamic Metropolis in Cairo, Revitalising a historic Metropolis*. Umberto Allemandi & C. Turin, Italy.
- 10 A. Ramadan. 2000. *Workshop on Schools "Madrasas" in Islamic Egypt*. Cairo: GEBO Republished.
- 11 Janet Abu-Lughod. 2004. *Cairo, an Islamic Metropolis in Cairo, Revitalising a historic Metropolis*. Umberto Allemandi & C., Turin, Italy.
- 12 Mohamed Abdullah Anain. 1998. *Islamic Egypt and History of Egyptian Plans*. General Egyptian Book Organization. Cairo: GEBO republished.
- 13 Hassan El-Razzaz. 1995. *Capitals of Islamic Egypt*. Cairo: People's Press.
- 14 Hassan El-Razzaz. 1995. *Capitals of Islamic Egypt*. Cairo: People's Press.
- 15 Mohamed Abdullah Anain. 1998. *Islamic Egypt and History of Egyptian Plans*. General Egyptian Book Organization. Cairo: GEBO republished.
- 16 Gamal Hamdan. 2004. *The Contemporary Islamic world*. Cairo: Ministry of Culture Egypt Press.
- 17 Mohamed Abdullah Anain. 1998. *Islamic Egypt and History of Egyptian Plans*. General Egyptian Book Organization. Cairo: GEBO republished.