

# Preserving the Past and Building the Future: A Sustainable Urban Plan for Mosul, Iraq

**Mays Dawood Salman & Amer Shakir Alkinani**

Center of Urban & Regional Planning for Post Graduate Studies,  
University of Baghdad, Iraq.

Email: mais.dawood1200a@iurp.uobaghdad.edu.iq

## Abstract

The city of Mosul, located in northern Iraq has a rich history and cultural heritage dating back to the ancient times. However, the city has been heavily impacted by war and conflict, leading to significant destruction of its urban fabric and cultural heritage sites. This paper examines the theoretical and practical framework for urban reconstruction following wars and disasters. The study investigates the effectiveness and efficiency of the framework in achieving sustainable reconstruction outcomes.

It employs a comprehensive analysis of previous architectural and urban knowledge, and identifies key conclusions and recommendations for enhancing the reconstruction process.

The findings highlight the significance of flexibility, stakeholder engagement, and integration of real-world experiences in achieving successful reconstruction. The paper emphasizes the importance of prioritizing sustainability, and community well-being in rebuilding cities. In the case of Mosul, the city should focus on utilizing its rich cultural heritage to drive economic development through tourism. This strategy should take into account the unique circumstances and challenges facing the city and involve community participation.

It argues that by adopting a comprehensive framework that incorporates these principles, cities can adapt to the future challenges and foster long-term development. The research contributes to existing literature on urban reconstruction and provides valuable insights for policymakers, practitioners, and researchers involved in post-war and post-disaster reconstruction efforts.

**Keywords:** Mosul, Sustainable, Urban, Heritage, Resilience, Iraq.

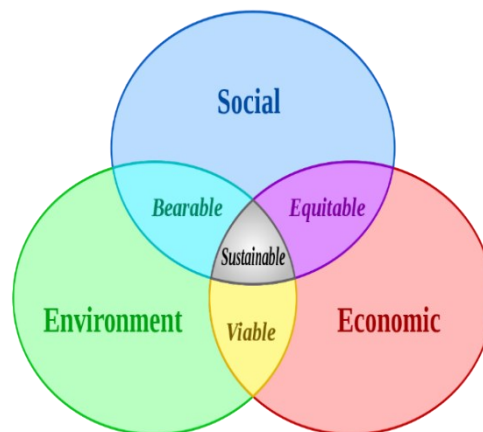
## Introduction

Mosul is a city located in northern Iraq with a rich and diverse cultural history. It has been inhabited for thousands of years and has been the site of many historical and cultural landmarks, including the ancient Assyrian city of Nineveh and the medieval Mosul Grand Mosque. However, in recent years, the city has experienced a significant decline (Marr, 2018).

In 2014, the city was overrun by the Islamic State (IS) extremist group, which caused widespread destruction and displacement of the local population. Many historical and cultural landmarks were destroyed or damaged during the conflict, and the city's infrastructure and economy were severely impacted (Isakhan and Meskell, 2019).

After the end of the IS conflict in 2017, the city has been left in ruins, with many buildings and infrastructure destroyed or damaged. The population of the city has been greatly reduced, and the local economy has been severely impacted. The city is in dire need of reconstruction and revitalization, which is a complex and challenging task due to the many factors that have contributed to its decline (Saeed et al., 2022).

To model a standalone infrastructure for a city like Mosul, it would be necessary to gather data and perform analysis on these and other factors in order to develop a comprehensive plan. This might involve working with a variety of experts and stakeholders, including urban planners, engineers, policymakers, and community leaders to give three dimensions of sustainable development as shown in the Fig. 1. The resulting model would serve as a blueprint for the design, construction, and operation of infrastructure, and could be used to guide decision-making and resource allocation (Kukadia and Hall, 2004).



**Fig. 1:** Three dimensions of sustainable development

Source: Holton et al., 2008.

Based on the aforementioned, we observe significant departures from the plan brought on by the uncertain conditions in Iraq. There is a serious inefficacy in the processes for putting the ideas, conceptions, and guiding principles of the original designs into practice. This is compounded by the city's submission to the influence of ill-considered policies. Since land is a natural resource that was not created by people, other resources cannot replace it. In order to make sound planning decisions for the potential expansion trends of urban areas leading to the new master plan goal of 2030, this study addressed additional land planning indicators, geological and topographic factors, and patterns of agricultural, industrial, forestry and other land uses (Ding, 2008).

### Research Aim

The aim of this study is to propose a sustainable urban plan for the city of Mosul that balances the preservation of the city's historical and cultural heritage with the needs and aspirations of its residents for economic and social developments. The study focuses on the old city of Mosul, which has been heavily impacted by war and urban decay, and seeks to provide a framework for urban regeneration that prioritizes the restoration of the city's urban identity (Munawar, 2023). Proposed plan aims to ensure a physical environment that smoothly promotes economic growth while preserving the city's history and culture.

Its objectives are:

1. To evaluate the existing theoretical framework for urban reconstruction after wars and disasters.
2. To analyze previous architectural and urban knowledge in relation to post-war and post-disaster reconstruction.

3. To identify the strengths and weaknesses of the current practical framework for urban reconstruction.
4. To assess the effectiveness and efficiency of the framework in achieving resilient and sustainable reconstruction outcomes.
5. To explore the role of flexibility strategies in the reconstruction process and their impact on meeting community needs.
6. To examine the potential of modeling and simulation technologies in enhancing the reconstruction process.
7. To provide recommendations for enhancing the theoretical and practical framework for urban reconstruction.
8. To contribute to the body of knowledge on urban reconstruction practices, with a focus on sustainability.
9. To offer insights and guidance for policymakers, practitioners, and researchers involved in post-war and post-disaster reconstruction efforts.

### Problem Statements

The problem statement of this study is to address the challenges facing the historic city of Mosul in terms of urban development and preservation of its cultural and architectural heritage. The city has been severely affected by war and conflict, leading to the destruction of its historic fabric and the displacement of its inhabitants. The research addresses various problems related to urban reconstruction following wars and disasters. These problems include the inadequacy of existing theoretical frameworks to address evolving trends and challenges, limitations in practical frameworks to meet diverse community needs, insufficient integration of flexibility strategies, underutilization of modeling and simulation technologies, inadequate prioritization of historical preservation, the need for enhanced sustainability considerations, lack of coordination among stakeholders, limited incorporation of local knowledge and community participation, and insufficient financial and logistical support.

In summary, Mosul is a city with a rich cultural past and an important historical heritage that has been severely impacted by the conflict and occupation of ISIS, as shown in the Fig. 2. The city is in need of a comprehensive and sustainable urban development plan that addresses the needs of the population and preserves the city's heritage.



**Fig. 2:** Buildings destroyed during the armed conflicts  
Source: Heritage, 2017

### Architectural and Urban Identity

Buildings and architecture play a significant role in shaping the identity of a community or group of people. These structures are often considered as boxes of memories, and hold deep cultural and historical significance for the people who live in them (Wheeler, 2014). In times of war or political conflict, targeting these buildings can be used as a strategy to weaken the national identity of a community and create feelings of displacement and disconnection among

the people (Poulligny, 2005). The destruction of cultural heritage sites and landmarks can also lead to the disintegration of values, traditions, and ultimately, the identity of a community. Therefore, preserving and promoting cultural heritage is crucial for reclaiming a city's unique and distinguished identity. As UN Habitat highlighted, planning and efforts to preserve cultural heritage should be made to ensure the communities living in cities are able to connect with their cultural heritage and maintain their sense of place (Hosagrahar et al., 2016).

Urban identity can be described as the connection between a place and the individuals or community that occupy it (Melnychuk and Gnatiuk, 2019). It encompasses the physical, cultural, and historical elements that make a place unique and recognizable. Researchers have attempted to define urban identity objectively, but it is often understood as the relationship between oneself and the surrounding environment (Lalli, 1992). The built environment, including the architecture and design of a city, plays a significant role in shaping its identity. Aspects such as the ability to accommodate social and cultural interactions, traditional and historical qualities, and tangible and intangible heritage all contribute to a city's unique identity. Additionally, urban identity is influenced by the aspirations and experiences of both citizens and visitors, and can change over time due to societal, cultural, environmental, and technological transformations. Ultimately, urban identity is a reflection of a society and its collective decisions.

### **The Need for Urban Identity**

Identity of a city is a crucial aspect that creates a connection between the past and the present, as well as the people who live there. This can be seen in a city's historic and unique urban form, architecture, building materials, and structural techniques (Farhan and Nasar, 2020). These elements come together to create a unique visual image of the city, making it stand out from the others. Urban identity is also closely tied to the cultural identity of the society, and constantly evolves as people interact with their environment. It is shaped by the material and intellectual abilities of the community, and is always in a state of change.

### **Urban Regeneration vs. Preserving Urban Identity**

Urban regeneration refers to the process of revitalizing and rejuvenating declining or under-utilized urban areas through various development and revitalization efforts. This can include things like building new infrastructure, creating new housing and commercial developments, and improving public spaces (Jaszczak et al., 2021).

On the other hand, saving urban identity refers to the preservation and protection of the unique cultural and historical characteristics of a city that give it its distinct identity. This can include things like preserving historic buildings and landmarks, promoting local culture and traditions, and maintaining the traditional urban fabric of a city (Hmood, 2019).

Both urban regeneration and saving urban identity are important for the long-term success of a city. Urban regeneration can help to create new opportunities for growth and development, while saving urban identity ensures that a city retains its unique character and sense of place (Licciardi and Amirtahmasebi, 2012). However, there can be tension between these two goals, as urban regeneration projects can sometimes threaten or erase important elements of a city's identity. Careful planning and balancing of these competing priorities are needed to ensure that a city can thrive both economically and maintain its unique identity.

Urban regeneration projects often aim to revive declining ancient city centers, historic centers, and old industrial and harbor sites by improving the physical and economic environment. These projects also strive to include the perspectives and aspirations of the local community in order to enhance their sense of belonging and identity within the history of the place (Boussaa, 2017). However, it is important to balance the need for change and development with the preservation of a city's urban identity. This can be achieved through thoughtful urban renewal that focuses on preserving traditional urban fabric, activating the potential of the community, promoting a sense of belonging, and engaging the community in decision making about the city's future.

These are six key concepts that can be used to guide the process of urban regeneration in declining ancient city centers and other historic areas. They are as follows.

1. Sustaining of the traditional urban fabric of the old city: refers to the importance of preserving the historical architecture and layout of the area in order to maintain its unique character and identity.
2. Reactivating society's hidden potentials: highlights the importance of involving local residents and businesses in the regeneration process in order to tap into their ideas and resources.
3. Sustaining the sense of belonging to the city: emphasizes the importance of fostering a sense of community and connection among residents in the area.
4. Reclaiming social and cultural impacts: refers to the importance of preserving and promoting the cultural heritage and social connections that are associated with the area.
5. Sustaining architectural styles, materials and technologies: emphasizes the importance of preserving the architectural and material elements that contribute to the unique character of the area.
6. Enhancing the participation of individuals in decision making regarding their city's destiny: highlights the importance of involving local residents in the decision-making process and giving them a voice in shaping the future of their community (Hussein et al., 2019).



**Fig. 3:** The key concepts that can be used to guide the process of urban regeneration  
Source: Hussein et al., 2019

### Review of Literature and Past Projects

Sustainable urban development is crucial for the rebuilding of Mosul as it can help to preserve the city's heritage and culture, while also addressing the needs of the local population and supporting economic growth. This includes the development of sustainable infrastructure, preservation of historical and cultural landmarks, and support for local businesses and industries. There have been several proposals and initiatives for the reconstruction and development of the city following the end of the war.

One such proposal is the 'Recovery and Rehabilitation in Mosul', which has been developed by the German engineering firm GIZ in partnership with the Nineveh Governorate and local authorities. The plan aims to provide a comprehensive framework for the reconstruction and development of the city, with a focus on infrastructure, land use, and economic development. However, this project focused only on schools and hospitals.

Another initiative is the 'Reviving Mosul and Basra Old Cities' which is a collaboration between the United Nations Development Programme (UNDP) and the Governorate of Nineveh. The project aims to revitalize the historic Old City of Mosul, which was heavily damaged during the war, by restoring damaged buildings, improving public spaces, and promoting economic and cultural activities. However, the city faced heavy damage that this project can't revitalize all.

Additionally, the 'Mosul Reconstruction Fund' was established by the United Nations and the Iraqi government with the goal of supporting the rebuilding of infrastructure and services in the city.

However, these plans and initiatives are still in the early stages of development and implementation, and the actual outcomes heavily depend on the funding, political will and the security situation in the region. Therefore, it will not be implementable in the necessary scope.

It's also important to note that the reconstruction and development of the city should be done in close collaboration with the local community, and with consideration of the unique challenges and opportunities that the city faces.

Yawer et al. (2023) conducted research on sustainable urban development in historical cities, with a focus on Mosul City in Iraq. They identified the challenges faced by heritage sites, such as the imbalance between the historic physical buildings and the requirements of its residents, and the urban pressures that threaten the preservation of cultural heritage. To address these challenges, the authors proposed an approach that balances economic, social, and environmental concerns. They emphasized the importance of preserving the cultural heritage of historical cities while also promoting economic growth and social well-being. The authors also highlighted the need for interdisciplinary research and context-specific analysis to guide sustainable urban development. In terms of achievements, the authors' work contributes to the growing body of literature on sustainable urban development and cultural heritage preservation. Their research provides insights into the challenges and opportunities of sustainable urban development in historical cities, and proposes an approach that can guide policymakers and urban planners in their efforts to balance economic, social, and environmental concerns. However, the authors also acknowledge that more research is needed on the actors, institutions, and planning and management framework in Mosul City to fully understand the challenges and opportunities of sustainable urban development. Therefore, further research is needed to build on the authors' work and to develop more comprehensive and context-specific approaches to sustainable urban development in historical cities.

Hussein et al. (2019) propose a strategy of urban renewal and restoration of the urban layout to reclaim the urban identity of the old city of Mosul. They emphasize the importance of local heritage values and the need to harmonize new urban proposals with the old fabric of the city. The authors provide specific recommendations for how to implement their strategy, including reclaiming buildings with historical symbolism and integrating new urban proposals with the old fabric of the city. Overall, their work highlights the importance of preserving local identity and memory in the process of urban regeneration.

Alfuqhar and Aysu (2022) explore the relationship between sustainability and urban renewal, and provide insights on how to apply sustainability strategies to the social, economic, and environmental aspects of the study site. The research problem is summarized in the lack of available information on the current situation of the city after the events of the last war, in addition to the weakness about the information on the social and economic status of the population. The research takes a scientific approach in collecting and analyzing data in the chosen location for the study, according to the results obtained from the questionnaire and the information available from previous studies and projects for the region.

Al-Hinkawi et al. (2021) examines the impact of street networks on the morphological changes and urbanization of historical urban centers. It utilizes the space syntax method to measure and analyze the spatial organization of these centers before and after significant changes occur. The study focuses on the historic center of Mosul in Iraq as a case study, aiming to contribute to the city's development strategy and rebuilding efforts following the destruction caused by military operations. By understanding the spatial characteristics before and after formal changes, the research provides insights for decision-making and urban planning processes.

Al-Samurai and Al-Qaraghuli (2021) focuses on the importance of adopting sustainable development principles in the reconstruction of cities and buildings that have been destroyed by wars and disasters. The objective is to present a comprehensive understanding of sustainable development in reconstruction, considering multiple dimensions such as organizational,

institutional, cultural, economic, social, and environmental aspects. The practical study highlights the varying focus on sustainability dimensions in reconstruction projects, with an emphasis on cultural preservation, social well-being, and environmental considerations. The institutional dimension is identified as an area that requires more attention. The case study of post-war Mosul reveals the extensive destruction and the potential for leveraging sustainable development principles in reconstruction efforts. The study provides proposals and design ideas that can be applied not only in Mosul but also in other Iraqi cities affected by wars.

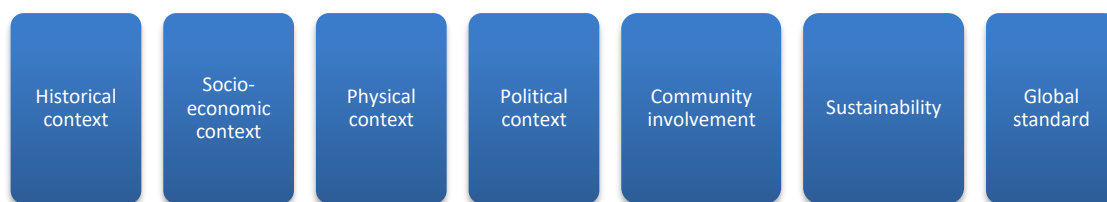
## A Theoretical Framework

Producing a theoretical framework for a research study involves identifying and organizing the key concepts and ideas that will guide the investigation. It is essentially a roadmap for the research, outlining the key variables and relationships that will be studied, as well as the methods and techniques that will be used to collect and analyze data (Hancock et al., 2021).

The process of producing a theoretical framework typically begins with a review of relevant literature in the field, to identify key concepts, theories, and models that have been used to study similar phenomena. This review should consider both classic and contemporary literature, and should be conducted in a systematic and thorough manner. Once the key concepts and ideas have been identified, they should be organized into a logical structure that allows for clear and concise communication of the research question and objectives. This structure should be visually represented, such as in a diagram or flowchart. Overall, the theoretical framework is a crucial aspect of any research study, as it helps to guide the investigation and ensure that the results are meaningful and relevant to the broader field of study.

A theoretical framework for urban planning in Mosul should consider the following elements:

- 1. Historical context:** Mosul has a rich history dating back to ancient Mesopotamia and has been a center of culture, trade, and industry for centuries. Understanding this history and the cultural heritage of the city is essential for developing a plan that respects and preserves the city's identity.
- 2. Socio-economic context:** Mosul has been affected by years of conflict and displacement, and the city's population has undergone significant changes. A plan for the city should take into account the current socio-economic conditions of the city and its residents, including issues such as poverty, unemployment, and displacement.
- 3. Physical context:** Mosul has been heavily damaged during the conflict, and the city's infrastructure and built environment need to be rebuilt and rehabilitated. A plan for the city should consider the physical context of the city, including issues such as land-use, transportation, and the built environment.
- 4. Political context:** Mosul is located in a politically complex region, and the city has been affected by the actions of various actors, including the central government, local authorities, and non-state actors. A plan for the city should consider the political context of the city and how it will be implemented.
- 5. Community involvement:** A plan for the city should involve the community in the planning process and take into account their needs and aspirations. This includes involving residents in the decision-making process and ensuring that their voices are heard.
- 6. Sustainability:** The plan should consider the long-term sustainability of the city, including issues such as environmental sustainability, economic sustainability, and social sustainability. This includes ensuring that the city's development is resilient to future shocks and is inclusive and equitable for all residents.
- 7. Global standard:** The plan should consider the global standard for urban planning, this includes issues such as urban design, urban management, and urban sustainability. This includes ensuring that the city's development is in line with the global standard.



**Fig. 4:** The theoretical framework.

### Research Methodology

This study focuses on the local practical case of Mosul city after disasters and war, and the entities involved in its reconstruction. The research adopts a descriptive-analytical method to verify the indicators of the theoretical framework. The descriptive-analytical method serves the purpose of providing a comprehensive understanding of the study area and analyzing its characteristics. It involves describing and analyzing the selected research area, specifically focusing on the changes and indicators related to urban flexibility and reconstruction. The analytical aspect of the method involves evaluating and analyzing the study area based on specific indicators and measurement criteria. These indicators are derived from the theoretical framework and are designed to assess the extent to which the fundamental principles of urban flexibility and reconstruction are realized in the study area. It involves analyzing the study area through several stages, including a general description of the study area based on sources, re-analyzing the study area according to specific measurement indicators, adopting description and illustrative forms, and then measuring the evaluation level for each of those indicators.

The data gathering stage involves identifying data sources, collecting relevant information, organizing the data, validating its accuracy, and preparing it for analysis. This stage ensures that a comprehensive and reliable dataset is obtained, which serves as the foundation for analyzing Mosul's urban characteristics and potential for sustainable development. The collected data informs the formulation of strategies and interventions in the urban planning process.

The general description of the study area provides comprehensive introductory information about the selected research area, which is closely related to the overall topic of the research. It lays the foundation for urban flexibility and reconstruction.

The measurement indicators of the theoretical framework follow an evaluative-statistical approach, including a checklist that the researcher evaluated to align with the research objectives. The indicators were assessed using a Likert pentagon scale, which consists of five options: strongly agree, agree, neutral, disagree, and strongly disagree.

The extraction of ratios occurs at two levels. The first level is associated with measuring the achievement ratio of the fundamentals within the main indicators in the selected study area. The second level involves achieving the overall extracted ratio to the maximum possible evaluation level for the chosen study area.

### Case Study: Historical Mosul City

The historical city of Mosul, located in Northern Iraq is known for its rich cultural heritage and history. The city has been inhabited for thousands of years and has been an important cultural and economic center in the region (Ogunkan, 2022).

During the previous fifteen years, Mosul has experienced a continuous decline due to the conflict with ISIS which was ended in 2017. The city has been heavily damaged during the conflict, with many of its historical buildings, monuments, and artifacts destroyed or severely damaged (Farhan and Nasar, 2020).

Overall, the sustainable urban development of historical Mosul city should be approached with a holistic and integrated approach, considering all aspects of the city's development and taking into account the specific context and needs of the city.



### Location of Mosul City

Mosul is a city located in the northern region of Iraq, it's located in the Nineveh Governorate and it's about 400 km northwest of Baghdad as shown in the Fig. 5. The city sits on the west bank of the Tigris River and is situated in a strategic location at the intersection of several important transportation routes (Allawai and Ahmed, 2020). The city is also located near the ancient Assyrian city of Nineveh, which is one of the most significant historical sites in the region.

### Historical Context

The city of Mosul has a rich and diversified historical context, dating back thousands of years. It is believed to have been founded as the Assyrian city of Nineveh in the 7th century BC. The ancient city was one of the most important cultural and economic centers in the region and was the capital of the Assyrian empire. The city was known for its impressive architectural and engineering achievements, including the famous Hanging Gardens of Nineveh, which were considered one of the Seven Wonders of the Ancient World.

After the fall of the Assyrian Empire, Mosul was ruled by a succession of different empires and cultures, including the Persians, the Greeks, the Romans, and the Arabs. During the medieval period, Mosul was an important center of Islamic culture and learning and was home to many famous scholars and artists.

In the modern era, Mosul played a significant role in the political and economic development of Iraq. It was an important center of industry and commerce and was home to many diverse ethnic and religious communities. However, in recent years, the city has been heavily impacted by conflict, with much of its rich cultural heritage and historical sites damaged or destroyed.



**Fig. 5:** Location of the Mosul city.

Source: (Yawer et al., 2023)

### Historical Urban Fabric

The historical urban fabric of Mosul refers to the physical layout and design of the city, including its streets, buildings, and public spaces, as well as the social and cultural practices that have shaped its development over time.



**Fig. 6:** The historical urban fabric of Mosul.

Source: Al-Awsat, 2017; El-Ghobashy, 2017; Bordoni, 2021

The historical urban fabric of Mosul is characterized by its dense and complex network of streets and alleys, which are lined with traditional multi-story buildings made of mud brick and stone. These buildings typically feature intricate decorations and are built around central courtyards, which serve as the primary social and functional spaces within the household.

The city also has a rich cultural heritage, with many important historical sites and monuments, such as the Great Mosque of al-Nuri, the Al-Hadba Minaret, and the Our Lady of the Hour Church as shown in the Fig. 6. These monuments reflect the different cultural influences that have shaped the city over time, including Islamic, Christian, and Assyrian heritage.

The historical urban fabric of Mosul, and its cultural heritage, has been damaged during the conflicts, the city has experienced over the past years. Efforts are being made to restore and preserve the remaining structures and sites to prevent further deterioration and to preserve the city's rich cultural heritage for future generations.

Illegal development in Mosul has largely occurred outside of the city's 1973 master plan, in public and agricultural areas, due to population growth, poverty, lack of social services, and poor urban planning. Two distinct patterns can be observed in the city's current urban fabric, with both traditional, compact designs and newer grid-based designs being used. The traditional compact layout can be seen in the ancient old city, characterized by small courtyard houses and narrow passageways, while the grid-based design is evident in the neighborhoods of single-family dwellings, semi-detached houses, and row houses. The city is divided into eight administrative sectors, with residential zones laid out in a grid pattern of rectangular blocks of houses separated by roads.

The old city neighborhood is considered to be the city's center, due to its location along the Tigris River. To fully understand the history and development of Mosul, it is important to examine the surrounding environment and the interplay of urban, cultural, social, economic, and political factors that shape the city's structure. By studying the city's urban fabric, we can understand how to improve the livability of the city and make informed decisions about preservation and urban design.

The urban fabric in the city of Mosul is characterized by a mix of traditional, compact design and more recent, grid-based design. The traditional design is based on the old city, which is composed of small courtyard houses and narrow passageways. The grid-based design is seen in the more recent residential areas, which are made up of single-family houses, semi-detached houses, and row houses. The city is also divided into eight administrative sectors, with the old city being considered the city center due to its location along the Tigris River. The study of the urban fabric is important for understanding the structure of a city and how it can be improved for the benefit of its residents. Additionally, it is a crucial aspect of urban planning, preservation, and design.

**SWOT Analysis**

A SWOT analysis is a strategic planning tool that helps organizations identify their strengths, weaknesses, opportunities, and threats. It is often used to assess a project, product, or business venture.

An analysis of the strengths of Mosul city would focus on its unique cultural heritage, which gives it advantages over other cities and makes it difficult to replicate. A review of the weaknesses of the city would highlight the limitations that impede its preservation and inheritance of cultural heritage. An evaluation of opportunities and threats would take into account external factors that affect the city's growth and aim to minimize potential hazards while maximizing potential benefits for the preservation of Mosul. A risk assessment would consider the challenges posed by modern culture and business to the traditional rural culture and connection of the city. To ensure the city's sustainable growth, efforts should be made to minimize commercial exploitation and instead focus on promoting the cultural richness of the city, giving it a traditional folk-art brilliance and communal roots.

The SWOT analysis for Mosul city would involve evaluating the city's strengths, weaknesses, opportunities, and risks.

**Strengths:**

- Mosul's status as a state-level intangible cultural property gives it unique advantages over the other cities
- The cultural heritage of Mosul is historically significant and difficult to replicate

**Weaknesses:**

- The preservation of Mosul's cultural heritage is hindered by its own limitations
- The city faces challenges in maintaining its traditional culture and heritage in the face of modern societal influences

**Opportunities:**

- Opportunities for preserving and promoting the city's cultural heritage can be leveraged to attract tourists and boost the local economy
- Collaboration with organizations and governments to promote the preservation of Mosul's cultural heritage

**Risks:**

- Modernization and urbanization can lead to the loss of traditional culture and heritage
- The city's recognition as a cultural treasure can lead to over-commercialization and economic exploitation.

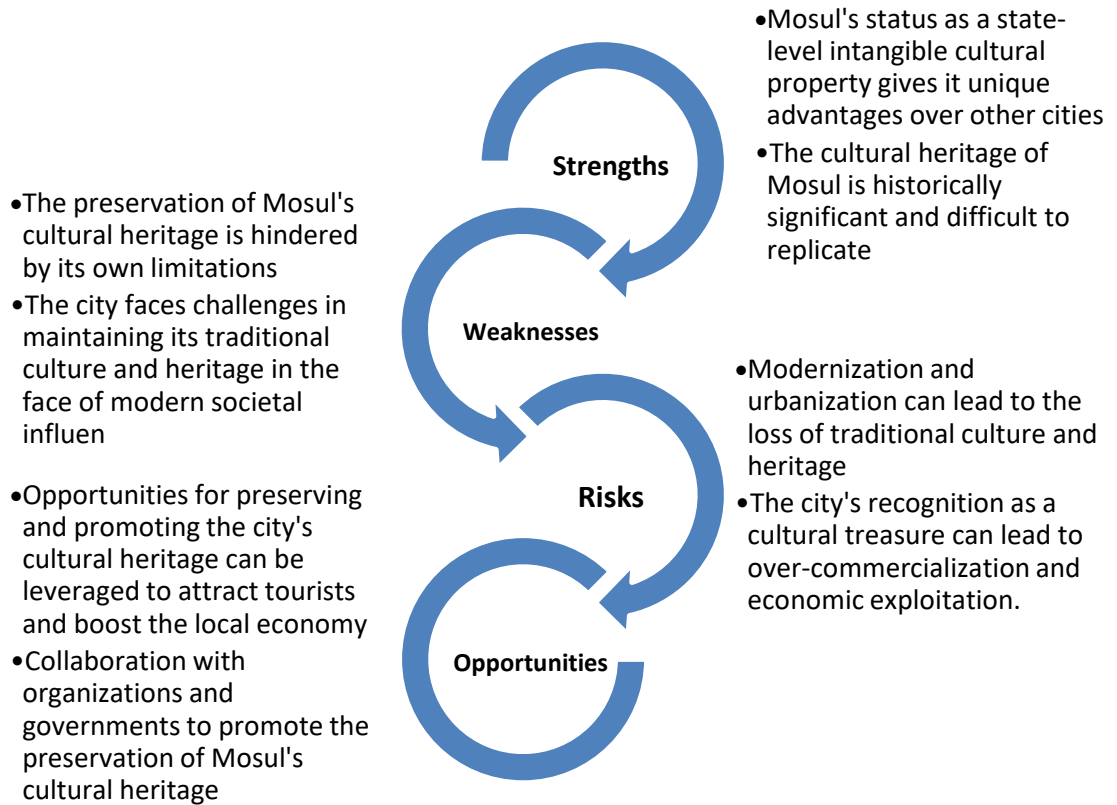


Fig. 7: The SWOT analysis of Mosul.

To mitigate these risks and capitalize on the opportunities, it is important to strike a balance between economic development and preservation of the city's cultural heritage. This can be achieved by promoting and highlighting the city's traditional folk-art and communal roots, and by limiting commercial exploitation.

### A Comprehensive Sustainability Strategy for Mosul

One key aspect of a comprehensive sustainability strategy for Mosul would be to carefully balance economic development and preservation of the city's rich cultural heritage. This could involve promoting tourism and development that highlights and preserves the city's historical and cultural assets, while also taking steps to minimize negative impacts on the environment and local communities. Additionally, it would be important to consider the needs of various stakeholders, such as residents, business owners, and visitors, in order to ensure that any development or planning decisions are equitable and inclusive. Other important considerations may include addressing issues related to transportation, energy, and resource management, as well as working to build sustainability in the face of climate change and other environmental challenges. Overall, a sustainable approach to city development in Mosul would prioritize long-term planning, community engagement, and a holistic understanding of the interrelated economic, environmental, and social factors that shape the city's future.

### Applying Sustainability Principles in Mosul City

Applying sustainability principles in Mosul city would involve several key steps. First, a comprehensive and long-term sustainability strategy would need to be developed, taking into account the city's unique context and challenges. This strategy would need to be continually updated and refined through ongoing planning and implementation efforts.

Next, the city would need to focus on environmental sustainability, including measures to reduce its carbon footprint, promote clean energy, and protect natural resources. This could include implementing green infrastructure, such as parks and green roofs, as well as encouraging sustainable transportation options, such as public transit and active transportation.

In addition, the city would need to prioritize social sustainability, including measures to promote equity and inclusivity, as well as providing access to affordable housing, healthcare, and education for all residents. This could involve implementing policies and programs that support low-income communities and marginalized groups, as well as engaging with residents and community organizations to gather input and feedback on city decisions.

Finally, sustainable decision-making would need to be integrated throughout all levels of city government, with a focus on transparency, accountability, and community participation. This would involve creating a culture of sustainability within the city government, as well as developing a robust system for monitoring and reporting on progress towards sustainability goals.

### **Preservation and Redevelopment of Historic Districts**

Applying sustainability principles in Mosul city would involve addressing the issues with the sewage system, gas supply, and public transit in the old city. This would involve renovating and upgrading infrastructure to improve the living conditions for residents and attract more residents and businesses to the area. Additionally, preservation and redevelopment of the historic districts, such as converting old homes into small hotels and revitalizing the souq, would promote tourism and create new opportunities for the local economy. This could also involve promoting the city and the surrounding province as a tourist destination, highlighting the abundance of historical sites and natural attractions. Overall, a comprehensive, long-term sustainability strategy that incorporates continual long-term planning and implementation is needed to address these issues and promote sustainable development in Mosul.

### **Pedestrian-Oriented Urban Planning**

Pedestrian-oriented urban planning is an approach that prioritizes the needs and safety of pedestrians in the design and development of cities. This type of planning focuses on creating walkable neighborhoods, with well-connected sidewalks, bike lanes, and other infrastructure that encourage active transportation. In the context of Mosul city, this approach could be applied to the historic districts, such as the old city, to improve access and mobility for residents and visitors. By promoting walkability, the city can also support local businesses and create a more vibrant and livable community. Additionally, pedestrian-oriented planning can also have positive impacts on the environment, by reducing the need for cars and promoting sustainable transportation. Overall, pedestrian-oriented urban planning can be a valuable tool for preserving and revitalizing historic neighborhoods while also supporting the overall sustainability of the city.

### **Integrated Transportation System**

An integrated transportation system is essential for the sustainable development of a city like Mosul. This includes a combination of different modes of transportation, such as public transit, biking, and walking, all interconnected and accessible to residents and visitors. This type of system allows for more efficient and sustainable mobility, reducing dependence on cars and promoting a healthier and more livable city.

To achieve this, a comprehensive transportation plan must be developed, taking into account the city's unique characteristics and needs. This includes the development of a robust public transit system, such as buses and trains, as well as the creation of dedicated bike lanes and pedestrian-friendly streets. Additionally, the plan should consider the integration of new technologies, such as electric vehicles and real-time data systems, to improve the overall efficiency and accessibility of the transportation network.

Furthermore, the city should also focus on improving the connectivity of the different transportation options available, such as integrating public transit with bike-sharing and car-sharing services. This will make it easier for residents and visitors to move around the city, reducing congestion and promoting more sustainable modes of transportation.

Overall, an integrated transportation system is essential for the sustainable development of Mosul, as it can help to improve the quality of life for residents, reduce environmental impacts, and attract tourists and investment to the city.

## Results and Desiccation

Theoretical and practical frameworks play a crucial role in guiding research and informing effective strategies in various fields, including urban planning and reconstruction. In the context of cities impacted by wars and disasters, it becomes imperative to develop frameworks that not only address the immediate challenges of reconstruction but also promote long-term resilience, flexibility, and sustainability. This paper presents a comprehensive exploration of the theoretical and practical framework for urban reconstruction, focusing on its effectiveness and efficiency in the face of destruction caused by conflicts and calamities.

### The theoretical framework

The theoretical framework of the research yielded several conclusions regarding the effectiveness and efficiency of the current theoretical framework in light of previous architectural and urban knowledge. These conclusions are as follows:

1. Wars and disasters provide opportunities for flexibility strategies in reconstructing destroyed cities, aiming to meet the community's needs while aligning with preservation and revitalization requirements of historical areas and buildings with high symbolic value. Additionally, they address the evolving and emerging trends that may require adoption based on the extent of destruction.
2. Flexibility serves as the foundation for post-disaster and post-war urban environments by creating urban environments that are responsive to disasters with short- and medium-term perspectives. It can facilitate preparedness and enhance recovery to restore the pre-disaster condition of the city in the medium or long term. Furthermore, it can stimulate development and transformation after complete collapse, establishing new foundations to achieve greater efficiency and effectiveness.
3. Urban flexibility can be embraced in reconstruction to accommodate diverse approaches of preservation, revitalization, innovation, and sustainability, ranging from traditional to advanced or green supportive approaches, ensuring the achievement of flexible characteristics.
4. The adoption of modeling and simulation technologies, including both reality and virtual reality, contributes to the development and improvement of damaged buildings due to wars or disasters. It also facilitates documenting the status of these buildings and enhances communication among stakeholders involved in reconstruction, within an integrated model that can be used for evaluation and design.
5. It is important to consider the potential of flexible features in urban reconstruction to achieve development, improvement, and an enhanced quality of life.
6. Keeping up with global and contemporary trends in environmental conservation, minimizing material and resource consumption, and reducing pollution are essential.
7. Meeting the basic needs and requirements of communities after wars or disasters is a crucial necessity for reconstruction, especially in the short and medium term. It can be achieved, particularly in service buildings, by utilizing local experiences and involving the population themselves to achieve a better and more flexible life.
8. The significance of employing supportive technologies in urban reconstruction, as they increase the sustainability of buildings that have been destroyed due to wars or disasters, particularly preserving those buildings or their components with historical value in the city.

### **The practical framework**

According to the analyzed indicators of the study area (specifically, the city of Mosul), the research has drawn the following conclusions for the development of the study area, contributing to the promotion of flexible and sustainable urban reconstruction and planning:

#### **1. Preparedness Phase:**

The preparedness phase focuses on the necessary measures and arrangements to prepare the environment, infrastructure, resources, and tools for initiating the reconstruction and rehabilitation process. This phase includes developing plans and strategies to achieve these objectives and ensuring the provision of logistical support for the teams involved in reconstruction and rehabilitation.

The research highlights several general ideas regarding the preparedness phase for the reconstruction of Mosul:

- Establishing a preparedness team: Forming a team consisting of experts and specialists from various fields such as civil engineering, urban planning, housing, health and safety, etc.
- Identifying and using disaster and risk scenarios: Updating information on disasters and risks, providing maps of expected and unexpected hazards.
- Assessing current damages: Conducting a comprehensive assessment of the current damages in the city through studies and detailed reports.
- Setting priorities: Prioritizing reconstruction based on the assessment of current damages, with a focus on the most affected areas that significantly impact the lives of citizens.
- Developing reconstruction plans: Developing detailed reconstruction plans, including designs for houses, buildings, roads, bridges, and basic infrastructure, along with cost estimation and implementation timelines.
- Raising awareness: Increasing awareness about the services and functions of infrastructure systems within the city's policy and projects since there is a lack of awareness in this area.
- Local and international cooperation: Enhancing local and international cooperation in the reconstruction process by engaging with local and international organizations and companies interested in reconstruction.
- Ensuring financing: Securing the necessary funding for the reconstruction process through local and international collaborations and encouraging investments in the city.
- Occupational health and safety: Ensuring the implementation of best health and occupational safety practices during the reconstruction process to protect the lives of workers and citizens.

The research concludes that the preparedness plans for the flexibility of Mosul in the study area partially comply with the Sendai Framework and cover some of the ten essentials. However, the authorities lack proper support from external sources to effectively regulate, coordinate, and involve citizens in the process.

#### **2. Response Phase:**

This phase aims to address the current situation of the city after the destruction it has suffered. It involves addressing the basic needs of affected populations and rebuilding essential infrastructure such as roads, bridges, electrical networks, water supply, and sanitation systems. Additionally, it includes the reconstruction of houses, public buildings, and commercial structures. The response phase also encompasses waste management, debris removal, and the provision of food, water, medical, and psychological services to affected populations. These tasks are carried out in collaboration between government entities, non-governmental organizations, international donor agencies, and specialized entities involved in reconstruction.

The response plan for the reconstruction of Mosul includes several steps as follows:

- **Damage and loss assessment:** Evaluating the damages and losses resulting from conflict and war in the city and documenting them in an official report.
- **Provision of humanitarian assistance:** Ensuring the necessary humanitarian aid for populations affected by the conflict, including food, water, shelter, healthcare, and psychological support.
- **Clearing land and dismantling mines:** Cleaning the land from debris and dismantling unexploded mines and explosives to ensure the safety of residents and reconstruction workers.
- **Infrastructure repair:** Repairing the city's infrastructure, including water, sewage, electricity, gas, roads, bridges, and government buildings, along with other services.
- **Support for house reconstruction:** Providing the necessary support for rebuilding houses destroyed by the war, including the provision of construction materials, tools, and training.
- **Encouraging economic activity:** Promoting economic activity in the city by reconstructing shops, factories, farms, and providing necessary support for small and medium-sized projects, as well as initiating new economic activities.
- **Training residents in necessary skills:** Training residents in the skills necessary to enhance community sustainability since citizen participation in disaster risk reduction is weak or nonexistent.

### **3. Recovery Phase:**

The recovery phase is the stage that follows the response phase and focuses on restoring the city's natural life and rebuilding its infrastructure and essential services. This phase relies on the response plan that was prepared and implemented in the previous phase. Several aspects need to be addressed during this phase to achieve the desired goal, including:

- Providing water, electricity, sewage, and other essential services that are vital for the residents and businesses.
- Repairing and rebuilding damaged infrastructure, including roads, bridges, government buildings, houses, and other facilities.
- Organizing efforts to remove debris and waste, clean streets, neighborhoods, public parks, and other affected areas.
- Creating employment opportunities for the residents, especially the youth, including training programs and support for small and medium-sized projects.
- Rehabilitating schools, hospitals, cultural centers, sports facilities, and other vital establishments.
- Assessing the damages resulting from the conflict and identifying the needs for rebuilding and rehabilitating the affected areas for future use.
- Implementing flexible urban designs and development approaches, where the city's sustainability methodologies are enhanced, although not consistently, and some strategies cover certain risks for Mosul.

Overall, the recovery phase of reconstructing Mosul requires broad coordination among local and central governments, non-governmental organizations, civil society, the private sector, and donors to achieve the desired goal.

### **4. Adaptation Phase:**

The adaptation phase is the final stage in the process of rebuilding the city. In this phase, comprehensive economic, social, and institutional recovery is achieved, and efforts are focused on building the necessary sustainability to face any future challenges. This phase emphasizes community capacity building and promotes sustainable development to ensure the continuity of economic growth and development in the city. The work in this phase includes training and employing local residents in new jobs and providing logistical support for small, medium, and micro-sized projects that contribute to economic growth in the city.



The adaptation phase focuses on preserving the achievements made in previous stages and aims to enhance the city's ability to adapt to future changes and challenges. The adaptation plan includes several activities and measures, such as:

1. Developing infrastructure: Improving the city's infrastructure, including roads, bridges, buildings, sewage, water, and electricity. It is also essential to enhance the city's capacity to adapt to climate change, such as floods, sandstorms, and earthquakes.
2. Strengthening local capacities: Supporting local entities in the city, such as government institutions, non-governmental organizations, and civil society, to enhance their ability to adapt to future changes. This can be achieved through providing training, education, financial resources, and necessary technology.
3. Investing in sustainable development: Promoting sustainable development in the city by investing in projects aimed at enhancing the local economy and protecting the environment, such as agriculture, industry, tourism, and renewable energy generation.
4. Preserving cultural and historical heritage: Safeguarding the city's cultural and historical heritage and enhancing the local community's capacity to preserve and sustainably utilize it. This can be achieved through the reconstruction of historical areas, archaeological sites, and museums.

The process of rebuilding Mosul should occur in multiple stages. The first stage is the preparedness phase, which involves planning, preparing necessary plans, and identifying future needs and expectations. The second stage is the response phase, which includes emergency measures and addressing the damages resulting from conflicts and crises. This is followed by the recovery phase, which involves rebuilding and rehabilitating the affected areas. Finally, the adaptation phase comes, focusing on improving capacities of the local community in dealing with future risks and crises.

These stages require cooperation and coordination among various stakeholders, providing necessary resources, and enhancing economic capacity to promote sustainability and achieve the defined goals in each phase. Through collective work and collaboration, comprehensive and sustainable reconstruction of Mosul can be achieved. The results have shown the importance of understanding methodologies to attract new investments to the city, and there are some insights into funding methods, although the picture remains unclear, and only limited funding has been obtained. Different entities and organizations have developed some plans, but they lack coordination among them, in addition to the presence of scattered incentives.

## Conclusion

In conclusion, this research paper has explored the theoretical and practical framework for urban reconstruction after wars and disasters. The findings emphasize the importance of flexibility, integration of real-world experiences, and stakeholder engagement in achieving effective and sustainable reconstruction outcomes. By prioritizing resilience, sustainability, and community well-being, cities can rebuild with the capacity to adapt to future challenges and foster long-term development. Further research and collaboration are necessary to refine and expand the framework for diverse contexts. Ultimately, integrating theoretical principles and practical experiences can contribute to efficient and successful urban reconstruction worldwide, revitalizing cities and creating sustainable environments for the future.

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