Urban Acupuncture, a Strategy for Development: Case Study of Al-Rusafa, Baghdad

W. Sh. Al-Hinkawi1* S. M. Al-Saadi2
1Architectural Engineering Department, University of Technology, Baghdad (Iraq). 2Architectural Engineering Department, Kufa University (Iraq). *E-mail addresses: 90039@uotechnology.edu.iq

Abstract. City centres face many social and environmental challenges, such as environmental pollution, narrowing or lacking green spaces, low urban quality of life and loss of vitality. These challenges have brought calls for sustainable development. The strategy of urban acupuncture has emerged as a model and approach for developing third-generation cities. It combines the principles of urban design with the traditional medical theory of acupuncture: catalytic and energy-intensive interventions in the urban fabric regulate so-called "energy flows" (environmental, social, cultural and informational) within the city. The strategy transforms the scope of acupuncture into the larger urban context, as needles refresh the whole patient’s body through the healing of parts. Our research problem is the lack of a comprehensive knowledge of the mechanisms of acupuncture theory and its benefits in the context of city centres. To address the research problem, we built a comprehensive theoretical framework for the concept of acupuncture and the levels of intervention in general. We propose an acupuncture theory for revitalizing city centres in particular, which we then test and apply in a part of the historical Rusafa Center in Baghdad City.

1. Introduction
The strategy of urban acupuncture is linked to trends in sustainable development, beginning from the principle of restructuring a city's energy—environmentally, socially and economically—through the simplest interventions. The aim is to preserve natural resources and raise the quality of residents' lives in the midst of technological progress and population expansion that has produced cities suffering from social and environmental problems and challenges. Hence, our objective was to build a comprehensive theoretical framework on urban acupuncture strategy:
- First, we define the concept of urban acupuncture, explaining its effect and its modalities by reviewing previous literature. We develop a comprehensive theoretical framework and extract the most important indicators.
- Next, we apply this theory in practice to a part of Al-Rusafa Centre that suffers from urban problems, reaching a proposal for urban acupuncture according to the framework’s indicators.

2. Defining Urban Acupuncture
Urban acupuncture, proposed by various urban pioneers, combines urban design with the traditional Chinese medical theory of acupuncture. According to Casagrande (2012), one of its proponents, cities are complex beings of energy, with different overlapping layers of energy determining citizens' lives and
behaviour in addition to the development of the city. With many ways of mixing the environment with urban design, Casagrande developed methods to manipulate the timelines of urban energy flows in order to create an environmentally sustainable urban development, what is called a “third-generation city” (post-industrial city). In this urban acupuncture, small-scale stimulating interventions transform the energy of small sites in the larger urban context. The sites are chosen through a comprehensive analysis of social, economic and environmental factors, developed in dialogue between designers and society to reduce stress in the environment through these small interventions in the urban fabric (Figure 1).

Casagrande (2012) describes urban acupuncture as a cross-architectural manipulation of the city's collective sensory thought. The city is seen as a sensitive, multi-dimensional organism, a living environment. By handling blockages and pushing relief energy around this body, it can be more responsive and sensitive to society’s needs than traditional institutional forms and large-scale urban renewal interventions [1].

As David West (2011) described Urban Acupuncture, the strategy focuses on small, subtle and light interventions that employ and positively direct community energy, including active citizens to address urban problems and improve the city's landscape. It is intended to substitute for large, top-down interventions that usually require massive investment from scarce municipal funds. More broadly, acupuncture sites in urban areas can be seen as a contact with the city outside, a natural sign of life in a city programmed to accommodate it [2].

Morales (2004) devised urban acupuncture as a small intervention strategy, a more local and social approach in an era of limited budgets and limited resources that democratically and cheaply increases the comfort of city dwellers through the corrective potential of compact catalytic urban interventions. Achievable within a somewhat short period, these small interventions can restructure their direct surroundings. Cities are living, breathing organisms, with all parts completely intertwined; sustainable projects—which serve as needles—can refresh the whole by healing the parts [3].

Lurner (2015) suggested the term urban acupuncture for some of the medical “magic” that can and should be applied to cities for recovery and sustainability. Urban problems can be addressed through "pressure points", with partial ripple effects that positively affect an entire city. At the physical, sensory level, acupuncture interventions include infrastructure, such as transportation, as in the development of Cortes, Brazil, or the addition of a building at historical sites, as in the intervention of the Louvre Museum, or a natural view, as in the Park Guell project, or using simpler treatments, as in the development project in Luanda, Angola. These interventions can achieve several goals, the most important of which are the increase in external spaces to make the city stimulate interactions among people. The more effectively functions are integrated into spaces, the more effective they will be [4], as shown in Figure 2.
Marchall (2004) described urban acupuncture as a metastatic and strategic urban intervention for reconstruction, primarily supported by the design of public spaces, because urban acupuncture is more immediately effective in achieving goals related to public space. The term “metastatic” describes a series of measures that could be the focus of strategic renewal and act as a vital nerve affecting the centre of a neighbourhood and the city. These measures would be built for the purpose of improving what is already there, to convert, modify, rehabilitate, confirm or create identities that are clearer and more important. The local intervention strategy makes it easier for the designer and critic to achieve their best performance at one point in time, in this way to generate new flows of energy in the city, not only in terms of the specific location, but also in relation to future developments arising from the site in ways that cannot be expected [5]

As Foth (2008) explained urban acupuncture, the strategy aims to relieve the “body” or “the built environment” according to the basic principles of urban environmental and social theories, namely through strategic healing, where parts of the city operate as a heart that gradually heal the whole. A small expansion of the targeted range of interventions gradually turns into the larger urban context. That is, the specific points at which to apply pressure to the object in order to manage or treat diseases or any kind of pain are determined by the areas that need to be reformed. Sites are chosen after environmental, economic and social analysis of the broader context through interaction with the community. Similar to the body's healing action, small-scale interventions create a social stimulus in the urban fabric, releasing energy flows by responding to local needs. In other words, the whole city’s revival is activated by the treatment and recovery of component parts at strategic points [6].

From the above emerges a definition of the strategy of urban acupuncture as a small-scale stimulus or intervention in areas that need to be fixed (obstruction points), operating as a series of measures that can be the focus of strategic renewal and that shift their energy into the larger urban context. Sites are chosen through a comprehensive analysis of social, economic and environmental factors, developed through dialogue between designers and society to relieve stress in the environment. This would substitute for top-down, large-scale interventions that usually require massive investment of funds, which many cities do not have at present. The intervention occurs at two levels: physical and sensory. The levels of intervention include the transportation system, adding a building or adding a natural view, as well as simpler treatments.
This section reviews previous studies to clarify the various tools, methods and mechanisms to achieve the urban environmental strategy (acupuncture).

3.1. Aurelija and Vilenske (2018), “Urban Acupuncture in Historic Environment: Research of Analogues”

According to this study, acupuncture in urban areas occurs through various interventions and events, ranging from buildings or gardens to street festivals or any other positive event in a public place. The urban intervention in this research is considered to be an artistic object or design of solutions in the urban environment, creating a public space or merging one into existing space with a new capacity of expression. Most of the time, urban interventions aim to address social or environmental problems, including issues of local identity, and to create a new quality in the environment. The intervention or system of interventions considered at specific points of the urban fabric have social, economic, environmental or other potential to activate energy and affect surrounding areas.

Urban acupuncture is more efficient in the high-density urban fabric that usually characterises the historic urban environment. The study focuses on interventions of a historical nature, whether groups or a group of buildings, structures, open spaces, axes or nodes in their natural and environmental contexts. This includes archaeological sites and fossils, which constitute human urban settlements over a period of time. The cohesion of that settlement has thus been recognized as a result of its archaeological, architectural,
historical, scientific, aesthetic, socio-cultural or environmental value, thus preserving the Historical Evolution System of a city. The study identified several potential goals of acupuncture in the historical urban environment: restoring the vitality of society and the urban landscape, promoting heritage and improving open spaces (based on contextual characteristics), in addition to creating and promoting biological diversity [7].

Some of these interventions have a temporary or specific effect in a very limited area, while others have a wider scope; these are termed individual and systematic interventions, respectively. The study identified four types of acupuncture interventions in urban areas [7]:

- Intangible interventions do not have a permanent physical form but have a major impact on site viability (for example, iconic piece of music, traditions, and street artists).
- Local impact interventions affect only the specific surrounding environment.
- A broad-based intervention, while localized, affects wider surroundings (for example, the district).
- Systematic interventions constitute a specific network of spaces in order to influence the whole city.

3.2. Malvina (2015), "Urban Eco-Acupuncture Methods: Case Study in the City of Athens, Malvina Apostolou"

This study showed that contemporary cities face a transformation and boom in urban, social and spatial aspects; the traditional technics and mechanisms are insufficient for the perception of new urban phenomena. Therefore, urban acupuncture can work with time interventions to change social and urban realities by redefining urban action. The different dimensions of sustainability—time, open space, and citizen and government participation, along with new technologies—play important roles in relation to the emergence of participatory urbanization. Social stimulation is also among the primary goals of the urban acupuncture strategy, as intervention in the city is like a treatment that focusses on time and public space, while at the same time seeking to validate collective use. Economic recessions and environmental problems usually help in the formation of the built urban environment and space by restoring a social participatory spirit; by returning people's interest to a space and renewing their participation in a part that suffers from degradation, it is thus re-energized and re-used.

The meticulous approach to environmental regeneration focuses on the development of land uses and the development of small, bottom-up intervention tools. As for time, time management operations in the fabric of the city usually show a political will to change the view of the citizen in the abandoned or less visited neighborhoods by inviting them to discover or re-exploit them. Collective spaces are converted into temporary public spaces, where the event is clarified between time and place. These places host events for a pre-organized period, in the presence of a specific feature, allowing for a different perception of public places; it is no longer a place for meetings only, rather, the public space becomes a scene and an urban theater for exchanges and attendance. This meeting point stimulates the social and sensory dimensions of the population, and this is repeated every season in the winter. Another rhythm and time is created within the time of the city; the specified area dynamically affects the surrounding areas, providing reactive contact points to generate new energy for the city during the time cycle [7].

This raises the idea of a public space (Parking day) as a global annual event where citizens and artists collaborate and participate in converting parking spaces to temporary public parks. In this way, new forms of public urban spaces are created in neighborhoods that lack public open spaces. The most important challenge in this bottom-up and participatory intervention relates to a reassessment and redefinition of space in order to meet the needs of society. The research proposes the Major Street Initiative which is repeated every season in the winter. Another rhythm is created in the context; the specified area dynamically affects the surrounding areas, providing reactive contact points to generate new energy for the city over the time cycle [7].

This raises the idea of a global annual event (Parking Day) where people and artists work together and participate in converting parking spaces to temporary public space. In this way, new forms of public urban
spaces are created in neighbourhoods that lack public open spaces. The most important challenge in this bottom-up and participatory intervention relates to a reassessment and redefinition of space in order to meet the needs of society. The research proposes the Great Streets Initiative of the mayor of Los Angeles, Eric Garcetti, which is concerned, among other things, with street transformation through an urban acupuncture approach, re-envisioning and transforming secondary streets into neighbourhood centres. The focus is on creating a sense of community through the application of amenities and pedestrian spaces in selected areas of the city. Fifteen major streets across the city were chosen for small local interventions and changes to improve street life as a whole, reduce traffic congestion and boost economic activity. The project envisions bike paths, plazas, footpaths and other facilities attracting pedestrians and new companies. Urban acupuncture becomes a way to dramatically reduce traffic congestion and bring adequate amenities to neighbourhoods so that people can stay close to home and possibly avoid local use of their personal cars [7].

3.3. Casagrande (2015), ‘From Urban Acupuncture to the Third-Generation City’
This study concerns theoretical and applied principles of acupuncture in urban areas in terms of how urban environments deal with many problems and situations. Many projects that invested in this strategy with different tools and methods in various applications and light interventions are discussed. These successful urban acupuncture cases created and produced dynamic outputs, including the Bilbao Project in Spain (Figure 3). The Metropolitan region of Bilbao, the fifth-largest in the country, neglected the experiences and opportunities for life and work for its population. The city became an unpopular place to live, even for locals, with an eroded urban structure, so the aim of the intervention was to obtain a new image for the city.

The intervention involved adding the Guggenheim Museum building by the designer Frank Gehry in 1997. Cultural renewal was applied through wonderful architecture, creating a new art centre as a solution for the degradation of the industrialized urban economy. This approach operated at several levels, starting from organizing cultural events and proceeding to national and international remembrances, financing of iconic architecture and creating new cultural spaces such as museums and performing arts centres. This approach begins from the assumption that cultural policies can lead to a region’s economic renewal, improving the vision of a city and its appeal. According to this view, design can remove constraints on economic development and correct market failures. The project adopted a new comprehensive plan in addition to the museum, including a subway line, new systems for drainage and an airport. Residential, recreational and commercial complexes were built in the city. New riverfronts and seafronts, a seaport and industrial and technological parks were built away from the urban centre.

Figure 3. Guggenheim Museum, Bilbao, Spain. (Source: Google Image, https://dirt.asla.org/2014/09/18/jaime-lerners-urban-acupuncture)
The study also described a development project in Curitiba, Brazil, as a successful model implementing the acupuncture strategy. Curitiba is the seventh-largest city in Brazil and the capital of the state of Parana. The city had an ineffective traffic system, as cars controlled the streets and citizens hardly used the city in their free time. The city’s pedestrian traffic was almost non-existent, and the urban fabric had greatly deteriorated, prompting calls for rapid change. The intervention came at the level of the infrastructure in general and in particular transport by the adoption of a fast transport system for buses directed by the mayor of Curitiba, Jaime Lerner, in 1970. The mayor laid down a master plan integrated with land-use planning, with the aim of culturally, socially and economically transforming the city and revitalizing the central region while encouraging commercial growth along transportation arteries radiating from the city center. The city center was partially closed to automotive traffic, and pedestrian streets were established.

This acupuncture tool opened the main linear transportation lines to provide direct, high-speed routes inside and outside the city. The project developed a special bus system in timed stages to reach its current form, which comprises a hierarchical system of services from minibuses, which are routed through residential neighbourhoods, to traditional buses, which were recycled with more sustainable and less impactful features on the urban environment (Figure 4). The traditional buses were distributed on peripheral roads around downtown and on roads between regions. The backbone of the bus system is composed of express buses that run on five main arteries that lead completely to the city centre, taking into account the green component of street furniture.

Linear development along the arteries has helped to push high-density industrial and residential development along the axis, reducing the traditional importance of downtown as the main axis of daily transportation activity. Thus, reducing morning and afternoon traffic, replacing the car as the main means of transportation and development along the corridors resulted in a large number of transit passengers. That is, Lerner focused on interventions at the level of infrastructure: transportation, waste, land use and public spaces, achieving a less polluted and more sustainable environment and thus obtaining a higher level of quality of life for the city's residents socially, economically and environmentally.

The study touched upon the Manuel Casagrande project for the development of Taipei, which involved the investment of community garden networks and public spaces by 2010 Ruin Academy. The needles here transformed the industrial city into an effective organic machine. The intervention represented automatic and informal character and is distinguished by the self-organization of chaos, where urban farms—appearing in abandoned construction sites, destroyed housing areas, empty blocks or on the banks of rivers—tend to control the territory of the restricted area. This shift in Taipei resulted from disciplined and self-organizing interventions within the city, making the city ready for greater change and thus the process of restoring the urban environment [8].

Figure 4. Brazil's Curitiba Development Using an Acupuncture Strategy
3.4. Kanishk (2011), “Urban Acupuncture and Better Cities”

This study discusses the development of Kampung, Indonesia, which adopted urban acupuncture through specific, targeted, rapidly implemented interventions on four urban functions: transportation, recycling, affordable housing and urban and natural spaces. This idea is linked to the eco-city and sustainable urban development:

- Urban transport is like blood in the human body, transporting the food and oxygen necessary for the metabolic process. In the anatomy of the city, transportation preserves the life of the city, especially economically.
- Recycling is the acupuncture point that saves the city in the first place from the dangers of waste. In return, it generates an economic opportunity for poor cities, working with local governments and the private sector to convert waste into materials for industry.
- Affordable housing is not simply limited to providing housing as units in relatively remote areas. It also includes the provision of urban economics.
- Public activities and facilities bring interaction and vitality to residential areas. Urban parks are designed, first, to solve flooding problems by resettling people and, second, to increase the city’s percentage of green area.

The strategy in Kampung, based on the plan developed by Jaime Lerner, added interventions to the transportation system, green spaces, waste and housing. The region of mainly poor people forms a unique urban community in terms of different traditions, customs or customary laws. The strategy aimed to restructure society to preserve traditional norms and values and keep them alive in the city while aiding the transition towards a civil society made up of "social contracts" (i.e., established formal acts and laws). The project adopted the incorporation of access to Kampung into the entire city system. The following were acupuncture points to improve the area [9]:

- Accessibility: Developed within the larger urban context, where the transportation system, the TOD (Transit-Oriented Development) system, integrates with the Kampung center and development as a suitable local market.
- The green element: Adopting the principle of ecological urbanization that supports vital nutrients and the urban environment as a whole.
- Ecological Housing for Self-Help: It is a critical characteristic of the ability of the poor to provide housing themselves, with the assistance of the government and the private sector.

Environmental waste management: The plan must include all individuals to join the garbage campaign through how to recycle waste food, and thus, integrate the private sector into the process and benefit from it, as an income source for the poor population.

3.5. SPIRN (2011) “Ecological Urbanism: a framework for the design of resilient cities”:

The study touched upon the mechanism of action to find sites and implement this strategy "acupuncture points" found in time and space. It works relationally and interactively, by stimulating the tracking of radioactive effects and thus, to create networks of distinct energy levels with stimulating effects on the urban fabric, primarily economically, as it is located in the programmatic area between production and consumption. The study presented an application called "the neural network model for developing acupuncture in urban areas" to develop the city of Elche, Spain, through a self-organizing algorithm, following the effects of each of the water, transport, community networks through several steps [10]:

The first step - Identifying nodes: Determining each of the blocks of houses or buildings with a node in the network and perform the process of triangulation with these nodes to obtain a two-dimensional network consisting of a level of triangles.

The second step - Identifying hotspots (strong and weak nodes): Defining a set of positions in urban areas to establish some key points which can be determined according to the context and are the most critical points in the urban network.
The third step - Rebuilding the final network: Distributing new nodes or hotspots where we can implement acupuncture in urban areas. It is important to note that each of these nodes represents an axis or hotspot in the network that is, represents more than a straightforward node in the network such as the garden, pedestrian and water networks.

4. Theoretical framework:
The proposals outlined a number of tools, methods and mechanisms for urban environmental strategy (acupuncture) that can be summarized in several steps through which the region can be developed to reach a more sustainable city, which the authors have extracted and summarized as in Diagram 1.

5. The Practical Study:
To clarify the urban acupuncture strategy and its steps, mechanisms and tools, the author tends to conduct the practical study according to the theoretical framework extracted through the application of this strategy and invest it in developing the selected study area (Al-Rusafa Historical Center in Baghdad).

Diagram 1. Theoretical framework extracted for the strategy of acupuncture in urban areas, (Source: researchers).
5.1 General background of the study area:
The historical center of Rusafa is located on the eastern side of the Tigris River, which flourished when it became the capital of the Abbasid caliphate in 159 AH in the caliphate of the Mahdi. Al-Rusafa is vital at the local and regional levels, because it is related to many historical events and its content of a large number of traditional buildings, axes and squares. These reflect different styles of different stages of history that the region has gone through, as it includes various activities of mosques, schools, markets and khans in addition to the traditional residential neighborhoods. At the same time, it suffers from the problems experienced by most traditional centers like; deterioration, retreat, neglect and abandonment, in addition to the negative shift in primary uses in a way that harms them, such as the shifting of residential areas to industrial and storage. The isolation from the fabric and the difficulty of reaching because of the successive projects (the construction of the main streets, the most important of which are the Kholafa’a Street and the Republic Street and the change in movement systems and new buildings that are not compatible with the context). The random additions that have lost their visual integrity and over time this has led to the accumulation of urban problems of all kinds; urban, social, economic, and environmental, which led to a severe decay in urban areas. The area between the Shuhada Bridge and Bab Al-Muadham Bridge was chosen for the study as shown in Figures 5.

![Figure 5. Clarify the study area and land uses in the study area.](image)

5.2. The application of the strategy to the study area

5.2.1 Multifaceted analysis of the region, by identifying the problems and weak points of the site for each of the following points:

A-Historical Evolution System

- The Buildings and distinctive historical monuments: The study area contains a large number of historical buildings of aesthetic, visual, architectural, and social value, most of which suffer from
several architectural and urban problems. The most important of these buildings and landmarks are shown in Figure 6 and Table 1.

- **Distinctive historical axes and nodes**: The study area contains a large number of axes and nodes of historical, aesthetic, visual, architectural, and social value, most of which suffer from several architectural and urban problems. The most important of which are; Al-Rasheed Street, Al-Mutanabi Street, The river's edge, Al-Shohadaa Bridge, Bab Al-Muadham Bridge as for the nodes: Al-Midan Square, Abdul-Ghani Marouf Al-Rusafi Square, The square of the former Iraqi fighter. The most important of these axes and nodes are shown in Figure 7 and Table 1.

**B-Infrastructure system**

The infrastructure services system in the study area is related to the Rusafa region as a whole, and therefore it needs maintenance and improvement work to suit the requirements of the current era, especially that it suffers from deterioration and inefficiency.

As for the transportation and movement that system in the area, it is characterized by the randomness and irregularity, and the parking spaces are not isolated from the pedestrian movement, which causes frequent crowds and random parking in the streets are not designated for car parking.

**C-Greenery System**

The region suffers of a lack of interest in public green areas, as shown in Figure 5, and restricting to randomly growing plants, and therefore the region's lack of a green component despite the availability of axes, squares and the riverbank that can be used to improve the general view of the region and improve its urban environment.

**D-Land use systems**

The land-use in the study area suffer from the shift of residential to industrial and storage that are not commensurate with the specificity of the historical and heritage value, which contributes gradually to the visual deterioration and pollution of the urban environment and isolate many important and functionally distinct buildings from the general context of the region. For the public spaces, they suffer from the lack of clarity of their borders, the failure to exploit them properly, the diminution of their historical meanings, and most of them turned into parking. Their overcrowding in mixed traffic, in addition to the neglect of many of them and turning them into landfills that are not compatible with their historical, visual and urban values.
Table 1. The study area, the most critical features and distinctive historic (structures, axis and nodes) and their problems. (Source: researchers)

| Name of building                  | The existing problems                                                                 |
|----------------------------------|----------------------------------------------------------------------------------------|
| A: The building of Iraqi Ministry | A, B, C, and D suffer from the isolation problem that generated an abandoned and untapped area. |
| of Defense                       |                                                                                       |
| B: Abbasid palace                |                                                                                       |
| C: Alhikma Ahouse                |                                                                                       |
| D: Al-Wali House                 |                                                                                       |
| E: Qushla Building and clock     |                                                                                       |
| F: Al-Baghdadi Cultural Center   |                                                                                       |
| G: Minister's Mosque             |                                                                                       |
| H: Al-Baghdadi Museum            |                                                                                       |
| I: The Shabandar Café            |                                                                                       |
| J: Old court building            |                                                                                       |
| k: Mosque of King Ghazi           |                                                                                       |
| l: Al-Ahmadi Mosque              |                                                                                       |
| M: Ministry of Defense portal    |                                                                                       |
| N: The Mutanabbi statue          |                                                                                       |
| O: Al-Rusafi Statue              |                                                                                       |
| A, B, C, and D suffer from the   |                                                                                       |
| isolation problem that generated |                                                                                       |
| an abandoned and untapped area.   |                                                                                       |
| E, F and G suffer from the       |                                                                                       |
| isolation problem that created a |                                                                                       |
| deserted and untapped area in    |                                                                                       |
| addition to the difficulty of    |                                                                                       |
| accessing it.                    |                                                                                       |
| E suffers from a blurring of its  |                                                                                       |
| entrances and not being exploited |                                                                                       |
| as an attractive and stimulating  |                                                                                       |
| element in the region despite its |                                                                                       |
| historical and architectural     |                                                                                       |
| importance                        |                                                                                       |
| M and J suffers from a blurring  |                                                                                       |
| of its entrances and not being   |                                                                                       |
| exploited as an attractive and    |                                                                                       |
| stimulating element in the region.|                                                                                       |
| H, I, J, K, L, and M suffer from |                                                                                       |
| neglect at the level of interfaces|                                                                                       |
| and construction status or not   |                                                                                       |
| to be used in a way that enhances |                                                                                       |
| the privacy of the region, which  |                                                                                       |
| makes it vulnerable to collapse   |                                                                                       |
| and loses its historical value in |                                                                                       |
| addition to being considered a    |                                                                                       |
| crowded area due to the randomness of |                                                                                       |
| movement.                         |                                                                                       |

| Name of (axis and node)          | The existing problems                                                                 |
|----------------------------------|----------------------------------------------------------------------------------------|
| Nodes                            | - Al-Rashid Street (1) is isolated from the river and its identity and function over time have been transformed from cultural to industrial in a way that does not match its historical symbolic value, in addition to neglecting its buildings in terms of construction and architecture. |
| A: Square of the former Iraqi     | - The neglect of Al-Mutanabi Street, the Statue of Al-Mutanabi and the Sarai Market 5, 9, D from the structural and architectural aspects, despite its cultural importance in the region and the city. |
| fighter                           |                                                                                       |
| B: Al-Midan Square               |                                                                                       |
| C: Maarouf Al-Rusafi Square       |                                                                                       |
| D: Almotanabi statue             |                                                                                       |
| Axes                             | - The lack of clarity in the boundaries of each of the nodes and the important arenas A, B, C, D, despite their high symbolic importance and neglecting their architectural and urban significance. |
| 1: Al-Rashid Street              |                                                                                       |
| 2: Al-Shohadaa Bridge             |                                                                                       |
| 3: The River Bank                 |                                                                                       |
| 4: Bab Al Muadham Bridge          |                                                                                       |
| 5: Al-Motanabi Street            |                                                                                       |
| 6: Al-Midan street               |                                                                                       |
| 7: Secondary axis                |                                                                                       |
| 8: Secondary axis                |                                                                                       |
| 9: Alsarai market                |                                                                                       |
| - Narrowing and crowding axes (3,5,6,7,8,9) difficulty in movement, and failure to invest its historical and cultural value in developing the region. |
5-2-3 Determining the level of interventions and sustainability interventions:

A- Identifying historical system interventions.
   - Distinctive historical landmarks interventions, as shown in figure 9. and Table 2.
   - Distinctive Axes and Nodes interventions, as shown in figure 9. and Table 2.

B. Identifying the hot and weak points in axes and nodes

Figure 8. Identifying the strong and weak Urban acupuncture points (Source: researchers).

Figure 9. The proposed acupuncture points for interventions (distinctive landmarks and buildings) (Source: researchers).
Table 2. Suggested acupuncture area (proposed interventions for distinctive axes), (Source: researchers)

| The proposed acupuncture points for interventions (distinctive landmarks and buildings) |
|---|
| (A) intervention: Opening the barriers surrounding the ministry and activating and expanding the green areas around it. |
| (B) intervention: Widening the spaces surrounding the palace and opening the path leading to it towards the river bank. |
| (C) intervention: Activating the path leading to Alhikma house towards the river. |
| (D) intervention: Opening Al-Wali Palace, including its cultural events, restoration and maintenance of its facades, and expansion and afforestation of the surrounding paths. |
| (E) intervention: Promoting Al-Qushla by extending the path adjacent to it, clarifying its entrances and afforestation, and enhancing pedestrian paths. |
| (I) intervention: Structurally restoring the Shabandar café and enhancing its distinctive heritage properties. |
| (J), (K) intervention: Restoration of the King Ghazi Mosque and Old court building strengthening elements of its traditional facade, expanding the square opposite the entrance, and transforming its function into a cultural museum. |
| (L) intervention: Restoration of the Al-Ahmadi Mosque, which suffers from a deteriorating construction condition, and the enhancement of its distinctive characteristics. |
| (M) intervention: Creating a park and an external cultural exhibition to use it as a public space for gathering and social interaction. |
| (N) intervention: Expand the outer space surrounding the Mutanabbi statue and reinforce several paths to it, reaching the river bank |
| (O) intervention: Adding a theme park area featuring cultural and artistic events and exhibitions. |

The proposed acupuncture points for interventions (distinctive axes and nodes)

| nodes | axes |
|---|---|
| (A), (B), (C), (D) (interventions: Clarify the boundaries of the yards, plant them, and specify parking spaces near them to prevent crowds. |
| (E) intervention: Create a node that acts as a gathering space connecting the market with Al-Mutanabi Street to the river bank |
| (F), (G) intervention: Expanding space, creating gathering space, and adding green elements that encourage pedestrians to revive their social and cultural activities. |
| (3) intervention: Promoting the river bank by planting it and placing places for people to sit through direct views on the river. |
| (5) intervention: Extending the street and restoring the facades of the buildings overlooking its sides, adding green areas and pedestrian street furniture. |
| (6) intervention: Open a pedestrian path between the two nodes (F, G) to enhance and facilitate pedestrian movement |
| (7) intervention: Stretch the street down to the river's edge |
| (8) intervention: Expand the path adjacent to Al Qashla building |
| (9) intervention: Opening a path between Al-Rasheed Street and Qushla, to act as an optical and kinetic axis to accommodate the Qushla clock. |

B- Infrastructure system

As the region is linked to the infrastructure services system for the Rusafa region as a whole, and therefore it needs maintenance and improvement work to suit the requirements of the current era, especially as it suffers from deterioration and inefficiency.

Regarding the transportation system, the acupuncture strategy suggests converting the system into a public transportation system, limiting movement in the selected region to pedestrian traffic, and programming traffic times for service cars.

C- Greenery System

The region in general, needs to enhance the effectiveness of its public spaces by focusing on the green component, which contributes to providing a more sustainable and appropriate environment for the exercise, recreational, social interaction and cultural activities, especially as the region overlooks the River as shown in Figure 10.

D- Land use systems

As for the land uses, the strategy proposes to classify the region based on the proposed uses to (the area of cultural events, markets, and entertainment activities) and the use of mixed-use in specific parts that were previously suffering from neglect and abandonment.
5-2-4 Rebuilding the final urban network

At this stage, the city is reconnected and restructured according to the proposed procedures and interventions, as shown in Figure 11. To clarify the process of restructuring the study area according to the strategy, the interventions will be classified as follows:

- An architectural intervention represented by (restoration and maintenance), which will be red.
- Urban contextual intervention, represented by:
  - Opening or enhancing a dynamic and visual path, which will be yellow.
  - Add green items and it will be green.
  - Expanding a public square or space, which will be white, as shown in Figure 11.

6. Conclusions

The research defined the acupuncture strategy in urban areas as an alternative to traditional renewal and development processes that need high budgets that most cities lack, and it is often preferable to be adopted in historical areas that are difficult to deal with and fix comprehensively, and in the case of limited budgets. The research has shown, through the application of the strategy in a part of the historical center of Rusafa, that it can be applied in several levels, which range from adding or creating buildings and jobs to the most straightforward levels as adding streets' furniture and planting. The applying of urban acupuncture can make more sustainable urban environment because it depends primarily on the recycling of urban energy represented by urban elements and parts that have exhausted their strength, and structural and functional aging over time by pricking small interventions that rerelease energy in the decaying location.

References:

[1] Casagrande M. 2012 Bio Urban Acupuncture: From Treasure Hill Of Taipei To Artena, International Society of Bio urbanism, Rome, p.4-5. [http://www.biourbanism.org/](http://www.biourbanism.org/)

[2] Whitchurch C 2008 Shifting Identities and Blurring Boundaries: The Emergence Of Third Space Professionals In UK Higher Education. High education quarterly Vol. 62 Issue4, October Pages 377-396. Wiley online Library, [https://onlinelibrary.wiley.com/toc/14682273](https://onlinelibrary.wiley.com/toc/14682273)

[3] Morales D. 2004 The Strategy of Urban Acupuncture: Structure Fabric and Topography Conference, Nanjing University, China, p.55-56.
[4] Lerner J 2014 *Urban Acupuncture*, Washington, DC: Island Press/Center for Resource Economics, USA, p.160-163.

[5] Benach N 2004 *Public Spaces in Barcelona 1980-2000*, in: (Ed) *Transforming Barcelona: the renewal of a European metropolis*, London: Routledge, p151-160.

[6] Marcus F 2009 *Handbook of Research on Urban Informatics: The Practice and Promise of the Real-Time City*, Information Science Reference, Hershey, New York, p.17-19.

[7] Dauģėlaitė A and Grazulevičiute-Vileniske I 2018 Urban Acupuncture in Historic Environment: Research of Analogues, *Journal of Sustainable Architecture and Civil Engineering*, Kaunas, Lithuania, p.8-10.

[8] Apostolou M 2015 Urban Eco-Acupuncture Methods: Case Study In the City Of Athens. 2nd *International Conference on Changing Cities II: Spatial, Design, Landscape & Socio-economic Dimensions*. Jun 2015, Porto Heli, Greece p.945-948.

[9] Marco C 2015 From Urban Acupuncture to the Third Generation; City, *La vile rebelle. Démocratiser le project urbain*, Gallimard, France, p8-12.

[10] Jain K 2011 *Urban Acupuncture and better cities*, university school of architecture and planning, Dissertation, Bachelor of architecture, Guru Gobind Singh Indraprastha University, Delhi, India, p.19-22.

[11] Harjoko T 2017 Urban Acupuncture An Alternative: Purposive intervention to urban development to generate sustainable positive ripples for an ‘Aided Self-Help’ Kampung Improvement, *The Indonesian Journal of Planning and Development*, vol. 3, no. 1, The Indonesian Journal of Planning and Development, Jakarta, p. 19-31.

[12] Spirn A 2011 Ecological *Urbanism: A Framework for The Design of Resilient Cities*. Springer Verlag, Berlin, p.11-14.

[13] Al-Atraji R 1975 *Baghdad building in the era of Abu Ja’far al-Mansur*, AD, al-Nu’man Press, Najaf, Iraq p. 146.

[14] Google map, [http://www.maplandia.com/iraq/baghdad/baghdad-33-20-19-n-44-23-38-e/#map](http://www.maplandia.com/iraq/baghdad/baghdad-33-20-19-n-44-23-38-e/#map).

[15] Google Image -dirt.asla.org.

[16] Taghalub A-H. 2017, *Baghdad 21st Revival of a Historical City*, Adib Books, Amman.