Conservation Approach as an Architectural Instrument to reviving Historical Cities; technical analysis for multi international cases

Sabeeh Lafta Farhan\textsuperscript{1,2,*,} Haider I Alyasari\textsuperscript{3} Hamed Hyab Samir\textsuperscript{4} Salah L Zubaidi\textsuperscript{5} and K S Hashim\textsuperscript{6,7}  
\textsuperscript{1}Department of Architecture, College of Engineering, Wasit University, Iraq  
\textsuperscript{2}School of Architecture, Design and the Built Environment, Nottingham Trent University, UK  
\textsuperscript{3}Department of Architecture, College of Engineering, University of Kerbala, Iraq  
\textsuperscript{4}Department of Architecture, College of Engineering, Basra University, Basra, Iraq  
\textsuperscript{5}Department of Civil Engineering, Wasit University, Wasit, Iraq  
\textsuperscript{6}Environmental Research and Studies Centre, University of Babylon, Hill, Babylon City, Iraq  
\textsuperscript{7}BEST Research Institute, Liverpool John Moores University, Liverpool, UK  
* Corresponding author: drsabeeh@uowasit.edu.iq

Abstract
The conservation of historical and heritage buildings depends on its ability to meet the immediate and future requirements of society, maintains the balance of system shape and values within the urban landscape and its ability to succeed economically and environmentally through the building and functional works. The research aims to uncover contemporary modern procedures and techniques to conserve historical buildings that would define historic city centres. A descriptive and analytical approach was adopted, which included building a cybernetic theoretical framework about historical buildings, extracting the most important variables and indicators for each individual and comparing these variables with selected examples from the United Kingdom, the United States and Iraq. It is recommended to take advantage of important international experiences and studies to increase awareness and understanding of the correct methods of dealing with and conserving historical buildings. That includes cooperation with international organizations in providing international expertise to identify the best means of rehabilitation in accordance with nature, quality and style of our heritage buildings in particular, and heritage of architectural centre in traditional urban centres in general.

Keywords: Architectural Conservation, Historic Cities, Moderns Technique

1. Introduction
Historic city centre is the product of human thought and culture that a real crossing of the nation's culture and heritage intellect since the peoples known by its culture and civilization. Architecture is crossing all the privacy community formed because of diverse social, economic factors and other interaction that.
The importance of the concept of conservation deals with the memory of the community by preserving the characteristics of the heritage and historical evidence to ensure continuity effectiveness and avoid neglect to be an extrapolation of the identity and privacy of the community. Thus, the importance of thinking about how to deal with these buildings, how to preserve and restore them to life, and the extent of their response to maintenance work, as well as their suitability to the requirements of the modern era, by using modern technology. Accordingly, the research will address three important experiences in conserving urban architecture from different environments and diverse cultural heritage, which are the British Museum, the experience of the city of Philadelphia in the United States and the holy city of Karbala in Iraq.

Historic city centre is the product of human thought and culture which real expressing the nation's culture and heritage since the culture and civilization reflect their peoples. Architecture represent the social privacy which formed because of diverse social, economic factors in addition to other interaction. The importance of the concept of conservation is to deals with the memory of the community through preserving the characteristics of the heritage and historical evidences to ensure continuity and avoid neglect, in order to be an extrapolation of the identity and particularity of the community. Thus, the significant of thinking on how to deal with these buildings, how to preserve and revive them, and the extent of their response to maintenance work, as well as their appropriately to the modern requirements of the new era via using modern technology. Accordingly, the research will address three important experiences of architectural conservation from different environments and diverse cultural heritage which are the British Museum, the city of Philadelphia in the United States, and the holy city of Karbala in Iraq.

2. Conservation

Conservation can be defined as the process of protection and prevention of historical and heritage buildings, which suffered damage obliterated the original features in accordance with the evolving process methods, a technique suitable for trading with traditional residential areas and intended to confer a distinctive character of it [1]. That is, regeneration of our old buildings and their continued re-use is in all our interests. It ensures that the present generation can experience and enjoy the physical expression of past generations. It includes maintaining all operations performed on the buildings to keep the cultural importance. Conserving the architectural heritage has become a historical responsibility for humanitarian, help in retaining the last milestones to see the children of the future [2]. The Xi’an Declaration draws attention to the conservation of context, which defined as the physical, visual and natural aspects as well as social and spiritual practices, customs, traditional knowledge and other intangible forms and expressions, in the protection and promotion of world heritage monuments and sites [3]. Authorized urban conservation is a struggle against the collapse of the factors that caused to buildings as a result of multiple issues. Besides, it is primarily based on respect for those buildings that are less physical intervention as possible.

2.1. Types of Conservation

2.1.1. A heritage Conservation on the urban level. The conservation of the architectural heritage areas includes historical cities, heritage areas, housing centres, and other activities. For example, traditional markets and areas with religious events, while in the cities of the Holy Shrines include the shrine and the surrounding urban areas on the basis that the shrine part is originally separate from the surrounding urban areas.

2.1.2. A heritage conservation on the architectural level. It is intended to conserve heritage buildings of a historical or individual character, and buildings of religious, cultural, historical, or architectural significance. The work includes conserving multiple acts classified by many researchers in the [4], namely:

- Replace completely identical defective parts with a copy of the original but a different material.
• The introduction of the new configuration corresponds to the original in form and material and clarifies the same idea that was outdated in the original but achieves contemporary artwork.
• Replace affected parts and ephemeral projections with the same material as the original building but refer to outlines (layouts) of the model only.

2.1.3. Motivated urban conservation. Humanity has witnessed over the past century many destructive wars that have shown the weakness of the urban heritage and humanity in general before the destructive power of weapons and wars. Moreover, the influence of human on the architectural heritage was heavier and greater. The industry contributed to the increase in environmental pollution of air and water, which directly affected the architectural heritage. The historic conservation based on the policy objectives can be summarized as follows [5]
• The protection of the national heritage of the urban fabric, for reasons of historical dimensions, and spiritual and national, social and aesthetic.
• The increasing pressures and changes that threaten the fabric with extinction and need to be adapted to suit contemporary requirements.
• Reviving areas affected by deterioration and change in use, especially in city centres, their services and infrastructure, which led to abandonment.
• Economic feasibility of conservation, as buildings and protected areas can be achieved in the event of moving to new jobs, reusing the economic life of the area and providing additional income for building owners.

3. Urban Development
The power of association is clearly appearing when a place is threatened by change, especially in urban development projects, since the residents feel a strong emotion towards their place of residence because of the association of this environment with their memories [6]. It is a vital act that deals with the accumulations of transformation in the system that the human has adapted in the environment around. This could be through the vulnerability of Western thought, which has faced multiple ideological currents intertwined with deeply rooted values in the region. Consequently, the random chaos turned into a breach of the city’s values [7].

3.1. The development of the historic city centers
The concept of historical centres can be identified as living centres of distinct historical or aesthetic importance. The city centres in the city and its spaces have two shapes, namely:
• It is an integral part of the original foundation and ideal city structure. In this case, it takes the spatial location and the elements that make up a place to have its meaning.
• An integral part of the original basis and the ideal structure. In this case, the centre can act as a mediator between the original bases of the city fair. Meaning that it is a stage for the occurrence of incidents [7].
The second type, the secondary centres, has distinct historical values located in major cities.

3.2. Distinctive elements of historical urban centers
This can be classified as follows:
• Elements of the urban space configuration, which are the elements of the urban structure and the network of primary roads to the centre as well as the diversity of urban space with decorative bodies in the historic centres.
• Elements of aesthetic configuration: the aesthetic configuration of historical buildings could be single or interconnected elements which represent the diversity of the individual buildings and the authenticity of the site.
• Elements of the social structure: the continuity of urban activity and the reorganization of life in the historic centre area, along with the demographic changes associated with conservation projects, depend on the cultural level.

3.3. Priorities conservation and development of urban heritage areas

Development work assumes that priority is given to areas of architectural heritage (urban and architectural) in the inner city or areas that must be conserved. Not every old building or building that carries values is conserved, but there are standards set by which to diagnose which buildings will be conserved. This is done based on the use of a set of criteria, including the age of the area for urban building maintenance and the age of architectural maintenance, the historical significance of the area or building, the state of the urban area in terms of demolition rate, the physical nature (urban fabric - blocks, voids, etc.) and the architectural character and technical details of the buildings. An important criterion is the economic aspect and the possibility of investing by conserving. Each of these measures has its own weight (relative weight based on the objective of conservation area), so that the final evaluation of the area counterweight between all factors. Then the areas are classified into first, second and third categories according to goals, budgets and requirements [7].

There is a classification of historical buildings in terms of the first function, which arises from the building and creates the feeling that they represent the historical value of the building and the size of values and symbols [8] according to the following:

- Position abolished and meaning like the rest of the Mustansiriya School.
- Position and meaning remain cancelled, such as the use of the Babylonian theatre for contemporary purposes where no longer carries the old meanings.
- Position and meaning are cancelled and replaced the meaning with a new meaning like Ziggurats.
- Position and meaning remain such as mosques and holy shrines.

3.4. Challenges faced by the architectural heritage in the historic city centers

The most traditional city centers in Iraq are currently in a deplorable state, some of them threatening residentially and demographically. Losing the historical monuments will result in a disconnection between the future generations and their history because the lack of knowledge of their cultural heritage would lead to a weakening of their identity [9]. The lack of periodic preservation of any building leads to deterioration due to environmental pressures or groundwater that damage the foundations of the old building and its walls. Many historic city centers still do not have general strategic plans that organize many of the renovations carried out in accordance with international trends. Most of the building renovations were done individually, even though they had a moral, artistic and historical value, but without preserving the surrounding fabric [10]. The fact that most towns, cities, and heritage shrine centers today suffer from distortion and change in basic characteristics. Many heritage buildings in the city center are either abandoned or misused to the point of distortion. Abandoning the building, of course, is preferable to severe abuse, because abandoning leaves the building intact, without the interference or manipulation of human behavior.

4. Research Purpose and Methodology

The research aims to uncover contemporary modern procedures and technologies to conserve historical buildings that would define historic city centres by reviewing the most important experiences at the global level. A descriptive and analytical approach was adopted, which included building a cybernetic theoretical framework about historical buildings. Three different samples were chosen for the architectural conservation work, which are the British Museum in the United Kingdom, the city of Philadelphia in the United States, and the city of Karbala in Iraq. Moreover, all samples have varied between different functional activities and heterogeneous environments. Among the most important things that are classified within the individual structures, are the historical buildings and the historical edifice that has been absent from its historical surroundings and survived inside the place despite the changes that it has acquired.
4.1. The British Museum (United Kingdom)
The British Museum is a public institution dedicated to human history, art and culture. Located at Great Russell Street, in the site of the former home of Montagu in London, United Kingdom [11].

![Image](image_url)

**Figure 1.** The British Museum in London [11].

4.2. Conservation purpose process
With the passage of time and the increase in the size of the museum and the diversity of its activities as well as the functional needs of the museum, and the number of visitors interested in the museum, the link made it easy to move between spaces and thus led to the difficulty of the movement system within the spaces. Therefore, there has become an urgent need to rehabilitate the museum in order to meet all these requirements, which increases the efficiency of its performance at all levels. The museum has an extensive suite of laboratories and uses a wide range of microscopy and imaging techniques, vibrational spectroscopy, elemental and molecular analysis. The research is supported by access to extensive reference collections of organic and inorganic materials. The Department of Scientific Research, at the museum, helps to ensure the long-term preservation of the Museum’s collection through the use of innovative techniques such as lasers in conservation treatment and X-radiography to probe the structural integrity of objects. Moreover, they have opened up new approaches to see how objects deteriorate. The team is a distinctive international and an interdisciplinary science group, with a wide range of new facilities for CT scanning, molecular analysis and multispectral imaging that conducts research with a global reach. Conservation research includes the study of the deterioration and alteration of artefacts or the materials they are made from. The results of such research allow new or improved conservation methods to be developed [12]. The success of the restoration process led to a boom in the life of the surrounding buildings and an increase in the tourist attractions and investment value. Thus, raising the value and importance of the museum itself. The possibility of applying such ideas in many heritage and historical neighbourhoods, by merging more than one building with associated urban spaces and changing their function can be done to meet the needs of the community.

4.2.1. The documentations. The use of tri-dimensional modeling techniques, which have helped to take the appropriate decisions and accurate processing of service systems (mechanical, electrical and plumbing) for new spaces. See figure 2.
4.2.2. The Reservation. The increasing of the functional needs of the building that require new spaces in associate with modern requirements of the building has been expanded and added service systems (mechanical, electrical and plumbing). The achievement of transforming outer space into inner space has converted space into a link. The central roofing yard increased the general space of the museum. As a result, visitors were allowed to move freely throughout the ground floor. The central courtyard became a link between the museum spaces, where visitors now have several directions in front of them to move.

4.2.3. Administration. The British Museum building has been subjected to many changes in the level of tariff and supplementary elements as a result of adding new spaces to meet the functional and traffic of the need in the museum. Therefore, the building is distinguished by the renewal of the tariff elements, as well as the level of services, and the preservation of the historical importance of the building so that it does not affect or tamper with the exterior style of the building.

4.3. The city of Philadelphia (United States)
The historic cities of the United States of America witnessed the most important political events in their history, and there are many landmarks that speak of these facts. Including the Declaration of Independence Building (Independence Hall) located in the eastern United States in Pennsylvania. The old city, which is called central city between the two rivers and surrounded by two expressways somebody has seen vandalism and removal (structural, economic and environmental) that passed us in American cities, but was suffering from the recession and the problems of extinction [14]. They worked to improve the old city in the seventies. The most important points of the project:

- Priority to economic development;
- Renew (develop) and rebuild the work base;
- Economic objective (reviving the economic character of the town core, and the building of a big commercial centre in the downtown area);
- Obtaining and allocating the budget;
- Support locally based institutions and sectors;
- Retain significant buildings for the sole purpose of museums.

Figure 2. Design sections of the additions. (a) Ground floor diagram, (b) Stages of adding spaces and new elements of the building and (c) The perspectives of the museum section after rehabilitation [13].
4.3.1. Structural objectives:

- Led events are logical with the objective of the commercial core of the city, and the repair or removal of buildings is consistent with this role.
- Maintain significant individual buildings and remove the rest.
- Removing the buildings in front of the president scene and constructing the rest of the buildings whose height is lower than the historical buildings.

4.3.2. Transport and Traffic:

- Completion of parking spaces in non-residential locations;
- Coordinating the railways;
- Modernizing urban infrastructure and superstructures;
- Planning method (the order in which lands are used by urban areas);
- Preparing site plans that do not contravene the design of the foundation.

This project has led to an increase in the number of families who come to live there (the buildings surrounding the municipality), as they were premises with a good income and they go more than one-third on foot to work, Figure 3. With such success and the presence of many favourite sites and intimate streets, remained a dirty neighborhood. Many international companies that are not thinking about the interests of Philadelphia have made the purchase of local events [15].

Figure 3. Philadelphia's intimate streets and favourite sights for locals.

The work on improving the urban landscape through the pedestrian streets equipped with lighting and renew covering, planting trees in the streets, set benchmarks for guiding tourists and passers-by, as the municipality accepted the duty of taking charge of the trees, which are nearing death [16]. Interface improvements - how to convert empty buildings to a certain activity, particularly residential use. Each of these distinct means of improvement will enhance a further one. Thus, the aim of the owners is the most profit, the municipal tax increase, and the parents make them take pride in their group and enjoy the frequency of them, a safe and comfortable place. The survey found that more people are familiar with the board's work because they may have seen customer service representatives with wireless devices and cleaners. They value their presence in the region in total security [17]. This popular scientific institute was the biggest success of the municipality much in the organization and restructuring of this ancient city. May benefit from this model in the creation of a supreme body ensures an end to the disastrous situation of the old town and includes all stakeholders and be authorized by an act of the Provincial Council of Representatives or so. It receives full power to operate in the old urban center and attend as a senior administrative body to solve their problems.
4.4. **The historic center of the city of Karbala, Iraq**

4.4.1. **Principles of Karbala city study.** It is necessary to identify the physical and social deterioration aspects that the traditional areas within the city have suffered from, which could be accomplished by taking samples from several regions in the city core, Figure 4. The survey collected data representing the current situation in older areas, such as social, economic and urban data. The survey used two methods to collect the data questionnaire and interviews, along with direct observation inside the site [18]. The expected number of foreign and local pilgrims in Karbala will be quite high if there is a good way to revive heritage sites and activate the tourist aspect, especially the traditional urban fabric in the city center. The city of Karbala had a special religious function, throughout the year. The city is therefore faced with two major issues. First of all, it is a matter of welcoming pilgrims and meeting their needs, especially with regard to religious matters. Second, is related to the local community and problems that creating because it’s an attractive city and therefore encourage migrants from other cities to coming and dwelling in it [19].

![Figure 4. Map showing neighbourhoods of old city](image)

There are two primary justifications for expanding upon the holy shrine in Karbala, which are [21]: First of all, the present building is not suitable for the main function which is to serve the pilgrims, because its capacity is not sufficient to welcome them in order to carry out their religious activities like prayer and circumnavigation. Accordingly, it is necessary to add an area within the shrine or the land around it. Second, increasing modern activities and sub-functions in response to current demands. The holy shrines have a specific role in architecture, regardless of Muslims or others. The centralization of the shrine within the building and the axial movement of the pilgrims around it is seen as an entrenched value which must be confirmed. Hence, the shrine must be placed in the heart of the building while all the other activates located around it [22].

The new building may have the same principles as the previous one; however, the meanings are different from one another. Furthermore, the symbol expressions, which have been used by the designer in the new building, may be different since the materials have changed and developed [23]. The new meanings are added to the old to make it suitable for a specific function or to enlarge the old building [24]. In this case, there is a common function between the two sides, but there is a difference between them in terms of the time they have integrated. The merger of two parts requires a joint, sometimes the joint can be evident to express the difference between the two periods and clarify the difference between the old and new [25].
5. Conclusion
The conservation of historical and heritage buildings depends on its power to fulfill the immediate and future demands of social club, maintains the balance of system configuration and values within the urban landscape and its ability to deliver the goods economically and environmentally through the building and functional works. As a result, the research focuses on three important experiences in the conservation of urban architecture of different environments and cultural heritage, which are the British Museum, the experience of the city of Philadelphia in the United States of America United and sacred city of Karbala in Iraq. Essentially, most urban centers and heritage shrines today suffer from distortion and shift in fundamental features. Many heritage buildings in the downtown core are either abandoned or diverted at the distorted point. Abandonment of the building is better than serious abuse, as abandonment leaves the building intact, without interference or manipulation of human behavior. The conservation of architectural heritage has become a historic responsibility for humanitarians, helping to conserve the latest milestones so as to see the children of the future. Authorized urban conservation is a fight against the collapse of the factors that caused the buildings due to numerous problems. Moreover, it is primarily based on compliance with these buildings that are less physical intervention than possible.

6. References
[1] The Ministry of Municipal and Rural Affairs 2005 Graphic evidence of the Ministry of Municipal and Rural Affairs, "The architectural heritage Conservation Guide", Riyadh, the first edition
[2] Mahgoub Y O 1995 Urban development of modern architectural heritage in the UAE effect a seminar on the preservation of architectural heritage in the UAE Dubai
[3] Samir H H 2017 Iraqi architecture between tradition and modernity: Re-creating the urban identity of Basra, the “Venice of the east” Doctoral Thesis, University of Salford, Manchester, UK
[4] Mosisaan R M 2001 The dialectical relationship between tradition and modernity and its impact on the expansion of the old buildings master thesis submitted to the Faculty of Engineering Department of architectural / Baghdad University
[5] Aga Khan for Architecture 1983 Network
[6] Castells M 1989 the Informational city: Economic restructuring and urban development Oxford: Blackwell Publishers
[7] Shahbandar 2006 The urban environment between the Arab Thought and shifts the values of the times M S Ph.D. thesis in Faculty of Engineering, University of Baghdad
[8] Farhan S L, Jasim I A, and Naji A A 2019 The Sustainable House: Comparative Analysis of Houses in Al Kut Neighborhoods-Iraq International Conference on Developments in eSystems Engineering (DeSE), IEEE 1031-1036
[9] Samir, H H and Trillo C and Toriello A G 2017 Managing challenges to local culture in construction: Preserving architectural identity in the city of Basra, 13th international post-Graduate research conference, university of Salford, Manchester, IPGRC
[10] Jawad M A G 2008 Urban Renewal and the Quality of Life The school's first-Mustansiriya University in the Islamic world, Dar Al-Buraq
[11] Foster N and partner 2001 Norman Foster and the British museum New York
[12] http://www.flickr.com/photos/heliophile/80842167
[13] Foster N and partner 2020 The Reichstag Munich, London
[14] The Department of Scientific Research 2020 History of scientific research on the collection. Retrieved from https://www.britishmuseum.org/our-work/departments/scientific-research/Kalantr H,Techniques & Experiences Planning of Historical Area, Navi press, 2004.
[15] Foster N and Partner 2001 Norman Foster and the British Museum New York 66-82
[16] Joncas R and David J N 2006 Turner Paul V. Stanford University Princeton Architectural Press, NEW YORK
[17] Levy P 2001 Downtown:Competitive for a new century In Jonathan Barnett,Planning for a new century Washington DC, Island Press
[18] Barnett, ed...Planning for a new century. Washington DC, Island Press.

[19] Attia H N 2008 Notes on the expansion of the Haram al-Sharif al-Husseini roofing saucer The second edition of whipped, gentler Press, Karbala

[20] Dewan’s Najaf 2012 Stage 3 Report - Ar, Najaf Stage vol. 3

[21] Farhan S, Akef V and Nasar Z 2020 The transformation of the inherited historical urban and architectural characteristics of Al-Najaf’s Old City and possible preservation insights Front Archit. Res.

[22] Farhan S L, Abdelmonem M G and Nasar Z A 2018 The urban transformation of traditional city centres: Holy Karbala as a case study Archnet-IJAR 12 53–67

[23] Farhan S L, Jasim I A and Al-Mamoori S K 2019 The transformation of the city of Najaf, Iraq: analysis, reality and future prospects J. Urban Regen. Renew. 13 160–71

[24] Farhan S L and Nasar A Z 2021 Urban identity in the pilgrimage cities of Iraq: Analysis trends of architectural designers in the city of Karbala J. Urban Regen. Renew. 14-2

[25] Farhan S and Abdelmonem M G 2018 Navigating the SOCIO-spatial and planning conditions of traditional public spaces in Iraq’s holy cities Traditional Dwellings and Settlements Review 30