The Threshold of Urban Sustainability within the Traditional Cities: Traditional Alnajaf city as a case study

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Abstract. Successful urban interventions in traditional cities must be thoughtful, accurate and wise intervention, so the research assumed that urban sustainability represents a contemporary development intervention that tries to regulate the performance of urban products (components - dimensions) in traditional cities within three factors which are, the right time, right place, and positive performance. The traditional Alnajaf city in Iraq was taken as a case study, morphologically; the general shape of the city was classified into five main parts and examined them with physical dimension that was depended on the concepts of sustainability threshold according to the descriptive data. From this analysis the research determined the right, time and place to achieve the best sustainable intervention. The research found that there is a variation in the level of sustainability in traditional Alnajaf city resulting from the different type of intervention at the level of the constituent parts of the urban fabric. Thus, it is possible to take advantage of the limits of urban sustainability (The Threshold) in creating a balance between the type of urban intervention and the needs of the original city to preserve the traditional cities, including traditional Alnajaf city.

Keywords: Threshold, Urban Sustainability, Traditional Cities, Alnajaf, urban performance.

1. Introduction

Traditional cities were distinguished by their complex urban fabric, and the diversity of events and places, which led to the accumulation of activities over time [1]. As a result of this overlap, the traditional city can be defined as a complex organic structure of components, flows, communications, and relationships [2]. This description is the reason why sustainability is one of the most important ways to improve the relationship between people and their built environment in such types of cities.

These urban areas have succumbed to a struggle between the power of conservation and the pursuit of progress to meet the contemporary demands of residents, making the question of when is the right time for a wise and sustainable intervention essential for all. Thus, research tries to specific the right time to intervene with sustainable threshold in traditional Alnajaf city in Iraq as a case study to be successful intervention for preservation and continuously [3]. The city exists showed signs of
deterioration in some parts of the city related to the nature of the intervention patterns, despite the ongoing maintenance of important buildings and streets in traditional Alnajaf city.

Here the disagreement is not over the processes of urban renewal and its role in changing traditional city centres under the name of developing old areas, but rather about the appropriateness of these parts to the components of the city and their image for a certain age and a specific generation of users. Like the city of Manchester which is hosting the games (Commonwealth Games, 2002) It was in the nineties with an integrated arrangement of physical installations, but the modern images after the process of urban renewal and the construction of stadiums and accessories for the Games show the great change in its physical composition that negatively affected the future of the city after the end of the Games and its appearance as the appearance of the deserted city [4].

Therefore, not every renewal and development of a part of the city is suitable for it if it is not linked to the vision and goals of urban development. Urban renewal in the old traditional areas must guarantee a great benefit for the sustainability of the urban form within the advantages of the site and the surrounding urban environment and the preservation of the natural and urban environments, and the use of more efficient ways to benefit from them to develop a framework for urban design in accordance with the system of sustainable development to ensure urban adaptation with modern developments and a concept against transformation Total urban or negative to say the least.

The research consists of three main parts: The first part: presenting the main ideas, and the second part deals with various information about the reality of the city’s situation, as the research relied on gathering information from various sources. While the last part deals with analysing and comparing data and linking it to the main idea of the research in order to reach the appropriate limits of the sustainability threshold that can be used in the city development. The objectives of this study to suggest a methodology for the sustainable interventions of historic traditional areas, in a way that makes them more effective and more responsive to the requirements of future developments .It tries to make the sustainable intervention to be more a wise according to the right (time - place) , thus we must depend on the main fact which confirms that the Urban sustainable intervention attempts to regulate and preservation the positive urban component performance over the time especially in traditional cities.

2. Methodology

The first stage, the research adopts the historical descriptive approach, through the calculations of Traditional evidence, whether on site or through historical documents, diagrams, drawings, archives,
or analyses of the Traditional topic description mode is generally not used for theory building purposes, but rather focuses on highlighting specific events and things. Thus, the study of the urban parts of traditional Alnajaf city was taken advantage of to achieve the research objectives. al-Dewan's reports on traditional Alnajaf city were mainly used for data on the center of the old city, in addition to information collected by researchers.

The second stage, the research takes a theoretical-deductive approach to develop the threshold theory's applications through used sustainability principles to increase the life cycle of urban parts of the city centers.

3. The Case Study

The traditional Alnajaf city occupies a prominent position among the important Arab and Islamic cities. It was chosen for applied studies, because it is one of the most important Traditional centres whose texture is characterized by the diversity and permanent renewal of some urban parts without others, which generates the actual need for the emergence of the threshold of sustainability [7].

Urban sustainability tries to capture the right positive moment for urban performance to preserve and continue it for the longest possible time.

The life cycle of the existing traditional buildings ranges from what is legacy in place and continuing to perform and legacy worn out, with the presence of added buildings and eliminated buildings that affect the determination of urban performance [8]. The traditional Alnajaf city was morphologically divided into five main Parts, which are (the Holy Shrine, expansion areas of the holy centre, development projects, the residential area and the large traditional market), research tries to evaluate the physical performance dimension of these parts as a basis of threshold of urban sustainability intervention [9].

The imbalance between preserving and protecting urban heritage, economic development, city functions and livability can negatively affect the city or urban life in it. The different approaches - heritage, ecological, economic, cultural, and social - do not conflict with one another. They are complementary to each other and their long-term success depends on their bonding with one another.
4. Sustainable Threshold and Wise Intervention

The threshold theory began in 1960; represented as a tool to solve the population growth problems. Its applications represented by a graph that organizes the relationship between two variables, one of which is the vertical axis, it represents (additional costs) or called threshold size, and the horizontal axis that usually represents the second variable, such as the population size or the area of the city. There are three types of urban thresholds (physical, technical, and structural), therefore the basic function of the applications of this theory that is to raise the level of urban product's performance to an acceptable level by the maintenance and restoration. According to The Graph, The right time of the urban threshold theory intervention that is in the fourth quarter where performance is low and weak to restore it as acceptable level again [11].

The procedural definition to Urban Sustainability Threshold is the extent to which the intervention becomes positive to ensure the sustainability of traditional cities. This is done through the functions performed by this threshold, which are (identifying the positive point or moment for the urban performance of the product, preserving the positive moment for the longest time distance, and sustainable improvement through interventions that reduce costs, pollution, crime, etc.). Urban Sustainability Threshold theory proposed here represents an interference in the moment of positive performance that varies with the passage of time to make it a stable positive moment and for the longest possible time distance because it represents interference between the variable and the master or the relative constant. Instead, he aims to target and have the best positive performance at the best possible moment to keep it going.

The importance of defending traditional city unity, and insisting on controls and laws that take into account the long-term sustainability of urban parts, is crucial to residents and developers [12]. If the density and length restrictions are irrelevant, why is there a policy at all? Why are there committees, inquiries, consultations, negotiations, reports, if there is no principle or code worth defending? The question here is not about the method of development and modernization, but about the way to deal with the original parts that make up the city.

![Threshold Graph](image.png)

**Figure 3.** Threshold According to the well-known "Threshold Theory": It is the boundary between two states of urban performance as (higher - lower, good - Bad, better - worse). Then, always cost intervention is required to raise the level of performance to the acceptable level.

Sustainable threshold represents an intervention at the right moment of positive product's performance over the time to make it as a stable moment within the long-time possible, it tries to catch the best positive performance, so it is not preferred using at the weak performance moments [13]. Through the Graph, This threshold represents a relationship between two variables; the first is vertical axis which represents the level of urban products' performance, the second is horizontal axis, which represents the time [14]. Also through the general Graph, we find that there is a horizontal median line represents an acceptable performance line, and there is a vertical median line represents the limit line between the developing and decline, so that the general plan consists of four quarters.
The sustainable threshold's Graph draws the existing products performance line which based on the given measurement of urban dimension performance over time within five stages (Growth, maturity, peak as line in top graph, regress, and decay) into four quarters. Sustainable threshold includes the existing buildings at the positive moment of physical performance and does not include the deteriorating buildings or the buildings under construction. Also, the research limited the Indicators were adopted to assess the physical dimension, which are (life span of buildings, percentage of land use, times of maintenance, year of last development or maintenance, level of infrastructure supporting it, and percentage of deterioration and decay).

Figure 4. Left: Urban sustainability seeks to control the positive performance of the built environment products (buildings, spaces, systems or infra – super structure). Right: L1, 2...6= The line of same performance, Assessment the specific right moment of urban sustainability threshold.

The research depended on the many studies to get the necessary description data as al-Dewan bureau study which had been submitted to the Iraqi Ministry of Municipalities. The holy shrine and its dominance over the traditional fabric are the most important determinant of morphological characteristics in the built urban environment, and it has a great influence on religious, commercial and tourism functions, The holy shrine has a religious and symbolic status for the Islamic communities, so it is under the auspices of its administration, the local government and the state to carry out continuous maintenance and development over time.

Large traditional market is one of the most famous markets in traditional Alnajaf city and is in the heart of traditional Alnajaf city Governorate, in front of the shrine of Ali bin Abi Talib .The market starts directly from the shrine of Imam Ali and reaches what is now called al-maidan Square. The market shops belong to the indigenous traditional Alnajaf city residents [9].

Figure 5. Urban components at traditional Alnajaf city [15] and Photography by researcher.
The market is covered with an iron roof, its structure resembles the style of the Ottoman markets that may date back to its era, and many tourists from different countries visit it to enjoy watching the different goods and the unique beauty. Gold jewellery, perfumes, clothes, and many other items are sold widely. It also has internal branches in which various goods are sold. Each branch specializes in a specific type of commodity such as spices, clothes, sweets, leather, fabrics and other commodities and products of all international origins.

Figure 6. Development projects. Photography by researcher.

The urban development of the Khornk and Al-Huwaish projects came in sync with the Visitor City project. These projects complement the urban developments in the old city, their construction was completed, and their buildings work commenced in 2011, they represent about (5%) of old city area. The fabric of the old city is characterized by the density of traditional urban style houses, which were mainly cantered around the holy shrine of Imam Ali. Because of the importance of the holy city and the holy shrine, urban developers and decision-makers resorted to finding spaces to expand the shrine to contain the crowds of pilgrims, so the shrine was expanded towards the Alnajaf Sea, an area about (15%) of the old city area [16].

Most of the urban renewal projects for traditional Alnajaf city are related to the general morphological aspect through projects of intervention in the existing structure and strengthening the economic, health and service aspects of the city, but the most important aspect is the investment projects that take advantage of the pressure that the Traditional centre of the city suffers from during visits in private and public events (Millions) and weekly visits, as well as other facilities (cemetery, religious schools, seminary), which were secondary to the renewal projects.

| parts                          | Life span/ age of building | land use% | times of maintenance | level of infrastructure | Decay% | Nature of intervention                      |
|-------------------------------|----------------------------|-----------|----------------------|-------------------------|--------|--------------------------------------------|
| 1 The holy shrine             | More than 1000 years       | 7.0%      | continuously         | high                    | 5%     | Sustainable improvement                   |
| 2 expansion areas             | 15 years                   | 15%       | Under construction   | high                    | 12%    | Wait to complete                          |
| 3 development projects       | 20 years                   | 5%        | Maturity stage       | Acceptable              | 23%    | Wait the peak of performance              |
| 4 the residential area        | More than 50 years         | 51%       | No maintenance process | Weak                   | *40%   | Maintenance or remove                      |
| 5 the large traditional market| More than 50 years         | 17%       | Twice                | Acceptable              | 4%     | threshold of urban sustainability           |
The five parts represent the basis on which the research depends in determining the time of intervention (Figure 7), as each part indicates the extent of its ability to get sustainability within the urban fabric. What is noticed here in the evaluation process is the extent to which the part approaches or moves away from the threshold of sustainability, and therefore the evaluation of the part and its comparison with the whole indicates the appropriate time for intervention and this methodology is good in dealing with traditional cities to determine the appropriate time for abandonment. It has been indicated that the threshold of sustainability at traditional Alnajaf city appears in two cases:

The first case: it is the threshold of positive sustainability, in which there is interaction towards the development of urban parts in parallel with the development of the city. The second case: It is the state of negative sustainability that depends on partial development that takes place in the absence of joint coordination between the parties to the intervention.

Both cases require consideration of the sustainability threshold to coordinate the intervention activities to create the required balance for the city’s future. Both cases will be discussed in the results with an important comparison of some studies and research that dealt with traditional Alnajaf city.

5. Results and discussions

We see from the foregoing that the interest in parts and working on their sustainability is not sufficient to give a clear integration of the traditional Alnajaf city on the contrary; there is a clear disparity between the urban parts. As a result, the sustainability of urban parts is due to planning decisions to develop the city through future projects of the city and the complex political and economic outlook within clear plans, as well as the important human values that are related to defining the good shape of the traditional Alnajaf city. As a vital space, the shrine contributes to bringing people together in a specific context within an urban space,[17, 18] which enhances communication and community participation - and increases opportunities to learn about different cultures, and contributes to creating a sustainable space. The urban part has reinforced this vitality as the spiritual nucleus of the region and the core point of attracting commercial and diversified activities to the rest of the events [19, 20]. This point of the research reinforces the findings of the research that in that the starting point and strengthening the intervention must start from the points of urban attraction so as to enhance the existing values and contribute to their improvement [21, 22].

Urban interventions have effectively contributed to enhancing the future transformations of the city by removing a large portion of the traditional fabric of the historic centre. On the other hand, the interest in accommodating urban renewal processes rather than accommodating the declining transformations of the city within the renewal activities makes it important to find a starting point for innovation in the process of effective balance of city development [23, 24]. The impact of the shrine was clear on the structure of development and renewal, as its parties focused on investment activities because there was no basic reference or because it was often weak, and the matter remained related to focusing on some morphological characteristics without the others. The interest in the physical and cultural references of Najaf seemed more evident in relation to the centre, which was more liberal in adopting material references and their impact on the sustainability of the city.

There are additional factors enhance the sustainability of the cities include the freshwater sources [25-27], mitigate the climate change[28, 29], conservation the potable water from pollution resulted from industries[30, 32].

- According to the sustainable threshold's Graph and table, the right time of the sustainable interventions in traditional Alnajaf city was at the third quarter when the right moment of performance of sustainable threshold was at the higher performance and the longer period of urban product in third
quarter. The research determined the large market as a right place and had a right performance at analysis moment.

- Classic threshold theory may be as maintenance processes at residential area to rise the performance then we can intervene as sustainable threshold.

- Other parts of traditional city need more time to growth and mature.

The problems of absorbing balanced sustainability appear in the master plan and developments in modern life are more evident in the unimportant parts. This requires attending creative solutions and seeking the assistance of people with expertise and competence in solving the problem of balance and initiating the use of the threshold concept.

6. Conclusions

1- The sustainable threshold represents a tool to help decision makers at traditional cities.
2- The sustainable threshold plays an integrative role with the classic threshold theory. Because it is possible to assume that into two processes, the first, which is to raise the negative performance of urban product in the fourth quarter of Graph to the acceptable line or the third quarter through the classic urban threshold interventions such as maintenance, restoration, etc., and then comes the second process, which is the intervention of the sustainable threshold to keep on the positive product's performance.
3- Unbalanced development and attention to only major urban parts threaten the sustainability of the traditional centre negatively most of the time.
4- Any addition at traditional cities must be a wise.
5- Dealing with the traditional centres shows that the city was vernacular buildings that designed by unprofessional people thus they try to conserve what they possess even if their buildings is suffered from decline, that was a reason to be government agencies and institutions to responsible of urban interventions nature.

7. Recommendations

- To improve the quality of traditional cities life, that must provide accurate data about their components and dimensions of performance.
- Prioritize policies and actions for conservation and development, including good governance, while establishing appropriate partnerships (public - private) and local governance frameworks.
- Urban heritage is vitally important in traditional cities - now and in the future.
- The sustainability threshold is a real criterion for creating the required balance in the development of traditional Alnajaf city.

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1. Performance of traditional Alnajaf city.
2. Visitors city had been removed and cancelled in traditional Alnajaf city.
3. The performance of Centre expansion area in traditional Alnajaf city.
4. The performance of old heritage residential area traditional Alnajaf city.
5. The performance of commercial market in traditional Alnajaf city.

Figure 7. Urban Sustainability Threshold traditional Alnajaf city.
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