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EXPLORING A NEW DESIGN APPROACH TO REVIVE THE DAMAGED HERITAGE BUILDINGS IN POST-DISASTER CITIES

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EXPLORING A NEW DESIGN APPROACH TO REVIVE THE DAMAGED HERITAGE BUILDINGS IN POST-DISASTER CITIES

Abstract

Heritage is the inherited past; it is what evokes a nostalgic sense of tradition or history. In built environment, it's meant to note the structures, buildings or urban areas that are of historic, aesthetic, architectural or cultural significance. Heritage buildings may be considered as the most permanent method by which cultures of civilizations are remembered. Disasters, whether natural or manmade, are usually accompanied with physical destruction, property damage, deaths, injuries and leaving so many homeless. The result is a downfall on social and economic levels. Typically, this leaves the community vulnerable, making it urgent to rebuild and heal the damaged society. This researches argues damaged heritage buildings are not passive victims to be rescued but an active agent providing resilience to post-disaster cities. For this novel study, the research aims to propose a new design approach to revive the damaged heritage buildings in post disaster cities. To achieve this aim, the research will first start with reviewing the literature by analysing similar examples. The second part will focus on the case study: Beirut in the aftermath of the explosion. As a conclusion, a mixed approach of restoration, adaptive re-formation and engaging social connectivity can revive the heritage, ensure remembrance, help overcome the blast and rebuild city resilience.

Keywords

Built Heritage, Design Strategies, Reviving Heritage, Post-Disaster Cities

1. INTRODUCTION

History carves the now and then of the human civilization, and “*the world of architecture is no exception*” (Proptiger, 2016). The nostalgic sense of this history is noted as “heritage” (Oxford English Dictionary). Heritage buildings are thus those structures that narrate the stories of old cities by which they exist. Such buildings are known for their historical, aesthetic, or ecological traits; they’ve stood firm in resistance of time and calamities (Baxer, 2014). So what role do heritage buildings have in post-disaster cities?

1.1. Research Approach

Architectural heritage contributes to the formation of sense of place and cultural diversity (Kou, Chalana & Zhou, 2020). Disasters, whether natural or manmade, are usually accompanied with physical destruction, property damage, deaths, injuries and leaving so many homeless. The result is a downfall on social and economic levels. Typically, post-disaster communities are left vulnerable and mutilated making it urgent to rebuild and heal the damaged society (Dewi & Rauzi, 2017). The revival of heritage buildings was proven to grant much to the reconstruction of the urban identity (Sowińska-Heim, 2020). Recreating the traditional image in the aftermath of destruction recalls the identity and builds resilience (Jełński, 2018). In this sense, this research argues damaged heritage buildings are not passive victims to be rescued but an active agent providing resilience to post-disaster cities. But what are different approaches to revive these buildings?

Cities in the aftermath of tsunamis, earthquakes, wars and invasions, internal conflicts, explosions, even capitalism and feudalism have been under spot in studies of urbanists. The physical damage as well as the psychological harm differ. Approaches to revive heritage buildings also differ; Kathmandu valley in Nepal revived heritage sites through reviving rituals and festivals within these sites after the devastating earthquakes (Chandani & Karuppanin, 2019), same was done in Baghdad (Fadhil & Ashour, 2020). Other approaches such as adaptive reuse, like Lodz (Sowińska-Heim, 2020), adaptive re-form, like Banda Ach (Dewi, 2016) and rehabilitation like Portland cities (Jełński, 2018) and Chinese ones ((Kou, Chalana & Zhou, 2020). The research thus tackles these strategies and approaches in detail.

1.2. Research Problem

As mentioned before, disasters damage cities at physical, social and economic levels. In the 4th of August, 2020, a devastating blast hit the city of Beirut at its heart, the port, as shown in the map of figure 1. The explosion was classified as the most powerful non-nuclear bombing of the 21st century (McCarthy, 2020). Over 200 were killed, 5,000 injured (BBC, 10/08/2020) and 300,000 residents almost homeless (UNICEF, 05/08/2020). In just a glams, 40% of the city was devastated.

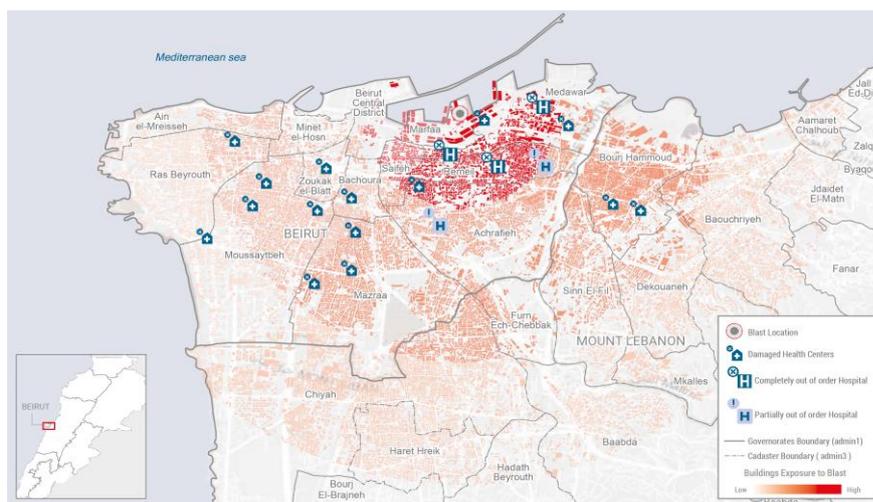


Fig.1: Buildings Exposure to Blast - Source: OCHA 14/08/2020

Latest reports state that 730 buildings erected between 1860 and 1930 were damaged and around 331 are fully devastated, as shown in figure 2 (Harrouk, 02/09/2020). A question thus raised: “Will the architectural heritage of Beirut survive the explosion?”



Fig.2: Footage of the mutilated heritage buildings in Mdawar, Mar Mkhayel, Achrafeyeh, Rmeil and Gemayzeh after the blast – Source: Photographed by Rami Rizk, source: Harrouk, 2020

The destruction was not limited to physical assets; the blast “*added new wounds to old scars*” (AFP, 12/08/2020). On the psychological level, the city was already struggling with a financial and political crisis as well as social division that haven’t yet recovered from the civic war (Massena, 2020). The city was wounded and in urgent need to gather itself.

1.3. Aim and Objectives

For this novel study, the research aims to “propose a new design approach to revive the damaged heritage buildings in post disaster cities”. To Achieve this aim, the research targets the following objectives:

- Exploring strategies approached in reviving heritage buildings in post-disaster cities.
- Analyzing similar projects and critically appraising the link between the trauma, the approach and the contribution of reviving heritage buildings in post-disaster practices.
- Investigating a case study, one of the most affected heritage building on St. Nicolas Stairs of Art, Achrafeyih, Beirut, Lebanon.
- Conduct inquiries from inhabitants of the selected area under study.

1.4. Hypothesis of the Study

The research hypothesizes that a mixed approach of restoration, adaptive re-formation and engaging social connectivity can revive the heritage, ensure remembrance, help overcome the blast and rebuild city resilience.

1.5. Research Methodology

To achieve the aim and objectives of the research, and in attempt to validate the proposed hypothesis, the research is divided into two parts, indicated in figure 3: The theoretical part and the practical part. As for the first part, the researcher will review the literature, going through previous attempts in reviving heritage buildings in the aftermath of disaster. It will thus use an in-depth desk study in an analytical comparative approach for different similar examples. In the second part, the research will use the action methods in an inductive-field study to investigate the existence, where it will assess the physical assets through observation, and engage user centered design through questionnaires.

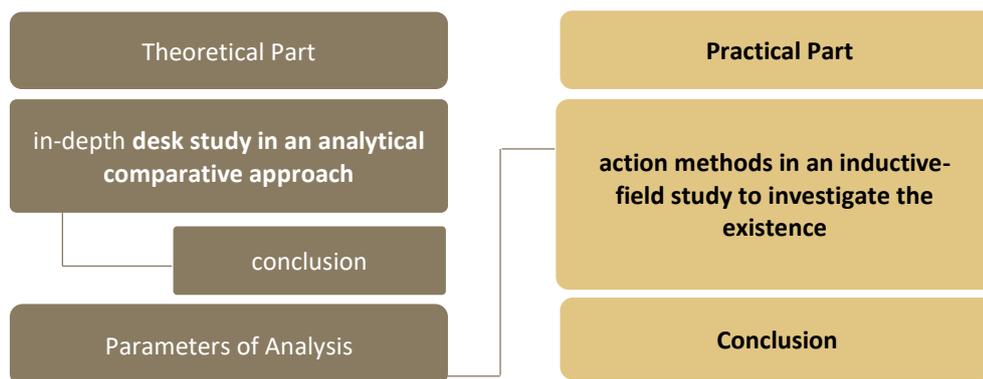


Fig.3: Diagram of Research Methodology

1.6. Research Determinants

The investigation is limited to buildings that are considered historic, built around 100 years ago, regardless whether they're classified by authorities as heritage or not as it is agreed there's a dereliction in this field. It will also be limited in location to area affected by the blast. The topic will be approached from a pure scientific perspective and without any political or religious references or pressures. The research will also respect property rights, and will avoid any form of plagiarism.

2. LITERATURE REVIEW

Heritage buildings are core elements contributing to the composition of the culture of a society with its various dimensions; social, economic, political as well as religious (Ahmed, 2006). Practices of conservation, adaptation, preservation, and restoration are a matter of which mostly every heritage building is subjected to. But what are theories corresponding to intervention in heritage buildings? What design approaches have been used throughout history in reviving heritage buildings? What are provocative elements that shape the approach to the intervention to revive heritage buildings?

2.1. Crisis and Societies

Disasters are either natural, like earthquakes, floods, and tsunamis, or manmade, such as wars, internal conflict, or even political corruption and its consequences. Such incidents occur suddenly with tragic, extensive and negative results (Sowińska-Heim, 2018). Sometimes, the destruction is extensive to an extent that nearly every single building is devastated. The far-reaching consequences are not only physical; the case is more of a torn society with psychological, social, economic and political wounds (Jalabi, 2020). Manmade disasters have higher psychological impact and that's why it will be the focus of this research. In this context, the concept of city resilience and recovering citizenry in the post-disaster was highlighted. Resilient communities have the capacity of preparedness; they can take effective response to the impact of various hazards (Calame, 2005).

2.2. Heritage in Post-Disaster Context

In the post-WWII, Jan Zachwatowicz presented and put forward the conservation of the historic districts of Polish cities, which was then approved and adopted by the international community of conservation. The motivation to revive these historic centers was the belief that such practices will recreate the cultural landscape that contributed to the sense of existence and belonging of the nation (Vale, 2005). The applied principles contributed to preserving the historical urban fabric, skylines, and the mediaeval layout of the Polish cities. The symbolism in the pragmatic process of recovering the historic urban form is well revealed in the cases of Jerusalem, Tokyo, San Francisco, Chicago, Guernica, Beirut, Warsaw, Tangshan, Berlin and Mexico. In contrast, Sichuan, China adopted a different approach in the post-earthquake recovery; the focus was mainly a rapid economic recovery (Guo, 2012). Dujiangyan on the other hand adopted a top-down planning strategy, yet still gave too little importance to the historic urban fabric. This derived the attention to the essential corporation between different parties of the society to avoid fragmentation; this creates cultural resilience and raises the question of what recovery is needed. According to Vale and Campanella (2005) the question is: "who should

recover which aspect of the city, for whom, in what intention and by what mechanism". Barcelona, Bilbao and Madrid are three war-cities that reacted differently to the process of reconstruction exemplifying different approaches. An interdisciplinary study conducted by Munnoz-Rojas Oscarsson describe the Avinguda de la Catedral, Barcelona, as a catalyst for urban development, while in Bilbao the reconstruction advocated the change in the political genre. The Cuartel de la Montaña in Madrid demonstrated the ambitious utopian potential of reconstruction (Oscarsson, 2009). The Polish cities exemplifies the significance of reconstruction on the spirit of the space and not only its physical urban structure (Davies, 2001). For a long period of time, the World Heritage committee refused the idea of reconstruction; their first exception was made in 1980 where rebuilding the city center of Warsaw reclaimed the strength of the city. Currently, their guidelines are similar to the Venice Charter.

2.3. Local, Regional and International Exemplifications

In order to derive parameters of analysis, it is first important to figure out provocative elements that shape and identify the approach to reviving heritage buildings. The criteria for selecting these examples are:

- Located in a relatively old historic context.
- Located in areas affected by manmade crisis.
- Located beside or within heritage sites.
- Variety of strategies and design approaches in reviving heritage buildings.

The analyzed similar examples will mainly answer the question of "what"; the mechanism and approach to revival.

2.3.1. House of Beirut, Beirut, Lebanon

The city of Beirut was subjected to a series of hits since the French mandate, followed by the Israeli invasion. After that, the civil war that lasted for 15 years tore the city into territorialities. House of Beirut or what was called the yellow house, shown in figure 4, dates back to the 1924.

- a. Intention: Aiming to overcome the negative consequences of the civil war, an attempt to replace the bad experience with a positive one, emphasizing the building as a memory of the crisis and linking the community to it via activities.



Fig.4: Beit Beirut, Beirut, Lebanon – Source: Photographed by Sawt Asharq

- b. Functions and Activities: Formerly, the building was a residential- apartment building. As for the activities added, a museum was introduced to allow cultural meetings, as well as halls for researches. The Office for Urban Planning for the city was also located there. Daily life activities enhance the interaction.
- c. Mechanism/Approach: A part was kept with traces of the conflict, and another was treated by the use of glass. The used approach is a conservation of the scar where it is possible, reconstruction for the completely destroyed part using modern light material, and adaptive reuse of the space on two levels: memorial and daily routine activities. These activities fit the location of the building and needs of the surrounding.

2.3.2. Arts & Craft Center, Birzeit, Ramallah, Palestine

Holding to the longest and most complex conflict in the era, Palestine has witnessed a great loss in its cultural and built heritage, as shown as in figure 5.

- a. Intention: As a call to celebrate the cultural heritage with the ambition of culture dialogue, the revival of the historic center of Birzeit took place. It intended to mobilize craftsmen and stockholders into a dynamic process of healing at the social, economic and political levels. It was also a prototype to 50 other cities to be revived.

- b. Functions and Activities: The already existing buildings were renovated and the devastated parts were reconstructed, maintaining old functions and adding new workshops and children's activities.
- c. Mechanism/Approach: The used mechanism involves literal replication of the previously existed façades with the addition of light weight glass façades, focusing on three main considerations; authenticity, environment and reasonable cost.



Fig.5: Reviving Heritage in Historic Center of Birzeit, Ramallah, Palestine
Source: Photographed by RIWAQ

2.3.3. Peace Memorial Park, Hiroshima, Japan

One of the most devastating and unhuman catastrophe to hit a city was the nuclear bombing of Hiroshima. Barely no buildings survived the attack except for few, one of which is A-Bomb Dome, presented in figure 6. formerly a Prefectural Industrial Promotion Hall, which served as a center for Hiroshima's Industries.

- a. Intention: The intention of revival was to highlight the dome as a tangible link to the unique past of the city, dedicated to the victims and the legacy of the place.



Fig.6: Hiroshima Peace Memorial - Source: Photographed by Guide to Peace Memorial Park

- b. Functions and Activities: The building was once a Prefectural Industrial Promotion Hall, which served as a center for Hiroshima's Industries. A park with many functions was designed by Kenzō Tange including: children's peace monument, a rest house, three museums, several monuments for memories of victims, the crisis and the need for peace. They encounter a number of ceremonies and festivals over the year.
- c. Mechanism/Approach: The vast empty space caused by the bomb wasn't rebuilt but yet transformed into a public space, a center of shared activities. The concept was to recall the busy crowded commercial and industrial center with activities that build connections among citizens, while linking them to the past.

2.4. Parameters of Analysis

By looking through literature, and comparing the similar examples, the parameters of analysis of the selected case study, Beirut, can be as follows:

- Who and for whom is the revival oriented, what is the intention and motivation?
- What aspect of the heritage is the focus of revival (cultural, rituals, physical image...)?
- Typology, functions, activity and behavior before the crisis.

- Consequences of the disaster; physical, economic and social. At the physical level, it is important to study the structural state and safety of buildings.
- User centered need analysis, what behavior and by what means.

3. METHODOLOGY

Several methodologies were used to conduct this research. An in-depth desk study was used first in an inductive method, where data was gathered to investigate the case study located in Lebanon; Beirut City in the aftermath of the Blast. Then, the research explored in a field-action methodology the area affected by the 4th of August Blast that hit the port of Beirut. Several locations were visited in the city, taking photographs, mapping affected heritage buildings and sketching interesting sites. The research undertook interviews and questionnaires for users of public spaces in the city. One hundred questionnaires were distributed in Gemmayze'h, Hamra, Zaitouna Bay, and Rouche'h exploring users' interests in certain activities and motivations to select one space rather than the other, in an attempt to engage users in designing a space they are targeted to use. The third methodology used was the analytical method; the researcher analyzed the results of the questionnaires. Finally, the deductive method was deployed to reach the new design approach to revive heritage buildings post the disaster of Beirut city. The following section presents the four methodologies mentioned.

3.1. Introducing the Case Study: Beirut in the Aftermath of the Blast

Beirut, one of the oldest cities on the Mediterranean, has witnessed severe wounds over history. Following the French Mandate and independence, an armed civil war was ignited. It lasted for fifteen years, leaving the country, and mainly its capital, Beirut, with severe devastation. Al-Ta'if Agreement intended to finish the conflict, but it promoted quotas among parties, leading to unprecedented corruption, referred to be the result of an explosion in the port of the city - shown in figures 7 and 8 - leaving the city traumatized over its unclosed wounds.

Beirut as seen today dates back to the 1800s; its heritage refers to several alternating civilizations from the Phoenician to the French styles going through Roman, Mamluk, Byzantine, and Ottoman (Lee, 2014).



Fig.7: Location of Beirut Blast with respect to the country
Source: AFP

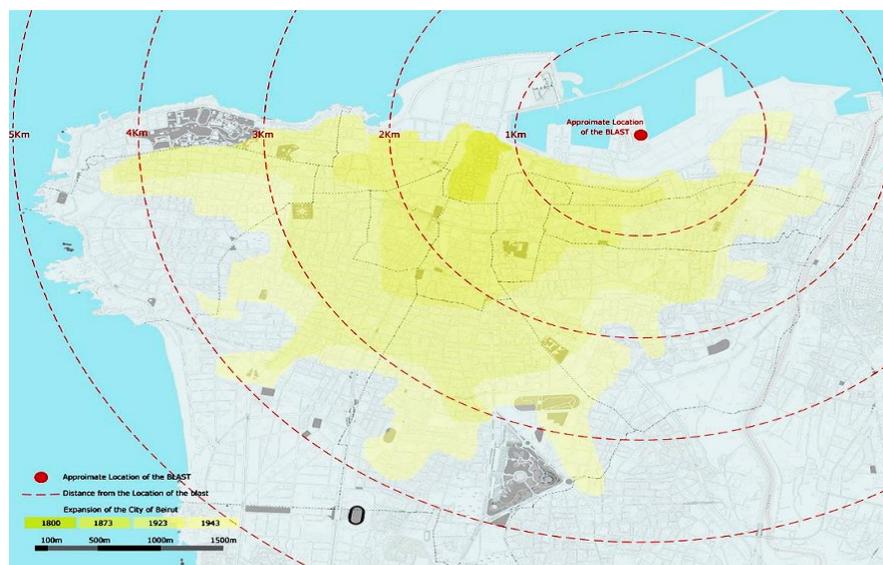


Fig. 8: Growth of the city over history with respect to the distance from the blast
Source: Yassin, 2012, edited and illustrated by author

3.2. Identifying Problems

The explosion left the area in severe damage at all levels; physical damage, psychological and social damage, economic crisis, which was already devastated prior the blast, and deteriorated health circumstances (Sabaghi, 2020). Estimated to be caused by 2,700 tons of ammonium nitrate, the explosion destroyed around 40% of the city “in a couple of seconds” as stated by Christele Harrouk (Harrouk, 2020). Based on the reports of the UNDP, the blast affected mainly the northern side of the city, that is the selected zone under study. Over 200,000 housing units were harmed in addition to 40,000 harmed buildings where 3,000 severely damaged (UNDP reports, 2020). It was reported that 730 historical buildings were destroyed, 331 of them were in complete devastation.

On the other hand, this left 300,000 people homeless. Around 200 people passed away, more than 6,000 were wounded most of which ever-lasting wounds. The city was traumatized again over its old unclosed wounds (AFP, 2020). Citizens experienced a series of tragic events leaving them hurt and in a bad psychological state. Doctors of the World reported state of anger, panic, fear and shock. They quoted a visual artist:

"I don't know how or if one can get over something like that, I mean you continue your life, but you continue it differently."

On the economic level, the country was already going through an economic crisis; public debt-to-gross domestic product became of the highest in the world with around third its population living below poverty line. The exchange rate of US dollar to Lebanese Pound witnessed duplication three times, and increased in the last 12 months to 600% of its previous rate (BBC, 2020). The explosion is about to give the economy the bullet of mercy. The cost of damage was estimated at 15 billion dollars, not to mention the collective loss of damaged small enterprises in the area. Landfills in Karantina and Burj Hamoud were damaged too. This recalled the solid waste problem, where the domestic waste piled up in the streets, in addition to tons of debris accumulated from damaged buildings and over 7,000 tons of glass waste (Osman, 2020). The Human Rights Watch (HRW) warned about the health risks of this amount of pollution on residents.

3.3. Urban Analysis in the Shadow of the Blast

Considering the most affected area of the blast, the research investigated Medawar, Rmeil and Saifi. Located within one kilometer from the blast, and belonging to the oldest part of the city, the selected region contains a numerous amount of affected heritage buildings.

3.3.1. Density, Built Lots and Vacant Ones

Located right beside the port, the selected zone has developed rapidly over the years. It was the gate between the Middle East and the Mediterranean. It's a very high dense area, over populated with condensed building fabric, as shown in the map of figure 9.

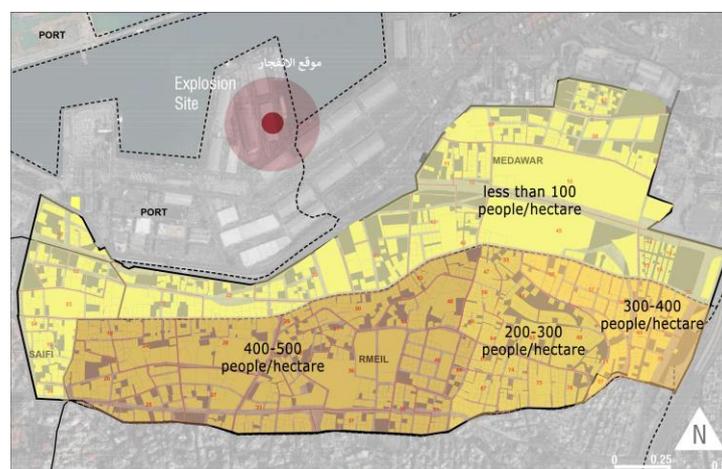


Fig.9: Built lots (in yellow) vs empty ones (in Gray) and population Density
Source: AFP, map Action, and OEA reports, illustrated by author

3.3.2. State of Heritage Buildings

No district in Beirut has no historic buildings. The blast affected nearly all buildings, but heritage one were the most affected, as indicated in the maps of figure 10. That is due to the lack of renovation strategy and the greed in removing low-rise old buildings and replacing them by more profitable ones with higher exploitation rates.

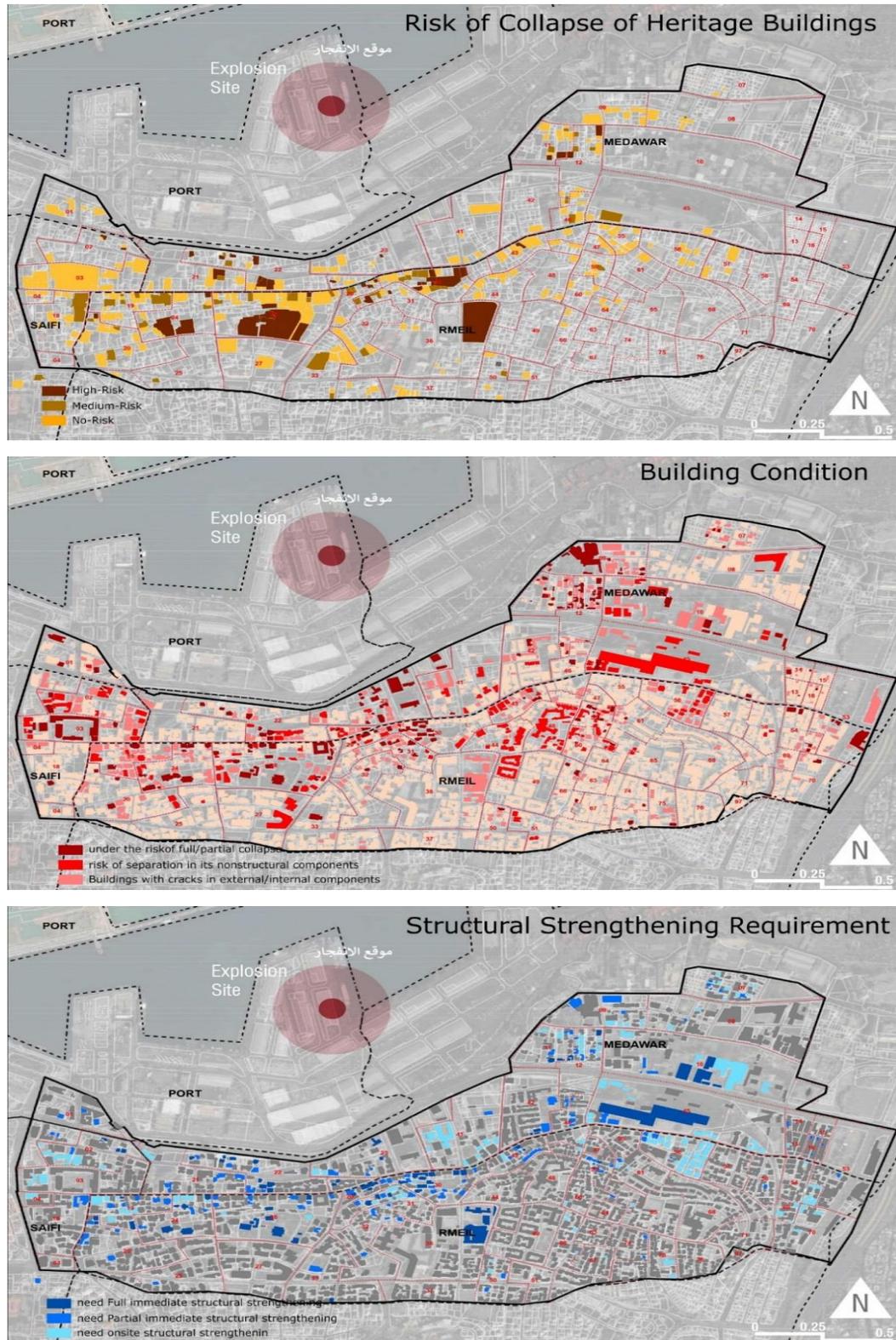


Fig.10: Heritage Buildings condition and structural requirements in light of the blast
Source: AFP, map Action, and OEA reports, illustrated by author

1.1.2. Cross Sections

The 125 steps link Gouraud Street to Sursock Street with 31 meters' difference in level. Climbing up the stairs, 13 buildings surround the stairs, with different styles, dates of construction, multiple colors and functional constitutions, as shown in the author's sketch of figure 13.



Fig.13: Cross Section Across L'Escalier de L'Art – Source: Sketch by the author

1.1.3. Close-up Urban Analysis

In order to understand the composition of the stairs more, it was a must to look close at the urban composition of the buildings on both sides of the stairs. The following image, shown in figure 14, study the land use, regulations, building heights, risk of collapse as well as heritage buildings conditions.

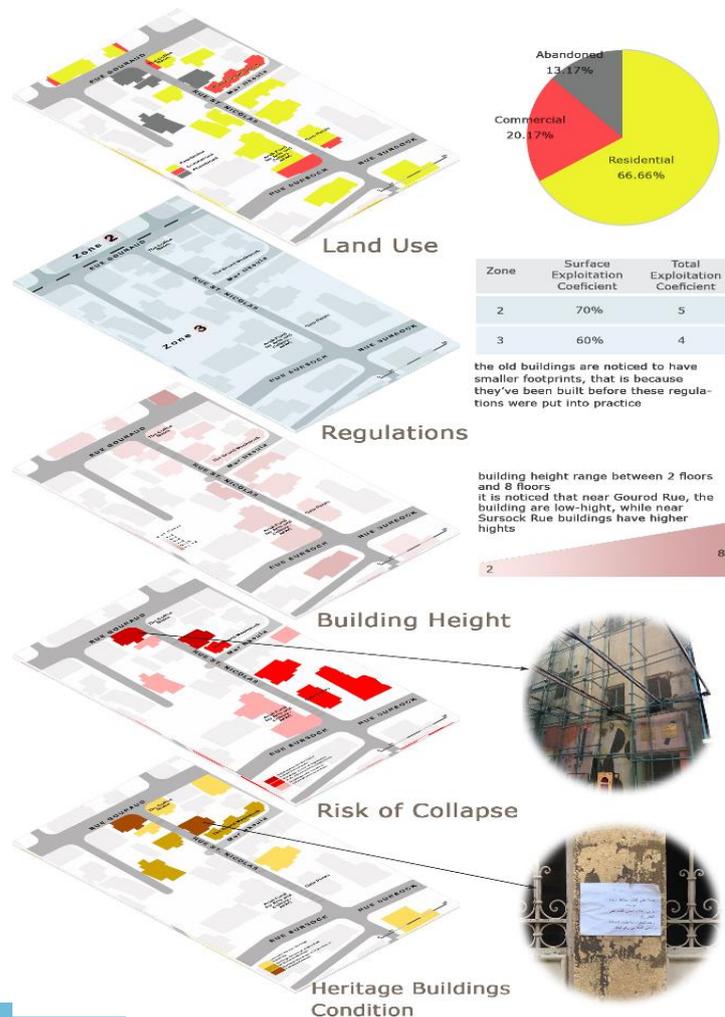


Fig.14: Close up Analysis of L'Escalier de l'Art (source: author)

1.1.4. Selection of a Rescue-in-need Heritage Buildings

Looking at the mapped damage heritage buildings, some were found in high risk of collapse, with immediate need for structural support. These buildings are no longer safe for uses of the stairs. As shown in the map of figure 15, one heritage building with a very critical case is the one lying on the land lot 345 which was evacuated by order of the city governor. Moreover, it is the closest to the area of which temporary exhibitions take place, as well as the potential surrounding to create events.

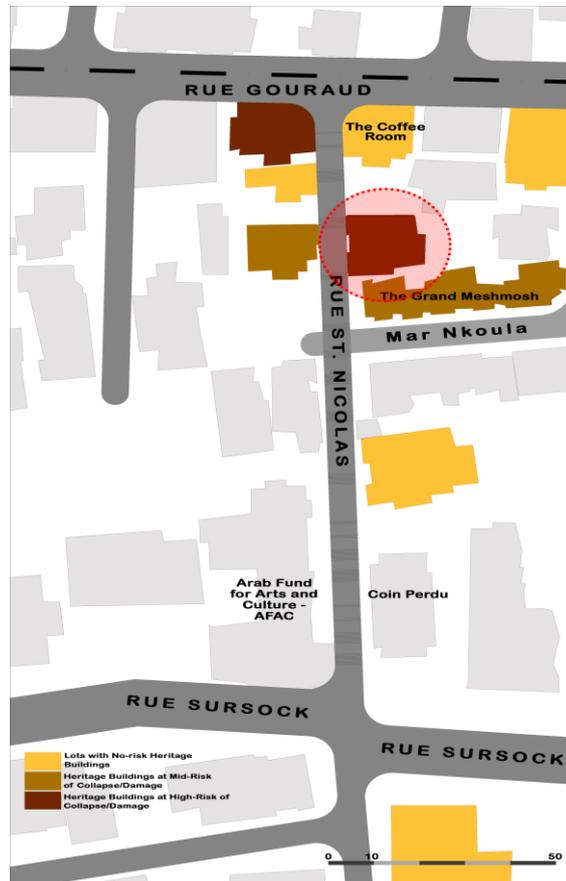


Fig.15: The selected lot for intervention

1.2. Users' Perspective through a questionnaire

One hundred questionnaires were distributed in Gemmayze'h, Hamra, Zaitouna Bay, and Rouche'h exploring users' interests in certain activities and motivations to select one space rather than the other, in an attempt to engage users in designing a space they are targeted to use. The sample was selected of educated people, aged between 20 and 50. The questionnaires constituted of closed-questions, direct and simple. Very specific requirements were targeted by the asked questions that were as follow:

- What kind of Arts are you interested in?
- Do you "go to" or "go through" L'Escalier de l'Art?
- What do you "go to" do at L'Escalier de l'Art?
- What would provoke you to "go to" L'Escalier de l'Art?

The sample selected were first introduced to the aim of conducting the questionnaire, then asked to electronically fill in a multiple choice answer form to the above questions. Here, the field-action method is finalized; the results and findings of the answers are later analyzed in the upcoming section.

2. FINDINGS

The results of the conducted studies are analyzed using the analytical methodology and are presented in this section under two titles; observation summary and questionnaire results.

2.1. Observations' Summary

Walking through the areas affected by the blast, and looking at the stairs itself, the northern part is noticed to be crowded with abandoned heritage buildings on both its sides as shown in the sketched sections, shown in figure 16.

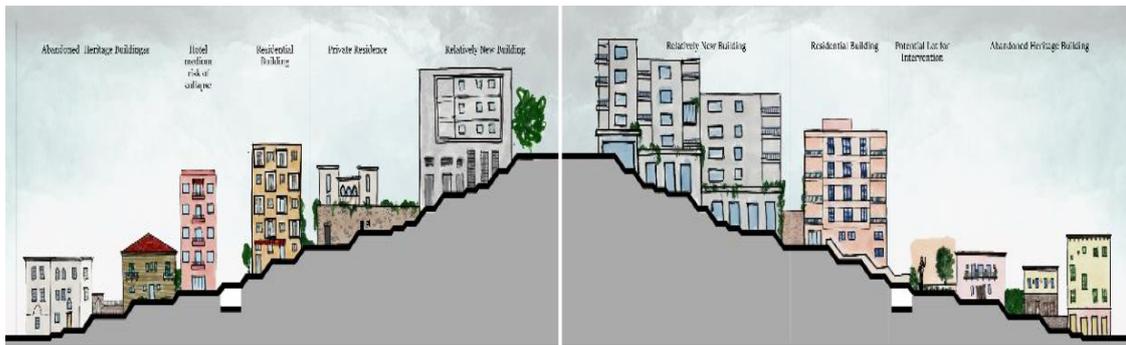


Fig.16: Sketches of sections, showing abandoned buildings – Source: Sketched by the author

2.2. Questionnaire Results

The results of the questionnaire showed that 80% of interviewed people were interested in art work. Most of which thought they were talented and would like to be engaged in art work. 60% of the asked people go through the stairs rather than go to. The findings are presented in the charts, shown in figures 17 and 18.

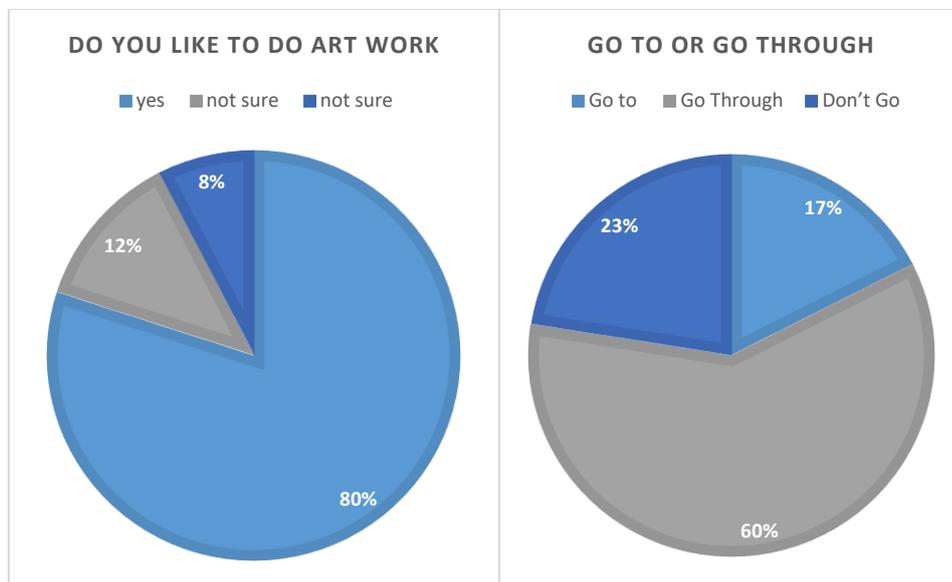


Fig.17: Results of the questionnaire, to the left results of asking whether they liked arts, and to right whether they go to or go through

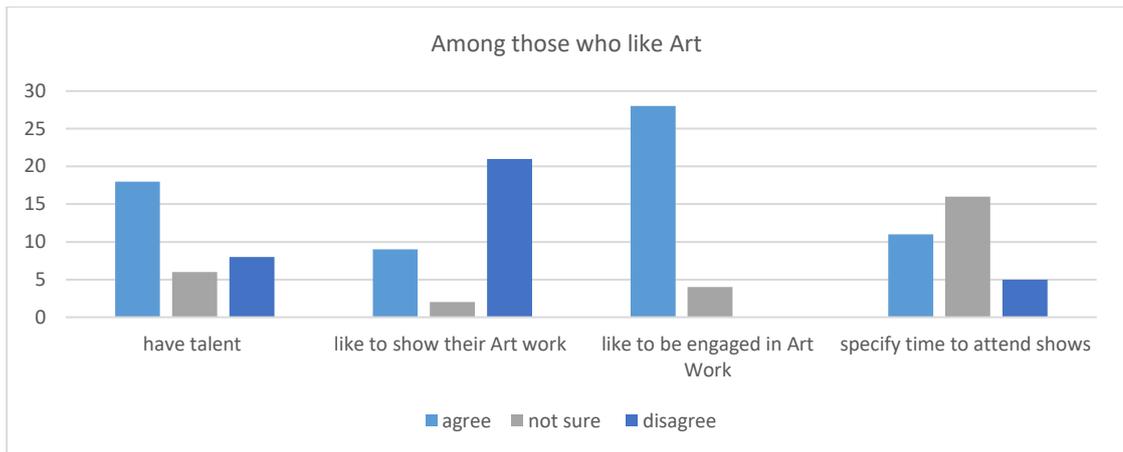


Fig. 18: Chart of the answers' results among those who were interested in art works regarding their intention to be involved in art work – Source: Prepared by the author

3. DISCUSSION

By analyzing the previous results, it is clearly recognized how heritage built environment is neglected by authorities, buildings are in serious rapid need to intervene in order to save them from collapse. Reviving these buildings can leave a positive influence on the traumatized community; people showed much interest in performing certain activities in such areas. This process of revival may occur through a mixed in order to heal the collective trauma of a hopeless society. Concerning the selected building, this may involve:

- Immediate intervention for structural supporting.
- Renovate its exterior façades as is.
- Introduction light weight envelopes to complete the missing parts of the enclosure while opposing its style to emphasize the memory.
- Emphasizing the stairs as a spine connecting districts and reconnecting fragmented territorialities through designing the ground floor as to be connected to the stairs.
- Repurposing the building through strategic adaptive reuse of its space for holding events and calling for the new blood for everlasting interactions.
- Enhancing vitality through increasing landscape areas and inducing social interaction.
- Bridging the experience between the past and the future through different material used.

The proposed strategy can be transformed into a well-designed intervention to be executed through corporation between Ministry of Culture – The Directorate of Heritage Antiques and Built Heritage, Ministry of Public Works – The General Directorate of Urban Planning, and Order of Engineers and Architects to figure out the optimal methods of scaffolding and the appropriate way to intervene, as well as the optimized form and function of the architectural intervention.

4. CONCLUSION

To sum up, the conducted research led to a group of conclusions:

- Reviving Heritage, whether cultural or built has a positive influence in the aftermath of disasters, as it contributes to the recovery process.
- Recovering from disasters, especially those caused by conflicts or wars is required to have a futuristic vision to get up stronger than the state before disaster.
- Expanding horizontally through the permeable urban fabric allows “urban acupuncture”, establishing discrepancy between past and future.
- Expanding vertically electrifies the present and calls up for futuristic images.
- The whole journey represents a narrative and a storytelling of a society that has suffered a lot, a call for forgetters through remembrance.

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