This paper is part of the Proceedings of the 1st International Conference on Islamic Heritage Architecture and Art (IHA 2016)
www.witconferences.com

Execution of contemporary Islamic architecture through design: the Cyberjaya Green Platinum Mosque Project in Malaysia

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Abstract

This paper discusses an urgent need for architects to take an alternative direction when designing mosques in order for mosque buildings to be sustainable and progressive in their architectural expression. It is also a review of the continuous evolution of mosque architecture in Malaysia and the region that has been using and mixing architectural references from various past Islamic architectural elements or language. In an effort to promote a more modern approach in designing many future mosques, various suggestions are still being introduced using unnecessary elaborate embellishments commonly used to grandly express the mosque. At the same time, the design has to meet the need to project an Islamic image, by incorporating some Islamic and traditional elements into the design of the mosque. The borrowed architectural styles and the architectural language or nomenclature have been used regularly over a long period of time, reaching a point where they need to be evaluated. It has come to a point where there is now an urgent need to redefine this approach of designing the mosque by taking into account past values, the surrounding environment and future expectations. The expression need not be repeated or follow traditional mosque designs as it has become stagnated with no significant architectural value. The sustainable approach to future mosque design, like the Cyberjaya Mosque in Malaysia, is used as a case study in this paper, and argues that there is now a need for more efforts to pursue this direction to be in style with the ever changing times to ensure that Islamic architecture is still relevant.
Keywords: energy efficient, green design, mosque architecture, progressive, sustainable.

WIT Transactions on The Built Environment, Vol 159, © 2016 WIT Press
www.witpress.com, ISSN 1743-3509 (on-line)
doi:10.2495/IHA160021

1 Introduction

Several writers on mosque architecture have brought to our attention the fact that various traditional architectural elements have been borrowed from other parts of the world. Rightly or wrongly, these elements somehow had now become part of our Islamic architectural vocabulary and been used to build mosques in Malaysia and throughout this region, until today. These builders or architects had consciously incorporated many different Islamic architectural elements in their designs, referring to them as universal forms of Islamic mosque architecture. These architectural elements are still being used in current modern mosques in Malaysia and are considered by many as a continuation of Islamic architecture. Thus, the various architectural elements have been mixed and have become part of the Islamic architectural nomenclature of Malaysia and the region.

Many critics have questioned the continuing use of these architectural elements for mosque designing in Malaysia. However, social and political consideration play a crucial role in influencing the choice of styles to be used. To understand the Malaysian mosque architectural styles, it is essential to go back in time to better understand the origin of Islam in the Malay-Indonesian Archipelago, going back as far as the 12th century to about the 19th and 20th century.

Johar [1] reports that during the early arrival of Islam in Malaysia or the Malay Peninsula, mosque architecture was simple with no clear features compared to the mosques in the Middle-Eastern countries. The early mosque architecture was vernacular in nature and resorted to using many familiar materials. Islam began to enjoy a strong presence in the Malay-Indonesian Archipelago in and around the 13th century. During this era, the mosque architecture incorporated many previous religious and cultural influences.

Since Buddhism and Hinduism flourished before Islam, it is believed that the iconography of their temples served as the base form most befitting the new religion, Islam, at that time (Rasdi [2]). Hassan [3] further suggests the influence of Chinese architecture as noted in the roof construction analysis of the Kampung Laut Mosque which was built in the 15th century. Moreover, at the beginning of the 19th century, the British who had colonised Malaysia for about two centuries brought in the exotic architectural nomenclature of the Moghul and Moorish to become part of the local architectural language, thus introducing a new set of Islamic language which had not been used previously. The Islamic architectural style of Malaysia and the region had not developed its original style.

One major concern lies amongst the architects unwilling to take the necessary risks to experiment new forms or approaches when designing mosque architecture. It is also imperative for the public, or the owners, as decision-makers, to realise the need to open up and accept a different interpretation of Islamic architecture. There is a dire need for all new mosque buildings and other non-religious buildings to take a more comprehensive, sustainable and progressive approach.

Figure 1: Kampung Laut Mosque in Kota Bharu, Malaysia.

Moreover, in the eyes of the public, a mosque must have the elements of domes, minarets and pointed arches to be considered as 'Islamic'. These are design elements taken from the Middle-Eastern and Moghul architecture. Presently, it is still an arduous task to move away from such pre-conceived expectation because of varying opinions. This 'Pan-Islamic' style is a shift towards Universalism that was conceived as a 'normative' or conscious desire of Muslim communities to become more Islamic (Khan [4]).

These expectations, however, may be superficial as they are inclined towards a combination of the various earlier Islamic styles used extravagantly in the past grand mosques. It may have been designed insufficiently to cater towards our environment and context. Most of all, it is designed mainly to depict the Middle-Eastern Islamic architecture which follows its centuries-old traditional architecture.

The desire to express Islamic architecture in a grandeur fashion came during the nation's rapid growth in the late 1980s and were probably due to its new found wealth, knowledge and confidence. Mosques were built in such designs to equate Malaysia to other known Islamic countries which were well-known for their grand mosques. The Postmodern Islamic architecture has opened a Pandora box of an array of styles such as Egyptian, Iranian, Moghul, Moorish or the Ottoman styles. It is also predicted that future mosques will still use more of the same approach that is if no attempt is made to allow for a change. To many, the current approach is acceptable as it is based on an image of the mosque that is familiar. However, this phenomenon is not limited to Malaysia, but also other countries around this region, such as Brunei, Indonesia and Southern Thailand.

In contrast, after Malaysia's independence in 1957, there was a conscious attempt to break away from the Islamic architecture imposition of the colonial era, introduced particularly during the British rule (circa 1786 to 1957).

The attempt to break away from the colonial style architecture resulted in one of the most prominent mosques of the Post *Merdeka* (Independence) era, namely

Figure 2: National Mosque in Kuala Lumpur, Malaysia.

the National Mosque. Completed in 1965, the mosque's design had moved away from the use of onion-shaped domes and Moorish-style arches. The spirit of this approach was not continued after that; hence, it is now time to revisit this effort to select the next generation of mosque design. It is often regarded as the first indigenous Malaysian style mosque, original and without the influence of any previous or past architectural or using borrowed architectural style.

2 Methodologies

Few methodologies were carried out and used to achieve this objective. Through analytical and conceptual research methodologies, the history of mosque architecture and its typologies have been studied and analysed. It was then compared by using the design of the Cyberjaya Mosque as a contemporary, sustainable modern-style mosque. By doing so, a suitable design can then be developed using Islamic architectural features that may also surpass expectations and place Malaysian architects at the forefront of a new progressive mosque architecture. The failure to do so may lead to the continuation of an incomprehensible design language for the mosque.

Studies have been undertaken to classify various mosque designs and typologies around the world. Rasdi [2] suggests several classifications, which are from the Arabian, Umayyad, Timurid, Turkish, Iranian, Indian, Chinese, Southeast Asia and the modern styles. Another study was also done by Khan [4] who advocates the simpler classifications, which are the Vernacular, Historicist, Contemporary Classic and Modern types.

Throughout the findings, several typologies have been identified and used to determine various Islamic architectural styles in various parts of the world, including Malaysia.

In Malaysia, Rasdi [2] wrote that there are seven different styles of mosque designs which have been used in Malaysia throughout this region. Most of the examples used to describe these typologies were built over a period, roughly from the 1700s until today, using various influences taken from various parts of

the world. These typologies are the Traditional Vernacular, Sino-Eclectic, European Classic, North Indian, Modern Vernacular, Modernistic Expressionism and Postmodern Revivalism styles. All of these styles are now considered as part of our heritage.

Currently, there is possibly a new typology making its presence known, and it is hoped that it will gradually replace the Postmodern Revivalism in Malaysia and the neighbouring region. Its styles are more inclined towards sustainability and functionality. Its design approach advocates design practicality rather than over providing its need of embellishment and replacing it with a strong sense of design minimalism.

3 Findings

The Muslim population in Malaysia, as released in the Population Distribution and Basic Demographic Characteristics Report 2011 by the Department of Statistics Malaysia, is 61.3 per cent of a total population of 28 million people (2010), or approximately 18 million Muslims (Department of Statistics [5]).

The Malaysian population is predicted to reach 45 million people by the year 2050 before it registers a negative growth following the population growth patterns of many developed countries (Pew Research Centre [6]). Within a period of approximately 34 years from now, it is projected that an additional 16.8 million will be living in Malaysia of which approximately 14.7 million will be Muslim or 367,500 additional Muslims per year. The total population of Muslims is projected to be at least 45.2 million out of the projected 32.7 million population in 2050 or 72.4 per cent of the population (Malay Mail [7]).

Currently, there are around 6,329 mosques in Malaysia (JAKIM [8]). With the growing Muslim population, more mosques would be added on with the years. It is estimated that 50 new mosques will be built each year up to 2050.

Between the early years of the beginning of Islam in Malaysia to the 1700s, mosques in Malaysia were probably built in a simple, modest manner. Utaberta

Figure 3: Jame' Mosque in Kuala Lumpur, Malaysia.

[9] reports that the earliest typology of mosques in Malaysia is believed to be those built purely of timber with the characteristic pyramidal roof of two or three tiers and also those of the long gable house-type. Known as a vernacular mosque, only a few major mosques built in the 1700s have survived till today, which are the Tengkera Mosque, Melaka, Kampung Hulu Mosque, Melaka, Kampung Laut Mosque, Kota Bharu and Kampung Keling Mosque, Melaka in Malaysia.

During and soon after the British rule of Malaya, which began during the rise of the British Empire around the late 1700s until the first half of the 1900s, there were many mosques and other public structures built with the influence of notable British architects using 'borrowed' Islamic architectural language. One of the reasons the Anglo-Indian style was introduced by the British was due to the 'Gujerat' influence in the spreading of Islam into this region. Moreover, India was also a stronghold of the British Empire (Rasdi [2]). This was also the era where the grand, monumental and isolated mosque buildings began to be built in the country (Utaberta [9]). The building of mosques during this time was probably carried out by request, either as a gift to appease the local Muslim community or as a contribution or donation by wealthy patrons to the community.

When Malaya gained its independence in 1957, there was a move to seek a Malaysian architectural identity style for public buildings. It was a direction inclined towards the more traditional Malay identity or Islamic architectural built form. Kosman and Ibrahim [10] described that there were overwhelming discussions on the search of a national architectural identity in the 1960s and 1970s. It was continued in 1980s when the Ministry of Culture, Youth and Sports, Malaysia organised a seminar entitled "Towards the National Identity in Architecture", from January 20 to 23, 1980 in Kuala Lumpur, which concluded that:

"Malaysian architecture should have an identity that would be known by its people and must be based on the Malay cultural values."

Figure 4: Sultan Salahuddin Abdul Aziz Shah Mosque in Shah Alam, Malaysia.

The new 'international style' of the 1960s and 1970s was found to be too bland for a newly independent country. Thus, it had probably started a movement towards creating a new identity for Malaysia. Ismail and Rasdi [11] concluded that from the 1950s to the 1970s, most of the buildings during this time did not properly acknowledge the idea of a national identity as buildings were mass produced within a short period and presented in a modernistic style which had emphasised the abstraction of forms and expressive structural elements as an aesthetic impression. This approach was considered as a futile experiment as it is not deeply understood or accepted by many.

From the 1980s until the year 2010, the period brought in Islamic architecture revivalism which had used elements from an earlier mosque typologies. It was also said that the architectural language follows the trend of 'ReIslamisation' period which began around the 1980's and swept through the region. While in the new decade of the second millennium, from the year 2010 to present, there is a move towards sustainable architectural building designs.

Historically, new and different typologies of mosque architecture have been created ever since the beginning of the rise of Islam in the seventh century by the Caliphs, Sultans or Rulers. They saw it as their religious obligation to do so to promote the greatness of Islam to the world and to spread the teachings of Islam. The approach will continue as long as there are people worldwide who are willing to build such buildings using this approach. There is no particular set of style as these buildings may vary in its designs and the type of materials used. It can be made from prefabricated, recycled materials with the use of glass and steel.

Moreover, this method was previously emulated by various religions before and after the formation of Islam, i.e. Christianity, Hinduism and Buddhism. As the various civilizations throughout the world grew prosperous, many religious buildings were adorned with various motifs and embellishments. However, Pirani [12] implied that in this case, Islam is different as it is a dynamic faith that has been continuously adapted to any society. Hence, the Islamic architecture has no specific style in contrast to others, such as Roman, Byzantine or Gothic. The works of art, calligraphy, motifs, geometric patterns and even landscapes are mere beautification components of the mosque's design or its architecture.

This is also further evidence supported by Moustafa [13] in the Seven Principles of Islamic Architecture that Islam embodies a way of life and serves as a cohesive force among ethnically and culturally diverse population for centuries throughout the Islamic world. There is no essential difference between spiritual and secular art in Islam, allowing the virtues of Islamic architecture to transcend mere form and function.

Therefore, based on the research, six or more different styles of mosque typologies have been identified that were once used by architects, builders and designers in designing mosques in Malaysia and around the region. There should be a re-examination of the use elements of the mosque architecture built during the last 30 years, since the 1980s which lacks the use of sustainable design, the adaptation to the spirit of the place and its time. The current environmental issues have also led to the need of environmental preservation that aim to

eliminate many negative environmental damaging impacts of our daily existence to ensure buildings remain energy efficient and relevant in the future.

The findings have led to the feasibility study of the progressive and sustainable mosque design. It has now been explored and tried through the design of the Cyberjaya Mosque in an attempt to put restrain on the use any previous Islamic known architectural languages and embellishments. It was designed in the spirit of the National Mosque, completed in 1965, which until today, was well regarded as a brilliant example of a modern mosque conceptualized and built by Malaysian.

Cyberjaya Mosque was designed to adapt to the environment and its surroundings. It also follows or was tested against the Seven Principles of Islamic Architecture, as proposed by Nisreen Moustafa. The seven principles are *Tawhid* (Unity and Uniquity of Allah), *Ihtiram* (Respect), *Ikhlas* (Sincerity), *Ilm* (Knowledge), *Iqtisad* (Balance), *Haya'* (Modesty) and *Dikr* (Remembrance), Moustafa [13].

Various sustainable design elements were incorporated in the design of the Cyberjaya Mosque to conform to the Green Building Index (GBI) and Malaysian Standards (MS 1525) guidelines to achieve the objective to design a new sustainable and progressive mosque architecture.

4 The case study: Cyberjaya Mosque, Malaysia

Cyberjaya Mosque is the first mosque ever built in Malaysia's planned ICT hub, located in Selangor. It is designed from the start to be the first platinum rated mosque building using the Green Building Index (GBI) rating systems. ATSA Architects were tasked to develop the design of the mosque by the owner, Cyberview Sdn. Bhd. which will be handed over to the Islamic Religious Department of Selangor (JAIS), care for the mosque in perpetuity.

With the gross floor area of 8,779 sq. m., it can accommodate up to 8,300 worshippers at any single time. It is built on 17.5 acres land, which is a part of the future development of University Islam Malaysia (UIM) campus. Cyberjaya Mosque has been completed in 2015.

The design of Cyberjaya Mosque is unparalleled to any previous mosque styles. It is a modern, progressive designed mosque with a symbolic use of contemporary Islamic façade design. Its main concern is to build a sustainable building that portrays Islam as a progressive religion using simplicity and purity in its design.

The GBI and MS 1525 are being applied as well as the guiding principles of Islamic Architecture. As reported by ERIA [14], the Uniform Building Bylaws (UBBL), which may be amended to include the MS 1525 requirements shortly. It will be another milestone and a step in the right path to include elements of sustainable design when designing buildings including mosques.

The 'green' design features of the Cyberjaya Mosque will lower maintenance and running cost. For instance, the concrete material is made of 'fly-ash' concrete, a form of concrete with recycled content and a certified green product,

Figure 5: Cyberjaya Mosque, Malaysia.

while all other architectural finishes and mechanical and electrical installations will use the green products following a rigorous certification process.

The overspill area around the central courtyard allows for natural ventilation and day lighting, which are harvested and utilized to minimize energy dependency. The glass dome located above the enclosed main prayer hall will be installed with randomly fitted energy efficient LED lighting system and utilizing two panels of Low 'E' glass attached to the aluminium decorative grilles which will be used as sun shading devices.

Any rising hot air trapped within the main prayer hall will be extracted and released through ventilation louvers below the pinnacle of the uppermost dome, thus reducing the indoor temperature of the main prayer hall, basing on the flue stack/chimney effect concept. The indoor temperature is aimed at an average temperature of 26 degrees Celsius with the use of mechanical fans. Low energy air conditioning system is designed ideally only to operate for an average of two hours during Friday prayers, *Aidilfitri* and *Aidiladha* festivals and other special events. The vast overspill area is naturally ventilated. The use of patterned GRC will which allows for opening act as permeable surfaces.

The architectural language is simple, but distinctly Islamic, devoid of any over providing embellishments. The design approach is straightforward and friendly to allow for easy ingress and egress. The main prayer hall is allowed to function without the use of air-condition or lighting during the day. It has a *mihrab* wall projection made of timber adorned with Quranic inscriptions in gold leaf. A simple timber *mimbar* is placed to the right. It does not make any reference to any past architectural styles. The *mihrab* wall is left open and set against a water body to all for cool air to flow into the area.

The use of double glazed LE glass with geometric pattern metal sunscreen placed at the exterior of the glass dome. The glass dome allows in natural light which will cast varying light and shades each day. It allows for different ambience each hour during the day. The double LE glass prevents heat to enter to the glass. The roof top is planned to be used as a future overspill area for

players. Artificial turf is used as the floor finish and the area will be shaded by BIPV (Building Integrated Photovoltaic Solar Panels). The flat concrete roof is designed with extra cautions due to our climate which not only hot and humid by only need to withstand water without the possibility of leaking.

The Cyberjaya Mosque is also designed to be a potable water efficient building. It has a rainwater harvesting system to collect water for irrigation of the landscape in and around the mosque. A series of columns encasing UPVC down pipes are located at the main entrance of the main prayer hall will be used as rainwater down pipes to channel the rainwater to the rainwater harvesting storage tanks located on the first floor. The roof is then used as a water catchment area channeling rainwater to flow off the R.C. roof into the same first floor storage tanks.

740 numbers of BIPV Solar Monocrystalline panels that capable of harvesting 0.18 kWp will be fixed onto the system of aluminium support placed on the R.C. roof. It has also been one of the first large mosques in the world to be installed with the solar panels to generate renewable energy. The harvested renewable energy is a substantial energy source that will be fed back to the national grid via the use of the 'Fit in Tariff' that can generate around RM750.00 per day for the management of the mosque as an added income to maintain the mosque.

5 Outcomes

In summary, to date, in Malaysia and over the region, various types of mosque typology from around the world have been built and it has prompted a big question; either to continue with the past design approach, or to begin a new generation of design in a more progressive and sustainable manner.

Thus, architects are urged to take the lead in defining the future of our mosque architecture. There should be immense efforts to produce 'unfamiliar' mosque designs or its architecture that will have worthwhile design characteristics to suit our built environment. There will be risks, as it may take greater explanation for reasons behind the concept and time for the clients or users to be fully convinced with the approach. This challenge is to produce a design that will include the various traditional elements in the modern context that will be acceptable to many.

Therefore, a sustainable design approach that is guided by the Green Building Index (GBI) or other rating system and MS1525 are imperative in designing green buildings that are using less energy and efficient form of renewable energy sources. It would also be reflected with the architectural principles of Spirit of Time (Zeitgeist) and the Spirit of the Place (Genius Loci).

The GBI rating is based on six key criteria, which are Energy Efficiency, Indoor Environment Quality, Sustainable Site Planning and Management, Material and Resources, Water Efficiency and Innovation. Points will be given to each criterion that will determine the 'green' level of the building (GBI [15]). With this approach, the need or consumed energy, the need for large carbon footprint and long-term costs can be reduced over time.

There are various examples of mosque architecture from various countries from this region and others that have moved away from the traditional approach. Some mosques have been built and completed, while other mosques are in various design and construction stages. Numerous modern mosque proposals have been produced by various architects, who had chosen to depart from the use traditional Middle Eastern or Northern India architectural languages, and replaced its emphasis towards sustainability using progressive Islamic architecture or its abstraction.

Another method to find a suitable approach is the move towards using a modular design, as it will be one new way to address sustainable aspects of building mosques in the future. It is cost effective and requires a shorter construction period as most of the building components are pre-fabricated in various factories. A typical 8 m x 8 m modular panel is a prefabricated component that will be transported to the site and assembled by a fewer worker within a few months. For instance, a 16 x 24 sq.m. mosque will only need three to six months to be fully constructed and operated as a mosque or *surau.*

A modular mosque can easily be extended and expanded when it is needed. The materials used are made to be easily disassembled down and re-fixed again on a different site. This could be a successful construction method for a new mosque, as some design components will be pre-design to meet various needs, fabricated in the factories and easily installed on to a particular site.

6 Conclusion

An architectural expression used to project Islamic architecture of a mosque is an architect's mirror of the creative mind. It invisibly challenges the mind to put ideas on paper using the pen and his or her ability to visualise the end design and see things in three-dimension before it is built. It is even more challenging if the architects put upon themselves to produce a design that express the mosque architecture differently.

Every clear idea and profound thought generated from the mind are always put together with the hope it will become clear with refreshing statements to express its purpose; whereas the act of using ambiguous ideas or elements will be subjected to conversations and a topic of some ramblings. The trouble, in many cases, is because we sadly lack in our defence, very lucid thoughts or reasons to explain why it is necessary to use other borrowed elements or forms to describe the mosque. However, its basic requirements for the function must be followed, such as its orientation, the placement of toilets and separation between man and women during prayers and so forth.

In the Islamic world, the use of past architectural elements to define a mosque is complicated, and it takes much effort to understand even one facet of the whole combination. Until one is put to experience such an epiphany, it is sometimes better to heed and be safe. The use of restraint and approach by way of simplicity is the zenith of many better designed mosques.

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