SUSTAINABLE URBAN SPACE STRATEGIES IN THE RECONSTRUCTION OF DESTROYED CITIES AFTER THE WARS

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Abstract
It is essential to rebuild the devastated cities after the war. The research problem is how to quickly and sustainably bring post-war cities back to life. So the hypothesis of the research is the integration of city reconstruction strategies in a sustainable manner. The case study in this research was urban spaces in Mosul - Iraq. The objective of the study: know the sequence of the process of reconstruction and arrangement of solutions to situations according to its importance, and arrange the strategies used in the reconstruction process to be a balanced and sustainable process that includes all social, economic, and environmental aspects at the same time, while specifying the time needed for that used analytical approach to study the reality and collect as much information as possible, analyse it and evaluate it based on the theoretical background of reconstruction and previous global experiences and compare them. Then come up with recommendations for starting reconstruction from now and for the future. The research has found strategies for reconstructing urban spaces, first aid strategy, selective strategy, emergence and re-emergence strategy, sustainable housing strategy, and sustainable transport strategy. The research recommends starting a first aid strategy. Establishing a financial base, through the establishment of a follow-up agency, with the responsibility reconstruction of public spaces, reconstruction as a sustainable city, improve green spaces through the restoration of forests, practical design, improving air quality and the environment by preserving the rich historical and cultural heritage by expanding the nodes, squares, and gardens, with a variety of recreational activities, as well as public participation in formulating the strategy, as well as other recommendations.

Keywords: Cities, Destroyed, Mosul City, Reconstruction, Sustainable Strategies, Urban Space, Wars.
1. Introduction

After the war, the reconstruction of destroyed buildings and the re-establishment of urban spaces were essential steps to return to everyday life. Before the start of the reconstruction process, the first challenge must create security and protection to begin sustainable recovery resettlement of displaced populations and the elimination of the conditions that generate conflict [1].

The current research analysed a variety of previous experiences in the reconstruction of devastated cities, and it reached the research methods that have been applied in the city of Mosul, being one of these cities after the liberation from ISIS in 2017, integrated information has gathered, and accurate information about the level of destruction:

- The research provided a theoretical framework by analysing previous literature in reconstructing cities destroyed in wars to elicit general indicators, research variables, and indicators.

- The research surveyed the Mosul city residents from specialists in architecture and urban planning to find out the real problems and take their opinions to develop general strategies and contribute to the reconstruction of urban spaces within the city.

- The research collected information and surveyed the study area by collecting images of the destroyed urban spaces.

2. Previous studies

German cities became ruined cities in 1945, destroyed by the Allied bombers, the main architectural monuments were severely damaged, and a large part of the dwellings was destroyed. In addition, at the end of the war. Observers believed that it would take forty years to rebuild Germany. However, by the late 1950s, West German cities rose again. The housing crisis has been overcome, and almost all important landmarks have been rebuilt. Cities have regained their distinctive identities. Everywhere there was a mixture of old and new: Historic churches and city halls stood together with new residences and shops; it has maintained the layout of the old streets and has been surrounded by significant streets. According to modern planning principles, developing ancient city centres was balanced with suburban gardens. In this book, Diefendorf [2] examines the questions raised by this remarkable achievement of urban reconstruction.

Diefendorf [2, 3] explained, who is in charge, what represents the speed of reconstruction, and how to set priorities and make decisions about them. He argues that Germans in critical areas such as architecture, urban planning, historic preservation, and housing policy relied on individuals, ideas, institutions, and practical experiences from the Nazi and pre-Nazi periods. Diefendorf explains that the reconstruction of West German cities after 1945 can only be understood in long-term urban development [2, 3].

Diefendorf [3] concluded that Germany managed to revive its urban cities in record time and pursued a decentralization policy. Each city dealt with its problems, following the same schematic pattern before the war. Cities that followed pre-war street plans and preserved ancient urban density became more attractive places than places that drove urbanization and modernized spaces. The author invited for
selective strategy and sensitive development: preserving heritage structures, sacred shrines, and churches, reverting to their original forms.

The destruction of heritage and architectural symbols by conflicts and wars, such as the destruction of mosques in Iraq, the bombing of British cathedrals in World War II, and the fall of the World Trade Center towers on 11 September, is the destruction of collective memory. Bevan [4] believes that this destruction undermines the culture and morale of the nation and is a deliberate act to eradicate and erase its cultural memory.

Through his historical studies, Bevan found that the goal of these wars and conflicts was mainly to destroy architecture by eliminating the Cortez cities of Aztec, to the Dresden and Tokyo bombings of World War II, to the war in the former Yugoslavia. Therefore, the destruction of memory exposes the cultural war behind the architectural genocide and reveals that this attack aims to eradicate the people. He has suggested that it is a crime that international law should punish them. The demolition of mosques and temples of priceless museum buildings defy the concept of “collateral damage,” but it finds it A deliberate act of cultural destruction [4].

A strategy for preserving the city’s identity includes architecture, cultural and Intellectual Memory, Morale by Messages, Propaganda, Reconstruction Revival, and Protection.

Wars destroy cultural heritage and the built environment, and efforts have been shown to rebuild these cities [5]. The reconstruction process takes its course for each place and time. The researcher addressed analysis the case of Warsaw and Dresden after the Second World War, and the situation of Mostar, after the Yugoslav war, as well as humanitarian law and its development related to the protection of cultural heritage in times of conflict, a set of strategies, was drawn as:

• Preparation and Planning.
• The people themselves have done immediate reconstruction.
• An emergency plan has protection and preservation of cultural property.
• Use of traditional methods and materials.
• The strategy of selective.
• Replica Strategy [5].

To conclude: Develop a strategy to protect cultural heritage

There are serious economic challenges, the development of appropriate policies and successful financial plans to start a simple reconstruction process, the lack of essential services such as health and electricity, and the failure of steps to accelerate the reconstruction process, political and security instability, and administrative and financial corruption. The main challenge for the reconstruction of Iraq. The need to develop a strategy through the economy and market management. The Iraqi government takes over the task of reconstruction itself with an international umbrella represented by the United Nations [6]. To conclude: Develop a strategy through the management of the economy and the market.

Bădescu [7] studied the relationship between post-war urban reconstruction and the process of compatibility with the past. Focusing on Belgrade and Sarajevo. She explored how post-war space relates to a sense of history. His research has focused
on post-war urban reconstruction and homemaking for refugees and displaced persons within their own countries. He discussed with various grants post-war rebuilding of Post-World War II Germany 2005-2007, Lebanon 2008-2010, Bosnia and Herzegovina 2008-2015, and Serbia 2012-2015. In Sarajevo, he discussed the post-war homemaking process for the displaced. Bădescu called for the research to return lost places and that memory - a platform for cross-European exchange on history and remembrance. He also called for policies, urban design, and strategic planning for sustainable destinations at Romania's National Geographic Society and UNDP Space construction. He worked on EU-funded local development strategies and projects in Romania, Armenia, Georgia, and Moldova. Bădescu's research focuses on the relationship between post-war urban reconstruction and the process of compatibility with the past [7].

In the second study in 2011: Beyond the Green Line: Sustainability and Beirut's Post-war reconstruction, Bădescu [8] looked at Beirut after 20 years of civil war. He argues that Beirut, the capital, is a booming economic center for the region. Still, to complete a sustainable Beirut, the city needs to prioritize public transport infrastructure and make its public spaces more inclusive. They need to improve their economic, environmental, and social impacts. The state's ability to control urbanization through city planning systems has been very limited in Lebanon. He argues that the primary step will be future dialogues between policymakers, businesspeople, and civil society representatives to build cooperation; trust and partnership are essential aspects of maintaining mobility.

- Bădescu called for a sustainable city, prioritizing infrastructure and public transport.
- Improving the economic, environmental, and social aspects
- Urbanization Control Through Town Planning Systems
- Community participation and cooperation with civil society

The Schiller institution has worked on a document, "The focus of discussion on the process of rebuilding Syria" It is a project that is still under development and is constantly being updated [9]. The document called for the use of the credit system through the announcement of the reconstruction and development plan, which will take the steps of action in time, thus issuing the amount of credit required to operate the workforce, tools, and essential materials. The state grants licenses to each project to be initiated and, at the same time, provides credits. The tasks can be implemented and managed either by private sector companies or government institutions as needed, capacity and efficiency, and have reached the following:

- The population is the primary incubator of all possibilities: mobilizing all available options.
- Rebuilding infrastructure and industries with the capacity. Directing and organizing infrastructure construction
- Use of advanced technology in reconstruction [9].
- Infrastructure and transportation strategy.
- The reconstruction and development plan sequences the steps of action chronologically.

Al-Shishakly’s study [10] dealt with strategies for the reconstruction of Syria, demographic, legal, and economic dimensions by linking them to theoretical
concepts and global and local experiences to come up with an integrated strategy for reconstruction and at the same time use it in the future in the case of disasters. There must be a comprehensive strategy governing reconstruction.

Development strategies in the areas must include occurrence and orient towards urban sustainability. They are preparing plans, alternatives, and options for these programs and application options to complete this process in line with the local community’s social, economic, heritage, cultural, and political specifics. Sustainable future planning to preserve human history and identity and preserve identity alongside the human dimension.

A comprehensive reconstruction of all components of the urban environment The research reached a set of strategies through the previous studies as shown in Table 1.

<table>
<thead>
<tr>
<th>Study name</th>
<th>strategies</th>
<th>Variables</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>In The Wake of War: The Reconstruction of German Cities After World War II</td>
<td>Urban planning strategies</td>
<td>Street plans strategies</td>
<td>[2, 3]</td>
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<td>Housing policy strategies</td>
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<td>Terrorism morale, propaganda</td>
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<tr>
<td>Replay to Iraqi working chance &amp; challenge</td>
<td>economy and the market, managing government strategies</td>
<td>Opportunities</td>
<td>[6]</td>
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<td>Challenges</td>
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<tr>
<td>The destruction of cultural heritage by warfare and reconstruction strategies: lessons learned from case studies of rebuilt cities</td>
<td>Reconstruction strategies</td>
<td>future strategies</td>
<td>[5]</td>
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<td>immediate strategies</td>
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<td>Replica Strategy</td>
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<td>traditional methods and materials</td>
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<td>Conservation strategies</td>
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<td>City makers, urban rebuilding, and coming to terms with the past in Sarajevo</td>
<td>Sustainable reconstruction strategies</td>
<td>Infrastructure</td>
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<td>Sustainable transport</td>
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<td>Making a liveable place</td>
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<td>Communication with the past</td>
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<td>Making homes for refugees</td>
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<td>Phoenix project Syrnia: Discussion points on the reconstruction of Syria</td>
<td>Reconstruction plan and development credit system</td>
<td>Population strategies</td>
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<td>industries strategies</td>
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<td>Reconstruction strategies in Syria</td>
<td>Comprehensive strategy</td>
<td>Demographic dimensions</td>
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<td>Legal dimensions</td>
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<td>Economic dimensions</td>
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3. International Experiences

In order to achieve the objectives of the study, the historical and descriptive method will be followed to study post-war reconstruction by collecting and discussing theoretical information related to the research and surveying international studies and experiences. It better understands the subject of the study. Use the historical method to study global and local experiences in reconstruction, as was the case in many international cities after wars.

The research presented some global experiences that worked on the reconstruction of cities after wars:

3.1. The Marshall project

An American project, planned by the U.S. Secretary of State in 1947, is an economic blueprint for the reconstruction of Europe after the end of World War II. It was announced in 1947 in a speech at Harvard University. The project was managed by the Organization for European Economic Cooperation and Economic Cooperation EAC, the body established by Western European countries to oversee the spending of 13 billion U.S. dollars for the reconstruction and operation of the European economy and factories [11].

The Marshall Plan was officially the European Recovery Program (ERP), an American initiative to help Western Europe, with $13 billion to rebuild the Western European economy.

The Goals of the United States were to rebuild war-ravaged areas, remove trade barriers, modernize industry, make Europe prosperous again, and prevent the spread of communism. The Marshall Plan required the easing of barriers between states, the rollback of many regulations, and encouraged increased productivity, trade union membership, and the adoption of modern business procedures [12, 13].

3.2. Hiroshima - Japan experience

The city was built in 1594, it was a center of commerce in 1945, and the United States of America dropped an atomic bomb on the town [14]. It is the first atomic bomb in history. It targeted the intersection of bridges over the Tonkawa and Motoyasu rivers. The bomb destroyed Hiroshima within a 5 km radius, resulting in 140,000-150,000 deaths that year, Japanese architect Kenzo Tang has been commissioned.

Through the reconstruction of Hiroshima and the development of the Hiroshima Peace Center and Memorial Park, Tang expressed solidarity among human beings and a commitment to peace, as shown in Figs. 1. The city was rebuilt, then commercial activities began to restore its vitality, and the work was as follows:

- It was completed Cleaning and surveying 2.4 million square meters - the laborious process that took four years to complete.
- They built a baseball field for the city team, from stadiums to automobile factories and shipbuilding sites.
- Allow private national donations to heavily damaged cities.
They built an excellent peace monument as a suitable anchor for the city. The monument finally became a memorial to peace, a beautiful 30-acre site not far from the center of the bomb's fall, designed by the late Japanese architect Kenzo Tang in 1955.

Hiroshima became a base for continuing and communicating by preserving and using this building as much as possible as it demolished most of the modern Japanese architecture built in 1950. However, this building is still alive, a pioneer in contemporary architecture in Japan. Inside, the museum succeeded in presenting the technical data on the bomb to the victims' dramatic testimonies, all in structured halls. Tang also combined the five vocabularies of Lo Corbusier with elements in traditional Japanese architecture and drawings, such as sunscreens and the arrangement of units on the façade.

Moreover, Tank loved Le Corbusier's style. He was convinced that Japanese architecture would become enormous, and the quest that demand was a significant architecture built within the human social domain, as shown in Fig. 2. The building was illustrated from reinforced concrete.

We can deduce: Emergent and re-emergence strategy, action and reaction, mobilizing possibilities for revival, and comprehensive tourism development.

3.3. Germany experience
Germany’s experience is different because it did not have a national government until late 1949, since there was no national capital that dictates to cities how to rebuild unlike Japan and the Soviet Union, where the federal government set the reconstruction mechanism, where "funding is subject to government instructions", so most cities followed the reconstruction mechanism set by their governments, but in Germany there was no government that existed to provide funding, which left the population to rebuild themselves, many churches reconstructed at the expense of their community, people tried to rehabilitate their properties as soon as it was damaged during the shelling, but planners were often trying to change, building-wide streets suited to traffic, the west expanded the roads leading to the cathedral, which is located in the neighbourhood of Mesadam, in Cologne, but was rejected by the inhabitants of the community, Stacking the buildings as part of the privacy of that neighbourhood. There was a tendency to open large spaces in cities, updated with wide streets of cars and skyscraper buildings, in Berlin and Hamburg, and other cities.

Residents often borrowed money from relatives in the countryside, where they also found building materials. People have tried to identify and preserve the local identity of their neighbourhoods. In addition, interest in large pedestrian areas most opposed these modernization plans for their cities. This opposition has not succeeded in halting some modernization projects, while others have planned them as local administrative functions. People demanded new reconstruction on the edges of cities and not in the old town. Many towns used prisoners of war to remove and remove rubble during the war. After the war, the Germans also found ways to organize their affairs and operate relatively quickly. The women were arranged to clear the rubble. At the end of the war, local governments obligated Nazi party members to remove the wreckage.

In many heavily damaged cities such as Berlin and Hamburg, people collected bricks and stones for reuse but lacked the workforce eligible for reconstruction. However, people in East Germany used modern materials such as pre-made concrete. The lack of qualified construction workers has had a tangible impact on the reconstruction process [15].

The Bauhaus, a modern school building in Dessau that was previously closed, was very influential in demanding modern building materials.

People restored the destroyed West Berlin municipality building and symbolic buildings and tried to conserve some neighbourhoods like Charlotte burg. In East Germany, there was a clear tendency towards modernity. A controversy over Berlin's old palace, the winter residence of the Kings of Prussia, which had been removed from East Germany and built a modern building for its government, was demolished after the fall of the Berlin Wall. In contrast, the old palace was rebuilt. If someone goes to some of the eastern areas near the city center, they will see how some places are demolished. The desire of both East Germans and the Soviets to create a new country that they saw as a leader of modern ideas was the cause of East Germany's tendency to modernity. Germany preserved historical and civil identity by reconstructing Romanesque-style churches in Cologne and not only the ancient Gothic cathedral. In Lubbock, anyone feels the city's historical spirit, and it is not just a collection of newly created buildings. Dresden's old city, which was an essential part of the city's identity, was restored. Although they did not fully recover what they see as the most important German city of the Renaissance. They rebuilt
the cathedral. "We should not be ultra-modernist and find places to park cars, and Urbanism should not be about the presence of cars." [16, 17].

A program to rebuild the Hohenzollern Palace began in East Germany after the fall of the Berlin Wall. It is important to preserve historical buildings; any components of architectural history should be determined essentially. Any members of architectural history should be selected as necessary. There are many complex options about what is being done and what is not being reconstructed [18, 19]. Through experiences, vocabulary, and concepts, as shown in Table 2.

Table 2. Summary of previous experiences.

<table>
<thead>
<tr>
<th>The Experience</th>
<th>The Strategies</th>
<th>Variables</th>
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<tbody>
<tr>
<td>The Marshall Project</td>
<td>European Recovery Program</td>
<td>Economic strategy</td>
</tr>
<tr>
<td>Hiroshima – Japan</td>
<td>Peace Museum Park and Building</td>
<td>Tourism Emergency Strategy</td>
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<tr>
<td>Experience</td>
<td>Preservation Strategy in West Germany</td>
<td>Particular strategy and sensitive development</td>
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<td>Germany Experience</td>
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<td>preserving local identity</td>
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<td>reconstruction edges of cities</td>
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<td></td>
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<td>traditional methods and materials</td>
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</table>

4. Destruction and Sustainability

Sustainable development: is the optimal utilization of all available resources and capabilities in an environmentally, socially, and economically balanced way, and hence a knowledge society enjoying justice and quality of life linked with the preservation of its national identity. The concept of sustainability revolves around three fundamental themes, economic, environmental, and social, by achieving [20, 21]:

- Ensuring a high quality of life for all citizens by civilized standards and the integrity of the environmental framework they live.
- It must upgrade the educational level of all citizens and move towards a knowledge and innovation society.
- It must raise the level of public health for all citizens.
- It must preserve identity in the face of projects of hegemony, integration, cultural alienation, and the consolidation of social and cultural values.
- Sustainable economic development.

Factors affecting sustainable city reconstruction:

- The security factor.
- The available resources and capabilities, the provision of financial liquidity, and its allocations set work priorities.
- It must go to Determine work priorities and the speed in cases of the intersection of work levels.
- It must secure raw materials, machinery, and equipment for the construction process.
- It must secure the appropriate land for new projects.
- Reorganization and rehabilitation of informal housing areas if they appear [22].
Steps for sustainable building destroyed cities:

- Social development: achieving humanitarian choices and needs, expanding the range of choices for individuals through a long and healthy life, ensuring a reasonable level of education, and finding resources to ensure a good standard of living and other human needs, community participation.

- Orientation towards environmental and urban development: upgrading the community and raising the standard of living in the urban aspects, infrastructure, and infrastructure, by regulating land use, providing urban services, and absorbing the increase in growth.

- Economic development: automatic economic development can be measured by the quantitative change in the indicator production, loan, and national income [23].

5. Practical Study

5.1. Mosul city

Mosul is the center of Nineveh province, Iraq's second-largest city after Baghdad, with about 2.5 million. Located 465 km north of Baghdad, Mosul is famous for its proximity to Syria and Turkey. Mosul residents speak the Mosul dialect (The Maslaoui dialect), similar to the northern Syrian dialects. This Mosul dialect has a more significant role in preserving the city's identity. Mosul's population is a mix of Muslims, Christians, Kurds, Turkmens, and Shabaks, who make up only 20 percent of Mosul's total population, and Iraq's largest dam in Mosul had been built (refer to Fig. 3 [24-26]).

![Fig. 3. A satellite image of AI-Mosul city.](image)

5.2. Analysis of the urban situation

5.2.1. Roads and bridges

Bridges are considered one of the most critical urban aspects of the city and work to connect the city, urban spaces and the war has led to destruction constitutes a large constitute.
The first bridge names, The Old, Nineveh, Al-Attic, King Ghazi: it is an iron bridge located on the Tigris River of the oldest bridges in Mosul built by King Ghazi, opened in 1934, a length of about 305 m and was at the beginning of its construction is a floating bridge connecting the area of victory near the city of games on the left coast field in the right coast. It consists of 8 spaces with a length of 37.5 meters for one space. The width of the auto lane is 6 m, and the width of the walkways on each side is 1.40 m, as shown in Fig. 4.

![Fig. 4. The first, Al-Attic bridge or Nineveh bridge.](https://justpaste.it/jisoor)

The Ministry of Reconstruction, Housing, Municipalities, and Public Works has begun the reconstruction and rehabilitation of three bridges in Mosul, the center of Nineveh province, which was damaged by ISIS's occupation of Mosul and military operations to liberate it. Contributes to the restoration of normal and safe traffic, where the contract for the reconstruction of the old bridge was damaged by the fall of spaces 1, 2, 7 for 2,980,300 billion dinars and six months.

The second, Al-Hurriya bridge: the second bridge built, about 634 meters long, connects the right coast of the city near Mosul municipality, Al-Khader Mosque, Mosul Market, and Sheikh Abu Ala, to its left coast Al-Faisaliah, and Spring Theater, as shown in Figs. 5.

![Fig. 5. The Second, or Al-Hurriya Bridge](https://justpaste.it/jisoor)
The Third, Abu Tammam Al-Taie, or Al-Shuhada Bridge: Connecting the general hospital and The Mosul Hotel, on the one hand, forests, teachers’ institutes, and fine arts, on the other hand, length: 942 m, see Fig. 6.

(a) The Bridge before the war.  
(b) The bridge After the war.  
(c) The Bridge before the war.  
(d) After the war.  
(e) Satellite image is after destruction.

Fig. 6. The third, Abe Tammam Al-Taie, or Al-Shuhada Bridge. 

The Forth Bridge: connecting the right coast - to the pedal of the left-lane officers, length -1257 m, see Fig.7.

(a) after the war.  
(b) before the war.  
(c) After the war.  
(d) The bridge before the war

Fig. 7. The fourth bridge- 
https://i2.wp.com/alnoornews.net/wp-content/uploads/2016/12/%D8%AC.
"One of the ministry's formations, for 1,044,012 billion dinars, was referred to Al-Fao for four months," a contract was signed for the reconstruction of The Forth Bridge, which is constructed on Tigris River, and its damage as a result of its bombing by ISIS falls the spaces 1, 2, and 3 from the right side. It is 706 meters long by two bridges back and forth and consists of 13 spaces by 56 meters per space except for the last spaces of 45 meters long and the width of the car lane 13 meters and the width of the walks 2.50 meters with a middle island. It will also be treated as a temporary solution by bridging the use of fast-track bridges. The rehabilitation of the bridges is financed by the World Bank's emergency loan to reconstruct liberated areas.

The Fifth Bridge: The most significant and last bridge built in Mosul and one of Mosul's major urban landmarks, built in the 1980s, connects Al-Mohandes and Shifa neighbourhoods, length: 1940. See Fig.8.

The secondary bridges are as follows: See Fig.9.

- Suez Bridge is located on the Khosr River, linking Al-Faisaliah and Al-Zeraei district, 269 m.
- Sennacherib Bridge: The second corridor in Mosul, linking the agricultural quarter to Al-Faisaliah, length: 567 m.
- Al-Zuhur Bridge to Al-Muthanna: Information: It connects Al-Muthanna neighbourhood with Al-Zohour neighbourhood on Al-Khor River. Its length is about 124 meters.
- AL-Sugar Bridge: It connected Al-Barid neighbourhood to the intersection of the Sugar District and is located on Al-Khor River. Its length is about 120 meters.
- Al-Muthanna Bridge: It connects Al-Muthanna and Al-Nur neighbourhoods of Al-Khor River. Its length is about 238 meters.

A contract has been signed to reconstruct the Second or Al-Muthanna Bridge by the Ministry of Housing and Reconstruction. It will be temporarily addressed by the construction of fast-track iron bridges, damaged by the fall of the aliens 2, 3 for the pass to go to Muthanna and the second space of the pass of the fathers. The work was referred to one of the ministry's formations for 263.5 million dinars, consisting of 5 spaces 20 meters long for one space and a width of 15.25 meters,
including 11 meters of a car corridor and 4.25 meters for pedestrians, and the bridge was built and opened in 1984. One solution is the first aid strategy, the construction and opening of the iron bridge connecting the right side to the left side by the military engineering battalion, see Fig. 10.

(a) Al-Zuhur bridge.  
(b) AL-Muthanna bridge, Al-Khor River.

Fig. 9. The secondary bridges. http://www.panoramio.com/photo/89292408

Fig. 10. Military Engineering Effort Erecting, The first an iron Bridge 2017.

5.2.2. Valuable buildings

Includes buildings of moral and material value, including heritage and historical buildings and tourist facilities, the urban landscape of the Old City, ISIS has destroyed most of the city's cultural monuments, see Fig. 11.

The old city 2017.  
Al-Nabii Yunus shrine in 2014.  
Al-Aswad Mosque.

http://kirkuknow.com/arabic/?p=52894

In 2017.  
Before 2014  
Alley old zone before 2010.  
Alleys near Omar Al-Aswad Mosque.

http://www.alhasso.com/Shahersouk2.htm

Al-Faruq Mosque St.  
Al-Hadba Minaret.  
AL-Ssaea Church before the war.

http://www.panoramio.com/photo/84878496?  

Journal of Engineering Science and Technology  December 2022, Vol. 17(6)
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AL-Ssaae Church in 2017.

St. Joseph Church in Al-Medan area

Before 2014

In 2017

Before

After the
Shit Al-Nabii Mosque

Mohsen Imam Mosque, 5th c. A.H.
https://www.youtube.com/watch?v=VzQ_PrhgLYA

Before

After
Mosul Hotel, the second largest hotel in Mosul, did not collapse

The central library

before destruction

after liberation
Mosul downtown 2013.

Middle prep in Mosul is one of the oldest schools

Faculty of Management and Economics


Source- http://www.rudaw.net/arabic/middleeast/iraq/

Al-Dawasa junction

parks opened in Al-Rashidiya - 2017

Fig.11. Valuable buildings.
5.3. Questionnaire

The practical study was conducted through a questionnaire for a selected group of experts in architecture and urban design from Mosul Governorate to find out the practical possibilities available for reconstruction and thus develop reconstruction strategies for urban spaces. The following vocabulary set has been extracted from previous studies

- First aid strategy
- The General Urban Strategy:
  - Planning pattern urban block
  - Planning pattern of streets and bridges
- Selective, sensitive strategy:
  - Identity
  - Perception and psychological impact
  - Urban scene and skyline
  - Monument and Peace Park
- Strategies for sustainable housing:
  - Excesses and squatters’ housing problems
- Tourism Development Emergency Strategy:
- Comprehensive planning strategy:
  - Short term planning five years
  - Long term planning 10-25 years
- Identification of obstacles to the implementation of reconstruction strategies

92.1% of the Mosul architects were 60.5% currently in Mosul, 31.6% of the Mosul architects displaced outside Mosul, 46.2% of them work in consulting offices and contracting companies, 29.9% of them work at the University of Mosul - College of Engineering - Department of Architecture, 11.5% work in municipalities and urban planning, and the details are in Figs. 12-16.

5.3.1. First aid strategy

What better strategy to address the city’s problems graphically? City planning strategies are mysterious throughout Iraq. How and the urgent need to plan in the event of crises and disasters! The first aid strategy must be as follows:
• A political decision is to form a specialized advisory body to develop planning strategies for Iraqi cities, define local experiences, and consult foreign expertise.

• It must start with infrastructure, water, electricity, and sewage. Roads and bridges provide minimal livelihood infrastructures.

5.3.2. General urban strategy:

The development of the basic design, which is currently abolished, divides the city into sectors, and the participation of residents in reconstructing their buildings after the allocations or interest-free loans are monitored. Municipal laws are developed to ensure private sector companies invest in residential and commercial sites in partnership with landowners.

• The task of reconstruction is entrusted directly to the prime minister wall linked to the union of engineers and the Union of Iraqi Contractors, the old engineering offices in Mosul city, and the University of Mosul. It must use the actual expertise. It will form a public body.

• Develop progress plans for the city according to priority and start rehabilitation.

• It must expand the city in the left and right directions.

• Develop and address current planning errors.

➢ Planning pattern of the urban block

The results concerning the type of block used in the reconstruction of urban spaces are the restoration of the same current pattern found on the site, i.e., Traditional in traditional places, modernity in its places, and hybrid pattern as fig. 17.

➢ Planning pattern of streets and bridges

The street planning pattern in the case of reconstructing the ancient city, 41.7% prefers hybrid, 29.2% remains organic, and 8.3%, depending on the site, either in the case of new housing complexes, 42.3% diversity between reticular and organic, 19.2% annular or radial planning. As the Figs. 18 and 19 the most essential destroyed bridges connected the two banks of the Tigris River. For reconstruction as quickly as possible, the first is the Old Iron Bridge (Al-attic) 35.1%, and the fourth bridge was found to be the most critical 27.0%, as fig. 20.

Fig.17. Preferred methods.

Fig.18. preferred street pattern

Fig.19. Planning pattern of new complexes streets

5.3.3. Selective strategy and sensitive development

➢ The identity of the city

As for the identity of the city through fig. 21, we find that it is manifested through its heritage and historical buildings 27.4% and culturally 16.8%, and 7.4% that it achieves being a city for various religious schools and holy shrines of the prophets.
and the presence of churches finds that this identity must be achieved in the reconstruction strategies. There are capabilities to be a tourist city because of its heritage, civilizations, and historic buildings, in addition to its capabilities of picturesque and aesthetic nature. 21.1% of the respondents found that it could be a tourist city, 20% find it could be a commercial city, a city of money and business, according to its geographical location, bordering Turkey, which is an essential resource for Iraq.

➢ Perception and psychological impact

- The most important buildings and facilities destroyed:
  Ancient mosques such as Al-Nuri Mosque, Al-Nabii Yunus Mosque, churches such as AL-Ssaea Church, government, administrative and service buildings, educational buildings in Mosul University, Nineveh, and some schools, residential houses with an estimated 50,000 private homes in the old city as well as hospitals.
  - It destroyed the hotels’ infrastructure, bridges, and details in previous forms.
  - All the ten hospitals in the city are the General Hospital, Al-Jumhori, Al-Salam, Al-Batool, Al-Khansa Hospital, Ibn Al-Atheer, Al-Sukkar, Ibn Sin Hospital, and the Medical Educational Complex except for one hospital, with minor damage 20%.
  - The building of the old and new government complex, all government buildings, banks, communications.
Through a question posed to the architects of Mosul, which building hurt them, Al-Hadba ‘Minaret ’ was 35.7%, after which was Al-Nabii Yunus shrine 23.2%. It means accelerating the reconstruction of these two scenes, see fig. 22.

➢ Urban scene and skyline

Through the Mosulian architectural question about which building has the most influence on the urban scene of the city of Mosul, respectively, Al-Hadba Minaret was 40.7%, then, Al-Nabii Yunus Mosque Minaret was 22.2%, then the church towers at 20%. Fig. 23.
➢ Monument and Peace Park

Through previous studies, when building destroyed cities, buildings were built that express peace, preserving the remnants of war that can be preserved and the crisis experienced by the residents of the city. The question for the specialists was which squares were suitable for building a great monument to peace as a good anchor for the city, as fig. 24. The answers were 30% in the courtyard platform, 20% near the Tigris River and The Cornice Square, and 10% in Bab Al-tube Square Al-Nasir.

5.3.4. Strategies for sustainable housing:

Suggestions for building multi-story apartment complexes to accommodate families whose homes were demolished:

- Building rapid and low-cost housing complexes accommodates displaced residents' old areas to alleviate their suffering. The government can fully own the demolished areas to re-plan this area scientifically and practice that suits the importance of this region as a city center.
- Construction of multi-story residential complexes, ready building, not exceeding four floors, limiting horizontal expansion, increasing green space, activating vertical building laws.
- Multi-story buildings for families whose houses in the old area were demolished and compensated, and the old city was handed over to the International Organization. UNESCO is to rebuild the old city because most of its inhabitants are poor people who cannot appreciate its historical value.
- The construction will be in two phases, low-cost emergency houses, then the second stage, modern complexes, according to the areas available in the municipality of Mosul and the availability of services if the designs meet the living needs. In addition, they are in close quarters and outside the old city's belt, considering the integration with services and transportation, and not exceeding four floors.
- It is necessary to start with the multi-story building to put quick solutions to housing in the severe shortage of infrastructure. It is built with varying levels of income level because the affected people are from more than one category and possibility.
- It failed to provide permanent maintenance and continuous services to ensure the success of vertical housing currently in Mosul.
- The choice of the right place to build the vertical housing was on the left side, thanks to the construction of the mental panel for speed as Fig. (25, and 26.)

Fig. 24. proposal for the Peace Monument  Fig. 25. Proposed new expansion zones.
Excesses and squatters’ housing problems

On the violations of building and municipal laws and urban planning by citizens and the emergence of informal housing, 81.8% say there was a violation of the laws before ISIS entered in 2014. As Fig. 27. Before the emergence of squatters housing, due to the displacement of many conductive families, as Fig. 28.

5.3.5. Tourism Emergency Strategy:

Because it has a beautiful nature, the city’s tourism development can generate economic profits that help the development of the province through the rehabilitation of many areas within the city, as the fig. 29.

5.3.6. Comprehensive planning strategy

➢ Short-term planning five years

It must remove the effects of the destruction and rehabilitate the destroyed buildings, reconstruct the old Mosul.

- Infrastructure and essential services water, electricity, medical. Housing and repair of existing public buildings.
- Addressing problems, caring for security, and improving security.
- Solve the problems of the displaced and damaged housing, schools, health buildings, and hospitals.
- Building bridges and parkways, building internal and external transport parking, and constructing the train station.
- Reforming the educational and health system and spreading cultural awareness against extremism in all its forms and concern for agriculture.
- It must study available sites to build complexes within international standards according to their availability.
- Especially the advancement of the right side of Mosul, as it does not contain tourist areas, and it is possible to use Al-Hawi Southern Church area for that as it lacks shops and highways. Parking lots can build in an area Field.

➢ Long-term planning 10-25 years- the Renaissance of the city

After securing urgent and short-term needs, the historic city and monuments have been rebuilt and repaired. Tourism, new projects, and possible expansion of the city.

- Make a political decision to form a specialized advisory body to develop city-planning strategies for all of Iraq, identify local expertise, and consult foreign expertise as needed.
- Develop a comprehensive plan for the city and address it as a whole and not as areas, expand the basic program and construct new cities surrounding the
Mosul belt, move government services outside the city center sector, and provide a sophisticated and effective network of transportation lines.

- Attention to improving agriculture and natural resources, thus improving the city’s economy, leads to urban advancement accompanying economic recovery.
- It must rebuild educational buildings and housing, and then the buildings of the province and the administrative buildings.
- It must establish industrial projects, develop agricultural and irrigation projects, and construct water treatment plants.
- It must rehabilitate tourist, recreational, and religious facilities and the development of tourism of all kinds.
- They are developing the city abroad and establishing industrial cities.
- The construction of new bridges and high-speed transportation, roads, a bridge linking the arrest and its supervisor, and a metro tunnel network can be established linking some areas of Mosul.
- They encourage investment in building malls, health buildings, and private hospitals.
- It must be the start of the implementation in Mosul International Airport.

➢ **Identify obstacles to implementing reconstruction strategies**

Providing the necessary cash for financing, securing the raw materials, machines, and equipment needed for the construction process, securing the appropriate lands essential for establishing new projects, As well as administrative and financial corruption. One of the most critical obstacles to construction is the provision of financing, as Fig. 30.

![Fig. 29. Tourism development places](image1)

![Fig. 30. Obstacles of reconstruction](image2)

**6. Conclusions**

There is a set of strategies for the reconstruction of urban spaces:

- First Aid Strategy: A quick action group to restore life and continuity.
- Selective strategy and sensitive development: preserving heritage structures, sacred shrines, and churches, reverting to their original forms.
- The research found that an essential strategy is roads, bridges, and linking the city’s two sides through the questionnaire.
- The identity of the city of Mosul, which must be preserved, is reflected in the following: The nature of its land, its environment, and its backbone, the Tigris River.

Inhabitants distinguish the city with their diverse affiliations and the unity of their social habits and distinctive dialect.
The destroyed old city and commercial hubs emerged after the mid-20th century, making up the city’s newest identity.

- The strategy of emanation and emergence, through action and reaction, mobilizes the possibilities for a comprehensive tourism wish renewal.
- Sustainable housing strategy, building new integrated small cities to contain the housing crisis and housing of displaced people whose homes have been demolished.
- Sustainable transport strategy, repairing bridges and transport routes as quickly as possible, and finding new alternatives.

7. Recommendations

Based on the finding of this study, it is recommended to:

- Work on Rapid completion of the demolished bridges to connect the city and being monumental structures of historical importance and improving the infrastructure.
- It should be a priority to reconstruct infrastructure, especially roads and bridges, to connect the right and left sides of Mosul city.
- Create a financial base by establishing a monitoring body responsible for rebuilding public spaces, footpaths, street scenes, and urban spaces. This body will focus on internal investment, which will bring employment.
- Reconstruction as a sustainable city, improving green spaces by reviving forest cover and practical design that highlights the role of natural plants to reduce pollution and improve air quality and the environment.
- Preserve the rich historical and cultural heritage by expanding the contract, squares, and gardens with various recreational activities and achieving public participation in formulating the strategy.
- The city of Mosul possesses great geographical potential. It would have become one of the vital tourist ports globally and added to the budget of Iraq and its exhausted displaced population if its engineers and planning firms were allowed to carry out implementation operations.
- Lack of labor from potential problems and a sufficient number of workers qualified to repair buildings.
- Some buildings have been destroyed so severely that they are preferable to be rebuilt, but the original patterns and styles must be referenced.
- The city’s identity is historical, heritage, tourist, cultural, commercial - the city of money and business, global, and being a commercial crossing.
- It is needed to open a land crossing to Turkey and the previous crossing with Syria, following the geographical area with Turkey.
- Multi-story buildings to demolish their homes from the old area and compensate them. The government owns the demolished areas to re-plan this area scientifically and practically that suits the importance of this area as a city center, or hand over the old city to the international organization. UNESCO is to rebuild the old city because most of its inhabitants are poor people who cannot appreciate its historical value.
- Construction of multi-story residential complexes, ready building, not exceeding four floors, limiting horizontal expansion, increasing green space, activating vertical building laws.
• The construction will be in two phases, low-cost emergency houses.
• The second stage: it must provide modern complexes, according to the areas available in the municipality of Mosul and the availability of services, provided that the designs are suitable for the living needs and that they are in close quarters and outside the belt of the old city, taking into account the integration with services and transportation, and that it does not exceed four floors.
• It must provide Quick solutions for housing, built at varying levels of income level because those affected by more than one category and possibility.
• It must provide permanent maintenance and continuous services to ensure the success of vertical housing currently failed in Mosul.
• The will, the money, the honesty, the transparency, and the integrity must be available for rebuilding the city.
• It reconstructs an honest administration for the reconstruction of the city's residents and the formation of a professional reconstruction council in consultation with the Engineers Association to share local engineering cadres with foreign companies in planning, design, and implementation.
• Eclecticism: A specific part of history must be preserved, and other periods neglected during reconstruction. There must be interest in restoring the ancient historical periods and may be ignoring specific political periods of record for the city (it needs more studies, each building itself).

References