**ANKARA YILDIRIM BEYAZIT UNIVERSITY**

**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**


# EVALUATING THE APPLICABILITY OF REGIONAL TRADITIONAL ARCHITECTURAL ELEMENTS IN THE POST-WAR RESIDENTIAL RECONSTRUCTION PHASE IN ALEPPO CITY

**M.Sc. Thesis by**

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# M.Sc. THESIS EXAMINATION RESULT FORM

We have read the thesis entitled **"EVALUATING THE APPLICABILITY OF REGIONAL TRADITIONAL ARCHITECTURAL ELEMENTS IN THE POST-WAR RESIDENTIAL RECONSTRUCTION PHASE IN ALEPPO CITY"** completed by **Mohamad Naal** under the supervision of **Asst. Prof. Nurçin Çelik** and we certify that in our opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science.

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# EVALUATING THE APPLICABILITY OF REGIONAL TRADITIONAL ARCHITECTURAL ELEMENTS IN THE POST-WAR RESIDENTIAL RECONSTRUCTION PHASE IN ALEPPO CITY

## ABSTRACT

Traditional architecture left us a great legacy, with its aesthetic elements that outperformed the aesthetic stagnation, that accompanied contemporary architecture,

As well as its functional and environmental efficiency, without high cost, as well as its suitability to local communities, and their ways of living.

Traditional architecture's positive features had a great effective role in contemporary architecture, and the presence of sustainability concept, despite the radical transformations, that took place on the contemporary era.

And as a city rich with a long-standing residential architectural heritage, Aleppo city has been exposed to architectural distortions, both environmentally, and aesthetically, in the first place, due to the departure from the Alepine architectural identity, represented by its architectural elements, then the distortion to the authentic architectural identity of Aleppo increased, while it was damaged during the conflict in Syria, and these distortions began to appear clearly in the architecture of the reconstruction stages, after the crises.

So this study purpose is to prove the feasibility of re-employing traditional architectural elements and techniques in the residential architecture of the post-crisis reconstruction phase in Aleppo, in order to benefit from its advantages on the functional, environmental, and aesthetic levels, then to suggest how to use these elements within the contemporary architecture.

**Keywords:** Traditional architecture, revival, Aleppo, reconstruction, regional identity, traditional house, sustainability.

# HALEP ŞEHRİNDE SAVAŞ SONRASI KONUT YENIDEN İNŞASI AŞAMASINDA BÖLGESEL GELENEKSEL MİMARİ UNSURLARIN UYGULANABİLİRLİĞİNİN DEĞERLENDİRİLMESİ

## ÖZ

Geleneksel mimari, çağdaş mimari ile birlikte, sahip olduğu estetik değerleriyle bize büyük bir miras bıraktı. O, yerel topluluklara ve yaşam biçimlerine uygunluğunun yanı sıra, yüksek maliyetlere sebep olmaksızın, işlevsel ve çevresel verimliliğini devam ettirmiştir. Geleneksel mimarinin olumlu özellikleri, çağdaş mimaride ve günümüzde yaşanan köklü dönüşümlere, değişimlere ragmen, sürdürülebilirlik kavramının varlığının devamlılığında çok büyük rol oynamıştır. Uzun süre varlığını devam ettiren geleneksel ve mimari mirasına sahip zengin bir şehir olan Halep şehri, günümüzde hem çevresel, hem de estetik açıdan mimari bozulmalara maruz kalmıştır. Bunun sebebi, her şeyden önce, mimari öğeleriyle temsil edilen özgün Alep mimari kimliğinden uzaklaşılmasıdır. Bununla beraber zaman içinde Halep'in özgün mimari kimliğindeki bozulmalar artarken, Suriye'deki çatışmalarda sırasında da kentin tarihi mimari yapıları ve özgün mimari kimliği büyük hasar görmüştür.

Suriyedeki çatışmalardan sonar yeniden yapılanma sürecine girilen kentte yukarıda bahsi geçen çarpıklıklar, kendini daha net bir şekilde göstermeye başlamıştır. Dolayısıyla bu çalışmanın amacı, Halep'te kriz sonrası yeniden yapılanma aşamasında, özellikle konut mimarisinde, Halep mimarisine ait özgün değerlerin, geleneksel mimari unsurların ve tekniklerin, kentin mimari kimliğinin de devamlılığının sağlanması açısından, yeniden kullanılmasının uygulanabilirliğini kanıtlamaktır. Geleneksel mimarinin işlevsel, çevresel ve estetik düzeylerdeki avantajlarından yararlanmak için, bu unsurların çağdaş mimaride nasıl kullanılabileceğini ortaya koyabilmek amacıyla tez kapsamında bir öneri proje çalışması da yapılmıştır.

**Anahtar kelimeler:** Geleneksel mimari, canlanma, Halep, yeniden yapım, bölgesel kimlik, geleneksel ev, sürdürülebilirlik.

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# CHAPTER 1

## INTRODUCTION

The inherited traditional architecture is considered a source of architectural inspiration and creativity; with its simple eco-friendly materials, the suitability of its elements to the required architectural functions that they were made for, without excess, and its suitability to local styles and decorum.

And the modern era, with its modern global architectural styles, has witnessed, in most countries, a departure from the architectural heritage, which expressed the local identity, and was appropriate to the local social and climatic conditions.

On the other hand, in the face of these modern models, some attempts have appeared to return to traditional architecture, and benefit from it, but they also tended to extremism, and departed from their intention, that was benefiting from the past to the present, and became a transfer to the past as it was.

They also became strange elements, in a contemporary surrounding suffering from dispersion!

And the modern era, as in the case of every era, included both types of crisis: disasters and armed conflicts.

The contemporary conflicts affected more and more influential in the lives of societies than the conflicts of previous eras, due to the multiplication of the number of people affected by them.

And even the modern era disaster has become more harmful than the past, due to the gathering way, that have been changed from simple buildings to the high buildings, which increased human gatherings in smaller areas, while the spread prevailed in the past was horizontal.

And after the succession of crises, especially in the Middle East, and recently, in Syria, the attentions and studies began to turn towards the post-crisis stage, the reconstruction phase, and its characteristics.

And because of the distraction that the post-war in Aleppo phase suffers from, we notice a loss of the Alepine identity in the reconstruction phase, and a dispersion in its style.

The dispersion of the social bonds themselves, also caused the neglecting to the local style suitable to its society.

And with the increasing global calls for achieving sustainable architecture, the contemporary residential architecture in Aleppo has moved away from the principles of sustainability.

So, returning to the traditional residential architecture, which is stemming from the people's requirements, and was compatible with the principles of sustainability, was an ideal solution to think of, after the destructive crisis.

So, this study examines the feasibility of using the inherited traditional architectural elements, avoiding the failures of previous revival attempts, in order to obtain better results in the residential reconstruction phase in Aleppo, in the midst of modern architectural styles which are strange to the Alepine heritage.

Another important reason to revive the traditional Alepine architectural style, is compensating parts of that fabric of traditional houses, whose an authentic Alepine identity, which were destroyed and lost irretrievably during the armed conflict.

And enriching the city again with that lost style.

Aiming to achieve a reconstruction phase, appropriate to the local traditions, and the environmental, climatic, and social conditions prevailing in the Alepine society.

## 1.1 Research problem

The research problem lies in the role of inherited Alepine traditional architecture, to face the contemporary architectural styles and trends, that are completely separate from the local architectural identity.

And the study raises many questions:

- How important can be the inherited traditional architecture for a better contemporary reconstruction phase in Aleppo?
- Can the traditional Alepine architecture be revived and suitable to the contemporary context in the reconstruction phase in Aleppo?
- What are the suitable Alepine traditional architectural elements and values, to be used in the reconstruction phase in Aleppo?
- How can we develop the benefiting from traditional architectural style, and use its advantages, without copying from strange architectural identities?

## 1.2 Research importance

- Merges the advantages of the Alepine traditional style, with the contemporary context.
- Achieves a better reconstruction phase from aesthetical, environmental, and social aspects.
- Reconfirms the Alepine local traditional identity, that has been lost and ignored.
- Compensating parts of the destroyed fabric of Alepine traditional houses.
- Makes an economical and less effort-dependent proposal in the post conflict phase in Aleppo.

## 1.3 Research objectives

The targeted group of the study will be the Alepine community affected by the Syrian conflict, and the residents of the old Alepine neighborhoods.

And the objectives of the study will be the following:

- Coming up with a successful reviving approach, benefits from the previous failures in the revivalism.
- Restoring the authentic traditional identity of Aleppo architecture.
- The integration of the local community with the reconstruction phase (thanks to its knowledge of the traditional architecture that will be dealt).
- Creating more aesthetic, more identity-linked, more social, and more environmental architecture in the reconstruction phase of Aleppo.
- Reducing costs and efforts in the reconstruction phase of Aleppo, by relying on the local used materials and techniques.

## 1.4 Research Hypothesis

1-The research assumes that proving the importance and advantages of the architectural elements, found in the Alepine traditional architecture, will prove the feasibility of using these elements in the post conflict phase in Aleppo.

2-The usage of the Alepine traditional architecture will emphasize the local traditional architectural Alepine identity.

- The independent factors: The local traditional architectural elements in Aleppo.
- The dependent factors: The Alepine identity, eco-effect, and the needs of the local architecture and community in the reconstruction phase.

## 1.5 Research methodology

The research is using the descriptive and analytical method, in theoretical framework;

Where previous international attempts of reviving ancient traditional architectural styles will be analyzed, in order to benefit from their mistakes.

Then the local traditional architectural elements in Aleppo will be analyzed, and compared with the contemporary ones, according to previous studies or the researcher’s observations.

And there will be interviews, which examines the opinion of the Alepine society, and interviews with expert architects, to assess which elements are most efficient, and which aspects are most important when making comparisons, in order to examine the feasibility of using these elements in the reconstruction phase.

As well as the practical framework, where the elements, which are suitable to the contemporary context of Aleppo, will be applied in a proposal, which will be a part of the thesis result.

The data used in the research will include data collected from researches, reports and studies, which include similar case studies, or evaluations of elements from traditional architecture, the interviews with the people of Aleppo, and the interviews with architectural experts.

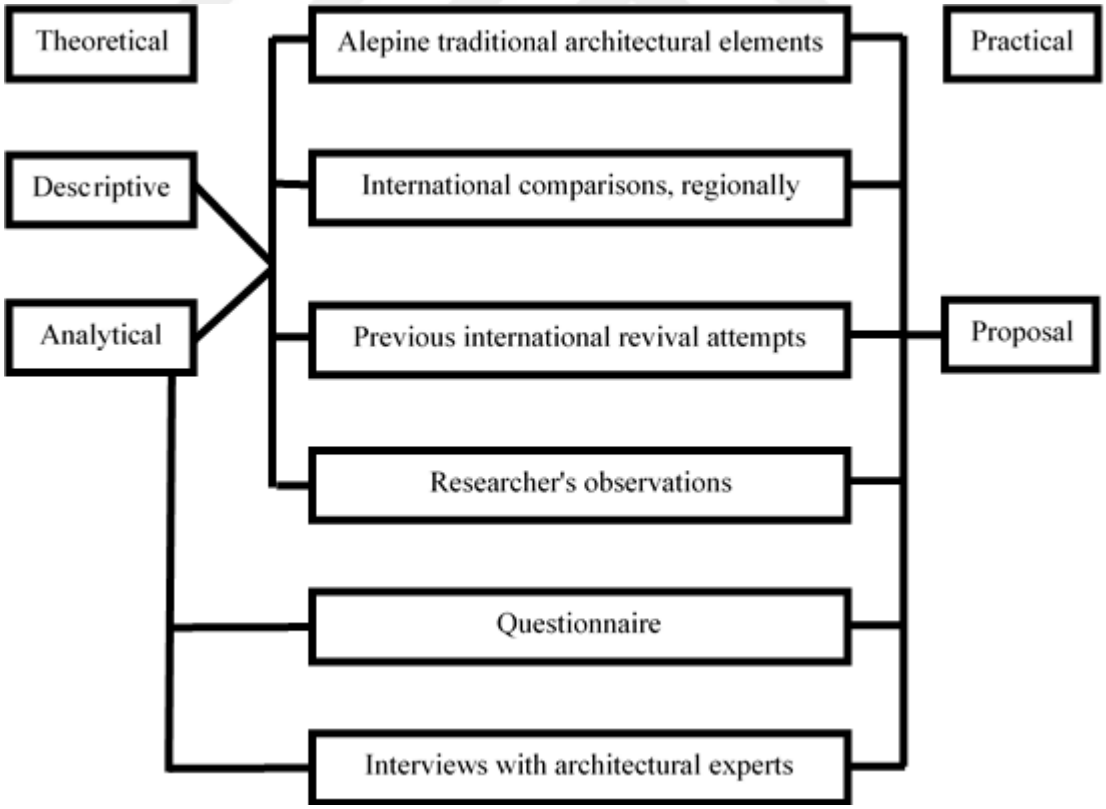


**Figure 1.1** Structure of the study, developed by the author.

## 1.6 The literature review

This literature review aims to present the studies that discuss the importance of traditional architecture, and the importance of its elements, their social effect, and the sustainability of them, and the effect of using them in the contemporary architecture.

Despite the neglection of its role, and not giving it the importance it deserves in some societies and architectural schools, traditional architecture has a prominent role in many aspects, whether social, environmental, aesthetic, and construction...etc.

Where we find that Hasan Fathy believes that it is the architecture that respects the environment, its specificities, its spatial, temporal and social conditions and its geographical data.

Thus producing an authentic architecture that expresses the needs of the culture and civilization. [1]

Christopher Alexander defines traditional architecture as primitive architecture, in which civilizations are distinguished from each other, and social bonds play a major role in its social and popular structure. [2]

Despite the different opinions among contemporary architects and their thoughts about traditional architecture, and the desire to revive it, or benefit from it, we find that adherence to traditional architecture or not, is related to local characteristics related to local conditions and societies.

For example, we find that the people of the Middle East tend to benefit from their traditional architecture.

As explained by Amin Al-Habaibeh: traditional architecture buildings are an outstanding example of sustainable buildings with their simplicity, and the eco-friendly building materials used in them [3], and according to a questionnaire presented by Mahdavinejad:

Iranian architects tend to use traditional architecture, because of its suitability with: concept, form, materials used, which were generally local, and compatible with the local context. [4]

And the study pointed out that some Iranian architects are still following the imitation of previous architecture using styles of this type of architecture, in the same style and traditional methods, while others used the necessary courage and participated in their individual creativity, but preserved the traditional characteristics during their design.

This may be due to the local factors and societal values that originally affected the traditional architecture, and whether the community remained in interaction with these factors and values or not. [5]

Such as the influence of religion, cultures, and ideas carried by a society, and the desire to preserve the prevailing traditional architectural style, may be linked to the prevailing climate in the country, and the adaptation of traditional architecture with it.

Foreign architecture, alien to the local, may be a cause of creating a crisis, as well as its inability to bridge the rift social situation in the midst of the separation after the crisis, where moving away from the local styles, that are appropriate to the regional context, towards that random globalization, is a social setback.

Marwa Al-Sabouni pose Syria as an example, where the effects of this social setback came over the past decades:

Where the effects of that legacy faded, and architectural modernity remained with the distraction and social distortion.

That era was the beginning of the abandonment of traditional architecture, when the elites of society moved from modest alleys to high-end neighborhoods.

These factors finally ended with the majority of Syrians living in poor cement neighborhoods, with the rupture of social links, that were prevalent in traditional alleys, which was, in my opinion, one of the reasons that could explain the outbreak of the civil war later.

Syria has always been characterized with its traditional architecture, that was formed through successive creative eras, which created distinct Islamic styles that have remained until today.

Those styles have proved the beauty of production from that eras, and the social importance, which was then marginalized, due to the extraneous styles that prevailed during and after the French occupation, under the pretext of keeping pace with the development. [6]

She also dealt with other reasons that caused a movement away from traditional architecture, such as commercial transformations, that began to reject traditional commercial architectural structures, and look to spaces and forms different from what traditional architecture provided, as well as shifts in social and residential requirements, where modernity extended to the social aspect, and taken it away from the social fabric, that the traditional neighborhoods played a major role to preserve it, in addition to the difference of the contemporary concept of privacy, from that concept represented in the traditional Islamic architectural fabric.

As for the change in the traditional residential fabric in Aleppo, the Alepine scholar Lamia Jasser indicated that most of the traditional Alepine houses did not remain as its original form; some of which were divided into several smaller houses, with adding new parts and modern modifications,

While some were converted into hotels and restaurants, with the necessary modern modifications for these purposes, and some houses have been abandoned, or converted into warehouses, without significant modifications. [7]

While we notice in Nigeria that the factors that caused some cases of developing the traditional Hausa houses, were the following:

Economic changes throughout history, the impact of colonialism that led to the transformation from traditional villages to new settlements, changing the social structure, and weakening social links,

The weakness that occurred due to the reducing of the family census, where the analysis of the traditional Hausa house showed its prevailing traditions:

Such as marrying off sons in the same house, which may inspire us to solve the problem of creating common spaces in the same building, without breaking the privacy, or the Islamic customs related to privacy.

Another tradition is the strict separation between males and females, so we find that religious belief dominating in society, had an impact that formed this architectural heritage. [5]

Similarly to the case in Aleppo city, which the study will focus on, even if the Hausa dwellings differ from the Alepine houses, but they share the reasons that established the local heritage, which prompt to the revival of this legacy.

Also Iman Ibrahim refers to the factors that make this legacy, the traditional architecture, and socially sustainability; where the traditional architecture, represented by the design of traditional Sharjah houses, included justice, equality and social cohesion between the classes of society,

And in turn, presented a variety of houses models, that meet the different needs within the community, while preserving the family bonding, and providing a decent life that suits all individuals, and makes them feel social democracy. [8]

In the context of privacy, Al-Tayyash believes that talking about privacy calls for the revival of that Islamic architecture, in which privacy is manifested in its best forms,

While this privacy is in opposite with contemporary architecture and imported Western architecture in particular. [9]

Mahdavinejad also indicates that the revolution in Iran and its principles, had a major role in making a radical change in several fields in Iranian society, through the Islamization of society,

And as a result of that policy, was the revival of the Iranian Islamic identity, including the architectural identity with its traditional elements, which topped all other architectural trends that appeared in Iran:

Such as eclectic architecture and contemporary architecture, in addition to the architecture that tried to combine local Islamic styles and globalization.

In my opinion, the example of the Iranian experience is one of the successful examples of revival architecture; as we benefit from its idea, which started from the regional, social, and religious context, with the entire concepts of society, including the Islamic architectural identity. [4]

And in order to understand the Identity term in a better way, it was defined as the qualities that make a person, organization, etc. different from others. [10]

And among the determinants of this identity are the region, geography, climate, society and cultures, such as language, religion, customs and traditions. [11]

Maha Salman also focuses on culture as a major determinant of identity, as identity is closely linked to society, which in turn is linked to its culture.

On the environmental level, Rana Matarneh refers that interests are moving towards environmental and energy sustainability, that lies in traditional buildings, depending on the simplest costs and materials. [12]

I think that these late interests indicate that there are latent features in traditional buildings, that have been marginalized by contemporary architectural designers.

Al-Habaibeh in his article, refered to recent attempts to take advantage of traditional architecture; such as the dependence on the earth's interior temperature, and the usage of some traditional architectural elements:

Such as the openings, the usage of traditional materials, and buildings built with sustainable traditional designs, which will help, if these designs are adopted according to the regional context, in reducing the dependence on non-renewable energy, thanks to the dependence on the properties of natural materials, as well as the traditional

techniques, included in the traditional planning and design, that reduce the need for non-renewable energies.

[12] also indicates to some of these examples in the traditional houses of the city of Salt, such as the narrow streets that reduce the penetration of the sun, and accelerate the penetration of air, he also referred to the thick walls as traditional thermal insulator, directing the windows towards the interior spaces that provide natural cooling in the summer, to maintain that pleasant coolness within the interior spaces.

Al- Habaibeh also focused on the importance of these elements, such as the old alleys, which shows more thermal comfort than the streets of today, due to the natural materials that do not store heat, in addition to the good planning, through the proximity of the buildings, which forms neighborhood fabric. [3]

In my opinion, these networks of narrow alleys served as a roof that is shading its below, and although it is difficult to create such closeness in the whole city today, it is possible to benefit partially from some of these alleys' features.

Al-Habaibeh also dealt with the internal courtyards, as an important element, as they provide an ideal climate, and an outlet of the building, in addition to the openings that help with their sizes, and shapes, in more shading and conditioning. [3]

The Alepine scholar and architecture professor Mahmoud Zein Alabidin points out that the design of the courtyard in the traditional Syrian house is suitable for a hot dry climate, because it increases shading, and allows the creation of a pleasant climate within the house, with the thick stone masonry, which provides sufficient thermal mass. [13]

I think that this ideal element with its environmental efficiency, in addition to the social benefits it provides, are the most important elements that can be used when benefitting from the traditional architecture of the Levant.

Al- Habaibeh refers to another type of environmental benefit that our ancestors took in their traditional houses, such as houses dug in the rocks, as in Petra, Jordan, or in

the ground to take the advantage of its appropriate temperatures, like the case in Matmata in Tunisia. [3]

Modi indicated that traditional Hausa houses use cheap and environmentally friendly local building materials, which makes them more effective to keep using them until today.

The study also recommended achieving interaction between modern and traditional design concepts, and the use of those traditional and cheap materials. [5]

This recommendation is valid for cases that have experienced similar situations, where those cheap materials are a necessary measure after conflicts, that weaken states and their economies, as in our case study, Aleppo.

Another advantage of traditional architecture is its simple implementation methods, realistic and not expensive, and that its architectural elements, have achieved, the condition of the environmental comfort, and provided the aesthetic and functional aspects required.

While typical modern architecture did not achieve this comfort, as well as the lack of identity and architectural reference. [14]

On the aesthetic level, Al-Ansi refers in his thesis to the splendor of the elements, that give the traditional Yemeni facades aesthetic touches, that attract the beholder to their moderate usage without exaggeration.

These elements also gave an attention to the expression of local identity, such as relying on traditional arches, the shapes of openings and their wooden and wall decorations.

The study also dealt with many Yemeni and Arab cases, employing the elements of traditional architecture, with their aesthetics and benefits, within contemporary architecture.

These attempts were not limited to residential experiments, but we find among them administrative buildings that successfully benefited from traditional architecture: Such

as the Arab Bank in Sana'a, which was designed in accordance with the local identity, whether in the shapes of its openings, or in the colors of the facades, as well as the Shatha Hotel in the Sultanate of Oman, which combined the traditional and contemporary spirit, between the use of arches, arcades, traditional decorations, and modern materials, without exaggerating any of them. [15]

Most of these studies focused on the necessity of respecting and reforming this inherited traditional architecture and merging the present with the past without superficial copying.

I think that this kind of copying, if used, may have worse effects than neglecting this traditional architecture, because this kind of copying will distort the general scene, and I assure that this respect is not limited to preserving it from damage, but rather by preserving it from marginalization too, and reusing the elements of this traditional architecture in a way that respects the context in which they will be placed.

As for the effects of the Syrian conflict, Nour Munawar refers that the Syrian conflict, which is a (proxy war between opposing regional powers), the conflict that has affected all life aspects, and affected, also, all the kinds of buildings without distinguishing archaeological, religious, or residential.

As for Aleppo city, it was divided into eastern and western parts, where most of the historical sites, and traditional houses, were in the eastern part of the city, which was under the control of the rebels, and being a rebel area made it the most vulnerable to heavy bombardment and, consequently, it had the largest share of destruction, until 2016, when the whole city was controlled by the regime.

Munawar also explains the importance of the cultural heritage to the local people, as it links their past and history, with their unknown future, and the unknown fate of subsequent generations, which has become threatened by ongoing conflicts, which calls for reviving it in order to preserve that bond. [16]

In her article about the cultural heritage of Aleppo, Dalia Mokayed mentioned that the bond between the Alepine people and their heritage is able to remove the negative effects that affected the city as a result of destruction and displacement.

She also emphasized that involving the Alepine community in the city's reconstruction phase has an important contributing role in the city's developement, after making the community aware of the importance of its heritage, which can remove the negative effects that affected those people socially, and their architectural heritage aesthetically and structurally. [17]

In the context of talking about the post-war phase in Aleppo, Christine Kousa shows that the traditional housing within the old city were in two miserable cases:

The first case was the traditional houses that suffered from destruction during the war, and were not restored despite the end of the war,

While the second case was the traditional houses that have been modernized by returnees, without any coordination or deliberate plans by the authorities, which are concerned to form the laws of restoring the historic fabric of the city. [18]

# CHAPTER 2

## REVIEWING TRADITIONAL ALEPINE ARCHITECTURAL ELEMENTS

Aleppo city is located in northern Syria, according to coordinates 36°13′N 37°10′E, and its countryside extends adjacent to the Turkish border in the north, the cities of Idlib in the west, Hama in the south, and Raqqa in the east.

Its location has an importance throughout history:

On the military level, because it was located in the past between the two most influential kingdoms on earth, Persia and the Romans,

Then it was adjacent to the borders of the Byzantine state with the Muslim state,

And then it was located in the middle of the road between the capital of the Ottoman Empire in the north, Istanbul, and the cradle of Islamic civilization, the land of the Hijaz, in the south, and later because of its location on the contemporary borders between Turkey and Syria.

While its importance on the commercial level, because it is the strategic commercial link between the cities of the Mediterranean and the countries of the east [19] .

Its name was in Assyrian (Halabo), then (peroia) according to the Greeks, and it is called (Halab) in the Arabic, and has a nickname as (Shahbaa) which refers to its white stones [20].

Although there is no conclusive evidence about the beginning of this great city, historians confirm that it is one of the oldest inhabited cities, due to the discoveries of caves in the Kallasa area, which were used as dwellings, before the emergence of Alepine dwellings, that were planned according to a checkered planning in the Hellenistic era.

The remaining historical center of Aleppo city has all the features of the Arab Islamic city planning, such as the mosque, the squares between alleys, the market, in addition to the internal courtyard houses.

This does not contradict the evidences of the previous existence of an urban society in the Hellenistic era, as Hajjar mentioned. [21]

During the Islamic era, the city expanded, and its walls were restored, and expanded towards the east during the Mamluk era, until Tamerlane sabotaged the city in 1260.

Then the city faced a new architectural transformation, and a flourishing urban and commercial era, during the presence of the Ottomans in it, where, according to the French consultant Chevalier Dario in 1735:

The number of residential houses reached 13,360 houses, organized in 50 residential neighborhoods, in addition to 272 religious buildings, 68 inns (Khans), and 64 public baths [21].

Then the city suffered from deteriorating living conditions at the end of the Ottoman era, then fell under the French occupation, and witnessed a major change that affected its architectural identity, and caused a deterioration in living conditions until the independence of Syria in 1946,

The contemporary Aleppo city is characterized by being the highest in terms of population density, where its population, according to the 2013 population census, reached 3.08 million people , and it is considered the first economic city on the Syrian level, in terms of industry and trade.

Aleppo is also distinguished by its richness of heritage and its antiquities throughout different eras, which added tourism income to the reasons for the growth of the city's economy [22].

Aleppo city was added to the UNESCO World Heritage List in 1986 [23].

Most of the architectural legacy that we received, which has been documented, is from the legacy of the successive Islamic states that ruled in Aleppo, which ended with the

Ottoman era, in which the architectural movement, especially the residential, reached the height of its activity.

These architectural styles, which were similar in some points and elements, and differed in others, have produced architectural elements, that characterized Islamic architecture in general, and Alepine architecture buildings in particular, due to their widespread presence in Aleppo, and the distinctiveness of Alepine architects' creativity.

Lamia Jasser explained the general composition of the traditional Alepine house; It consists of a built section, often consisting of one or more iwans, in addition to the rooms distributed on two floors, and an open section as a courtyard, in the middle of the built section [7].

## 2.1 Spatial elements

### 2.1.1 Neighborhood fabric

Aleppo is distinguished by the Islamic city characteristics, in terms of urban planning, where the fabric of its traditional center, which exists until nowadays, was shaped in the Islamic states eras; starting from the Umayyads era, when the central great mosque started to be the main planning element, ending with the Ottoman era, in which it took its final urban shape.

The planning of the Arab Islamic city is distinguished by several characteristics, which are already found in the plan of the historical center of Aleppo: [24]

1-The hierarchical arrangement, which represents the gradation according to importance or privacy, as well as the gradation in the levels of the axes of movement.

And this is noticed in the street's fabric of Aleppo, where the main axial street leading to the Great Mosque or to the Citadel, is wider than the secondary streets, which in turn are wider than the alleys, which all meet in gathering arenas.

2- The diversity, whether in movement, shapes, or spaces, such as the diversity that we find in Aleppo planning, between the wide square and the narrow alley.

3-The human scale that was taken into account within the Islamic city, which can be found as an intimate scale in Aleppo, in addition to the interest of the Alepine architect not to spread too vertically, and to stay within the limits of the comfortable height for human sight.

4- Proximity: which characterizes the Islamic city, and that gives the feeling of the integration in the city.

This Proximity is noticed within the fabric of the historical center of Aleppo, with its proximate traditional houses, then solving that narrowness with gathering arenas.

5- Social harmony: as the proximity between the residents' houses leads to increase knowing each other's and creating a harmony among them.

As for the traditional alley, which is a part of the Islamic city fabric, it is affected by the regional context, depending on the surroundings and the society in which it is located.

*2.1.1.1 Narrow alleys*

Still there is a contradiction in the viewpoints about the alleys fabric, where Sara Hage defines the alleys, from an American viewpoint of the alley: as those narrow, neglected spaces, that connect front streets to back streets and building services [25].

The difference in the idea of the alley, according to the regional context, goes beyond the definition and the urban fabric, to the emotional and social aspect of this urban element.

**Figure 2.1** Narrow alley in Aleppo before the war [26].

The alley indicates a dark side in American society, as Hage referred to the distortion that occurred on the alley between the past and the present.

Where in the past, it was a network that contains a group of services, that eases the connection between them, while nowadays, we find that it is a source of fears in some societies, such as the American society, as it is a hotbed of crimes, robberies, rape, and extortion of innocent people [25],

So much so that it has become a good material for film directors, as a crime scene, a center for a gang, or a place for outrageous, in their adventures and crime movies.

One of the most important features of the old center of Aleppo, is the urban fabric of its narrow alleys,

Where the single houses (courtyard houses) are widespread there, which makes the urban expansion move in the horizontal direction, forming among them those narrow alleys, where the traditional houses were distributed on their edges.

The narrow alleys were designed with a width of nearly 2 meters, to accommodate a camel with luggage on its back [27], due to the lack of transportation that required wide streets, where transportation was limited to animals,

Where moving was often walking on feet within the residential neighborhoods.

These alleys are joined by secondary roads, that sometimes meet in squares, such as Al-Hatab Square in the Al-Jadida neighborhood, followed by wider secondary streets, that connect the neighborhoods with the main streets, that pass through the city gates and the main markets.

**Figure 2.2** Aerial photograph showing the fabric of the old city in Aleppo [28].

But the change in the rates of urban expansion between the past and the present, and the change in the building direction from horizontal to vertical, have changed the interconnected community structure into a disintegrated social structure.

In the contemporary era, only the narrow alleys, that provide access to houses and gathering squares remained from the old Alepine streets fabric,

While the main and secondary streets are mostly absent, due to the expansion of modern streets, and using their places for contemporary needs.

*2.1.1.2 Gathering arenas*

Gathering arenas are the bonds and outlet for the narrow fabric of the traditional alleys in Aleppo, as they are the places where secondary streets and narrow alleys meet with each other, so that these gathering arenas relieve the pressure that can result from the gathering of a number of people that exceed the absorptive capacity of the narrow fabric.

These arenas contain many social activities that serve the neighborhood people: cafes, shops, and in contemporary times, some arenas contain antique shops, as in Al-Hatab arena, and some other arenas contain ancient water taps.

**Figure 2.3** View in Al-Hatab arena in Al- Jdeydeh neighborhood [29]

### 2.1.2 Courtyard

As defined in Oxford dictionary; Courtyard is an open space that is partly or completely surrounded by buildings, and is usually part of a castle, a large house, etc [30].

And in the architectural context: it is an interior space that is open to the sky, to which the traditional Islamic building closes.

It is surrounded by various rooms and spaces, and has many characteristics at the building level, and the urban level of the city as a whole [31].

Courtyard housing is an architectural device with a long history, first appearing in the buildings of Syria and Iraq three millennia ago [32].

Historically, the first dwelling with a courtyard appeared in India and China 3000 BC [33],

Then the courtyard dwelling began to spread towards the west, reaching the Iraqi city of Ur, 2400 BC [34].

These courtyards with their links to the position of the yard, help to reduce the apparent exposure to solar radiation, as well as controlling thermal comfort, by increasing the shading [35].

We find that the internal courtyard in ancient civilizations' architecture mostly limited to dwellings and temples, as in the architecture of Mesopotamia [36].

With the flourishment of architecture in Islamic eras, the presence of the internal courtyard was in most types of Islamic architecture buildings:

Starting with the mosque, which was the basic block of Islamic society, where we find most traditional mosques had the central courtyard, and corridors or praying halls distributed around it:

- In four directions, such as the domed porticos surrounding the courtyard of the Sultan Ahmed Mosque in Istanbul.

- In three directions, as in The Umayyad Mosque in Aleppo.
- Or in one direction, like Al-Adiliya Mosque in Aleppo, and in the middle of the courtyard of the mosque, there was ablution place in most cases.

The internal courtyard was more widespread, and in its most beautiful forms within the traditional Islamic house; where the spaces of the house are distributed around it, and in the middle there is a pool, while on the edges of the courtyard we find plants or trees.

We also find the internal courtyard in the middle of the ground floor's stores, and the upper rooms in commercial buildings, the old form of hotels (khans) [36], such as Khan al-Wazir in the city of Aleppo.

Also, in the Islamic schools, the courtyard was central, surrounded by corridors, rooms, or Iwans, in which students used to gather, and in the middle there was a pool, as in Al-Firdaws School in Aleppo, that was later converted into a mosque.

**Figure 2.4** The courtyard in different buildings in Aleppo (the great Umayyad mosque [37], Khan Al-Wazir [38], Al-Firdaws madrasseh [39])

The courtyard in the traditional Alepine house, which is mainly a space with an ornamented marble floor, and limestone walls, is accessed by the house door through a narrow corridor, while the main spaces openness is directed toward this courtyard, such as the Iwan, which is used as a summer sitting space, also the two rooms on the Iwan both sides have windows opened towards the courtyard.

Even the guest room is accessed through this courtyard, the living room and the cellar, some of which are used for storage, and others for living in the winter, are accessed by the courtyard too.

The main windows of all rooms, including the upper rooms, are directed towards the courtyard, while some other simple openings are directed towards the street, with smaller windows.

Additionally, the courtyard includes complementary additives, such as water pool, that is often in the middle of it, and the basins of plants inside and around the courtyard.

**Figure 2.5** Courtyard of a traditional house in Al-Farafrah, Aleppo, taken by the author in 2017.

### 2.1.3 Internal spaces

The rooms and service spaces, such as kitchen, toilet, bathroom, and pantry, are considered the main component in the house, where most of the activities take place.

These rooms are varied functionally, and despite the differences in the Alepine houses' models, according to the number of the built sides, courtyards and iwans, and despite the functions of the rooms, that can be changed according to need, and the seasons, the rooms of the Alepine house can be classified into:

- Guest rooms: often located near the entrance, in the ground floor, or they may be located on the side of the iwan [26],

**Figure 2.6** Guests room in Ajek-Pash house [26].

And they are large enough, in order to suit the number of guests on the special occasions.

These rooms are sometimes divided into rooms for men, and others for women, in the cases of large houses, and they are rich with the ornamentations, especially the Ajami in the houses of the late Ottoman era [7].

- Living rooms: are located in the ground floor, used generally for the family life, and for resting, or as bedrooms when needed, their doors and windows are opened to the courtyard, and their ornamentations are less than those of the guest rooms, the ceilings of these rooms are mostly flat, mostly of wooden panels, and bonding mortar.
- Bedrooms: are often located on the upper floors, and some may be located on the ground floor, as bedrooms for guests, and as for the ornamentations in the bedrooms, they are often few, compared to the living and guest rooms.

- Al-Elliyah (attic): a room that may be in the upper floor, accessed by a special staircase in some houses, and it is used for sitting or sleeping on the summer nights.

  In addition to the service spaces, such as:
- Kitchen: is in the ground floor, and has an access and windows to the courtyard, its structure is like the rooms structure, with no ornamentations.

  Kitchens are often attached with pantries.
- Pantry rooms: often located in the cellar spaces, and sometimes attached to the kitchens, located next to them, their structure usually is thick stone walls in addition to the vaulted ceilings, they are used to preserve foodstuffs from spoilage, thanks to their appropriate temperatures.
- Toilets: are often located in the ground floor, and mostly found in the space under the stairs.
- Bathrooms: might be located either in the ground floor, or in the upper floor, near the bedrooms, most bathrooms in the traditional houses are recently partially covered with ceramics.

  Additional toilets or bathroms might be found in the same house, in case the sons are married in the upper floor.

### 2.1.4 Iwan

Iwan is a large hall, or audience chamber, often open on one side, and found in Parthian architecture [40].

And in another definition: it is a Persian origin word, which is an Islamic archaeological term, referring to a rectangular plan hall, with an opened façade [41].

It is often roofed with a vault, and its unblocked side opens, often, to an unroofed courtyard, and the most famous example throughout history was: Iwan Khosrau in Iraq.

While as for the first presence of the Iwan in Syria, Jasser indicated that it was in the twelfth century AD [7].

The Iwan had a great importance in Islamic architecture in general, as it was widely spread in mosques, ancient doctrine schools, khans, and houses, where each iwan in those schools referred to a different doctrine, Umm Al-Sultan Shaaban mosque and school in Cairo as an example [42].

The residential Iwan generally is distinguished with a high arch that forms its opening side, while the facing side is solid, with ornaments in some cases, and the other two walls have the openings to the two side rooms.

As for the Alepine house's iwan, there are two types of iwans:

-Summer iwan: located on the southern façade, and oriented to the north, in order to have better ventilation.

-Winter iwan: located on the northern side, and oriented to the south, in order to have more sun rays in the winter.

The iwan's height often exceeds the height of the ground and first floors, and its elevation is higher than the courtyard floor, and can be reached by one or two steps [13].

The iwan is used for sitting, either by the family, or the guests, and there might be several iwans in the same house, and all of them may be gathered in one courtyard or space, as is the case in the Haramlek Hall, in Dar Jumblatt in Aleppo [43] .

**Figure 2.7** Iwan in Alfarafrah neighborhood in Aleppo, taken by the author in 2017.

## 2.2 Constructive elements

### 2.2.1 Arch

Is a curved structure, that supports the weight of something above it, such as a bridge, or the upper part of a building [44], it was used by most of the civilizations of the ancient world, as an important aesthetic and structural element.

The first to develop the idea of the arch architecturally, were the Mesopotamian civilization (Iraq now), in the second millennium BC [45].

The first idea of the arch was composed of two stone panels, tilted in opposite directions, which relieves the pressure loads applied to the building, which was called the false arch, then the arch developed significantly, several centuries BC, after Archimedes found a method to determine the centers of bodies' gravity, which helped in distributing the loads applied to the arched structure instead of distributing them vertically,

Thus, the idea of the real arch appeared, which transferred the loads through its compact stones to the outside, then through the vertical elements to the ground, and because of the efficiency of these arches, it spread to be used in the bridges' construction, to facilitate the connection of the Roman Empire regions, who later found the vault by repeating many real arches.

Then the appearance of the architectural arch spread later in more civilizations, where in the Middle Ages, pointed arches appeared in Gothic architecture, the height of which mitigated the pressure loads.

Then the Arab arch appeared in Gothic, Spanish, and Islamic architecture, whose horseshoe shape, which appeared for an aesthetic purpose [46], and the Islamic civilization, particularly, was characterized by the use of several types of arches across successive Islamic reigns:

Such as the semicircular arch in Syria (formerly the Levant), the horseshoe arch in Moroccan and Andalusian architecture, and the pointed arch in Seljuk and Safavid architecture.

While the semi-circular arch remained the most prevalent in most civilizations, which is the most prevalent in the buildings of the historical center of Aleppo, whether public or residential buildings, where the use of the arch has spread in various types of Aleppo buildings:

Mosques: Where the arches were used as an opening between the corridors and the internal courtyards.

It was an aesthetic element in addition to its structural function, that supports the roof of the corridor,

It was also used in the mihrab as an aesthetic element, and the domes were used to cover the large main space.

Also, it was used in the public Khans, where The arches were used within the openings.

And another use was in the public Bathrooms, where Arches were used in the facades and entrances, and cross arches were used in some spaces, and domes were used in the main space within the interior section.

As well as the Covered Markets, where many parts of the covered market, extending over 1200 meters, were covered with vault arches.

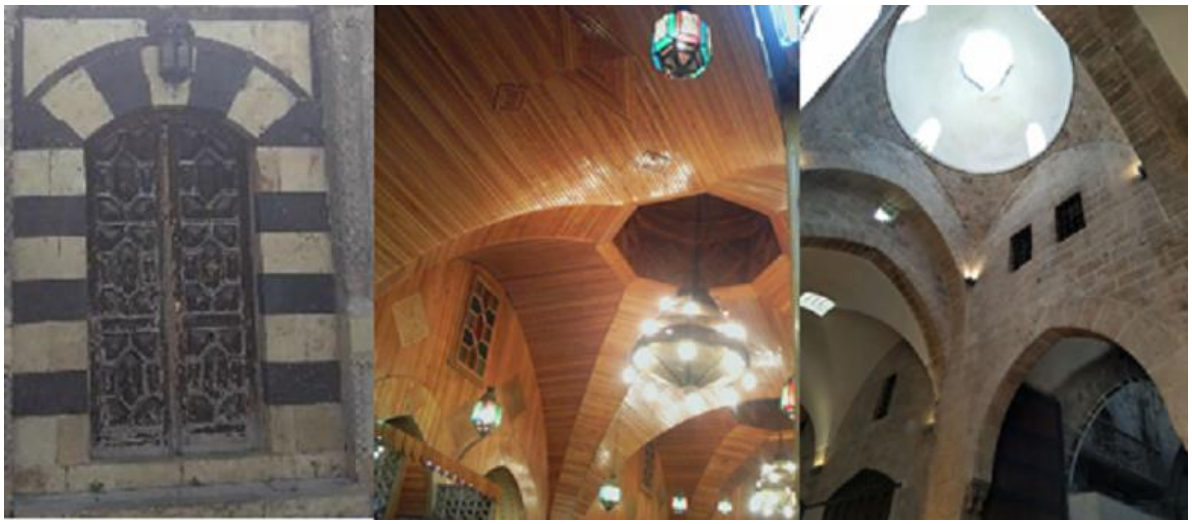

**Figure 2.8** Using the arch in different types of buildings (Sha'banieh mosque,taken by the author in 2017, Nahasin hamam [47], Khan Al-Jumruk [48])

While in the narrow alleys, the vault arches appeared in the roofing of a part of the alley, topped by an additional room, belonging to one of the two opposite houses, which is called in arabic (Sobat).

And the widest usage was in the traditional houses and palaces, where arches were mainly used in the Iwans and openings (windows and doors), and the vault arches were used in some basements.

**Figure 2.9** Using the arc in the internal windows of Ibraheem Basha house [7], and in Sobat in Al-Farafrah alley, taken by the author in 2017.

### 2.2.2 Walls

The walls of the traditional houses in Aleppo are divided into internal and external walls, according to their location:

As for the external walls, either overlooking on the alley, or on the courtyard; they are made from thick limestones, in order to isolate the house from the external factors.

The external walls also give an aesthetic look with the Ablaq stones, or the external stone order, while the internal walls between the internal spaces are less thick, as their function is only separating the spaces from each other.

These walls are decorated in another ways, such as the wooden ajami, or the stone inscriptions.

The walls' thickness also varies according to the level in which they are located, so they are divided into thick walls in the basement and the ground floor, and the walls of the upper floors that are less thick.

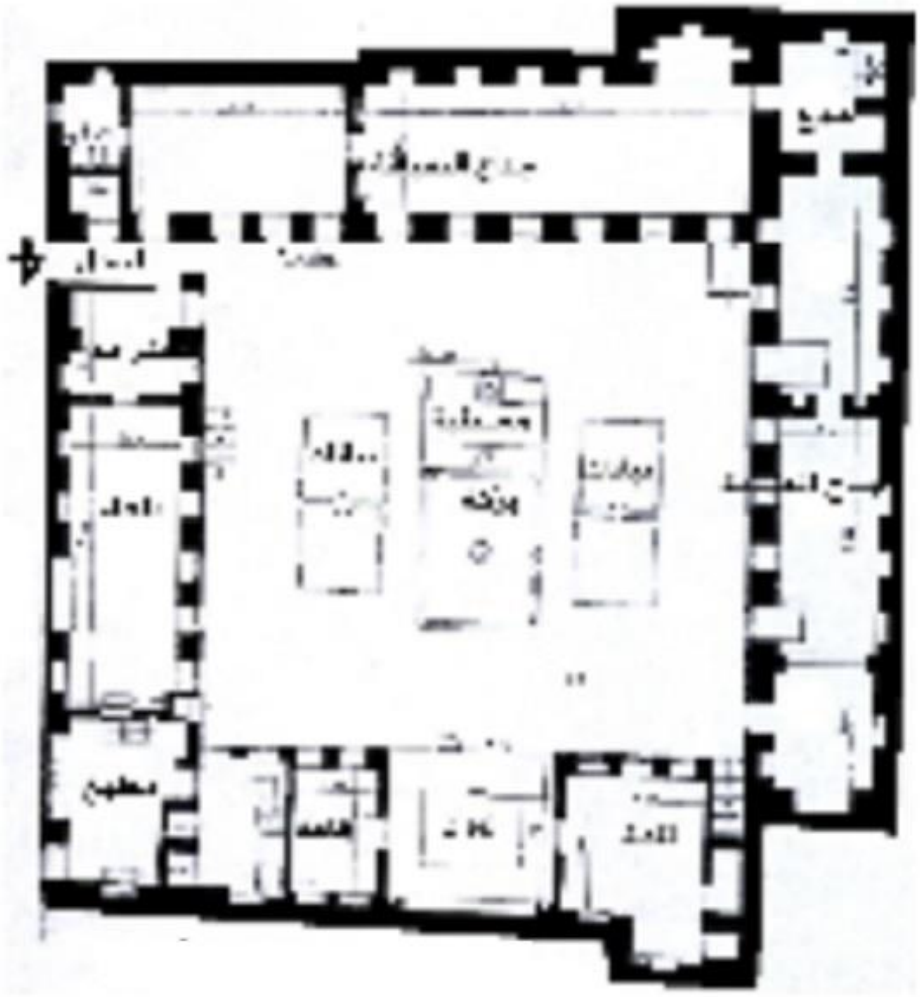

**Figure 2.10** Dallal house plan, showing the difference between the walls' thickness [7].

### 2.2.3 Wind catchers (Bahthenj)

Wind catcher is a straight pivot, above to which an opening that polarizes the wind into the house, in order to adjust the temperature [49].

Historically, the idea of polarizing cold air from above appeared in some houses in the cemeteries of the ancient Egyptian state 2100 BC, then it was used later, in the eighth century BC in Mesopotamia [50].

It spread widely in the Abbasid era, in many regions of the Islamic world, such as Iraq, Syria, Egypt and Iran, whether in the houses or Bimaristans (hospitals in our time's language) [51],

As for its presence in Aleppo, it was mentioned in Tabaqat al-Atibba' book, when talking about the famous doctor Ibn Batlan, deceased in the fifth century AH, mentioned that the wind catchers spread in Aleppo recently, so that every house contained a wind catcher after they were absence there [52].

While the local name of the wind catchers differs from one region to another, and most of them are foreign names: where it in Syria, it is called Al-Bahthenj, and in Bahrain it is called Al-Badkir, and in the United Arabic Emirates it is called Al-Barjeel.

So, the wind catcher was considered as the first conditioner system found through the history, which works by suctioning the wind from the desired wind direction, through the high hole, at the top of the air catching tower, and passing it into the building depending on the negative air pressure, resulting from the movement of the air.

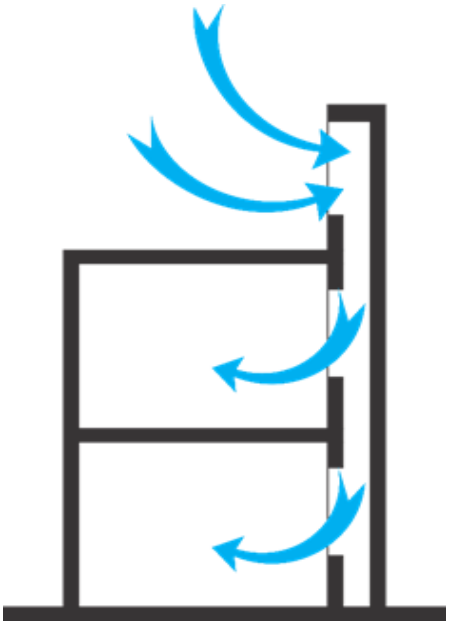

**Figure 2.11** Sketch showing how the Alepine Bahthenj works, made by the author

A net may be added to the wind catcher, in order to purify the wind from impurities, pottery jars, containing water, also might be added to reduce the temperature of the entering wind, by evaporating the water.

While as for the bahthenj in Aleppo, it consists of a vertical opening, at the top of the wall, which attracts the desired western wind, and the air moves through its extension, until it reaches the opening in the house, into which it flows the desired fresh air.

**Figure 2.12** Bahthenj in Bab Al Hadeed neighborhood, taken by the author's friend: Monther Eskef Jilo January 2023.

### 2.2.4 Materials

Building material has always played a major role in protecting the occupants of the dwelling from various weather factors:

Starting with tents as the simplest forms of shelter, with their simple material, then the human created the architectural idea, as a more permanent shelter, using mud houses, for more protection from different weather factors,

Then was the development into building stone and brick buildings, that withstand various factors, and resist for a longer period, and isolate the internal spaces from the external weather, then modern buildings appeared, and there was the use of the most advanced insulation techniques.

Although it is not feasible to use traditional architecture as it was, with all its characteristics, because sometimes it is unable to meet the needs of contemporary building functions,

Some of its materials can not fit with the contemporary surroundings, or its materials may be structurally unable to handle the loads found in the contemporary buildings.

However, there are some exceptions where traditional architecture can be the best solution, in some particular cases, even in its simple building materials.

As in Aleppo case, where the materials used for long generations there, were the most efficient for the city, and its society alike.

#### *2.2.4.1 Limestone*

The limestone is considered the main building material in Aleppo city, due to the occurrence of the city within the area of limestone quarries,

Where the area is located in northwestern Syria, within the area between Apamea, north of the present-day city of Hama, to Jabal Samaan in Aleppo city, and the countryside of Idlib, consists of seven hills of limestone, with altitudes between 400-800 meters above sea level [53].

Its use has been known for thousands of years in Syria, and especially the traditional houses of Aleppo, that were famous for it.

It was the main element in the structural system of Aleppo buildings, due to its withstanding to the pressure forces, and good resistance to various climatic factors.

The stone also had an aesthetic role in the Alepine buildings, where in addition to the limestone, we find the black basalt stone, which is brought from other Syrian cities such as As-Suwayda, where Jabal Al-Arab region is famous for its black basalt stones throughout history.

The white limestone is often found in the façade, alternating with the black basalt, to make the Ablaq façade system, which is an Islamic architectural art style, in which the stones are arranged with alternating colors' courses, yellow, black and sometimes pink.

The Alepine sculptor played a major role in its decoration, with ornamental inscriptions that increased its aesthetic aspect.

**Figure 2.13** Ghazaleh house, the using of limestone, and the decorative Ablaq in the bottom of the wall [54].

*2.2.4.2 Bonding mortar*

A mortar called (Qasermel), which is a mixture of Alepine soil, lime, and ash, was used to bind the stones of traditional houses in Aleppo city, due to the availability of its raw materials and the ease of local manufacture.

*2.2.4.3 Wood*

Pine wood is from the most common wood in Aleppo, and it is widespread in the countries of the Mediterranean basin, due to its ability to adapt to the different climatic and hydrological conditions in the region, and its patience for the lack of water [55],

While we find that the wood used recently for windows, doors, and furniture, in Aleppo, is beech because of its high quality and strength,

But the reason for its high price is the lack of its trees in Syria, so it was replaced with other available, cheaper, and less quality kinds of wood,

But generally, the wood used as a building material in the traditional architecture of Aleppo was less than that of stone, due to its low availability in the region, unlike Turkey, for example, where wood, in the same era, was widely used in walls, floors and ceilings due to its availability there.

The use of wood was noticeable In Aleppo: it was found structurally, where the wooden logs were the main section of the ceilings, and the windows and doors were made of wood,

Where [56] indicates that the wood was treated with tar to preserve it from the surrounding factors, which increased its life.


**Figure 2.14** Using the wood as ceiling [57], and windows material [56].

Many decorations were also carried out with wood, and this use increased with the emergence of Al-Ajami decorations later, most of which were done on wood.

Due to the moderate humidity, the lack of earthquakes and natural fires, the use of wood was healthy, safe, and eco-friendly.

*2.2.4.4 Iron bars*

Iron bars were used to make a protection as cage bars, horizontally and vertically with a net shape, linked by golden colored iron knots,

Iron was also used to make the railings of the upper floors, or roofs, overlooking the inner courtyard, in order to avoid falling from the top floors.

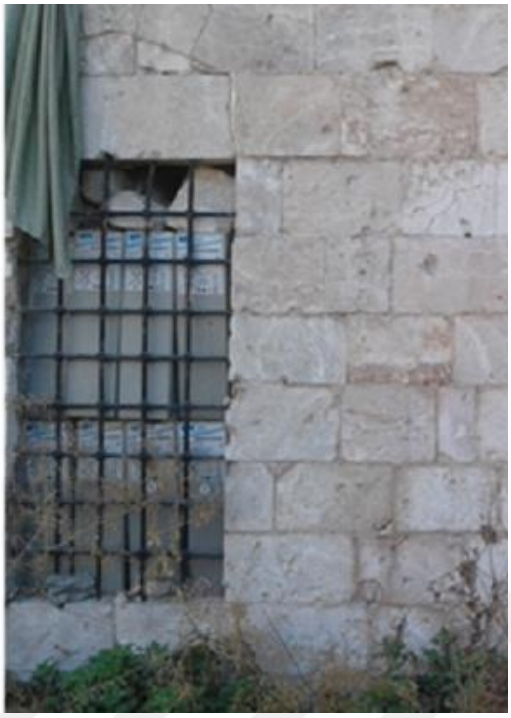

**Figure 2.15** Using the iron bars as protection cage on the window, taken by the author in 2017

## 2.3 Aesthetical elements

### 2.3.1 Ornamentation

Ornamentation is a term which has a deeper meaning than the tangible decoration,

From a religious point of view, the saints' atonement for sins is an adornment for the sinner, just as humans are an adornment for the universe created by God.

As it was stated in the Quran, the stars and planets are elements that decorate the sky, and Heidegger defines the ornamentation as the sparkle that makes Objects appear and become part of a unique assembly [58].

And it can be defined as any enrichment or any beautification of anything [59].

It could be an architectural element, which represents an ornamentation itself with its beauty, such as the columns found in historical buildings, for example, or Muqarnas

corners bearing domes, which, in addition to their structural function to distribute the loads, are employed as a decorative form.

The ornamentation might be an embodiment of natural elements, such as plant or animal motifs, such as the Ajami inscription on the walls and ceilings of the traditional Alepine houses, or as animals shown in the Pharaonic inscriptions,

Also the decorations might be just abstract and pure, such as the geometric marble ornamentations, that adorn the floors of traditional Alepine houses.

Traditional Alepine architecture is considered a treasure of beauty and exquisite Islamic decoration, whose elements of beauty are ranging between simplicity and complexity through the centuries,

Where the ornamentations of Aleppo houses were distinguished by two types of decoration, according to the period of construction and influence:

- The ancient style: whether derived from previous Islamic eras, such as the Mamluk and Seljuk period, or from the early ottoman period.
  this style includes the faience, muqarnas, the ablaq system, or the decorations carved on the stones; Geometric, botanical and written.
- Late Ottoman era and the modern styles: there was a larger spread of Ajami inscriptions engraved on wood, that were fewer before,
  And the complicated botanical and geometric decorations, and the appearance of paintings on the ceilings, such as the ceiling of Ghazala house (the Italian hospital) lobby,
  As well as the symmetrical and luxurious staircases at the entrances, such as the facade of the Al-Wulat (governors) Palace.
  The external facades began to be influenced by European styles in this era.

We find that the alternating paving stones in the ablaq system was one of the simplest forms of decoration in the facades of public buildings,

As well as the internal facades of houses, like the Ablaq system which is alternation between black and white or yellow that gives the facade a simple touch that breaks the monotony.

Also, the marble decorations on the floors cannot be neglected, such as the mosaic marble on the floor of the courtyard of Wakil's house.

**Figure 2.16** Ghazalah house lobby [7], wulat palace [60].

Likewise, stones carved with geometric shapes, Quranic verses, wisdom and poetry, are nicely adorning the entrances and some parts of the facades, while muqarnas and faience were rarely used, especially in houses, the use of muqarnas was probably limited to religious buildings, such as mihrabs and domes.

Then the most complex, and perhaps expensive, decorations at that time, which are the multi-colored wooden decorations (Ajami), which contain geometric and plant designs that reflect the cultures of their owners and makers, or the name of the owner, and the date when the house built. [26].

**Figure 2.17** Ablaq in JanBolad house [7], Mosaic marblein Wakil house [7], Inscription shows the date when Basil house was built [26].

### 2.3.2 Mashrabiyah

Since there is no consensus on one reason for calling it the Mashrabiyah, it is likely that the reason for this name is due to the placement of drinking pottery jars, placed within the Mashrabiyah to get cooler.

The word mashrabiyah also might be derived from the term (Tashreeb) in Arabic, which means the making of shallow grooves, or small projections, in wood [61].

The mashrabiyah is sometimes in form of an Oriel window, is wooden lattice-work screen, used to prevent glare, control air flow, reduce air temperature, increase humidity, and ensure privacy [62].

There was no historical evidence of the use of the mashrabiyah in pre-Islamic times, but the emergence and spread of the mashrabiyah began during the Abbasid era, mainly in houses and palaces, and developed through the Islamic eras.

The mashrabiyah finally reached the peak of its development and beauty, and the peak of its use in the Ottoman era [63].

Then it became used, in contemporary ways, in some buildings with different functions in modern architecture, such as the Arab World Institute in Paris, and Muscat bank in Oman [15].

**Figure 2.18** The arab world institute in Paris [64], Muscat bank [65].

It is considered one of the main aesthetic elements in traditional Arab architecture, where the wooden pieces are formed by different decorative formations, that were created and assembled by the Arab artist, in addition to its environmental function within the hot and desert environments in which it spread.

The mashrabiyah also plays a major role in providing natural lighting, as it also allows only an appropriate amount of solar radiation to be exposing through, and prevent the harmful huge amounts of it.

It allows the flow of pleasant air, as well as its important social function in Islamic societies, that care about privacy as a priority, thanks to its small wooden formations, that encloses narrow spaces between them.

The craftsmen in the dry Arab regions, which lack an abundance of wood, were able to form the Mashrabiyah in a way that saves on wood consumption, using small pieces of wood, instead of using whole wooden boards and cutting them.

So, they were innovative in lathing wood in the small required sizes, then paving them with equaled spaces, and confining them between larger wooden bars, without the use of adhesives, by digging cavities in the large bearing bars, so that the small bars are contained inside them. [63]

With this technique, the mashrabiyah craftsmen were able to make it capable of facing forces such as wind and weight.

The mashrabiyah was also used in traditional houses and palaces in Aleppo, and it was often used with the upper floors openings, while it can rarely be found in the ground floors.

**Figure 2.19** Mashrabiyah in AL-Farafrah neighborhood, source: taken by the author in 2017

## 2.4 Evaluating the traditional Alepine houses and alleys according to the principles of sustainability

the sustainability in general as defined in Cambridge dictionary is the quality of being able to continue over a period of time [66].

But contextually, it is not easy to give a specific general definition of sustainability, without explaining the aspect with which we associate the term Sustainability [67] .

However, it was defined in the World Commission on Environment and Development (WCED) as: (development that meets the needs of the present, while preserving the ability of future generations to meet their own needs) [68].

A bit more specifically, the sustainable housing were described as a housing that provides life in an economic and environmental way, housing that is accepted by the community, and its construction techniques are feasible, all of which are considered within the local context in which the building is done [69].

Sustainable architecture must deal with the architecture and its surroundings, basic human needs, and the relation between all of them [70].

And as achieving the sustainability has become one of the most important goals of architecture nowadays, so it was necessary to look for solutions, that ensure creating an architecture that remains for the next generations, without threat,

And to ensure that future generations can benefit from this architecture,

This part includes a review of the sustainability principles within traditional and vernacular residential architectures, then applying each of these principles to the traditional Alepine housing:

### 2.4.1 The environmental sustainability

1-Respecting the Nature

One of the principles of sustainability achieved by traditional or vernacular architectures, is the affection by the terrain and geology of the region in which they are located, in addition to the optimal choices of the site by the traditional architecture builders, with the least amount of modifications to suit the residential purpose, and adapt to it, where every building exists within an environmental context.

A site's features and local culture influences local building types and techniques [71].

This can describe and suit the case of Aleppo, which is located on a flat limestone plateau, and the city's traditional houses were able to adapt to its topography, without harming the surrounding environment, in addition to the adaptation to the local dry environment.

But we notice the depletion of spaces, through the expansion of the spaces of traditional houses, which exceeds the needs of their owners, which affected negatively on the site, due to the large horizontal spread, that did not match the population inflation.

2-Benefiting of natural and climatic resources:

The diversity of global climatic conditions led to many solutions, that proved the ability of their building elements to adapt with seasonal, or daily fluctuations of climatic factors [72].

As in the case of the Alepine traditional architecture, we find the compatibility with the local climate, by directing the openings in the courtyard to the prevailing desired westerly winds.

As well as directing the iwan towards the north, in order to take the advantage of the northern coolness in summer, in addition to creating a middle place, to avoid direct transmission between the cold outside, and the warm inside.

Also the creation of a water fountain in the middle of the house's courtyard was a good solution for the dry climate there, in addition to the plants, that played an important role in softening the atmosphere inside the courtyard.

3-Reducing the Pollution and Waste Materials:

Traditional architecture has always been questing to secure the most appropriate local resources, that avoid negative impact on the environment.

And the materials used in vernacular architectures were obtained from the local geographical area, where the buildings were found [73],

While we notice less respect to the environment in the contemporary construction sector, by the increasing consuming of non-renewable energy, and the increasing carbon emissions resulting from industrially produced building materials in the contemporary times.

And for the Alepine traditional architecture, this respect was evident by using locally available materials, such as stones, in building the main structure.

On the other hand, the usage of less available materials decreased, such as wood, and the lack of reliance on materials that need to be manufactured, such as artificial bricks.

Also, building the houses relied mainly on local labor, without relying on mechanisms or importing materials from outside the city.

4- Contributing to health quality:

The dwelling’s health is determined through adequate control of solar radiation, natural lighting and ventilation, as well as the humidity of inner spaces in the vernacular architecture's solutions [74].

Which is related to the well selection of architectural elements that benefit of the building's orientation mainly, the sizes and shapes of openings, and the natural ventilation elements.

Within this context, the traditional housing in the Alepine architecture is more suitable for a healthy life than modern housing, as it does not require additional consumption of energies in order to provide lighting, but rather, is provided by opening up to the courtyard, which ensures that all rooms are lit,

It also does not need additional energies to modify the climate, as the stones of the outer walls act as a good thermal insulator, and the traditional house has a smooth transition between thermal milieus, so that the one does not move from the cold street directly into the warm and private house's rooms, but into a place in between in warmth, which is the courtyard.

All of these features in the Alepine traditional house led together to the residents' feeling of a healthy well-being.

5-To Mitigate the Effects of Natural Hazards:

Since its inception, the house has always been the basic unit, in which people feel safe and protected from dangers, especially in the hazard-prone regions, so, it was important to add elements that give the residents a feel of safety in their houses.

Giovagnorio stated that in hazard-prone areas, vernacular builders have implemented constructive strategies for coping with local natural risks [75].

As an example, we notice traditional methods to reduce seismic risks in the Alepine traditional houses, since Aleppo city is located in a seismic area, and has been subjected to catastrophic earthquakes previously, and among those methods:

The wooden stumps that were placed, separating the stones that separate two levels, or on certain heights, in order to work as a pressure-absorber, a function that stones cannot perform alone.

### 2.4.2 Socio cultural factors

The social and cultural importance of traditional and vernacular architecture, whether residential or non-residential, highlights in the local communities' ability to create the most appropriate conditions, for their surroundings as much as possible.

Loubes emphasizes that we must reuse that cultural dimension, that modernism and functionalism has removed, into apartment buildings [76].

and the following are the principles of social and cultural sustainability, applied in traditional and vernacular housing [77]:

1-Protecting the cultural landscape:

The traditional urban fabric has always been a part of the cultural landscape, where the architects of traditional and vernacular architecture accorded every element of this architecture or its surroundings a heritage value.

One of the most prominent forms showing the Alepine community's preservation of the cultural landscape, at the city level, was the preservation of the city wall, which has remained for centuries surrounding the city, and protecting its people, as their first defensive fort.

It also has always been a part of the Alepine urban fabric, and inside the boundaries of this wall, there was a preserved texture of narrow alleys, which, in turn, formed the residential city within this wall.

2-Transferring construction culture:

Where this architecture was a history of the knowledge, and experiences of vernacular craftsmen and architects, whose names were not immortalized by history, but rather immortalized the building methods they invented and developed throughout the eras.

This was demonstrated through the Alepine buildings and houses, whose architects have preserved the identity, and the construction methods through the passing periods of development and expansion, like the method of making the Alepine mortar mixture, that binds limestone for hundreds of years, and still as strong as it was.

3-Enhancing innovative and creative solutions:

Where traditional architecture can be considered as an example of creativity, produced by collective intelligence in society.

And as mentioned in the proverb: "the necessity is the source of invention", the Alepine community has used this principle throughout its centuries of prosperity,

through many innovative solutions to the problems that faced the Alepine house during its development.

So the Malqaf was used to secure an air current during the summer, and the Arabic developed mashrabiyah was used as a climatic and social solution at the same time, in addition to the aesthetic richness in the Alepine traditional architecture, with either simple, or complex aesthetical elements.

4-Recognizing intangible values:

Where traditional architecture expresses the memory of the place and its residents, and the values associated with it.

As the traditional Alepine architecture was inspired by Islamic styles, and the Ottoman style for houses particularly, it was distinguished by its own identity, which reflected the cultural identity of the local community, and its link with the place, and the Islamic identity emerged clearly with the mosques as public gathering places, which gives peace, in addition to the serenity given by the atmospheres of traditional houses' courtyards.

5-Encouraging the social cohesion:

Traditional and vernacular urban fabric, originally emanating from the common people themselves, reflects the social interdependence between the residents, cohesion through the cooperation way of life, and the way of assembly, provided by this traditional fabric.

Also, in the case of the traditional Alepine residential architecture, it contributed greatly to create the social cohesion in the local society that inhabited there,

This was proved in the narrow alleys that brought the distances between the neighbors closer, to make more integration, as a one family, whether in the intimacy and love, or the cooperative atmosphere, imposed by this traditional fabric.

Also, the yards created between these narrow alleys, that were distinct as a pedestrian zones, for walking, relaxing, and communicating within the traditional neighborhoods,

In addition to the role of shared public facilities, such as public bathrooms, which evolved from just an ordinary public facility, to a place for social gathering.

### 2.4.3 Socio-economic factors

Society is affected by economic factors in its daily life, depending on its needs of resources that affect the economy, and becomes affected by it.

So it was necessary to combine a part of the social sustainability principles, with the economic aspect related to sustainability.

The following are the social and economic principles for the sustainability applied in traditional and vernacular housing: [78]

1-Supporting the autonomy:

Which is evidenced in the traditional vernacular architecture, by achieving self-sufficiency within the community, by relying on available materials, local labor, technical conditions, and available local building capabilities [79].

In addition to using local materials, such as the local stone and the Alepine mortar, building the traditional Alepine houses relied on local labor, by enhancing this craftsmanship of the local population, and the building method they inherited through the centuries.

This led to supporting local production, and reducing the costs of importing craftsmanship and craftsmen from outside the city.

2-promoting local activities:

Commercial and exchange transactions provide the community with opportunities to promote their local products, and obtain what they need from the other regions' products.

These commercial operations increase the interaction between the communities within the unit, whether it is a city or a village [80].

The plan of the historical center in Aleppo city included creating suitable spaces for internal and external trade, without compromising the privacy of the residential activities, which created an interaction between the Alepine society and other societies, that interact with it for trading and exchanging goods, all of that often took place in the Khans or the old city market, and contributed disseminating the local activities and culture of the Alepine society.

The activities available by the planning of that historical center also included the development of some handicrafts.

3-Optimizing the construction effort:

By improving the materials usage, and the multiplicity of their functions, and achieving the sufficiency with their features, without relying on complementary and additional materials, and using the least required techniques and modifications to the materials, which would increase the complexity of the construction process.

The vernacular architecture avoided the use of large construction equipment, furthermore, using local materials reduces the need for transporting.

All these features are noticed in Aleppo, where the Stone, and even the building mortar are locally made.

4-Extending the building lifetime: By constructing the vernacular architecture in a durable way that ensures its lasting as long as possible, and its flexibility with the functions of next generations.

This is noticed when comparing the buildings of the old vernacular traditional buildings, with to modern buildings.

There is also flexibility in the Alepine traditional houses, in order to build rooms in the upper floor, or building them in advance, in order to give the opportunity for the family sons to marry within the same big house of the family.

As for the structural aspect, a longer lifespan of the building was ensured, by using strong materials and methods of implementation, which, despite their simplicity, save

the building from being affected, or damaged under the influence of any of the external factors.

5-Saving the resources:

This was evident in Aleppo through relying mainly on renewable energy, by natural ventilation, lighting and heating, in order to reduce the need for air conditioning and heating systems, that consume non-renewable resources, and make the dependence on them secondary instead.

Also the compactness of blocks near each other, which is evident in the planning of narrow alleys, had a major role to reduce the waste of spaces,

While on the other hand, we notice a waste of internal spaces, whether the spaces of halls and rooms, or the space of courtyards, which may exceed the needs of the residents.

# CHAPTER 3

## CONTEXTUAL CASE STUDIES

### 3.1 Important terms for benefitting from traditional architecture

As an introduction to benefitting from traditional and historical architecture, some important terms should be introduced, in order to understand the different architectural and critical viewpoints related to this context:

We should first define the architectural style, which is a consequent of the interaction of several common factors:

Building and construction methods, regional and local characteristics, and social, economic and cultural factors, coordinating with each other, for the general purpose of creating the building and its characteristics. [81]

The concept of architectural style started to arise in the nineteenth century, and was associated with the Swiss architectural historian Heinrich Wölfflin. [82]

There were factors throughout the history of architecture that have influenced the architectural style locally:

The geographical influence that controls the nature of planning and access, the geological impact of the area which determines the building materials and techniques and the climatic influence, that determines the orientation, openness and isolation of the building, in addition to the social impact of customs, traditions and religious beliefs on the architectural style.

Also the role of the ruling and political classes whose opinions dominated all aspects of life, including the architectural aspect.

The historical and cultural aspect, as the architectural styles of the communities that prevailed in the region in the past, influencing the local style and their impacts remain,

as long as their history is still narrated through the generations, should be taken into account too [59].

And talking about the architectural style will lead to the definition of by [83],

As for the traditional architecture, it was defined it as an architectural style that is a response to the local climate, community and materials [83].

And it is, according to Brunskill: the buildings designed by local architects, without training in the architectural design field, guided by familiar frameworks, in the places where the buildings are held, using local materials, with some attention, to express the result of a locally agreed-upon buildings [84].

While vernacular architecture refers to the buildings done outside any academic tradition, and without professional guidance [85],

Where it includes the broadest category of buildings that fall outside the scope of architectural and critical ideologies, and although it is related to lots of traditional buildings, which raised randomly, but still considered important historically, socially, and architecturally.

And with more simple definition: the vernacular building is ordinary building [86].

Vernacular architecture differs from traditional mainly with its makers.

Ordinary members of society, motivated by an instinctive desire to achieve the job they need, are the ones who build vernacular architecture, while we find what are under the name “traditional” are more organized, functional and aesthetic, as their builders are professional Architects. [87]

On the other hand, the modern architecture can be defined as a new architectural and design philosophy that emerged in the twentieth century,

It is associated with an analytical approach of the buildings' function, the rational use of new materials, structural innovation, the rejection of ornamentation, and dependence on simplicity (Modernism).

This functionalist philosophy can be represented by the famous sentence of Louis Sullivan: “Form follows function”.

It is concluded from the description of modern architecture that it contrasts with the traditional architecture and the attempts to revive it.

We can also distinguish, within this context, the extremism towards traditionalism, that can be represented by conservative traditionalism: which seeks to re-represent traditional architecture with an exact copy as it was, this architectural ideology can be represented by the architecture of Hassan Fathi, while on the other hand, we find the interpretive traditionalism seeks to extract useful values and concepts from traditional architecture, and employ them within a shape that is compatible with the present context.

It is also important to distinguish between the close concepts: interpretational traditionalism itself and contemporary regionalism, where contemporary regionalism works at the level of the building itself, while the interpretive traditionalism is more comprehensive, as it is broader than just the building, but rather on the holistic site level.

And finally the Revivalism which copied the past and traditional architecture as they were, and it was defined as the use of a specific visual style, to imitate earlier architectural styles [88], and appeared to reuse the traditional elements inside a new environment, regardless of whether these elements were suitable to the new environment or not.

## 3.2 The importance of regional context in creating the traditional architectural style

Context was defined, linguistically, as the interrelated conditions, in which something exists or occurs. [40]

While In architecture, it refers to the building that responses to the characteristics of the environment in which it is found [89].

The importance of context in contemporary architecture emerged from the need to create harmony with the historical environment, which has adapted to the needed context, more than contemporary trends did.

Also in the midst of modernist trends, and some extremist modernist views, the interests in the regional context appeared as an architectural concept, Regionalism, that seeks to balance local needs and capabilities, with the progressive lessons of modernization [90].

For Frampton: its fundamental strategy was to "mediate the impact of universal civilization with elements derived indirectly from the peculiarities of a particular place" [91] which means:

The interest in the regional and spatial context, as in the traditional architecture.

And among the reasons for resorting to regionalism are:

- Its appropriateness to the local environment, while global styles that are generalized, regardless the local context, are compatible with some regions, while not compatible with another.
- Regionalism is resorted to in some developing countries, because they depend in the construction industry on locally available techniques, materials and means,

  While their economy is unable to keep pace with the costs of international styles, techniques, and materials.
- Regionalism gives importance to the characteristics of each place, separated from another's,

  While global styles seek to repeat the same forms everywhere, despite different circumstances.

And talking about applying the elements from the Alepine traditional architecture does not necessarily mean copying them as they were in the past, as in the conservative traditionalism concept,

But thinking more towards the interpretive traditionalism that refers to use these elements and linking them with the modern context, on the holistic level, such as the Alepine traditional fabric, and the modern regionalism as for the single block identity level.

And in this part, there will be a comparison of the traditional residential architecture in Aleppo, with its counterparts in the following regions:

Arabian gulf region, as in its example in Al-Muharraq city, and the Persian region, as in its examples in Yazd and Kashan cities, in order to understand the necessity of the architecture's compatibility with the regional context, by analyzing the architectural elements in these cities, which are counterpart to those elements in Aleppo city.

### 3.2.1 Traditional Houses in the Arabian Gulf region

The countries bordering the  Arabic Gulf are located in southwest Asia, including: Saudi Arabia, Oman, Kuwait, United Arab Emirates, Qatar, and Bahrain,

As Arabian Peninsula countries, they are located  on the equator, or in a proximity to it, by a continental desert climate.

Temperatures are very high, and may exceed 40 degrees Celsius during the summer, which extends for most months of the year.

It decreases in the short winter and may drop to less than 10 degrees Celsius in the northwest, and the rainfall is rare in the region in general. [92]

Due to that, the traditional houses in the Arabian Gulf region were greatly affected by the prevailing climate.

#### *3.2.1.1 The spatial elements*

The alleys of Muharraq are also characterized by being narrow, for climatic reasons,

such as shading the alley from the high-temperature sunlight that with which the Arabian Gulf region is famous.

And as for the openness in the gulf traditional houses, as in the Bahraini city, Muharraq (between the 18th and early 20th centuries), was towards the inside of the house through the internal courtyard, which provided the rooms with appropriate lighting and ventilation, to face the desert climate conditions,

In addition to the presence of plants and a water fountain, to humidify the dry air entering the house.

The purpose of the openness towards an internal courtyard was, in addition to the climatic issues, the social and religious traditions, as the Arabian gulf after the presence of Islam was completely inhabited by Muslims,

So, the privacy was one of the first priorities in the life aspects, where this openness towards the internal space, provides an outlet protected from neighbors and passers' sights.

**Figure 3.1** Alley in Muharraq city [93].

Also the iwan was found, which was opened against the sun direction, to avoid the blazing sun of the day [94].

While as for the rooms, which are usually rectangular, and roofed with wooden beams, [94]refers that they are divided into two types: summer rooms, and winter rooms:

As for the winter rooms, they are located on the ground floor, with thick walls, and the openings are limited to small upper windows for lighting, and they are generally for living, and used for naps sometimes.

While the summer rooms, which are in the upper floor, with more windows, are used for sleeping generally, and used for living in the summer evenings.

In addition to the service spaces, a room called (madbasah), which is located on the ground floor, or the basement, if any, It is a dark room without windows, used to preserve dates and extract dates molasses from it, while as for the iwans, we find them only in the mosques.

*3.2.1.2 Constructive elements*

We also find the arch above the openings of the corridors in the large houses, such as Sheikh Issa Bin Ali suite.

And as for the walls; we find that the ground floor walls were thicker than the upper ones, to bear the loads of the other elements and floors above it, also, in order to isolate the house from the external factors.

**Figure 3.2** Internal courtyard in Sheikh Salman house in Al-Mahraq [94].

While as for the wind catchers, we find that the traditional houses in Muharraq had several types of wind catchers (badagers), which and [94] classified into two types, according to their mechanism:

One of which was the wall Malqaf, that depends on winds colliding with two barriers, which allows the air to enter the house through a space between them.

The other type, the more widespread, which are wind catching towers, which he categorizes according to the tower's top slots into one direction, two directions, three, or four directions opening.

And as for building materials in the Arabian Gulf region, they varied between mud, wood, and mainly the stone.

[94] showed that most of the materials used were from the available materials in the region.

Starting with the most used material, the stone, where the limestone used was taken from the coastal land, or from the sea.

And as for the mortar, it is diverse in terms of raw material, and it was prepared locally, including lime mortar, whose raw stones are called in Bahrain (Al-Noura), gypsum mortar, clay mortar, and the mortar which is a mixture of lime and clay.

As for timber, the most widely used type of wood was palm tree trunks, which are widely available in the coasts of the Arabian gulf, and it was used in roofing.

Tropical Mangrove was used in the Emirates, Oman and Bahrain, which was imported from India and the eastern coasts of Africa, and it was used Also in roofing and wall reinforcement.

Teak wood, which was used to make the wooden elements, such as doors and windows, was also imported from India.

The ground floor rooms (winter rooms) were thick-walled, in order to withstand the loads above them, like the ceiling, and the walls and ceiling of the next floor.

Another environmental reason, which is to preserve the heat inside the room. [94]

**Figure 3.3** Stone wall in Muharraq city [94], and Lime mortar falling due to rain, Muharraq city [94].

*3.2.1.3 Aesthetical elements*

There are various ornamentations in the traditional Gulf house in Muharraq city, where we notice the stucco decorations, such as serrations that top the roofs of buildings, and decorative bars, that are frames of the arches and openings.

There are also stucco geometric drawings in the openings, that allow light and air to pass through their perforations, and they might work like the Mashrabiyah.

There are also wooden decorations that decorate the openings, in addition to the metal decorations and colored glass decorations that adorn some of those openings. The ceilings are also decorated with wood, and also decorated with coloring.

**Figure 3.4** Wooden window in Siyadi house [94], Stucco ornamentation in sheikh salman house [94].

### 3.2.2 Traditional Houses in Iran

Iran is located in an area with a hot and dry climate in most of it, except for some northern regions, where most of the Iranian cities are located near the desert, so we find the desert feature in it, with its climatic fluctuations, between cold nights and hot days.

So the regional characteristics of the region are noticed, imposed the people to build houses, able to protect them from the prevailing climatic conditions, and provide comfortable living spaces.

Although the Iranian cities are ancient, and their history going back to the eras before Islam, the traditional buildings that we see today, are inspired by the Islamic architecture [95].

*3.2.2.1 Spatial elements*

Iran is located in western Asia, north of the equator, with an arid climate in most of its central and southern parts, and temperate climate in the northern parts, located on the Caspian Sea.

The traditional Iranian cities, with a hot, dry climate, such as Yazd city, have compact urban fabric, which leads to narrow winding alleys, and consequently, a decrease in the external area exposed to the sun, so both walls and pedestrian paths are shaded [96].

Moving into the house, the courtyard is considered a major element in the traditional Iranian house, and traditional Iranian architecture in general.

The Iranian courtyard plays an important role in adjusting the climate, by moderating temperatures, and organizing spaces, as entry is through it to the other spaces in the house.

It also plays an important role in creating privacy for the house from a social point of view, which is an important issue in the Islamic societies.

As for the rooms of the traditional Iranian house, they are two levels: one for the family and the other for guests, but they are also divided with another aspect:

- Summer rooms, located in the south of the courtyard.
- Winter rooms, located in the north of the courtyard, so the residents move to live between them several times a year.
- In addition to the rooms in the basement.

And as for the iwan, which is considered an essential element in the architecture of the Persian civilization, and later the Islamic one in Iran.

The Iranian iwan works as a summer sitting space in the traditional Iranian house, and it is oriented towards the south to obtain a cool natural ventilation.

**Figure 3.5** Ornamented iwan in Kashan [97].

*3.2.2.2 Constructive elements*

The arches were found largely in the traditional Iranian houses, as a structural and aesthetic element as well, since Persian architecture, then in the Islamic architecture, and due to the hot and dry climate in most of the Iranian states, which contain the traditional Iranian houses, as in Kashan, mortar, mud and unfired bricks were used, due to their low thermal mass. [97]

Also the stone was used in the main structure through the history.

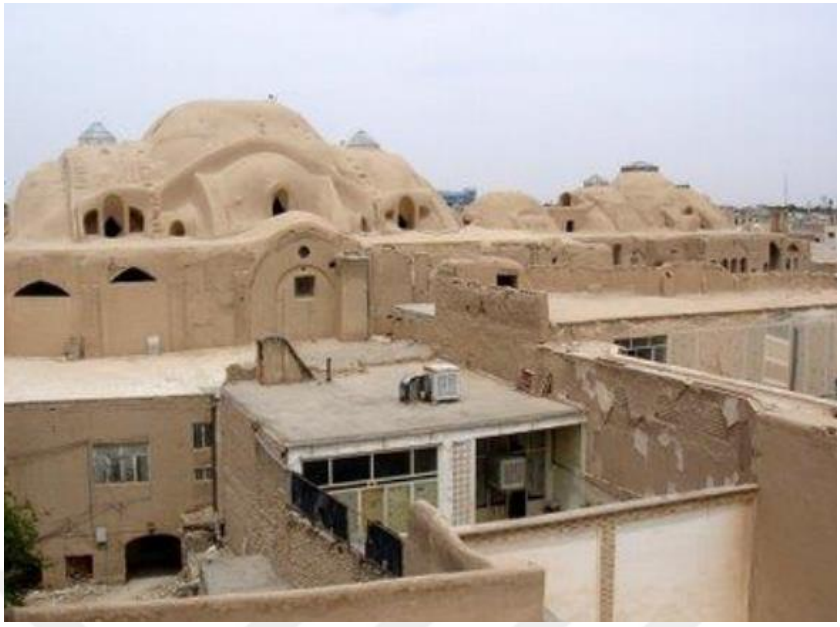

**Figure 3.6** Using the mud in the traditional houses in Kashan [97].

Wind catchers are also widespread in Iranian traditional architecture, due to the need for ventilation, in order to adjust the hot climate.

The wind catchers (Badgeer) are a chimney-like tower, capture air from any direction of its openings, then directs the air to the channels, which are connected to the house below. [97]

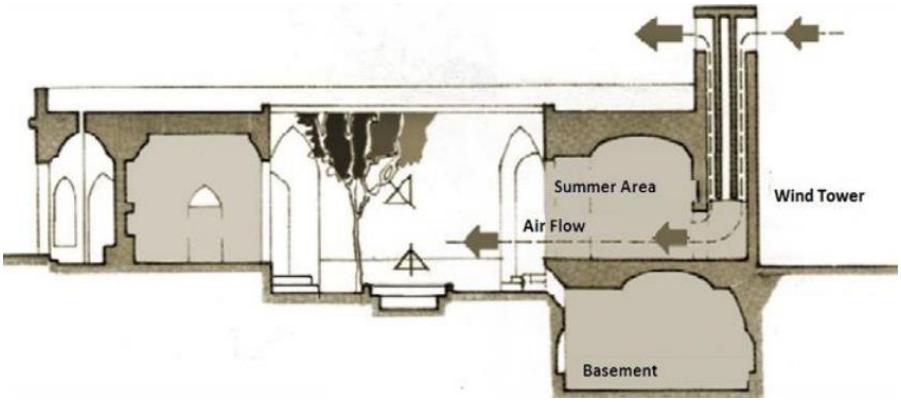


**Figure 3.7** Illustration of how badagir works in Kashan [97].

*3.2.2.3 Aesthetical elements*

Ornamentations vary in the traditional Iranian architecture, such as the arch, and stucco ornamentations, and iwan also is a part of the ornamentations, where it plays a major role in the aesthetic aspect of the Iranian traditional house, with its ornamentations [98].

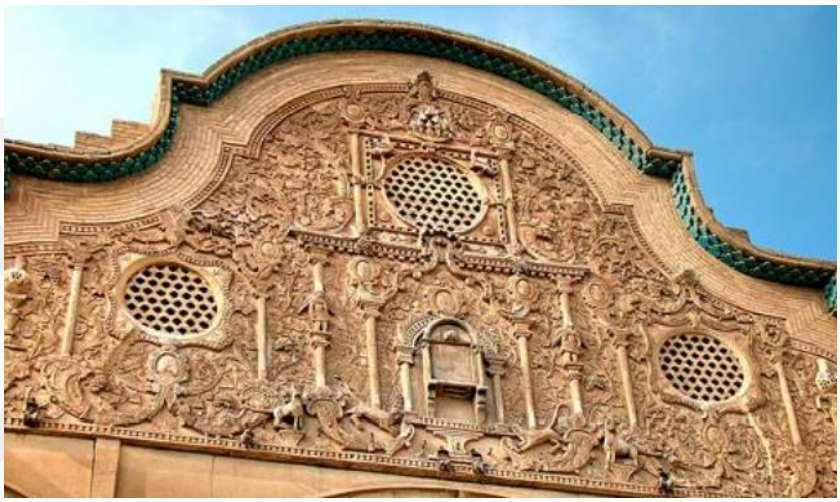

**Figure 3.8** Brojerdiha house in Kashan [97].

### 3.2.3 Conclusion

Despite the different regions, the Arabian gulf, Iran, and Syria, in which Aleppo is located, there are similarities in the architectural characteristics, due to the influence of the Islamic civilization, which might be because of the long period that Islam ruled in these areas, and due to the similar dry environments.

Despite the differences in the time of building each of these architectural identities, the difference in the place and geography of each of them, and the different shapes and methods of construction,

But they all share the same fact, that they were in response to the spatial context in which they were found, and for which

# CHAPTER 4

## CONTEMPORARY ALEPPO, AND CONTEMPORARY POST-CONFLICT RECONSTRUCTION

This chapter includes reviewing the Alepine architecture in the contemporary era, and after the 2011 conflict, then evaluating the selected elements' compatibility with the contemporary reconstruction phase.

### 4.1 Aleppo contemporary architecture

This theoretical part includes a discussion of the contemporary architecture in Aleppo, compared to its traditional architecture,

Then it will review the Syrian conflict effect on Aleppo city, and showing the documented damage, and finally, reviewing the city's architectural situation after the conflict.

#### 4.1.1 Aleppo architecture transformation

We can discern the start of abandoning traditional architecture, distinguished by the traditional Arab yard, with the middle of the 19$^{th}$ century, and moving towards contemporary architecture.

Instead, imitating international and European architectural styles in particular, in Aleppo, in the nineteenth century, until it was completely separated from the traditional identity in the twentieth century, then it started to be characterized by the unorganized transition to modern architectural styles, which led in the seventies to urban chaos, with population inflation, and the urban sprawl [7].

With the beginning of the twenty-first century, some traditional houses began to be removed, and high-rise buildings were built in their place, distorting the urban fabric [18].

We can notice the main differences between the traditional Alepine examples, dating back before 19th century, and those after it, with the start of being influenced by the contemporary trends, and globalization and European architecture, as following:

**Table 4.1** The differences between the Alepine buildings before and after the start of the the contemporary and globalization trends influence, done by the author, sources: [32], [7]

| Element | Before the influence | After the influence |
|---|---|---|
| Influencing source | Islamic architecture | Globalization |
| Openness | Inwards | Outwards |
| Courtyard | Yes | Not always |
| Ewan | Mostly found | Mostly absent |
| External decorations | Simple | Ornaments and fake columns |
| Internal decorations | Engraved Quran ayas, poem, and wooden ornaments (Ajami) | Ajami, then the ornaments started to be absent in the 20th century buildings |
| Construction materials | Stone, and wood | Stone, wood, metal, and concrete in some cases |
| Stairs | Mostly external | Mostly internal, decorated, and symmetrical |

### 4.1.2 The Syrian conflict 2011 effect

The Syrian conflict began in 2011, on an intellectual and social scale, mainly, as it did not affect all aspects of Syrian life at the beginning.

The impact of those introductions was not significant on the city of Aleppo, until the year 2012, where Aleppo started to be affected and effective significantly, when the conflict took an armed turn.

The impact of the armed Syrian conflict, that started in Aleppo in 2012, was not limited to the political and military aspects, but also to the architectural, humanitarian, social and economic aspects.

With the outbreak of armed conflict in Aleppo in 2012, the city began to buzz, not only with the sounds of shells, but with the sounds of stones, flying from buildings, and the authentic houses of the city.

The concentration of the conflict parties in the middle of the buildings, under various pretexts, eventually led to the result of a large percentage of destruction and damage.

And according to a report published by United Nations Institute for Training and Research in March 2019:

Aleppo topped the list of Syrian cities, in terms of the number of damaged structure, with 35,722 buildings, between the partially damage, and destruction, the vast majority are residential buildings [99].

**Table 4.2** Buildings damage analysis in Aleppo until September 2016, done by the author with data from the previous table's source

| Description | Amount | Unit |
|---|---|---|
| Destroyed | 4,773 | Building |
| Severe damage | 14,680 | Building |
| Moderate damage | 16,269 | Building |
| Average | 4 | Building per hectare |

And according to the documentation of the historical center damage, which is considered the heart of the city, in terms of location and historical importance, as it is the part that arose when Aleppo city arose.

This center gradually expanded to reach what the city is today, the social importance, as it is considered the birthplace of the original families in Aleppo city, and the architectural importance, as it is the source of traditional architecture.

And according to the documentation:

Nearly 50%. of the historical center was affected, 10% of it was completely destroyed.

More than 30 mosques were damaged, the historical covered market, whose length exceeds 1200 meters, was damaged by 60%, and the main fabric in the historical area, the traditional houses, which are more than 16,000, including the luxurious houses of the Mamluk or Ottoman era, had the largest share of the bombing and destruction in the historical center [28].

The reconstruction phase in Aleppo as whole, took two directions:

The first was a reconstruction influence by the modern architecture, difficulty to be distinguished, whether it belonged to a particular architectural style or not, which prevailed in the contemporary periods of the architecture of Aleppo,

While the second, taken by those interested in the city's heritage, was seeking to reconstruct and restore historical markets and mosques, but neglecting the traditional residential alleys, although it has been several years since the armed conflict stopped in the city, a large part of its architectural heritage, represented in the historical center generally, and the traditional residential houses particularly, is still neglected without being restored,

This neglection was due to the abandonment by its residents, and the lack of effective plans for restoring the traditional residential architectural heritage and reviving the traditional residential alleys fabric.

The stakeholders, who have the decision about the form of the reconstruction phase in Aleppo, related with the old city fabric, are, mainly, the responsible governmental authorities or municipalities.

As the conflict case is local conflict, between two Syrian parties, that complicates defining the exact stakeholder, as well as international organizations, interested in cultural revival in the city, in addition to the participation of the community as an essential stakeholder with its craftsmen and specialists, since the local community's people are the most familiar stakeholders, with their social, material and moral needs and requirements, which are not in the focus point of the donors.

**Figure 4.1** The destruction in an Alepine traditional house, taken by the author in 2017

## 4.2 The compatibility of the traditional Alepine architectural elements with the contemporary reconstruction phase

This section includes the important aspects of each traditional element to be used in the Alepine reconstruction phase, then evaluating the possibility of using these elements in the contemporary context in Aleppo.

Each one of the elements will be compared with the corresponding elements from the contemporary Alepine architecture.

And within the criteria for evaluating the traditional architectural elements, there were the environmental aspects, because architecture has always sought, since its beginnings to achieve environmental comfort, and interaction with the surrounding environment, where avoiding negative weather conditions was one of the first human requirements, in order to find a primitive traditional dwelling.

The criteria also included the aesthetic aspects of these elements, in addition to the economic aspects, when they have a decisive role in the evaluation.

And because the reconstruction is not limited to rebuilding physical structures only, but also to rebuild and recover the community lifestyle, as it is the main affected, and the main stakeholder in the reconstruction phase. [100]

It was necessary to focus at this stage on solutions that guarantee comfort and societal acceptance, within the proposals related to the architectural aspects, by taking the opinion of the local people about reusing these elements again in their city's buildings.

Interviews were conducted in Arabic language, to find out the opinions of the residents about using elements from the traditional architecture of Aleppo.

The interviews included, in addition to personal questions, about age, gender and place of residence, questions about the residents' opinion of each of the elements to be benefitted from, and whether they prefer to reuse it again, or prefer the corresponding element from contemporary architecture, or a proposal that merges them, if possible.

The interviews were with 11 Alepine, ranging in age from 20 to 50, 82% of them are males, and 18% of them are females, 18% of them live in Aleppo until now, and the 82% are living out of Aleppo right now, and 73% of them live (or lived previously) in traditional houses.

The opinions of five architectural and engineering experts, including PHDs , Master's degree holders, and working engineers, were also considered, while evaluating the elements,.

### 4.2.1 Spatial elements

#### *4.2.1.1 Neighborhood fabric*

The reason to make the alleys of the traditional cities in the Middle East with several turns, not straight like today's streets, is reducing the speed of the hot, dry, dust-laden wind [101].

In addition, he attributes this to an additional reason, which is to create a diversity between the shaded and lighted spaces in the alley, creating small currents of light gentle wind, which can be found in the case of the traditional alleys in Aleppo.

He also indicates, from the social aspect, that the hierarchy of streets and alleys in the Islamic city planning increases the privacy between the (public) and (semi-public) streets and alleys,

Which is noticed in the planning of Aleppo, starting from the main streets, ending with the narrow alleys serving the houses, which are meeting in the gathering arenas.

We find the following aspects showing the importance of the Alepine traditional narrow alleys:

##### *4.2.1.1.1 Environmental importance*

[101] refers to the reason of creating several turns within the alleys in the traditional cities in the Middle East, which was in order to reduce the speed of the hot, dry, dust-laden winds.

So the narrow alleys serve as good air corridors in Aleppo alleys, when the entrance to the alley is directed towards the desired western wind in the city.

This narrowing plays an important role in accelerating the passage of the air stream, to alleviate the hot weather inside the alley.

And we can notice the shading in the Alepine alleys, thanks to the traditional houses' high walls, compared to the width of the alley, which creates a diversity between the shaded and lighted spaces in the alley, creating small currents of light gentle wind, which can be found in the traditional alleys in Aleppo.

Also, the narrowness of the alley, compared to wider streets, contributes in reducing the cars activity inside it, which reduces the pollution caused by car exhaust.

And as for the gathering arenas, they play an important role as a general outlet where the neighborhood people can sit on these arenas' shaded benches, and do their activities in the fresh air of these arenas, which is created by the gathering wind currents flowing from the narrow alleys.

*4.2.1.1.2 Social importance*

One of the advantages of the traditional fabric in Aleppo, on the social level, is granting the privacy to the people of the alley, while achieving the social gathering in the arenas.

We can differentiate public and semi-public streets and arenas, and the alleys, where all the people, within the same alley, which is the smallest level, know each other due to the closeness between the houses.

The lack of residents within this level, the alley, and the hierarchical arrangement of the roads in the Islamic cities, and Aleppo city in particular, makes the residential alley almost isolated from those who do not intend to enter,

In another words, the entry of strangers is rare, and when happens, they are recognized, by the alley people, as soon as they enter.

Also, this acquaintance between the people of the alley increases the bonds of cooperation, and strengthens the relations of neighbors between them, through the proximity in the alley, and gathering in the arenas.

Where the arenas play an important social role, as they attract the people of the same neighborhood for their social activities, and strengthen the bonds and social cohesion at the neighborhood level, which is a wider than what the internal courtyards do.

While we find this social cohesion almost not existed in the neighborhoods of the modern city, due to many reasons:

1- The urban expansion and the multiplication of the city's population by many folds which led to the mixing of different social components, religiously, ethnically and intellectually, which led to poor communication, understanding and blending between these diverse sects.

2-Also the heavy movement of cars within the neighborhood reduces the rate of social interactions, since narrowing the alley creates a feeling of safety (in communications),

This increases the opportunities for interacting between residents, so the alleys, as a small level within the neighborhood, are the best solution that guarantee the appropriate social relations.

Also, the traditional alley scale, which is close to the human scale, creates a feeling of gradualness, between the public, wide, and crowded street, then the gathering arenas, passing through the half-public, narrow, and less crowded alley, up to the spacious and private house.

So that, the residents of the neighborhood do not feel the streets, where the houses are opened to, as an enormous element to the human scale.

While on the other hand, some of those who previously lived in traditional houses, rejected the idea of the narrow alley, and the compact fabric of the city in general, because the adjoining houses and the adjacent roofs, in some cases, led to the encroachment and theft of some houses.

Additionally, the adjacent roofs expose the neighbors' courtyards, which causes social problems among the neighbors, given that the Alepine society is a conservative society, gives a great importance to the covering of the family's women from others' sight.

*4.2.1.1.3 Evaluation*

The evaluation of the openness to narrow alleys in Aleppo city depends, mainly, on their comparison with the openness to streets, and the comparison will be with the following respects:

**Table 4.3** Comparing the openness on narrow alleys with the openness on streets, done by the author.

| Criteria | Openness to narrow alleys | Openness to streets |
|---|---|---|
| Adapting with the climate | More adaptation with climate due to the airflow and shading they provide | More adaptation with climate |
| Exposing to pollution | Less cars pollution People clean in front of their houses periodically | More cars pollution The entire street is not cleaned by residents |
| Exposing to noise | Less noise, only the residents and few people passing the alley | Cars traffic, residents, and strangers can pass, which makes more noise |
| Securing privacy | Preserves the privacy of the alley residents between each other | No privacy of residents due to the passage of strangers |

| | | |
|---|---|---|
| Securing safety | More safety, but the lack of people may make them places to commit immoral acts | Not safe due to the amounts of strange people passing |

And given the above choices, experts opinions, about the best way within the reconstruction phase, were as the following:

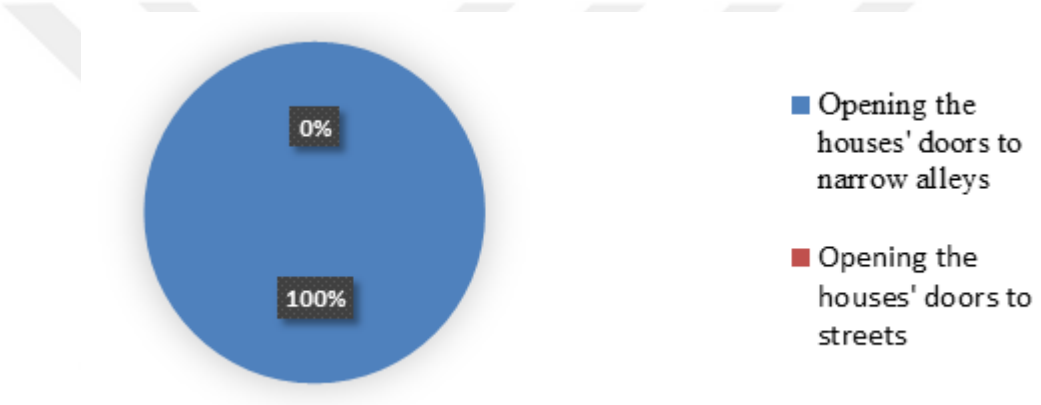


**Figure 4.2** The results of the interviews with the architectural experts about narrow alleys, done by the author.

While the results of the interviews, regarding the place to which the houses' doors are opened, after asking: if they support opening the doors to narrow alleys in the reconstruction phase in Aleppo, were as following:

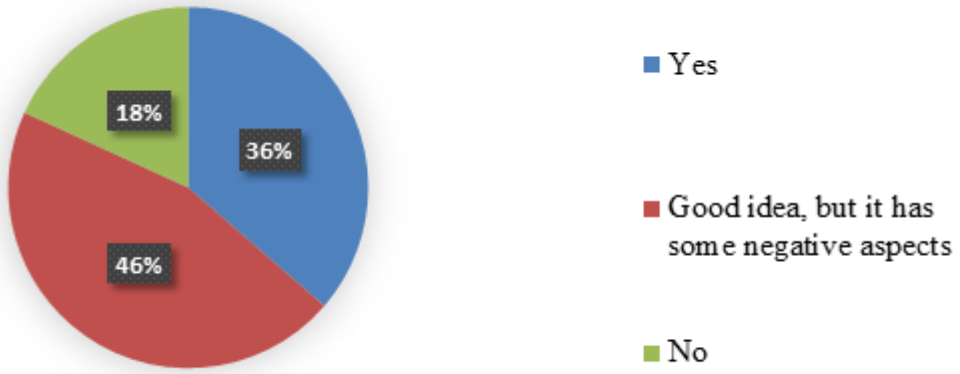


**Figure 4.3** The results of the interviews with the Alepine community about the narrow alleys, done by the author.

By comparing the opinions of experts and the societal acceptance, we find that the traditional neighborhood fabric whose openness towards narrow alleys is better to open the houses' doors onto them in the reconstruction phase,

Taking into account the difficulty of passing transportations, which can be solved by widening the alleys, to allow the passage of only one service vehicle, when necessary.

*4.2.1.2 Courtyard*

It was indicated by [102]: that the reason of the residential buildings' openness towards the outside in European countries, is due to the need to be exposed to the largest possible amount of sun, in order to face the cold climate prevailing there.

While residential buildings in the Middle East, as in our case study, Aleppo, seek to have an openness towards the inside, because of the need to shade the spaces, given the prevailing hot climate.

[103] also indicates that this form of housing design prevents the passers-by in the street, or the residents of the neighboring houses, from breaking the privacy of the house, whether within its spaces, or its inner courtyard, which is common in the Islamic cities' fabric, such as Aleppo.

And we can evaluate the courtyards of the Alepine traditional houses, after reviewing their following aspects:

*4.2.1.2.1 Environmental importance*

The courtyard is a space opened to the sky, in the middle of the traditional house, it works as the lung of the house.

The environmental importance of using the internal courtyard in Aleppo is manifested in the fact that the city has a dry climate,

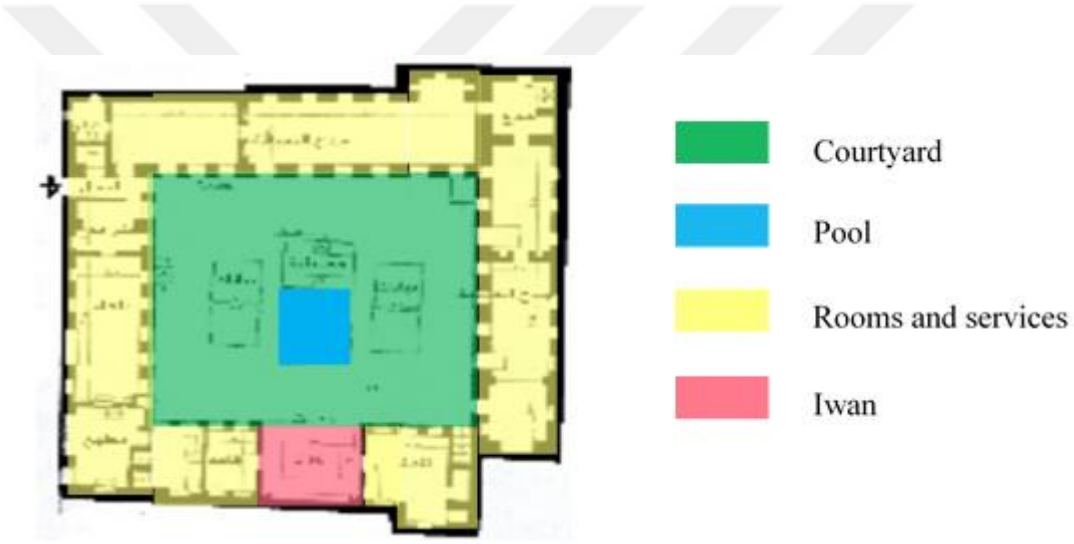


**Figure 4.4** The courtyard and its surrounding spaces of Dallal house in Aleppo [7], illustrated by the author.

Where the openness of the houses, to the outside, will cause a rise in the temperatures acquired from the surrounding, the heat of the air coming from the surrounding environment, and the heat gained from asphalt street floors, in summer, and decreasing the temperatures in winter.

While internal courtyards, generally, have the ability to achieve thermal comfort for the houses, as they act as modifiers for the microclimate [104].

In addition, they achieve a great amount of shading and natural unpolluted ventilation.

As well as the functions of the additional contents of the courtyard, such as plants and fountain, that rid the air of dust particles stuck in it.

Also, the availability of these contents within the courtyard, helps in cooling and humidifying the internal atmosphere.

As well as the construction technique, which is based on thick load-bearing stone masonry, provides adequate thermal mass [13].

The courtyard also has an important role in securing natural lighting, as it is noticed in the design of most of the rooms surrounding the courtyard.

Where the longest side is directed towards the courtyard, in order to provide the largest amount of natural light during the day, through that outlet, in addition to its role in reducing the noise pollution, caused by street and neighborhood noise [105].

So, the internal courtyards are more suitable to be used within the contemporary environmental context of Aleppo, than the buildings that depend on outside openness, to the surroundings.

*4.2.1.2.2 Architectural aspect*

One of the disadvantages of that internal courtyard, is the consumption of large areas, the area of itself and the distribution of the wide spaces around it, which receive the lighting, ventilation and solarization, through that courtyard.

While contemporary architecture tends to consume less spaces, due to the increasing population.

Another disadvantage, related to the architectural solution, is that the access to some rooms, or spaces, is through the internal courtyard, or through a corridor opened to the sky, without even  a small sunshade, that protects the passer from the rain or sun.

**Figure 4.5** The courtyard of Zamira house in Aleppo [106].

*4.2.1.2.3 Social importance*

The social importance of the Alepine courtyard is highlighted by its compatibility with the Islamic customs related to the privacy mainly.

The traditional courtyard isolates the life inside the house, from the street and the outside world.

It also works as a separator between the public and the private within the house itself, as it regulates the isolation between the family’s and the guests' spaces [107].

The courtyard is also the center of the family gathering, which strengthens the intimacy bonds between them,

Where the internal courtyard, thanks to its area and its openness to the sky, is used in the Alepine houses as a venue for events, whether evenings at the family level, or celebrations at the neighborhood level, while we do not find a similar social space in modern houses.

It also plays an important spiritual, psychological, and intimate role starting with the door of the house, which works as an entrance to that paradise decorated with plants and flowers, as the green color brings comfort and tranquility to the soul, according to some Islamic concepts.

Where the idea of the Alepine House, especially the courtyard, emerged from the description of Paradise, that every Muslim aims to reach it, in the Holy Qur'an, where God Almighty said:

These it is for whom are gardens of perpetuity beneath which rivers flow, ornaments shall be given to them therein of bracelets of gold, and they shall wear green robes of fine silk and thick silk brocade interwoven with gold, reclining therein on raised couches; excellent the recompense and goodly the resting place [108] [109].

The courtyard itself, with the plants and trees inside it, is that miniature paradise,

And the fountain in the middle of the courtyard is a symbol of the flowing river,

While sitting in the iwan is like high and comfortable sofas, with attention to the smallness of that paradise, in comparison with the real paradise.

We also note the auditory comfort, provided by the courtyard, moving from the noisy outside world, towards the calm and intimacy, that the music of the fountain brings to the soul.

*4.2.1.2.4 Evaluation*

In order to evaluate the inner courtyard, which represents the openness to the inside in the traditional Alepine architecture, it will be compared with the corresponding contemporary form in Aleppo, which is the openness to the outside:

**Table 4.4** Comparing the openness inward with the openness outward, done by the author

| Criteria | Traditional courtyard house (openness inward) | Contemporary house (openness outward) |
|---|---|---|
| Adapting with the climate | Being surrounded from all its sides by walls, rooms, and plants, creates more adaptation with climate changes. | Not adapted to the climate changes |
| Exposing to pollution | Not exposed to pollution, due to its isolation from the direct contact with the street | exposed to the pollution, due to its direct contact with the street |
| Exposing to visual distortion | Not exposed to see it, as it creates its own view | Exposed to see the outside visual distortion |
| Exposing to noise | Less exposed to the outside noises | Exposed directly to the outside noises |
| Securing privacy | Preserves the residents privacy | Exposed to the outside, needs means to preserve privacy |

And given the above choices, experts opinions about the best to be used within the reconstruction phase were as the following:

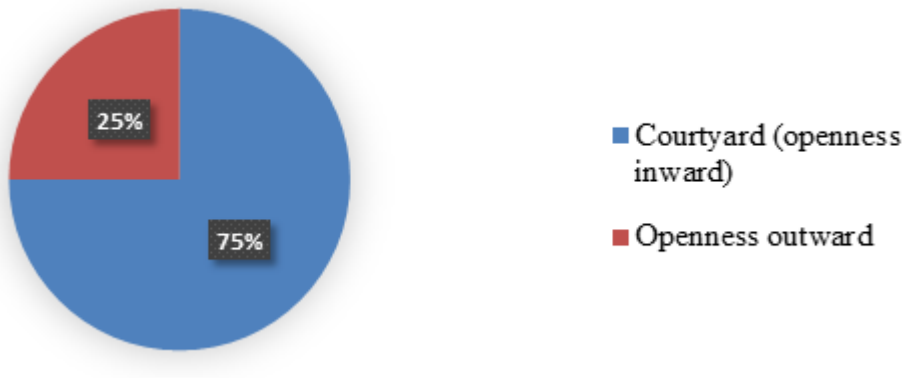


**Figure 4.6** The results of the interviews with the architectural experts about the courtyards, done by the author.

While the results of the interviews, regarding the traditional courtyard, after asking: if they support reusing the traditional courtyard, as an outlet instead of the gardens outside the house, were as following:

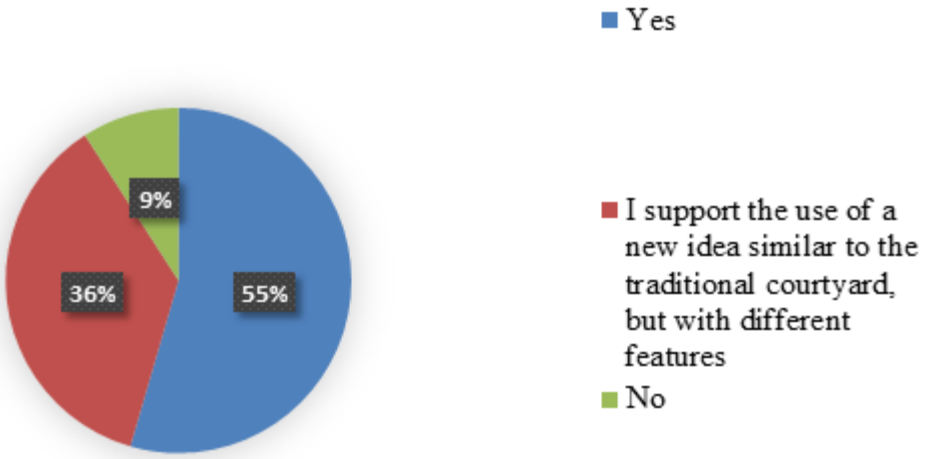


**Figure 4.7** The results of the interviews with the Alepine community about the courtyards, done by the author.

By comparing the opinions of experts, and the societal acceptance, we find that the traditional courtyard is better to be used in the reconstruction phase,

Taking into account the negative point, mentioned by some architectural experts, which was the excess spaces that the traditional courtyard requires, while the city suffer from the lack and high costs of lands.

The space issue can be solved by reducing the courtyard area as possible, without affecting its function.

*4.2.1.3 Internal spaces*

The distribution of the spaces in the traditional Alepine house into sections: a section for family living, a section for guests and another for sleeping, can be evaluated from the architectural aspect, and social aspect:

*4.2.1.3.1 Architectural aspect*

The traditional Alepine house's spaces, rooms and service spaces, are distributed according to the function, the occupants, and the time of occupancy, and this organizes the houses' spaces, and provides better architectural solutions,

Where those functions do not contradict, although they intersect in some cases.

*4.2.1.3.2 Social aspect*

As the distribution of the traditional Alepine house's spaces is compatible with the conservative Muslim society in Aleppo, whether on the family level, where family members, moving in the living section, cannot come across sleeping members, which would be immoral, especially in the summer.

As well as on the level of family relations with guests, where the presence of guest rooms and bathroom at the entrance prevents them from exposing the family members and their privacy.

*4.2.1.3.3 Evaluation*

The evaluation of the traditional way of separating the Alepine house's spaces depends, mainly, on their comparison with the contemporary random distribution of the spaces, with the following respects:

**Table 4.5** Comparing the traditional way of separating rooms with the contemporary random distribution of the rooms, done by the author

| Criteria | Traditional way of separating internal spaces | Contemporary distribution of the internal spaces |
|---|---|---|
| Functional solution | More flexible for moving within the house, requires more spaces | Movement restrictions |
| Securing privacy | Secures more privacy | Less privacy |

And given the above choices, experts opinions about the best to be used within the reconstruction phase were as the following:

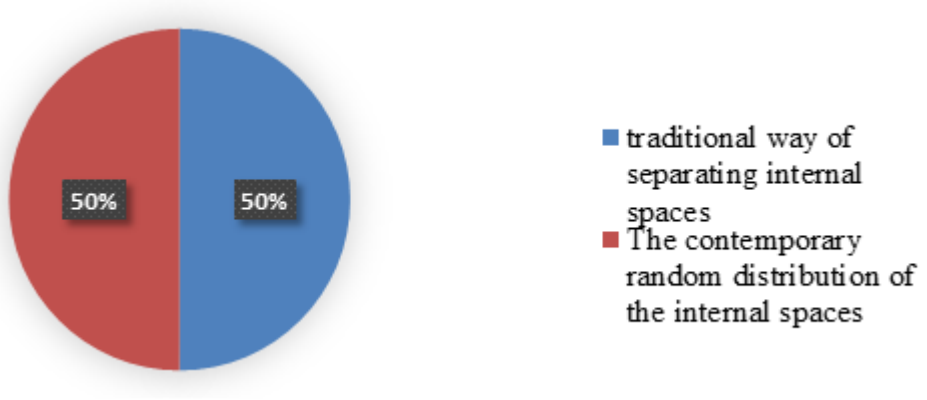


**Figure 4.8** The results of the interviews with the architectural experts about the way of separating internal spaces, done by the author.

While the results of the interviews, regarding the internal spaces distribution, after asking whether they support reusing the traditional way of separating the spaces, instead of the contemporary random distribution of the spaces, were as following:

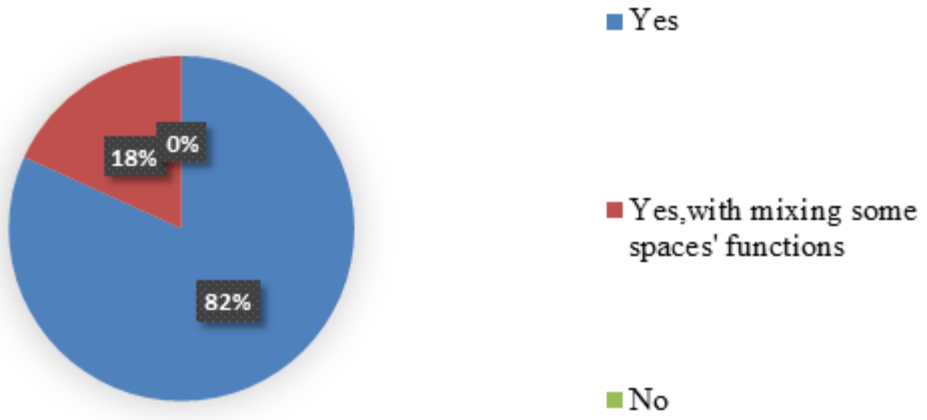


**Figure 4.9** The results of the interviews with the Alepine community about the way of separating internal spaces, done by the author.

By comparing the opinions of experts, and the societal acceptance, we find that the traditional way of separating the spaces, either the rooms or services, is better to be used in the reconstruction phase, Taking into account the spaces that may be common to more than one section.

*4.2.1.4 Iwan*

It is rare to find a traditional Syrian house, and particularly in Aleppo, without an iwan, either small or large, which refers to the importance of this element, which can be evaluated from several respects:

*4.2.1.4.1 Environmental aspect*

In addition to its being as a sitting space, that has good ventilation, because it is a semi-open space, the iwan provides lighting and ventilation for the two rooms on its either sides, due to their lack of spaces opened toward the courtyard.

*4.2.1.4.2 Social aspect*

The Iwan is considered an important center for events and family gathering.

*4.2.1.4.3 Aesthetic aspect*

The iwan is also an ornamental element in the traditional Alepine house, due to its axial location in the courtyard,

So, it is an attractive point, for those who enter the courtyard,

In addition to the large arch above the iwan entrance, and the ornaments that may be contained in the iwan, such as stone inscriptions, or the faience, such as the Jumblatt House [26].

*4.2.1.4.4 Evaluation*

The evaluation of the Alepine Ewan, depends on its comparison with the solid internal facade, and the comparison will be with the following respects:

**Table 4.6** Comparing the Iwan with the solid internal facade, done by the author

| Criteria | Iwan | Solid internal facade |
|---|---|---|
| Organizing the spaces | Well spaces organizer, but requires more areas around it | Doesn't require more areas around it |
| Aesthetic effect? | More aesthetic | Less aesthetic |

And given the above choices, experts opinions about the best to be used within the reconstruction phase were as the following:

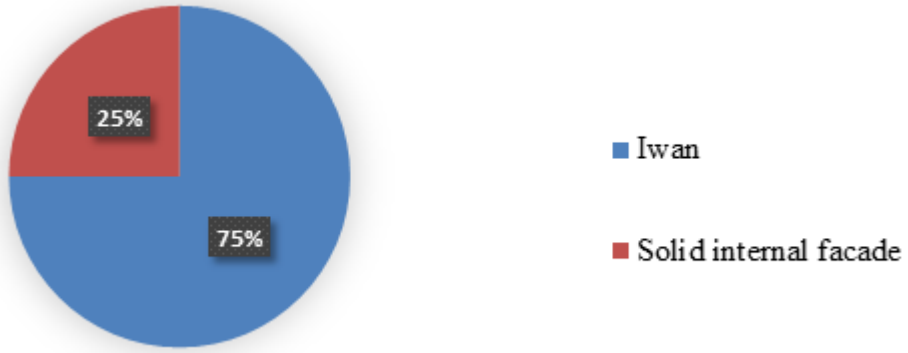


**Figure 4.10** The results of the interviews with the architectural experts about the Iwan, done by the author.

While the results of the interviews, regarding this subject, after asking: if they support reusing the Iwan, instead of the solid internal facades, were as following:


**Figure 4.11** The results of the interviews with the Alepine community about the Iwan, done by the author.

By comparing the opinions of experts, and the societal acceptance, we find that the Iwan is better to be used in the reconstruction phase, taking into account the extra areas it might require in the courtyard and the side rooms, which can be solved by reducing the iwan area as possible, which will affect in reducing the areas required.

### 4.2.2 Constructive elements

#### *4.2.2.1 The arch*

Reusing the arches, in the residential architecture in Aleppo, creates more convergence between the houses, and the authentic Islamic Alepine architectural identity.

This Islamic architecture there has always have the arch with its various forms, as a remarkable element in its different regions, and particularly as semi-circular shape in windows, Iwans, courtyards, and the corridors in Aleppo.

##### *4.2.2.1.1 Constructional importance*

The importance of arches from the structural aspect was its ability to withstand pressure stresses, thanks to its stone material.

Additionally, it has the ability to resist tensile stresses thanks to its shape, which made it an ideal shape to be used in all structures of the traditional architecture in Aleppo.

In addition to the low cost of its construction, compared to the alternative materials and forms used in the contemporary architecture to perform the same function of the stone arch, in terms of bearing pressure and tensile stresses together.

*4.2.2.1.2 Aesthetic importance*

Arches have an important aesthetic role among the architectural elements, as they break the boredom of straight lines, through their simple and streamlined curves.

Despite their simplicity, they give a sense of the grandeur of the place,

In addition to the comfort, tranquility, and spirituality that they give to the place, which made the arches widely used in religious architecture, such as mosques, and Islamic buildings in general.

Even in the architecture of traditional houses, we find that the arch is the streamlined part that occupies the place instead of the fourth rib in the window, and the element which, with its aesthetic, shows the grandeur of the sitting space in the Iwan.

So the arch became a major part of the aesthetics of traditional Alepine architecture, as Aleppo is a part of the Islamic civilization, and includes lots of its architectural elements.

*4.2.2.1.3 Evaluation*

The evaluation of the arch depends, mainly, on the comparison with its alternative in the contemporary architecture, the straight rib, and for this comparison, experts were asked for their opinions, according to these aspects:

**Table 4.7** comparing the arc with the straight rib, done by the author

| Criteria | Arch | Straight rib |
|---|---|---|
| Bearing loads | More load bearing | Less load bearing |
| Affecting the Psychological aspect | Affects better, Continuity of the sight and breaks the routine of straight lines | Sight stops at the end of the rib which repeats the same straight lines |
| Requiring experiences | Needs more experience | Simple, needs less experience |
| Requiring costs | Its execution costs more | Its execution costs less |

And given the above choices, experts opinions, about the best to be used within a residential proposal in the reconstruction phase, were as the following:

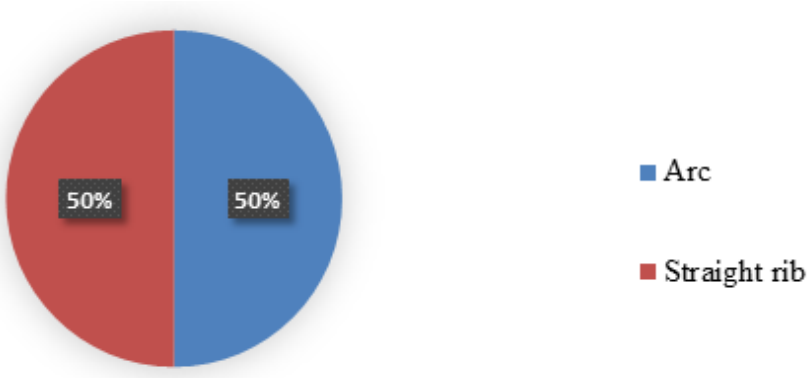


**Figure 4.12** The results of the interviews with the architectural experts about the arch, done by the author.

While the results of the interviews, regarding the traditional arches, when asking the Alepines: whether they support the idea of using the traditional arches within the reconstruction phase in Aleppo, were as following:

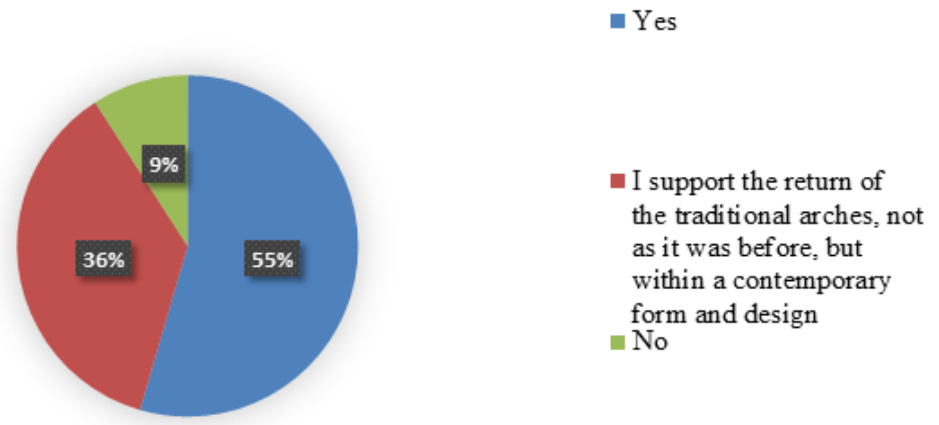


**Figure 4.13** The results of the interviews with the Alepine community about the arch, done by the author.

By comparing the opinions of experts, and the societal acceptance, we find that the traditional arch is better to be used in the reconstruction phase,

Taking into account avoiding its negative points, such as the high cost, and the additional expertise required to implement it, and this can be solved by reducing its use, and diversifying its use with the use of straight ribs.

*4.2.2.2 Walls*

The walls of the traditional houses in Aleppo are multi-function elements, as they play an environmental, social, and aesthetic roles:

*4.2.2.2.1 Environmental importance*

The walls are considered the first fort against the external weather conditions, with their good isolating feature.

*4.2.2.2.2 Social importance*

The walls social importance lies in the privacy levels that they secure, either between the house and its surrounding, or the privacy that they secure between the different parts of the house.

*4.2.2.2.3 Aesthetic importance*

The walls play a role in giving an aesthetic touch, either with the Ablaq stones, or the external stones order.

*4.2.2.2.4 Evaluation*

The evaluation of traditional walls in Aleppo depends on the material from which it is built, and mainly, on the comparison between the limestone wall with the contemporary concrete and brick walls, with the following respects:

**Table 4.8** Comparing building using the limestone walls with building using the concrete and brick walls, done by the author

| Criteria | Limestone walls | Concrete and brick walls |
|---|---|---|
| Withstanding the conditions | Withstands the conditions well | Withstands the conditions well |
| Insulating the heat | Good insulator | Need additions for thermal insulating |
| Insulating the moisture | Good insulator | Good insulator |
| Requiring experiences | More experience, less equipment | Less experience, more equipment |

| | | |
|---|---|---|
| Requiring costs | Local and simple material, with less costs | Requires more costs |

And given the above choices, experts opinions about the best wall to be used within the reconstruction phase were as the following:


**Figure 4.14** The results of the interviews with the architectural experts about the walls, done by the author.

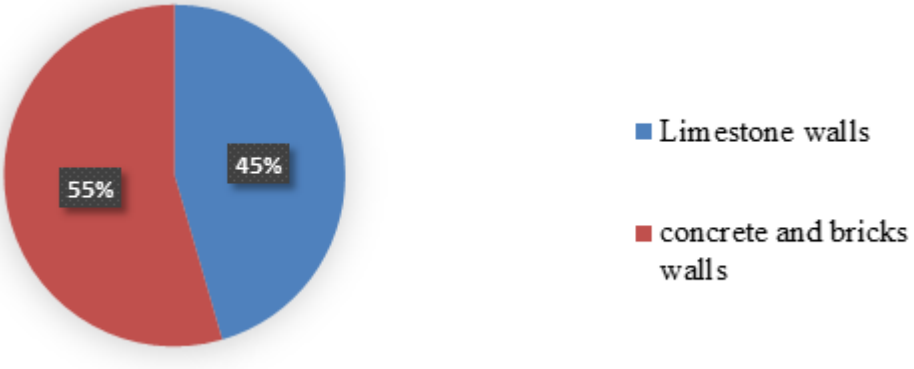


**Figure 4.15** The results of the interviews with the Alepine community about the walls, done by the author.

#### *4.2.2.3 Wind catchers (Bahthenj)*

The wind catcher, as a natural conditioning system, and simple one at the same time, has many aspects that makes it an important element to be discussed within the reconstruction phase:

##### *4.2.2.3.1 Environmental aspects*

Due to the dry climate of Aleppo, and the high temperatures in the summer, the wind catcher (Bahthenj) plays an additional role, besides the openness to the inner courtyard, in adjusting the temperature inside the spaces of the traditional house.

It pulls the fresh air from the direction of the desired wind in summer, which is the western wind, from a high point, above the roof of traditional house, where the air is not mixed with lots of dust and pollution from the street.

##### *4.2.2.3.2 Economical aspects*

Despite the high initial cost needed to build the Bahthenj, compared to the small initial cost of industrial ventilation, it saves costs throughout the entire building life, where the Bahthenj provides free ventilation, without relying on additional energy sources, such as electrical energy.

So, by orienting it towards the west, the air current is permanently provided, as long as air current is available outside.

##### *4.2.2.3.3 Evaluation*

The evaluation of traditional wind catchers (Bahthenj) in Aleppo depends, mainly, on their comparison with the contemporary artificial ventilation, with the following respects:

**Table 4.9** Comparing the wind catchers (Bahthenj) with the artificial ventilation, done by the author

| The factor | Wind catchers (Bahthenj) | Artificial ventilation |
|---|---|---|
| ventilation | Provide better natural ventilation as it is directed to the best wind direction | Provide artificial ventilation |
| Environment | Provide ventilation clear of dust | Provide ventilation without cleaning it |
| Cost | Cheaper during the building's whole life | More costs during the building's whole life |

And given the above choices, experts opinions about the best ventilation method to be used within the reconstruction phase were as the following:


**Figure 4.16** The results of the interviews with the architectural experts about the wind catchers, done by the author.

While the results of the interviews regarding the ventilation method, after asking: which ventilation method the Alepine people prefer to be used in the reconstruction phase in Aleppo, were as following:


**Figure 4.17** The results of the interviews with the Alepine community about wind catchers, done by the author.

By comparing the opinions of experts and the societal acceptance, we find that the wind catcher (Bahthenj) is better to be used in the reconstruction phase,

Taking into account the general pollution in the city, that can affect the air, that enters through the wind catcher, and this can be solved by increasing the air purifying techniques on the wind catcher's entrance, such as the simple net.

*4.2.2.4 Materials*

According to [110], the building sector is the sector that is the most consuming energy, especially in the residential sector, and societies vary in this, according to the surrounding environmental, social, and economic conditions.

Given the great importance of reducing energy use, and the calls for reliance on renewable natural energies, it was necessary to re-think about the feasibility of reusing building materials and techniques, that were used in traditional architecture.

Some of those materials have proven their efficiency in reducing reliance on the non-renewable energies, to meet climatic conditions naturally.

Some physical properties, found in the Alepine local materials, related to environment, such as conduction, resistance, permeability, and the heat transmission duration to and from the building, and those related to light, such as permeability, could be appropriate to the local conditions, through the following aspects:

*4.2.2.4.1 Architectural aspect*

Using thick walls of limestone as main load-bearing structure in the walls, leads to a significant increase in the structure weight,

Additionally, the usage of stone walls reduces the flexibility of adjusting or openings in the wall later.

As for selecting the bonding mortar depends on the type of the wall material used;

In the case of using bricks as main wall building material, the recently used cement mortar is more compatible, and more coherent with it than the Alepine soil mortar (Qasarmel),

While in the case of using limestone, the Qasarmel would more compatible.

As for the wood, it has good toughness in order to be used as windows' framework material, beside the glass,

While using the wood in ceiling reinforcement, as it was used before, is not efficient, due to the weakness of wood to withstand pressure loads above it.

And from the architectural aesthetic aspect, wood is compatible with the intimacy of traditional architecture, and in harmony with its antique materials.

Also, the use of iron, for making the cage shape on windows, has an architectural decorative aesthetic aspect,

In addition to the safety aspect, in order to protect from theft of rooms opened to the courtyard.

As for the use of iron in the railings, it has more durability than the wood or the recently used hollow painted thin metals.

While the stone railings are more durable then the iron.

*4.2.2.4.2 Environmental aspects*

The Syrian limestone: plays an important role in thermal insulation, so it is still used in Aleppo city until now, thanks to its physical properties,

Such as absorbing and storing the heat to which it is exposed during the day, and then passing it into the house at night, which reduces the exposing outer temperature to enter the house in the summer,

It also reduces the coldness of the night in the winter, thanks to the heat gained during the day.

As for the Alepine mortar (Qasarmel), it is made of natural materials, from the surrounding environment, such as lime, ash and Alepine soil, so it can be considered as a good eco-friendly material.

From the environmental aspect, wood, despite its good thermal insulation, when used in windows, is considered unhealthy if used without insulating additives, as it is affected by humidity and decays.

While in terms of fire dangers, it is safe to be used in Aleppo due to the scarcity of natural fires.

*4.2.2.4.3 Economic aspects*

The limestone is an economic material to be used in the reconstruction phase, due to its availability, with cheap prices, and the low costs of shaping it.

It also reduces energy costs, during the usage of the building, due to the thermal insulation provided by it,.

As for the Alepine mortar (Qasarmel), it is also economic, due to the availability of its raw materials, with low prices.

As for wood: the wood can be considered an economic material when used as windows' frameworks and doors.

While its use in ceilings, as it was used in the past, is expensive, because wood is not available in Aleppo with large quantities for that purpose.

As for using the iron in the railings, or window cages is not very expensive due to the wide availability of cheap iron, and welding works in Aleppo city.

*4.2.2.4.4 Evaluation*

The evaluation of traditional building materials in Aleppo city depends, mainly, on their comparison with the contemporary building materials, by the following respects:

As for the limestone evaluating, it was evaluated in the walls evaluation part.

**Table 4.10** Comparing the Alepine local mortar (Qasarmel) with the cement mortar, done by the author

| Criteria | Alepine mortar (Qasarmel) | Cement mortar |
|---|---|---|
| Withstanding the conditions | Withstands the conditions well | Withstands the conditions well |
| Insulating the heat | Less heat insulation | Good insulator |
| Insulating the moisture | Less moisture insulation | Good insulator |
| Requiring experiences | Less experience required | More experience required |

| | | |
|---|---|---|
| Requiring costs | Local raw materials, low costs | More cost required |

**Table 4.11** Comparing the wood with aluminum as windows material, done by the author

| Criteria | Wood | Aluminum |
|---|---|---|
| Withstanding the conditions | Withstands the conditions well | Withstands the conditions well |
| Insulating the heat | Good thermal insulation | Less thermal insulation |
| Insulating the moisture | Less moisture insulation | More moisture insulation |
| Requiring experiences | Simple | Simple |
| Requiring costs | Expensive material due to its low availability | Expensive material due to its low availability |

And given the above choices, experts opinions about the best to be used within the reconstruction phase were as the following:

The material that would be the best, as bonding mortar in the reconstruction phase in Aleppo:


**Figure 4.18** The results of the interviews with the architectural experts about the bonding mortar, done by the author.

The material that would be the best windows' frame material in the reconstruction phase in Aleppo:

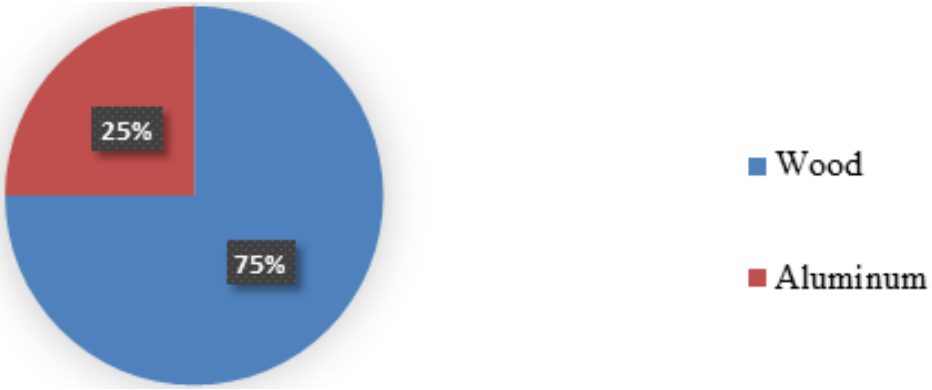


**Figure 4.19** The results of the interviews with the architectural experts about the windows' frame material, done by the author.

While the results of the interviews after asking: which material would people prefer to be used in the reconstruction phase in Aleppo, were as following:

Regarding the windows' frame material, after asking: which material they prefer to be used in the reconstruction phase in Aleppo, were as following:

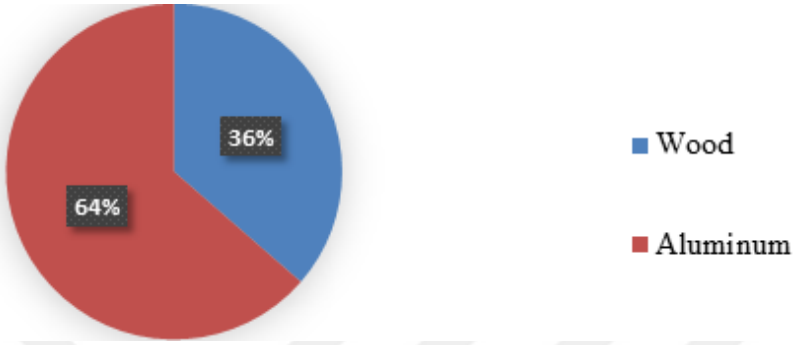


**Figure 4.20** The results of the interviews with the Alepine community about the windows' frame material, done by the author.

By comparing the opinions of experts and the societal acceptance, we find that the limestone is better to be used as wall covering material in the reconstruction phase,

While the main structure that will be bearing loads will be concrete.

And as for the mortar, the cement mortar will be better, for its durability, and good insulation.

While as for the windows frame, the Aluminum will be better than wood to be used.

### 4.2.3 Aesthetical elements

*4.2.3.1 Ornamentations*

[59] considers that the acceptable ornamentation is the ornamentation corresponding to the function, performed by the ornamented element, the location in which the element is located, the building materials of the element itself, as well as the materials from which the ornamentation was made.

While [58] defines general functions of ornamentation that together achieve the wanted purpose of the ornamentation:

1- Expressive function: as the ornamenting details give a meaning to the element they adorn, and these meaning stems emerge from the ornamentor's soul,

As he gives it a part of his identity, and the connotations that he aspires to clarify.

The symbolism of the ornamenting element should be appropriate to the purpose that it will express,

So that, it should not be just a simple aesthetic element, devoid of any significance, as well as not to be excessive in expressive rigidity.

2-Adjectival function: Each type of the ornamentations, within any element, gives it an adjective, and sometimes an identity, that would not have existed without this ornamenting addition;

Where the element, or the building as a whole, may be characterized by beauty, enormity, smoothness, or complexity, thanks to the ornamentation it carries, and gives it that characteristic.

3-Ordering function: where the ornamentation plays a role in clarifying the functional, and even social, hierarchical arrangement,

Where we distinguish through the ornamentation style between the public building, and the administrative building, and between the housing of the well-off, and the housing of those with limited incomes, through the type of ornamentations, their density, distribution and method of implementation.

4-The decorative aesthetic function: which is represented in the aesthetic aspect, that expresses the need in the human soul for pleasure.

This is a function of the aesthetic extra accessories, such as the additions and inscriptions that adorn the architectural arch, for example, where the arch itself can be considered as a kind of ornamentation.

While as for the Aleppo in particular, the importance of the ornamentation is shown in the following:

*4.2.3.1.1 Aesthetic importance*

As mentioned above, the decorative function of the ornamentations fulfils the aesthetical aspect of the human needs.

As an example in the traditional Alepine architecture: even the mashrabiyah itself is considered one of the wonderful forms of the facade decoration,

As well as its other decorative aspect, by highlighting the beautification of the shape of the sun ray entering the space behind it, giving the tranquility to the soul.

*4.2.3.1.2 Intellectual importance*

In addition to the cosmetic purpose of the ornaments, it may be a symbolic expression of belonging to a geography, religion, nation, race, or a particular idea,

For example: the crescent has always been a national symbol of the Turkish nation, the cross is a religious symbol of Christianity, and so on...

Also, decorative symbols in the traditional Alepine houses architecture, were often indicating to the intellectual and cultural level of their owners,

In addition to the religious significance of some Islamic decorations.

*4.2.3.1.3 Evaluation*

The evaluation of traditional ornamentations in Aleppo depends, mainly, on their comparison with the contemporary decoration methods, with the following respects:

**Table 4.12** Comparing the traditional ornamentation with the contemporary decorations, done by the author

| The factor | Traditional ornamentation | Contemporary decorations |
|---|---|---|
| Aesthetic | More expressive and more detailed | Less expressive and less detailed due to the loss of identity |
| Strength | More resistance to conditions | Less resistance to conditions |
| Cost | High cost | Normal cost |

And given the above choices, experts opinions about the best decorating way to be used within the reconstruction phase, were as the following:


**Figure 4.21** The results of the interviews with the architectural experts about the ornamentations, done by the author.

While the results of the interviews, regarding the decorating method, after asking: if they support the reuse of the traditional ornamentations in the reconstruction phase in Aleppo, were as following:

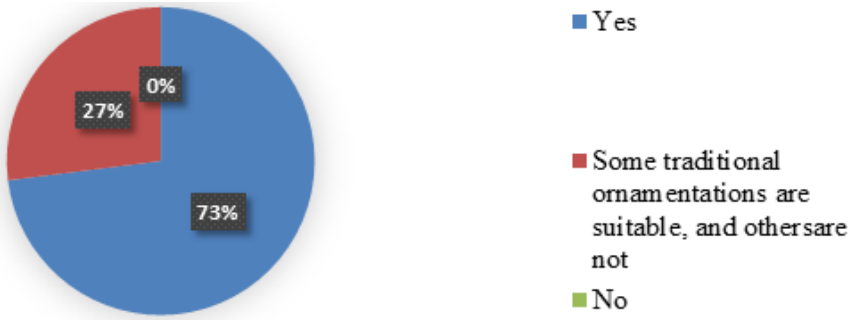


**Figure 4.22** The results of the interviews with the Alepine community about the ornamentations, done by the author.

By comparing the opinions of experts and the societal acceptance, we find that the traditional ornamentations have more beauty aspects that make them better to be used in the reconstruction phase, taking into account the high costs of implementing them, which can be solved by reducing the use of ornamentation, using the architectural elements that play an ornamenting role, in addition to their main function, simplifying the decorative side, and preserving their basic symbolism.

*4.2.3.2 Mashrabiyah*

Mashrabiyah is a multi-roles element, as it plays an environmental, social, and aesthetic role, related to the authentic identity of the city:

*4.2.3.2.1 Aesthetic importance*

The mashrabiyah adds an important aesthetic aspect, whether on the solid outer wall, or on the inner wall,

As for the outside, the mashrabiyah breaks the monotony in the external interface, whether by its prominence from the solid wall, or by its wooden material, away from the stones,

For the inner space, the fine details of the mashrabiyah add an additional internal decor to the room, gives the interior wall more beauty than a normal window covering it,

Also, the lighting emitted from the Mashrabiyah openings is filaments of solar rays, that imprint the shape of the Mashrabiyah on the interior space, in a way that gives a pleasant feeling, and comfort sight, thanks to the simple amount of light it passes.

*4.2.3.2.2 Environmental importance*

Aleppo city has a moderate, dry climate in summer, so the mashrabiyah reflects the acclimatization with climatic conditions in the city.

The wooden pieces of the Mashrabiyah, with their interlocking structure, provide shading from the hot sun ray during the day, and instead, allow the cool air to enter, through the small empty spaces between them, preventing strong air currents from entering.

The wooden fibers of the Mashrabiyah also have the ability to store and release humidity, so it stores humidity to humidify and cool the dry air entering through it, when the mashrabiyah is not painted with materials that prevent water permeability [111], in addition to the traditional method that helps increasing humidification, which is by placing pottery jars to increase the humidification of the entering air,

The mashrabiyah also works, by its prominence, on shading the openings (window or door) that are located below it.

*4.2.3.2.3 Social importance*

The mashrabiyah has affective social and psychological benefits, compatible with the customs of the Alepine community, as the Alepine society is a Muslim society, and it preserves its customs and traditions, regarding to the privacy, and keeping the family females hidden away from strangers' sight.

The Mashrabiyah was the perfect solution, to prevent those standing outside the house from seeing the privacy of what is inside the house, while not preventing those who are inside from seeing the surrounding outside the house, represented by the familiar alley, which is exposed by the Mashrabiyah.

*4.2.3.2.4 Evaluation*

The evaluation of the Mashrabiyah depends mainly on its comparison with the prevailing windows in contemporary Aleppo architecture, which are with a wooden frame, or with an aluminum frame, and the comparison is with the following respects:

**Table 4.13** Comparing the mashrabiyah with the normal windows, done by the author

| Criteria | Mashrabiyah | Normal windows |
|---|---|---|
| Insulating the heat | Insulating the heat more | Less heat insulating |
| Insulating the moisture | Less moisture insulating | Insulating the moisture more |
| Controlling the light | Flexibility in entering and blocking the light ray | No flexibility due to constant exposure to light through the glass |
| Withstanding the conditions | Strong enough to withstand conditions | Strong enough to withstand conditions |
| Appearing aesthetically | Ornately and beautifully crafted | Mostly solid aesthetic parts |
| Requiring costs | High cost | Less cost |

And given the above choices, experts opinions about the best to be used within the reconstruction phase were as the following:


**Figure 4.23** The results of the interviews with the architectural experts about the Mashrabiya, done by the author.

While the results of the interviews regarding the Mashrabiyah, after asking: if they support the presence of Mashrabiyah in the reconstruction phase in Aleppo, were as following:

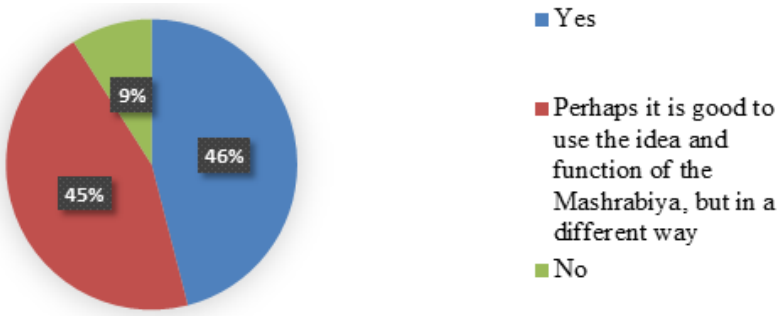


**Figure 4.24** The results of the interviews with the Alepine community about the Mashrabiya, done by the author.

By comparing the opinions of experts and the societal acceptance, we find that the Mashrabiyah is preferred to be used in the reconstruction phase, taking into account the high cost that Mashrabiyah requires, and this can be solved by implementing less Mashrabiyah, and avoid using, and implementing the with the simplest shape.

# CHAPTER 5

# THE RESULTS

After reviewing the case studies, and the traditional architecture in Aleppo, its importance, elements, compatibility with the principles of sustainability, and comparing it with its counterparts in contemporary architecture, the hypothesis of the study can be proved, and the thesis conclusions, can be divided into two levels:

## 5.1 At the general level

- Adapting with the environmental, social, cultural, and the economic principles leads to more sustainable architecture
- Achieving the compatibility with the architecture, in a regional context, according to the local identity, leads to the surrounding acceptance.
- It is not possible to revive an architectural style successfully unless the attempt is compatible with the surrounding environment, its nature and its climate, and the function that the building will occupy, the human, and society as a whole, who will interact with that building.
- The importance of creating a balance between the architectural ideologies, without extremism in the contemporary globalized ideologies,
  Neither extremism in returning to the past within its circumstances, ignoring the contemporary conditions.

## 5.2 As for the level of Aleppo city

- The great impact of the armed conflict in Syria on residential architecture in Aleppo in general, and on the heritage architecture,
  Especially the traditional residential houses, whether through damage, or total or partial destruction.
- The Alepine society is the most related stakeholders of the traditional residential architecture in Aleppo.

- Most of the elements of traditional Alepine architecture, such as the arch, courtyard, Iwan, mashrabiyah, limestone, narrow alleys, ornamentations, and Bahthenj, proved their efficiency to be an important part of the reconstruction phase in Syria,

  As this phase seeks to provide the best possible conditions, in the simplest available means, which is what this traditional architecture provides.
- As the traditional Alepine building materials and techniques were from the local surrounding, so traditional Alepine architecture is more adaptable to the climatic conditions,

  It is also more compatible with environmental sustainability, than the contemporary architecture there.
- The same reason was a proof to consider the traditional Alepine architecture more economical than the contemporary one.
- Given that the architectural identity of the traditional Alepine architectural elements was Islamic through more than a millennium,

  And given that the majority of the Alepine society is a Muslim society,

  Then the traditional Alepine architectural elements will revive the authentic Alepine identity, when reusing it in the reconstruction phase,

  This will also show its aesthetic superiority over the elements of contemporary architecture, without distorting the contemporary context.

# CHAPTER 6

# RECOMMENDATIONS

## 6.1 General recommendations

- Choosing simple traditional solutions for the post-disaster residential reconstruction phase, as they achieve the largest amount of possible goals within short time.
- Choosing low-cost solutions for the post-disaster residential reconstruction phase, to deal with the bad economic situation after the disaster, with the need for urgent sheltering project.

One example of these solutions is reducing the ornamentations as possible, to avoid their high costs.

-Building in accordance with the surrounding environment, and the prevailing climate, whether with building materials and techniques, or the distribution of spaces.
-Building according to the local identity, that reflects the traditional architectural value, the cultural and social structure, and the prevailing traditions in the region.

## 6.2 Recommendations related to the case study in Aleppo

-Integrating the Alepine community with the reconstruction phase.

-Making proposals for the residential reconstruction phase in Aleppo, which combine the advantages of the traditional architectural elements, and the solutions of their negative points.

Most notably is solving the traditional courtyard importance on the environmental and social level, with the necessity of reducing the spaces used.

Such a solution will be more economic for a post-war reconstruction phase.

- Avoiding trespassing by damaging or demolishing the traditional heritage fabric of the old city, even if the project is for reviving that fabric.

-Taking into account the traditions prevailing in the Alepine society related to privacy, during the reconstruction phase, in order to avoid subsequent individual modifications, which may distort the general view.

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# CHAPTER 7

## APPENDICES

### APPENDIX A - Revival attempts

Revivalism was not just a temporary architectural movement that finished with the appearance of next movements, it still used even randomly, without being under the name or the period of revivalism.

Because this study takes a revival approach, but in proportion to the contemporary environment, there will be a focus on the revival concept, to benefit of its positives as well as its negatives,

And because some of the revival examples were a successful architectural benefitting, appropriate to the surrounding and its conditions, and some of them were a clear distortion, and a mutation inappropriate to the body in which they were found.

It is important to analyze the previous global attempts of benefitting from traditional architectural styles, to distinguish the successful and failure attempts,

According to the temporal and spatial context where these traditional styles and elements were used,

While reviewing them, we can divide the attempts to revive architectural styles according to some aspects:

**Appendix A1 Reason of revival**

*Appendix A1.1 To face the global architectural styles*

One reason of the revival style was to face the global architectural styles, that were created by the trends of the industrial revolution, and to return to the aesthetics found in ancient architectural styles.

As an example, we can take one of the first attempts to revive the Greek style, which appeared widely in the 19th century in the USA.

The Old Capitol Building in Springfield (Illinois State House): it was designed by John F. Rague w in 1837 as a Greek revival building, and became operational in 1840 [112].

Greek style was clear in the columns, similar to the Doric columns in the entrance of the front facade, as well as the triangular front derived from Greek temples, which gives the entrance more clarity and focus,

cAlso benefitting from the principle of symmetry from Greek architecture, which gave the building a more formal character.

**Figure A.1** Illinois state house front facade [113], US, Hera temple, Italy [114].

The building looked formal which makes it suitable to its function as state building, but the design was a new revolution itself, in that era, as it was, not inspired from the traditional architecture of the local civilizations there, either the native Americans, or the mixture of European people and elites, such as the Spaniards, the first to settle that land, and the new English settlers.

Perhaps it would be more related to the local identity, if the New England style was used, instead of copying the foreign Greek style, where the New England style relied more on wooden structures, as the 17th century architecture there, it would have been more related to the regional identity, more suitable to that era's American society, and more suitable to the environment, and surrounding climate.


**Figure A.2** The witch house [115].

*Appendix A1.2 To reject colonial domination, and focus on the national identity*

The examples of that can be found in the Egyptian architecture, in the period of independence from the British occupation, in the middle of the twentieth century,

Where Pharaonic styles, as well as Islamic styles, began to appear again in the buildings, to confront the Western style by these authentic Egyptian styles. [116].

As an example of this revival, there was the mausoleum of the Egyptian national leader Saad Zaghloul, whose construction began in 1927 in Cairo.

**Figure A.3** Hathor temple [117], Saad Zagloul mausoleum [118].

It was designed and supervised by the engineer Fahmy Moamen, with the authentic local pharaonic style [119], as an affirmation of the identity of national architecture, and to stoke patriotic feelings in the face of the English occupation.

The benefitting from the pharaonic style is clear through the use of huge columns at the entrance, and the use of the forms of pharaonic obelisks at the entrance to the shrine precincts, as well as clearly showing the use of pharaonic inscriptions above the door, that Emphasizes the local identity of the pharaonic architecture.

Although the idea that the mausoleum of a Muslim leader was inspired by pharaonic tombs, is an idea that might be reprehensible by a Muslim community such as the Egyptian society,

We note that it was locally accepted, because the Egyptian national identity through the ages was closely linked to the pharaonic symbols,

Also, the building of the mausoleum of the leader Saad Zagloul was not strange within Its architectural surroundings, with these stones and elements found in many public buildings there, but also, as an individual mausoleum, was huge for the human scale.

**Figure A.4** Pharaonic inscription [120], Pharaonic inscriptions above Saad Zagloul mausoleum door [118].

*Appendix A1.3 Admiration for the other civilizations, and the tendency to transfer their achievements*

In addition to the possibility of including the revival of the Greek style in America within this title as well, we will take another example, which is the palace of the Oswaldo Cruz Foundation in Rio de Janeiro in Brazil, was designed by the Portuguese architect Luis de Moraes Junior, with an Andalusian style [121].

The Andalusian style of the palace was chosen, because Louise was influenced by the new Moroccan style and admired it during his time in Europe.

The shape of the palace was inspired by a sketch that the owner, Oswaldo, had imagined, inspired by medieval castles [122].

The designer succeeded while benefitting from the aesthetics of the Moroccan Andalusian style.

We notice a great similarity between the two protruding sections of Oswaldo Palace, and the Andalusian towers and minarets, such as the Giralda minaret, as an example.

We notice that designer benefitted the shape of the Andalusian window, which was distinguished by its arc, that is a little more from the semicircle.

He also benefitted from the decorative cornice separating between the end of the repeated section and the top of the tower.

We also notice the designer’s success while taking the advantage of the diversification in the material’s shapes and colors, between stone and red brick.

But for the surrounding texture, the building still as an alien block within the contemporary Brazilian architecture, although its suitability to the Brazilian climate conditions, and the suitable scale as a palace.


**Figure A.5** Palace of Oswaldo Cruz Foundation [123], Giralda minaret, Seville, Spain [124].

## Appendix A2 The revival source

*Appendix A2.1 Local source*

Where the revival architecture relied on local styles, thus focusing on the local national identity, and reviving of national history.

As an example, the Syrian parliament building in Damascous, it was built from 1928 until 1932, on the ruins of  the Ottoman building (Çanakkale cinema and theater), and its facade was designed with an Arabic style [125].

Benefitting from Arab Islamic architecture is most evident through the ablaq pattern, where alternation was used in some parts of the façade, between the soft white stone, and the dark yellow stone.

It is also noticed through the symmetry in the building, and the prominent entrance block, sealed with an Islamic arch.

We notice that the attempt in the Syrian parliament to benefit from the Memlukid Ablaq pattern, and the emphasis on Islamic arched entrance, was suitable to the Muslim society, that aimed to revive the Islamic values after the French occupation.

Also, the materials used were familiar to building's surrounding texture, and suitable to face the local climate conditions.

**Figure A.6** Syrian parliament, Damascous [126], Hammam Yalbugha, public bath in Aleppo [127].

*Appendix A2.2 External sources*

Where the revival architecture is imported from another civilization or country abroad, it does not seek to revive national architecture, and does not focus on national identity.

The reasons for importing may be admiration for that civilization, or religious reasons, related to certain symbols, or other reasons related to the building itself or its owner, such as if he had foreign origins from that civilization, from which he imported.

As an example, the Egyptian building (a part of Virginia Commonwealth University, the medical college of Virginia), which was built in 1845 by the Philadelphian architect Thomas S. Stewart [128].

The ancient Egyptian style appears clearly in the entire facades of the building;

The designer used the columns whose crowns with the form of the papyrus paper, that characterized ancient Egypt.

In addition to focusing on the enormity of the entrance mass, compared to the small size of the functional entrance opening, to look as an Egyptian temple entrance,

As well as the decorations used in the facades are purely ancient Egyptian motifs.

Despite the symbolism of the idea, where the ancient Egyptians were pioneers in the fields of medicine, including the first doctor, and the first engineer according to the Western history, Imhotep, the building shape never referred to its function as a medicine college,

In addition to the criticize that an Egyptian building, with the whole pharaonic characteristics and decorations in an American state, would seem a strange block;

Whether about its architectural surroundings, American identity, or even About the European civilizations that affected the American civilization,

We notice, also, that the huge scale of the building has never referred to the human scale of a college.


**Figure A.7** The columns of the Temple of Hibis in Egypt [129], Egyptian building in Virginia [128].

## Appendix A2 Evaluation

As mentioned before, the revival attempts' results are varied between success and failure,

So, the previous attempts will be compared and evaluated according to the following criteria:

*Appendix A2.1 a. Compatibility with the local society*

The local community are the people who deals with the built block, and they are the ones who inherited the local identity,

So, they can decide whether this design is compatible with its identity or not, and the incompatibility of the design with the desires of the local people, even if it is suitable for the required function, may create a state of social neglect, or rejection towards that mass!

It would not be accepted to build a pagan temple in the holy city of Makkah, which is inhabited and visited by Muslims, even at the level of a small community, represented in a neighborhood, or a group of buildings, because the strange building within a community whose specific traditions, habits, and identity, might be a social gap, or neglected mass in the place.

*Appendix A2.2 b. Compatibility with the surrounding texture*

It is necessary that the design is integrated with its surrounding fabric, whether the surrounding is natural or architectural, for a wooden hut, or New England style designs, for example, is the most appropriate design within a forest or an area surrounded by trees.

While we find a mud or stone house, for example, is more suitable for the desert, for considerations of the adaptation with the surrounding environment, as well as compatibility with the local climate.

As for architecturally, planting a building of the Egyptian Mamluk style in the middle of medieval and Baroque buildings in Warsaw, would be a strange mass in its surroundings.

While we find that it may be acceptable to build buildings with Pharaonic style in the Acropolis of Athens, thanks to some similarities between the two styles.

A design that appears foreign amid a particular style, may distort the general view.

*Appendix A2.3 c. Compatibility with the function related*

The shape of the building must be compatible, in one way or another, with the function it contains, we find, for example, that the monotonous repetition of similar openings in the facades of administrative buildings,

Such as the Neo-Renaissance style buildings, may be acceptable, and is justified by the repetition and similarity of the offices, while this repetition is unacceptable in the facade of an opera.

*Appendix A2.4 d. Compatibility with to human scale*

It is considered, for example, when designing a mosque, the large scale of the mass,

As well as the huge space designated for the main prayer hall, gives a sense of the greatness of Allah, while it is different in the house, where the smaller dimensions are preferred, to give a sense of intimacy.

And with all these considerations, the main consideration in the scales should be the suitability to the human scale, and his interactions with the space.

*Appendix A2.5 e. Compatibility with the local environment and climate*

The design elements, which will be selected, must suit the local climate of the environment in which they will be placed, in order to provide climatic comfort for the users of the building and its contents, such as temperatures, and various weather factors.

The traditional architecture that is opened and directed inward, such as the traditional residential architecture in the Middle East, for example, cannot be used in northern European countries, even in neighboring regions, such as northern Turkey, it may be useless to use this style, because of the cold weather, that is not suited by the openness to the inside,

While in those regions, we find that the traditional buildings depend on the gabled roof, because of the snowy climate of those countries,

The buildings are also directed outward, while keeping the interior space closed, like the residential buildings in old Warsaw.

The xperts from the architectural and engineering fields were asked to give these criteria from one to five points, to evaluate and compare them, in order to evaluate the previous attempts according to these criteria.

Then, the revival attempts were evaluated by the author, depending on their compatibility with each criteria.

**Table A.1** Evaluating and comparing the criteria of the revival attempts, done by the author depending on experts' evaluation

| | | a | b | c | d | e |
|---|---|---|---|---|---|---|
| a | Compatibility with the local society | | b | a | a | 2a |
| b | Compatibility with the surrounding texture | | | b | 2b | 2b |
| c | Compatibility with the function related | | | | c=d | c |

| | | | | | | |
|---|---|---|---|---|---|---|
| d | Compatibility with to human scale | | | | | 2d |
| e | Compatibility with the local environment and climate | | | | | |
| | Total | 4a | 6b | 2c | 3d | 0e |
| | | 7a | 10b | 4c | 5d | 0e |

**Table A.2** Evaluating the revival attempts depending on their compatibility with the their criteria, done by the author

| | | a | b | c | d | Total |
|---|---|---|---|---|---|---|
| 1 | Illinois State House | 1 | 1 | 5 | 4 | |
| | | 7 | 10 | 20 | 20 | 57 |
| 2 | Saad Zaghloul mausoleum | 3 | 4 | 4 | 2 | |
| | | 21 | 40 | 16 | 10 | 87 |
| 3 | Oswaldo Cruz Foundation | 2 | 1 | 5 | 4 | |
| | | 14 | 10 | 20 | 20 | 64 |
| 4 | Syrian parliament | 5 | 4 | 4 | 3 | |
| | | 35 | 40 | 16 | 15 | 106 |
| 5 | Egyptian building | 1 | 0 | 1 | 0 | |
| | | 7 | 0 | 4 | 0 | 11 |

We conclude from the analysis of the previous examples, that the attempt to benefit from any previous architectural style will fail if it is not in accordance with the local environment, local architecture, and the acceptance of the local society that will deal with this resulted building,

Because the elements alien to the local identity make the building reprehensible by the surrounding texture and people,

In addition to the importance of its suitability to the function, that will be used in it, and the human scale that suites its settlers and visitors.

We can also notice from the comparison that the successful Syrian architecture's attempt to revive the local traditional Islamic elements, refers to the applicability of a similar Islamic elements' revival approach, in such society and circumstances.

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# APPENDIX B - Proposal for the Alepine reconstruction phase

After the theoretical reviews, and evaluating the Alepine traditional elements, there still an important question in this regard:

How can we develop this using from the Alepine traditional architecture, and benefit from its suitable aspects, without copying it to conditions differs from those in which it arose?

So we will come up with a proposal, includes elements from the Alepine traditional architecture, that are appropriate for the contemporary context at the same time,

Also combining the authentic Alepine architectural identity with the contemporary needs of the population, which will be concluded from the results of the interviews with the Alepine community samples and the experts.

## Appendix B1 The proposal site

Specific aspects were followed to select the most appropriate area for the proposal, and these aspects include:

### *Appendix B1-1 Contextual aspect*

Locating the proposal within an appropriate environment, where it ensures not to distort the environmental surrounding, or appear as a strange element within the site.

So we cannot plant this traditional proposal within a modern housing area, whose buildings have a contemporary architectural style, which is opened to the outside, and in which contemporary building materials and decoration styles are used, while it can be acceptable to establish such a housing proposal within one of the vernacular residential areas, even if it is not within the historical fabric.

So, the new proposal will continue the characteristics of the ancient style, without affecting the existing ancient fabric.

*Appendix B1-2 Historical Architectural aspect*

Given the historical and architectural importance of the historical center in Aleppo city, and the presence of  building laws of the places within which construction is allowed inside the heritage fabric,

It is taken into account to choose the land for the proposal outside the historical center of Aleppo city, because the empty spaces within the fabric there are small areas, therefore , the implementation of a proposal within it will require the infringement of the historical fabric, and demolishing some of that architectural heritage.

On the other hand, it is better not to move away from the historical area, to create some connection between the proposed fabric and the close historical fabric.

Taking into account the first two aspects, the research can be limited to the empty, or destroyed sites, in the traditional residential areas located next to the historical residential fabric.

*Appendix B1-3 Social aspect*

Keeping the neighborhood away as much as possible from the high buildings, that negatively affect an important feature of the traditional housing, which is achieving privacy for the residents.

The privacy of the neighborhood generally should be also taken into account, by preventing the passers, who do not intend to enter the neighborhood, while not isolating the neighborhood from the surrounding at the same time.

*Appendix B1-4 Choosing the most suitable site*

The results of the interviews, about the most appropriate area for the proposal, varied between the vicinity of the ancient city, and the neighborhoods within it, in the areas around the citadel, Bab Al-Hadeed, Qadi Askar, Bab Al-Makam, Maysaloon, Qarleq, Al-Bayyadah, Qastal Al-Harami, Qastal Al-Mosht, and Bab Al-Neirab.

But due to the aforementioned aspects, most of these areas are excluded, due to the lack of sufficient empty spaces to implement the proposal on them,

In addition to the inability to remove parts of these areas' fabric, due to their historical importance, whose texture cannot be modified.

After reviewing the map of the region surrounding the old city, in which the traditional buildings are located, the suitable land was in Qansreen Park, that most of which is not invested, and no need for any infringement to any heritage buildings, and the area is adjacent to the historical wall area, and therefore close to the traditional residential fabric.

Part of the garden area will be deducted, leaving a distance of 35 meters from the main Bab Qansreen Street, in order to avoid the traffic congestion in it.

The area of the selected part is about 22,000 square meters, which can be enough to build 4 traditional residential islands, about 5,100 square meters for each island, Each residential island contains 22 houses, with a population density of about 110 people.

**Figure B.1** Map showing the proposal position from the citadel which is covered with yellow, done by the author.

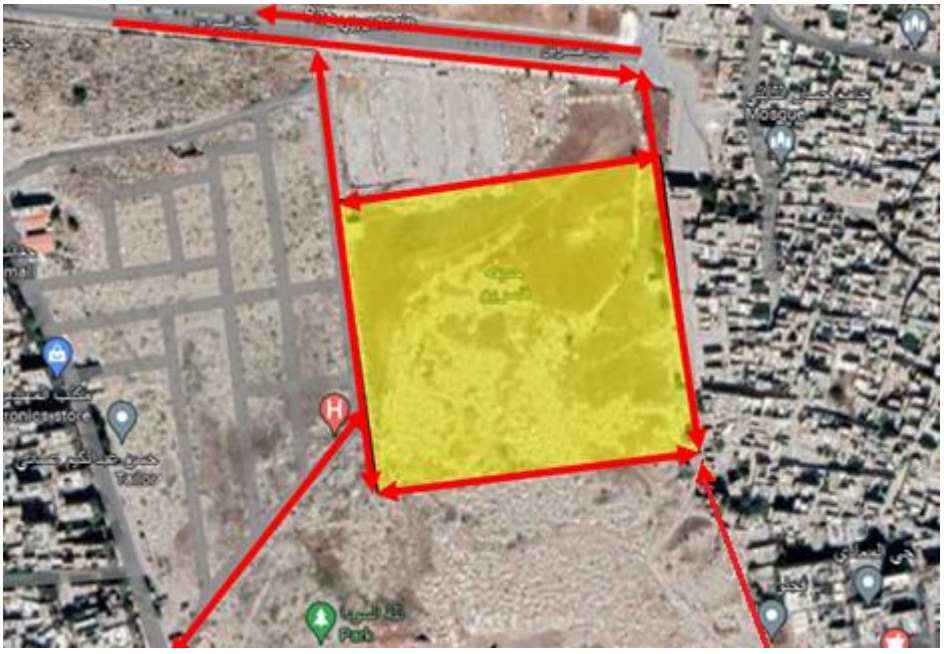

**Figure B.2** Map showing the proposal with the surrounding streets, done by the author.

**Appendix B2 The proposal elements**

Starting at the neighborhood level, which will be a fabric of narrow alleys, containing the houses, that can allow only one service car to pass when necessary, while the alleys are gathered in gathering arenas.

While cars will occupy the parking in the ground floor, beside the surrounding shops.

Where in case of the spread of asphalt over large spaces covering the streets designated for cars, within the residential fabric, leads to high temperatures in summer and decreased temperature in the winter, which may affect the general temperature within the area.

Therefore, the floor of the alleys and arenas will be paved with flint tiles that does not reflect the heat in the summer, while the asphalt use will be confined to the streets in the vicinity of the residential complex.

Entering the house, and given the important role of the traditional courtyard in Aleppo city, environmentally, in terms of its suitability to the prevailing climate, and socially, as it is a gathering place for the family.

So it is the most important element to be taken into account while getting inspired by the Alepine traditional architecture, to the reconstruction phase in Aleppo city.

But when thinking about a proposal that includes an internal courtyard, we should balance between two important conflicting issues:

One of which is that the contemporary architecture is seeking to save spaces, due to the population increase, that requires reducing the spaces allocated to individuals, while the internal courtyard's need for more spaces, in order to achieve the best natural enlightenment and ventilation.

As for the rooms, they will be divided into three sections, with explaining the common relationships between them:

- Section for guests includes a room for guests at the entrance of the house, and a room on the close side of the iwan, can be used as a female guest room,

While men occupying the main guest room, or as a guest bedroom, in addition to the guest bathroom, shared with the family living section.

-Section for family living: It includes the two rooms on both sides of the iwan, the attic above the iwan,

In addition to the kitchen, the pantry room next to it, and the shared bathroom with the guest section.

Family sleeping section: Includes three bedrooms on the upper floor, in addition to the possibility of using the attic for sleeping during the summer nights, and the bathroom for the sleeping section.

A room covering a part of the alley below it, can be added in some houses, forming the Sobat.

As for the roofs of the houses, they will be unreachable, in order to avoid thefts or exposing the houses through that roofs.

And as for the iwan, an iwan will be constructed in the north side of the courtyard, surrounded by two rooms on either its sides, considering minimizing the area of the iwan, with the least possible space that meets the environmental and aesthetic purposes required.

As a different idea, a corridor will be built above the iwan, linking between the eastern and western sides of the house, at a height that exceeds the height of the upper floor, which can be considered as an upper sitting place (attic).

Since the Alepine heritage and traditions are mostly Islamic, the proposal to revive traditional Alepine architectural elements to the reconstruction phase should include the arch as an architectural element, because the arch expresses the Islamic identity when used in the iwan especially, and in windows, decorations, and alley elements as well, such as the Sobat, in addition to the constructional importance that the arch has.

And as for the wind catchers, they will be used to supply the living rooms with the desired western wind, as the living room has the most ventilation need, and as the Bahthenj is a good, natural, and non-costing conditioner.

As for building materials, materials from both traditional and contemporary materials will be used in this proposal, due to several aspects:

1-Environmental efficiency.

2-Structural efficiency.

3-Economic efficiency.

4-Sustainability.

Where the concrete will be used as main structure material, as it will be used as columns, while the concrete bricks will be used as walls material, which will be covered with the limestone as external walls' material, the cement mortar will be used as a bonding mortar, and the Aluminum will be used for the windows' frames, surrounding the glass.

As for the ornamentations, cheap and easy to implement ornamentation elements will be used; such as the Ablaq stone system in the facades, the marble mosaic in the courtyard floor.

Starting with the houses' external walls, which are simple, as there are no openings in most of the walls, with some decorative elements, by the ablaq system itself.

While the internal facades are richer and more vibrant thanks to the arched openings, and arched balconies overlooking the internal courtyards, and some gypsum ornamentations, in addition to the elements of the courtyard, such as the fountain and plants basins.

And because of the aesthetics that mashrabiyah gives to the alley, and the environmental benefit, by providing natural ventilation to the internal space, the mashrabiyah will be added within the proposal.

But due to its relatively high cost, it will be used limitedly, in a way that achieves the aesthetical purpose as possible.

Each house consists of two floors, the ground floor (at the elevation 360) contains the guests room next to the entrance, wc, the internal courtyard, the Iwan with its surrounding two rooms, the stairs of the house, and the kitchen.

While the first floor contains bedrooms, attic above the Iwan, a bathroom, and corridors overlooking the courtyard of the house.

The proposal will be as a mixed commercial and residential complex, surrounded by car streets, where the ground floor will be occupied by shops and car garages, topped by houses with courtyards and two floors, taking into account the following:

-Achieving a balance between the horizontal spread, that prevailed in the past, and the contemporary vertical spread needs, caused by the lack of spaces.

-Achieving the environmental and social functions, required from courtyards with the least possible space.

- Cars reach the perimeter of the complexes only, while the streets inside the complexes are limited to pedestrians and service cars for necessity.

## Appendix B3 The proposal plans and perspectives


**Figure B.3** General plan of the proposed complex, done by the author.

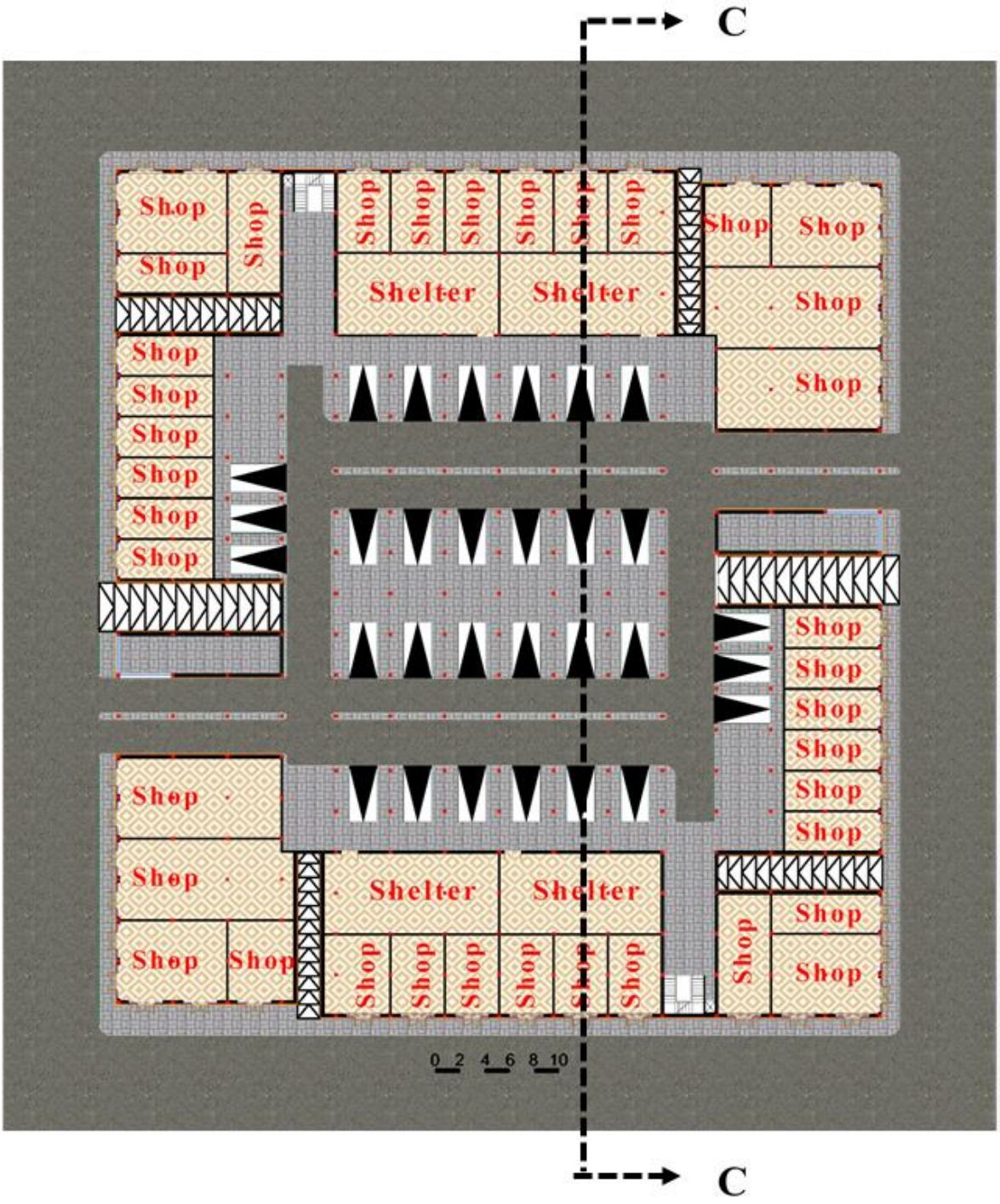


**Figure B.4** Plan of the 0 elevation (shops and parking), done by the author.

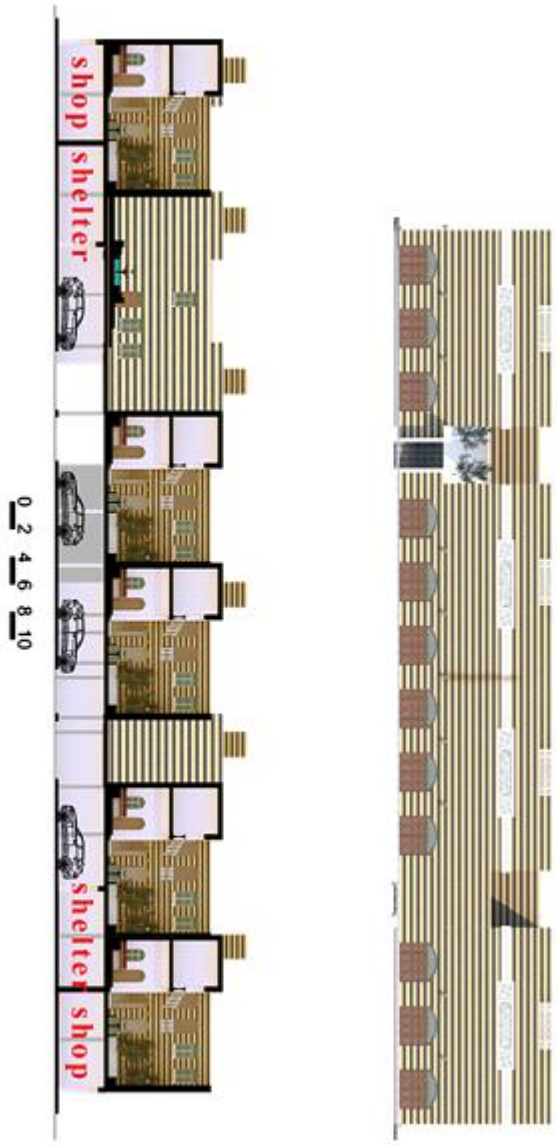


**Figure B.5** CC Section in the complex, and the southern facade of the complex, done by the author.

**Figure B.6** Perspective showing an entrance to the complex, done by the author.

**Figure B.7** Perspective showing an alley in the complex, done by the author.

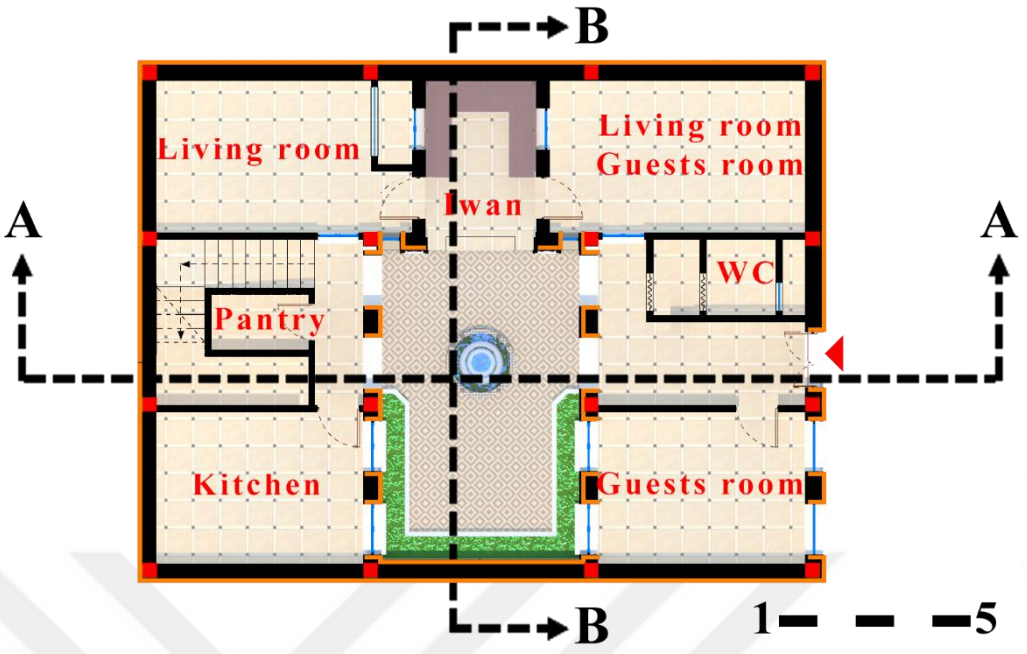


**Figure B.8** The plan of the ground floor in the house, elevation:360 cm, done by the author.

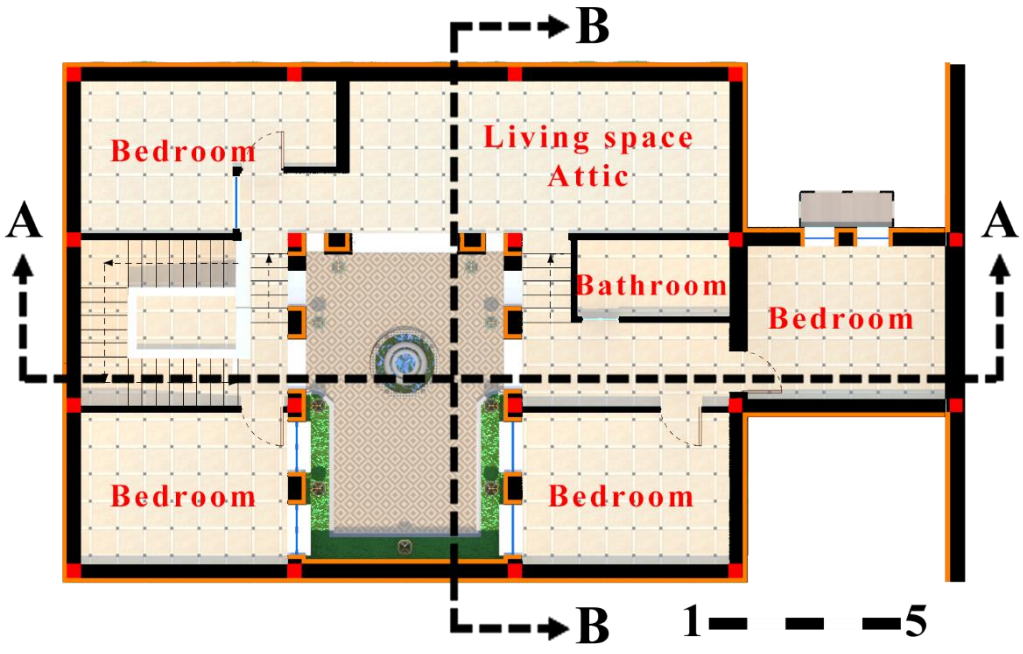


**Figure B.9** The plan of the first floor in the house, elevation:720 cm, done by the author.

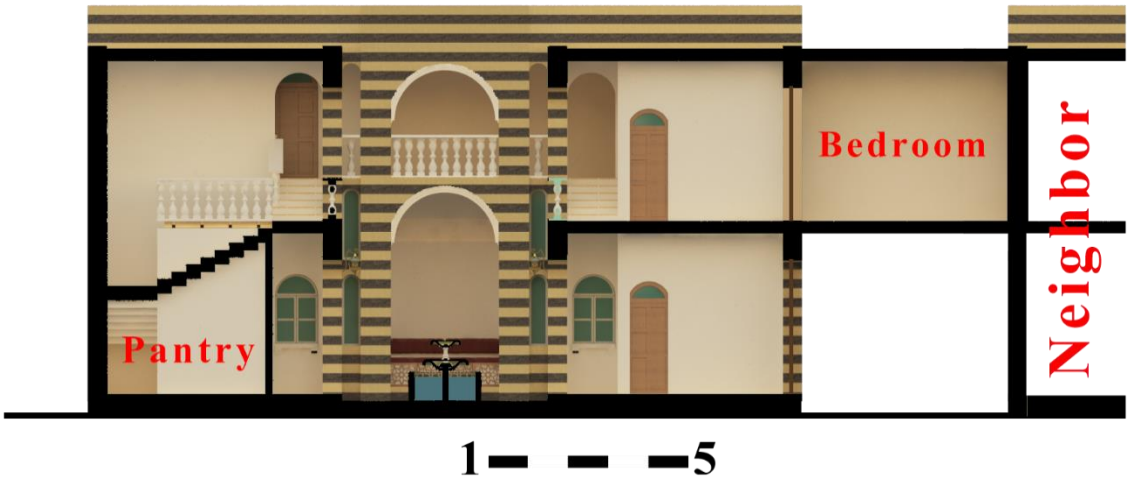


**Figure B.10** AA section, done by the author.


**Figure B.11** BB section, done by the author.

**Figure B.12** Interior perspective showing the Iwan facade, done by the Author.

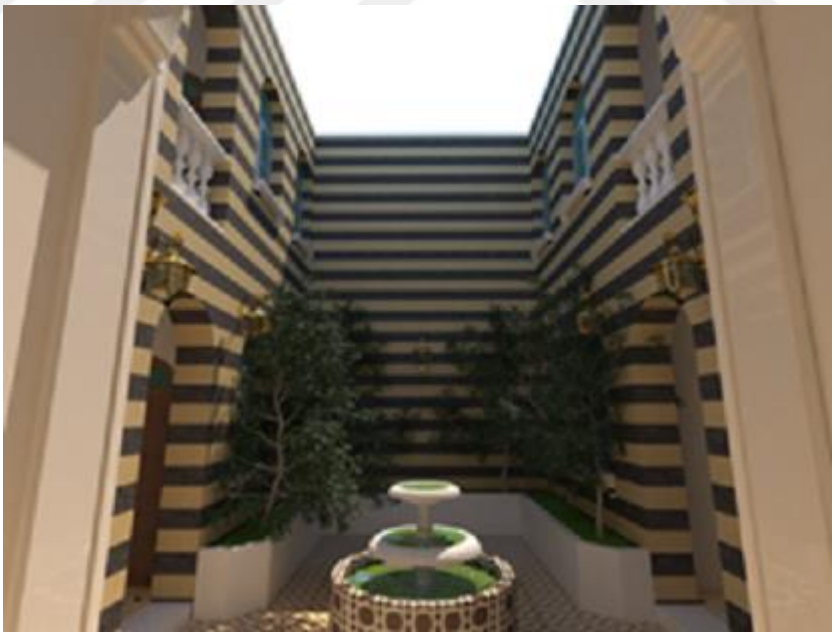

**Figure B.13** Interior perspective showing the southern internal facade, done by the Author.

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