The Challenge Between Traditional And Environmental Aspects Against Modern Architectural Design, a Case Study.

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ABSTRACT

Modern designed buildings in the mamiluk and Fatimid part of Cairo represent an odd vision for the mere observer and the relevant visitor. This part of Cairo displays an array of historical cultures exhibiting the sequence of very outstanding and important episodes in the Islamic history of Egypt. The Children's Cancer Hospital near the River Nile at Cairo is a world-class pediatric facility dedicated to the care of children with cancer. While in the heart of Islamic Cairo it has its outlines reyling more to reform than to tradition. The designer inspired the boats in the river for his structure. How this design has served the purpose and functions of the building and the compatibility to the Islamic culture of the environment, is the aim of this paper. The tools used by the author include an analysis of the plans from ecological and site environmental point of views. A comparison study was made for other new buildings in the area namely, Dar El Eftaa and Mashiakhet Al Azhar where some Islamic traditional considerations were adopted. The challenge is how these traditional outlines can best fit the function of the building and the facilities intended to be offered to the patients from one side, and how the new building has satisfied the requirements of the traditional environment.

The hospital and the two other establishments were analyzed along, data collection including plans and elevations, elements of design and architectural treatments that achieve ventilation and thermal balance. Other elements such as esthetical considerations, facades, and ornaments were also analyzed.

The results show increasing usage of glass in the hospital which does not offer sufficient heat insulation or reasonable lighting. Internal spaces were not efficiently utilized. The site and the available area are quite limited, wasting of spaces therefore, is critical. The design of this building relied on its position near the river Nile in an area of Islamic traditions which gives an odd appearance. The two other establishments although of completely different functions, their design considered and recognized the environmental requirements, and the historical background.

Keywords:
Architectural design, historical landscape, Historical cultures, traditional outlines and environmental requirement

1. INTRODUCTION

Architecture history in Egypt is displaying an array of civilizations and cultures of the people in this region. It demonstrates ages of great supremacy and steep declines of dynasties that ruled through a long history beginning from ancient Egyptians to modern times. The people of Egypt adopted Islam early; only 28 years later after the descending of Islam on prophet Mohamed. Since then Islamic architecture in general and especially in Egypt, had reacted with and modified previous famous architecture styles of Greek, Byzantine, Persian and Roman styles. Islamic influence on the other hand was a major contributing factor to architecture development in Andalusia, and whole Europe during renaissance age. Islamic architecture in essence encompassed a wide range of both secular and religious styles.

Cairo as the capital of Islamic Egypt, is displaying the dynasties of a long Islamic history since its establishment. Several quarters are distinguished with its dynasty style. The conservation of this heritage in such historical town is therefore of vital importance not only for Egyptians but also for humanity in general. Although this principle is violated in many ages in several districts; the survival of many structures are still a human wealth.

The foundation of Children Oncology Hospital and many other institutions is just a violation of the principle of preservation of human heritage and its environment. This study is comparative and analytical in its purpose to show degrees of contradictions to the dominant Islamic styles in the region.

2. ENVIRONMENTAL BACKGROUND

The origin of old Cairo City, the core and skirts are a function of the reaction of several elements including environmental, religious, economic, social and political. Of the most important aspects that specialize and characterize the region is the Islamic culture with its social and traditional characters. Islam religion beside its nature as a relation between God and the individual is forming a way of life with its special respect of neighbours and the conservative attitudes of families. These characteristics are reflected in the dominant architecture types. The location of Egypt in general and Cairo in particular, under arid hot conditions has affected greatly the Urban and the Architectural pattern. This pattern is obvious in adopting some elements such as thick walls, Malkafs, domes, courtyards, Mashrabia, and the urban tissue including the organic system.
3. HISTORICAL BACKGROUND

Fatimid Dynasty

The city of Cairo had witnessed a sequence of historical events since its establishment by the Fatimid Commander Jawhar al Siqilli (a previous Sicilian slave) as a new quarter (969-973) onto Fostat (the capital of Egypt since Islamic conquest by Amr Ibn El Ass in 640 which was founded beside Babylon fortress).

During the Fatimid dynasty, a number of magnificent buildings were founded including Al Azhar mosque, a famous mosque and in the same time as the oldest university teaching Islamic faith in its various sects. Other surviving Fatimid structures include the Mosque of Al Aqmar (1125) as well as the monumental gates of Cairo City walls commissioned by the powerful Fatemid emir vizier Badr Al jamali (1073-1094) (CPAS 1992). Besides these elegant constructions, elaborate funerary monuments were founded. The houses were simple and closed, characterised by open courtyards and unstraight entrances, Fountains were also erected in the courtyards together with the use of Malkaf (air catching unit) and Mashrabia.

It is worth to say that since the fatimid came to power, the city expanded gradually later on exhibiting with each age a special architecture style. All of which own their imprints of Islamic art. This art in general is strongly affected by the Islamic faith and traditions and stands in harmony with climatic and environmental aspects. Islamic architecture elements facilitated codes of conduct within the multiple and historical contexts of the Islamic world.

Mamluk Dynasty

Mamluk Dynasty started at the end of Ayubid dynasty of Saladin (1169-1252) after his outrageous triumphs over the many crusaders campaigns. The reign of Mamluks (1250-1517 AD) marked a breathtaking flourishing of Islamic art which is most visible in old Cairo. Religious concepts offered them generous patterns of architecture and art with majestic domes, courtyards and soaring minarets spreading across the city. The Mamluk architecture decorative arts including enamelled and gilded glass, inlaid metalwork, woodwork and textiles flourished under their rule and had a profound impact and influence around Mediterranean both in north (Europe) and south (African north coast). Distinguished Mamiluk rulers established a patronage of public and pious foundations including madarases (schools), mausolea, minarets and pemarestans (hospitals) (CPAS 1992).

4. ELEMENTS OF ARCHITECTURE STYLE AT FATIMID AND MAMILUK DYNASTIES

Islamic architecture style at Fatimid and Mamiluk Dynasties may be identified with the following Elements. (Fig 1)
- Minarates as Towers, and Mihrab indicating qibla.
- Sahn (courtyard).
- Central Fountains (Maida) used for ablutions.
- Iwan to intermediate between different sections
- Domes, Vaults, Moqarnas and Arches.
- The use for geometric shapes and repetitive art (Arabesque)

5. COMPARATIVE ANALYTICAL STUDY OF THE THREE MODERN INSTITUTIONS.

Oncology Hospital

The location of the Hospital: The hospital is located at a short distance from Cairo Fostat west of Magra El Oyoun wall (Saladin Fortification) in the centre of a random urban district. The area of building and surrounding is about 10 thousand square meters. Three entrances are leading to the main building. The site was also surrounded mainly on the foreground by tracts of green loans and parking lots. In order to establish a better surrounding, several unplanned (randomly planned) blocks of buildings and houses were demolished. However the neighbouring areas are consisting of slaughter yards and their relevant industries forming a serious pollution source (Fig 2).
Hospital elements and components: The hospital is a building of eight stories with a total area of 10000m². Clinics, emergency and reception constitute the ground floor. These units are accessed through separate entrances from the main street. Other medical departments were distributed in the upper floors according to their functions. The hospital is provided with modern electromechanically systems including lighting, air condition, computer network and an efficient system for water treatment and waste disposal, beside the highly sophisticated medical equipments (Fig 3).

Conceptual Design: The architecture concept adopted is to build a construction with integrated and functional facilities. The core is originally a block of Falluka (boot) form with its sails inspired by its location near the River Nile. The concept achieved the optimum level of service efficiency but failed to be in harmony with the prevailing Islamic style coding the region. The designer (Jonathan Bailey) created an architecture construction which is quite strange to the environment. The establishment in fact came to existence devoid of any Islamic element and the main building is a mere block of western pattern.

The Islamic style however, reveals a dynamic relation between blocks and spaces. To introduce Islamic elements to a modern hospital is a real challenge to the designer and could be inspired from the surrounding Islamic architecture.

The compound of Mashiaikhet Al Azhar and Dar El Eftaa
This modern compound is replacing separate old institutions of both buildings. These two institutions are under the control of Al Azhar establishment, the first one (Mashiaikhat Al azhar) is the head quarter of the grand Sheiks (Imams) offices and the host of specialized centres for research, publications, Faith dissemination, and international relations. The other one (Dar El Efta) is formally recognized as the only source of fatwas (interpretations of Islamic laws). The two institutions are formerly occupying old buildings, lacking in general enough space and suitable facades. These are the main reasons for having another site with enough spaces for several extended facilities.

The location of the Mashiaikhet Al Azhar and Dar El Eftaa: The site was chosen for the new structures in the region of the Fatimid Cairo at a short distance from the Al Azhar Mosque (the famous Fatimid mosque in Cairo.), on a hilltop clearly elevated than the surrounding streets and grave yards at the cross road of Salah Salim and Al Azhar street. The Islamic surrounding environment has the main impact on planning and architecture design of both buildings. The compound is forming an engineering architectural model integrating all elements of Islamic architectural style and art considering in general the historical Islamic landscape (Fig 4).
Elements of Mashiakhet Al Azhar: The building is an administrative construction in general occupying an area of 6000 m$^2$ in a lot of 18000 m$^2$. It is composed of 8 stories to accommodate the various administrations according to the program of utilitarian needs and functions. These

Elements of Dar El Eftaa: This is essentially an administrative building, where consultant services are offered to citizens and authorities. Its area is about 2000 m$^2$, and composed of five stories. Administration offices are accommodated according to the sequence of functions. The internal courtyard is used as a pray yard surrounded by lateral courts. The office of Mufti (Azharian sheikh) is occupying a central and special location at the main facade looking at outside by a magnificent ‘Mashrabia (a famous mamiluk architectural element representing modern balcony), (Fig 6).

Conceptual Design: The conceptual design of these two constructions is compatible with the Islamic heritage of the Mamiluk Cairo. The concept adopted by the designer(ABDTC, local bureau) depended on achieving an Islamic style in a modern and contemporary spirit, integrating in the same time with the many surrounding Islamic buildings and historical landscape, it incorporates the common elements of Fatimid and Mamiluk nearby monuments.

6.COMPARATIVE ANALATICAL STUDY OF THE ARCHITECTURE FORMS AND ELEMENTS IN THE THREE INSTITUTIONS.

The study revealed the following results;

External facades

All outside facades of the hospital are mainly in glass, giving an impression of transparency from a distance which is strongly contradicting with the Islamic design concept of the external facades. This, has less openings looking outside while the main and important openings are looking at internal courtyards, which are achieving the important Islamic principle of privacy. The design of both Mashiakhat Al Azhar and Dar El Eftaa came in presenting wonderfully this preceding element (Fig 7).
Opening

Due to the extensive surface areas of the openings at the façades of the hospital, sun rays and glare vision became a problem in day time to the wide spaces in the structure. To overcome this obstacle heavy curtains and doubled glass sheets with argon gas in between as a filter of harmful sun rays is critical in cancer treatments to the children who are put under radiation exposure and chemical treatments. The use of wide glass planes did not result in successful heat insulation. Accordingly, the hospital is using mechanical and electrical means in all times to achieve the previous objectives.

Openings at external façades of both Mashiakhat and Dar El Eftaa are few and in many instances covered with decorative wooden Arabisque to mitigate light intensity and to achieve shading and moisture conservation. The adopted design of openings in the Two Islamic institutions were modernized in a sense that is not loosing its elemental essence (Fig 8).

Fig 8. Photo 1 shows the effect of Mashrabit at the internal façade on reducing glare and heat transmission inside the building. Photo 2 illustrates the glare resulted from extensive use of wide glass openings in patient rooms and how curtains are used to solve this problem.

Elements of structure form (columns, domes and arches).

Islamic Architecture in the vicinity has known to embrace important and characteristic structural elements. Columns are one of these elements and were transported in the earlier decades of Islam from Churches and Temples (Abd El Gawad 1987).

In later periods columns were modified especially during Mamluk dynasty exhibiting elaborated forms. The designer of those Islamic institutions inspired different forms of columns using modern materials for coating, like marbles and some other manufactured materials. Dome element was successfully used to cover the bulk of the principle building. Also Aqoud (Archs) of Islamic style were used with similar scales used in the fatimid and Mamluk dynasty with some modifications to give a contemporary style to the construction (Fig 9).

In the hospital building a different concept and culture were adopted by the designer, using for instance a spherical form of glass and metal structures. He used these forms as constructional forms and as decorative patterns, which are adversely compatible with the styles of the surroundings.

Fig.7. Terrestrial photos showing the external facades of the three institutions.

The glass facades of the hospital though of double layers did not in fact accomplish shaded and/or conditioned interiors. Curtains and centralized air conditions were extensively used. For attaining shades and light refraction, metal structures were used in many parts of the frontal facades. These structures including in some parts sails forms are quite apart from any Islamic style in the surroundings.

Fewer openings of limited lengths in the frontal facades of both Islamic constructions, and using of Islamic treatments such as Mashrabit, ornaments, finishing coloured materials, and other elements, all came in harmony with the Islamic architectural style.

Entances

The Islamic architecture has a common characteristic style, concerning the main entrances which are generally with almost the same height of the building or the first floor, these are strong and confirmative. In the Islamic compound of Al Azhar, the two institutions are designed with this style of entrances in the fronts facing the main streets. Every entrance is obvious, strong and lintelled with a pointed arch.

In the hospital metal structures were used to define and confirm the main entrances. Other entrances are simple usually with front and intermediate glass doors.
Fig. 9. Photos 1 & 2 illustrate some form elements (columns, domes, arches) at Al Azhar compound inspired and developed from the Islamic prototypes as shown in drawing 3. (Abd El Gawad 1987)

Ornamental and Mouldings

Ornamental forms and mouldings in Islamic Mamluk Architecture are quite different than those in Greece or Byzantine styles. They are reflecting Islamic culture and spirit. The decorative principles are resting on the basic foundations of calligraphy, geometry, repetition and multiplication (Clevenot, D., and Degeorge, G, 2000).

Using a Variety of decorative elements, spaces are articulated. Famous ornamental patterns were used in the Islamic compound of Al Azhar. These are used to decorate frontal facades, entrances and some other surfaces (especially Mashrabiat). This is in fact not meant to serve utilitarian needs but rather to give a spirit in harmony with the surrounding buildings. In other words, to define regional identity relevant to the eternal principles of Islam.

Concerning the hospital functions, it is basically needed. The use of Islamic structures and forms would be a challenge to designers. Local designers and architects are encouraged to play this role successfully. The two Islamic buildings in Al Azhar compound are examples of having modern buildings with Islamic spirit and culture. This Islamic approach was unfortunately not adopted in designing of the hospital. All pollution protection elements or clinical regulations could be maintained with an outside of Islamic identity.

Architectural Forms

Architectural Forms established in the Mashiakhat and Dar El Eftaa buildings are consisting of a strong block of large scale balanced with the central axis of the internal courtyard following the important principles of Islamic architecture.

Balance and symmetry around an axis are noticed obviously in the horizontal elevations and plans of the two Islamic buildings. There is also efficient use of Islamic decorative values, resting in unity and harmony with all of the architectural elements (arches, openings, ornaments, and calligraphy) adopted in new scales that recognize the function without wasting the essence.

Hospital forms in the contrary are demonstrating blocks in symbolic shapes and using glass facades giving an inspiration of transparency and conduct with the outside. This approach is contradicting with the Islamic architectural principles. Covering the front with metal structure as a sail gave impressions in harmony with its location near the river Nile but not compatible with the nearby environment (Fig 10).

Fig. 10. Black and white drawings of Al Mashikhat and El Eftaa showing the balance and the symmetry around the axis of the courtyard. The other blue drawings show the symbolic forming of the Hospital which is not in harmony with the Islamic forms.

Internal Facades

The design of the Islamic institutions depended on decorating the external facades with Islamic elements, repeated also in the internal facades using excessively calligraphic patterns. Mashrabiat and wooden arabesque are used to decorate large openings in the different facades. Marble with geometric patterns and different colours are used in floors, and walls. Ceilings are decorated with geometric units and coloured finishing materials. Carpets and furniture decorated with Islamic repetitive patterns were spread in courtyards and reception halls (Fig 11).

In the hospital interiors imported materials are used in covering walls and floors. Finishing materials used in covering walls are chemically products treated to resist bacteria and microbes. Using these materials and treatments could be used in the interiors of the Islamic constructions without contradiction and could be elaborated to be in harmony with the Islamic spirit (Fig 12).

Fig. 11. Photos of Al Mashikha illustrate the Islamic ornamental patterns used on internal walls and ceilings. Marbles in geometric patterns is seen in floors.
Fig. 12. Photos of the Hospital illustrate the colourful chemical finishing materials and the finishing that resist bacteria and microbes, also showing the imported colourful Terrazzo floor.

7. RESULTS AND DISCUSSIONS

The Site and design of the two buildings, Mashikha and dar El Eftaa of Al Azhar compound have achieved complete harmony with the surrounding environment. The Hospital on the other hand may quite fit its utilitarian needs and functions, but lacks in general environmental and traditional balance with the whole district. Functional and traditional aspects however could be fulfilled successfully in the same time. It is the job and the art of the designers to develop certain Islamic elements to fit the purpose of construction. The reaction of local designers with the traditional and environmental requirements is noticed in many other establishments.

The location of the hospital is another unsuccessful option. It could be located at the expansion districts of Cairo. If there is a certain need to be present in this area; it should be compatible with its environment. The location of such a critical and highly sophisticated institution is greatly contradicting with environmental and traditional requirements.

8. RECOMENDATIONS

A complete compatibility with the environmental and traditional aspects is a challenge facing the designer who is also striving for the application of technological advancements in the relevant fields. The contradiction between the two cultures, traditional and contemporary would call the architect to neglect one for the other; the site in this case would dictate the decision. Environmental and traditional aspects should be carefully considered when great and important projects are to be implemented in the city. Different designs of a project are better displayed to the public opinion for discussion and evaluation. Local architects are called for their role and duty in harmonising between technological and traditional requirements. The advantage of cooperation and assistance with foreign experience is sought in applying modern technology in a frame of integrated system, satisfying both traditional and environmental needs. Architecture competition in big projects of national interest should necessarily be organised for this purpose.

9. REFERENCES

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