

## INTRODUCTION

This research paper aims to explore the post-conflict reconstruction and recovery of war-torn cities, particularly focusing on rebuilding efforts that are both efficient and culturally sensitive. Specifically, it investigates how vernacular architecture can be integrated into modern construction techniques in the reconstruction of Sana'a, the capitol city of Yemen. The objective is to develop a framework for rebuilding cities that preserves cultural identity and shared memory while simultaneously adapting to contemporary needs.

### Context and motivation

The choice of Sana'a as the focus of this research is deeply personal. My father was born and raised in the city, and I spent the first twelve years of my life there before the war forced my family to migrate. This research is not only an academic study but also a personal journey to explore how, after the conflict, we might recover the Yemen that my family and I remember – a country rich in its history, culture and identity.

Before the war, Yemen was known for many things, but what stood out the most was its architectural heritage, particularly in the Old City of Sana'a, Shibam Hadhramawt, and the Taiz region. The architecture in the region has a unique form of expression and serves as a powerful reminder of identity for both the nation and its people.

Conversations with people that have visited Yemen often reflect on how the country's distinct architectural craftsmanship shaped their impression of the country. Social cohesion was strong in the cities, supported by the infrastructure and the built environment, encouraging communal interaction, despite the difference in belief and opinion.

However, much has changed after the conflict. Besides the physical destruction of the country came the ruin of the architectural expression and identity of the Yemeni people. Many of the beautifully crafted buildings have collapsed, taking with them visible symbols of collective memory. Today, the Yemeni people dream of a future in which tradition is not only preserved but reimagined within a new, modern context. In discussions about reconstruction, locals have expressed their desire for a rebuilding strategy that honours their heritage while embracing innovation. They seek a modern Yemen that remains true to its cultural and historical roots.

### Research question and the scope

In response to this desire, the main research question of this paper is: **How can vernacular elements be integrated with modern construction techniques in the post-conflict reconstruction of Sana'a?**

It is important to note that this research does not aim to restore or replicate the historic architecture of the Old City of Sana'a, nor does it solely focus on the preservation of existing heritage sites. Rather, the research investigates how principles, materials, and

local knowledge embodied in traditional Yemeni architecture can inform and be used in modern construction methods. **The goal is to merge tradition with modernity – to reintroduce traditional expression in a way that is adaptive, contemporary, and contextually relevant.** This includes possibly maintaining elements such as craftsmanship, spatial logic, and passive design strategies that are still applicable today.

The scope of the research is focused on Sana'a, although architectural references from other Yemeni cities will be considered to develop a comprehensive understanding of the broader Yemeni vernacular architecture style. Additionally, comparative case studies from post-conflict reconstruction projects in other parts of the Middle East – namely Aleppo, Syria and Beirut, Lebanon – will be examined to provide insights into the challenges and approaches involved in balancing modern rebuilding with the preservation of cultural heritage and identity.

#### Structure of the research paper

The methodology used in this paper involves multiple components. It will start with a contextual background and theoretical framework developed through a literature review. The contextual and theoretical analysis uses established research in vernacular architecture, resilience, and post-conflict urban recovery – such as Khaled A. Al-Sallal's work on the vernacular tower architecture of Sana'a, Ali Sayigh's research on sustainable vernacular practices, and Goksenin Inalhan's exploration of place attachment theory – to provide an understanding on the importance of architectural identity and the emotional ties between residents and their built environment. To examine the relationship between trauma, memory, urban space, and how cities recover after catastrophes, the research will also refer to the works of Adrian Lahoud in *Post-Traumatic Urbanism*, Charlotte Heath-Kelly's *Death ad Security* and Lawrence J. Vale's *The Resilient City*.

Rather than introducing new theoretical concepts, this research aims to build upon the existing body of work to identify how these theories and insights can guide a more informed and culturally appropriate approach to rebuilding Sana'a. The literature analysis will serve as an interpretation tool for the main methodological focus on this research: a comparative case study analysis. The first case study analysis will explore the traditional architectural styles in Yemen, particularly in Sana'a, to identify vernacular elements that can be integrated in modern design strategies. Then case studies on the post-conflict reconstruction of Aleppo and Beirut will be studied, highlighting how these cities responded to the challenges of rebuilding while preserving heritage. These cases will serve as precedents, helping to identify both successful strategies and potential downfalls that should be avoided in the case of Sana'a.

Complementing the theoretical and case study analysis is a collection of informal discussions with family and friends currently living in Sana'a. These discussions allowed the residents to share their views on reconstruction, cultural identity, and the role of vernacular architecture in reconstruction. Insights from local voices is an essential part

of this research, ensuring that the proposed design framework aligns with community needs, values and expectations.

The outcome of this research paper will be a list of design guidelines and approaches that inform the reconstruction process of Sana'a. The goal is for these guidelines to be used by architects, urban planners, and local builders, giving them the tools to rebuild their cities in an efficient, sustainable, and culturally meaningful way.

Furthermore, the research highlights a couple of key themes in post-conflict reconstruction, including sustainability, material choices, and participatory design. It will explore how vernacular techniques – such as passive heating and cooling systems – can contribute to environmental sustainability and how local participation can strengthen the cultural significance of the reconstruction projects.

This research is significant as it has the potential to inform reconstruction efforts not only in Yemen but also in other conflict-affected regions worldwide. As global conflicts continue to destroy cities and displace populations, there is an urgent need for clear, adaptable, and culturally sensitive reconstruction guidelines. Frequently, reconstruction processes are implemented hastily, overlooking the cultural and emotional needs of the affected population. By developing this framework while the conflict in Yemen is still ongoing, the research offers hope and a plan for the future. It provides a foundation upon which the Yemeni people can rebuild with dignity, identity, and a renewed sense of belonging. It provides an example of how other war-torn cities can start their reconstruction journeys.

## CONTEXTUAL BACKGROUND

### The conflict in Yemen

Yemen, located on the southwestern end of the Arabian Peninsula bordering Saudi Arabia on the north and the Red Sea on the west,<sup>1</sup> is facing one of the world's largest humanitarian crises, with a civil war that has been active for more than a decade. The current conflict began in 2011 when widespread public protests, part of the Arab Spring, forced the long-standing president Ali Abdullah Saleh – who had ruled the country since the unification of the North and South of Yemen in 1990<sup>2</sup> – to hand over power to his vice-president, Abdrabbuh Mansour Hadi.<sup>3</sup> This transition led to the division of the Yemeni army and enabled al-Qaeda in the Arabian Peninsula (AQAP) to seize territories in eastern Yemen.<sup>4</sup>

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<sup>1</sup> Varanda, Fernando. *Art of building in Yemen*. (Cambridge: MIT press, 1982).

<sup>2</sup> Al Jazeera. "A Timeline of Yemen's Slide into Conflict and War." Al Jazeera, April 11, 2023. [www.aljazeera.com/news/2023/4/11/a-timeline-of-yemens-slide-into-conflict-and-war](http://www.aljazeera.com/news/2023/4/11/a-timeline-of-yemens-slide-into-conflict-and-war).

<sup>3</sup> "Yemen: Why Is the War There Getting More Violent?" BBC News, April 14, 2023. [www.bbc.com/news/world-middle-east-29319423](http://www.bbc.com/news/world-middle-east-29319423).

<sup>4</sup> Al Jazeera, "A Timeline of Yemen's."

By 2013, Yemen was experiencing significant governmental instability, largely due to worsening economic conditions and recurring AQAP attacks. In this weakened state, the Houthis – an armed group also known as Ansar Allah, which had emerged in the 1990s and gained prominence in 2014<sup>5</sup> – seized control of the Saada province in northern Yemen. They subsequently advanced into the capital, Sana'a, in 2015, forcing President Hadi to flee to Saudi Arabia.<sup>6</sup>

In response, a Saudi-led coalition, supported by the United States, launches a military intervention in March 2015. The coalition aimed to restore Hadi's government and counter what it perceived as Iran's growing influence in the region. The Houthis, a movement of mostly Zaidi Shia Muslims, were widely believed to be receiving support from Iran.<sup>7</sup> The conflict between Saudi- and US-backed Yemeni government and the Iranian-backed Houthis continued until 2022. A temporary ceasefire was reached in 2020 in light of the COVID-19 pandemic, though intermittent clashes continued between various armed groups, including AQAP and the Southern Transitional Council (STC), which is backed by the United Arab Emirates.<sup>8</sup>

In 2022, a ceasefire was declared after Hadi stepped down, promoting the beginning of peace negotiations in 2023. However, this fragile peace was disrupted when Yemen, in support of the Palestinian cause, halted trade through the Red Sea. This led to a military retaliation from the United States, which effectively ended the relatively stable period that had begun in 2022 causing unrest within the country once again.

### Impact of conflict on cultural heritage

The impact of conflict on cultural heritage in Yemen is both severe and complicated. It extends beyond the physical destruction of sites to include losses in identity, memory, social cohesion and economic stability.<sup>9</sup> The physical destruction of heritage sites is a common occurrence in conflict situations. Often architectural landmarks, archaeological sites, historical urban fabrics, and cultural landscapes are damaged or destroyed, especially when they are located between battle zones. Such destruction is frequently referred to as "collateral damage".<sup>10</sup>

Conflict also disrupts the natural social and cultural networks, causing displaced people to lose their homes, cities and communities, cutting ties to the places that

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<sup>5</sup> Ali, Marium. "Mapping US Attacks on Yemen's Houthis." Al Jazeera, March 16, 2025. [www.aljazeera.com/news/2025/3/16/mapping-us-attacks-on-yemen](http://www.aljazeera.com/news/2025/3/16/mapping-us-attacks-on-yemen).

<sup>6</sup> BBC News, "Yemen."

<sup>7</sup> Haddad, Mohammed. "Infographic: Yemen's War Explained in Maps and Charts." Al Jazeera, February 9, 2022. [www.aljazeera.com/news/2022/2/9/yemens-war-explained-in-maps-and-charts-interactive](http://www.aljazeera.com/news/2022/2/9/yemens-war-explained-in-maps-and-charts-interactive).

<sup>8</sup> Al Jazeera, "A Timeline of Yemen's."

<sup>9</sup> Thiel, Fabian, Rahaf Orabi. *Reviving Aleppo: Urban, Legal and Digital Approaches for Post-War Recovery*. (London: Springer Nature, 2024), p.V, <https://doi.org/10.1007/978-3-031-65858-7>.

<sup>10</sup> Miznazi, Diana. *Reconstruction of Cultural Heritage in Aleppo, Syria Reviewed: a critical exploration of current endeavors and practices*. (CEU School of Public Policy, 2023), [www.thealeppoproject.com/wp-content/uploads/2023/01/MiznaziPaperWithCoverV01.pdf](http://www.thealeppoproject.com/wp-content/uploads/2023/01/MiznaziPaperWithCoverV01.pdf).

defined their history and identity.<sup>11</sup> The abandonment of familiar living and working environments contributes to the overall loss of social memory and a collective sense of belonging.<sup>12</sup>

Therefore, cultural heritage plays an essential role in the re-shaping of both individual and collective identity. The loss of cultural heritage can diminish the self-esteem and fracture a population's connection to its shared history.<sup>13</sup> In post-conflict contexts, important questions need to be asked, such as: How should reconstruction take place? Which identity should be represented? What role do culture and memory play in rebuilding efforts? These are not merely architectural decisions but are also deeply symbolic. Reconstruction becomes a tool to interpret national identity and (re)construct collective memory.<sup>14</sup>

The economic impact of heritage destruction is also significant. Cultural heritage often underpins tourism, which contributes to national economic independence.<sup>15</sup> Yemen has suffered financially due to the loss of tourism revenue. As Yemen's economy is already in a fragile state, the destruction of its heritage sites is an additional threat – wrecking its national identity and economic survival. Reconstructing these heritage sites has the potential to attract both national and international aid and investment, contributing to job creation and economic recovery. However, prioritizing economic gain over cultural and social considerations, as seen in post-war Beirut, can result in the destruction of identity, memory, and heritage.<sup>16</sup>

Post conflict reconstruction can also face structural and practical challenges. These challenges can include a lack of financial and technical resources, outdated legal frameworks, poor coordination between stakeholders, and the challenge between preserving heritage and meeting immediate human needs.<sup>17</sup> One of the main challenges is in defining the boundaries and meaning of "authenticity" in reconstruction, especially in cities that have been through multiple historic changes.<sup>18</sup> Therefore, ensuring that local communities participate in the reconstruction process is essential in aligning the architectural interventions with the local community needs, values and expectations.

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<sup>11</sup> Lahoud, Adrian, Charles Rice, and Anthony Burke. *Post-traumatic urbanism*. 5th ed. Vol. 80. (Hoboken, N.J: Wiley, 2010), p.137.

<sup>12</sup> Thiel, *Reviving Aleppo*, p.177.

<sup>13</sup> Yang, Minja, Gina Doggett. *Culture/nature: the link to preservation*. UNESCO World Heritage Centre, 2018. <https://whc.unesco.org/en/activities/486/>.

<sup>14</sup> SOUFAN, Anas. "Historiographical Overview on the Post Conflict Reconstruction in Syria: From the Mid-19th Century to the 2011 Crisis." *UNESCO Publications*, 2015.

<sup>15</sup> Thiel, *Reviving Aleppo*, p.168.

<sup>16</sup> Risk, Yara. "Beirut Post-War Reconstruction: The Case of the Grand Theater." *Beirut Post-War Reconstruction: The Case of the Grand Theater*, 2019.

<sup>17</sup> Al-Harithy, Howayda, Dina Mneimneh. "Integrating culture, recovery and reconstruction for sustainable urban development: Beirut case study." *UNESCO Publications*, 2022.

<https://whc.unesco.org/document/175507>

<sup>18</sup> SOUFAN, "Historiographical Overview."

This also helps prevent residents from feeling alienated from their rebuilt environments.<sup>19</sup>

In general, the impact of conflict on cultural heritage is a complicated issue that requires careful consideration during recovery efforts. Post-conflict reconstruction must aim to create a balance between the physical rebuilding of cities and the preservation of cultural identity, memory, and social cohesion to achieve sustainable and meaningful urban development.

### Understanding vernacular architecture

Ali Sayigh defines vernacular architecture as the traditional and indigenous architectural practices that emerge from local customs, materials, and environmental conditions.<sup>20</sup> It is often characterised by its ability to respond to the specific needs of a local community and the available resources. By nature, vernacular architecture is a form of sustainable architecture, as it usually relies on locally sourced materials and construction methods that are both environmentally and culturally appropriate.<sup>21</sup>

In the Middle East, vernacular architecture has been an essential design method that responds to climate, cultural, and economic challenges. Some vernacular design elements that are commonly found in houses across the Arabian Peninsula, include *mashrabiyas*,<sup>22</sup> courtyards, and windcatchers. These elements are specifically designed to provide thermal comfort and reduce energy consumption in hot climates.<sup>23</sup> Other vernacular strategies such as aligning entrance with courtyards, using linear housing plans, orienting rooms based on sun paths and wind directions, and using thick walls and local materials are all proven strategies in effectively creating environmentally responsive architecture.<sup>24</sup>

Beyond the environmental benefits, vernacular architecture is deeply rooted in cultural identity. In the Middle East, it is not just a response to the environmental conditions but also a strong expression of regional traditions and values.<sup>25</sup> It reflects the connection

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<sup>19</sup> Miznazi, *Reconstruction of Cultural Heritage*.

<sup>20</sup> Sayigh, Ali, and ed. *Sustainable Vernacular Architecture: How the Past Can Enrich the Future*. (Cham, Switzerland: Springer Nature, 2019), p.1-5. <https://doi.org/10.1007/978-3-030-06185-2>.

<sup>21</sup> Sayigh, *Sustainable Vernacular Architecture*, p.5.

<sup>22</sup> Varanda in the *Art of Building in Yemen* (p.86) describes a *mashrabiya* as a window screen mostly made of a wooden lattice covering a perforated window which increases air flow and ventilation while reducing the amount of direct sunlight entering a room.

<sup>23</sup> Bagasi, Abdullah Abdulhameed, John Kaiser S. Calautit, Abdullah Saeed Karban. "Evaluation of the Integration of the Traditional Architectural Element Mashrabiya into the Ventilation Strategy for Buildings in Hot Climates." *Energies* Vol 14, no. 3: 530(2021): 1-24. <https://doi.org/10.3390/en14030530>.

<sup>24</sup> Sayigh, *Sustainable Vernacular Architecture*, p.23.

<sup>25</sup> Tamimi, Azzam Khalid S.A, Dr. Halil Zafer Alibaba. "Integration of the Vernacular Passive Cooling Systems with Contemporary Architecture in the Middle East." *International Journal of Recent Research in Civil and Mechanical Engineering* Vol. 3, no. 2 (2017): 8-16.

[www.paperpublications.org/upload/book/Integration%20of%20the%20Vernacular-859.pdf](http://www.paperpublications.org/upload/book/Integration%20of%20the%20Vernacular-859.pdf)

between community and its place, and it serves as a visual and spatial representation of their cultural heritage. The specific architecture of region can represent centuries worth of accumulated knowledge, presenting local customs, family structures, and collective memory.<sup>26</sup>

Middle Eastern vernacular architecture is also significant in regard to its sustainability advantages, not just environmentally speaking but also economically and socially. It offers low-cost solutions that require fewer external sources, while maintaining a sense of continuity and belonging among the people.<sup>27</sup>

Zooming in, Yemen also provides a number of rich vernacular architecture examples, ranging from the iconic tower houses of Sana'a and Shibam to a number of religious structures such as the Ba Jamal Mosque in Shibam. These buildings use a number of architectural elements – including multi-story earth structures, architectural rhythms, light-coloured facades with gypsum coating, intentionally positioned windows, and thick insulating walls – to reflect the environmental adaptation and the cultural expression of the cities.<sup>28</sup>

In the Yemeni context, vernacular architecture has successfully met functional needs while also supporting sociocultural values. Its ability to provide thermal comfort at low energy costs makes it a compelling model for possible reconstruction.<sup>29</sup> In discussions of post-conflict reconstruction in Yemen, it is essential to contemplate the role that vernacular architecture might play as it offers a pathway to rebuild in ways that are culturally and environmentally appropriate. The vernacular elements and techniques that could be used in this reconstruction will be further explored in the case study analysis.

## THEORETICAL FRAMEWORK

### The role of vernacular architecture in post-conflict reconstruction

Vernacular architecture has significant potential in post-conflict reconstruction due to its cultural, environmental, social and economic value. Integrating vernacular elements into the rebuilding process not only restores physical structures but also plays an important role in healing, reconnecting, and empowering destroyed communities.

One of the most important aspects of vernacular architecture is its role in preserving cultural identity and collective memory. These buildings are not merely shelters; they are a representation of heritage, traditions, and the experiences of the people.<sup>30</sup> In post-conflict scenarios, where much of a society's cultural fabric has been damaged or lost, the reintroduction of vernacular elements becomes a vital part of rebuilding identity.

<sup>26</sup> Sayigh, *Sustainable Vernacular Architecture*, p.2.

<sup>27</sup> Sayigh, *Sustainable Vernacular Architecture*, p.353.

<sup>28</sup> Sayigh, *Sustainable Vernacular Architecture*, p.24-40, 337.

<sup>29</sup> Sayigh, *Sustainable Vernacular Architecture*, p.2.

<sup>30</sup> Thiel, *Reviving Aleppo*, p.311.

According to researchers, integrating familiar architectural forms and local materials helps communities re-establish a sense of continuity with the past and contributes to emotional and psychological recovery.<sup>31</sup>

As previously mentioned, vernacular architecture in addition to its cultural value is inherently sustainable. It has a built-in response to local environmental conditions, typically using locally available materials and passive design strategies. This adaptation leads to energy efficient, climate responsive designs that require little external sources.<sup>32</sup> Incorporating vernacular principles in reconstruction can reduce a country's dependence on imported technologies and provide comfort and functionality fitted to the specific environmental context.<sup>33</sup>

There are also clear social and economic advantages. For example, the use of local materials and construction methods strengthens the local economy by creating employment opportunities and engaging with local craftsman.<sup>34</sup> This creates a sense of ownership among communities and broadens the capabilities found within the local workforce. In contrast, reconstruction projects that overlook the use of traditional knowledge in favour of foreign materials or labour can undermine local autonomy and create long-term international dependencies.<sup>35,36</sup>

Particularly in the case of Yemen's vernacular architecture, the iconic examples of the mud-brick tower houses in Sana'a and the centuries old building of Shibam Hadhramawt demonstrate a deep understanding and adaptation capabilities to harsh climatic conditions.<sup>37</sup> These structures which use earth-based building material and traditional construction techniques, represents the efficiency and identity – through its appearance and cultural relevance – of Yemeni architectural heritage. Therefore,

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<sup>31</sup> Vale, Lawrence J., Thomas J. Campanella. *The Resilient City: How Modern Cities Recover from Disaster*. (New York: Oxford University Press, 2005), p.359.

<sup>32</sup> Al-Sabahi, Hatim M. "A Comparative Analysis of the Vernacular Housing Cluster of Yemen: Sana'a and Shibam Hadhramawt A Case Study." *Journal of Science & Technology* Vol. 10, no. 2 (2005): 27–34. <https://doi.org/10.20428/jst.v10i2.71>.

<sup>33</sup> Al-Sallal, Khaled A. "Vernacular Tower Architecture of Sana'a: Theory and Method for Deriving Sustainable Design Guidelines." In *Sustainability, Energy and Architecture*, edited by Ali Sayigh, 257–287. Oxford: Academic Press, 2013. <https://doi.org/10.1016/B978-0-12-397269-9.00010-4>.

<sup>34</sup> Benslimane, Nawal, Ratiba Wided Biara. "The urban sustainable structure of the vernacular city and its modern transformation: A case study of the popular architecture in the Saharan Region" *Technologies and Materials for Renewable Energy* (2018): 1241-1252. <https://doi.org/10.1016/j.egypro.2018.11.290>.

<sup>35</sup> "Reconstruction and Recovery in Yemen: Recommendations from the Development Champions." *Rethinking Yemen's Economy*, April 8, 2019. [https://devchampions.org/publications/policy-brief/Reconstruction\\_and\\_Recovery\\_in\\_Yemen/](https://devchampions.org/publications/policy-brief/Reconstruction_and_Recovery_in_Yemen/).

<sup>36</sup> Sultan, Basel. "Modern/Traditional Buildings in Yemen and Sustainability," 2008. [www.researchgate.net/publication/256599703\\_Modern\\_Traditional\\_Buildings\\_in\\_Yemen\\_and\\_Sustainability](http://www.researchgate.net/publication/256599703_Modern_Traditional_Buildings_in_Yemen_and_Sustainability).

<sup>37</sup> Al-Sallal, "Vernacular Tower Architecture", p.257-287.

traditional elements should be preserved and reflected in post-conflict rebuilding strategies.<sup>38</sup>

### Theoretical lenses guiding the research

Within this research paper critical regionalism, place attachment theory, and resilience are used as the main theoretical lenses to provide a framework for understanding how vernacular architecture can contribute to meaningful, sustainable, and community-centered design.

#### Critical regionalism

Critical regionalism is an architectural approach in which the importance of cultural, historical, and environmental context is emphasised throughout the design process. It focuses on the reinterpretation, rather than replication, of vernacular forms to develop modern architecture rooted in local traditions.

The research aligns with this concept by exploring which specific vernacular elements from Yemen can contribute to modern construction. These could possibly include sustainable strategies such as passive cooling systems and thermal comfort, which are embedded in traditional techniques.<sup>39</sup> This integrated approach (traditional into the modern) seeks to capture the *genius loci* – the spirit of the place – through the intentional use of local materials and methods that align with the cultural memory of the place and the contemporary needs of the people.<sup>40</sup>

Another principle of critical regionalism is the integration of architecture into the natural landscape. This includes site sensitive design and the use of traditional techniques or appearances that unify the built structure with its surroundings. Furthermore, the idea of using rubble from destroyed structures in new construction does not only recycle the material but also provides a sort of historical continuity, anchoring the reconstruction to a specific movement in history.<sup>41</sup>

Most importantly, the critical regionalist approach does not aim to replicate the past, but rather to reinterpret it. By incorporating vernacular features in new ways, this method encourages innovation while simultaneously respecting tradition. It supports the central goal of this research: to propose a hybrid architectural approach that merges tradition with modernity in a way that serves the present while honouring the past.

#### Place attachment theory

Goksenin Inalhan explores place attachment theory as the emotional and psychological bonds that people form with their physical environments.<sup>42</sup> In post conflict contexts,

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<sup>38</sup> Sultan, “Modern/Traditional Buildings”.

<sup>39</sup> Sayigh, *Sustainable Vernacular Architecture*, p.23.

<sup>40</sup> Sayigh, *Sustainable Vernacular Architecture*, p.141-163.

<sup>41</sup> Sayigh, *Sustainable Vernacular Architecture*, p.181-205.

<sup>42</sup> Inalhan, Goksenin, Eunhwa Yang, and Clara Weber. “Place Attachment Theory.” In A

these bonds are often broken due to displacement, destruction or the loss of familiar surroundings.<sup>43</sup> Therefore, the reconstruction of these destroyed cities becomes not only about the physical rebuilding of the environment but also a matter of restoring the emotional and cultural connections to the place.

The integration of vernacular design elements – such as the architectural forms, spatial organisation, and materials familiar to the community – can significantly help rebuild environments that resonate with people's memories and identity, consequently restoring the people's sense of belonging and emotional stability.

Additionally, reinvesting in urban heritage is strongly related to encouraging displaced populations to return and reviving social cohesion within the city. This can increase the urban recovery and economic development, further highlighting the community's sense of place and purpose.<sup>44</sup> When people feel emotionally connected to a place, they are more likely to reinvest in rebuilding their community and strengthening its resilience.

Failing to consider place attachment theory during the reconstruction process can lead to a deeper sense of loss, especially among the displaced populations. The lack of familiar landmarks and architectural expressions could make it difficult for individuals to reconnect with their surroundings.<sup>45</sup> Incorporating vernacular design elements can help mitigate this risk by re-establishing visual and cultural connections within the built environment.

### Resilience

The concept of resilience is fundamental to post-conflict reconstruction, especially when viewed as both a physical and sociocultural process. Resilience can be described as the ability of a city or community to recover from trauma and strongly rebuild itself.

From an urban planning perspective, resilience is often paired with rapid restoration of public infrastructure and services.<sup>46</sup> However, a more general understanding of resilience includes the healing of cultural wounds and the rebuilding of social and religious networks that were broken by war.<sup>47</sup> With this in mind, resilience can be viewed to have a deep connection to identity, memory, and place – all of which are linked to vernacular architecture.

Vernacular architecture contributes to resilience by preserving cultural heritage, encouraging emotional recovery, and promoting a sense of continuity in disrupted

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*Handbook of Theories on Designing Alignment between People and the Office Environment*, edited by Rianne Appel-Meulenbroek and Vitalija Danivska, 181–194. London: Routledge, 2021.

<sup>43</sup> Risk, “Beirut Post-War Reconstruction”.

<sup>44</sup> Thiel, *Reviving Aleppo*, p.177.

<sup>45</sup> Thiel, *Reviving Aleppo*, p.165.

<sup>46</sup> Heath-Kelly, Charlotte. *Death and security: Memory and mortality at the Bombsite*. (Manchester: Manchester University Press, 2017), p.178.

<sup>47</sup> Vale, *The Resilient City*, p. 42.

communities. Additionally, rebuilding in traditional materials or methods can serve as a collective cultural expression, confirming the community's identity and values.

Resilience is also a socially constructed narrative; it is shaped by how the leaders and inhabitants interpret and respond to a crisis.<sup>48</sup> Therefore, post-conflict reconstruction is once again not just about the physical buildings; it is about telling the story of recovery that resonates with the people. Integrating vernacular architecture into this narrative creates a vision of resilience rooted in local identity and tradition.

It is crucial to examine the reconstruction process of any war-torn city through the lenses of these three theoretical concepts. It is through studying them all that we truly understand that reconstruction is much more than just the physical rebuilding of these cities, but it is rather a collective of physical, social, cultural and emotional reconstruction processes that encourage displaced or destroyed communities to connect on a deeper level. Post-conflict reconstruction is an architectural approach that allows communities to reinterpret their identity and strengthen their social bonds.

## METHODOLOGY

### Case study analysis on Yemeni vernacular architecture

- Looking at different journal articles and book chapter that highlight the vernacular elements used in traditional Yemeni construction.
- Dissecting these vernacular elements and techniques, based on their materiality, function, expression (symbolism), and efficiency in a modern context.
- Creating a comprehensive list of which vernacular elements can be integrated into modern design to provide efficient, sustainable and culturally appropriate reconstruction opportunities.

### Case study analysis of reconstruction process of Aleppo and Beirut

- Provide a short summary of the reconstruction process in both Aleppo and Beirut.
- Mention which strategies were particularly successful and which were not.
- Discuss whether there was a focus on cultural heritage preservation, if any of the theories studies above have been incorporated and whether vernacular architecture was implemented.

Disclaimer: the case study analysis does not touch upon all aspects of the research; it merely provides with examples of how reconstruction process has been conducted in the past and if some elements would be applicable in the case of Sana'a. It also will only list a number of vernacular elements that are relevant to the city and environmental context of Sana'a.

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<sup>48</sup> Vale, *The Resilient City*, p. 355.

## EXPECTED RESEARCH RESULT

Based on the case study analysis and the literature analysis a comprehensive set of design tool will be written. The results of this research paper will provide a guideline for architects and builders on how to reconstruct the city of Sana'a, this tool guide will list ways in which the reconstruction of Sana'a can be conducted in a modern way while also respecting its traditional heritage but integrating some vernacular elements. This design guideline will be tested in the design part of the graduation project, in which I will make the reconstruction design proposal based on the results found in this research paper.

## INITIAL DESIGN IDEAS

The initial idea is to design a small-scale neighbourhood, in which I have a mixed-use building targeting the needs that came up during informal discussion with family and friends. Possibly designing a gathering place, such as a school or gathering hall, with some shelter opportunities on the upper floor levels. The main focus on the design is to provide crucial systems such as water and waste management into the neighbourhood proposal as such facilities have been completely destroyed.

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