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Sustainable urban development of historical cities: Historical Mosul City, Iraq



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Urban Fabric;
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Conservation

Abstract Due to the imbalance between their historic physical buildings and the requirements of its residents, heritage sites are subject to several urban pressures. However, the major potential for urban growth in such locations is in their historic assets.

The purpose of this research is to provide an approach for conserving and enhancing urban history in a manner that is beneficial to the environment, society, culture, and economics. Heritage conservation is attempting to distinguish itself. This is due to the fact that conservation and sustainability objectives do not always coincide. The findings are based on research conducted in Mosul and a study of sustainable development's concepts and pillars. With the use of UNDP reports, the present condition in Mosul was determined. The results demonstrate the need of devising a strategy to safeguard historic cities while allowing residents to continue to reside there. This plan should include objectives, strategies, and instruments to ensure that the “historic living city” can adapt and evolve in accordance with the sustainable development principles and the sustainability cycles.

The paper uses an inductive methodology to apply sustainable development to historic city centers worldwide.

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1. Introduction

Mosul has a rich and diversified cultural past; yet, during the previous fifteen years, it has experienced a continuous decline until 2017, when the IS conflict ended.

Lots of cities in Iraq and the Middle East feature medieval-era historic districts and are the epicenter of Arab civilization. These historic cities are distinguished by their great cultural

assets, prominent religious structures, harmonious urban shapes, attractive streets and public spaces, traditional producing and commercial activity, and social connections [1]. New challenges have arisen as a result of urbanization, growing pollution, and limited resources the principal elements that destroy historic cities yet “urban heritage” seeks to address these difficulties [2].

Conservation of heritage has been pointed out as a key part of achieving sustainable development. Using the city's history means that not only each building, but also the city and area as a whole, must be kept in good situation [2]. As part of the overall goal of historical conservation, efforts should be made

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to modify physical and intangible aspects of a city in order to strike a balance between the past and the present of important urban locations. When it comes to managing urban growth and preserving land, repurposing abandoned structures is the most important component. It is also important to keep in mind that future generations will benefit from the preservation of land, buildings, and infrastructure that have been abandoned [3].

In the subject of urban development, there are several methods for assessing the sustainability of the built environment, each with its own perspective and objective. Many of these strategies are insufficient for historical conservation due to their inability to adapt to the particular characteristics of a heritage site [4]. Most cultural heritage assets aren't evaluated holistically and sustainably because of the importance placed on a few key indicators and sub-indices that aren't considered in heritage value management [5]. This research attempts to provide a strategy for maintaining and upgrading urban history in a manner that adheres to environmental, social, cultural, and economic sustainability norms since it is unclear what the function of heritage preservation is in planning for sustainability.

2. The research methodology

This research will use an inductive methodology with different phases and instruments: As shown in (Fig. 1).

1. **Theoretical Analysis of Concepts and Modern Ideas:** Initially, a conceptual analysis is conducted by explaining the many meanings of the concepts of "sustainable urban development" in cities.
2. **Descriptive and Analytical Study:** Then, a descriptive study is conducted to demonstrate how sustainable urban development might be implemented in urban areas. The ideas, indices, and strategies of sustainable development in historic city cores are next analyzed.
3. **Application and Evaluation for Calibration of the Proposed Framework:** The framework is then applied to the ancient city center of Mosul using a variety of methodologies. This phase is conducted to provide a particular set of suggestions to improve the likelihood of sustainable urban growth in Mosul.
4. **Discussion of Outcomes, Conclusion, and Suggestions:** As a method of sustainable development of historic city centers, the application and comparison analysis findings are dis-

cussed to explain the research's conclusions and to provide a set of suggestions to be implemented in various cities.

3. Urban heritage preservation and sustainable development

The continual upgrading of urban cultural assets provides support for the ongoing preservation efforts. Architecturally historic locations and structures are those that are significant to the history of a civilization but are not kept as well as they should be. Because it does not get the same level of attention as officially protected places, its past is rapidly vanishing as a result of industrialisation and urbanisation. This is as a result of its position. The nation's cultural richness may be seen in the great number of unprotected historical and cultural sites that are still in use, as well as in the physical and intangible aspects of its past [6].

In addition to its historical significance, the legacy is worthy of preservation since it illustrates the principles of long-term relationships in contemporary society. It is essential to emphasise that these cultural properties are not legally protected. Historic urban neighbourhoods are essential to a region's identity as a place with lasting cultural and social characteristics that function as economic and creative magnets [7].

Sustainable development became a topic of conversation after the Brundtland Commission Report was released in 1987. According to the article, "fulfilling present demands without jeopardising future generations' ability to meet their own needs" is the definition of sustainable development [8]. Following more than two decades of study and legislation, the word has grown more generic and relative. Economic, social and environmental concerns are always balanced in accordance with the three sustainability principles. Disparities in living circumstances between cultures are being recognised, and approaches that integrate social and environmental systems are being developed in response. Cultural development was referred to be the fourth cornerstone of sustainable development during Johannesburg's 2002 Earth Summit. However, cultural issues have been around for a long time. [9].

City sustainability can only be achieved if the city's cultural history is preserved, which is why it is the most important element in creating a city self-sustainable. When it comes to historic urban sites, "the concept of sustainable development allows for the preservation and active protection of urban history as a requirement for development," according to the This

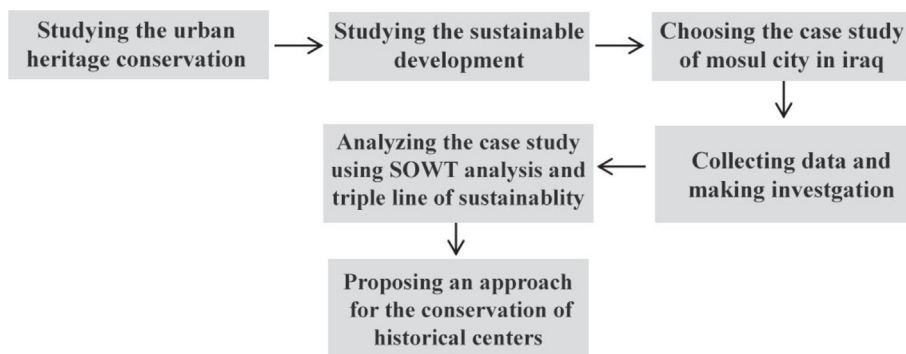


Fig. 1 The research approach used. (Researchers, 2022).

is clear from the 2011 UNESCO Recommendation on the Historic Urban Landscape [10]. Recent events have shown the significance of cultural heritage. The Sustainable Development Goals adopted by the United Nations General Assembly in 2015 contain the sub-goal to “strengthen efforts to safeguard and preserve the world’s cultural and natural heritage.” [11].

With Sustainable Development Goal 11 (SDG 11), governments have agreed to “provide inclusive, safe, resilient, and sustainable cities and human settlements.” Within this objective, Target 11.4 seeks to “strengthen efforts to maintain and safeguard the cultural and natural legacy of the globe.”

To track this objective, the UIS is developing a new internationally comparable indicator of how much each nation spends per capita to preserve its cultural and natural heritage. It encompasses public and private expenditures, including local, national, and international investments alone or with civil society organizations. Private spending sources include foundations, non-profits, corporate sponsors, and individual donations [29].

Together with governments and partners, the Institute simplified and reclassified this indication as Tier II. [29].

Conservation and sustainability aims are likely to clash in many scenarios due to the fact that they encompass so many diverse topics, such as how difficult it is to utilise renewable energy in historic settings and how energy efficient ancient structures are [39]. To make historical preservation and sustainable urban growth work together successfully, legislation, techniques, and current goals must be matched with precision [3].

4. Triple pillars of sustainability

The concept of three aspects of sustainability, as depicted in (Fig. 2), has become central to mainstream sustainability thought. According to this viewpoint, the triple bottom line is a concept established to encourage sustainable development by measuring performance based on social, economic, and environmental implications. When used to evaluate projects, programs, and policies, it delivers the message that financial, cost-benefit, and economic concerns are not the only ones driving projects. Economic, social, and environmental concerns are all given equal weight in this approach [12].

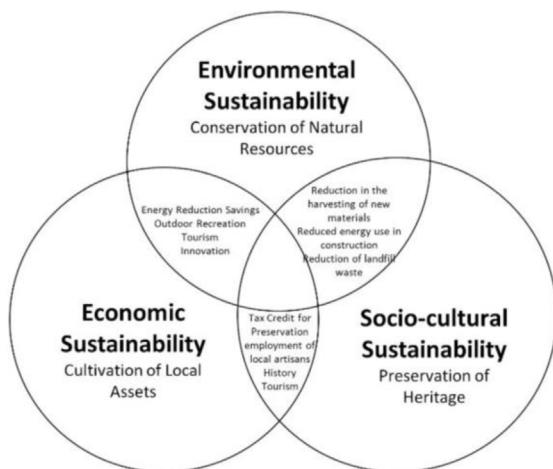


Fig. 2 The Triple Bottom Line of Sustainability [13].

4.1. Environmental aspect

UNESCO and other heritage management organisations (ICOMOS, UNEP, UCS, etc.) have launched programmes to investigate the hazards to monuments presented by climate extremes and changes in temperature, precipitation, salinity, and sea levels. Universities and environmental research organisations gather data to accurately track trends and predict the future. The scope of disaster monitoring operations include climate extremes and meteorological events. These programmes aim to provide more adaptive preservation and conservation solutions for historical artefacts, architecture, and landscapes in light of climate change [14].

4.2. Economic aspect

Significant monuments and structures are maintained for future generations via heritage conservation [15]. Due to budgetary constraints, the necessity for property development, and the paucity of land-based employment opportunities, conservation was pushed to demonstrate the financial viability of its initiatives. The commercialisation of heritage and culture has been influenced by these and other factors. The establishment of natural partners in the heritage sector via tourism has driven conservation to recognise its role in a sustainable economy and contribute to quality of life. Cultural preservation and tourism are gaining popularity as economic development methods [16], given that tourism employs over 200 million people and contributes over 10 % to the global GDP.

4.3. Social and cultural aspect

Urban communities have become more diverse as a consequence of population movements, industrialization, globalisation, international migration, and other factors. While redevelopment and population growth need new infrastructure, communities are seeking to balance these demands with sustainable land use decisions. Urban planning and management are becoming more concerned with conservation as a result [17]. Social sustainability is the capacity of a society or social system to maintain an acceptable level of social well-being through time. Focusing on cultural characteristics and social ties may have a significant impact on the long-term health of a society. By adjusting to local constraints, these contributions increase community engagement, demonstrate diverse perspectives, and emphasise long-term survival [7].

5. Case study: Historical Mosul City

Mosul, is one of the country’s most important cities. It is the seat of Iraq’s northern governorate of Nineveh and the country’s second largest metropolis after Baghdad. Nineveh’s Mosul District is the most populous of the nine districts. It consists of six sub-districts in addition to Mosul city: Mahlabiya, Hammam Alaleel, Shora, Qayara, Ba’shiqa, And Hamidat [18].

This paper provides Mosul as an example of how sustainable development and historical preservation may coexist. The built environment may be managed in a manner that is beneficial for the economy, the environment, and society. This

practise is known as sustainable built environment management. Additionally, social problems might often be more significant than economic and environmental concerns.

5.1. Location of Mosul city

Mosul is located on the Tigris River about 400 km (250 miles) north of Baghdad. The major city of Mosul has expanded to incorporate significant portions of both the “Left Bank” and “Right Bank”. On its eastern side, Mosul is constructed around the ancient Assyrian city of Nineveh. (Fig. 3).

5.2. Historical context

The ancient city features a unique combination of Islamic-era urban and architectural styles that have withstood the test of time. Numerous ancient mosques, domes, and shrines have been discovered there. It is renowned for the harmony between its urban and architectural Islamic influences (Table 1). Mosul’s ancient city has several archaeological houses, the most of which come from the nineteenth century. These houses include the Iraqi Primary House, Khan Al-Sawaf, and Alkhan Al-Mofty [18]. The residences of the ancient city, in addition to wood ornamentation, furniture in assembly, interlock, cushioning, engraving, and producing geometric designs, are one of the most outstanding occurrences (Table 1).

5.3. Historical urban fabric

Mosul’s ancient city is a classic Islamic settlement with a historic city center. Mosul’s urban fabric has been influenced by a number of Islamic kings. The Hamdani periods occurred following the Rashidun, Umayyad, and Abbasid periods. In the eighth century A.D., during Umayyad authority, the city flourished and became one of Mesopotamia’s most prominent cities [19]. In addition to the city’s architecture, economic activity and transportation alternatives grew at a rapid pace. The oldest market in Mosul was founded during this time period. Saeed Bin Abdul Malik, the Umayyad monarch, was the inspiration for the name. urban constructions such as souks and other buildings are being constructed. job opportunities, agriculture and population density were all facilitated by the eleventh century’s prosperity. “ Azerbaijani, Syrian, and Iraqi tourists were among those who attended [20].

Most of Mosul’s illegal growth after 2003 happened in public and agricultural areas outside of the city’s 1973 master plan. This was because of population growth, poverty, lack of social services, and bad urban planning [21]. Two different patterns can be seen in Mosul’s urban fabric right now. Both the old, compact design and the new, grid-based design are used. The traditional compact layout is based on Mosul’s ancient Old City, which is made up of small courtyard homes and narrow passageways. [22]. The existing grid design reveals much about the city of Mosul, where single-family dwellings, semi-detached homes, and row houses, the most popular form, coexist [23]. (Fig. 4) depicts a map of old city as well as the urban fabric of the historic city.

The city’s eight administrative sectors include the residential zones. For the most part, neighbourhoods are laid out in a grid pattern, with rectangular blocks of houses separated by roads running horizontally and vertically [22]. As a result of its location along the Tigris River, the Old City neighbourhood is frequently considered to be the city’s centre. As seen in (Fig. 5A) and (Fig. 5B), typical residential neighbourhoods in Mosul are made up of rectangular blocks of Row-house units separated by roadways and green areas [24].

To comprehend how Mosul was constructed in the past, one must examine the surrounding surroundings. The urban fabric is logical and emphasizes the significance of “ways of perceiving.” It makes use of a conceptual technique that combines urban environmental, cultural, social, economic, and political components into one cohesive system of thought [39]. To appreciate a city’s beauty and importance, one must first understand its structure. The study of urban fabric is crucial and helps people live better lives. In addition, thorough investigation of the past and current urban form enables us to determine what to avoid and how to make things better, which is one of the primary objectives of effective urban administration. Respect for urban fabric is uncommon because it ties together planning, preservation, and urban design, all of which are significant application areas [25].

Several maps are made to assist individuals grasp the urban fabric of the city. (Figs. 6–9) According to the land use map, the ratio of buildings to void is more than one, and the city lacks sufficient open space. Also indicates the necessity for services and employment. In accordance with the neighborhoods plan, the city is split into nine neighborhoods. According to the street width plan, about 90 percent of the city’s roadways are

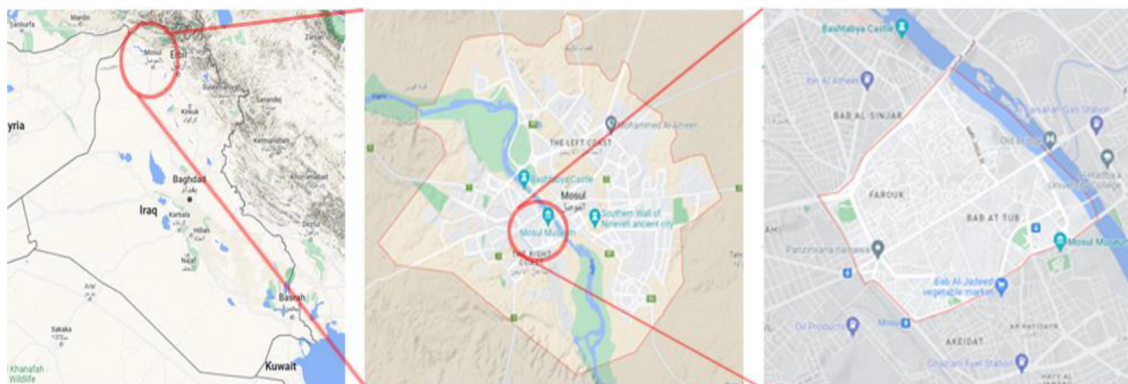


Fig. 3 Location of historic city of Mosul. Maps from (by researchers, 2022).

Table 1 Elements and ornaments in the last century in the Mosul city (By Researchers).

common patterns	1910-1925	1925-1940	1940-1955	1955-1970	1970-1985	1985-2000	2000-2015
Ornaments							N/A
Archs							
Al-Rahra	N/A		N/A	N/A	N/A	N/A	N/A
Hib Water Colers							N/A
Local Materials							
Wynd							
Mosuques							
Cul-De-Sac							



Fig. 4 An old city map provides a look at the historic city's urban fabric (By Researchers).



Fig. 5 Aerial view (A) and schematic housing layout (B) [22].

less than 15 m wide, posing a significant problem in terms of accommodating population density.

5.4. SOWT analysis

The SWOT analysis technique is an excellent tool that enables researchers to analysis the present state of a research objectively and precisely. In other words, it is a tool for selecting appropriate strategies by combining internal and external factors along the four dimensions of strengths, weaknesses, opportunities, and threats; the internal factors include the dimensions of strengths and weaknesses, while the external factors include the dimensions of opportunities and threats [30]. In conclusion, depending on the SWOT analysis, the researchers will create appropriate remedies or strategic approaches for the current issues. (Fig. 10).

Evaluation of Strengths (S). The strength analysis will concentrate on positive elements. Mosul city’s status as a state-level intangible cultural property gives it several benefits over other cities. since these advantageous characteristics are historically transmitted, so constituting Mosul is hard to clone.

The Examination of Weaknesses (W). Although the cultural heritage of Mosul possesses it will have an inheritance and preservation edge over others, but its flaws will limit it.

Therefore, there is a strategic benefit to assessing its detriments.

The Evaluation of Opportunities (O). Opportunities and dangers analysis refers to external elements that influence the

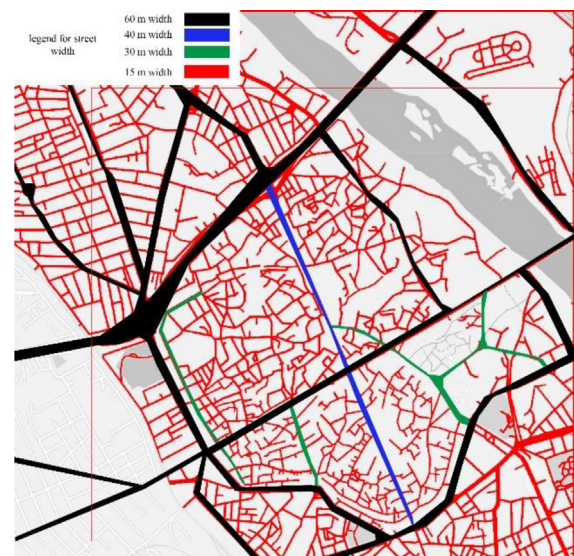


Fig. 7 Street width (By researchers).

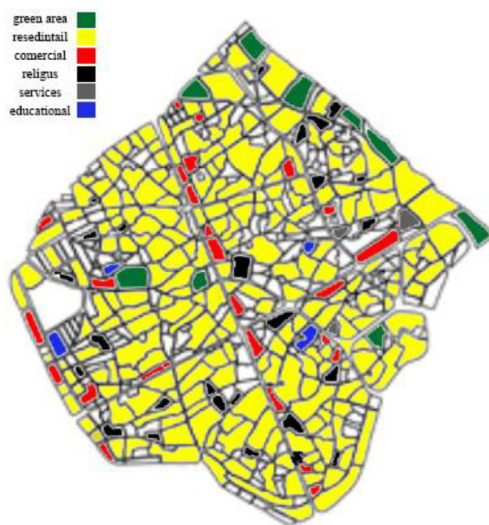


Fig. 6 Land use (by researchers).

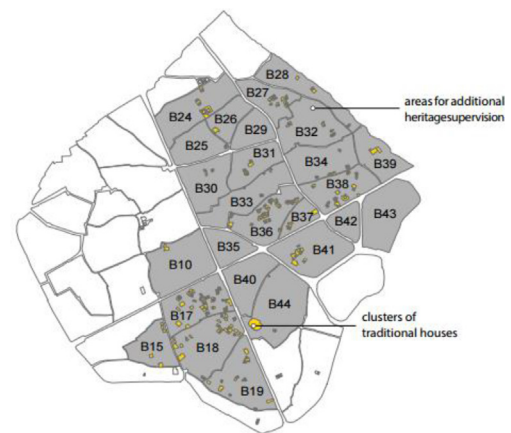


Fig. 8 Areas with listed traditional houses [21] (edited by researchers).

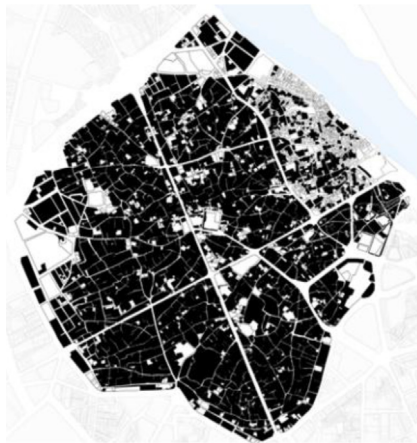


Fig. 9 The buildup area in historic city [21] (Edited by researchers).

growth of the city. As uncontrollable as these variables are, they are used as a basis for making strategic judgments. We can take advantage of the possibilities while minimizing our exposure to the hazards. The conclusion of the study will focus on the options likely to contribute to the preservation of Mosul city.

Risk assessment (T). Modern culture and business are dangerous. Rural sensibility and connection give Mosul city energy and endurance. This state-level cultural heritage faces threats from modern civilization as more residents leave their tradition for the city. Traditional culture has evolved substantially, and residents are influenced by modern societal ideas, making it harder to inherit and keep Mosul.

Mosul’s recognition as a state-level cultural treasure has brought notoriety and economic benefits. To guarantee Mosul’s steady and sustained growth, we must reduce utilitarian economic exploitation and unearth its cultural richness. This will give the city a traditional folk-art brilliance and communal roots.

6. Integrated approaches to sustainability

Sustainable decision-making, environmental sustainability, and social sustainability are all dynamic variables in the realization of city sustainability. Whether the focus is on transportation infrastructure, or the economy depends on the city’s context. As a whole, the city needs a comprehensive, long-term sustainability strategy that incorporates continual long-term planning and implementation [26].

6.1. Applying sustainability principles in Mosul city

Integration of the strategic planning with a focus on local possibilities and small-scale improvements are crucial components of the proposed system, which seeks to implement sustainability principles in Mosul with an emphasis on the city’s historic district.

6.2. Preservation and redevelopment of historic districts

Particularly in the old city of Mosul, there are issues with the sewage system, the gas supply, and public transit. Due to this deficiency, as well as social issues and restrictions on land usage, the original inhabitants must leave the center zone. They are replaced by occasional residents and those with mod-

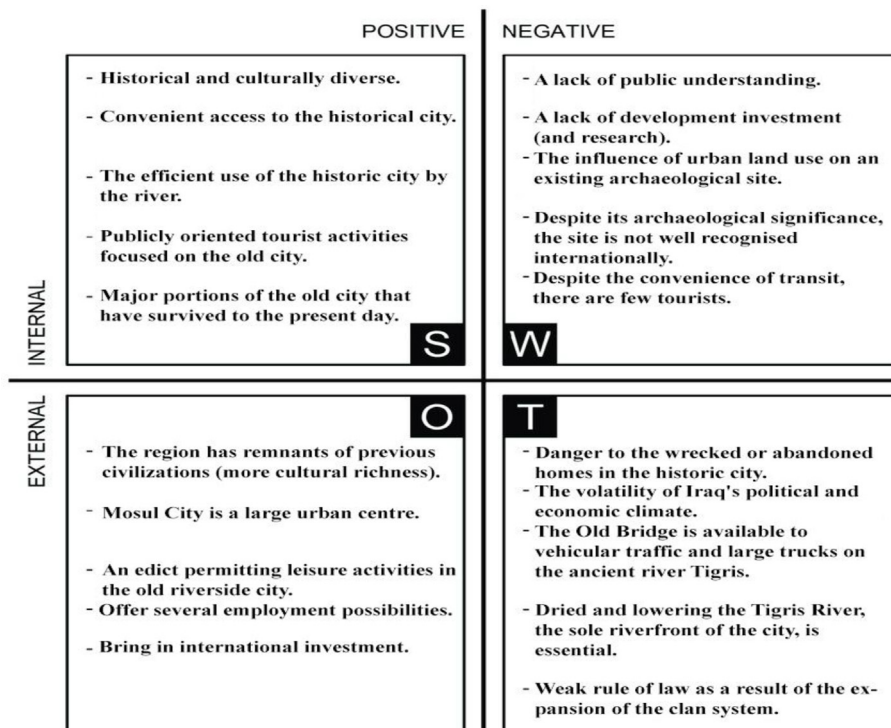


Fig. 10 SOWT analysis for the old Mosul city (by Researchers).

est salaries. These immigrants have little to do with the region's customs and earn very little money. As a result, the social and economic condition of the neighborhood is poor.

There are around 200 historic residences, 10 palaces, and 30 notable mosques and organizations in the old city of Mosul (Fig. 11). Even though some of these historic structures have been employed as museums and cultural centers, the great majority of them are no longer used in urban areas. Additionally, lack of access has an impact on daily living [21].

Some see the tourism industry as an adaptable solution to a variety of difficulties in historical zones. In this concept, ancient homes are renovated and converted into tiny hotels. Due to the layout of the historical neighborhood, a few residences may be combined to form bigger tourist districts. Souq is a two-kilometer-long, covered, linear trade district in the heart of the historic district. Numerous small production enterprises aid in its operation. A few little adjustments to the acupuncture points at its openings might mend and revitalize it. The majority of the enterprises in the bazaar are owned by long-time residents of the old town. This affords the bazaar the opportunity to serve as a focus for urban development and community participation [27].

The Tourist Oriented Planning is applicable across the city. Despite its mild environment, Mosul has the potential to become a major tourist destination, hence creating new opportunities for the local economy. The province of Nineveh, on the other hand, is home to an abundance of well-known historical sites and natural tourist attractions. All of these factors contribute to a potentially favorable atmosphere for International Journal of Development and tourism development. They may be considered major historical interests in order to enhance local social and economic circumstances.

6.3. Pedestrian-oriented urban planning

Daily in Mosul, navigating the city is difficult. As a result, some urban initiatives in the central zone include the widening of highways. Due to the fact that many surrounding properties are privately held, however, the concept has not been used much. Also, typical patterns of physical development have led to an increase in the number of individuals who own vehicles. Therefore, regulations that encourage individuals to walk and ride bicycles are long-term answers [14].

It protects ancient structures from further degradation and provides people with diverse methods to interact with the same architectural environment. With "needle access," you may rapidly enter your vehicle if necessary. People may learn more about their city's history, environment, and cultural events in the city's pedestrian domain. It offers visitors a safer, more attractive, and more convenient way of living [28].

6.4. Integrated transportation system

Mosul has eight major transit hubs and one temporary halt. They are separated into those who manage transportation links outside of the city and those who manage transportation links within the city. The Old City is served by three bus stations: the right and left Bab Al Tob Terminals link the Old City to the East and West Banks, respectively (Fig. 12). Priority is given to the rehabilitation of these two bus stops in order to link the Old City to the public transportation network. The Baghdad Bus Station requires major expenditure to be properly rebuilt, as removing big concrete remaining buildings greatly raises cleanup expenses. The bus/taxi routes and termi-

PROTECT HERITAGE FROM FURTHER DESTRUCTION
SAFEGUARD VULNERABLE LANDMARKS

#	Heritage landmarks	Status
1	Elisa Dadah shrine	Destroyed
2	Imam Abdulrahman shrine	Destroyed
3	Shekh Al Shat tomb	Destroyed
4	Al Umawi mosque	Destroyed
5	Omawi mosque minarat	Destroyed
6	Primary house of Iraqi	Minor Damage
7	Emam Ibrahim mosque	Destroyed
8	Hammo Al Qaddo mosque	Destroyed
9	Catholic church	Minor Damage
10	Al Aghawat mosque	Minor Damage
11	Al Sawwaf khan	Minor Damage
12	Nabi Jarjis mosque	Destroyed
13	Al Basha mosque	Minor Damage
14	Al Hadbaa minarat	Minor Damage
15	Al Mufti khan	Minor Damage
16	Hammo Al Qaddu khan	Minor Damage
17	Al Nuri mosque	Minor Damage
18	Saida Nifisa shrine	Destroyed
19	Shah Zanan shrine and tomb	Destroyed
20	Al Hagiyat Khan	Minor Damage
21	Al Najafi street	Minor Damage
22	Khengar Khashab mosque	Minor Damage
23	General old police station	Destroyed
24	Al Totonch house museum	Destroyed
25	Al Hatra hawks square	Destroyed
26	Al Saah church	Minor Damage
27	Dominican fathers monastery	Minor Damage
28	Monastery of Dominican nuns	Minor Damage
29	Khuzam mosque	Minor Damage
30	Ancient Nineveh wall	Destroyed
31	Al Rabiaa mosque	Minor Damage
32	Imam Awn Aldin shrins	Destroyed



Fig. 11 Some of the historical building in old city of Mosul. [21] edited by the researchers.

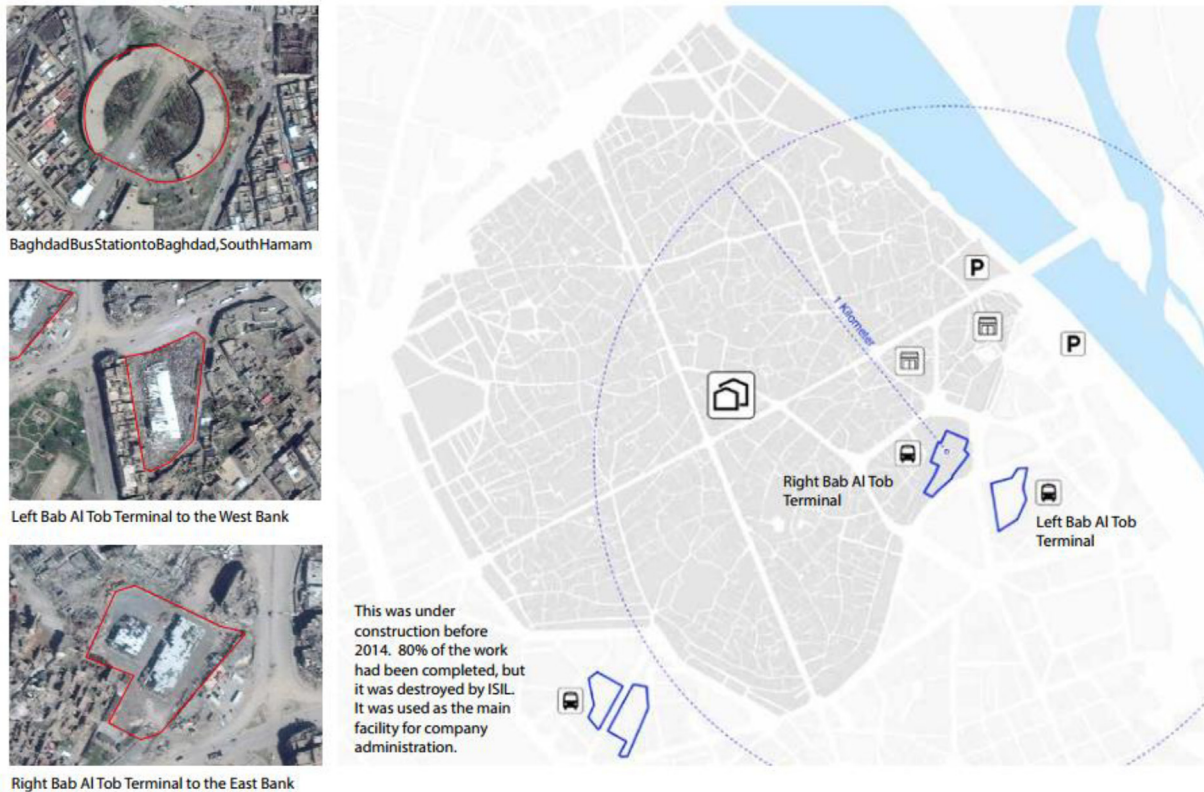


Fig. 12 Bab al Tob terminal. [21].

nals will be managed by the Public Transportation Management Private Company authority [21].

The region west of the Old City has the potential to re-establish itself as a transportation hub. A Transit-Oriented Development (TOD) should be considered for this area. It hosts:

- The Old City market and other nearby business amenities in a limited space.
- A substantial number of parking spots existed prior to the crisis; and - a high population density.

A TOD is a planning technique that tries to provide housing, jobs, and transportation all within walking distance of one another. As a result, it minimizes reliance on automobiles and encourages pedestrian traffic. A TOD strategy must include high density housing areas, public transportation and parking, commercial amenities, and strong pedestrian access.

7. Discussion

In Iraqi historical cities, due to their unique importance in the country’s urban network and cultural legacy, they have been designated as World Heritage Sites. Social-cultural factors have a greater influence in potentials (monuments, sites, and events) than do potentials (monuments, sites, and events). In actuality, all in an adaptive process, sustainability issues should be addressed. In the case of Mosul, due to the peculiar Along with tourism, the environmental and building criteria that comprise the sustainability framework were developed.

Industry expansion. Despite the fact that this sustainability approach may be extended to other historical places, requires localization in each setting. Due to cultural, social, and political factors, priorities must shift. environmental standards. Integration of urban planning and execution are the crucial factors.

Keeping a city in good situation requires consideration of a number of different variables. These include: (Fig. 13, 14).

The tourist trail: The interactions that occurred between visitors, locals, and the host region are depicted via a history trail.

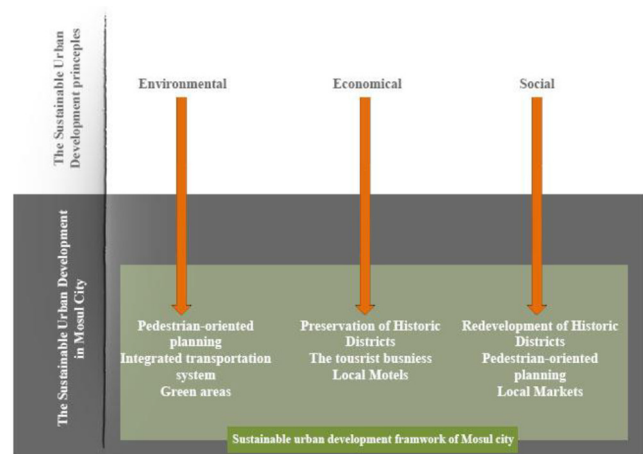


Fig. 13 The Sustainable Urban Development in Mosul City (Researchers, 2022).

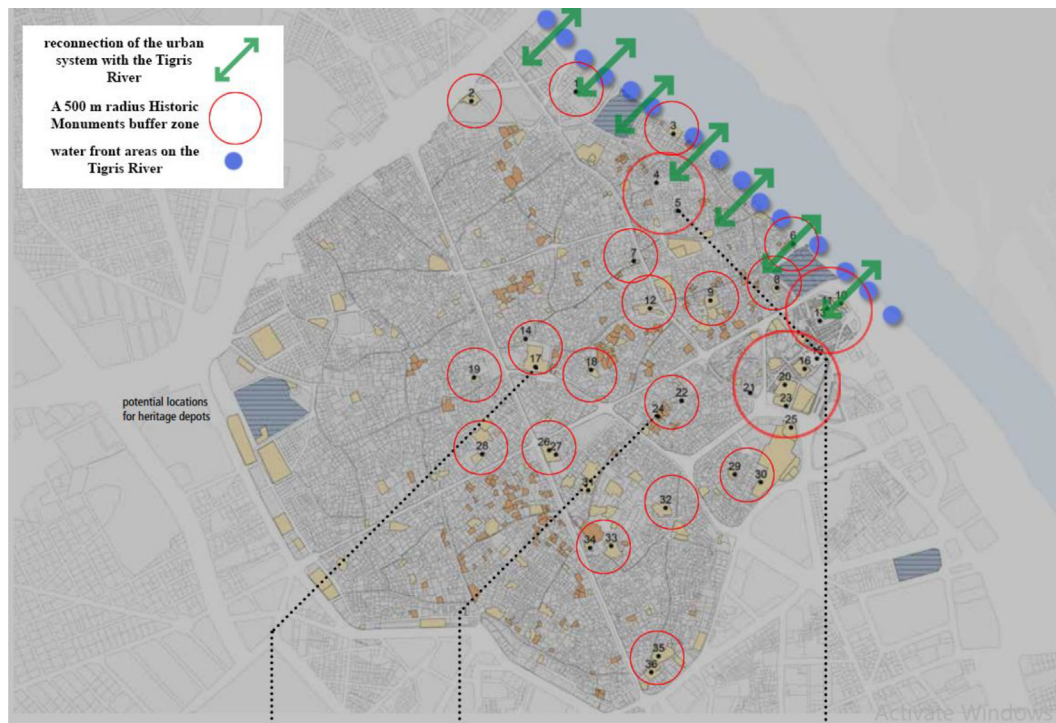


Fig. 14 The Historical Sites in The Mosul and The Relation with Tigris River (Researchers, 2022).

This is a straightforward implementation of Krippendorf's concept of "people tourism." His suggestion is based on the concept that "animation" should play a big role in the travel and tourist industry. In order to stimulate the establishment of new connections, the goal of animation is to remove any barriers that may be in the way and encourage participants to adopt an adventurous mindset [31]. As goals and activities for visitors, learning, self-discovery, and adventure are placed at the forefront by this method. This lends credence to the notion that the objective of the heritage path is to encourage partnerships between tourists and historic places that are advantageous to both parties. As a direct result of this, a history trail promotes the practice of cultural tourism in historically significant locations. Visitors are also able to contact directly with the individuals who work at built-heritage sites while on their own self-guided tours. [32] As a result of these direct connections, the tourist is able to discover, take in, and experience cultural heritage.

Because it is most directly tied to exchanges between tourists, locals, and hosting towns, local economic development is seen as a suitable criterion for measuring the benefits of a history trail [33]. According to the author's point of view, the economic benefits received by the local community are due to the satisfaction of mutual requirements by means of these relationships. It is possible that tourism may play a role in the regeneration of historical sites, which will in turn improve the quality of life for local residents. In addition, the most significant advantages of tourism for locals are likely to be economic in nature, such as higher levels of income and more prospects for employment. Archer and Fletcher make a distinction between economic advantages that are directly, indirectly, and indirectly induced. The early effects of local community

engagement in tourism-related efforts are felt very immediately [34].

This covers both remuneration in the form of wages and profits. Also considered a direct consequence is the amount of money the government receives as a result of taxes and other levies.

There may be unintended consequences that result from asking those working in the tourist industry to promote or support their economic activity. Labor, food, drinks, and other consumables are all accounted for in this price [38].

Aspects of the intangible heritage of ancient Mosul

- Crafts and Trades Festivals and public celebrations Festivals and public celebrations.
- Festivals and public celebrations Festivals and public celebrations Festivals and public celebrations.
- Food Procedures Festivals and public celebrations Food Procedures.

Pedestrian Oriented Development: POD refers to a kind of urban design that makes it simpler for individuals to walk to commercial, residential, and transportation destinations. POD is implemented by combining many land-planning principles, such as traffic calming, pedestrian- and public-transit orientation, compact development, mixed-use, and a variety of housing types. POD is most successful in urban and downtown settings, but it may also be used successfully in rural and suburban locations.

Compact development fosters effective land use and aids in minimizing the loss of open space by making it feasible to construct at a greater density in areas experiencing expansion, such as town centers and downtowns.

These measures may be incorporated in the legislation governing compact development: [35].

- (1) Large, authentic neighborhoods should be situated near to the city center to provide adequate accessibility to attractions.
- (2) Redevelopment is the process of converting empty areas into green, human-friendly settings.
- (3) Maximum requirements for the number of on-street parking spaces, as opposed to minimum criteria; and.
- (4) acceptable square footage criteria for downtown or city center commercial buildings.

Some picture for before and after of the proposal

The rehabilitation of the Al-Nouri Mosque complex, a historical monument that is part of the fabric and history of

Mosul, will be a milestone in the process of improving the city's reconciliation and social cohesion, according to Audrey Azulay, director-general of UNESCO. "Heritage places and historical monuments are potent stimulants for a feeling of connection, community, and identity. They are essential to revitalizing the spirit of Mosul and all of Iraq. (Fig. 15) shown the proposal of the rehabilitation of the great mosque with the buffer zone and the using the same urban fabric of the surrounding area making the great mosque one the attractive touristic places in Iraq.

The location and design of streets, building edges, parking, and open space, as well as the total amount of housing and jobs located within walking distance (approximately a quarter mile) of transit stations, have a direct influence on people's propensity, ability, and choice to use transit, walk, and bike. Therefore, excellent transit planning also entails appropriate

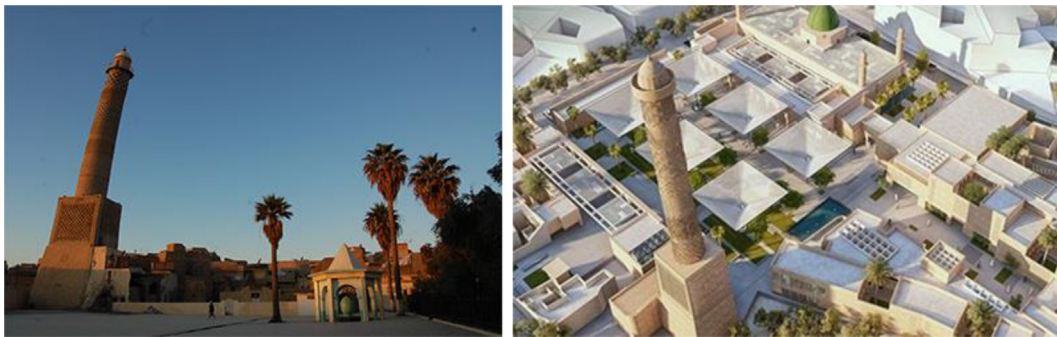


Fig. 15 Rehabilitation of the Al-Nouri Mosque via Reconstruction [36] edited by authors.



Fig. 16 The distribution of the street's paths (by researchers, 2022).



Fig. 17 The bazar before and after (By researchers, 2022).



Fig. 18 Abandoned historical houses in mosul can be used as a small motel. (by researchers, 2022).



Fig. 19 Abandoned historical houses in mosul can be used as a restaurant. (by researchers, 2022).

TOD planning throughout the whole transport route. (Fig. 16) show the the street before and after using the TOD in Mosul city [37].

Fig. 17 shown of the bazars of old mosul city and the proposed land scape and sitting area for the same bazar.

Figs. 18-19 shown some of abandoned historical houses that we can use it as restaurants or motels to use it as attractive point for tourist to visit the old city of Mosul.

8. Conclusion

It has been increasingly widely accepted that cultural heritage is a sustainability goal as the idea has become more complex. For the simple reason “prevention is better than treatment.” It is crucial to take the required procedures to protect cultural property since prevention is better than treatment. A comprehensive strategy for protecting historic buildings and places to prevent a historical city from falling apart. In the future, it will be necessary to develop comprehensive heritage policies that concentrate on some or all of the means of protecting and preserving cultural resources.

This study opens the door to inter-disciplinary research on sustainability, but mostly stays within the confines of physical planning. Indirectly, the most intriguing notion is investigated: “contextually” adopting planning principles acquired from a specific urban setting. This more critical line of thought suggests that Mosul is not all that different from other urban regions in Iraq (in terms of its spatial and environmental contradictions). In addition, given the paper’s focus on qualitative and context-specific analysis, more study on actors, institu-

tions, and the planning and management framework in Mosul is conceivable. The concepts of sustainability must be guided by the recognized drivers.

According to the Mosul research, it is essential to enhance the city Centre. This involves safeguarding the city’s history, identity, and legacy, as well as coordinating planning and conservation activities so that long-term growth and conservation may coexist.

Keeping a city in good situation requires consideration of a number of different variables. These include:

- In order to improve the city’s social and functional mix, pedestrian zones should be established in its historic core, as well as the city’s physical link to the Tigris River.
- The creation of a 500-meter buffer zone around the Historic Monuments helps to ensure their visibility and cohesiveness with the surrounding urban environment.
- (Tramway, metro, or public transit) networks are used to enhance the infrastructure and transportation systems of the area
- Streets have good potential in terms of urban design, with pavements and lighting components, but they require additional green elements, such as street furniture, chairs, and garbage bins.
- Amazing architectural styles may be found in buildings. They are, however, marred by air handling units hung from windows and ground floor store banners.
- This location has all of the elements of attraction; if the sustainable urban development model is used, its appeal to inhabitants and visitors will grow.

Urgent Actions That Should Be Taken to Develop Mosul's Historical City:

- Making improved public transit and parking facilities available to people in need, as well as resolving conflicts between various modes of transportation and pedestrians.
- More trees will be planted, as will more garbage cans and notice boards with information about the historic buildings and why they are significant.
- Both the public and private sectors are revitalizing and developing ancient buildings in order to preserve the cultural uniqueness of the city core.
- Reorganizing small businesses and putting a halt to street vendors.

This paper study the relationship between urban development and sustainable city development. This topic is an important component of a larger set of topics in the realm of urban design. This large area will continue to expand, with new ideas and conceptions emerging as conditions and settings change, presenting new problems and opportunities.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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