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THE CLASSIFICATION OF PRAYER HALLS IN MODERN SAUDI MASJIDS: WITH SPECIAL REFERENCE TO THE CITY OF JEDDAH

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Abstract

Prayer hall, where traditional Muslim prayers take place, is the most important element of Masjids (mosques). Prayer halls are historically shaped as simple orthogonal walled spaces. Over time, little changes have occurred to them. Recently, with the evolution of architectural schools of thought and the advent of new construction and electromechanical systems, prayer halls have been subject to creativity and experimentation. Architects designed prayer halls with different shapes, spatial configurations and forms, which, in some instances, contradict with the essentials of prayer. This research attempts to monitor and classify different types of contemporary prayer halls according to their spatial configuration with special reference to the Saudi Arabian context. Taking the city of Jeddah as a case study, a representative sample of masjids is surveyed, documented, analyzed and classified. The analysis is based on shape, enclosure, symmetry and complexity of prayer halls space. The study concludes basic and non-basic prayer halls and their corresponding bisects. The classification, however, constitutes a base upon which design criteria for prayer halls across the Islamic countries can be built.

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INTRODUCTION

Masjid has historically been a simple prayer hall, a walled courtyard (sahan) with a number of entries, and a roofed arcade (riwaq) running along one or more sides of the sahan. The first masjid, built by the Prophet Muhammad (peace be upon him) in Almadinah Al Munawarah in 622 AD, was a 30 by 35 metre enclosure (Oldham and Elkhateeb, 2008). In the prayer hall, followers used to perform the daily five prayers, Friday prayers or listen to sermons and speeches (Brown, 1989). The spatial configuration of the prayer hall was formulated in accordance with the prayer ritual. Prayer is performed in parallel rows behind the leader of the congregation (Imam) and in the face of Makkah (qiblah). In terms of Islamic law (shariah), the front rows are favoured over the back ones (Kahera et al., 2009). This illustrates why the wall facing qiblah is longer than the perpendicular ones (Damluji, 1998). In 628 AD, after the transformation of qiblah from Jerusalem to Makkah, the prophet's masjid was enlarged to 50 by 50 metres but with almost the same spatial configuration (Grabar, 1987) (Figure 1).

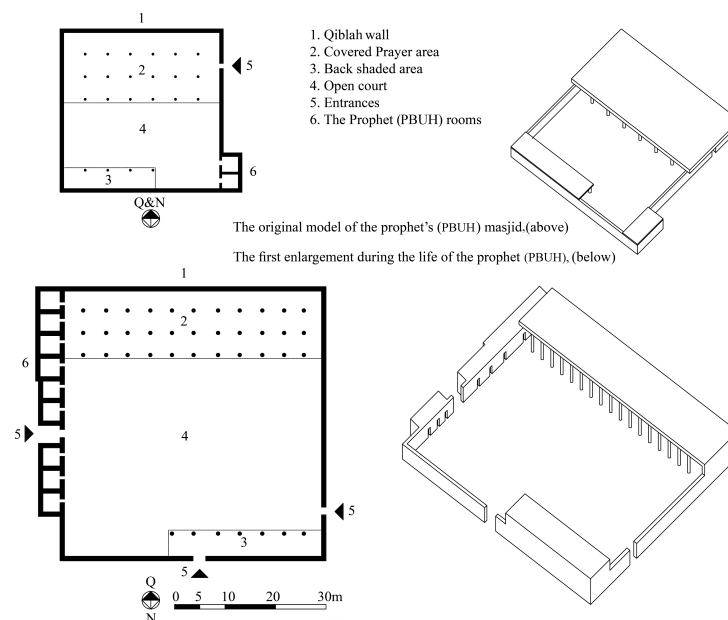


Figure 1: (Above) The Prophet's masjid before qiblah transmission (Source: Oldham and Elkhateeb, 2008); (Below) The masjid after qiblah transmission (Source: Grabar, 1987).

Through more than 1400 years, tens of thousands of masjids have been spread across the world. Many of these masjids strictly follow the prophet's model. Nevertheless, many others apply only the principles but develop different architectural approaches (Fethi, 1985). Generally, masjids can be classified into historical and modern (Elkhateeb et. al., 2016). The historical are those built before the era of reinforced concrete, i.e. almost to the end of 19th century (El-Said, 1993; Frishman and Khan, 2002; Holt, 1982). Modern masjids, those of the 20th, 21st and the later part of the 19th century, embrace a wide variety of movements, theories, and attitudes (Abdou, 2003). Modernism resides particularly in a tendency to reject traditional or historical forms in an effort to create new ones that are more adapted to change in social, economic, and technical status (Alin, 2015). Modern masjids, generally built using reinforced concrete, constitute the core of this work.

With the emergence of air-conditioning, open spaces in modern masjids disappeared and performing prayer became limited to the prayer hall (Al-Brahim, 1996). The advance of structure systems allowed prayer halls to be wider with less pillars (Khan, 2008; MDC, 2008). Experimentation and creativity in modern masjids have implications on the shape and configuration of prayer halls causing, in some instances, defects in the requirements of prayer ritual like disorientation to the qiblah, narrowness of front rows and missing the feeling of reverence.

Prayer halls, according to a space syntax analysis, are the most influential in terms of frequency of use and visual, spiritual and technical aspects (Aazam, 2007). Therefore, they need more deep investigation and analysis. While some attempts have been made to study and classify the masjid built form, none of the studies addressed prayer hall by itself. It is believed that sorting prayer halls can constitute a base for formulating design criteria that enhance the performance of such spaces.

METHODOLOGY

A discussion for previous attempts of masjid classification was, initially, introduced. Meanwhile, tens of modern masjids in Jeddah, Saudi Arabia, were examined via Google Earth, Jeddah Explorer, site visits, sketches and, finally, a full architectural survey for a carefully selected sample. The sample includes 43 modern masjids spreading across Jeddah city (listed and illustrated in Appendix 1). The architectural survey utilized laser meters, conventional tapes, digital cameras and CAD software to document plans and sections for each of the chosen masjids. Based on a detailed analysis of the surveyed masjids, the spatial configuration, enclosure, symmetry and complexity of prayer halls were generated. Later, the surveyed masjids were classified and categorized into types or categories. Types most appropriate for prayer ritual can, thus, be deliberated. The methodology is illustrated in figure 2.

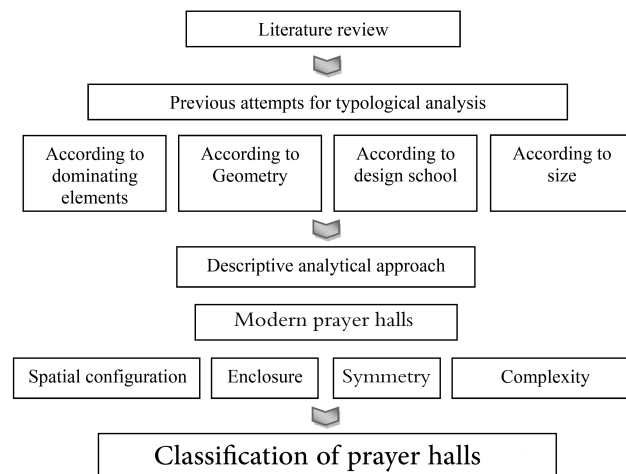


Figure 2: Research methodology (Source: Authors).

However, "type" does not literally mean an image that can be reproduced or exactly imitated (Younes, 1999). But, it is more independent, ambiguous but identifiable. Classification is a strategy whose goal is the development of a set of related but distinct categories or putting things into groups according to how they are similar; i.e. the study of how things can be

divided into different "types" (Othman et al., 2008). Type or category, therefore, is an abstract that can only be identified by the person who carries the classification activity who is usually equipped with knowledge in the area of classification. Classification is characterized by categorization, but not by hierarchical arrangement; the categories in a classification are related to one another, not subsidiary to one another (Güney, 2007). Classification can provide new knowledge that support or crumble preconceived ideas (Bambang, 2006). This suggests that classification is the most appropriate method for the scrutiny of prayer halls architecture. It gives opportunities for organizing, ordering and may consequently identify ideal types.

Every classification study is usually based on certain "ideal" type that will be the reference in identifying the level of changes in other models under study (Doty and Glick, 1994). No doubt that the prophet's masjid is that type to be taken as the reference in any study. The classification of modern masjids can, then, illustrate similarities and differences with the original one. It can also pave the road to formulate design criteria for the design of masjid.

Al Gohary (2008) argues that in contrary with historic ones, modern masjids across Saudi Arabia follow similar design concepts producing comparable or generic prototypes but with very little variations. He refers variations to the individual creativity efforts which, according to his viewpoint, are limited by codes and regulations. This allows the outcomes of the present analysis to contain modern masjids across Saudi Arabia; though, validation might need further investigation.

PREVIOUS ATTEMPTS FOR MASJID CLASSIFICATION

Masjid is linked to its time and place; the social and cultural context contributes to and influences the style, the elements and the overall composition of the masjid. All the time, architecture is influenced by a number of variables including the region, the period, the trends of the moment, the client and the architect's views, the purpose and the symbolic value. Different variables brought different results of forms, compositions, materials and elements. It is fascinating to look at the different results architects have reached in the last few decades when facing the design of masjids (Holod et. al., 1997). The variety of masjids produced over time stimulated researchers to classify the multitude of masjid styles.

The importance of classifying and understanding the architecture of masjid lies not only in the forms of architectural language but also in the collective meanings it transmits to the Muslim community. The relationship between masjid and the community has always been characterized in the structure of the Islamic city. Beside the main body of prayer hall, ancillary parts, which give the overall configuration, support and articulate the meanings (Mohamed and El Abd, 2011).

Many attempts have been made to classify masjids. In such concern, four alleys can be noted: first, according to dominating elements; second, according to geometry; third, according to design school; and fourth, according to size and area of catchment. With regards to dominating elements, masjids are classified into five types including, as shown in figure 3, the Arabian or the hypostyle, the dominant central-dome or the Ottoman, the four iwans, the triple-dome, and the detached pavilions (Hillenbrand, 1994; Khachan, 2008; Buhalfaia, 2006; Michell, 1978; Khan, 1990; Xiaowei, 1994). However, this classification draws the broad lines of the prayer hall without going into details of its spatial properties.



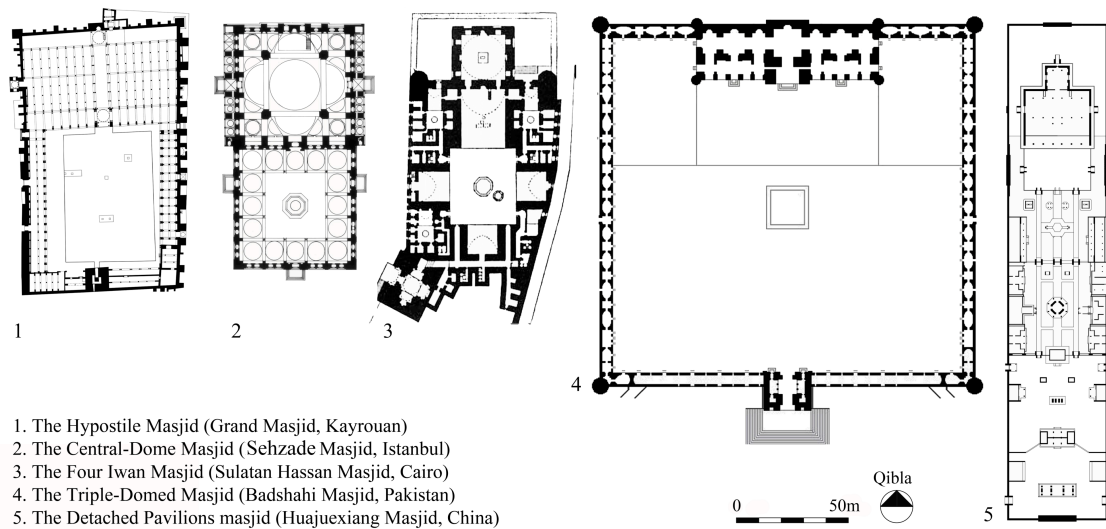


Figure 3: The classification of masjids according to dominating elements (Source: Khachan, 2008; Buhalfaia, 2006; Michell, 1978; Khan, 1990 edited by the authors).

According to geometry, masjids are attributed to follow one of the principles of centralization, modularity, symmetry or geometric patterns (Longhurst, 2012; Embi, 2012; Kaplan and Salesin, 2004). Again, this approach classifies masjids according to the reference to which the elements of masjid are arranged. It concentrates on the entire composition of the masjid rather than the prayer hall. Moreover, this classification overlooks other types of composition like the creative forms and the collision of forms.

From the design school perspective, masjid architecture is classified into hybrid styles or Westernization (1800-1900), revivalism (1900-2000), traditional or vernacular, conservative or conventional, adaptive, modern, postmodern – high-tech, eco-green, eco-tec or high technology types (Hattstein and Delius, 2007; Rasdi and Tajuddin, 2007; Petruccioli and Pirani, 2003; Serageldin and Steele, 1996). Modernism in masjid architecture was brought to life supported by experimentation and difference in restrictions, symbolic imagery, together with technical data and background history (Holod and Khan, 1997).

Regardless of design school, the exterior and interior architecture of masjids have direct connection with the scale of masjid and its symbolic role, the origin and background of the architect, the degree of liberating from the traditional to reflect the present, and the extent of utilizing the latest technologies and approaches in construction and materials. Location has similar effects especially with masjids built outside Arab-Islamic world when attempting to emphasize the Muslim-ness of the building (Salam-Liebich, 1990).

Classification according to design school is concerned more about the approach of design. Emphasis is put on the configuration of form, the allocation of elements, the visual impact and external features that reflects the thoughts of the school (Figure 4). This might have impact on the internal or the external configuration of the prayer hall, but, it is not given the foremost concern in the classification.



1. Vernacular Type: New Gourna Masjid, Luxor
2. Conservative Type: Abu al-Abbas al-Mursi Masjid, Alexandria
3. Adaptive Type: Grand Masjid, Kuwait
4. Modern Type: Negara Masjid, Kuala Lumpur
5. Post Modern Type: Malacca Straits Masjid, Malacca
6. High-Tech Type: Norderstedt Masjid, Norderstedt

Figure 4: Examples of masjid classification according to design school (Source: Serageldin and Steele, 1996; Rasdi and Tajuddin, 2007 edited by the authors).

Meanwhile, regulations divide masjids into three types including local, collector (Jame'e) and feast (Eid) (JM, 2015). The classification is based on the population served by the masjid which identifies its capacity and area of catchment. However, Orfali (2007) re-classifies these masjids according to their importance in the community into four types including major landmark structure, large state masjid, community masjid, and small local masjid. Classification according to this typology is concerned with the capacity (or size) of the prayer hall with little consideration for its characteristics.

CLASSIFICATION OF MODERN SAUDI PRAYER HALLS

Masjids under study are analyzed with regard to spatial configuration, enclosure, symmetry and complexity of the prayer hall. The spatial configuration is identified with reference to the original form of the prophets' masjid. Enclosure illustrates the degree of independence of the prayer hall; i.e. whether it is totally enclosed or it is linked to an open space (Sahan). Symmetry describes the similarity of the two sides of prayer hall shape around the axis perpendicular to qiblah wall. While, complexity is concerned with the purity of the prayer hall space.

Spatial configuration

Of the investigated masjids, 62% of the prayer halls are found to be rectangular and 33% are square in plan. 29% of the rectangular prayer halls face qiblah with the long side repeating the basic or "essential" type built by the prophet. In this case, the space of prayer hall is a right prism with a rectangular (or square) base, facing qiblah with one of its faces. However, facing qiblah with the long wall allows the first rows to be long. On the contrary, facing qiblah with the short wall shortens rows in a clear contradiction with the privilege of first rows.

Mihrab (a niche in the qiblah wall) is located in the centre of qiblah wall. Mihrab is semi-circular in plan with different dimensions and heights.

With a variety of structure systems, reinforced concrete is the main construction material. In most cases, the span is divided into three bays in both directions. Pillars are placed on grids parallel to qiblah wall easing defining qiblah direction and prayer rows. The central module is characterized with a dome or skylight (shokh'shekha) to carry daylight to the inside (Figure 5). Domes are not compatible with Wahabi philosophy as they are usually associated with the architecture of mausoleums and tombs (Macca and Aryanti, 2017). But, this seems to be changed over time and dome has become an essential feature of modern masjid. Domes are used in 63% of masjids with a height ranges between 12 and 30 metres. The flat ceiling height ranges between 5 and 9 metres. As the area per prayer is almost constant ($0.7 \times 1.3 = 0.91 \text{ m}^2$), the height considerably affects the volume per prayer. Volume has impact on air-conditioning, lighting, and acoustics as well as the feeling of reverence.



Figure 5: The distribution of columns and the configuration of ceiling in modern masjids
(Source: the authors).

However, some unique prayer halls were detected (9%). In this category, one masjid was found cylindrical in form with a circular prayer hall, one masjid took the form of octagonal prism with an octagonal prayer hall, and another masjid was found conical in form but containing a square prayer hall. Another masjid took the shape of a domed octagonal star but with a square prayer hall too. Finally, one prayer hall plan takes the shape of a quadrant attached to a circle. Slanted walls were also used more than once. Prayer halls, hence, are not in line with the basic one; and can be described as non-basic. Figure 6 shows some examples of these prayer halls, while Figure 7 illustrates the difference between the two types.

Usually, modern masjids include a prayer area for women. The women prayer hall occupies an area of 20-30% of the men prayer hall. It is usually located in a mezzanine floor above the back area of men prayer hall. Muslim women are not obliged to pray at the masjid; but, when men and women are together in the masjid then they should have first, men's lines behind the imam, then children and then women. This is the way Muslims used to pray behind the

Prophet. He did not ask his companions to have a curtain or wall between men and women. Due to many reasons of modesty and tradition, it became common to see segregated women halls (Katz, 2014).

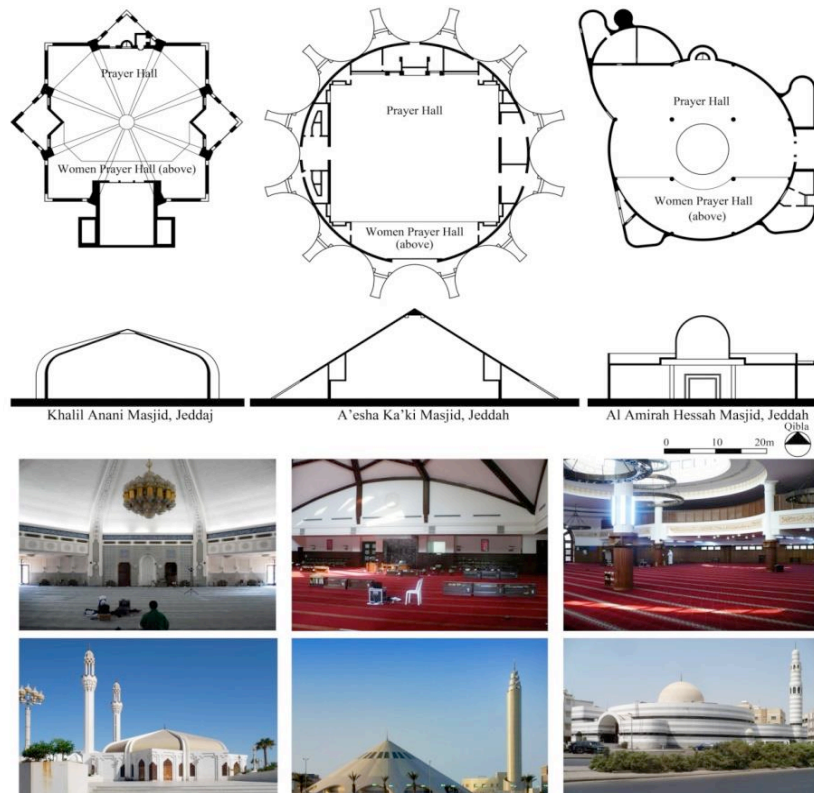


Figure 6: Examples of unique prayer halls (Source: Authors).

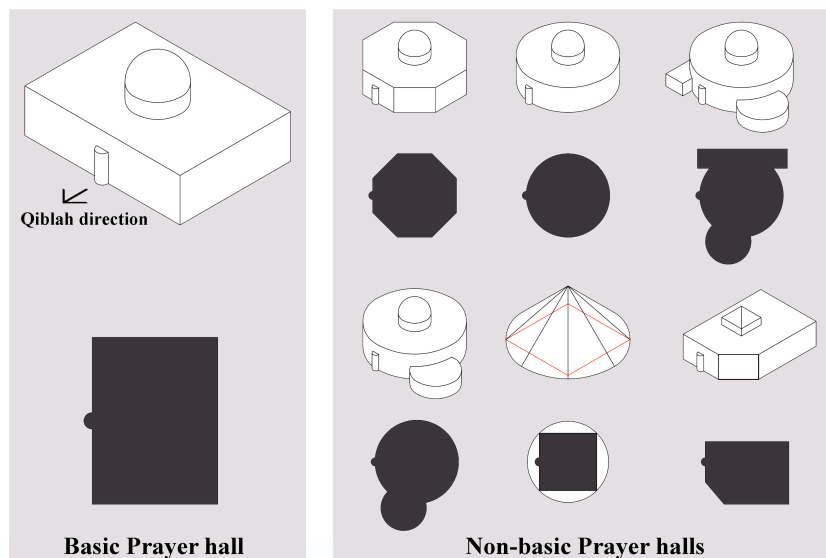


Figure 7: Schematic diagrams for basic and non-basic prayer halls (Source: Authors).

Spatial enclosure

Prayer hall in the prophet's masjid is a semi-closed space. The prayer hall is open on the backside opposite to qiblah wall. As indicated earlier, this side is open to a courtyard (sahan). Nevertheless, because of the air-conditioning systems, modern prayer halls turned into closed spaces to maintain the efficiency of cooling, and sahan, thus, disappeared. Only 4 modern masjids (designed by the same architect) included a sahan that is surrounded with an arcade. It is noticeable that many attempts have been made to cover the courtyard with light structural materials to provide shade and enhance the air-conditioning. A complaint of dust and birds was also detected (Figure 8). However, basic and non-basic prayer halls are found whether closed or semi-closed (Figure 9).

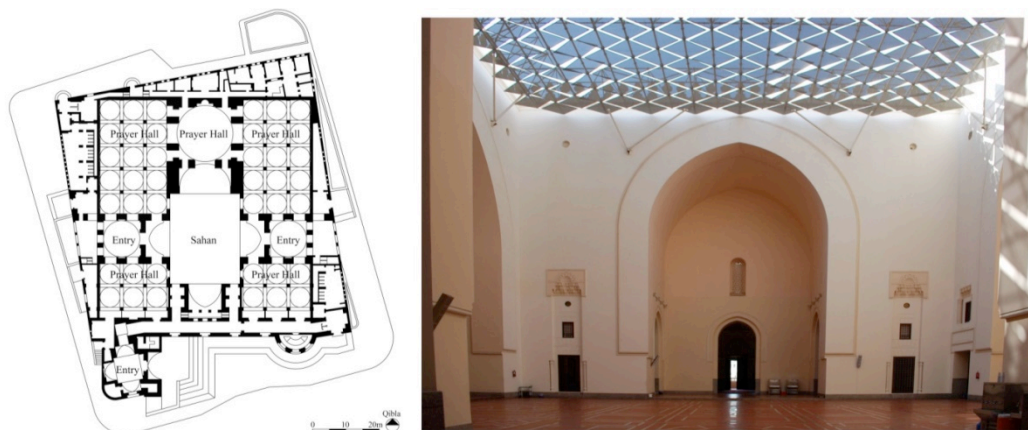


Figure 8: Modern masjid with Sahan, a semi-closed Prayer hall (Source: Authors).

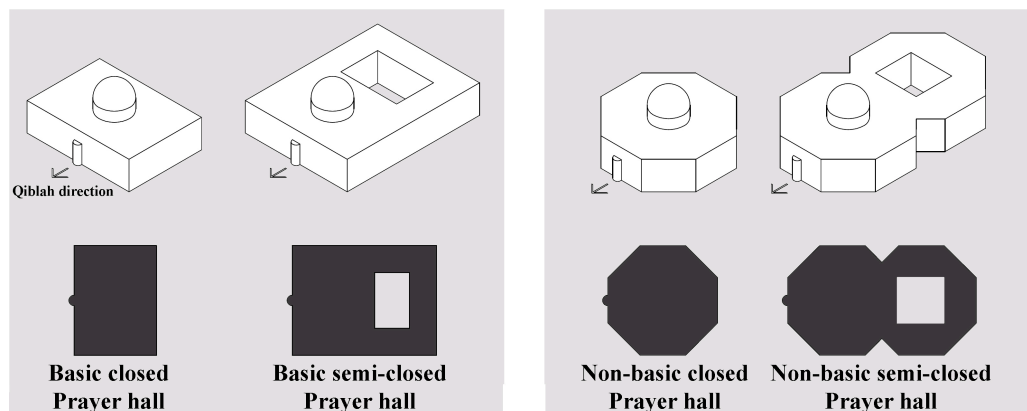


Figure 9: Closed and semi-closed types of prayer halls (Source: Authors).

Symmetry

Whether closed or semi-closed, the plan of the prayer hall might be typically reflected around the axis that perpendicularly penetrates the qiblah wall; this calls for the hall to be symmetrical. While, if this is not the case, the prayer hall is considered asymmetrical. Only four prayer halls of the surveyed masjids are found asymmetrical in shape. Within symmetrical prayer halls, asymmetric distribution of windows and doors could be noticed

(Figure 10). The reasons for the asymmetrical prayer halls are not clear unless dictated by site conditions. Asymmetry is observed in non-basic, closed and semi-closed prayer halls (Figure 11).

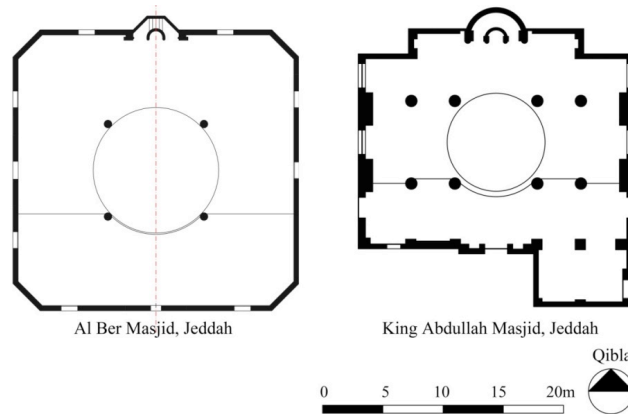


Figure 10: Symmetrical and asymmetrical prayer halls (Source: Authors).

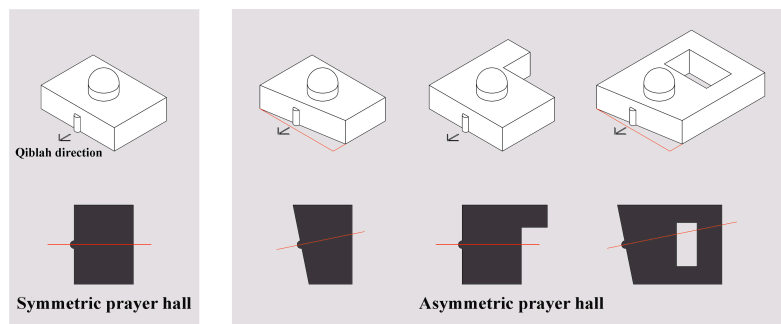


Figure 11: Symmetry and asymmetry in basic, non-basic, closed and semi-closed prayer halls (Source: Authors).

Complexity

Within the symmetrical prayer halls, 21 modern prayer halls consist of one simple space. A simple prayer hall has a basic form with a clear aspect ratio between its length (Qiblah wall) L , width W and height H . But, 13 prayer halls are rather complex in terms of configuration. A complex prayer hall consists of adding/subtracting several basic forms/spaces to or from the major space. The complex type is, thus, a product of bevelled or complex corners, with volumes added to the main prayer room such as entry porches, lobbies or niches (Figures 12 and 13).

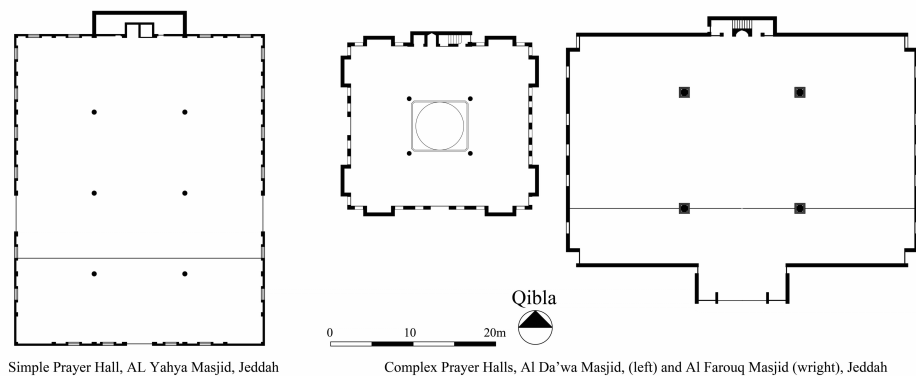


Figure 12: Simple and complex prayer halls (Source: Authors).

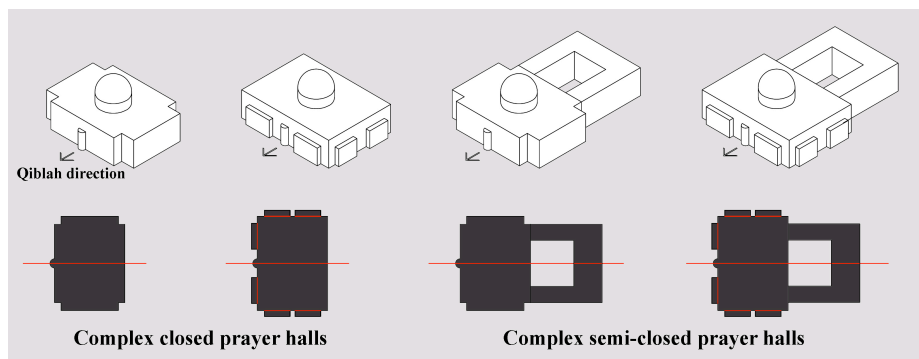


Figure 13: Different types of simple and complex prayer halls (Source: Authors).

DISCUSSION

The analysis of the surveyed masjids (Figure 14) indicates that the prayer halls in modern masjids can be basically classified into two main types; these are basic and non-basic (Figure 15). The term "basic" or "essential" indicates the type which mostly repeats the original design criteria as learned from the original model of masjid. While, non-basic type indicates halls that have unusual configuration. Basic prayer halls are right prisms with rectangular (or square) base, and the whole prayer hall faces qiblah with its long wall (in the case of rectangular plan). Non-basic type contains prayer halls with unusual configurations either in shape or form. Multi-sided (from pentagon to circle or even an ellipse), new forms and free configured plans are classified under this category.

Within the basic prayer halls, two types can be identified. First, the closed type in which the prayer hall is completely enclosed between walls on all sides. Second, the semi-closed, in which the prayer hall is linked to a court (sahan) along one of its sides. Sahan is rarely used in modern Saudi masjids due to its impact on air-conditioning. The similarity in basic prayer halls, whether closed or semi-closed, is compliant with the condition of reflection around the axes which perpendicularly penetrates the middle of the qiblah wall in both the plan and section. If this is not the case, the prayer hall is considered asymmetric. However, the asymmetric distribution of doors and windows does not affect considering the type symmetric. Symmetrical basic prayer halls can be classified into simple or complex types. In the simple type, the prayer hall has a basic form with a clear aspect ratio between its length, width and height (L: W: H). While, in complex ones, prayer hall is a transformed space either

by the addition/subtracting of other spaces to or from the major space. The roof ridge, either flat, flat with central dome or skylight, or with multiple domes affects the complexity of the prayer hall configuration. The complex type is, thus, a product of mitred or complex corners, areas added to the main prayer area such as entry porches and lobbies, and non-conventional ceilings and walls.

The classification does not prefer a type over the others but it sheds lights on types more appropriate for the legitimate requirements of prayer. The success of prayer hall should be measured in reference to the requirement of prayer. Performing prayer requires two essential needs: orientation towards qiblah; and the elongation and straightness in rows, in addition to the feeling of reverence achieved by the volume. In multi-sided and free formed prayer halls, it is not easy to accurately identify the qiblah direction nor to have long rows. However, pillars distribution and/or striped carpets can aid eliminating disorientation. Symmetry is a basic organizing principle through which the symmetry axis (entrance - qiblah) articulates the qiblah direction. The mirror image of prayer hall space brings monumentality, stability, balance and control. However, symmetric elements also evoke harmony and order in a space. Asymmetry is effective in drawing attention and breaking monotony but has adverse impact with regard to orientation.

Deciding on enclosure is a function of suitable climate, visual relation, and availability of land for sahan. Enclosed space supports control with regard to air-conditioning and acoustics; while relying on natural ventilation and lighting has a well-known environmental impact. It was noticed that the plot shape and dimensions is of major influence on the configuration of prayer hall and overall masjid composition. This can be solved on the urban level which usually gives priority for residential and commercial uses at the expense of religious facilities.

Complexity expresses the visual experiences the person praying gains having entered the prayer hall. Simplest spaces can be wholly experienced from one standpoint leaving the opportunity for the worshiper to concentrate on prayer. In complex spaces, the prayer gains new sensations and potentials while moving. Complexity is utilized to accommodate the prayer hall ancillary components, yet, it should not draw attention of the prayer.

The classification is believed to apply for modern masjids regardless the scale (Musalla, masjid or Jama'). Masjid scale is impeded more in the symbolic role, communal values and customer desire. However, developing design criteria for masjids can make use of the classification of prayer halls putting emphasis on the suitability of each type.



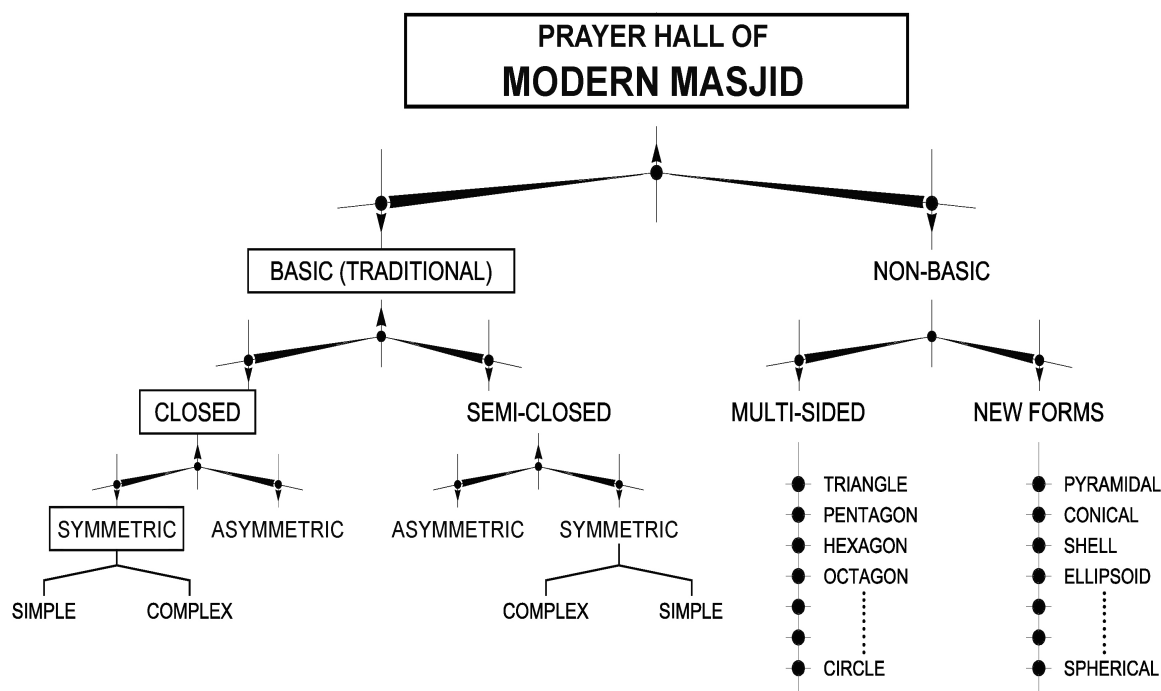


Figure 14: Classification of prayer halls in modern masjids (Source: Authors).

CONCLUSION

The present research proposes a classification for the prayer halls in modern Saudi masjids offering an analytical understanding of their types. The classification identifies two major types of prayer halls; these are basic and non-basic. The basic prayer halls are the most similar to the prophet's one. They are right prisms facing qiblah with a long side. In most cases, the flat roof comes with a dome or a skylight. The non-basic prayer halls do not follow strictly the classical form. They may be multi-sided, circular, elliptical, shell shaped or other new forms.

Basic prayer halls are categorized as closed or semi-closed if attached to a court. Both closed and semi-closed types are divided into symmetrical and asymmetrical according to the symmetry of the plan. Regularly shaped prayer halls are classified into simple and complex according to the purity of the space.

The classification covers modern prayer hall in its possible forms. Each type has its own characteristics that can be effectively employed according to context. Understanding such characteristics is the key to appropriate practice.

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APPENDIX A. LOCATIONS, NAMES AND PLANS OF MASJIDS UNDER STUDY



Figure 15: Locations of the surveyed sample across the city of Jeddah
(Source: Google earth edited by the authors).

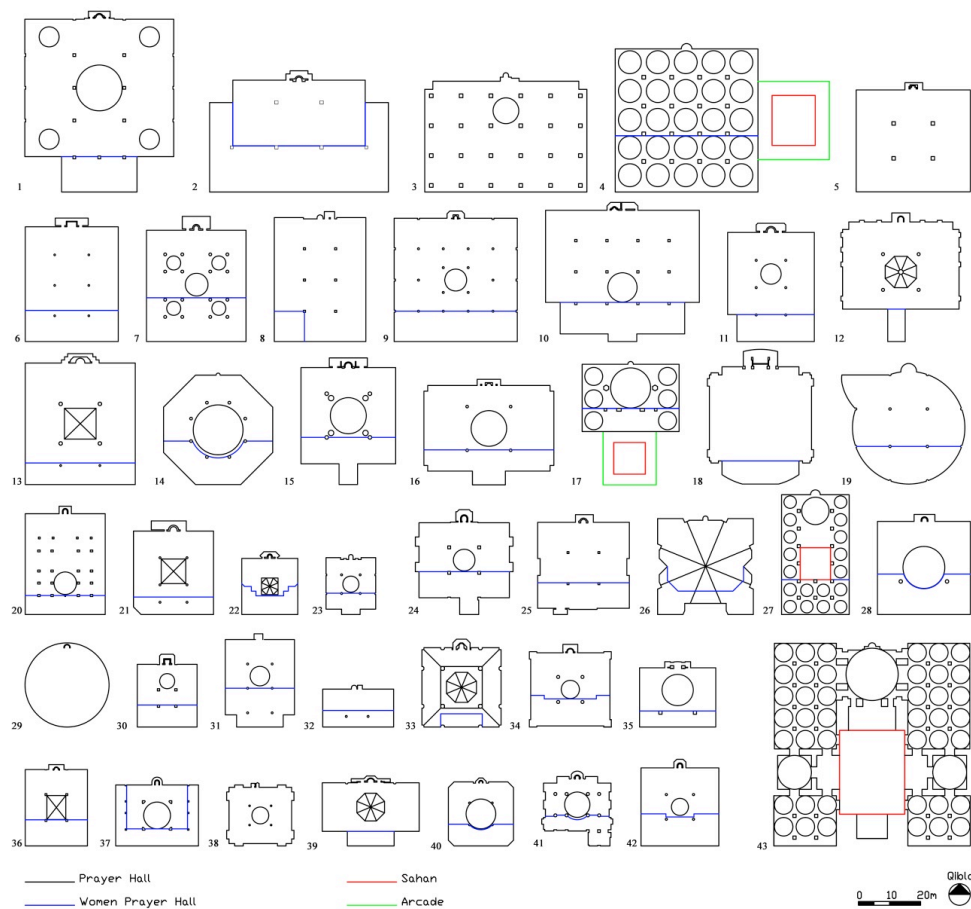


Figure 16: Plans of the surveyed sample (Source: Authors).

Table 1: Names of masjids under study (Source: Authors).

Masjid	Masjid	Masjid	Masjid
1 Khadijah Baghlaf	12 Om Al-qora	23 Al-omahat	34 AL-khair
2 King Saud, Nozlah	13 Amirah Hessah I	24 AL-kawthar	35 Khaled ibn El-walid
3 King Abdulaziz University 1	14 Al-rahmah	25 Abdulah ibn Amr ibn Ala's	36 Al-zahraa
4 Al-jaffali	15 Bin Yaman	26 Khalel Anani	37 Al-nour
5 Al-kawthar, Sarawat	16 Al-farouq	27 Al-harhi	38 Al-daa'wah
6 Al-yahia	17 Al-slayman	28 Al-barakat	39 AL-fattah
7 Imam Shafa'e	18 Aa'esah Kaaki	29 King Abdulaziz University 2	40 Al-ber
8 Hasan Fetaihi	19 Amirah Hessah II	30 Al-saif	41 King Abdullah
9 Ibn Baz	20 Abo Hanifah	31 Al-nagheel	42 Ba Lubaid
10 Al-saydah Roqayah	21 Bin Afif	32 Al-jameah mall	43 King Saud, Madina rd.
11 Riyadh Assalhen, Jeddah	22 Al-ryan	33 Al-rahmah	

