Proceedings of Symposium on Mosque Architecture, Vol. 5B, pp1-20, College of Architecture & Planning, King Saud University (1419H-1999)

The Dynamics of Planning Criteria for Mosques in Saudi Arabia

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Abstract: This paper deals with the system of mosques and attempts to investigate the salient aspects of planning criteria in Saudi Arabia in four sequential steps. First, it describes the salient provisions of the current planning standards for mosques, in Saudi Arabia, and examines them in the context of existing space standards of the hierarchic system of mosques in various urban areas of Saudi Arabia. Second, it attempts to identify the salient causes responsible for bringing about a change in the locational patterns of mosques, and undertakes a comparative analysis of the dynamics of the locational patterns of various hierarchies of mosques in Saudi Arabia against the backdrop of the traditional locational patterns. Third, it suggests a physical development pattern, which appears to be best, suited for a normative hierarchical location of mosques. Finally, part four highlights the salient conclusions and recommendations of the study.

Introduction

Despite the fact that the architects have continued to bring about commendable innovations in mosque architecture, the planning and design criteria of mosques have lagged behind in both, the functional as well as the locational arenas. Also, it could not cope with the fast changing patterns of urban development.

Ideally, the planning criteria for the system of mosques should deal with the numbers, sizes, functions and locations of the hierarchy of mosques; and should be conceived against the backdrop of highly dynamic pace of urbanization and its consequential physical development pattern(s). It should also be borne in mind that, unlike the pyramidal hierarchy of educational institutions, the hierarchy of mosques is diffused rather than discreet in its nature, viz., a primary school can not act as a secondary school, but a local mosque can be used for Friday prayers; and a Friday mosque can likewise be used for local as well as for Eid prayers. As a consequence, the hierarchic composition of mosque is at great variance in different cities of various Islamic countries including Saudi Arabia, and even in various parts of cities, especially in the central areas of Makkah and Madinah due to the presence of the grand mosques.

According to the Islamic ideology, the concept of mosque circumscribes a multi-dimensional hierarchy. It represents a temporal, spatial as well a functional hierarchy. Every Muslim is required to pray five times a day in a local mosque, once a week in a Friday mosque, two times in a year in Eid mosque, and at least once in his life time in the *Maidan-i-Arafat* if the person concerned is financially and physically capable of performing *Hajj*. Not only that the location of these mosques signifies a spatial hierarchy, but the reward for praying in them also constitutes a hierarchy, viz., daily prayers in a local mosque are rewarded 25 times more than praying at home; praying in a Friday mosque is rewarded

500 times; praying in *Al-Aqsa* and Prophet's mosques 50,000 times; and in the *Masjid Al-Haram* 100,000 times [1, p. 161].

The theme of this paper has been progressed by reviewing the provisions of the manual for "Planning Standards of Mosques [2], and by analyzing the data computed from "*Atlas Al-Mudan Al-Saudia*" [3] both published by the Deputy Ministry of Town Planning (DMPT), Ministry of Municipal and Rural Areas (MOMRA).

The Planning Standards for Mosques in Saudi Arabia

The Manual for "Planning Standards of Mosques" suggests a discreet, three-tier hierarchy of mosques, viz., Local, Friday and Eid Mosques. The suggested hierarchic composition is comprised of one Friday Mosque for every four local mosques for residential areas having a population of 4000 and above. The residential areas of less than 4000 persons will have a varying composition of local and Friday Mosques. Eid Mosque is to be located in every small and medium sized town as an open piece of land, and in various residential districts of big cities according to their population as shown in (Fig. 1).

Regarding the expected number of worshipers for various hierarchies of mosques, it has been suggested that the local mosques should only be designed on the basis of eligible males at the rate of 40% of the population, excluding the children and women because it is not obligatory for the children of less than 7 years to pray in a mosque; and for women it is desirable that they should pray in their homes. Nevertheless, it has been recommended that an additional provision for children be made at the rate of 1% of the population. As a consequence, it has been suggested that each local mosque should preferably be designed for 205 worshipers in a residential area with a population of 500 (40% for men + 1% children). It has further been provided that each local mosque should be located within a walking distance of 150-200 meters from the residences.

The Friday Mosque, in addition to the eligible male worshipers, should also provide spaces for women worshipers at the rate of 8% and for children at the rate of 4% of the population. The number of the total worshipers for each Friday mosque should be calculated at the rate of 40% of the catchment area population. Needless to say that every Friday mosque will invariably be used as a local mosque, however, the reverse in not true. Likewise, the Eid mosque should also cater for women and children worshipers each at the rate of 4% of the population in its catchment area. Each Eid Mosque should provide for at least 40,000 worshipers or 40% of the population (in addition to 4% each for women and children) which ever is more in large cities; whereas, its size should be in accordance with the total numbers of worshipers in small and medium sized towns. It has further been recommended that Friday mosque should be located within a walking distance of 250-300 meters from the residences.

It has further been suggested that the area for worshipers should be calculated at the rate of 1 m2 for each worshiper in local, Friday and Eid mosques; however, an additional area for services, such as parking, bathrooms, quarters for the Moazin and Imam should be provided at the rate of 20% per worshiper for local mosques, 30-40% for Friday mosques, and 5% for Eid mosques, thereby making a total of 1.2 m2, 1.3-1.4 m2 and 1.05 m2 per worshiper in local, Friday and Eid mosques respectively. The manual also provides tables, indicating the areas for various services for various sizes and types of mosques with and without courtyards.

Comparative Analysis

This section will attempt to carry out a comparative analysis of the salient planning standards suggested in DMTP's manual for the "Planning Standards of Mosques" and those existing in the urban areas of 10,000 and more, in Saudi Arabia, with a view to find out the extent of correlation or otherwise between them. This exercise will be carried out at three levels. One, at the level of the system of urban areas; two, in some of the selected cities; and three, in some selected residential districts of Jeddah.

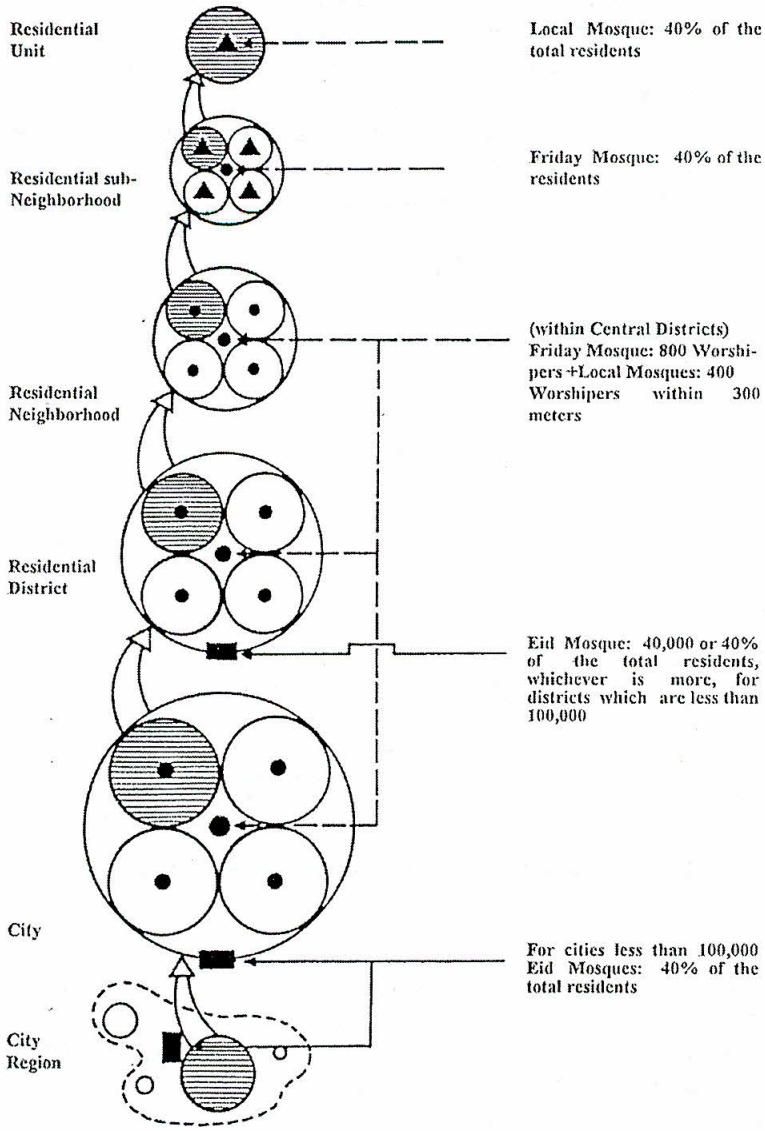


Fig. 1: Distribution of mosques according to their types and sizes in different urban areas.

(Fig. 2) shows a scatter diagram of the number of local mosques per Friday mosque in various urban areas in Saudi Arabia against the suggested ratio of four in the manual. Apart from the fact that there is no correlation between the two, the range of variation in the local/Friday mosque ratios is very great and does not even relate to the size of the urban areas. For instance, Madinah has about 21 local mosques per Friday mosque, whereas,

Makkah has only 3.5 local mosques per Friday mosque. Besides, Appendix 1 also indicates that Madinah has more local mosques per 1000 persons than Makkah, whereas Makkah has more Friday mosques per 1000 persons than Madinah. Perhaps this wide variation could be explained either in terms of the relative sizes of the two categories of mosques or by the inference that perhaps a much larger number of people of Makkah offer their local prayers in the Friday mas in the *Masjid Al Haram*. This wide variation may also be due to the two different definitions used by the two metropolitan cities while classifying the local and Friday mosques. Likewise, smaller urban areas such as Buqayq, with a population of 24,000 have only 3 local mosques per Friday mosque and Umm Lajj, with a population of 20,000 has 15 local mosques per Friday mosque. The planned ratio in the new Industrial City of Yanbu is about 2, whereas the ratio so far achieved in its existing built-up areas is 1. This leads to the conclusion that each urban area warrants an in-depth analysis because each urban area is different than the other in terms of its topography, demography, socioeconomic status, density and type of physical development pattern; and last, but not least, the varying attitudes and potential of the private sector to construct mosques and offer prayers five times a day in them rather than at home.

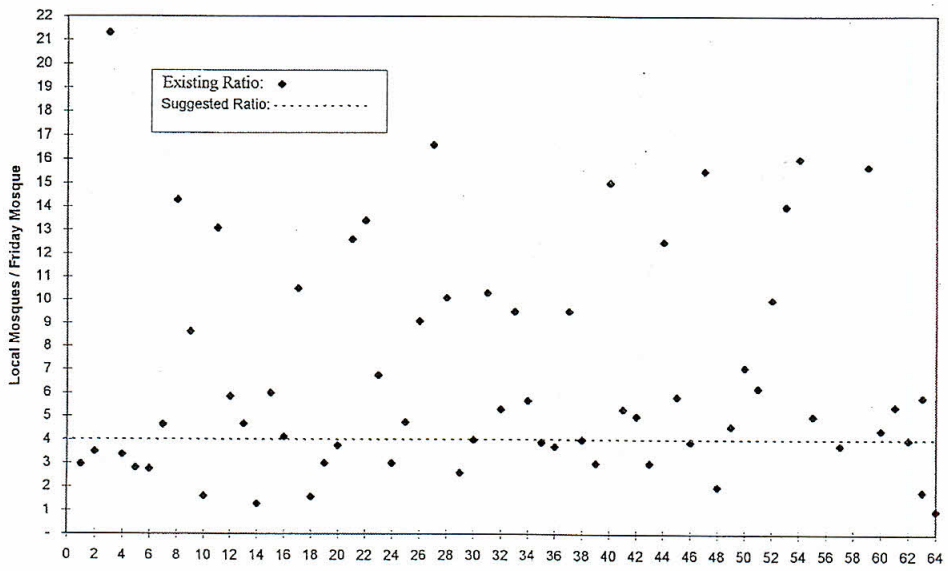


Fig. 2: Suggested* vs. existing number of Local Mosques per Friday Mosques in various urban areas in Saudi Arabia.

Likewise, (Fig. 3) shows the existing space per person in local and Friday mosques in various urban areas of Saudi Arabia against the backdrop of their respective standards suggested in the manual. The space standards given in the manual have been converted from space/worshiper to space/person to provide a comparative basis with those given in the Atlas *Al-Mudan Al-Saudia*. The suggested space/person for local mosques comes to .48 m^2 and the space/person for Friday mosques ranges from .52 to .56 m^2. The scatter diagram for space standards for local mosques shows a greater divergence as compared to the space standards for Friday mosques. (Fig. 3a) clearly shows that the local mosques having much higher space standards than the one suggested in the manual are more than the mosques having space standards lower than the suggested space per person.

(Fig. 4) shows the variation of the total number of local and Friday mosques per 100 person in various urban areas on a p-chart (proportion chart). The summation of the two categories of mosques is in fact the real indicator of local mosques, as Friday mosques also function as

local mosques. The variation of mosques in various urban areas is quite revealing. Most of the urban areas, wherein the number of mosques are even more than the upper control limits have less than 15,000 population. In urban areas with more than 15,000 population Buraida is the only town, with a population of 154,000, which lies outside the upper control limit.

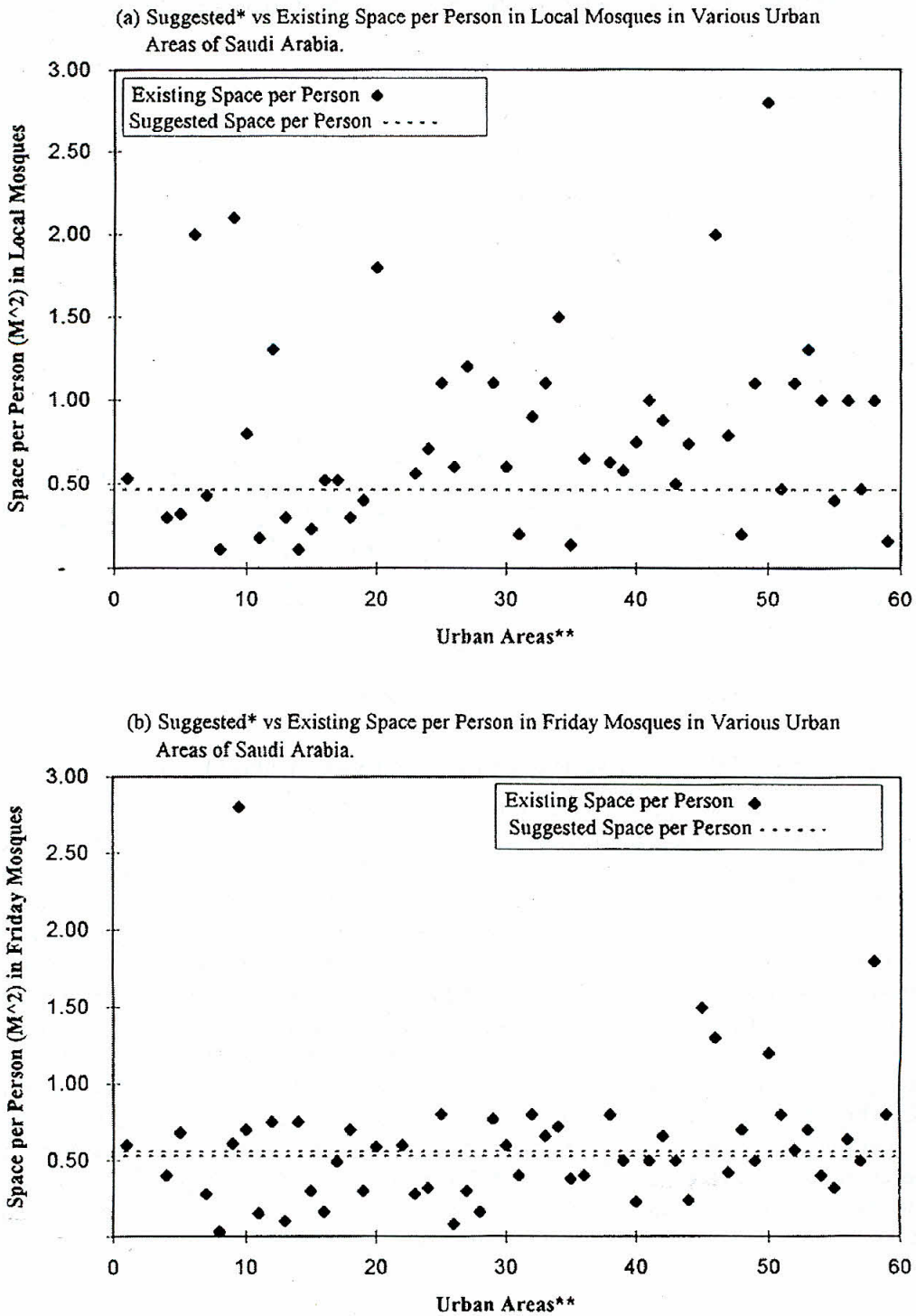
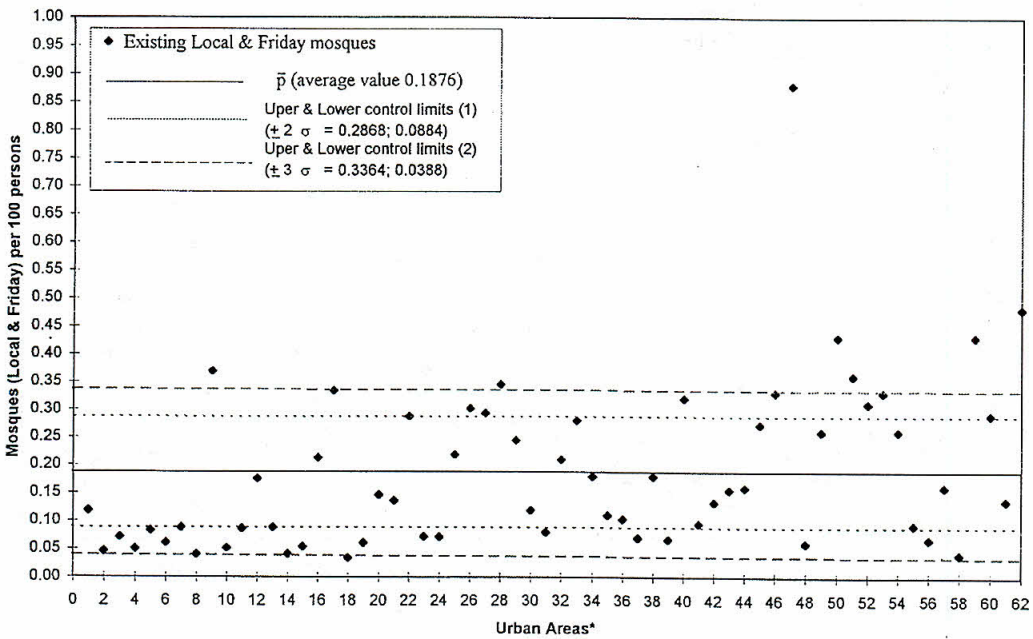


Fig. 3: Space per Person in Local and Friday Mosque in Various Urban Areas of Saudi Arabia.

This phenomenon could perhaps be explained in terms of the traditionality of the populace as well as the predominance of the traditional physical development pattern of these urban areas. As compared to this, the substantial number of urban areas having mosques below the average value of p, are the largest urban areas. These urban areas are the new towns in towns of Saudi Arabia [4, pp. 91-104]. Due to the predominance of gridiron pattern and automobile orientation, mosques tend to be larger in size and fewer in numbers in these towns.



* The numbers of urban areas refer to the serial numbers given in Appendix 1.

Fig. 4: Variation of Mosques in various urban areas of Saudi Arabia (According to p-chart).

(Fig. 5) shows space per person and population per mosque in the selected urban areas, other than Makkah and Madinah, which have a special status. All of these urban areas have more than 100,000 population with the exception of Jaizan (78,700), Ar Ar (65,000) and Abha (60,000). Each of the urban area is distinctly different from the other in terms of its location, economic base, topography and even the extent of the predominance or otherwise of the gridiron development. Although each of these urban areas deserves a detailed survey and analysis in its own right which is beyond the scope of this paper. Yet the Figure clearly indicates that the existing standards of space per person and population per mosque in these towns are at great variance. For instance, even though Taif and Buraida have the maximum space per person in their local mosques as compared with the other selected urban areas shown in (Fig. 5a), yet the situation of both of them is entirely different in terms of number of local mosques. Whereas, Taif has larger but fewer local mosques, Buraida has larger and about seven times as many mosques per 1000 persons as in Taif (Appendix 1). Likewise, the population per the Eid mosque in Riyadh is the highest as indicated in (Fig. 5b) due to the fact that the Eid Mosques in Riyadh are smaller in size (Fig. 5a) and fewer in numbers (Appendix 1).

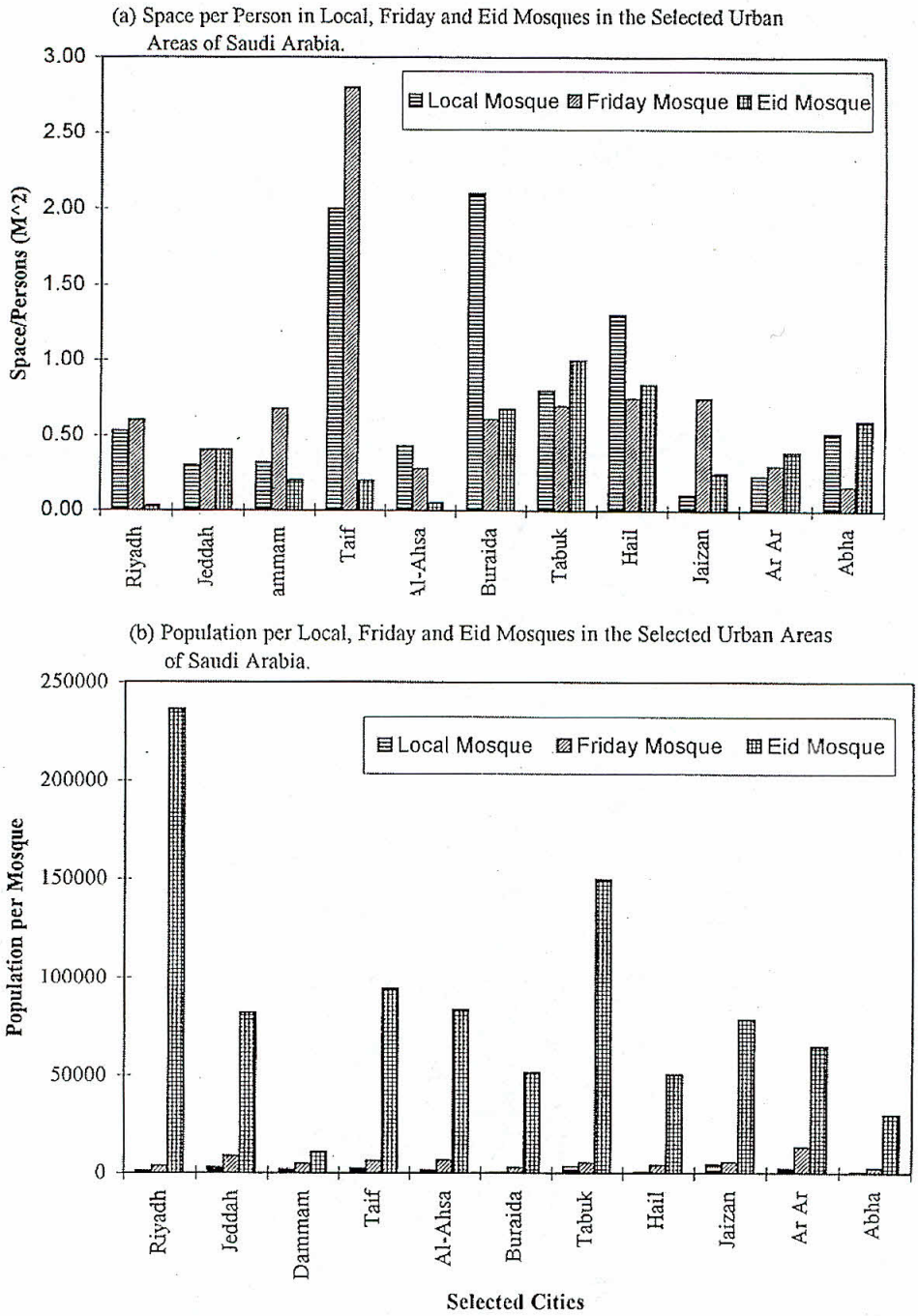


Fig. 5: Space person and population per mosque in the selected cities of Saudi Arabia.

It appears appropriate at this stage to focus on four residential districts of Jeddah viz., (a) University District, (b) North Jeddah District, (c) Amir Fowaz Housing District, and (d) Southern Public Housing Complex (Fig. 6). Each of these housing districts represents distinctly different socio physical characteristics and development periods. (Fig. 7) shows the number and the location of local and Friday Mosques in the University residential District. The district is the oldest of the four selected areas and its population is largely comprised of lower and middle-income groups. It is located in the north west of Prince

Mitab market and has a dense core of traditionally developed housing units with low and medium density residential peripheries which have a predominance of gridiron pattern. The district has 30 local and 6 Friday mosques; or in other words there are five local mosques for every Friday mosques. Figure 7 also indicates that the local mosques are mostly located in the traditional area and Friday mosques in gridiron and semi gridiron areas.

As compared to the University housing district, the north Jeddah housing district (Fig. 8) is resided largely by middle and upper middle income people. The area has been, by and large, developed on gridiron pattern and has some traditional residential pockets. As shown in (Fig. 8), the north Jeddah district has more Friday mosques than local mosque viz., 48 Friday mosques and 45 local mosques.

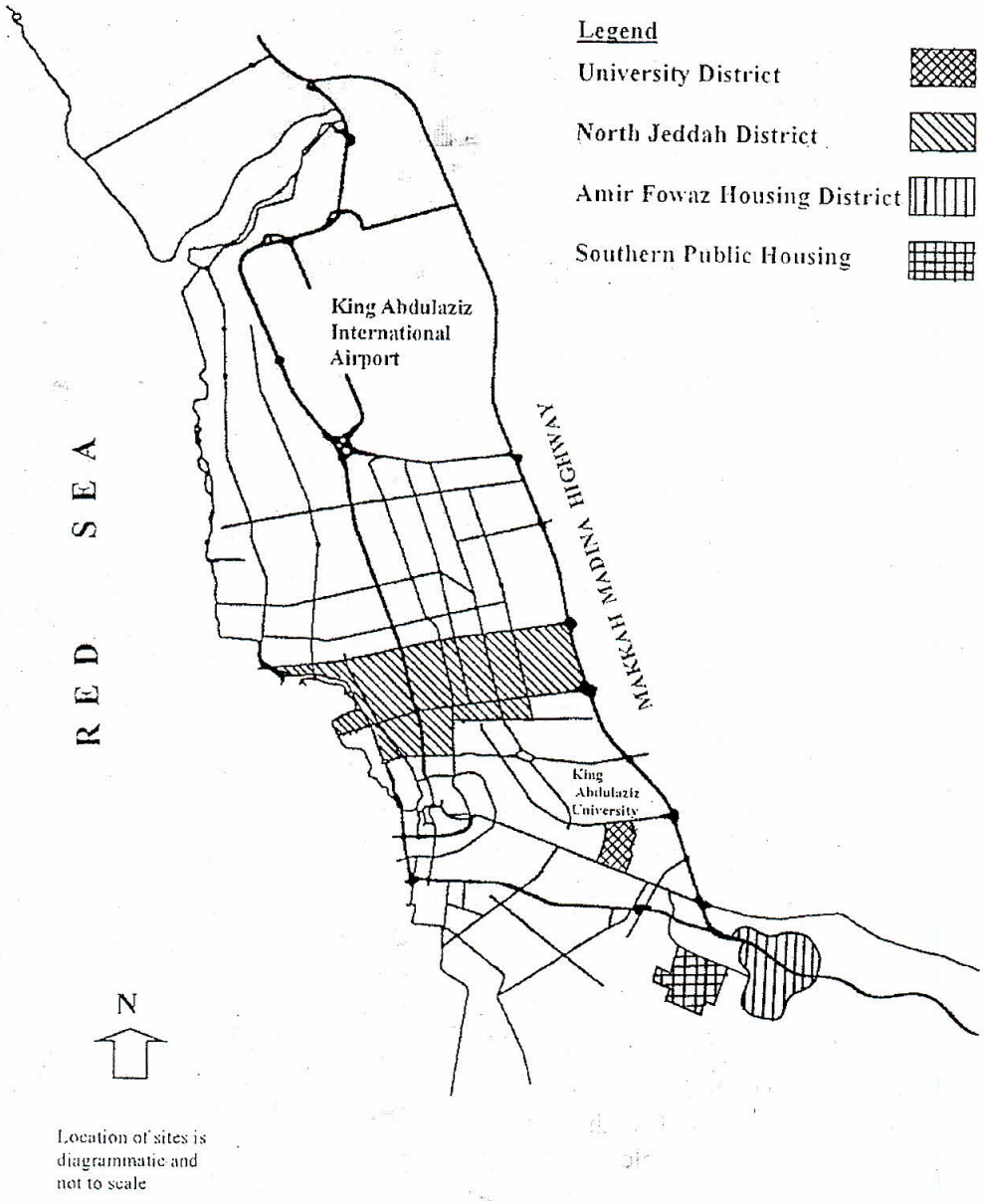


Fig. 6: Index plan showing the location of the selected housing districts in Jeddah.

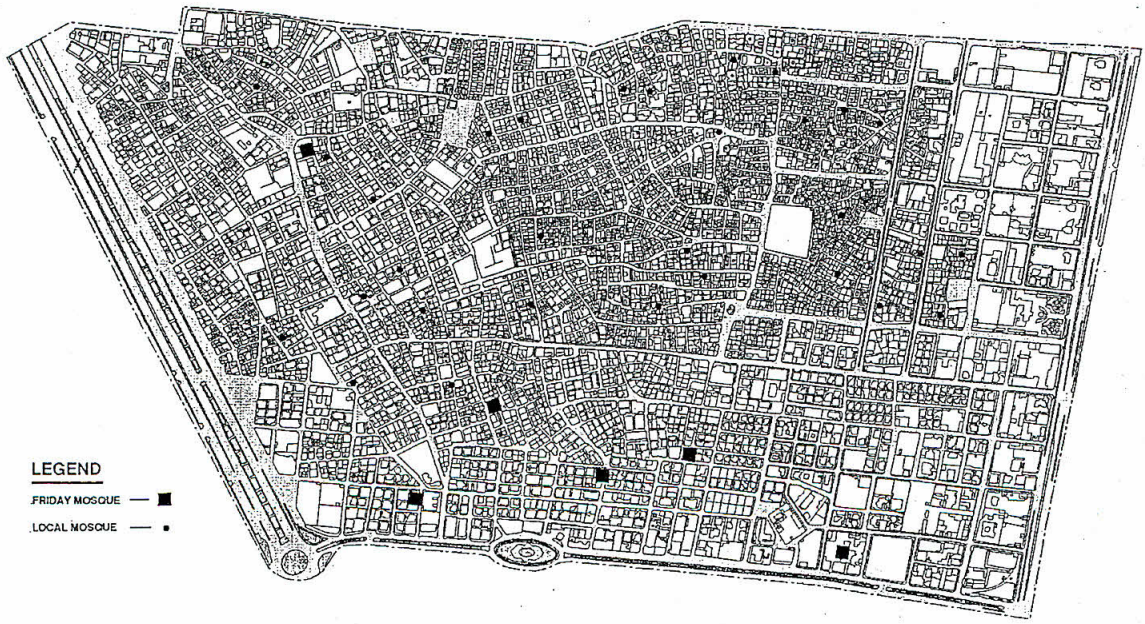


Fig. 7: University district, Jeddah.

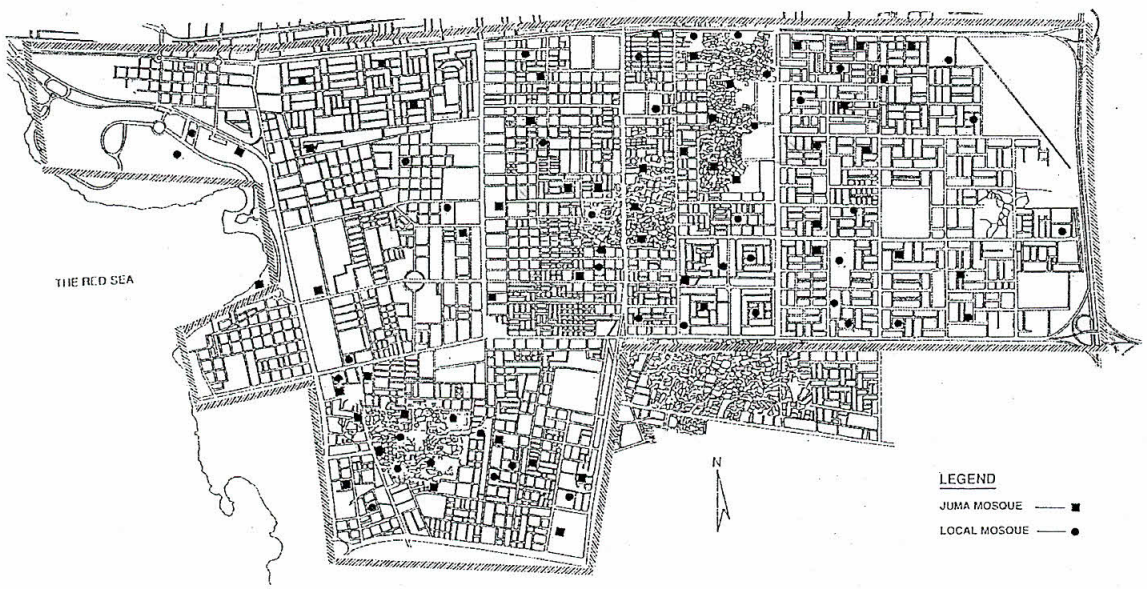


Fig. 8: The distribution of mosques in North Jeddah.

A study dealing with the distribution of mosques in Amir Fowaz Housing District (Fig. 9) was developed after the north Jeddah residential district for upper middle and high income people. It is a low-density residential neighborhood developed on gridiron pattern and provides for more than 1000 semi-detached villas. Amir Fowaz District has one Eid mosque seven Friday mosques and no local mosque. Lastly, (Fig. 10) shows the plan of the Southern Public Housing Complex alongwith the details of one of its residential clusters. Although the high-rise housing complex was completed in late 1970s and early 1980s, the housing units were not occupied until early 1990s due to the surplus housing developed by the private sector during the period 1985-90 [6].

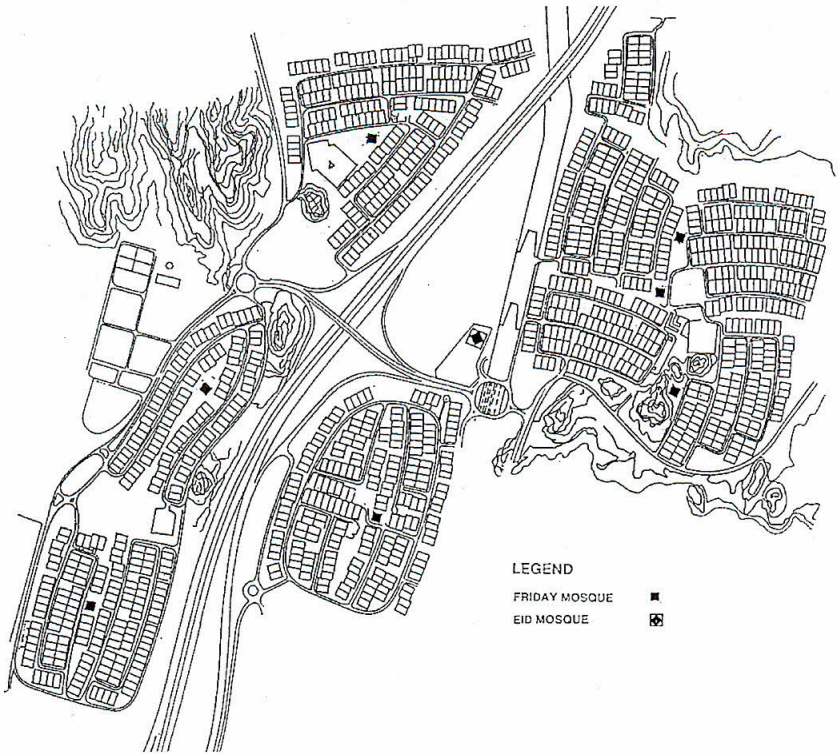


Fig. 9: Amir Fowaz Housing District, Jeddah.

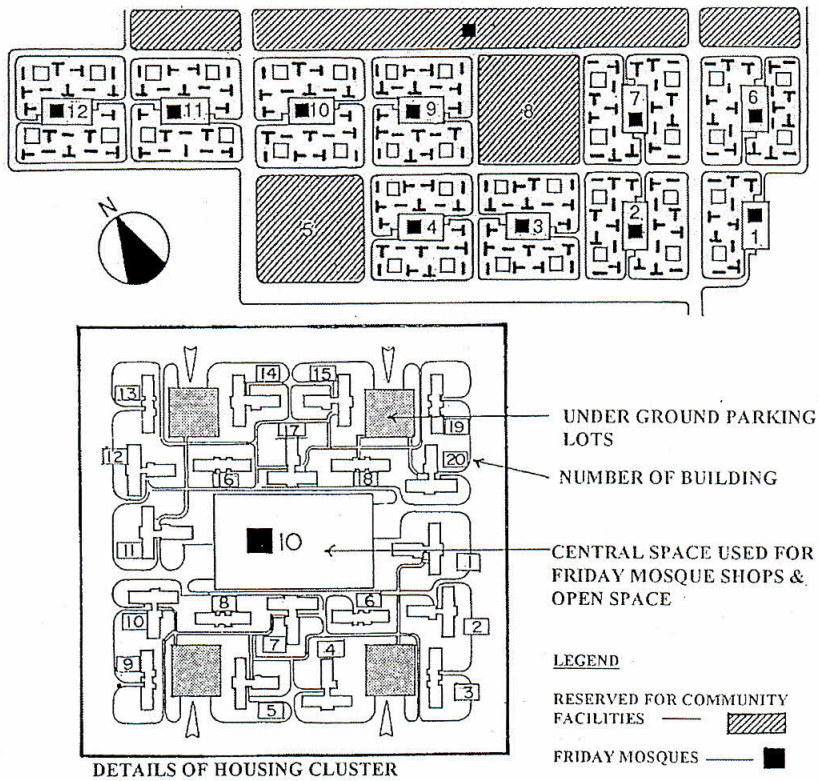


Fig. 10: Jeddah Southern Public Housing Complex.

The occupants mostly belong to middle and upper middle income groups. The housing complex provides for 188 four and eight storied buildings, which house 4320 apartments. There are 11 Friday mosques, one in the area provided for community facilities in front of the complex and 10 in the central open spaces in each of the residential cluster. The 10 mosques were not provided in the original plan of the housing complex and were allowed to be added by the Jeddah municipality on the request of the residents. All the eleven mosques have been constructed with the donations of the wealthy philanthropists. The mosque in the front is so big that it is not even half full on Fridays. There is no hierarchy of mosques. Indeed the roofs of the underground parking lots provide ideal places for Zawyah mosques (small mosques) child's play lots for the surrounding apartment buildings. The roofs were originally provided swings and slides for children, but currently they are in disuse and are completely deserted places with a collection of rusted steel and deteriorating concrete. It may be pointed that the area within the housing cluster is completely pedestrianized as the access to the underground parking lots is from the peripheral roads, as indicated by the arrows. If properly landscaped and maintained as small roof gardens, these spaces could easily be converted into sciopetal spaces for the surrounding neighbors who would get to know each other more intimately by participating in children's recreational activities and offering daily prayers; and even the mothers can watch their children play from the windows of the adjoining apartment buildings.

The foregoing comparative analysis of the planning and existing space standards of mosques in the selected residential districts of Jeddah, makes it highly manifest that these standards are not only at great variance but have also been subject to change with the changes in the physical development patterns at the micro level due to the changes in the level of urbanization at the macro level. The rate of change of urbanization, in turn, depends on the technological advancements, industrialization and structural changes in the employment pattern [7] which bring about socioeconomic and demographic changes, such as income levels, car ownership, household size, residential densities, age and sex composition and attitudes of people. Therefore, the planning standards of mosques, being a function of so many major and subsidiary variables, are not only at great variance in different urban areas, but also vary in different parts of the same urban area.

The Dynamics of Physical Development Pattern

This section reviews the emerging physical development pattern in Saudi Arabia due to rapid increase in its urbanization level. The dynamics of physical development patterns can perhaps be best understood in terms of three salient characteristics of urbanization. One, urbanization is largely irreversible [8]; two, it generally follows a rising s-curve [9, p.26] and three, during the initial period of low level urbanization, growth occurs in distinct nodes, whereas, the medium level urbanization is accompanied by the aggregative metropolitan growth; and the high level urbanization is characterized by the diffusive growth [9,pp.26&29]. The situation of Saudi Arabia is unique. Due to very fast structural changes in sectoral employment and consequential rapid increase in its urbanization level, the aggregative and diffusive tendencies of urbanization appear to have dawned ahead of time with the resultant differential overlapping.

These tendencies appear to have further been accentuated due to the vastness of the country and its regional diversity. As a result, one can see the concurrent evolution and emergence of nodal, aggregative and diffusive tendencies of physical development in different regions. Some examples in sight are the growth of (a) nodal cities like Hail, and Tabuk; (b) metropolitan areas of Jeddah, Makkah, Riyadh and Dammam; and (c) diffusive

development on the eastern coast, formed due to the merger of Dammam - Al Khobar - Dhahran metropolitan area with the settlements of Sahat, Al-Qatif, Safwa, Shaab and Ras Tanura. It is expected that the economies of scale and agglomeration will, subject to the physical limitations, provide impetus for the development of urban corridors along the various communication axes at the national level. For instance, the urban development along the eastern coast starting from Dammam, in course of time, may get extended upto Jubail and Khafji. In due course of time, the aggregative growth tendencies of Jeddah, the backward and forward linkage effect of Yanbu Industrial complex and the recreational potential of towns located on the west coast may lead to the emergence of a conurbation along the western coast axis. This axis appears to follow approximately the alignment of the famous "Frankincense route" which used to run from Hadharmaut (Yemen) to Syria via Madain-i-Salih and Petra (Jordan). Similarly the Riyadh-Buraida development corridor may get further extended upto Hail [10].

The synthesis of this section with the last section leads to the identification of two sets of salient causes which have not only brought about a reversal of the traditional hierarchy of local and Friday mosques in predominantly contemporary residential developments, but have even led to the extinction of local mosques, per se, in the new residential sub-divisions. The two sets of causes are (a) the emergent physical development patterns at the micro and macro levels, and (b) the roles played by the public and private sectors in the regulation and construction of the various hierarchic categories of mosques.

The Dynamics of Locational Patterns of Mosques

This section undertakes a temporal analysis of the resultant dynamics of locational patterns of various hierarchies of mosques against the backdrop of the traditional locational pattern. (Fig. 11) provides a rather generalized version of the dynamics of locational patterns of various hierarchies of mosques in Makkah, Madinah, and other urban areas in Saudi Arabia. (Fig. 11-a) indicates the traditional locational patterns, which existed in most of the urban areas of Saudi Arabia. Local mosques, which were usually smaller and numerous, got located ubiquitously. They perform best in pedestrian oriented physical developments. These mosques provide the venues where one can interact with his neighbors informally and make acquaintance with as many of them as possible, which is so desirable in Islam; and also the children can walk to these mosque without the fear of being overrun by the vehicular traffic. There were infact even much smaller mosques than the local mosques in old parts of cities like Jeddah which were locally called *Zawaya* (*plural of zawyah*). *Zawaya* played a very important role in bringing together the heads of the families living in its immediate proximity. Often the position of *Imam* in a *zawyah* was granted to the oldest head of the family. *Zawyah* mosques were located in the semi-private transitional residential spaces and very intimately related with the clusters of housing units in a sub-neighborhood. Until the middle of this century there were over thirty *zawaya* in Jeddah. [11, pp. 163, 168] Even to day, there are *Zawyah* mosques in old Jeddah, although they have now been confined to schools, hotels and offices.

As compared to local mosques, the Friday mosques are bigger and fewer; and the level of social interaction is also less informal. These mosques cater to the need of larger residential thresholds and are located sporadically.

It is considered desirable to pray in the Friday mosque of one's own neighborhood rather than travelling to far flung Friday mosques as the Prophet (pbuh) advised his followers to undertake special journey only for three mosques [1, p. 150] which have a special status and wherein prayers have been assigned higher rewards [12] viz., *Masjid Al-Haram, Masjid Al-*

Nabavi and *Masjid Al-Aqsa*. The logic behind this advice is that one should, in addition to offering Friday prayers, also make an effort to interact and know the residents of one's own neighborhood rather than travelling to a distant mosque and offering the prayers mechanically. This contention is also borne out by the concept that even though the Muslims are an *Umma*, which is trans-racial, and transnational in character, yet Allah Subhana-wa-Taala has divided them into nations and tribes so that they may know one other [13]. The main or city mosque comes next in the hierarchy of mosques. These mosques get constructed in primate location(s).

Other than the three special mosques mentioned in the last paragraph, these mosques are the characteristics of Capitals of the Islamic States or the King's Cities, viz., the Al-Hamra Mosque of Cordoba, the *Jamia Masjid* of Delhi, the *Shahi Masjid* of Lahore and main mosque of Riyadh. The last category in the hierarchy of mosques is the Eid Mosques. Traditionally the Eid prayers have been held in the open area, generally located in the outskirts of the towns. Their locational pattern is unitary which can be rationalized in the context of pedestrian-sympathetic, dense nodes of human habitations.

The dynamics of locational patterns of the various hierarchies of mosques can best be analyzed against the backdrop of the traditional pattern explained in the foregoing paragraphs and shown in (Fig. 11a). The temporal transformation of the locational patterns of mosques may be divided in two broad sets: One for Makkah and Madinah, and the other for the remaining urban areas of Saudi Arabia (Fig. 11). Each set will be analyzed in three temporal cycles. (Fig. 11b) very closely portrays the locational pattern in Madinah until the dawn of gridiron pattern in the urban areas of Saudi Arabia. The local and Friday mosques continued to follow the traditional locational patterns. However, the venue of Eid prayers had been shifted to the Prophet's mosque perhaps during or before the Ottoman period as the area west of *Manakha*, where Eid prayers used to be held, was developed into a Turkish, suburb known as "*Zuqaq Al-Tayyer*" during the later Ottoman period [14, p.24] and *Ghimama* mosque which now stands in a traffic island, was constructed to symbolize the venue of Eid prayers.

With the passage of time, as the physical development moved towards gridiron pattern by replacing the old traditional pattern and the vehicular traffic increased the accessibility, the new system of local mosques assumed sporadic locational pattern instead of the traditional ubiquitous patterns; also the Prophet's mosque, by and large, became the main venue of Friday prayers, which resulted in the reduction of the status of the then existing Friday mosques to that of local mosques as indicated in (Fig. 11c). This tendency of the people of Madinah and also of Makkah to offer their Friday prayers in the respective Grand Mosques is also borne out by the fact that the reward for offering prayers in these mosques is much more than in any other mosque [12].

Interviews with some selected professors from Madinah revealed that the construction and commission of the Inner Ring Road around the Prophet's Mosque has had a profound effect on quite a few Friday mosques in Madinah. The Friday mosques, which were almost reduced to the status of local mosques, are resuming their original status (Fig.11d). Although the Prophet's mosque, after extension, has almost become coterminous with the size of Madinah during the Prophet's time and a huge underground parking lot on two levels has been constructed on the southern and eastern side of the mosque, yet its accessibility has been reduced for both the pedestrians as well as vehicular traffic. For the pedestrians, the vehicular traffic on the Inner Ring Road provides a physical barrier; and for the vehicular traffic long queues and waiting periods involved in paying the parking charges at the exit barrier act as a deterrent.

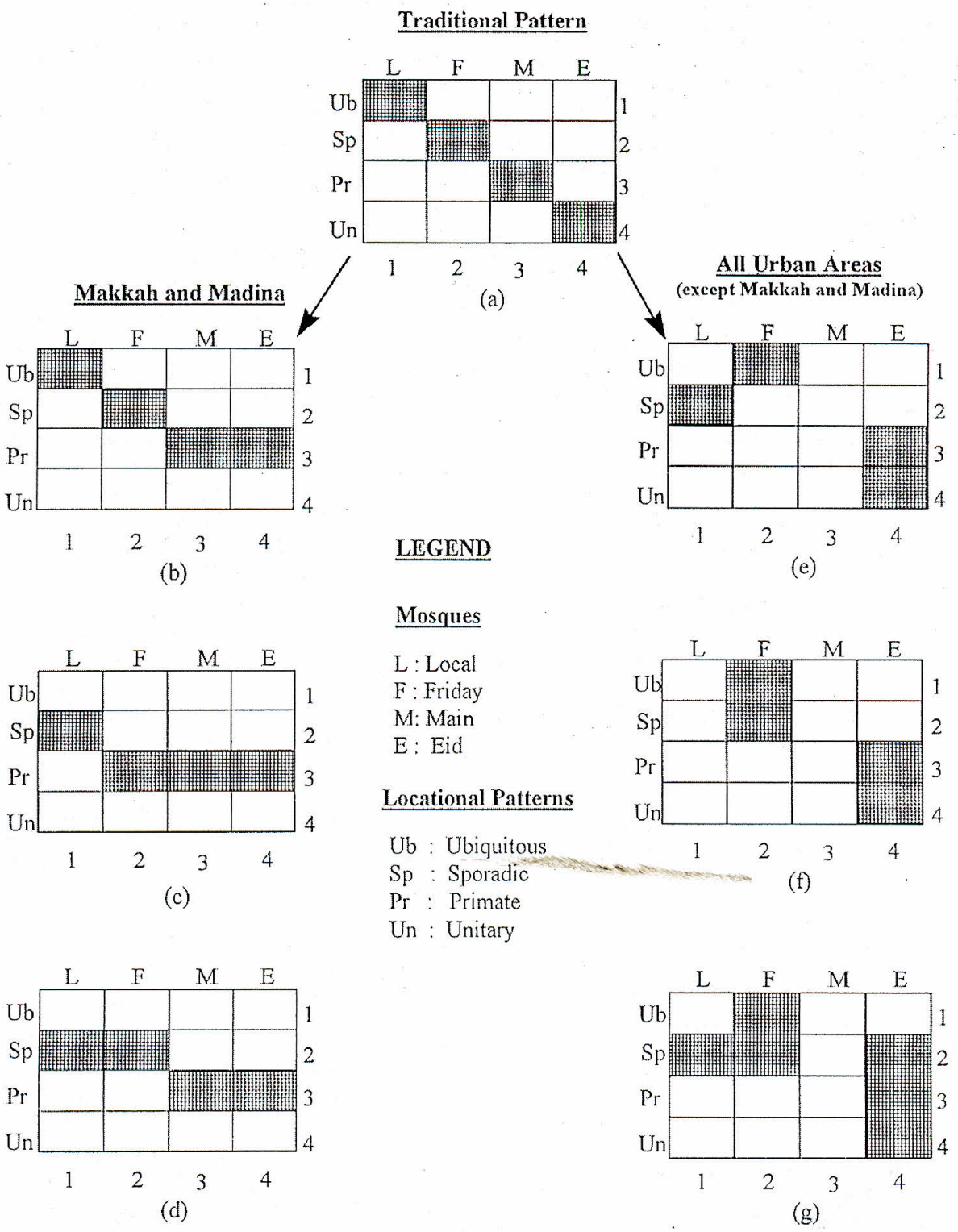


Fig. 11: Dynamics of Locational Patterns of Various Hierarchies of Mosque.

Perhaps the construction of well lighted and ventilated ungrounded pedestrian ways or shaded overhead pedestrian crossings across the Inner Circular Road; and arrangements for an expeditious exit from the underground parking lot by providing prepaid automatic ticketing machines may again reverse the "reversed tendency". It may be pointed out that matrices (b), (c) and (d) are broadly applicable to Makkah and Madinah; nevertheless the foregoing analysis has been carried out in the context of Madinah only.

The dynamics of locational patterns of various hierarchies of mosques in urban areas, other than Makkah and Madinah, has been outlined in matrices (e), (f) and (g) of (Fig. 10). Matrix (e) indicates that due to the invasion and succession of automobile oriented gridiron pattern in the new towns in towns [4] of Saudi Arabia, the Friday mosques have started following a ubiquitous rather than a sporadic pattern of location as is clearly evident in the plans of Amir Fowaz Housing Project and the Jeddah Southern Public Housing Complex (Figs. 9-10). As compared to this, the traditional developments get reduced to sporadic pockets on the vast urban fabric. As a consequence, the local mosques loose their ubiquitous locational character and look like sporadic clusters within the confines of traditionally developed areas. The reversal of locational tendencies of local and Friday mosques has led to a situation wherein the number of Friday mosques have exceeded the number of local mosques as indicated in (Fig. 8). With the exception of Riyadh, the main or city mosque does not exist in the urban areas of Saudi Arabia as explained in the earlier part of this section dealing with the traditional pattern (Fig. 11a). As regards Eid mosques both the primate and unitary locations patterns are prevalent in Saudi urban areas, depending on their size. For instance, according to appendix 1, in 70% of the urban areas with a population of more than 50,000, the location pattern is primate, viz., the number of Eid mosques are more than one. Whereas, 70% of the urban areas with a population of less than 50,000 have only one Eid mosque or in other words the locational pattern is unitary.

Matrix (f) indicates that the newly developed areas on gridiron pattern, with high car ownership, generally show a complete absence of local mosques and the locational pattern of Friday mosques tend to be sporadic because of bigger and bigger mosques. As Saudi Arabia continues its journey towards an urban society the physical development pattern would progressively get transformed into aggregative and diffusive patterns. This transformation will continue to result in a predominance of Friday mosques which will tend to be located sporadically, nevertheless, in the overall context there would still be some sporadic pockets of traditional areas with local mosques as indicated in matrix (g). The matrix also indicates that the Eid mosques will also get located sporadically due to the addition of bigger Friday mosques in urban corridors during the forthcoming diffusive urban development. The unitary and primate locational pattern of Eid Mosques will however continue to exist in the existing and the anticipated smaller urban areas. It may be pointed out that the village cluster centers of today are the anticipated urban areas of tomorrow. [15]

In addition to the aforementioned locational patterns of various hierarchical categories of mosques, three a-typical locational patterns of mosques are also emerging which need tailor made planning standards. Two of them are of diametrically opposite nature. The first category is becoming a part of a permanent skyline along the highways in the emerging complexes of gas stations at the macro level. These mosques, apart from catering round the year needs of the highway oriented traffic, are also serving the employees of gas station, restaurant(s) and other ancillary commercial establishments. The second category, which is usually found in commercial districts of urban areas and is traditionally known as *zawaya*. They emerge temporarily on the footpaths, service lanes and the parking lots in front of shops and restaurants, particularly for *Maghrib* and *Isha* prayers. The establishment and winding up of these instantaneous *zawaya* is quite a scene, viz., praying carpets are quickly

spread and public speaking system is installed by stretching a wire from a nearby commercial establishment. One of the employees acts as *Muazin* and *Imam*; and the original use of the place restored soon after the prayer. The third category pertains to the mosques in shopping malls and commercial districts, which have to cater to the need of a substantial number of "captive" women worshipers. These mosques will have to have a much higher provision for women worshipers.

The analysis of locational patterns of various hierarchies of mosques, carried out in the preceding paragraphs, leads to the conclusion that the relationship of forms and functions has completely been reversed due to the transformation of the contemporary gridiron pattern. While in the traditional pattern, physical form was following the human functions, in the gridiron development, human functions have to follow the physical form. As a consequence, the traditional hierarchy of mosques is fast disappearing and so are indeed, their humanized functions. With the evanescence of *zawyah* and local mosques, the informal human interaction in the transitional residential spaces is following the law of diminishing returns. At the highest level of the hierarchy of mosques, the locational patterns of Eid mosques are severally following unitary, primate and sporadic locational patterns depending on the size of urban areas and its physical development pattern, which has resulted in more Eid mosques in large urban areas. This, in a way, is good because, apart from making the human interaction less formal, these mosques have become more excessible and operationally more manageable. Besides, Eid prayers are held only twice a year and therefore their impact on the Muslim Society is not as great as that of local mosques, which are used five times a day.

A Normative Scenario

The forgoing analysis and synthesis makes it highly manifest that the gridiron and the traditional patterns of physical developments are diametrically opposite in nature, and symbolize two distinctly different sets of human activity systems. The former is best suited for formal and mechanized functions; whereas, the latter is highly informal and humane in its character and scale. Both the physical patterns, if used for their appropriate roles, become highly energy efficient and humane. Nevertheless, the two patterns are basically incompatible and unless regulated through public land-use controls, tend to transform the other, depending on the supremacy of human culture or the culture of the automobile. The empirical evidence of both types of transformations in the physical pattern is available in the literature dealing with the Arab-Muslim City. The transformation of highly structured gridiron plans of Damascus and Allepo into organic plans during the Muslim period provides one extreme example [16, p. 217]. The Saudi cities present the other extreme example. Due to the supremacy of automobile in Saudi Arabia, the gridiron pattern appears to have been institutionalized [17] at all hierarchical levels.

Gridiron pattern appears to be energy efficient at the metropolitan, regional and national levels, because it is automobile oriented and facilitates higher speeds. It also provides energy efficient national/regional grids for the infrastructural trunk services, and in addition affords the desired flexibility for macro level spatial development, as it is capable of accommodating the nodal, aggregative and diffusive stages of urbanization. The situation at the local level is however, just the reverse. At this level, the gridiron pattern not only leads to phenomenal wastage of energy over a long period of time, but is also anti-cultural as it is out of proportion with the human scale and changes the functional relationship between various human activity systems. This is clearly borne out by the fact that in residential areas with gridiron patterns, the traditional hierarchy of mosques has been reversed. Implications

of this reversal are far reaching. Due to relatively larger distances involved, people prefer to use automobiles rather than walking to the mosque. With the result that human interaction becomes mechanical and the human energy remains untapped which eventually manifests itself in the increasing incidence of diabetes, blood pressures and heart attacks!

The traditional pattern calls for larger number of smaller mosques within walking distances and implies that "small is beautiful". It is conducive to intimate human interaction, leads to optimum utilization of space and is, therefore energy efficient. As compared to this, the automobile oriented gridiron pattern calls for "bigger is better" philosophy which obviously leads to larger number of bigger Friday mosques and involve high consumption of energy due to high cost of air conditioning the large spaces and excessive use of automobile. Also, with the exception of Friday prayers, these mosques are grossly under utilized.

Saudi Arabia direly needs a diversification of its universally adopted gridiron pattern of physical development in order to achieve the desired integrative social interaction and optimum utilization of physical and energy resources. According to this conceptualization, the gridiron pattern would lead to the desired results at the regional and national levels. At the city and metropolitan levels, the formal gridiron pattern will need to get transformed into semi-grid pattern to provide for further differentiation into traditional pattern at the sub-neighborhood and neighborhood levels. In other words, the semi-grid pattern will act as a bridge between the traditional and contemporary pattern which are, respectively, best suited for informal human interaction, efficient utilization of energy and physical resources at the lowest and the higher levels of the spatial hierarchy. In fact some successful attempts have already been made in this direction. The Planned Unit Development (PUD) of the Ministry of Foreign Affairs and the Diplomatic Quarters in Riyadh, and the residential districts in the new industrial towns of Jubail and Yanbu are some of the examples in sight.

Conclusions and Recommendations

In summing up, it may be mentioned that this study did not find any empirical evidence in the urban areas of Saudi Arabia for the Planning Standards of Mosques suggested in DMTP's manual. The suggested standards are rather arbitrary because they neither take into account the physical development and its density of development nor the demographic and socioeconomic characteristics of the people of different urban areas. As a consequence, the walking distances without reference to the density and pattern of development, and the fixed percentages of eligible male worshipers in isolation of the age and sex composition of the inhabitants of different urban areas appear to be a hypothetical exercise.

The study further reveals that the planning standards and design criteria for mosques are of highly dynamic nature and change differentially in various urban centers depending on their socioeconomic, demographic and physical development patterns. These standards therefore call for "tailored" rather than "ready to wear" solutions. It may also be emphasized that according to the Islamic ideology the traditional hierarchy of mosques is extremely purposeful as it moulds and augments an "Islamic order". The traditional hierarchy initiates a hierarchic set of social interactions, ranging from most informal and personalized to formal; and brings about centers of dissemination of knowledge ranging from elemental to sophisticated and advanced. It is, therefore highly imperative that efforts should be made to restore the loosing and the lost traditional hierarchy of mosques, and their multifunctional uses, such as cultural, social and educational functions, on a sustained basis rather than restricting their use only for prayers.

There are latent and expressed tendencies working for and against the continuation of traditional hierarchy of mosques and its blended socio cultural uses. The tendencies working against the continuation of the traditional hierarchy are very forceful. For instance, some of the most potent factors which have reversed and even brought to extinction the traditional pattern, is the infusion of automobile oriented gridiron pattern; secular and pluralistic culture values; and the allocation of isolatory rather than integrated spaces for various social-cultural functions, such as social centers, conference halls, schools and reading rooms, etc. Whereas, the tendencies for the continuation of the traditional hierarchy of mosques are latent and weak; these tendencies have to be induced and augmented by capitalizing the potential of public and private sector.

Another major problem, which relates to the operational aspect of the mosques, is the dire need for their maintenance on a sustained basis. The lack of proper arrangements for the maintenance of mosques have perhaps also contributed to their restricted use for prayers only, viz., most of the mosques are opened little before '*Adan*' (call for prayers) and are locked soon after the last worshiper leaves the mosque.

As contended in this study, the planning and development of mosques depend on a number of factors, which lie in the public and private realms. Therefore, the achievement of the desired pattern and its multifunctional use, which not only best suits the religious, socio-cultural and educational needs of the people but is also cost effective, will require a number of concerted efforts by both the private as well as public sectors. Some of the salient facilitating ways and means may be cited as under:

1. The Deputy Ministry of Town Planning, Ministry of Municipal and Rural Affairs should formulate model sets of regulations for residential sub-divisions and planned unit developments (PUDs) which are pedestrian oriented and facilitate the development of the traditional hierarchy of mosques, along with an "enabling code" of planning standards for mosques rather than the "code" per se, providing guidelines for the municipalities to develop these standards in their own socio-physical context.
2. The various urban areas should undertake a comprehensive study of mosques in their areas of jurisdiction, identifying the existing deficiencies along with the potential locations for the various hierarchical units of mosques, including zawya mosques.
3. The potential of the private philanthropic sector should be capitalized in alleviating the distributional and hierarchic imbalances. The private sector should be advised and guided, on the basis on the basis of comprehensive studies, to construct mosques in areas which are deficient of certain categories of mosques rather than allowing them to construct mosques in areas where the provision is already adequate. It should also be emphasized on the private sector that bigger is not better in case of zawya and local mosques; and instead of constructing one huge mosque, they may construct two or three local or Zawya mosques. It should also be brought home to them that whereas building a mosque earns them a home in the heaven, [1, p. 150] its sustained use earns them a reward on a continuous basis (*Thawab-i-Jaria*).

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ديناميكية المعايير التخطيطية للمساجد في المملكة العربية السعودية

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ملخص البحث: تتناول الورقة نظام المساجد محاولة دراسة الأوجه البارزة لمعايير التخطيط في المملكة العربية السعودية من خلال أربعة خطوات متتابعة. أولا، تصف الورقة أبرز ملامح المقاييس التخطيطية القائمة في المملكة وتختبرها في ظل المقاييس الفراغية لهرمية المساجد في عدد من المناطق العمرانية. ثانيا، تحاول الورقة تقصي الأسباب الرئيسية التي تدعو إلى إدخال تغييرات في أنماط مواقع المساجد، وتقوم بتحليل مقارن لديناميكيات الأنماط الموقعية لعدد من الهرميات للمساجد في المملكة ضمن خلفية من الأنماط الموقعية التقليدية. ثالثا، تقترح الورقة نمط مناسب للتطوير الفيزيقي للمساجد. أخيرا، يلقي الباحث في الجزء الرابع أبرز النتائج والخلاصة من هذه الدراسة.