



## Towards Sustainable Revitalization: The Public Squares Characteristics - Led the Adaptive Urban Revitalization Mechanisms

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### Abstract

The public square is a specifically designed urban space that includes many natural and formative elements that achieve communication among the main axes of the city and facilitate the movement of users through it. The public squares (PSs) in many cities, especially Baghdad, need to be revitalized. The Adaptive Urban Revitalization (AUR) strategy, which focuses on improving the quality of urban spaces for PSs to enhance their location, activity, and purpose, can be used for this revitalization. The result is a new space that is adaptive and convenient with regard to the sustainable revitalization of the contemporary city. The main research problem is how to make PSs attractive places for users. There is an absence of clear knowledge about the mechanisms of the AUR strategy, its relationship to the characteristics of PSs, and its influence on the revitalization process. Considering this problem, the main research goal is to reveal the characteristics of PSs as factors that affect the mechanisms of AUR and the role that these influences have in developing a clear approach to the AUR strategy to make PSs attractive places for users. This can be done by improving their conditions and promoting their use more effectively. To achieve this goal, the research will address improving the quality of urban spaces through the application of the AUR strategy. The focus is on addressing urban problems that have an effect on PSs, obtaining the indicators of AUR, applying them to the selected case studies and testing them mathematically. The results of the research produced a clear approach with regard to utilizing the strategy of AUR in PSs. It examined all mechanisms represented by Urban Response, Urban Accessibility, and Dynamic Activities. The results showed a positive relationship of these mechanisms on the characteristics of PSs.

**Keywords:** Adoptive Urban Revitalization; Public Squares; Urban Response; Urban Accessibility; Dynamic Activities.

### 1. Introduction

PSs are open urban spaces intended for public use. It is one of the forms of urban space. These spaces represent a subset of larger and more public spaces, which is known as the network of urban spaces within a city. The squares perform public social activities and serve as a focal point [1–3]. PSs are symbolic spaces for city inhabitants and express the development of society. They also contribute to expressing social differences [4]. The squares, according to urban designers, are places that important buildings in the city are organized around and demonstrate the aesthetic values of these buildings [1, 5]. PSs differ from one place to another according to the nature and privacy of the community, which in turn affects the structure, formation, and details of these vital spaces within the city [6]. Urban PSs reflect an image of bonding social relationships [7]. The PS represents the "focus of activity" in the midst of compact and dense urban areas, surrounded by closely connected streets [4, 8]. The importance of the square changes according to cultures, eras, and forms of social, political, cultural, and spatial life, as it forms an integrated part of urban life [4].

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On the physical level, the PSs were characterized by several characteristics, represented by: *The form of PSs*: the form of squares achieves inclusion and suspension through the facades of surrounding buildings all around the squares [9]. *Location, accessibility, and connectivity*: In traditional cities, PSs were located next to religious and public buildings in city centers. In contemporary cities, choosing the location of squares must offer easy access for users to those squares to achieve accessibility, as well as provide the connection between the axes of circulation [10]. *Size and Inclusion*: The most common way to determine the size of a square is by calculating the possible number of users. Researchers have put forward several criteria to determine the size of squares. The most important one is the ability of users to distinguish the people on the other side of the square as well as recognize where activities will take place [11]. When determining the size, the visual perception of the square, the height, and density of the surrounding buildings influence the perception of the square. Squares that are surrounded by tall and dense buildings may appear smaller than they are. A ratio that is between 1:2 and 1.5:2 with regards to the height of the building and the urban space creates a highly inclusive and visually pleasing area. Edges are also important in the perception of urban squares [1]. *Activities*: PSs are places for various activities that are very helpful for social cohesion and communication between users. The squares must be designed to include different types of activities and users, the size and location of the square also affect the activities of the PS. For example, we find that large squares close to government buildings are preferentially used for protests or national celebrations, while squares that are near commercial centers are mainly used as meeting points, performing arts venues, or marketplaces. However, activities aim to attract people, so they should not dominate the character of the square [5, 12–14]. *Focal point elements*: focal point elements are useful to attract users, organize axes, and contribute to the formation of the identity and image of the square. A focal point can be created using any designed element (such as a fountain, sculpture, or statue), and these elements can occupy the surrounding parts of the square or pedestrian roads nearby. However, theorists have emphasized that the center of the square should remain empty [1, 15]. PSs in Baghdad were subjected to several influences and variables at the urban level, which have affected them as spaces that contribute to place-making and attract users [16]. This influenced spatial behavior and created a loss of identity and social interaction in these spaces, which consequently lowered the quality of social life [17].

One of the most important problems with squares in Baghdad is the division of the PSs into smaller spaces. This led to changes in the shape and size of the square. Weakness in the inclusion of urban space for activities and users came as a result of neglecting the urban context of the squares. The absence of spatial communication between the squares and surrounding buildings has caused the isolation of the square from its urban neighborhood and the loss of the urban and spatial identity of squares within the city structure [18]. All the above required a strategy that adaptively dealt with problems to restore life to PSs. The AUR strategy is an effective strategy that focuses on urban spaces, especially PSs, and is concerned with making PSs attractive to users [19]. AUR is the continuous development of urban spaces on the physical and social levels and the interaction between them within the boundaries of the urban context. In order to achieve functional diversity and optimal use of urban spaces [20]. The AUR of PSs can be defined as making changes and improvements that enhance the interaction between the elements of the square and their interaction with the elements of the surrounding urban structure. In order to make PSs more attractive to their users, several mechanisms are utilized: Urban Response, Urban Accessibility, and Dynamic Activities.

The *Urban Response* aims to achieve integration between urban spaces and users. Urban spaces must serve the needs of the community by providing effective and active spaces that enhance community engagement [9, 21]. The urban response affected by the characteristics of PSs includes inclusion, volume, and focal point elements due to their impact on the integration of the square to contain activities, attract users, and achieve optimum energetic activities. These factors contribute to the visual identity of PSs [22]. *Urban Accessibility* is connected to improving the quality of urban life through its integration with accessibility networks, in order to achieve accessible spaces with circulation and visual continuity [23]. It includes the characteristics of accessibility, continuity of circulation, and the visual axes of the square. This affects the integration of the square within its urban surroundings and thus enhances social interaction [16]. Urban accessibility is affected by the surrounding pedestrian paths leading to the square and the way it is linked to the network of axes and squares in the city [22, 24]. *Dynamic Activities*: The identification of urban activities primarily depends on the compatibility of the square space within the spatial pattern and urban context. This, combined with the importance and flexibility of the activities, helps to create a dynamic and vibrant space [25]. The characteristics represented by the mixed activities have an impact on the creation of an attractive urban space that is functionally and socially successful [18, 26].

AUR in PSs can be defined as a new strategy, and its mechanisms include *urban response*, *urban accessibility*, and *dynamic activities*. These are applied when there is a need to change the state of the urban square to one that is livable, attractive to users, and suitable for the current city status from both an urban and social perspective, while maintaining the basic features of the PSs [27].

## 2. Literature Review

Many previous studies have already dealt with PSs, their importance, and methods to revive them. Studies focused on the structural and formal features and networks of public spaces, which include forms and functions, axial relationships, square boundaries, interactions, human presence, surroundings, and circulation paths. Other focal points

include enhancing the square's potential as a node, destination, and path by creating clear boundaries for the square and creating strong axes to achieve order and clarity in public spaces. They emphasized that spatial inclusion is a common characteristic of all successful squares. It can be achieved through the buildings or elements of urban spaces that surround them, which are used to organize and enhance the enclosure of squares [1, 9, 10, 12, 28]. This also creates a sense of increased inclusion when approaching the square boundary and a far from the center [29].

Some studies have focused on the methods and principles used when designing PSs, which are: shape, location, size of the square, activities held within, open spaces inside the square, furniture, and main central and focal point elements. The main aim of designing PSs is to create an identity and a sense of place, enhance the public image of the city, and thus encourage public use, communication, and social integration [9, 29].

Other studies have focused on the process of urban revitalization through the development of PSs that accommodate spatial arrangements as well as general recreational and social needs. The design of open spaces can provide "use possibilities" for many groups of users. The scope of activities in these spaces is wider than in the specific functional design spaces. Problems resulting from the lack of open spaces cannot be solved by the design process alone; however, other spatial resources in the area must be invested [30]. Achieving the quality of designing squares, according to the concept of place-making, is achieved through the principles of accessibility, connection, safety, security, justice, equality, diversity of uses, interaction, community participation, and confirmation of local identity [31]. Other studies focused on the urban revitalization of PSs by rearranging the main axes in the city, the public transport system, the density of the surrounding buildings, as well as its economic activity, and the development of its current capabilities [32].

Many studies have focused on revitalizing public spaces by adding innovative public activities to reveal the potential of these urban spaces in improving the environment of cities that suffer from problems at the urban level that affect the quality of life within them [33]. The process of urban revitalization mostly focuses on improving the current urban squares by analyzing and using the standards of public urban spaces and finding the most appropriate solutions to improve the general characteristics of urban squares, increase pedestrian access, and reduce car access to attract more people and thus improve urban life. The urban revitalization process generates interaction and cohesion within urban spaces (public spaces). This can be considered an effective tool for creating a more enjoyable social environment, which creates more sustainable and long-term solutions [34]. Urban revitalization is the process of implementing the spatial, social, and economic changes that are made in the urban space of the PSs. The aim is to transfer the urban space of the square from a state of stagnation to favorable conditions for development. This is achieved by taking advantage of its internal advantages and working to restore its functions. Urban spaces can be transformed into positive and attractive public spaces using the concept of planned and designed urban space [35].

By discussing the previous literature, the research arrived at several main points, which are:

- Most of the studies focused on the characteristics of PSs (size, focal point, accessibility, and activities) and on the importance of the spatial inclusion of the square space.
- Several studies have discussed the importance of the urban revitalization strategy for PSs, by adopting accessibility and environmental and functional design as a basis for the concept of place-making.
- There is a limited knowledge regarding the strategy of AUR and its mechanisms in transforming PSs into livable and attractive places for users.

The main research problem is the absence of clear knowledge about the mechanisms of the AUR strategy and its relationship to the characteristics of PSs. These characteristics are considered essential influences on the process of revitalization and making PSs attractive places for users.

### 3. Methods and Materials

In this section, the research will address the testing of the selected case study by adopting mathematical methods, to reveal the impact of the characteristics of PSs on the mechanisms of the adaptive urban revitalization strategy, Figure 1.

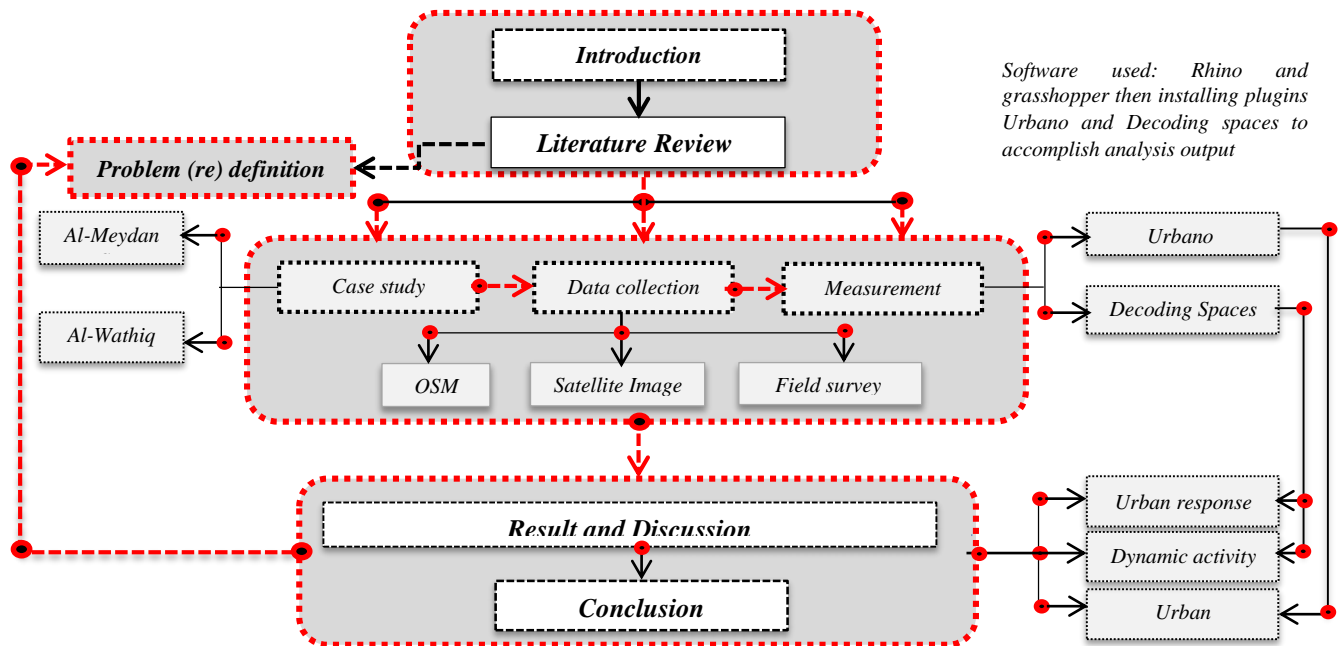
#### 3.1. The Case Study Selection

The research chose two PSs in Baghdad to achieve its aim:

**Al-Meydan Square:** is one of the most prominent squares in Baghdad. It is located within Al- Rusafa historical center, at the beginning of Al-Rasheed Street, close to the old Ministry of Defense and the National Library, surrounded by a number of historical buildings (Al- Abbasi Palace, House of Wisdom, Dar Al-Wali, and Al-Qashla) and number of historical mosques (Al-Muradiye Mosque, Al-Ahmadiyya Mosque, and Al-Haydar Khana Mosque).

**Al-Wathiq Square:** is located in Al- Karrada district, surrounded by a number of buildings with various activities (commercial centers - bank - restaurants). In the center of the square is the statue of Al- Caliph (Al-Wathiq). The square was rehabilitated through the initiative of (Alaq-Baghdad) (see Figure 2).





**Figure 1. Flowchart of the research methodology**



**Figure 2. The location of Al-Meydan and Al-Wathiq squares in Baghdad and the most important surrounding landmarks**

The two squares were chosen as a result of their exposure to several factors that affected the physical and social structure of the square:

- Weakness in the relationship between the squares and its surrounding buildings, which affected the square's inclusion and integration within its urban surroundings. In addition, the squares are free from focal points, which have less coherence within the urban context.

- Surrounding PSs with streets designated for cars, and turning parts of the PS into parking lots. In addition, the overlapping of car traffic with the pedestrian movement of the PS.
- Weakness in the connection between the activities surrounding the squares, which made the space unpleasant to the users. Neglecting the importance of green spaces in creating functionally and socially successful urban spaces.

### 3.2. Data Collection

- Field survey of the selected case study, and adoption of on-site observations through field visits.
- Preparing detailed plans based on: the satellite image, details of the site in OSM<sup>\*</sup>, and then visualizing the squares in 3D Masses using the Rhino program and processing the data using the Grasshopper program.

#### 3.2.1. Measuring Tools

For analyzing the indicators of AUR mechanism (Urban Response, Urban Accessibility, and Dynamic Activities), the research relied on (Tables 1 and 2):

**Urbano:** simulate the urban environment in an integrated context. It includes the analysis and study of urban activities, movement paths, and the analysis of (pedestrian, car, and bicycle) movement [36-38].

**Decoding Spaces Isovists:** Simulation program for urban environment. It includes analysing and studying the surroundings of urban spaces through studying the neighbouring buildings, facades and their influence. It also studies cohesion, movement, and diversity, as Decoding Spaces allows for the analysis of the urban context [39-40, 16].

**Table 1. The indicators of the PSs characters impact on the AUR mechanism**

AUR Mechanism		Square Characters	Indicators
Adoptive Urban Revitalization (AUR)	Urban Response	Volume	- Achieving a ratio (area of the yard to the height of the surrounding buildings) results should be around (1:2) and (1.5:2).
		Enclosure	- The compact context: The shape of the surrounding buildings and the edges of the square affect the enclosure of a square and positively affects PSs.
		Focal Point Effects	- The presence of monuments or artistic sculpture within the space of the square contributes to strengthening spatial belonging among users of PSs ( <i>focal point elements within the square</i> ).
			- The impacts of the historical and important buildings that surround the square as focal and influential points in the PSs ( <i>focal point elements surrounding the square</i> ).
	Urban Accessibility	Accessibility & Connectivity	- Pedestrian paths to the square and around it, while achieving continuity for those paths.
			- Accessibility from all directions to the PSs. And achieving kinetic and visual continuity.
	Dynamic Activities	PSs Functions	- The interdependence and variety of (cultural, commercial, governmental, economic, and residential) functions, placing them in the circumferences of the square space, and their compatibility with the place have a great impact on revitalizing a square.

**Table 2. The PSs characters impact on the AUR mechanism indicators and their measuring tools**

AUR Mechanism		Indicators	Measuring Tools		
Adoptive Urban Revitalization (AUR)	Urban Response	Volume indicators	Decoding Spaces	Isovists Field	
		Enclosure indicators	Decoding Spaces	Isovists Field	
		Focal Point Effects	focal point elements within the square	Decoding Spaces	Elongation
			focal point elements surround the square	Decoding Spaces	Isovists 3D Field
	Urban Accessibility	Pedestrian accessibility indicators		Urbano	Router
		Continuity indicators		Decoding Spaces	Visibility Mapping
	Dynamic Activities	PSs activities indicators		Urbano	Amenity Score

\* OSM: (Open Street Map) It is characterized by collecting details through aerial photographs and GPS technology and collecting information from users and updating it continuously.

## 4. Results and Discussion

The goal of the research was to reveal the characteristics of PSs as factors affecting the mechanisms of AUR and the roles of these influences in developing a clear approach make PSs attractive places for users. The research selected two case studies in Baghdad, Al-Meydan square and Al-Wathiq square (on Al-Rusafa side of the city) to measure the impact of the characteristics of each square on the mechanisms of AUR (Urban Response, Urban Accessibility, and Dynamic Activities). The results revealed the effect of the characteristics of the selected squares on the mechanisms of AUR.

### 4.1. Urban Response

In this section, the research will be measuring the effect of the size and inclusion of the surrounding buildings on the general context of the selected case study, as well as the buildings and monuments as focal points influencing the PSs.

*The impact of volume and inclusion on the PS:* the analysis of Al- Meydan square shows that the buildings adjacent to the square (Al-Ahmadiyya Mosque, the commercial buildings adjacent to the mosque towards Al-Rasheed Street, and parking), will have a high impact on the perimeter or borders of the square. This is due to the high compactness and cohesion of those buildings, and it will be less with the commercial buildings towards Bab Al-Moadam Bridge. The square achieved a high inclusion, due to the compactness of the surrounding buildings, as well as the ratio between the heights of the surrounding buildings to the space of the square equals to (1:2) (see Figure 3a). While the analysis of Al-Wathiq Square showed a weak effect of the buildings adjacent to the square within the urban context, which is due to the separation of the urban fabric surrounding the square. In addition, the ratio of the height of the buildings to the space of the square equals (0.5:2) (see Figure 3b).

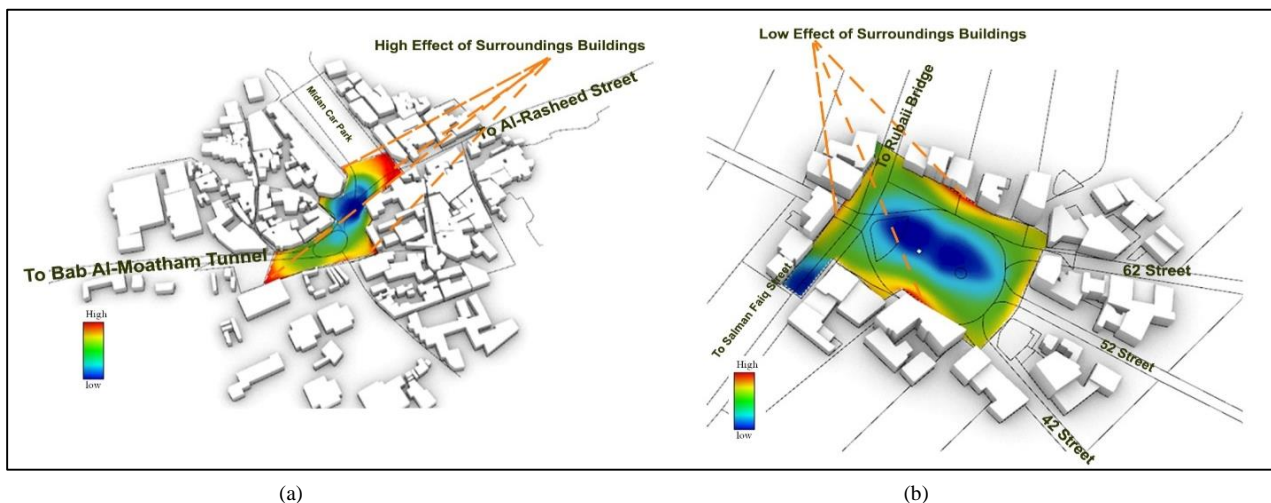
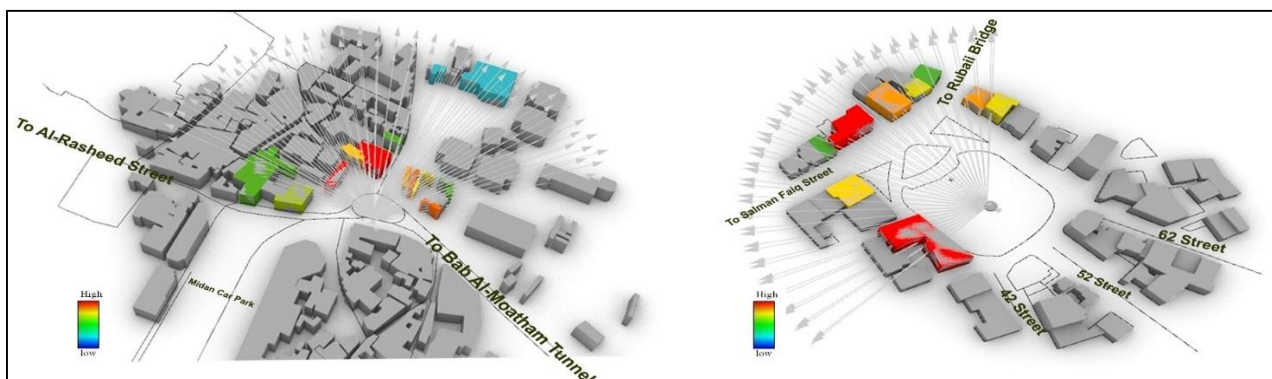


Figure 3. The impact of the surrounding buildings on the Inclusion in Al-Meydan and Al-Wathiq squares

*The impact of buildings and monuments as focal points:* The analysis in Al- Meydan square shows a great influence of the historical buildings, and their related activities (Al-Ahmadiyya Mosque and the souvenir sale markets), as well as the old Baghdad Governorate building on the square appealing. Al- Ahmadiyya Mosque achieved a high indicator as an influential focal point within the borders of the square (see Figure 4a). Al-Meydan Square recorded a weakness in the (Elongation) scale, because it does not contain any focal point within its space, which affected the attraction of the square (see Figure 5a).





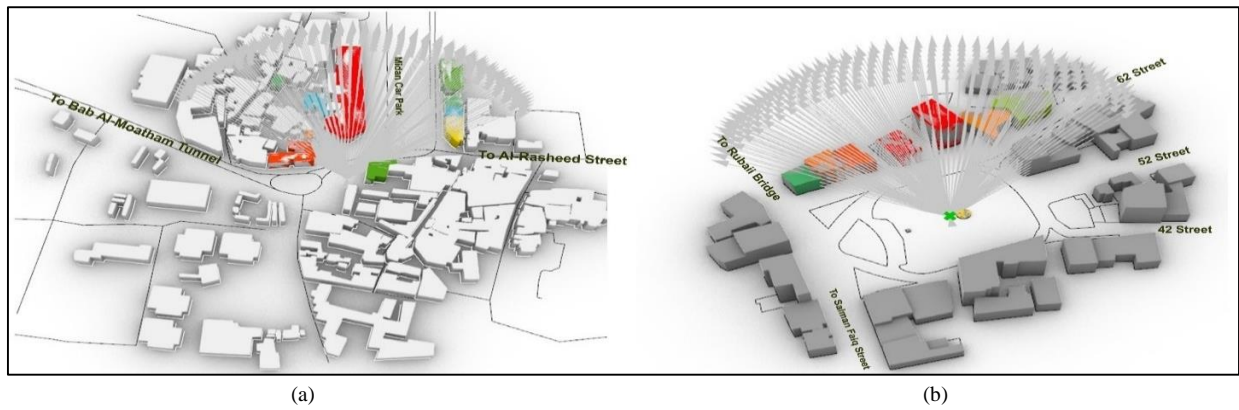


Figure 4. The impact of buildings that surrounding the squares as focal points in Al-Meydan and Al-Wathiq squares

From the analysis of Al-Wathiq Square, the research found that the buildings affecting the square are multi-story buildings, and its activities (commercial, administrative, and various activities) buildings towards Salman Faeq Street (see Figure 4b). In addition, there was a high influence of the focal elements within the space of the square, represented by the fountain element and (Al-Wathiq) monument (see Figure 5b).

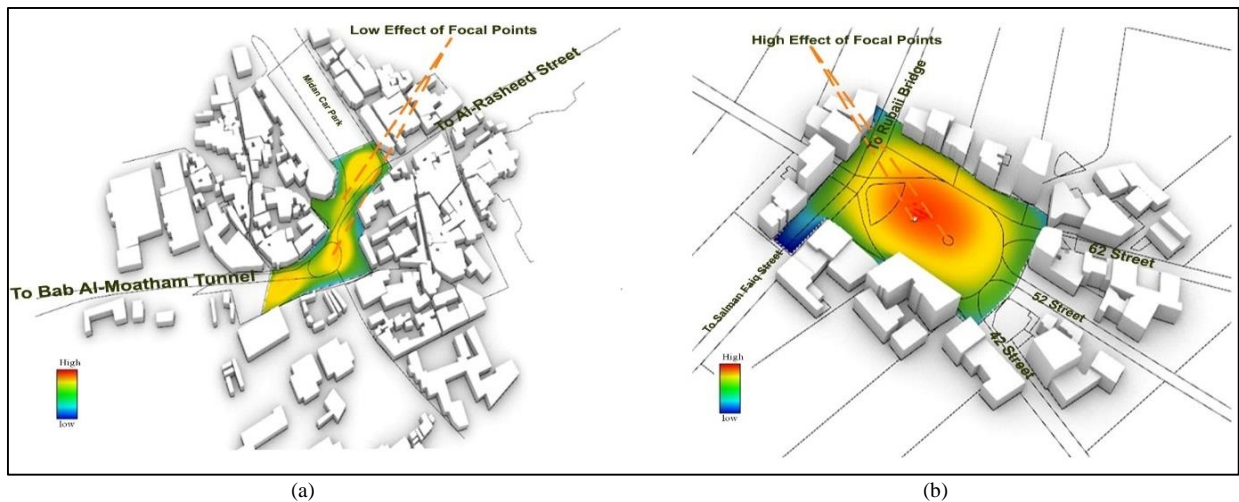


Figure 5. The impact of the monuments inside the squares as focal points in Al-Meydan and Al-Wathiq squares

#### 4.2. Urban Accessibility

Accessibility will be measured for Al-Meydan and Al-Wathiq squares, as well as the continuity of the kinetic and visual axes in the two squares:

*Accessibility for pedestrians and automobiles:* The analysis of the movement to the square showed that the high accessibility of pedestrians comes from the main axes from Al-Rasheed Street, Al-Meydan parking, and the sub axes adjacent to the square (see Figure 6a). The automobiles movement recorded very high accessibility from the main and secondary axes within the urban structure of Al-Meydan square as a whole (see Figure 6b).

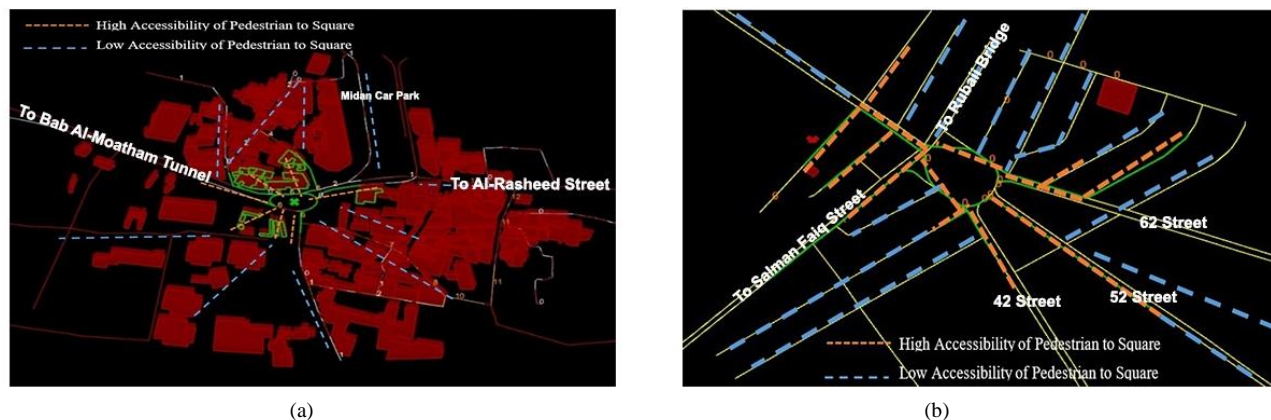
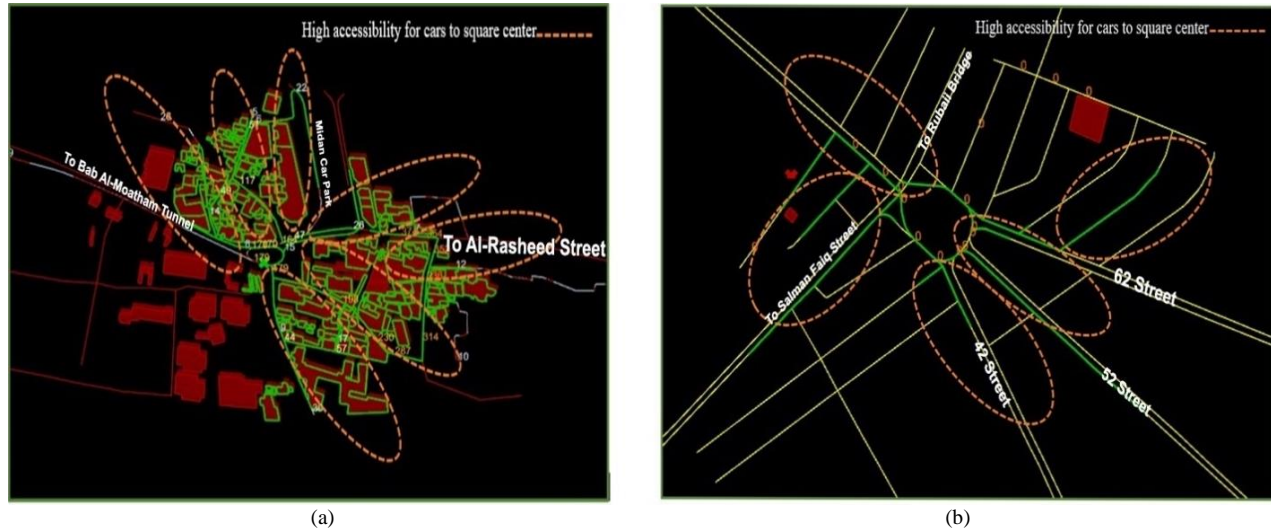


Figure 6. The pedestrian accessibility from the main and sub axes within the urban structure in Al-Meydan and Al-Wathiq squares

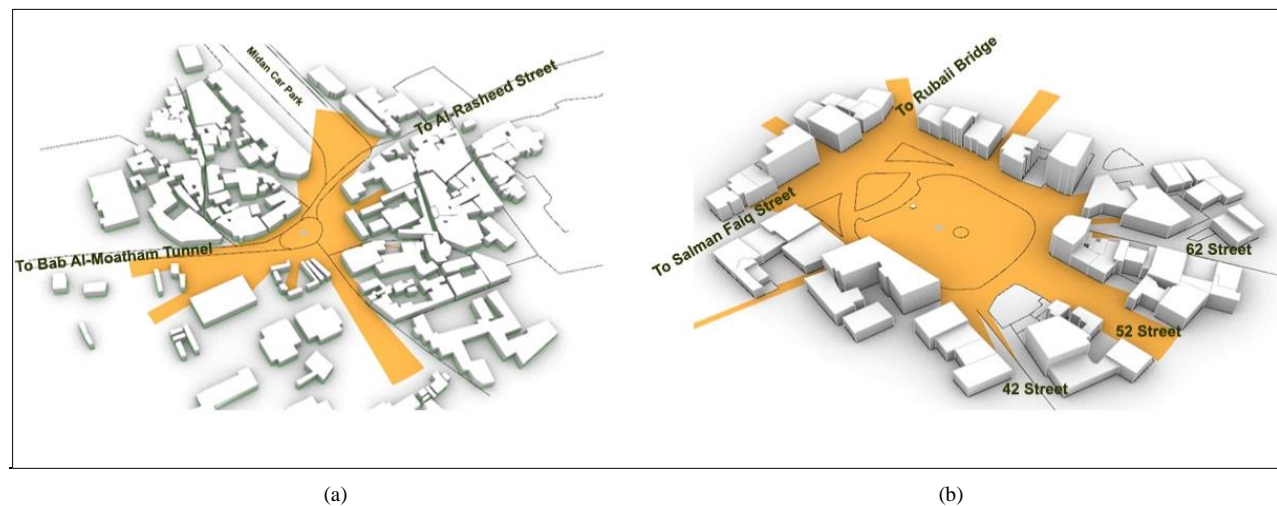
The analysis of pedestrian and automobile movement in Al-Wathiq Square showed that the high accessibility of pedestrians is through the main and secondary streets surrounding the square (42nd, 52nd, 62nd, Salman Faeq, and the surrounding secondary streets) (see Figure 7a).

The analysis showed that automobile movement within the urban structure of Al-Wathiq Square and its surroundings reach the square through the main paths. The slow motion of movement of automobiles around the square enhances pedestrian access to the square (see Figure 7b).



**Figure 7. The automobiles accessibility from the main and sub axes within the urban structure in Al-Meydan and Al-Wathiq squares**

*Continuity of the kinetic and visual axes:* The analysis showed high continuity of the main kinetic and visual axes, which gave vitality to the space of the square. The secondary axes recorded weak visual continuity, and the reason is due to the organic fabric surrounding Al-Meydan square (see Figure 8a). The main axes in Al-Wathiq Square also achieved a high visual and kinetic continuity, and they are reduced in the secondary (sub) axes leading to the square (see Figure 8b).

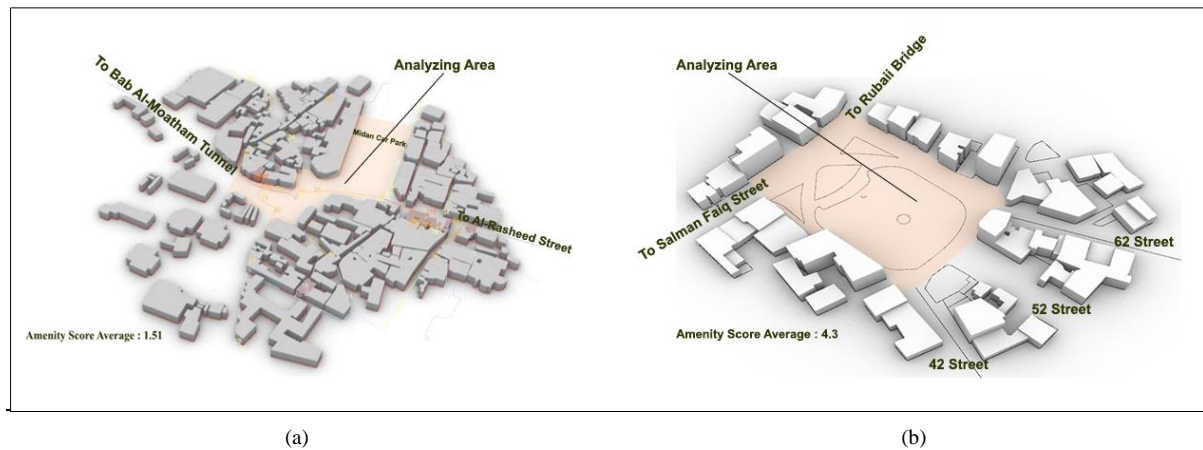


**Figure 8. The continuity of the kinetic and visual (main and sub) axes within the urban structure in Al-Meydan and Al-Wathiq squares**

### 4.3. Dynamic Activities

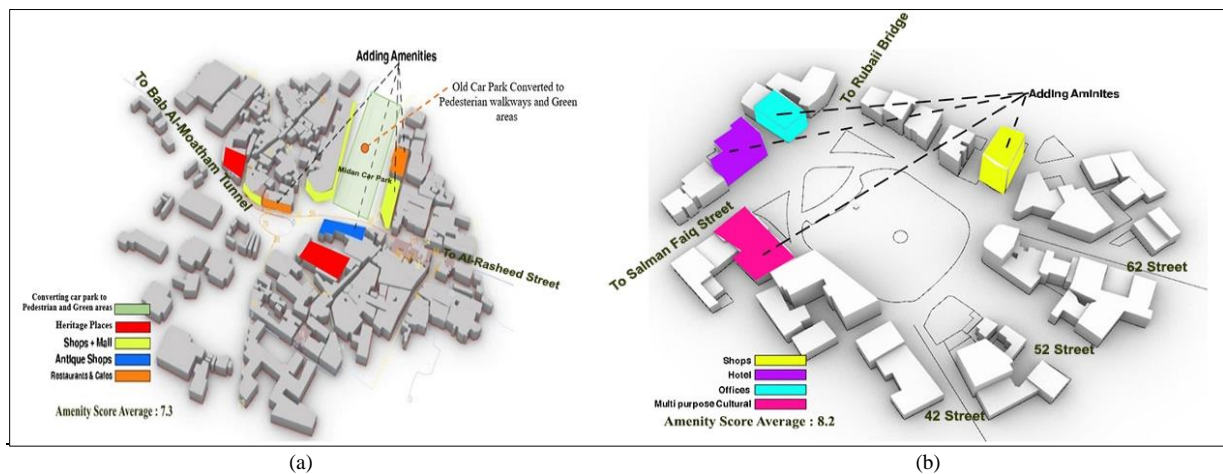
Attractive activities will be measured in the PSs and their surroundings. The effect of adding new activities will also be measured to stimulate the existing ones and make them more attractive to users. The analysis of the activities in Al-Meydan Square showed a weakness in the dynamic activities around the square, as it achieved a value of (1.15), and thus it shows a weakness in attracting users (see Figure 9a). While the analysis of Al-Wathiq Square showed a good presence of attractive activities for the users, the indicator recorded a rather high value of 4.3 (see Figure 9b).





**Figure 9. The certain activities in Al-Meydan and Al-Wathiq squares. Al-Meydan achieved a value of (1.15), and Al-Wathiq achieved a value of (4.3)**

Adding activities to the square: when adding various activities within the space of Al-Meydan square and its surrounding, the analysis showed an increase in the rate of the indication of active functions that attract users from (1.15) to (7.3). The active functions recorded the highest indicator for the historical buildings adjacent to the edge of the square (Al-Ahmadiyya Mosque and Al-Mouradia Mosque) (see Figure 10a). The indicator of active functions in Al-Wathiq Square and its surroundings increased from (4.3) to (8.2) when adding cultural activities and rehabilitating the hotel building (Ekal Hotel) within the urban context surrounding the square (see Figure 10b).



**Figure 10. Adding activities to Al-Meydan and Al-Wathiq squares. Al-Meydan achieved a value of (7.3), and Al-Wathiq achieved a value of (8.2)**

From the analysis of urban accessibility and dynamic activity indicators (represented by volume, focal point, and continuity of kinetic and visual axes), the research found that Al-Meydan Square remained an unattractive space for users. However, it did achieve a high rate of inclusion (a high indicator of the volume ratio of 1:2), in addition to the presence of influential historical buildings as a focal point of attraction at the square borders. The separation of the compact urban fabric around the square due to nearby development led to less inclusion within the space. In addition, there was an absence of a focal point as an influential element within the square space. The results from the analysis of Al-Wathiq Square showed that the presence of a focal point is one of the most influential and attractive elements in PSs.

Al-Wathiq Square achieved high attractiveness indicators despite the weakness of the inclusion index in the square (0.5:2). This causes low visual perception of the square boundaries. However, the presence of a focal point within the space of the square (the monument of Al-Caliph Al-Wathiq and the fountain) had a great impact on making the square attractive to users. In addition, the presence of a focal point on the perimeter of the square, which is represented by the tall buildings located on the edge of the square (the Ekal Hotel, Hyundai Motor Company, and the commercial building), is really impressive.

From the analysis of urban accessibility, the research found that accessibility to Al-Meydan Square achieved a high value for the index of automobile access to the square and its dominance over pedestrian accessibility. The square was characterized by heavy automobile traffic, which has negatively affected its ability to be an attractive space for users. Al-Wathiq Square was characterized by high accessibility for pedestrians from all the main and secondary axes

surrounding the square, as well as the slow movement of automobiles around the square. This affected the activation of pedestrian movement and became an attractive space for users.

Likewise, the area surrounding Al-Meydan square has an organic fabric, as the visual step does not coincide with the kinetic step in the axes (main and secondary axes). This affected the visual continuity of the movement paths of the square. In contrast, Al-Wathiq Square was characterized by the continuity of the main and secondary movement paths (kinetic and visual axes). Regarding the Dynamic Activities, the analysis showed a weakness in the indicator of the active functions that is currently present in Al-Meydan square. When adding the active functions to the square and simulating them mathematically, the index of Al-Meydan square recorded a difference of (6.15), while the index of Dynamic Activities increased slightly in Al-Wathiq Square and recorded a difference of (3.9). The index of Dynamic Activities increased when the research suggested replacing the cultural building in the perimeter of the square by a historical building (in order to prove the importance of the presence of historical buildings as a focal point in the PSs surroundings) (see Figure 11).

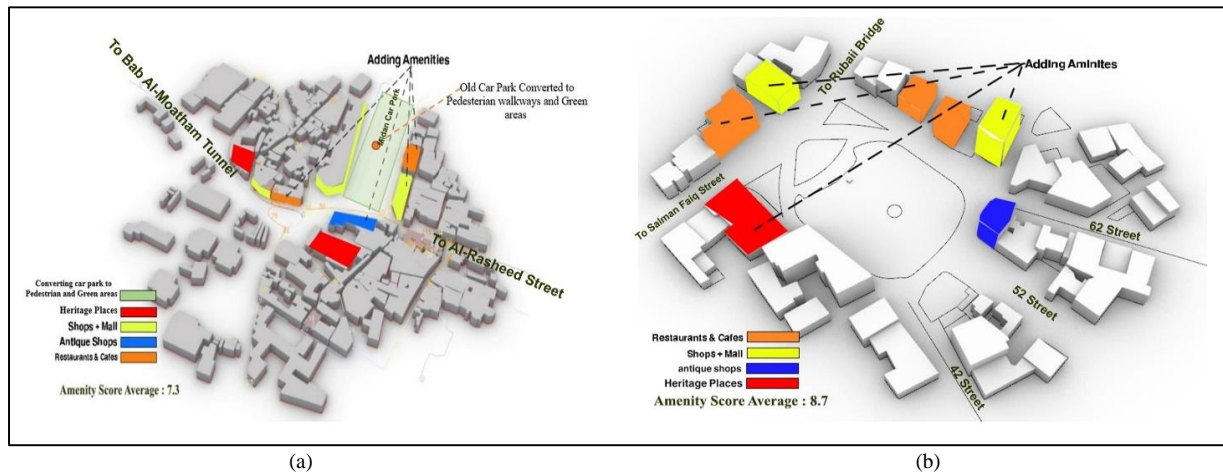


Figure 11. Adding historical activities to Al-Wathiq squares. Al-Meydan achieved a value of (7.3), and Al-Wathiq achieved a value of (8.2)

Table 3. The evaluation of the PSs (Al-Meydan and Al-Wathiq squares) characters according to the AUR mechanism

Indicators		Al-Meydan Square		Al-Wathiq Square
Achieving a ratio around (1:2) and (1.5:2).	High	The volume of the square is optimum to the height of buildings (1:2)	Low	The ratio of the height of buildings to the space of the square is not optimum (0.5:2)
The compact context (The shape of the surrounding buildings (the edges of the square) affects the enclosure of the square) and positively affects the square.	Medium	cohesion and high compactness of surroundings buildings	Low	The separation of the urban fabric surrounding the square
The presence of monuments or artistic sculptures within the space of the square contributes to strengthen spatial belonging among users of PSs (focal point elements within the square).	Non	No existence of any focal points elements	high	Existence of fountains and sculpture
The impacts of the historical and important buildings that surround the square as focal points and influential in the PS (focal point elements surround the square).	High	Effect of historical buildings Al-Ahmadiyya and Al-Muradiya mosques	High	Effect of Ekal Hotel, Hyundai Company HQ and Marketplace building.
Pedestrian paths to the square and around it, while achieving continuity for those paths.	Low	The intersection between the automobiles path and the pedestrian path	Medium	High accessibility of pedestrian to square from main and sub axes, Low speed of automobiles around the space
Accessibility from all directions to the urban space. And achieving kinetic and visual continuity.	Low	Effect of the organic fabric of the area surrounding the square	High	High effect of main axes around the square
The interdependence and variety of functions (cultural, commercial, governmental, economic, and residential) placing them in the circumferences of the square space, and their compatibility with the place has a great impact on bringing life back to the square.	Low	Low existing activities	High	High existence activities attract the users

The current research is different since it has relied on AUR mechanisms (urban response, urban accessibility, and dynamic activities) from other recent studies [19, 25]. Achieving inclusiveness is one of the factors that makes the PSs attractive elements within the city center's structure. The research found that the most important factor that helps the PS

achieve high inclusiveness is the urban fabric surrounding them (Table 3). This affects the height of the buildings surrounding the PS as well as the cohesion of parts of the urban fabric. Ultimately, compact fabric helps to achieve high inclusiveness in PSs. One of the factors affecting the attraction of the square is the speed of vehicle movement in the surrounding area. PSs with fast and dense movement make the space less attractive to users. Therefore, the effectiveness of the PS as an attractive space for users decreases. However, when the PS is surrounded by slow movements, such as pedestrians or slow cars, the attractive energy of the square is high. The presence of monuments, artistic sculptures, and fountains within the space (not in the center) of the PS creates a sense of inclusiveness for users and strengthens the spatial belonging of PSs. The use of monuments could create high-inclusivity spaces among them in PS. Placing a variety of activities (cultural, commercial, governmental, economical, and residential) in the perimeter of PSs and their compatibility with the place has a great impact on enhancing social life in PSs. Historical buildings act as focal points that have a high effect on transforming the PS space into a lively and attractive space.

## 5. Conclusions

The research focuses on studying the characteristics of PSs, represented by volume, inclusion, focal point effect, accessibility and the activity of the PSs, and its impact on the mechanisms of AUR (Urban Response, Urban Accessibility, and Dynamic Activities). The Urbano & Decoding Spaces Isovists program was used to test the extracted indicators on the selected case study (Al-Meydan Square and Al-Wathiq Square in Baghdad) to reveal the importance of AUR in making PSs livable and attractive spaces for users. The most important conclusions reached by the research are:

### *Regarding the Urban Response*

- The PS is formed by surrounding the important high-density buildings with open spaces, which is connected to the various axes to complete the traffic network within the city. It is a stopping area in the urban fabric, as it attracts groups of people to promote social interaction.
- The characteristics of volume and inclusion are interconnected with other square characteristics in making PSs attractive places for users.
- The focal elements represented by monuments, artistic sculptures, and fountains affected the Urban Response because the efficiency of PSs as attractive spaces (spatially and socially) decreases with the weakness of the focal point elements within the square or on its surroundings.
- When there is more than one focal point within the space of the squares, it creates a highly efficient and attractive space between them.
- The height of the buildings located in the perimeter of the PS affects its characteristic as a focal point for the square.

### *Regarding Urban Accessibility*

- Pedestrian accessibility is inversely proportional to automobiles access to PSs. Squares with high accessibility suffer from weak pedestrian accessibility, and affect the square's attraction to pedestrians.
- High speed of automobiles movement around the PSs negatively affected the square condition as an attractive space for users.
- The squares located within the organic fabric are less efficient in attracting users and in achieving access to the square. This is due to the lack of continuity of the kinetic and visual axes extending from the urban fabric. This explains the relation of PSs with the Boulevard since their establishment.

### *Regarding Dynamic Activities*

- Historical activities are among the best regenerative activities for PSs that attract users, in addition to easy recognition of the historical buildings and monuments located next to the squares.
- The diverse and mixed activities located in the surroundings of a PS are attractive elements for users.

There are many of limitations that led to the identification of researcher's knowledge and were reflected in the path of the research. The limitations are as follows:

- Election of PSs within the Baghdad city center as a case study for measurement and only at the urban level, due to the negligence of those important elements of the city. In addition, to revive them in a way that is not compatible with its urban context in the initiative (Alq Baghdad).
- The need for more studies regarding public spaces to prove the reliability of the results and the possibility of generalization, in addition to the possibility of the emergence of new indicators due to the development of the



urban structure of Iraqi cities. This could affect the relationship of PSs with its urban surroundings, and their standing as attractive elements within the city center and to users. It is possible to study the morphological dimensions of the urban structure and its relationship to the design of PSs.

The study attempted to develop a framework for AUR mechanisms of PSs, to make them vital spaces in city centers and attractive to users. The following are some areas of study that could be useful for further research:

- Studying the integrated relationship between all the PSs at the level of the city center structure to reveal and address strengths and weaknesses in squares.
- Applying AUR mechanisms on all types of urban spaces in city centers, to reveal effective indicators, and reach a comprehensive framework to revive those spaces and make them attractive to the users.

## 6. Declarations

### 6.1. Author Contributions

Conceptualization, Z.O.I. and S.F.A.; methodology, S.F.A.; software, Z.O.I.; validation, Z.O.I. and S.F.A.; formal analysis, Z.O.I.; investigation, S.F.A.; resources, Z.O.I.; data curation, Z.O.I. and S.F.A.; writing—original draft preparation, S.F.A.; writing—review and editing, S.F.A.; visualization, Z.O.I.; supervision, S.F.A.; project administration, Z.O.I. and S.F.A.; funding acquisition, Z.O.I. All authors have read and agreed to the published version of the manuscript.

### 6.2. Data Availability Statement

The data presented in this study are available in the article.

### 6.3. Funding

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### 6.4. Conflicts of Interest

The authors declare no conflict of interest.

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