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The Impact of Spatial Organization on Locating the Friday Mosques in the Traditional Islamic City-The Old Mosul City as a Case Study

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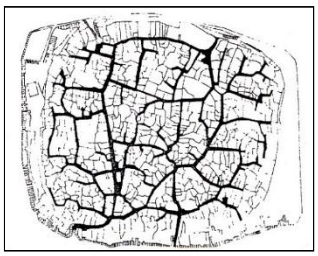
Graphical abstract



Abstract

Islamic city has its own character that distinguishes it from other urban environments. This is because it followed the Islamic ideology related to building the land. This led to that all cities built during early Islamic ages had followed the same principles in any part of the Islamic world. It is argued that the characteristics of the urban space configuration have a big role in making these cities successful environments. The key aspect in this matter is the distribution of land uses within the urban structure as it is directly associated with people movement and the distribution of their activities. The Friday mosques as the most important components of the Islamic city was located in a way that gave the city its own character. This study supposes that the distribution of the Friday mosques was affected by the way in which the urban space was configured. It aimed to find out to what extent this configuration influenced locating the Friday mosques in the urban fabric. Using space syntax as an analytical technique and the Old Mosul city as a case study, this research analyzed the spatial structure against several spatial characteristics with mosques locations to meet its goal.

Keywords: Islamic city; spatial organization; Friday mosques; Mosul

■1.0 INTRODUCTION

The physical configuration of a built environment consists of essential components such as activity areas, spaces, masses, and circulation systems. The good organization of those elements including the appropriate locating and the logic distribution is a significant goal of the planners and urban designers to create successful built environments [1].

Islamic cities include the cities belonging to the Islamic civilization. Given the continuous debate about what the term (Islamic city) means, the procedural definition of this term for this study was determined as 'all traditional cities that were built or modified during the early Islamic centuries'. Spatial organization of the Islamic city has given it the ability to control its social environment through the integration between the physical and social environments. According to Rapoport [2], spatial organization of a built environment is defined as the organization of the physical variables represented by linkage relations between urban spaces. It is, he added, the most significant aspect of the built environment design where the elements are organized according to it. Thus, the relations between people and physical elements are deemed spatial relationships resulting from the nature of the environment physical structure. It is also an organization of the relationship between masses and spaces surrounding them.

There are two ideas related to the spatial organization. The first is the (affordances of the environment) representing the features that the physical environment owns allowing a specific behavior to occur. While the second is the potential forces (motivations and needs) that direct people to take their needs [3]. As for the traditional Islamic city, the two ideas are integrated with one another to create a distinctive spatial structure. Actually, this is attributed to the integration between physical components depending on the principle of mixed land use [1]. As the Friday/collective mosques were the most important elements of the Islamic cities, they were located carefully in appropriate positions of the urban fabric [4]. The way in which pedestrian movement is distributed within the urban network can affect how urban uses are located. On the other hand, pedestrian movement is associated with the characteristics of the spatial structure such as legibility, connectivity and so on. This makes the continuous occupancy and movement in the space a significant factor in this issue. As a result, the spatial logic of an urban area reflects and affects the natural movement within this area [5].

1.2 Spatial Organization of the Traditional Islamic City

The structure of a built environment can reflect the relations between people and physical elements of this environment. It is argued that every city built during the Islamic era, had been following the same principles of all other Islamic cities in terms of planning and design [4].

Therefore, the spatial configuration was neither a result of advanced planning nor a spontaneous result, but a result of the interaction between the human and his environment. This is, in turn, affected by Islamic principles [6][1]. Since this interaction depends on spatial relations, the mutual relationship between masses and spaces of the built environment is a key factor. The urban structures of traditional Islamic cities belong to the notion of (Structure of Spaces), in which spaces seem as parts subtracted or sculptured from a huge mass forming outdoor rooms within the whole structure (Figure 1).

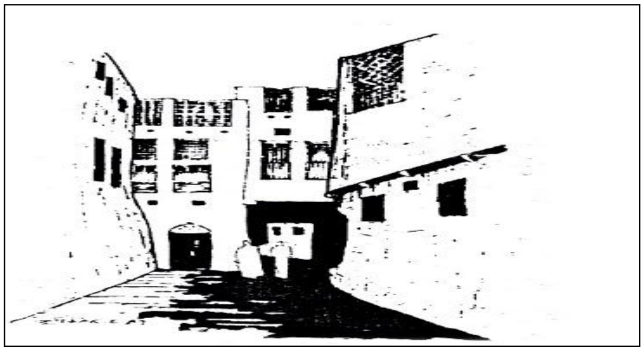


Figure 1 The urban space is well defined as an outdoor room *Source:* Ishteeaqe, Ellahi (1990)

Structures that refer to this notion consist of a structural continuous space working as a skeleton for the whole structure [7]. According to this concept, open spaces of the traditional Islamic city are able to give a positive sense of place to people. This is attributed to the fact that this spatial structure allows users to feel the sizes of the space as equivalent to the masses surrounding (Figure 2).

Figure 2 The parity between voids and masses–The traditional city of Sfax-Tunisia. *Source:* Alsamurra'ee, H. (1996)

Hence, urban spaces of the traditional Islamic cities, according to this notion, can work as linkages for the urban structure. These spaces, as a result, work as places for positive social interaction between people [6]. Actually, the physical components appear strongly linked with each other by a continuous urban space resulting in a coherent urban fabric (Figure 3).

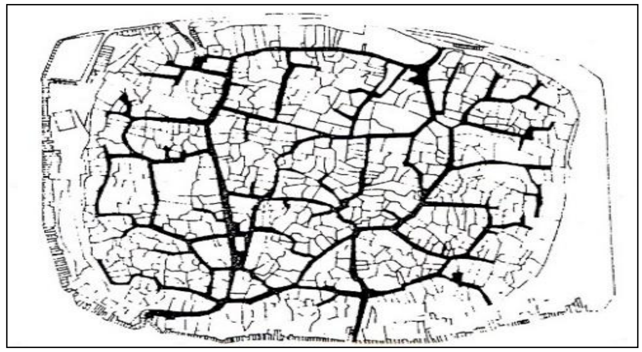


Figure 3 Continuous structure of spaces of the traditional Islamic city-Kirkuk old city-Iraq. *Source:* Alhafeed, M. (1989)

1.3 Friday Mosques and Spatial Structure of the Traditional Islamic City

Friday mosques are the main or great mosques of any Islamic city, in which the Juma'a and Eid prayers are performed. In addition to the religious tasks, Friday mosques were the places for many other tasks for the Muslim society such as cultural and political activities particularly during the early Islamic ages [8]. Physically, the Friday mosques are considered the most important components of the urban fabric of any traditional Islamic city. They also have been the most notable and memorable landmarks as main architectural elements in the urban structures of these cities.

In the earliest Islamic age, there was one main Friday mosque in the Islamic city, which had been typically occupying the center of the urban fabric of the city (Figure 4). During the subsequent ages, Islamic cities have become containing numerous Friday mosques, in addition to the main one [8]. It was claimed that the locations of these mosques is related to the characteristics of the spaces surronding them and the activities these spaces contain. For instance, the main mosque was surrounded by rings of varied activities such as clean markets, houses and polluted markets respectively [1]. In addition, the majority of great mosques was located in the public areas of the city overlooking expansions of its paths [9][10].

According to Zaidan [11], the characteristics of urban spaces of the Islamic cities made them work as linkages and places at the same time. These two characteristics are influential factors in sensing and perceiving the space positively by people. Hillier [12] attributed this case to the theory of the natural movement where the spatial configuration works as a generator of pedestrian movement. This is called the theory of (natural movement). On the other hand, buildings with their functions have the ability to encourage people to move towards them in different degrees of attractiveness. This case, according to Hillier [12], refers to the (Attraction theory). Among the most prominent goals of this theory is to change the sizes of pedestrian ways to fit the degree of buildings attraction. Hence, the characteristics of the spatial structure have a significant impact on the distribution of land uses (as attractive places) within the urban environment [5]. They added that this interpretation is achieved according to the functional logic of the traditional organic structures. In fact, this strongly applies to the traditional urban environments of the Islamic cities.

Therefore, this study tried research how Friday mosques, as important (attractive points), were distributed within the spatial structure of the city. This was done by examining the locations of the mosques against a set of characteristics of the spatial organization.

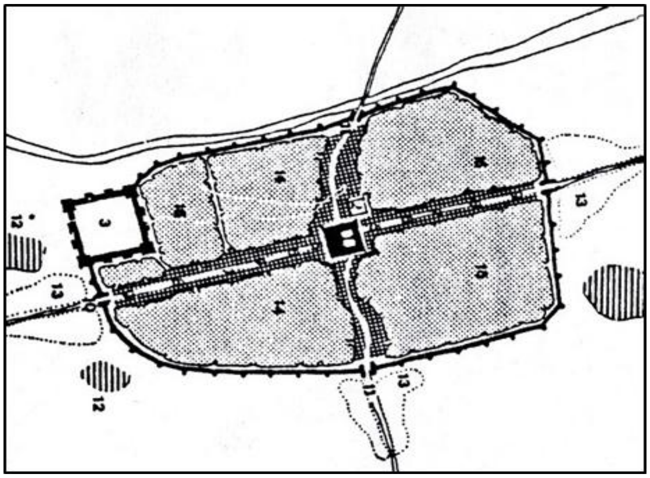


Figure 4 The main collective mosque within the urban fabric of the Islamic city. *Source:* Al-sayyad (1991)

2.0 RESEARCH METHOD

In order to meet its goal, this research employed the Space Syntax indicators in theory and practice. Space syntax was used because it is an objective analytical technique for urban systems connecting the physical and social variables. It was used by many researches on built environment analysis, especially the traditional ones. The spatial structure of the case study was analyzed using Space Syntax technique, while the results were interpreted according to the social logic of Space syntax theory.

Numerous structural characteristics were calculated for the case study spatial structure including connectivity, integration, choice as well as global and local control. This was done by using the axial map method, which space syntax depends on to express open spaces for spatial systems. Then, the cores of the spatial system in relation to every structural characteristic are determined as indicators to express the local and global characteristics for the system as a whole. According to Space Syntax, the core of a structural characteristic for the case study was assigned as the ratio of 25 percent of the whole number of axial spaces that have the highest values of this characteristic.

A graphical representation was used to find out the correlation between the spatial characteristics cores and the collective mosques of the case study system.

2.1 Case Study

The case study chosen for this research is the Old Mosul city, which is located at the western north part of Iraq, on the western bank of Tigris River. The city has ancient historical roots where Muslims opened the city in 16 AH/637AD. Then, they modified its planning according to the Islamic strategy. A wall with nine gates surrounds this traditional city. Inside the wall, there are many types of buildings such as mosques, schools, public paths, markets as well as residential areas [13] (Figure 5). There are winding and twisted paths linking the physical components with each other forming a continuous connected organic spatial structure. It has a unique organic spatial structure reflecting the character of the traditional Islamic city (Figure 6). As mosques was the most important buildings for any Islamic city, Mosul traditional city has its main collective mosque called Al-Nouri Great Mosque in addition to many other collective mosques. The number of those mosques is (20) collective mosques, which were studied in this paper (Figure 5). These mosques were encoded by giving them numbers from 1 to 20, as in Table 1.

This city was chosen as a case study for this research as it meets the following criteria.

1. Owns its original urban fabric whose original construction belongs to the early Islamic eras.
2. The availability of legible plans of the city, which should refer, at least, to the beginning of twentieth century.
3. The majority of its urban fabric has been protected from great changing or modifying over the ages.

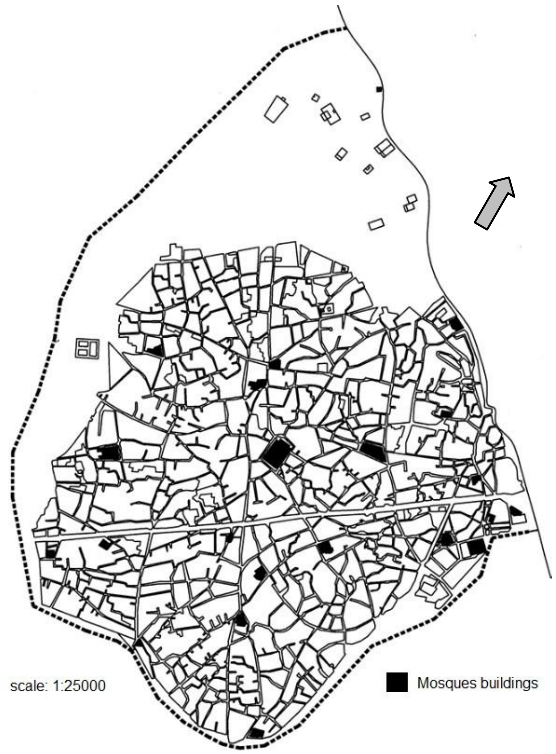


Figure 5 Plan of Old Mosul city 1918. *Source:* Mosul municipality-

Figure 6 Spatial structure of Old Mosul city. *Source:* Authors

Table 1 Collective mosques with their codes

Mosque	Code	Mosque	Code
Al-Shahwan	1	Al-Basha	11
Sulaiman bak	2	Al-Nu'manyya	12
Sultan Owais	3	Al-Rab'yya	13
Al-Musaffi	4	Al-Mahmoudain	14
Al-Nouri	5	Ali Alhadi	15
Al-Nabi Jarjees	6	Al-Muta'afi	16
Hammu alkaddu	7	Omar Al-Aswad	17
Al-Aghawaat	8	Al-Zaiwani	18
Suoq Al-alwa	9	Al-Omaryya	19
Shaikh Abdal	10	Ai-Oqaidat	20

■3.0 RESULTS AND DISCUSSION

3.1 Axial Map

It is a graphical method that the space syntax technique depends on it to express the open spatial structure. The axial map consists of the fewest and longest axial lines, which represent the straight visual-kinetic steps for any point of the system in one dimension[14][15]. The axial map of the case study showed that its spatial structure consists of (1120) axial spaces (Figure 7).

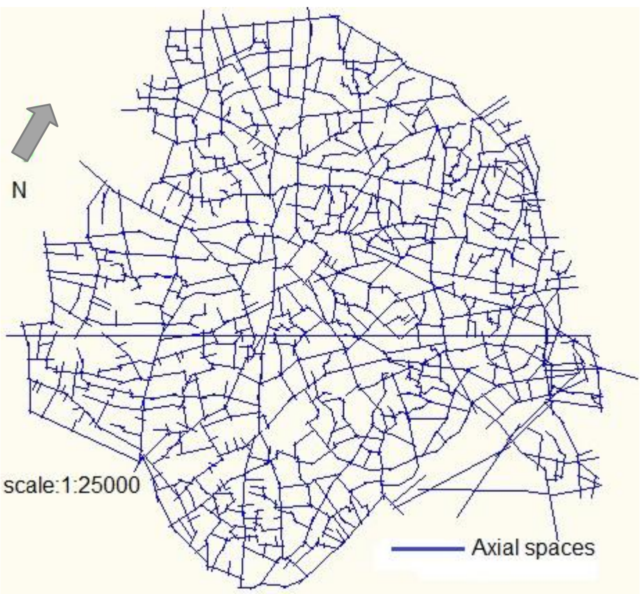


Figure 7 Axial map of the Old Mosul city. *Source:* Authors

3.2 Results Related to the Characteristics of Spatial Organization and Their Structural Cores

This analysis was conducted according to Space syntax technique depending on the structural analysis for the relations between the elements of the spatial system [16]. According to them, this analysis is done in two levels: local and global.

3.2.1 Global Characteristics

Refer to the attributes related to the relations of a space with all other spaces in the system including two characteristics, namely integration and choice [15]. The results of analyzing the global characteristics and their structural cores for the case study spatial system are as follows.

Integration Attribute

Integration attribute refers to the relative depth of a space in relation to other spaces in the axial map measuring the complexity of routes within an urban area [15]. Integration value indicates the extent of accessibility of a space as an area for directing the movement from all spaces in the system. The integration degree for a space can be calculated according to the following steps [11]:

1. Calculating the (depth mean) of the space by the Equation (1):

$MD = \sum D_k /k\text{-}1$ ----------- (1)

Where:

MD: depth mean of the space.
D: The number of the axial steps separating the space from any other space in the system.
K: The number of axial spaces in the system.

2. Calculating the (relative asymmetry) through the Equation (2):

$RA = 2\,(MD - 1)/k\text{-}2$ ------------ (2)

Where:

RA: Relative asymmetry
MD: Depth mean of the space
k: The number of axial spaces in the system

3. Calculating the (Real Relative Asymmetry) According to Equation (3):

$RRA = RA/Dk$ ----------- (3)

Where:

RRA: Degree of real relative asymmetry
RA: Relative asymmetry
Dk: Degree of real relative asymmetry in the diamond-shaped depth map
k: The number of axial spaces in the system

Actually, the degree of real relative asymmetry expresses the value of integration. Its values are ranging about the value of (1). While the values above (1) refer to the most isolated spaces, the values under (1) refer to the most integrated spaces of the system [14][12].

According to the analysis, the average of integration values of the case study spaces was (1.28), which indicates that the majority of spaces in the system suffers a lack of integration. As mentioned earlier, the integration core consists of the spaces with the highest values of integration degree forming a ratio of 25% of all spaces. Figure (8) shows the integration core and its relations with Friday mosques of the case study. The average of integration core was (0.92). Of the full number of mosques, (17) mosques were connected with the axes of integration core with a proportion of (85%) as shown in Table (2). This means that the majority of collective mosques in the spatial structure of the case study are located in integrated areas that represent the most global areas in the system. Since these areas are particularized for public uses in the system, they act as planes for non-residents movement.

Therefore, it can be said that the mosques are distributed in the areas that attract a heavy movement and social interaction in the system

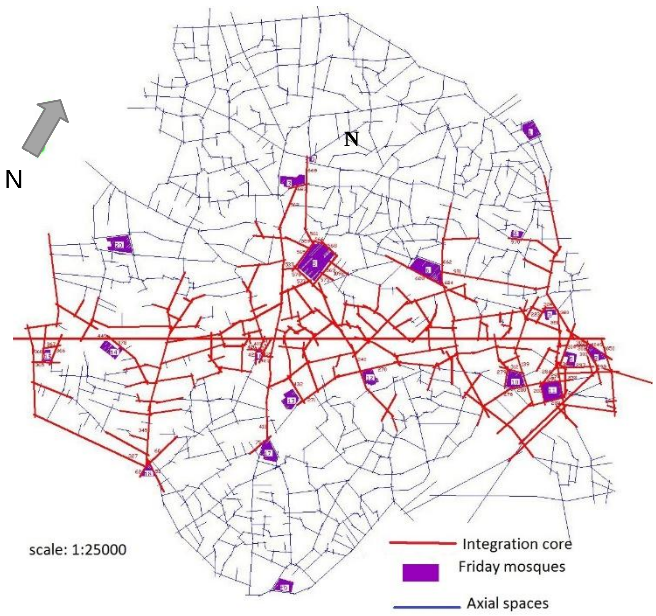


Figure 8 Integration core and the Friday mosques. *Source:* Authors

Table 2 linkage between integration core and mosques locations

Mosques	No. of adjacent axes	Mosques	No. of adjacent axes
1	-	11	6
2	1	12	2
3	3	13	2
4	1	14	2
5	11	15	4
6	4	16	7
7	5	17	2
8	6	18	5
9	9	19	-
10	5	20	-

Choice Attribute

Choice attribute indicates the control degree of a space on the permeability of the adjacent spaces. Therefore, it refers to the potential to pass through the space when using the shortest ways (axially and not metrically) linking two spaces in the system [17]. Choice attribute expresses the distribution of residents' global movement between system parts using the shortest paths. Choice values start from (zero) for one end-spaces (cul-de-sac) because they do not connect between two spaces [17][18].

Choice degree of a space can be calculated as follows:

$$CV = 2P / (k-1)(k-2) \times 100\% \text{ ------------ } (4)$$

Where:

CV: Choice degree of the space
P: The number of the shortest paths, which the space passes through them.
K: No. of the spaces in the system

The analysis showed that the average of choice degree for the case study was (1.26), while the average of choice core was (6.5). In terms of the relation with mosques locations, it was showed that there are (17) mosques are connected with one or more of choice core spaces (Figure 9). This number forms a ratio of (85%) of the full number of the mosques (Table 3). Therefore, it can be said that the locations of the collective mosques in the Old Mosul city were affected by the choice attribute. Hence, these mosques were located in the areas of high permeability for residents' movement attracting the high-density movement and the spontaneous encounters among people.

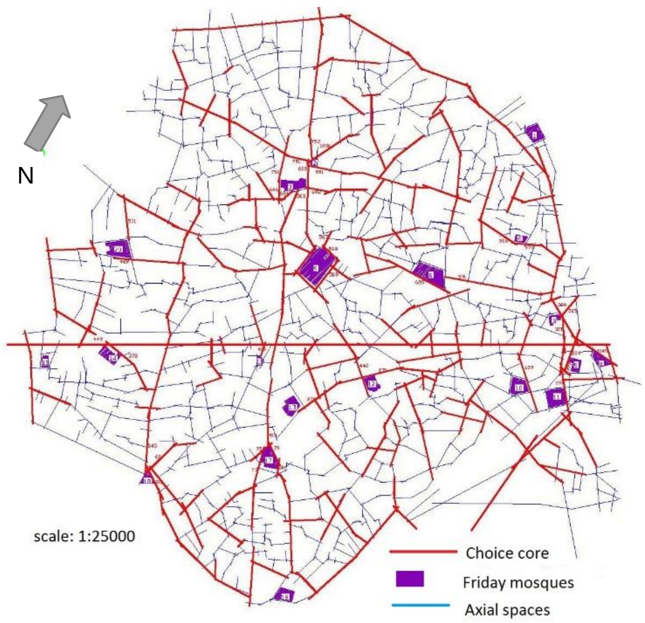


Figure 9 Choice core and the Friday mosques. *Source:* Authors

Table 3 linkage between choice core and mosques locations

Mosques	No. of adjacent axes	Mosques	No. of adjacent axes
1	-	11	1
2	5	12	2
3	6	13	1
4	2	14	2
5	9	15	-
6	2	16	2
7	3	17	6
8	2	18	3
9	2	19	-
10	1	20	2

3.2.2 Local Characteristics

Refer to the attributes related to space relations with its directly adjacent spaces in the system including two characteristics, namely connectivity and local control [16]. The results of analyzing the local characteristics and their structural cores for the case study spatial system are as follows

Local Control Attribute

Expresses the locality of a space within the spatial system indicating the degree of local choice provided by the space to move toward which from the adjacent spaces. In other words, this attribute refers to the spread of the local movement of residents and their daily fixed activities. It can be calculated through the following Equation [14]:

$$Er = \sum 1/cn$$

Where:

Er: local control of the space
Cn: axial linkages of the spaces linked to the space directly

Local control values range around the value of (1), where the spaces with values over (1) are high control spaces and the spaces with values under (1) are of weak control [14]. The average of local control values of case study's spatial structure was (1.95). The relationship with mosques locations showed that (18) mosques with a proportion of 90% were linked with one or more of the axes that form the local control core of the system (Figure 10). The relation between this core and the collective mosques was detailed in Table 4. From these results, it can be inferred that the majority of Friday mosques is located in the areas highly occupied by residents' local movement and the concentration of their fixed activities.

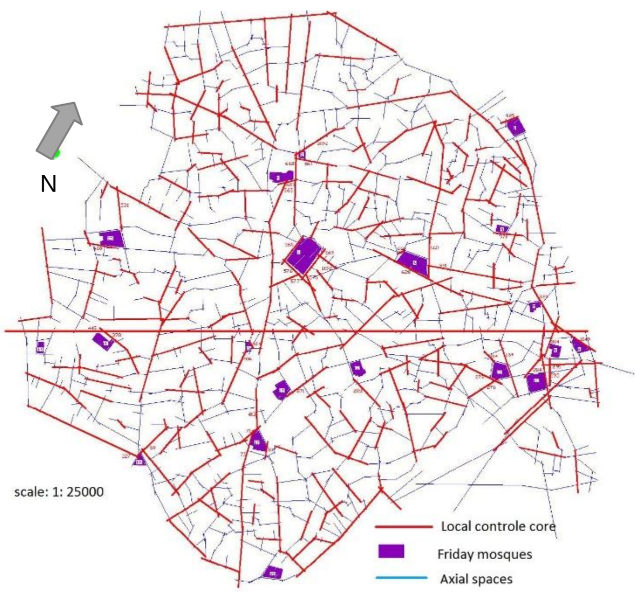


Figure 10 Local control core and the mosques. *Source:* Authors

Table 4 linkage between local control core and mosques locations

Mosques	No. of adjacent axes	Mosques	No. of adjacent axes
1	1	11	2
2	3	12	1
3	3	13	1
4	1	14	2
5	7	15	-
6	4	16	2
7	1	17	4
8	1	18	2
9	1	19	-
10	4	20	2

1. Connectivity Attribute

Connectivity represents the choice degree to move from a space to its directly adjacent spaces. Therefore, it indicates the measure of a space spread in relation to other spaces. Hence, connectivity degree represents the summation of the spaces linked directly with a specific space within a spatial system [19].

The results of the syntax analysis indicates that the spatial system of the case study recorded a connectivity average equaled to (3.25), while the average of connectivity core was (5.1). As for the correlation between locating the Friday mosques and connectivity core of the system, (18) mosques was connecting with the axes of this core consisting a ratio of 90% from the whole number (Figure 11). The details were disclosed in Table 5.

This shows that most of collective mosques correlate with the areas whose spaces have the highest values of connectivity in the system. This indicates the strength, cohesion and good definition of these areas. In addition, these areas enjoy a good movement and social interaction.

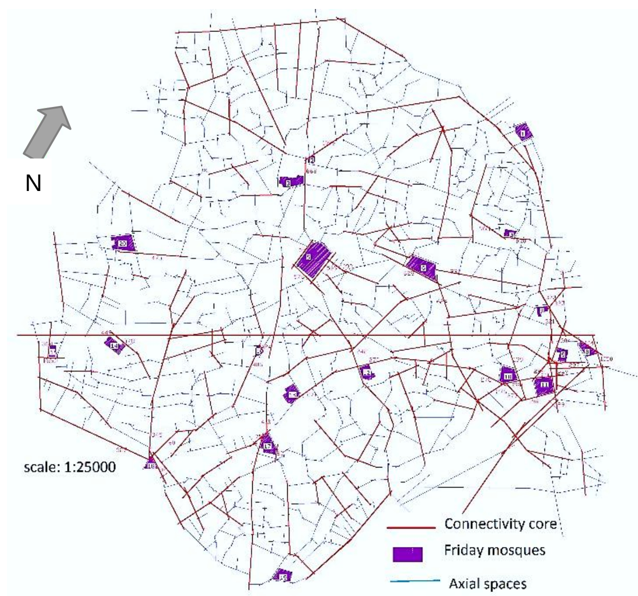


Figure 11 Connectivity core and the Friday mosques. *Source:* Authors

3.3 Results Related to the Local Areas of the Mosques

This section includes the results related to the delimitation of local areas of the collective mosques and the analysis of the structural characteristics of these areas. Local areas of the mosques in the case study area were delimitated by the specification of the axes directly connected with a mosque building, and then, the axes connected with this group. Hence, a local area consists of the axial spaces located one motive-visual step and two motive-visual step from the mosque building [16][20]. Hence, local areas would vary depending on the importance of the building within the spatial structure. Figure (12) shows the local areas of the mosques within the case study's spatial structure. Following are the results of the spatial characteristics of the local areas of the collective mosques buildings.

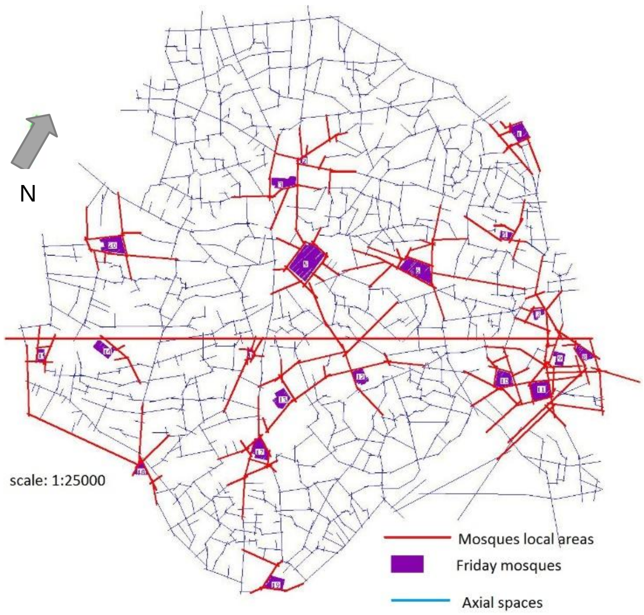


Figure 12 The local areas of the mosques. *Source***:** Authors

3.3.1 Global Attributes

Include two attributes, namely the integration and the choice.

Integration Attribute

The analysis showed that the average of integration degree of the mosques local areas for the case study was (0.96). The analysis also disclosed that (15) mosques of the total number of the mosques counted (20) forming a ratio (75%) were recorded with high values of integration degree. Table 6 indicates details of the integration values for mosques' local areas. This ratio indicates that the majority of mosques in the case study owns strong and public local areas. In addition, these areas are associating with public uses in the system accommodating a high incidence of interactions between people and representing as areas for outsiders' movement.

Table 6 Integration values for the local areas of the mosques

Mosques	Integration degree	Mosques	Integration degree
1	1.246	11	0.91
2	0.95	12	0.89
3	0.92	13	0.96
4	1.15	14	0.88
5	0.98	15	0.89
6	0.90	16	0.90
7	0.82	17	1.1
8	0.83	18	0.94
9	0.85	19	1.4
10	0.93	20	1.26
Average		**0.96**	

Choice Attribute

Choice results for mosques' local areas recorded a value of (4.33) as an average of this attribute. As mentioned above, choice value starts from (zero) for closed-end routes (cul-de-sac) and rises gradually for other types of routes. The analysis indicated that of (20) mosques there are (14) mosques forming a ratio of (70%) recorded high values of choice degree for their local areas (Table 7).

Table 7 **C**hoice values for the local areas of the mosques

Mosques	Choice degree	Mosques	Choice degree
1	1.14	11	2.4
2	5.53	12	4.9
3	7.03	13	1.07
4	0.79	14	12
5	5.9	15	7.8
6	2.9	16	0.53
7	7.8	17	2.5
8	9.0	18	4.79
9	7.15	19	0.74
10	0.66	20	1.8
Average		**4.33**	

In fact, these results indicate that the majority of mosques in the case study system owns local areas with high values of choice degree. This means that these areas have the shorter routes between system areas, which are used by the residents depending on their experiences. This can increase the activity in these areas within the spatial system, supporting the spontaneous encounters between people.

3.3.2 Local Attributes

Include two attributes, namely the local controle and the connectivity.

Local Control Attribute

This attribute recorded an average of (1.36) for the local areas of the mosques in the case study's spatial system. This average means that these areas enjoy high values of local control degree, if we know that the value of local control is considered high when it is higher than (1) and vice versa. This means that the local areas of mosques enjoy high occupation of local movement within the spatial structure. The analysis also showed that (85%) of the mosques in the case study own local areas with high degrees of local control (Table 8). Based on this ratio, it can be said that the local areas for most of the mosques show high directing and spread of resident's local movement and the concentration of their daily activities. In fact, this denotes that mosques have public and spreading local areas within the structure.

Table 8 Local control degree for the local areas of the mosques

Mosques	Local control degree	Mosques	No. of axes
1	1.136	11	1.25
2	1.04	12	1.4
3	1.2	13	1.25
4	0.99	14	2.7
5	1.126	15	1.92
6	1.1	16	0.87
7	1.68	17	1.34
8	1.97	18	1.5
9	1.6	19	0.97
10	1.1	20	1.116
Average		**1.36**	

Connectivity Attribute

The analysis of the local areas of the mosques recorded a connectivity average of (5.25), which expresses a high degree for the case study spatial system. This average is considered a high degree of connectivity indicating cohesive and defined areas within the spatial structure.

When we look at every mosque in the system, we find that there are (15) of (20) mosques owned high degrees of the connectivity for their local areas forming a proportion of (75%) of the total number of the mosques (Table 9). This ratio indicates that the majority of the mosques in the case study created local areas with high permeability and legibility within the structure. These characteristics can make these areas enjoy good vitality and attendance of people.

Table 9 Connectivity degree for the local areas of the mosques

Mosques	Connectivity degree	Mosques	Connectivity degree
1	3.11	11	6.5
2	3.44	12	5.1
3	3.7	13	4
4	3.5	14	10.4
5	3.64	15	8.12
6	4.35	16	3.2
7	7.3	17	4.46
8	8.4	18	5.5
9	8.7	19	3.33
10	5	20	3.6
Average		**5.25**	

3.4 Results of Analyzing the Linkages Between Structural Attributes

This analysis is related to the extent of the compatibility between the local and global characteristics of the spaces in the system. It was conducted by intersecting the cores of the characteristics of spatial organization and how the resulting cores are related to mosques' locating in the system. This includes global control core and global movement core.

3.4.1 Global Control Core

This core is formed by the intersection between the integration and the local control cores of the case study system. Hence, this core expresses the spaces owning a high degree of accessibility as areas that attract the movement from other spaces. These spaces refer to the structure of public spaces in which residents and non-residents surfaces are intersecting [17][14][21].

The analysis showed that there is a strong correlation between the spaces of global control core and mosques located in the case study. It was recorded that (16) mosques are connecting with the axes of global control core forming a ratio of (80%) of all mosques (Figure.13). Table 10 shows the number of core axes linked with the mosques buildings.

These results indicate that the locations of the majority of mosques in the system correlated with the most public spaces that control the movement of residents and non- residents with their activities. A high occupancy and a heavy movement also characterize these areas.

3.4.2 Global Movement Core

Global movement core results from the intersection between integration and choice cores in a spatial system. Therefore, its spaces enjoy a high degree of accessibility as areas for directing the global movement toward and across them [17][21]

As in Figure 14, the analysis of the relations with mosques locations showed that (16) of (20) mosques have correlations with this core spaces forming (80%) of the all mosques.

Table 11 discloses the number of the core axes linked with the mosques. Depending on these results, it can be said that the locations of most mosques are associated with the most public spaces having the greatest permeability. These spaces are accessed more by the non-residents people and, at the same time, they represent the shortest ways for residents' daily movement.

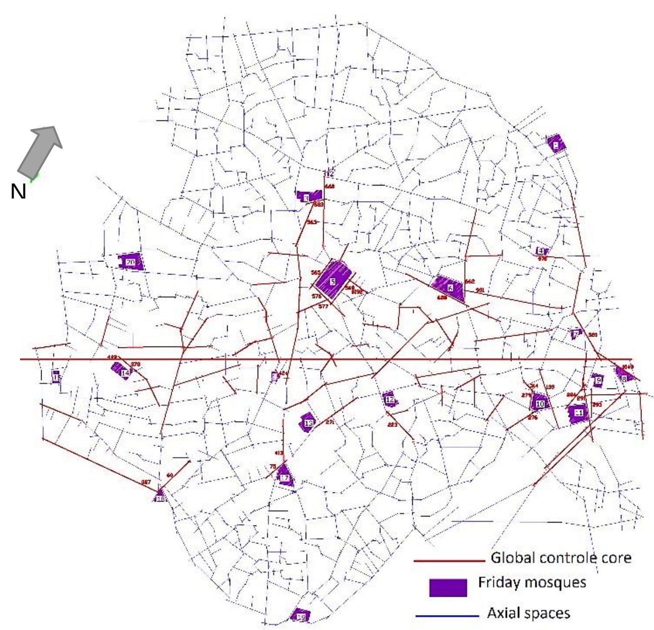


Figure 13 Global control core and the mosques. *Source:* Authors

Table 10 Linkage between global control core and mosques locations

Mosques	No. of adjacent axes	Mosques	No. of adjacent axes
1	-	11	1
2	1	12	2
3	3	13	1
4	1	14	2
5	10	15	-
6	2	16	1
7	2	17	2
8	2	18	3
9	2	19	-
10	1	20	-

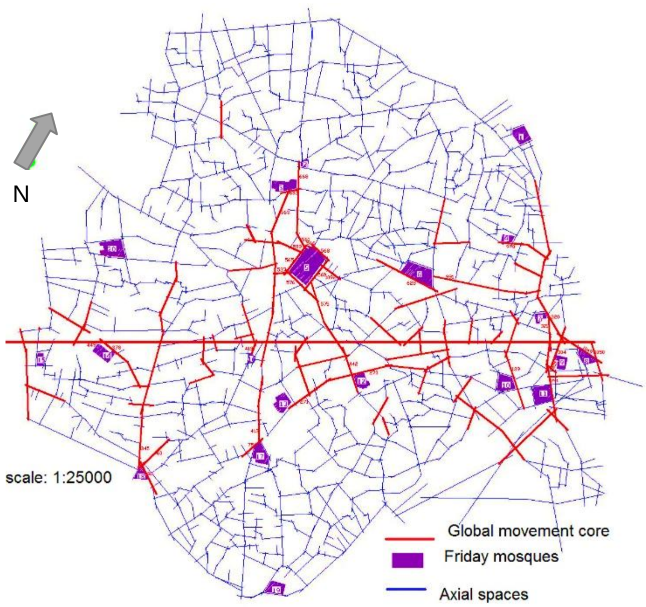


Figure 14 Global movement core and the mosques. *Source:* Authors

Table 11 Linkage between global movement core and mosques locations

Mosques	No. of adjacent axes	Mosques	No. of adjacent axes
1	-	11	1
2	1	12	2
3	3	13	1
4	1	14	2
5	10	15	-
6	2	16	1
7	2	17	2
8	2	18	3
9	2	19	-
10	1	20	-

3.4.3 Mosques Core

For further analysis to find out how the mosques were located in relation to the spatial organization characteristics, an intersection between the cores of global control and global movement were conducted. In fact, this step of the analysis is important to understand to what extent the Friday mosques are correlated with the spaces that enjoy the highest values of all the spatial organization characteristics of the system.

The common spaces between those cores form a new core having all of the important characteristics of spatial organization. This core includes the axes of local and global movement for residential and non-residential people equally, representing the most public spaces. The analysis showed that this new core represents as a link connecting the mosques in the system, spatially and functionally.

The analysis showed that this core is represented by a main straight axis extended along the spatial system with many secondary axes branching out from it. A group of (16) mosques forming (80%) of the total number of the mosques were correlated with axes of this core (Figure 15) and (Table 12).Thus, the majority of Friday mosques was spatially tied by a network of unique axes that enjoy the highest values of all spatial organization characteristics. For this reason, it is appropriate for this study to name this core (The mosques core).

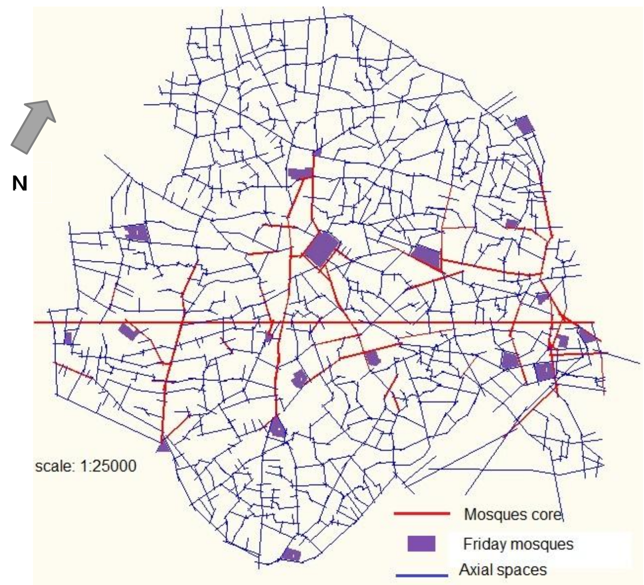


Figure 15 Linkage between mosques core and mosques buildings *Source:* Researchers

Table 12 Linkage between global movement core and mosques locations

Mosques	No. of adjacent axes	Mosques	No. of adjacent axes
1	-	11	1
2	1	12	2
3	3	13	1
4	1	14	2
5	7	15	-
6	3	16	2
7	2	17	2
8	1	18	2
9	2	19	-
10	1	20	-

4.0 CONCLUSION

This research proved in an objective method one of the numerous important aspects that enjoyed by the Islamic city. This aspect is related to the way in which the great (Friday) mosques were located in relation to the spatial structure of the city. It tried to find out to what extent the locating process was affected by the spatial organization characteristics of the city. It also aimed to find out how these mosques affect the spatial attributes of the system areas and how they are tied together spatially.

Since all traditional cities built during the early Islamic era had followed Islamic principles related to establishing and building cities[4], there is a considerable similarity of their physical and spatial structures. Therefore, it can be said that the results of this study can applies to the majority of traditional Islamic cities.

It was proved by the study that the Friday mosques of the Islamic city did not located or distributed randomly or arbitrarily within the urban fabric. However, they were located according to a unique planning process considering the features of a city's spatial structure.

Actually, this could be attributed to the great significance of the mosques for the Muslim society life.

This study found a considerable association between mosques locations and the characteristics of the spatial organization. The majority of those mosques were located within the cores of the spatial characteristics including the global attributes (integration and choice) and the local attributes (local control and connectivity) of the case study.

Conversely, the mosques have an impact on their local areas extending to two spatial (visual-motive) steps from the mosque building. These local areas owned higher degrees of all spatial characteristics namely, integration, choice, local control and connectivity. These attributes allowed a certain social status to occur within those areas. They also encouraged the social interaction in these areas making them more public and vital. As a result, these local areas had the potential to be available for residents and non-residents. Actually, these features reflect the efficiency of the Islamic spatial systems that meet the integration between the physical and social requirements of a system.

As a result, it was inferred that the Friday mosques are spatially tied with each other through a strong spatial core resulted from the intersection between the important structural characteristics cores in the system. It consists of a network of spaces owning the highest values of all the important characteristics of spatial organization of the system. This network forms the principal spatial core for the city attracting the local and global movement of the both residents and non-residents simultaneously. Therefore, it has been termed (The Mosques core) for this study.

Based on these findings, it is obvious that the traditional Islamic city with its unique spatial organization has respected the needs of the users and the locations of their activities. This was represented by carefully locating the mosques considering the features of the spatial structure to conduct this process. In other words, there is a mutual relationship between the distribution of society activities and the characteristics of spatial structure resulting in a vital built environment.

Moreover, the findings of this study highlighted the importance of the urban space for the Islamic strategy to plan and design the urban environments. Therefore, although the organic nature of its urban fabric, the Islamic city was based on an accurate system of the planning and design.

Finally, this study found the possibility of using the characteristics of the spatial organization as effective indicators to study and analyze various spatial systems and correlate them with other design aspects.

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