Comparing & Evaluating the Sustainability of the Old Traditional Houses Organization and New Residential Organization through User Satisfaction and Quality

Nawwar Adnan A. Lababneh

Submitted to the
Institute of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of

Master of Science
of
Interior Architecture

Eastern Mediterranean University
August 2021
Gazimağusa, North Cyprus

Approval of the Institute of Graduate Studies and Research

Prof. Dr. Ali Hakan Ulusoy
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science of Interior Architecture.

Assoc. Prof. Dr. Zehra Öngül
Chair, Department of Interior Architecture

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Science of Interior Architecture.

Asst. Prof. Dr. Ahenk Yılgın Damgacı
Supervisor

Examining Committee

1. Assoc. Prof. Dr. Hacer Başarır

2. Assoc. Prof. Dr. Payam Mahastı

3. Asst. Prof. Dr. Ahenk Yılgın Damgacı

ABSTRACT

Today, one of the most discussed issues in the axis of space design is the concept of sustainability. Rapidly changing; Space design, especially housing designs and materials used, which are affected by social, economic, and technological developments, is a completely current phenomenon examined in the context of sustainability. Reasons such as rapidly increasing population, transportation access, parking problems, changes in family structure or number, increase in housing in certain regions, fast consumption habits, decreased natural resources, and energy efficiency forces us to live in different residences. In other words, changing living conditions affect our lifestyle, living spaces, and, accordingly, our quality of life.

The aim of this study; to explore the sustainability of the Old Traditional Houses Organization and the New Housing Organization in Jordan through analysis and comparison through user satisfaction and quality.

In this context, the idea of housing quality and the methods of quality enhancement have been investigated based on the relationship between quality and satisfaction.

A number of houses, old and new, were observed and analyzed in Amman - Jordan through sustainable impacts like; interior space organization, the building materials used, furniture, and environmental conditions as natural light and ventilation. In addition, to the observation method, a survey was done which showed the extent of residents' satisfaction with the quality of their houses.

The analysis showed that there are many factors and sustainable methods that have been applied in these houses, but varying proportions. So the results of this study can help to create a sustainability index for future residential in Amman.

Keywords: Sustainability, Quality, Interior Space Organization, User Satisfaction, Amman Houses.

ÖZ

Günümüzde, mekan tasarımı ekseninde en çok tartışılan konulardan biri sürdürülebilirlik kavramıdır. Hızla değişen; sosyal, ekonomik ve deteknolojik gelişmelerden etkilenen mekan tasarımı, özellikle de konut tasarımları ve kullanılan malzemeler, sürdürülebilirlik bağlamında incelenmesi gereken, tamamen güncel bir olgudur. Hızla artan nüfus, ulaşım-erişim ve otopark sorunları, aile yapısının veya sayısının değişmesi, belirli bölgelerde konut artışı, hızlı tüketim alışkanlıkları, doğal kaynakların azalması, enerji verimliliği gibi nedenler bizi farklı konutlarda yaşamaya zorluyor. Yani değişen yaşam koşulları yaşam tarzımızı, yaşam alanlarımızı ve buna bağlı olarak yaşam kalitemizi de etkilemektedir.

Bu çalışmanın amacı; Ürdün'de Eski Geleneksel Evler Organizasyonu ve de Yeni Konut Organizasyonunun sürdürülebilirliğinin kullanıcı memnuniyeti ve kalitesi üzerinden analiz ve karşılaştırma yolu ile keşfetmektir.

Bu bağlamda, kalite ve memnuniyet arasındaki ilişkiden yola çıkılarak konut kalitesi fikri ve kalite geliştirme yöntemleri araştırılmıştır.

Amman - Ürdün'de hem eski, hemde de yeni birçok ev gözlemlendi. Aynı zamanda, bu sürdürülebilir etkilerle analiz edildi; iç mekan organizasyonu, kullanılan yapı malzemeleri, mobilyalar, doğal ışık ve de havalandırma olarak ise çevre koşulları analiz edilmiştir. Gözlem yöntemine ek olarak ise, konut sakinlerinin evlerinin kalitesinden ne ölçüde memnun olduklarını gösteren bir anket yapılmıştır.

Analiz, bu evlerde uygulanan, ancak değişen oranlarda birçok faktör ve sürdürülebilir yöntem olduğunu göstermiştir. Dolayısıyla; bu çalışmanın sonuçları, Amman'da gelecekteki konutlar için bir sürdürülebilirlik endeksi oluşturmaya yardımcı olabilir.

Anahtar Kelimeler: Sürdürülebilirlik, Kalite, İç Mekan Organizasyonu, Kullanıcı Memnuniyeti, Amman Evleri.

DEDICATION

To …

Whom I had the honor of bearing his name, my father, my first love, my backbone, source of strength, the best dad in the world, thank you for everything.

My mother who gave us boundless love, my life, my love, my happiness, source of my pride in this life.

My lovely brothers, my second back, my friends Anas and Ghassan, thank you for always giving and adding joy to my life.

My teacher, my friend, and my sister Anwar Bani Hani, to the ones who stood by me when everyone let me down.

ACKNOWLEDGEMENT

First and foremost, praise and thank God Almighty for his help to complete this research successfully.

I would like to express my deep and sincere gratitude to my research supervisor Assist.Prof.Dr. Ahenk Yilgin Damgaci, for her continuous support at all periods of study and research.

I am extremely thankful to my parents for their love, prayers, caring and sacrifices for educating and preparing me for my future.

I would like to say thanks to my best friend Omar for his honest and real support during this study work.

Last but not least, I want to thank all of the people who have directly or indirectly helped me to complete this study.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

Chapter 1

INTRODUCTION

The term sustainability in architecture has become an important path for all as it plays a vital part in project planning. Interior designers across the earth strive hard to disseminate this notion. Sustainable architectural design can’t just be described as a structure but also as the construction of the future. Sustainability spans a wide range of terminology and concepts in interior design. The term 'sustainable' itself denotes the ability to be maintained, supported, and promoted.

Sustainable interior design displays an honest commitment to environmental protection as it demands a long-term of high-quality designs, minimal environmental impact, waste and pollution reduction. An interior designer that is focused on delivering a sustainable environment has to have a great understanding of the term “sustainability” when selecting the project material because it has to take into consideration the cost, longevity and also the occupants well-being. In other words, when we talk about sustainability in interior design, other terms like optimal, suitable use of space where Interior Space Organization provides a wide range of activities and services into space through improve the space function as optimal use of all the space and employ the storage units. On the other hand, it makes the space safe by making the best design to avoid the accidents that affect the residents and provide a sense of privacy.

low environmental impact building materials on each of the interior environment and the residents, to achieve user satisfaction and comfort, in addition, to maximize the potential of nature in the space and the furniture through the use of good materials, as well as reduce the cost of materials by reusing them.

And energy consumption are all considered through providing a safe as well as a comfortable environment to the resident by ensuring safe and effective light by using creative and cost-effective LED design, capability to the luminance distribution, personal control, energy efficiency, and daylight integration in addition, to using natural light as much as possible.

Change is constant. Lifestyle and houses will always go through change and evolution. Also, human need for improvements and the concept of the house offers numerous opportunities for the shape and organization of the interior to meet the user needs in terms of quality, taste, sustainable functions, and residential solutions.

The objective of this study is to research the sustainability of the Old Traditional Houses and New Residential Organization in Jordan by examining and comparing user's quality and satisfaction.

The first chapter of the thesis briefly explains the significant role of sustainability and how it impacts the residents and residential spaces. it also identifies the main problem through the various factors.

After the description of the issue, the objectives for the analysis were highlighted in the following section.

Finally, the study methods and limitations were discussed give more clarity to the thesis framework.

1.1 Problem Statement of the Thesis

Generally, houses today are very much different than what it used to be in the past. Nowadays, sustainability plays a more important role and has a major impact on the interior of residential spaces. Making use of sustainable material can also create a perfect design. Therefore, one could say sustainability has an impact on both the human and the environment as it also shows the relationship between them.

Houses get altered and redeveloped, which shows that human needs a little bit of old but with new improvements. Based on the concept of the house, a user has many options to make changes to its appearance and also to organize the internal space with higher quality, efficient and sustainable functions in order to meet and satisfy the taste of the user.

Practicing sustainability in the houses creates a good communication between residents and the environment as it shows the way they acquire their needs and also satisfy their wants in a better way and at the lowest costs.

According to (Sian Moxon, 2012) Sustainability comprised of a number of interconnected aspects that benefit both the design and the residents. Firstly, there is the economic part, which is more focused on the material costs and how to minimize them appropriately. Secondly, there is the environmental aspect, which focuses on interior functions and spaces of the organization in a creative way. Lastly, the human aspect that focuses on human need and how to achieve comfort with major highlights

on optical feeding. It highlights the beautiful part that shows human passion towards a place. All these aspects improve the quality of the interior space (house).

Therefore, sustainability is needed because of its benefits and positive outcome that would help the designers meet the needs of residents. A degree of attention has to be given to sustainability, not only for its aesthetic but also for its protective and functional features on a house.

Interior design in sustainable sites is a type of design that respects natural resources and embraces cultural and historical differences. In the sustainability scope, the interior plays an important role in the development of the lives of individuals and families. It is a shelter that can provide flexibility and adaptability in the long term. Therefore, the interior structure of the houses is sustainable as it is capable of responding to changes and user needs for a long time (Yilmaz and Keleş, 2004).

Today, most of the population still lives in poor housing conditions. Unqualified interior spaces in houses, insufficient infrastructure in the area where they are located. There are various problems such as being expensive, high vehicle dependency due to the location of the interior space.

The unorganized spaces and neglect of the elements of sustainability such as materials, leads to an unsustainable space. Also, because of the functional issues as a result of poor design and the lack of quality/sustainable materials, the spaces failed to meet user satisfaction. Therefore, it is necessary to highlight this problem and makes it easier to solve it or avoid it in the future.

1.2 Aim and Objectives

The researcher believes that people (residents) and interior designers must be provided with the critical awareness of sustainability issues since it is a significant issue and the knowledge of it is a given need these days.

The main purpose of this study is to compare old traditional houses and new residential using the quality for sustainable design as a tool for interior architecture houses. Also, to provide some information about the materials used in houses, as well as the furniture to reach the best design for houses that gives user satisfaction of the residential space.

This leads to an improved house design with ease of use, required quality and space-saving through good organization, which affords many possibilities to alter the shape and size of internal space according to user satisfaction and comfort.

In this regard, the concept of quality, quality in housing and methods to increase quality were examined based on the relationship between satisfaction and quality.

1.3 Research Questions

- Why is the concept of sustainability important for interior design and especially for house units?
- How are the traditional houses organized and what kind of materials and furniture were used?
- Can renewable and recyclable materials be identified by looking at the traditional house design in Amman?
- How is the new residential organized and what kind of material and furniture were used?

1.4 Methodology of Research

This study uses both qualitative and quantitative research approach. Firstly, this study was conducted in the Middle East Jordan-Amman, where the data collected was analyzed, compared and analyzed. The reason behind choosing this area is that the findings of this research study are likely to provide the interior designers in my country Jordan with the critical awareness with this concern.

This analysis is supported by the opinions and findings of other researcher's literature review, data concerning sustainability and its impact on houses and users, that were gathered from related articles, books, MS thesis in addition to Ph.D. dissertations that includes solutions, recommendations, information about human needs, costs, and furniture in order to show the role of sustainability and to provide a comprehensive review. Secondly, in order to satisfy the quantitative research methodology used in this study, survey questions was prepared for field and on-site observations coupled with photographs of mass housings and their surroundings to evaluate and interpret user's answers.

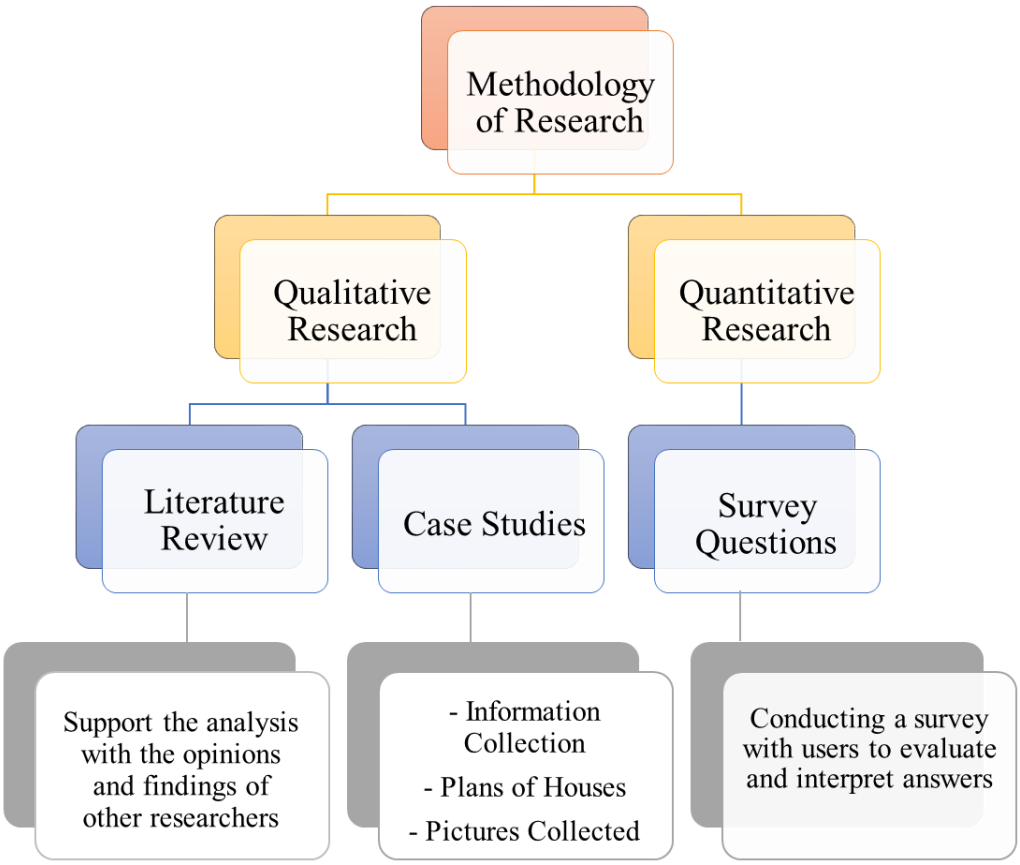


Figure 1: Structure of Methodology

1.5 Limitations of the study

This research concentrates on sustainability and its usage within the house, and thus its impact on the residents. The research is limited to Amman city, because it's the city in which the researcher lives and knows its details.

The researcher selected only ‘House units’ and not any other interior space, because the house is the most important space for humans. Especially after covid19, we started to spend most of the time in our houses. So, sustainability of the houses, materials, and the quality of life will be trending topics in design.

Consequently, instead of residents knowing the perfect design criteria and the human needs in the houses, residents could become subjected to staying in uncomfortable and harmful housing.

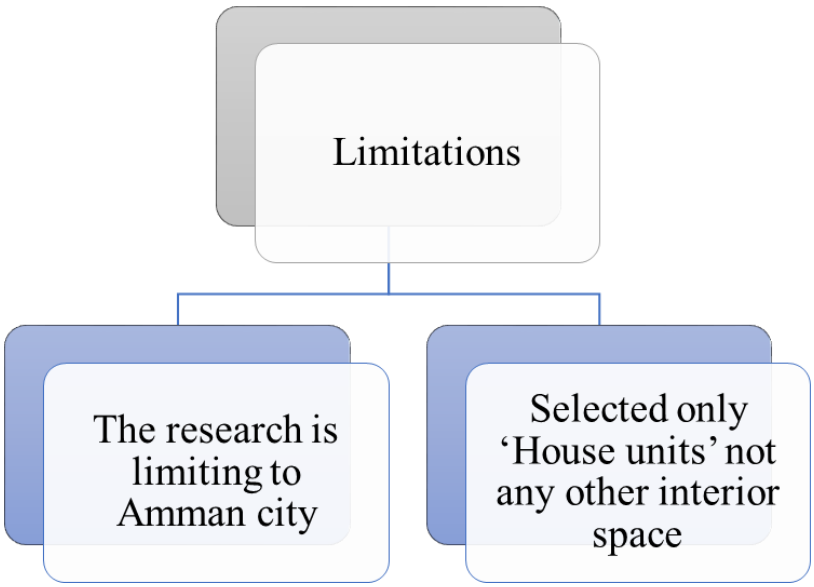


Figure 2: Structure of Limitations

1.6 Structure of the Thesis

Chapter 1	**INTRODUCTION** ▪ Problem Statement of the Thesis ▪ Aim and Objectives ▪ Research Questions ▪ Methodology of Research ▪ Limitations of the study
Chapter 2	**THE CONSEPT OF SUSTAINABILITY** ▪ The History of Sustainability ▪ Definition of Sustainability in Interior Space ▪ The Effect of the Concept of Sustainability on Interior Design ▪ Benefits of Sustainable Interior Materials ▪ Sustainability and the Role of Interior Designers ▪ Quality Housing and User Satisfaction
Chapter 3	**HOUSE DESIGN** ▪ General Definition of House ▪ Jordan Houses: Introduction to History of the House Design in Jordan ▪ Traditional Houses in Jordan ▪ Traditional Materials ▪ Last Period in Jordan Houses
Chapter 4	**AMMAN CITY: IN THE CHRONOLOGICAL DEVELOPMENT OF JORDAN** ▪ General Information About Amman ▪ History of Amman ▪ Physical and Social Characteristics of Amman
Chapter 5	**COMPARING OF THE OLD TRADITIONAL HOUSES AND NEW RESIDENTIAL IN AMMAN** ▪ Selection of the Case Studies ▪ Method of Analysis Observation ▪ Old Traditional Houses ▪ New Residential
Chapter 6	**FINDINGS: THE RESULT OF THE ANALYZES, GRAPHICS, EXPLANATIONS**
Chapter 7	**CONCLUSION**
	REFERENCES

Figure 3: Structure of the Thesis

Chapter 2

THE CONCEPT OF SUSTAINABILITY

2.1 The History of Sustainability

The history of sustainability describes human-dominated ecosystems from the oldest of civilizations to the present day. This history is noticeable by the increasing regional achievement of a particular society, followed by crisis that have been addressed and resolved.

The notion of sustainability has always existed for humans that pays attention to the future of the resources. The significance of sustainability can adapt to meet certain needs. The concept of sustainability was included in all biological systems once ecology became a field (world energy, 2014). The term sustainability is also used to describe the way people live on the planet as more sustainable.

Preserving the equipment of the present generation while keeping the capacity of the next generations to achieve their needs is the term of sustainability.

In the field of interior design, sustainability covers a broad spectrum of terms and concepts. The term 'sustainable' by itself means the capacity to be preserved, assisted, defended, or supported (Oxford University Press, 2007, p. 327).

Nowadays the terms “sustainability”, as well as “sustainable”, are used to hint at the natural environment and management of natural resources, the terms are becoming rousingly widespread (McLean, 2009).

The concept of sustainability means continuousness and renovation in order to create a perfect atmosphere for the users, allowing them to interact with the environment by providing an area that allows the individuals achieve their needs at a low cost, through using the existing materials instead of utilizing new material (Rashdan, 2016).

The term sustainability includes several aspects. Firstly, the economic aspect where the use of sustainable materials significantly affects the cost. In other words, the cost is reduced while maintaining a high quality of raw materials rather than using unsustainable material. Also, the environmental aspect that describes the preservation of the environment and what it means to live in a safe atmosphere. Sustainability also affects the social aspect (Users) by achieving convenience for the user without affecting the aesthetic aspect.

To improve the interior areas in a healthy way, you have to start by finding materials with no toxic attribute and is also friendly to the environment (Mustafa, 2017).

Due to the increase in population, there is always need for additional housing. The high price of the traditional materials and poor air quality indoors, leads to adverse health effects. Interior designers should take into account the factors that improve the indoor quality. Sustainability is a method directed to improving the quality of the space, and solving this problem through the re-use of the materials.

Interior designers have an impact on the choices of materials that should use in construction because the material that is used in the construction has an impact on the project's environment (Maxon, 2012, P. 106).

2.2 Definition of Sustainability in Interior Space

In interior design, sustainable design is describes with words like optimal, appropriate space use, the use of building materials that have low environmental impacts, and the intake of energy.

Aylap, N. (2012) studied and reviewed the dimensions and planes of sustainable interior environment, the adoption of sustainable principles in the interior environment construction process, the potentials of achieving sustainability from practicing the basics of interior design, analysis and review of natural resources that could be used in manufacturing indoor components and the plans that would decrease energy ingesting by using natural light.

The term sustainability is not only a theoretical course but a very technical expression in the face of problem solutions. As Sassi described, sustainability is not an academic pursuit or even a profession, it's a way of life that influences all a human does (Sassi, 2006).

Sustainable internal design in space is defined as “interior design in which all systems and materials are designed with an emphasis on integration as a whole to minimize negative impacts on the environment and its occupants, as well as maximizing positive impacts on environmental, economic, and social systems over the life cycle of a building” (Kang, Guerin, 2009).

Sustainable interior design practice is described by Kang and Guerin in three dimensions: global and sustainable interior design, interior quality, and indoor materials. Interior quality is the most important and influential dimension in the sustainability of interior environments.

A sustainable building has to possess some attributes such as interior space function, aesthetic, and serviceability. According to Attaianese, sustainable building has to impact to sustainable development (Attaianese, 2014).

To achieve the design needs and adapt to the environment, interior designers have to use a sustainable development because the recent evolution impacts the interior design and materials that are used in the design.

The improvement of interior air quality, which primarily reduces interior pollutants, develops thermal comfort, and increases interior lighting quality. In addition, used materials that have the potential of being recycled, is another standard in achieving sustainability in interior space. Considering these standards, materials, furnishing, and lighting are the most important components of interior design (Kang, Guerin, 2009).

2.3 The Effect of the Concept of Sustainability on Interior Design

Interior design, especially in houses, is a complex domain that requires a variety of skills to cover all sides of people's life in order to make houses livable and sustainable (Pardalos, 2012, p. 236).

As we mostly live indoors, the indoor will play a more active part in the emotional state of the user because in the interior design, different parameters like light,

organization, color, furniture, and materials are very important parameters (Haddad, R., 2014).

Among these parameters style or shape of space, the internal space is one of the primary design components that might affect the residents (Yalçin, M., 2015).

Architects and designers with vision have realized that the aim of good design is no longer described as constructing beautiful houses, rather, there is a need for houses to be responsive to the environment and to positively affect both the construction and the residents (Abdelsalam, T., & Rihan, G. M.,2013, p.160).

Sustainability in interior design is included in many parts of projects to offer high-quality, long-lasting construction. Where sustainable design aims at factors such as determining the efficient use of space, selecting build materials that low impact and renewable, and reduce energy consumption.

Since the building industry began to practice sustainable interior architecture, architects worldwide have adopted numerous approaches and techniques (Levine, R., & Hughes, M.,2008).

The literature review shows that sustainability principles have three basic elements. Firstly, the economic dimension is based on the notion of enhancing social well-being through the optimal use of natural resources. The second is the social dimension, which refers to human and natural relationships. Thirdly, environmental factors and the conservation of resources (Edgar, G & Lahham, N., 2008).

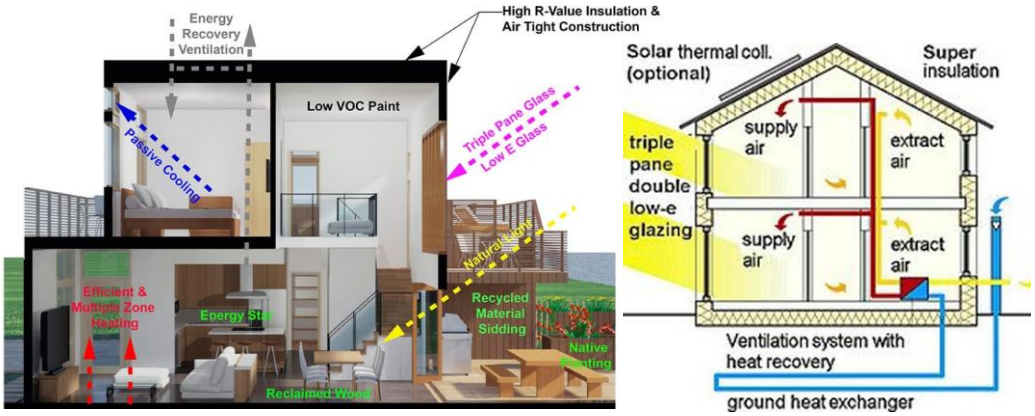


Figure 4: Sustainable House (URL 1)

One of the principles of sustainable interior design, is to drastically reduce the impact of the building on the environment while achieving the comfort and building requirements of the users. The following factors are crucial to these principles: natural light, air quality indoors, energy efficiency, water systems, material, and procedures for construction (Goell, E., 2007).

These concepts are defined in two topics: The first topic highlights the design principles that serve to generate the necessary energy. The second topic refers to concepts that reduce the consumption of energy through the construction design and elements (Abdelsalam, T., & Rihan, G. M., 2013, p.162).

2.4 Benefits of Sustainable Interior Materials

During the material selection, the material has to be selected according to its functional features as it is the most important factor. This can change a good design into a sustainable design (Alotibi, A., 2019, p.14).

Indoor materials, qualities and, finishes can affect resident's comfort at the house (Foster, K., Stelmack, A., & Hindman, D., 2012). Materials must improve indoor quality from a sustainability point of view by limiting pollutants, reducing raw material

loads and energy usage. That is of course in addition to being useful, desired, and thus filling the resident’s needs. For instance, sustainable interior materials can increase energy performance, and air quality in houses.

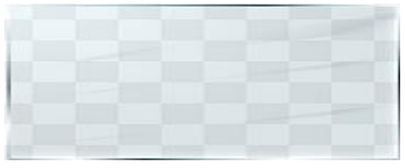
There is an important effect brought on by sustainable materials and its jobs over the life cycle of a house. An evaluation of sustainable material is dependent on project-specific objectives and may include an assessment of indoor air quality, resource efficiency, energy efficiency.

The interior environment includes indoor building materials, furniture, and equipment. As the goal of all world designers is to create a toxic-free indoor environment with effective resources (Alotibi, A., 2019, p.15).

When residents normally think about ‘sustainability', they don't necessarily consider the items in their houses. Rather, they believe in installing solar panels and energy conservation. These are all significant factors of a sustainable house but other interior elements play a significant function in creating sustainable houses as well.

Another approach to sustainable interior design can be achieved by using sustainable interior materials such as refurbished, upcycled, recycled, renewable, and local materials.

Table 1: Sustainable Interior Materials

Materials	**Description**	**Photos**
Wood	Wood can be preserved. It can also be reused as it is or restructured without making a fundamental change in its original form (Reham, M. M., & Eldin, M., 2017, p.3). The condition and quality of the materials are evaluated in order to determine the possibility of their reuse to create the desired appearance of the residents.	
Bamboo	Renewable materials may be substituted through natural procedures. Employing them is environmentally better than employing non-renewable materials because it means sustainability of the resources to the next generations and decreasing the impact on the natural ecosystem such as bamboo. There are many ways to use bamboo in interior design, and it has a wide range of applications. In addition to its strength, it is also highly flexible.	 
Natural Stone	The use of local materials reduces energy expenses. They also reduce their industrial processes and associated pollutants. Furthermore, the quality of an interior environment in a house can be significantly changed. Natural stone such as travertine or marble is a multi-use material.	 
Glass	A material that is recyclable. Glass is an interior design material that is infinitely sustainable.	
Cork	Upcycling transforms a reconditioned or residual material into something new and different from its existing state. Cork can be used on walls, floors and accessories in order to achieve the functionality, quality, and aesthetics of the house.	 

2.5 Sustainability and The Role of Interior Designers

Each designer who works in the construction and design industry must strive towards sustainability to ensure that our present needs are met without compromising the ability to satisfy the needs of future generations.

In creating a fairer, healthier, and sustainable world, designers have a critical role to play (McDonough, W., 2004, p.1). This is an ongoing, global challenge that isn't easy or simple, but designers can inspire a lot of change, with energy-efficient lighting and devices, sustainable materials, sustainable wood, sound and thermal insulation and water-saving functionality. A lot of interior designers are used in renovations and can play a significant role in updating energy and water systems as well as enhancing the house's thermal functionalities.

According to Moxon: "Sustainable thinking can simply become an integral part of their usual design approach, forming a routine consideration in good design practice" (Moxon, 2012).

So sustainability should be an important element of the professional obligations of the interior designer (Kazamia, K. I., & Kafaridou, M. O., 2010, p.575). The sustainable interior design includes the following:

- Integrated and developed buildings.
- Good Indoor qualities that promote the wellbeing and efficiency of occupants.
- Energy efficiency and resources.
- The positive economic effect of improved working, maintenance practices and life cycle.

- The use of natural resources for sustainability: Interior designers have to use renewable resources.
- Interior designers must reuse or recycle items, promote the creation and usage of products that are recovered, rehabilitated, and recycled.

Indoor environmental quality is one of the key criteria for evaluation. This category highlights the use of sustainable materials and reduces interior pollutions, improving air quality, lighting, and thermal comfort (Madanmohan, M., 2019). The three key components that define the degree of sustainable living in the interior are:

Table 2: key Components that Define the Degree of Sustainable Living in the Interior

Materials	The choice of materials is the responsibility of the designer. Materials can be classified based on their longevity, chemical content, and renewability. The designer must use this material properly based on its features and usefulness to exploit the greatest potential of a material.
Lighting	The main goal of an interior designer is to design, plan, and organize a space that does not stop natural light from entering the space and to decrease the consumption of artificial light. Which provides a sustainable system due to low energy consumption.
Furniture	The furniture has an important impact on space productivity. Furniture size, kind, and alignment may impact space functioning and esthetics but the efficiency and strength of the materials used will impact its sustainability.

On the other hand, focus on security, longevity, and flexible design in order to have lasting effect and to reduce the damage possibilities, buildings and spaces must be planned then constructed. Using non-combustible materials and safety devices and equipment such as sensor lights and alarm systems should be included (Byarchyi, 2019).

Indoor designers should also examine the lifespan of any material they want to utilize for security reasons and well-being of the user. The purpose of designing longevity is to create sustainable spaces that place with great emphasis on quality.

One of the important aspects to longevity in design, is designing adaptable environments. Designers must look at the flexibility of spaces before anticipating future alterations. This is done by modifying some walls to create more spaces, and high-quality furniture that is adjustable to suit the needs of the place.

Also, a design of comfortable spaces means the inclusion of high ceilings, appropriate colors, materials, storage facilities, comfortable equipment such as stairs and furniture, that allows the natural light pass through all spaces.

2.6 Quality

Poor quality has always been overlooked by designers in the past. Although quality issues have been studied, but the degree of attention has been rather modest.

Meeting unforeseen needs, efficiency, suitability for purpose, and user satisfaction are today's core principles in quality understanding (Der, V., 2005, p.16).

A unanimous definition of quality is difficult to come by. The multifaceted character of quality has led to many definitions. Experts, scientists, authors, and certain organizations provide the following definitions of quality without classifying them:

Table 3: Definitions of Quality

"Quality is all the characteristics that reveal the ability of a good or service to meet a certain requirement"(ASQC- American Society for Quality Control).
"Quality is the degree of conformity of a good or service to the consumer's wishes" (EOQC- European Quality Control Organization).
"Quality is the degree to which a product conforms to requirements"(P. Crosby).
"Quality is the least harm that the product causes to society after shipment"(G. Taguchi).
"Quality is fitness for use"(J.M. Juran).

According to J. M. Juran, one of the quality pioneers of our time with his works in the scope of quality avoided giving a single and simple definition for quality. Following is a list of the two most important meanings of quality as defined by J. M Juran.

Table 4: Definitions of the Quality Following by J. M Juran

"Quality is the characteristics that define the conditions for compliance of a product with customer requirements in order to achieve product satisfaction" (J. M. Juran).
"Quality is the absence of defects"(J. M. Juran).

These two definitions are not in opposition or alternative to each other, but rather complements each other.

Based on these definitions, it is possible to see quality as an important strategic weapon, which has many dimensions in terms of performance, reliability, compliance with standards, durability, aesthetics, and perceptibility.

Quality is defined as the summation of the effective evaluation by each resident or occupants of a building in order to assess user satisfaction. An emphasis on quality can lead to an increase in demand, price flexibility, as well as sustainability (Wicks, A. M., & Roethlein, C. J., 2009, P.82). Quality or stage of excellence seems to be viewed in many different ways, according to user and the case to which it is applied. The new meaning of quality given by Burt was: “the totality of the attributes of a building, which enable it to satisfy needs” (Burt, 1978).

Simply said, quality is a trait employed to identify, characterize, and decide beings or occurrences; it is not an abstract concept. Qualitative concepts include superiority, even perfection and advantages. May thus argue that "quality" is a notion that helps determine the attributes of things or occurrences and that somehow incorporates and communicates our value judgments about these qualities (Der, V., 2005, p.16).

2.6.1 Quality Housing

People's housing demands have been downgraded to quality-of-life issues with planning issues and housing constructed to produce profits without meeting the needs of the user has begun to be adopted (Guley, K., Damgaci, A.Y., 2019). These factors have a detrimental impact on both housing quality and the satisfaction of residents. There is a disconnect between the user and their environment that is the primary cause of this issue (Guley, K., Damgaci, A.Y., 2019).

The pursuit of improving the quality of housing is an important goal in the design process. As a result, the human-environment relationship is a system of interactions that initiates and feeds off of each other. In this interactive system, the house is the most significant.

Housing quality can be characterized in terms of whether or not a house complies with quality standards and household requirements. Housing quality is a comprehensive concept with complex social and economic repercussions. It considers both quantitative and qualitative features of residential areas, their immediate surroundings, and resident requirements. Quantitative parameters primarily refer to the structural, material, social, and economic components of housing goods or the outcomes of the housing sector's performance that can be quantified. In opposed to the quantitative dimension, the qualitative dimension is substantially more subjective and challenging to evaluate. Varied housing kinds give different levels of "comfort" and "quality," as well as reflect the residents' interests and expectations. (Garg, Y., Dhagat, N., & Shrivastava, B., 2014, p.2).

The major goal of sustainability is to improve quality. Various aspects and indicators are used to evaluate the quality. One of the main elements that impact quality is housing.

The people are estimated to be spending most of the day in their houses, mainly in their bedrooms and in their sitting rooms, highlighting the importance of studying the quality of the houses (Almeida, S. M., 2014).

In particular, the UN examined the concept of ‘quality housing’ in a series of workshops on the social elements of housing, using various terminologies like 'appropriate ', and 'standard' or 'good' housing.

As it was difficult to have a comprehensive meaning of good or quality housing, it was usually believed that good housing fulfils the requirements of residents at a particular stage in development (Sidi, N. S. S., 2010, p.3).

Also, it was decided that good houses should also satisfy all the different functions that housing should serve, including shelter, people's life, economic stability, and access to facilities (United Nations, 1977).

According to Soen (1979) ‘quality housing’ is in connection with residential satisfaction and requirements of residents. He highlighted that the quality of housing is determined by some aspects, including engineering, social and behavioral issues. Also housing quality is not static since it depends on circumstances. The quality of housing should thus be examined from a multi-dimensional viewpoint, especially about the role of housing to satisfy resident's needs (Soen, D., 1979).

The availability of sufficient space in the house is one of the important factors in the quality of housing. The key indicator to describe space issues is a method in the interior space organization which assesses the use of spaces, organization of furniture in the space, and privacy. Having enough space is fundamental to meet the resident's basic needs for safety/security, comfort, and making the house an enjoyable place to be (Streimikiene, D., 2015, p.141).

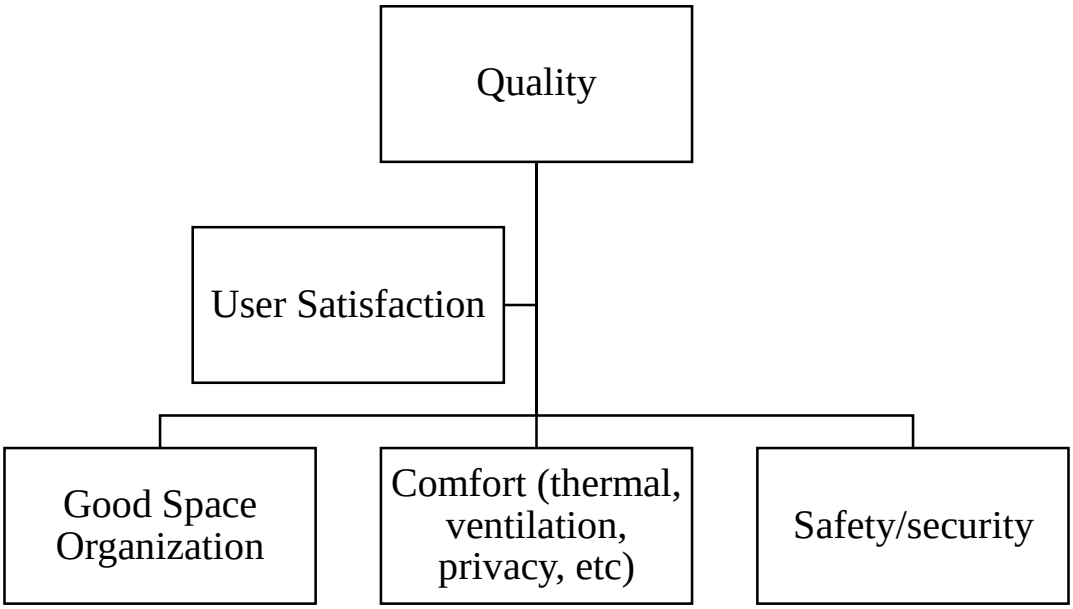


Figure 5: Criteria for Quality Housing (Created by the Researcher)

On the other hand, the quality of housing may also be evaluated by examining housing defects. For instance, the absence of some essential amenities like baths, showers, indoor toilet or storage facilities can cause several problems such as a leaking roof or a dark interior which can all affect the overall condition of the house.

The concept of “quality housing” includes many additional factors that contribute to the comfort level of a house, like the quality of the roof and the quality of the walls, flooring, doors and windows can also have adverse effects on the resident’s well-being (Streimikiene, D., 2015, p.141).

In addition, the evaluation of the resident’s overall satisfaction with the house quality is perceived to be an important indicator that is beneficial for the assessment of the quality of life connected to the housing. An individual's housing satisfaction may be described as "the gap between (his or her) expectations about what he or she wants and what (he or she) gets" (Lucas, R. E., 2007).

New studies on housing quality indicators have revealed that access to sustainable spaces is necessary in order to achieve quality as a good indoor environment is a source of satisfaction for residents.

2.7 User Satisfaction

For people to feel satisfied with their houses, perhaps a more essential factor than the house's architectural parameters, is that users have authority over it. A study by Sanoff (1990) found that the sense of being able to influence decisions, not to the degree in which requirements are met, is the primary source of user satisfaction.

Being able to contribute to the user's environment gives a person an opportunity to influence the environment more with his or her characteristics. The more a person participates in the formation and preservation of his/her environment, the more harmonious will his/her environment be for them.

Based on these studies, housing quality is believed to be determined by the degree of adaptation of the house and its surroundings to the user's satisfaction, psychological, and cultural requirements.

As Özsoy (1994) points out, it is widely acknowledged that the user's satisfaction with the environment is an essential indicator to the quality of a resident's living condition. Spatial features such as spatial organization, functional relations, space hierarchy, adaptability, and aesthetics are fundamental quality factors. User’s evaluations have gained great importance in determining the quality requirements and need of specific housing areas (Songur, 2001).

The expression of quality building or physical environment means a construction product or environmental formation that meets the user's need in the most appropriate way as it does not only preserve its feature over time, but it also does not create environmental pollution in aesthetic and ecological terms, takes into account the benefit of society and it is all achieved at an affordable price and in a suitable time (Dengiz, İncedayı, 2003).

The compatibility between human behavior and the physical environment reveals to a degree, the extent to which the user's needs are met by environmental values and the satisfaction provided. But the level of satisfaction can be related, in order of importance, durability, continuity of the construction and material, the exterior appearance of the house and the existence of the space features that meet the expectations of the people living there (Aydınlı, 1993).

2.7.1 Good Space Organization

According to writers like (Belganeh,2019) and (Ekholm, A., & Fridqvist, 2000), Space is one of the elementary concepts by which we refer to the material world and significant basics of design. Space is an intangible architectural feature defined by forms, shapes, scale, color, time, place and atmosphere. Space is where material objects are located, a geometrical concept among the objects and a thing with spatial characteristics (Ekholm, A., & Fridqvist, 2000).

Belganeh discusses in her article that Space is a blend of positive and negative components. Forms, colors, textures and other important characteristics are positive elements of a composition within a space. The negative space in architecture is the empty volume of space. On the other hand, Saar & Palang (2009) argue that space is understood as a physical and social landscape imbued with meaning and emergence

through the processes which it operates on various spatial and temporal scales in everyday social practices.

Based on the concept of space (Stanek, 2012), space is the element of architecture. In architectural design, they describe the outer layer of space with three kinds of plans: Overhead Plans (ceiling), Wall plans, and Base Plans (floor) to define depth and the horizontal and vertical volume of space.

In a house, space is described as a volume where users execute their activities by their varied needs. Good organized spaces meet user’s needs in the space they occupy, and help them be satisfied with that space.

The design process and its different stages should be reviewed in evaluation of the user's satisfaction to determine the most effective space organization. The creation process of good organization space consists of a series of performance-based feed-forward and feed-backward steps including design – building – occupancy – evaluation – change – re-use.

2.7.2 Comfort (Thermal, Ventilation, Privacy)

In interior design, comfort is simply offered in order to promote the well-being of users. As subjective as it may be, some criteria must be taken into consideration when planning a design project.

Everybody is subjected to a degree of comfort. When building the house, the main consideration is to create an atmosphere that meets the user's needs comfortably. One of the most important factors that should be considered to achieve a successful home design is the presence of a safe, suitable, and healthy living environment.

Analyzing the user's demands is also crucial when creating a house that provides a suitable and pleasant living environment. So therefore, the interior atmosphere of the building should play a major role when determining the quality of life of residents.

According to Hamdy, designers may make interior spaces safe and healthful by paying attention to the materials they choose, such as fabric, paint, glass and insulating materials. In addition, take into account what causes toxicity that affects the indoor air quality (Hamdy Mahmoud, H. T., 2017).

"Avoid sudden changes of energy levels which could demoralize people, if they are present, it must be made invisible with contrasting colors, making the floor slip-resistant, utilizing non-reflective light, using a glare-free and easy to clean, solid core construction for interior spaces partition, and privacy. It should also be easy to control and adjust by choosing a comfortable and safe furniture with good design" (Hamdy, 2017, p.6,7).

On the other hand, an efficient house exterior is one of the first things to consider when planning for thermal comfort. As a filter between the external and inside climate, a building's design helps to maintain a stable indoor atmosphere in addition to a well-balanced interior atmosphere, all of which contributes to a more sustainable structure. Thermal Inertia, Solar Gain, and Air Ventilation must all be considered while designing (Dima Stouhi, 2019).

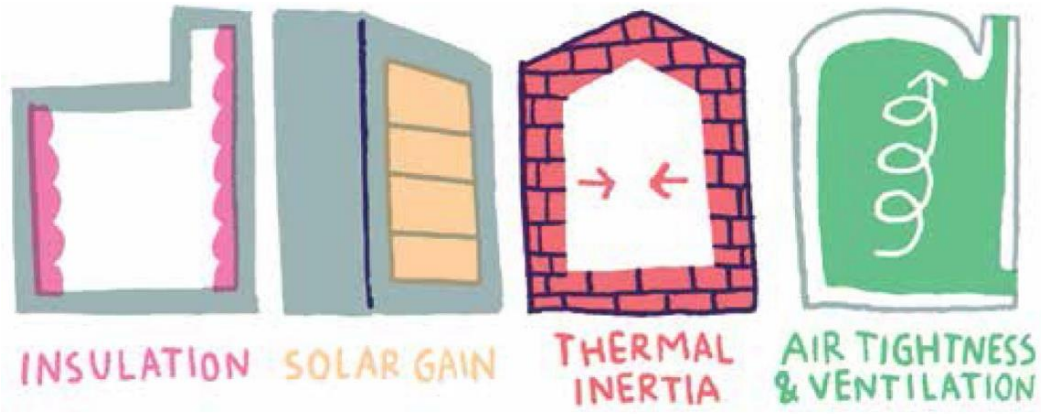


Figure 6: Design for Optimal Thermal Comfort (URL 2)

2.7.3 Safety/Security

Some of the hottest trends in interior design are related to something called security. The general idea is to make houses safer.

Safety/security is the degree to which an asset is protected against damage, such as a person, a house, or an organization.

Safety, security and privacy are important attributes in the resident's quality of life. To ensure the safety of the resident, many modern structures are fitted with smart locks and surveillance system that surrounds the building. Interior camera systems, motion detectors are also integrated into walls as well as soundproof materials which are all regarded as examples of interior design safety materials that embraces this broad principle.

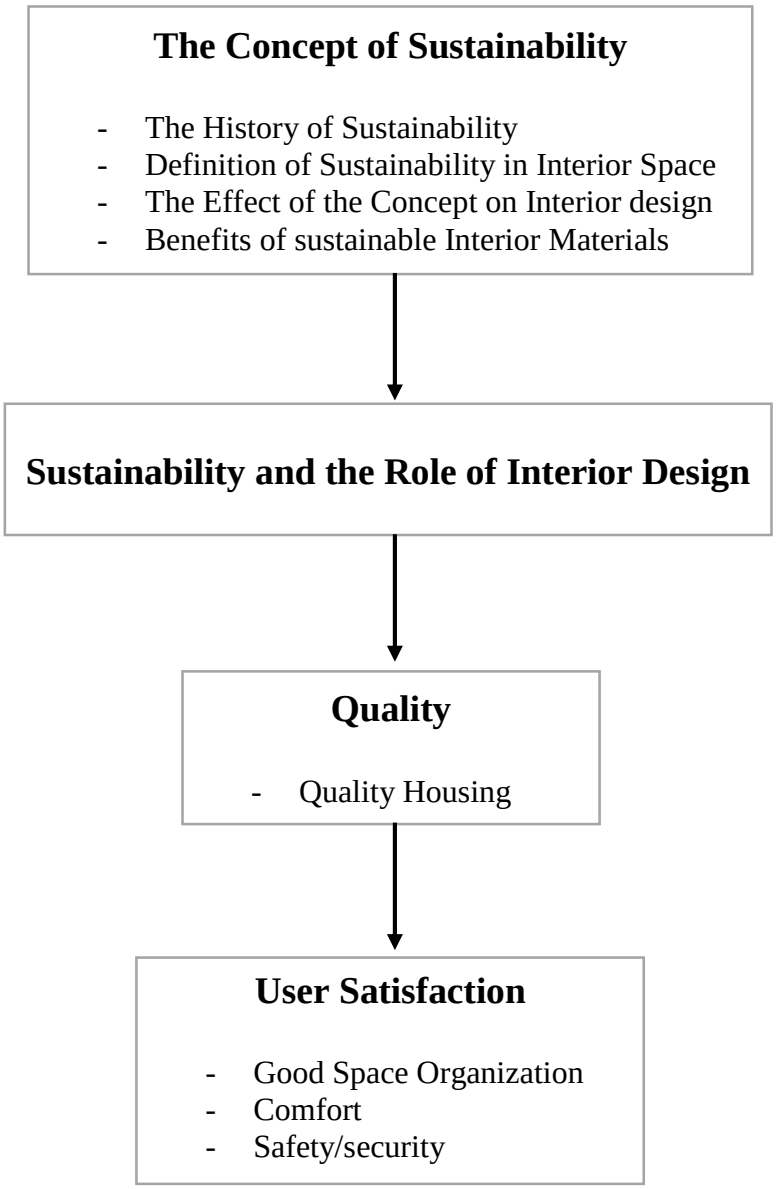


Figure 7: Summary Table for Chapter Two

Chapter 3

HOUSE DESIGN

3.1 General Definition of House

A general phenomenon from the old days till today is that the house remains a shelter for human beings regardless of the needs and style of life. The methods, and building materials used in the past, relating to architecture was for residential buildings as humans back then constructed houses for themselves and also for their idols.

As human development has changed over the years, so is the standard of the house. This was a key factor in the evolution of human societies and appearances of different civilizations. Bridget Franklin (2006) said that" the production of a building, in whatever era or place, in whatever shape and for whatever purpose, is irrevocably a human and a social act".

For instance, since human's inception, they have always looked for a place to protect themselves from heat, cold, and danger, in the past the humans lived in caves, and every time they protected themselves and keep from the influences of the outside world, they strive for the best. so the humans were looking for psychological and physical comfort, from here they began to invent materials Building.

Construction methods and materials used in house construction have evolved over time, and with development and scientific and technological progress, building

materials have been chosen based on what was available in the environment and what was suited to the environment, as well as on the conditions of use of the dwelling and the nature of its inhabitants. As a result of the need for places where some humans lived in separate units, these units became the place for humans to go when they were in need.

In general, housing is defined as a place where people live with their families in order to protect themselves from natural forces and to spend their daily needs outside the scope of their job, such as comfort, sleep, cooking, eating and gatherings of family and friends. Additionally, it includes a variety of activities, including those related to the arts, sports and games, as well as fun or creative events and relaxation. Additionally, the house is depicted as a permanent location that is secure and private for residents (Sixsmith, J., 1986).

A house is a vital location for protecting our relationships with the people we care about, acting from a position of strength. Nonetheless, the house possesses a strong emotional component and a socially acceptable environment that takes into account one's behavior, convictions and moods. Ideas can be shared with others as a platform for enjoyment and amusement with family and friends (Després, 1991). While the home is also becoming a medium for identity and self-expression (Sixsmith, J., 1986).

The house was also recently defined as the primary site of cultural activity and expression, portraying the individual's identity and relationship with society at the same time (Altman and Gauvain, 1981). Thus, the house is conceived as a dynamic (re)creation contained within a temporal framework (Dovey, 1985).

A house is a living thing. It consists of a variety of components and elements, ranging from the structural elements to the interiors and accessories. In reality, a house is a social space, not merely a place to sleep. The very fact that these two conceptions of the house are diametrically opposed suggests that the house is a complicated, and also a multifaceted phenomenon. As a result, an exploratory study focusing on what a house means to residents based on their daily lived experiences is necessary to define and explain various definitions of the house. Once the meanings of the house have become clear, the organizational relationships between the meanings of the house can be completely clarified.

3.2 Jordan Houses: Introduction to History of the House Design in Jordan

Jordan is an Arab nation situated at the intersection of Asia, Africa, and Europe in Western Asia, on the east bank of the Jordan River. Jordan is surrounded by Saudi Arabia to the south and east, the Red Sea to the south, Syria to the north, Iraq to the North-East, and Palestine to the occident. Jordan is the house of some of the oldest settlements and villages of history and many remnants of the great civilizations of the world (Alkhawaldeh & Akbalik, 2018, p.87).

Figure 8: Jordan Map (URL 3)

After the Jordan establishment, Jordanian architecture went through several phases especially under the influence of Ottoman and English architectural styles which had clear effects (Alkhawaldeh & Akbalik, 2018, p.88).

Housing patterns, styles, and shapes have changed throughout history and evolved with the development of human concepts, culture, environment, science and renewed innovations. When looking at housing as a component unit of human gatherings that resulted in cities as we know today, we find different types of housing according to the historical sequence. Dwelling can be classified into several stages throughout history.

The old traditional house in Jordan is a good illustration of the harmonization between design in the Islamic and Ottoman styles. However, the old traditional houses are one of Jordan's ancient architectural arts and have been a significant factor when characterizing the Jordanian and current Jordanian identity (Sokienah, Y., 2020, p.2).

Many old traditional houses in Jordan consists of two stories, with Jordanian houses maintaining simplicity and elegant design. These houses have been built using clay and stone. Clay is distinguished by the presence of straw, which strengthens and coheres the structure (Al-Asad, M., Khammash, A., & Lyons, B., 1997). The old traditional houses were built in the Ottoman style with arches and roofs made of mud mixed with straw.

The interior, the high ceilings and thick walls are some of the key characteristics of old traditional houses. Additionally, the windows and doors were built in the shape of arches to reduce the pressure on them due to the lack of metal at the time. Following the completion of the houses, the mud walls were covered with stones (Matrouk, M., & Goussous, J., 2011).

Figure 9: Using Arches in Doors and Windows in Old Traditional House & Covered the House by Stone (URL 4)

Jordanian architecture creates a connection between past and present. Whereas traditional architecture reflects a specific era, its influence endures to the present day. Jordanian traditional houses were built in accordance with Islamic architecture, with the addition of some contemporary architectural styles. This resulted in a distinctive architectural design for Jordan's traditional houses (Matrouk, M., & Goussous, J., 2011).

3.2.1 Traditional Houses in Jordan

Interior architecture, like any other creative endeavor, is exhilarating. Experience in interior architecture is gained through observation of what others have accomplished, as well as by analyzing their works and attempting to comprehend how they approached the challenge (Daher, 1999).

The concept of traditional architecture in the past was defined by two dimensions: location and time. It incorporates period values, uses indigenous materials and human touch as it is based on historical construction techniques and skills (Alsubeh, 2013).

The significance of old traditional houses stems from their construction method which utilizes familiar shapes and is also acquainted to the inhabitants' culture. Architects and builders use the characteristics of traditional architecture to ensure that connections to previous construction styles, material reuse, and house and building designs remain compatible with the area's overall construction structure. This creates a sense of continuity and connection to the past, assisting the region in maintaining its traditional appearance for the community's residents (Labin, A. M. J. E., & Aldeek, Z. A., 2017, p.13).

The traditional architecture of the past is considered irregular; where no urban plans were prepared in advance. it was constructed by residents according to their circumstances and requirements (Khammash, 1986).

The traditional houses included openings in the walls where they were used to store food (wall closets). It also includes slots for furnishes, blankets and carpets that are used in the winter. In addition, there was a corner of the house that has a jar used for storing water (Sokienah, Y., 2020, p.3).

Figure 10: The Openings (Wall Closets) (URL 5)

Additionally, in the yards of the houses are wells for the collection of rainwater. Likewise, a space for cooking as ovens are built-in. Guesthouses were separate from the main house. The ancient traditional houses were surrounded by stones and clay walls. it also features a grand main entrance, arched doors, and arched windows.

Arar's house can be used as an example in this scenario. It is located in the city of Irbid. The house has 5 rooms (two rooms for guests) and a large yard. The house was built of stones and mud. The black granite was used on the floors and it also has wooden doors and wide windows in the form of arches.

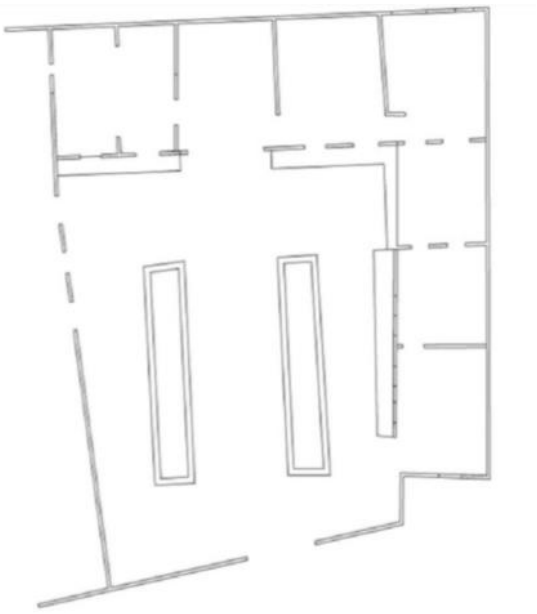


Figure 11: Arar's House Plan (URL 6)

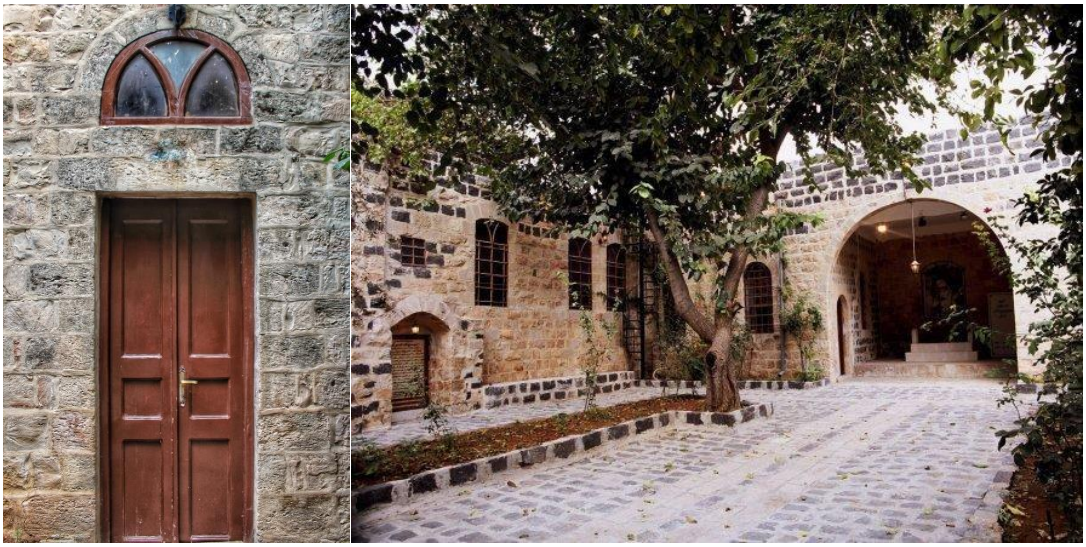


Figure 12: Arar's House (URL 7)

Another example is Nabulsi House. Also located in Irbid, the house has two floors. The building features an open yard that occupies three sides of the courtyard. The structure is as attractive from within as it is from the exterior. The interior courtyard is adorned with exquisite details, as it is surrounded by a facade and its arches are made of colorful glass (Rousan, A. & Al-Rajoub, A.K., 2010).

Figure 13: Nabulsi House (URL 8)

The house features several esthetic elements such as the sculpted outer façade stone and the indoor and outdoor windows of the color glass. The house has two units separated, it includes many rooms, whereas the windows and doors of the entire room are rectangular in design and have an arch in Islamic style above.

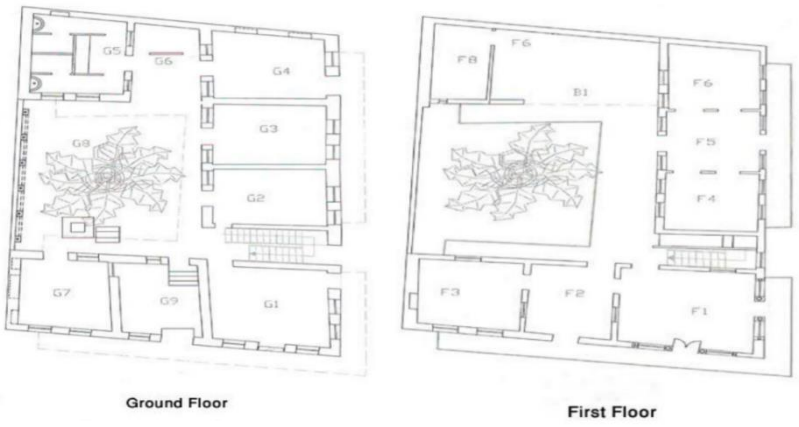


Figure 14: Nabulsi House Plans (URL 9)

3.2.2 Traditional Materials

Jordanian architecture is described by its reliance on natural elements such as stones, straws and clay. Jordanian architects utilize natural materials and connects them to their surroundings and climate. Since the dawn of the ancients, stone has been a fundamental building material. It is also the fundamental building material for Jordanian architects, particularly given Jordan's availability and diversity of stone layers.

However, Jordanian architecture avoided using stones on the interior façades of buildings, preferring a quiet and comfortable interior design. As a result, stones were traditionally used only on exterior facades (Mohannad Tarrad, 2012).

Figure 15: Natural Materials Used in Jordanian Architecture (URL 10)

3.3 Last Period in Jordan Houses (2000)

The most common type of housing is a relatively high-quality apartment block, followed by famous houses called Dar and villas. The work applications of the buildings vary significantly from the architectural design itself. Family houses (Dar) or private villas may have a more realistic architectural design.

Location, climate and the sun's path all influence design. It is a first step toward increased energy efficiency and sustainability. Also, great attention and emphasis are given to the building cover in the new residential houses.

Figure 16: Apartment Block (URL 11)

Figure 17: Villa (URL 12)

Figure 18: Family House (Dar) (URL 13)

The reinforced concrete structures frequent in contemporary Jordanian architecture act as a deterrent to earthquakes. Additionally, it is financially viable. The walls are typically non-structural and made of hollow concrete blocks, poured concrete blocks or treated natural stone, depending on the application on both indoor and outdoor. Additionally, concrete stone is a significant building material used in Jordan's walls.

Figure 19: A structure House Built of Reinforced Concrete (URL 14)

Furthermore, the stone is one of the most widely used construction materials as old houses were built from whole stone blocks. Presently, the stone is still used in the newest residential houses as basic materials. In addition, it is still possible to work manually on the stone using a variety of tools in order to give the stone an aesthetic feel.

Figure 20: Stone Surfaces (URL 15)

For walls, the main construction regulation in Amman requires light stone facades for the exterior of houses. The wooden wedges hold the stone pieces in place during the construction process until the concrete hardens and bonds with the stone.

Figure 21: Fixing the Stone with Wooden Wedges (URL 16)

As mentioned before, the walls consist of natural stone and cast concrete of both the interior and exterior. After that, there was widespread application of a thin thermal insulation layer in the walls.

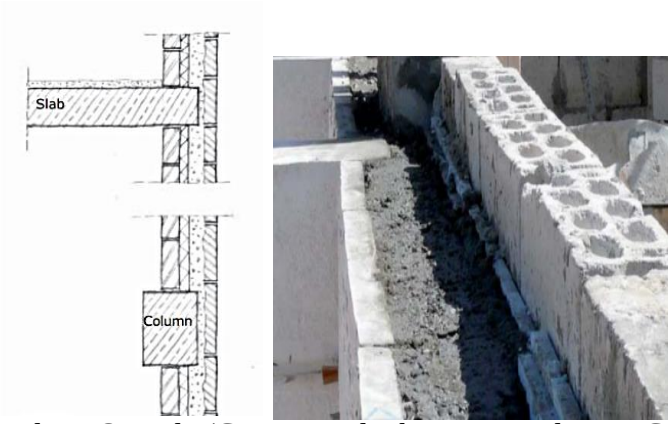


Figure 22: Wall, Inside to Outside (Concrete Block, Heat Insulation, Cast Concrete, and Stone Covering) (URL 17)

Doors and windows are important design elements, where the design of majority of the windows is made of glass in a rectangular shape with an aluminum frame having a simple shape with boxes for curtains for more privacy.

Figure 23: Aluminum Window Frames (URL 18)

Figure 24: Windows with Boxes for Curtains (URL 19)

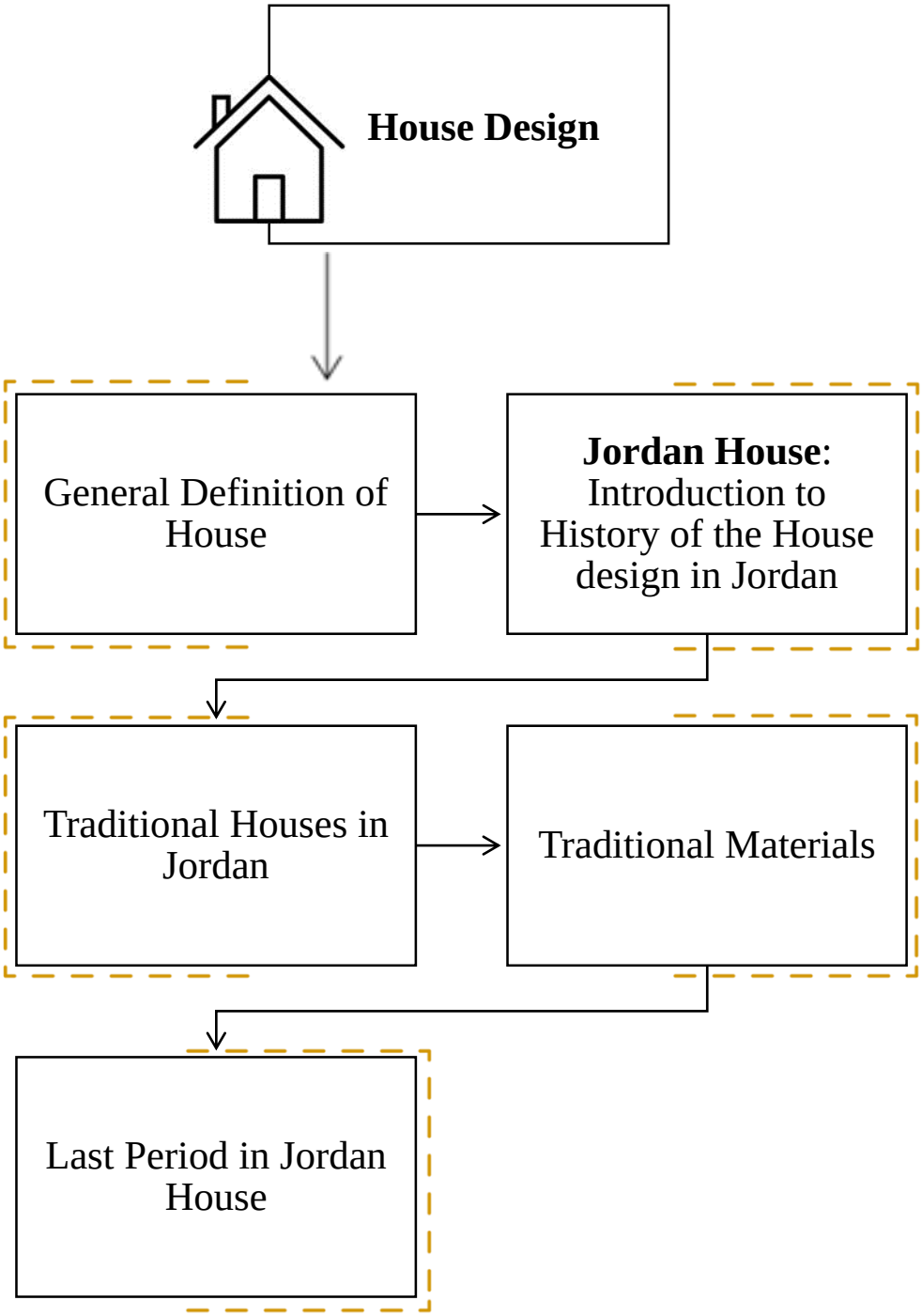


Figure 25: Summary Table for Chapter Three

Chapter 4

AMMAN CITY: IN THE CHRONOLOGICAL DEVELOPMENT OF JORDAN

4.1 General Information About Amman

In the 1930s, the city had a population of about 10,000. After Jordan became independent in 1946, Amman became the capital of Jordan. In Levant, Amman is the biggest city, and in the Arab world, it is the sixth-largest with a population of 4,007,526. (Ghazal, M., 2016).

Figure 26: Amman City (URL 20)

The city was known during the Iron Age as Ammon, house of the Ammonites' kingdom. In Greek and Roman era, it was called Philadelphia and in the Islamic era, it was finally named Amman (Britannica, T., 2021).

Amman was an abandoned place until the 19th century when Circassians stabled there as a portion of the Ottoman Empire (at that period) in 1878. They subsequently had a major role in the transformation of a small town into a city (Dumper, M., 2007).

After being named the capital of Jordan in 1921, Amman underwent remarkable growth. Regions of the city have acquired their names by the mound (Jabal) or the ravine (Wadi) like Wadi Abdoun, Jabal Lweibdeh, and Jabal Al-Jofeh (Dumper, M., 2007).

East Amman is mostly full of ancient landmarks, often hosting cultural actions, whereas the western part of Amman is more modernistic, which serves as the city's economic center. Amman's economy is rising rather quickly, and it has been classified as a Globalization and World Cities Research Network's global city. Furthermore, Amman was also recognized as one of the best cities in the Middle East and North Africa based its economic, environmental, employment rate and sociocultural factors (Britannica, T., 2021).

4.1.1 History of Amman

Rabbath Ammon was the name of the city in the 13th century B.C.E. The Assyrians and Persians, respectively, seized the city. Alexander the Great took control of the region in 332 B.C.E. Emperor Ptolemy II Philadelphia, changed its name to Philadelphia as they rebuilt the city after it was destroyed by an earthquake. During the first century B.C.E., the Seleucids took the city, which started a series of turmoil.

Until 63 CE, when the Romans took control of it, Philadelphia was part of the Decapolis, an Arab Semitic kingdom that had been established by the Nabataeans. It was built during the Roman era in 106 C.E. in the Roman Province of Arabia.

The Bishopric of Philadelphia was located in the early Byzantine period, and in 326 C.E., Christianity became the official religion of the empire.

The city of Philadelphia, renamed to Amman by the Ghassanians, which was a group of South Arab Christian tribes that had migrated from Yemen in the year 250 C.E. Amman was conquered by Arab General Yazid ibn Abi Sufyan in 635 CE which began the introduction of Islam.

The city, which had the appearance of being practically abandoned by 1300, was decimated by earthquakes. The Circassians were a mere hamlet and a pile of rubble until 1878, when the Ottoman Turks captured them from Russia. The construction of the Hejaz railway connecting Damascus and Medina gave Amman the status of a significant station and a city once again, by facilitatating the annual hajj pilgrimage and the continued trade of the Ottoman Sultan.

Amman remained a small city until 1948, and because of the influx of a large number of the Palestinian population to Jordan, Amman has developed and grown rapidly since 1952 under the Hashemite leadership.

The 1967 Six-Day war marks the second wave of refugees who entered Jordan after losing all territory of the west side of the Jordan River to Israel. The third wave of refugees was from Kuwait, which arrived after the Gulf War into Amman in 1991.

The city experienced a wave of Iraqi refugees after the first Gulf War, and another wave came after the 2003 invasion.

Many new buildings went up around the city, especially in West Amman, after the migrants established their new districts.

4.1.2 The Physical Characteristics of Amman

Amman sits on the undulating hill in the North-West of Jordan. The main place of Amman occupies seven hills, or 'Jabal' round the Wadi 'Ras el Ain' which shows the presence of the North-East hill towards the River Zarqa Basin (Potter, R. B., Darmame, K., Barham, N., & Nortcliff, S., 2009, p.2).

Over the last 25 years, the expansion of the city has resulted to a total of 19 hills occupying a sum of 875 meters and more. The city's terrain comprises of a range of steep hills and deep valleys that are occasionally narrow (Lavergne, M., 2004).

Most areas in Amman are named from the Jabals they are located in. Urban growth has increased considerably throughout the last 60 years in the frequently steeper mid-slope places.

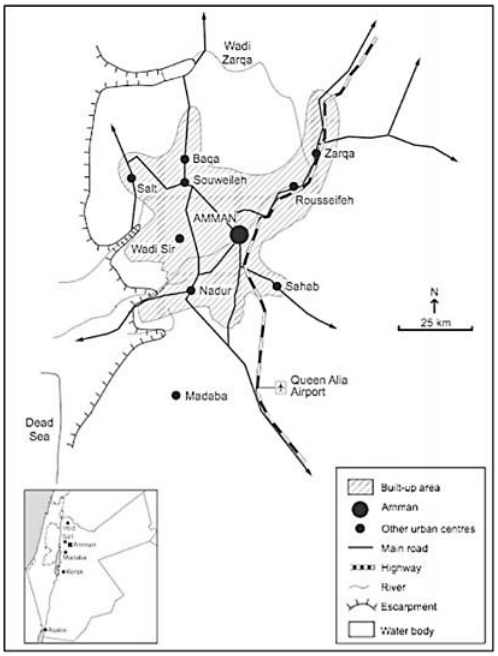


Figure 27: Amman: General Location Map (URL 21)

Geologically, the greater part of Amman lies under the limestone formation, which is about 85 meters thick and consists of fine to medium heterogeneous rocks.

In terms of climate, like the Northern side of Jordan, Amman shows a rainy season between November and April and a relatively dry season for the rest of the year. Due to Amman's position on the Jordan plateau, the wide double seasonal contrast in the case of the city can be further separated into four seasons. Spring and autumn are somewhat brief but acknowledged locally as one of the most enjoyable times of the year (Potter, R. B., Darmame, K., Barham, N., & Nortcliff, S., 2009, p.3).

4.1.3 Social Characters of Amman

4.1.3.1 Demography

Amman's population in 2021 was over 4.4 million. More than 42% of Jordan's population lived in Amman. The area measures 1,680 square kilometers, which offers a population density of 2,380 people per square kilometer. Immigration and migration have brought many people to Amman as population grew in tandem rate.

The city of Amman was ignored for decades until the Circassians took it over in the 19th century. Around 40,000 Circassians live in the area around Amman today. After the Hejaz Railway main station moved to Amman in 1914, Muslims and Christians from Al-Salt began to immigrate to the city.

Many Amman citizens are of Palestinian origin (urban or rural). The Jordanian and Palestinian Arabs are the two primary demographic groups in Amman at the moment. Some 2% of the population belongs to different ethnic groups.

In addition, Amman's lack of a strong native population contributed to the absence of a distinctive Jordanian dialect in the city, though more recently, Amman has been influenced by the various dialects of Jordan and Palestine.

In addition, the people of the town have begun to describe themselves as Ammani, even though their parents identify more with their home countries.

4.1.3.2 Culture

The Jordanian culture is generally rich in esthetics and creativity. Jordanian culture mixes the past and the present, so is the Islamic and contemporary cultural legacy. It also adopts East culture and accepts Western traditions, not to mention being an extension of the Arab culture surrounding it. At the end of the 20th century, cultural life arose in Jordan.

Jordan's capital is widely considered to be one of the Arab world's most liberal cities. In the Middle East and throughout the Arab world, Amman has risen in popularity as a location for western expats and students.

After a rise in Arab and local cultural activities and festivals, Amman was named the capital of culture in 2002. However, in 2017, Amman was named the capital of Islamic culture for the Arab region.

The vast majority of Jordan's radio stations, newspapers, and TV stations are in Amman. In addition to large events and institutional planning, the cultural identity of the city is bolstered by the use of tactical urbanism.

4.1.3.3 Economy

As for the economy, the banking sector is considered one of the main and important pillars of the Jordanian economy. The Jordanian banking sector maintained its 2014 development, despite the upheavals and economic challenges in the Arab world caused by the Arab Spring. There are twenty-five banks, 15 are listed on the Amman Bourse. Amman, one of the Middle East's leading financial institutions, is the basis town of the International Arab Bank.

On the other hand, tourism is one of the pillars of the Jordanian economy. Amman ranks fourth among the most visited Arab cities. In addition, occupying the ninth place among the most countries in the world in the recipient of international visitors' spending. Queen Alia International Airport dilation is an example of considerable investment in urban infrastructure by the Greater Amman municipality.

Amman is the heart of medical tourism in the Middle East, and Jordan in general. Jordan is one of the fifth-highest and attracts the most medical tourists in the region. Amman receives about $1 billion each year and 250,000 patients from countries.

Moreover, Amman presents itself as a hub for commerce. With the advent of new projects, the skyline of Amman is continually changed. After the Iraq War of 2003, a substantial part of the business came to Amman.

The two leading regional information technology companies Rubicon Group Holding, and Maktoob operate in Amman along with key international companies like Hikma Pharmaceuticals, one of the Middle East's biggest pharmaceutical companies, and Aramex a leading logistics, and transportation company in the Middle East.

Amman from the favorite hubs for Multinationals in the Middle East and Northern Africa region in a research published by Dunia Frontier Consultants. Moreover, many of the biggest investment banks worldwide are headquartered in Amman.

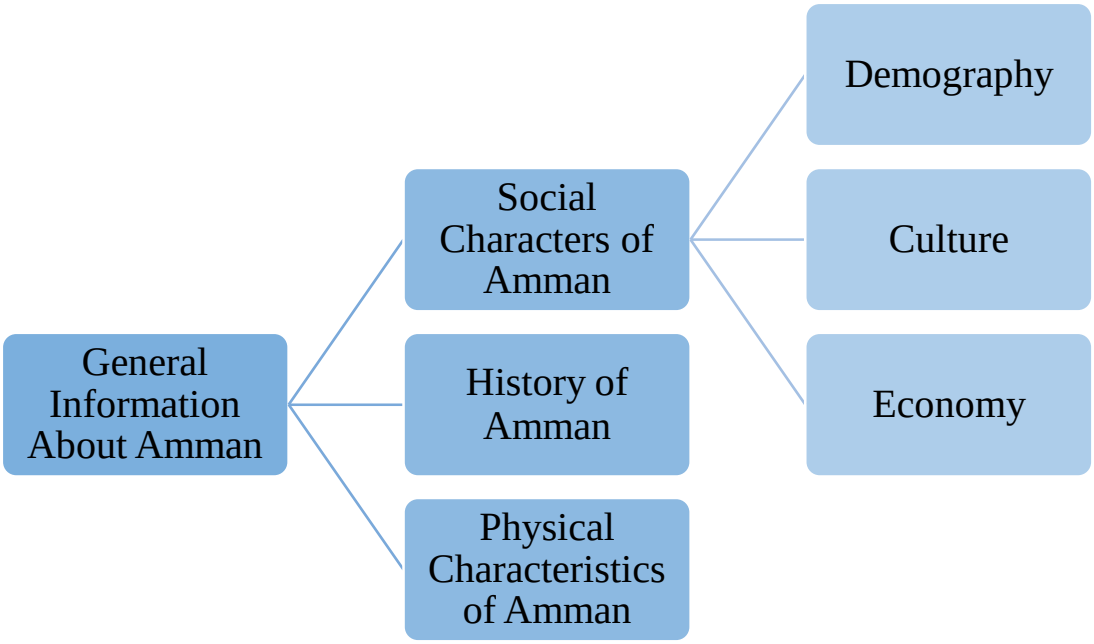


Figure 28: Summary Table for Chapter Four

Chapter 5

COMPARING OF THE OLD TRADITIONAL HOUSES AND NEW RESIDENTIAL IN AMMAN

5.1 Selection of the Case Studies

The study sample includes 20 houses (between 10 old & 10 new residential) located in the capital city of Hashemite Kingdom of Jordan, Amman, which was intentionally chosen for the objectives of the study.

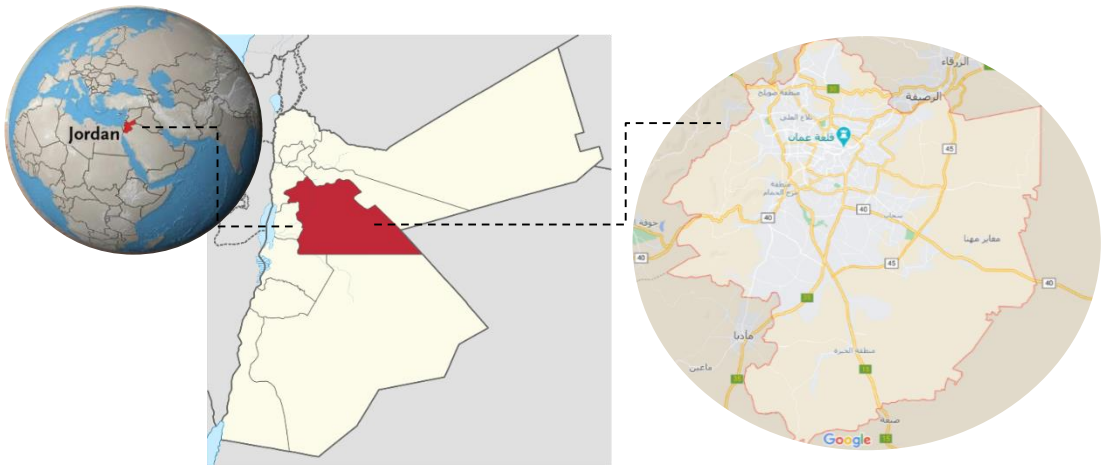


Figure 29: Map Showing the City Limits of Amman-Jordan (URL 22)

The selected samples were based on an investigation of the elements of sustainability in the interior design of houses with a special focus on the sustainable design features of old traditional, and new residential, taking into account Jordan's peculiarity in terms of the nature of the geographical location and its culture.

The samples also have special advantages, most notably:

- Sufficient data is available on them.
- The samples are still valid and in good condition allowing the researcher to visit and study them.
- The interior and external contents of the samples are available and in good technical condition.
- Availability of plans and photos of study samples or the possibility of visiting them in the field.
- Reflects clear design characteristics.
- The samples have many sustainability features.

5.1.1 Method of Analysis Observation

To the case studies, tables with accurate data was developed.

At the beginning of each table, there is a general information about the samples like name and location. In addition, high-quality pictures and plans have been chosen to observe the houses.

Consent has been taken for the use of the photos and plans by the house owners but some residents have not given permission to use the Plans, such as tables 7, 12, 13, and 14.

According to the descriptive method, the houses have been classified and listed in the tables below. The following are the criteria for the descriptive method:

- Interior Space Organization.
- Interior Space Components like:
    - The material for structure and furniture.

- Lighting and Ventilation patterns.
- Finishing, which includes infrastructures (solve the water, electric, heating), and design elements (aesthetic and functional).

By the end of the analysis, the method for evaluating the case studies has been developed.

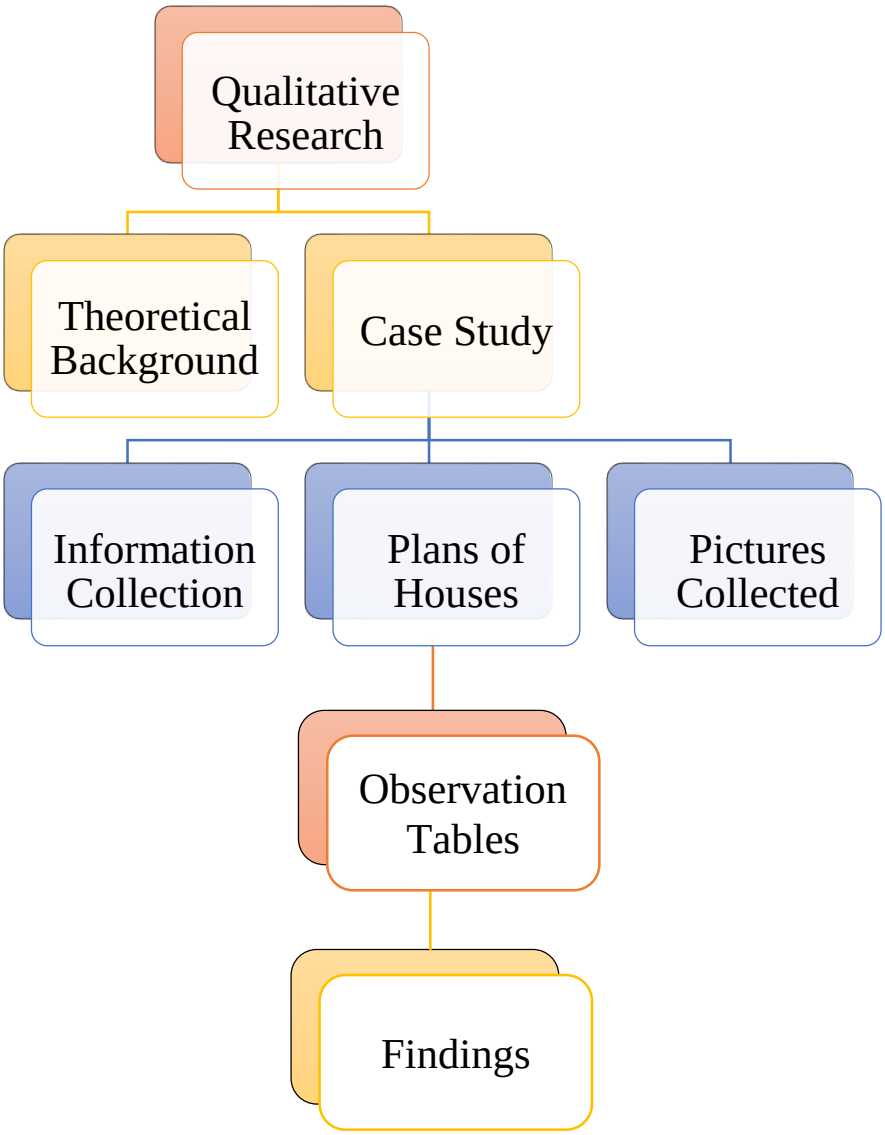


Figure 30: Method of Analysis Observation

Sustainability in houses is a critical issue and still in the domain of discussion. Some criteria have been improved and taken in wider perspectives in order to achieve the aim of the study:

- **Interior space Organization:** is one of the house's criteria, it provides a wide range of activities and services into space through improve the space function as optimal use of all the space and employ the storage units. Also, employ the flexibility it seeks to reach the changing needs of the residents through change the space organization based on the user's needs without any change in the house structure. On the other hand, it makes the space safe by making the best design to avoid the accidents that affects the residents, and provide the sense of privacy.

- **Materials:** it influences both the interior environment and the residents, to achieve user satisfaction and comfort, in addition, to maximize the potential of nature in the space and the furniture through the use of good materials, as well as reduce the cost of materials by reusing them.

- **Lighting:** is one of the house's criteria, it aimed to provide a safe as well as a comfortable environment to the resident by ensuring safe and effective light by using creative and cost-effective LED design, capability to the luminance distribution, personal control, energy efficiency, and daylight integration in addition, to using natural light as much as possible.

- **Finishing:** it aims to provide quality or state of being perfected through employ sound insulation materials, water systems, and procedures for construction to enhance its service and aesthetic.

5.2 Old Traditional Houses

The old traditional house is an outstanding native culture, both its architectural form and style embodied a practical and aesthetic combination of architecture and the environment.

The research reviews case studies of the old traditional houses in Amman's core: downtown. Downtown is an old, area of the Capital. Wast El-Balad is the city's oldest district, where believed to have been inhabited by residents for the first time through the Neolithic time (Ashour, K. N., 2016).

Downtown means the old houses, the old corners whose entrances narrows to the top just like the mountains located in the middle of the country, where people gather, stack up and run around houses piled up on all sides above the mountains.

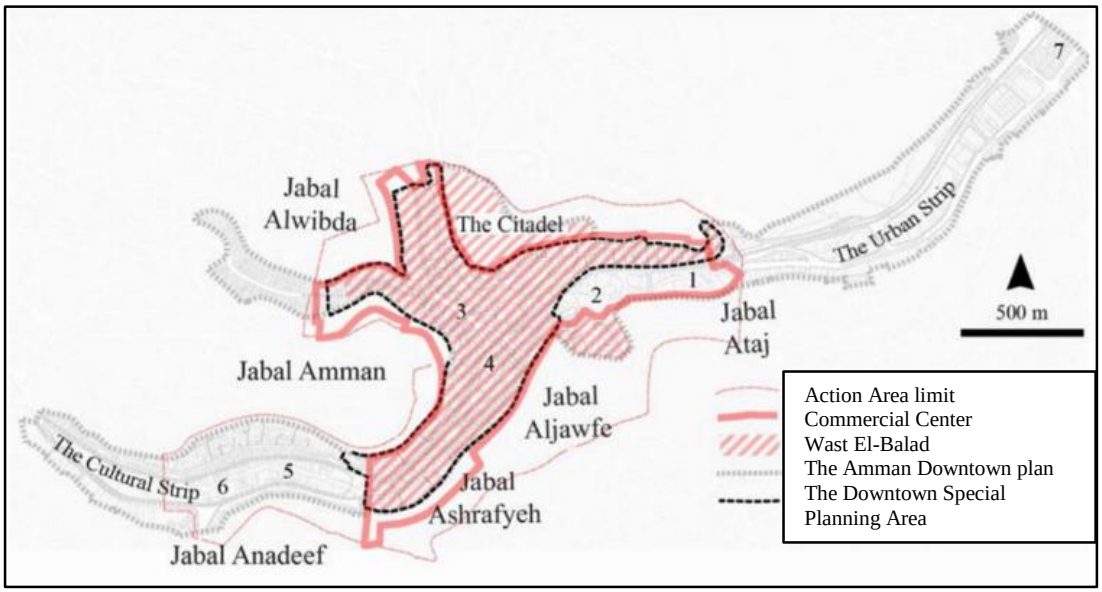


Figure 31: The Downtown Limit (Amman, Jordan) (URL 23)

5.2.1 Samples: Location, Information's, Materials, Ventilations, Comparative

Table 5: Analyze Wasfi al-Tal's House According to the Old Traditional House

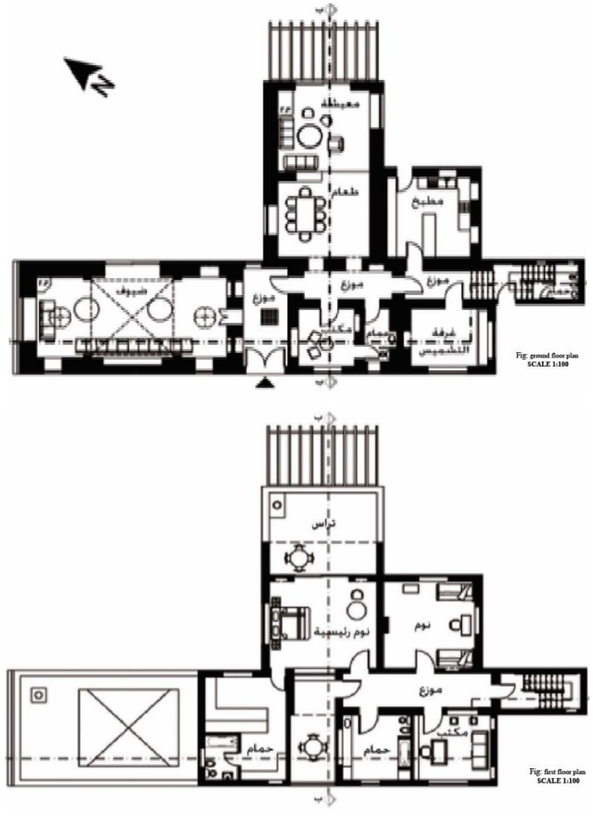
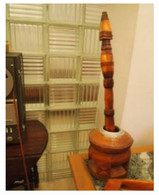
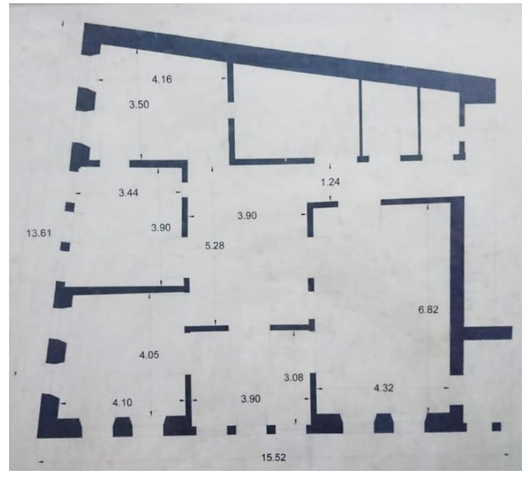
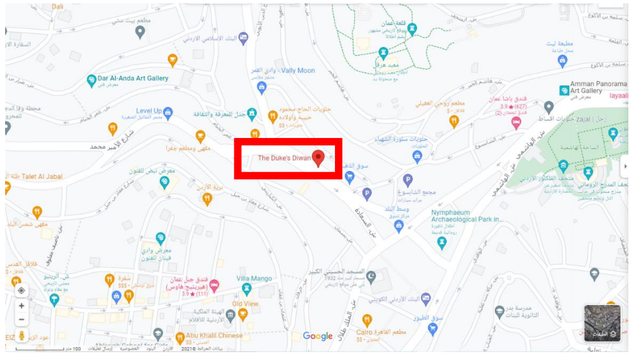
<table>
<tr><th colspan="4">Sample 1: Old Traditional House</th></tr>
<tr><td colspan="3">Name of the House: Wasfi al-Tal's House</td><td>Plans of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman- Al Kamalyah</td><td rowspan="5">  </td></tr>
<tr><td>Photos of the House:
  
  
  
   </td><td>Interior Space Organization</td><td>- The interior spaces are designed with two regular shapes, which are square and rectangular shape.
- The furniture is organized randomly in some interior spaces.
- Spaces have problems because of a lack of organization and exploitation.</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- Use local materials such as stone and clay to build the house.
- The external doors are made from iron to provide security.
- The furniture is traditional, with one work.
- Usage of natural wood in doors, windows, locker, tables, sofas, and beds.
- Use the glass in the windows and wall.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Employing natural lighting efficiently and creatively at the house.
- Use a thick glass wall with squares of glass provides more natural light.
- Use synthetic lights through decorative hanging lights.</td></tr>
<tr><td>Finishing</td><td>- Use locally available insulation materials like stone, clay, and wood.
- Use the ventilation effectively.
- A backyard creates privacy for the house.
- Maintain the appropriate temperature through the thick walls.</td></tr>
</table>

Table 6: Analyze Duke's House According to the Old Traditional House

<table>
<tr><th colspan="4">Sample 2: Old Traditional House</th></tr>
<tr><td colspan="3">Name of the House: Duke's House</td><td rowspan="2">Plan and Map of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman- Downtown</td></tr>
<tr><td>Photos of the House:
 
Entrance corridor
 
Dining Room
 
Balcony Room
 
Details for Furniture & Corridor
 
Balcony access
 
Living Room</td><td colspan="2">Interior Space Organization</td><td>- Spaces have problems that are not well organized and used.
- Failure to observe the movement corridors.</td><td rowspan="4"> 

First Floor Plan: Scale 1:50
 

Address: Amman- Downtown- King Faisal Street</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- The main material of furniture is wood.
- Many pieces of furniture are made from wood such as doors, frames of windows, tables, chairs, and others.
- Use the glass in windows and some tables.
- Use copper in hanging lights.
- Use local and raw materials such as stone and mud for a house.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Benefit from natural light amply through wide windows and large doors.
- Use artificial lights non-power saving.</td></tr>
<tr><td>Finishing</td><td>- Use of high ceilings to provide good ventilation for the house.
- Design different geometric forms on the floors like chess.
- A spacious balcony.
- The house is not resistant to earthquakes and fires.</td></tr>
</table>

Table 7: Analyze Nofa House According to the Old Traditional House

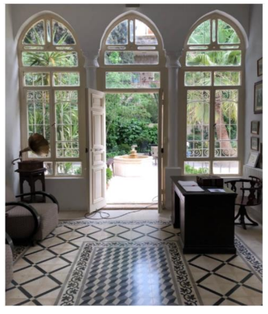
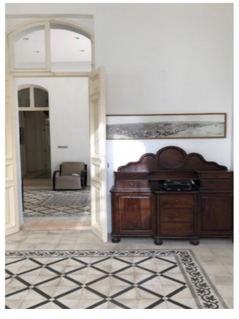
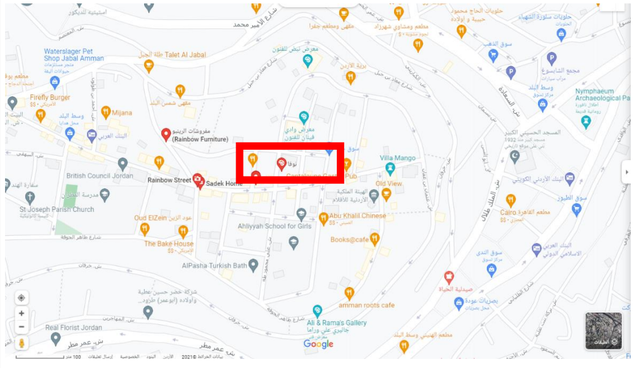
<table>
<tr><th colspan="4">Sample 3: Old Traditional House</th></tr>
<tr><td colspan="3">Name of the House: Nofa House</td><td rowspan="2">Map of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td></tr>
<tr><td rowspan="4">Photos of the House:
   
    </td><td colspan="2">Interior Space Organization</td><td>- Use of open space at the extreme level.
- The spaces have issues caused by their not properly organized and exploited.</td><td rowspan="4"> 
Address: Amman - Othman ben Affan Street</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- Use local and raw materials such as stone, mud, and glass.
- The furniture is simple, with one function for each piece of furniture with restricted creativity in design.
- The furniture is made from wood.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Use natural lighting as possible through wide windows, doors, and yards.
- Use artificial lights non-energy saving.</td></tr>
<tr><td>Finishing</td><td>- Planting the open space with natural plants.
- A large main entrance in the form of arches and big openings and windows.
- Design different geometric forms on the floors.
- The house is not resistant to earthquakes and fires.</td></tr>
</table>

Table 8: Analyze Manara House According to the Old Traditional House

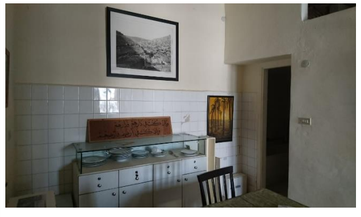
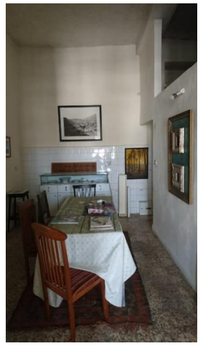
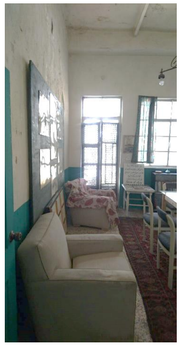
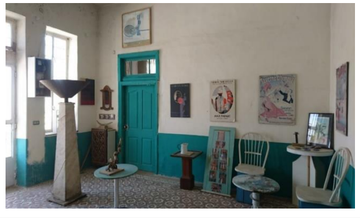
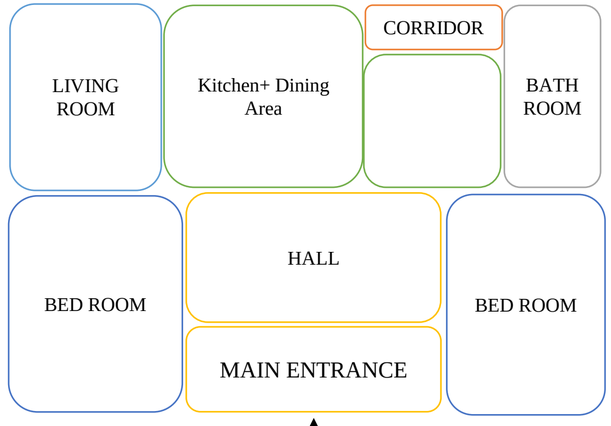
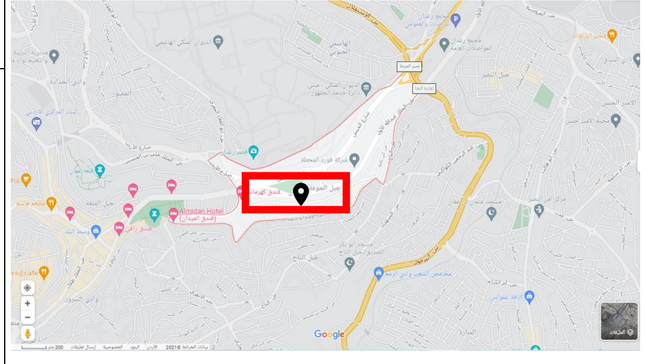
<table>
<tr><th colspan="4">Sample 4: Old Traditional House</th></tr>
<tr><td colspan="3">Name of the House: Manara House</td><td rowspan="2">Plan and Map of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman- Downtown</td></tr>
<tr><td>Photos of the House:
  
  
   
  </td><td>Interior Space Organization</td><td>- Spaces have problems that are not well organized and used.</td><td rowspan="4"> 
General Plan
 
Address: Amman- Downtown- Jabal Al-Joufeh</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- Use local materials like stone and mud to cladding the house.
- Use iron in the main door and outside windows.
- Use wood in the indoor doors.
- The furniture is old and is made from wood, glass, and fabric.
- Employ the glass in the big windows, doors, and tables.
- Use the ceramics on the bottom of the wall.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Employ the natural lighting efficiently at the house through wide windows.
- Use arterial lights through hanging lights.</td></tr>
<tr><td>Finishing</td><td>- Use of rising ceilings to provide good ventilation for the house.
- Design different geometric forms on the floors.
- The house is not resistant to earthquakes and fires.
- The security just through the iron door and iron forms on the windows.</td></tr>
</table>

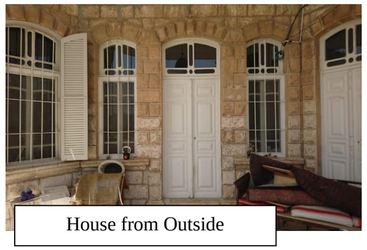
Table 9: Analyze Suzy House According to the Old Traditional House

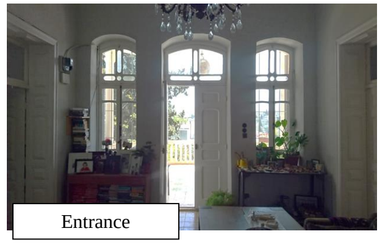
Sample 5: Old Traditional House

Name of the House: Suzy House

Location : Jordan- Amman

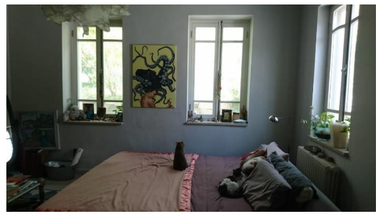
Photos of the House:

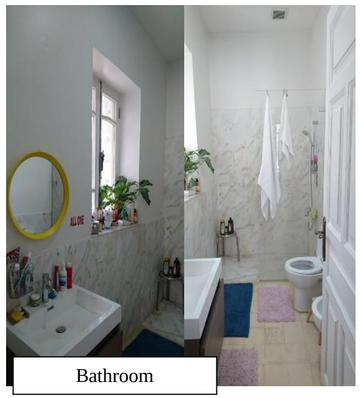

House from Outside


Entrance


Living Room

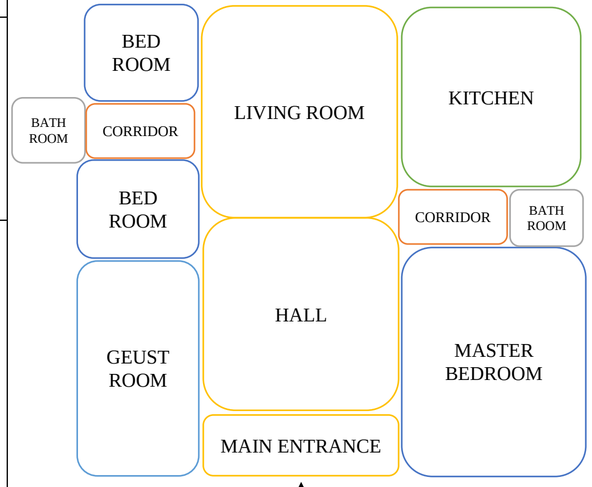

Kitchen


Bed Rooms

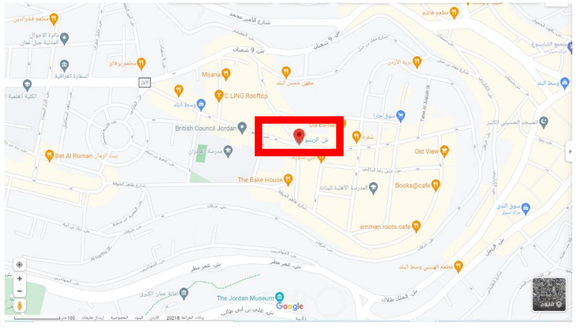

Bathroom

Interior Space Organization		- The indoor spaces are designed with two orderly shapes, which are square and rectangular shape. - In Suzy house use of space and organize the furniture the house at the maximum level. - Use the edges of the windows as a place to put accessories and plants to increase the aesthetic.
Interior Space Components	**Material** - Furniture - Building materials	- Use of natural stone cladding for the house. - Usage local materials like stone and mud to build the house. - In indoor, use of natural wood in doors, windows, locker, tables, and kitchen. - Employ the glass in the large windows, doors, and kitchen lockers. - Use the marble in the bathroom and on lockers in the kitchen. - The furniture between new and antique. - The furniture is made from wood, iron, and fabric.
	Lighting - Artificial light - Natural light	- Afford natural lighting through the large windows and arches from glass in doors. - Having more than one large window in the bedrooms makes a good balance of the natural lighting. - For artificial light, use the hanging lights in the living room, and accessories light in the bedrooms.
	Finishing	- A large main entrance in the form of arches and big openings and windows. - Design the iron forms and doors for the windows to increase security. - Use of heating throughout the house. - Use of high ceilings to provide good ventilation for the house and resistance to moisture.

Plan and Map of the House

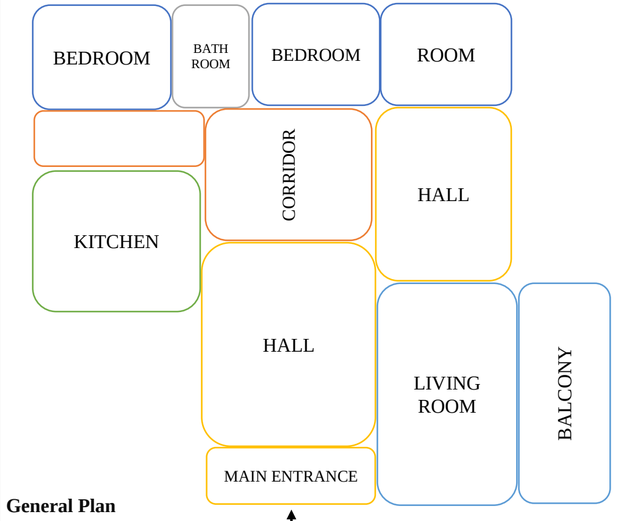


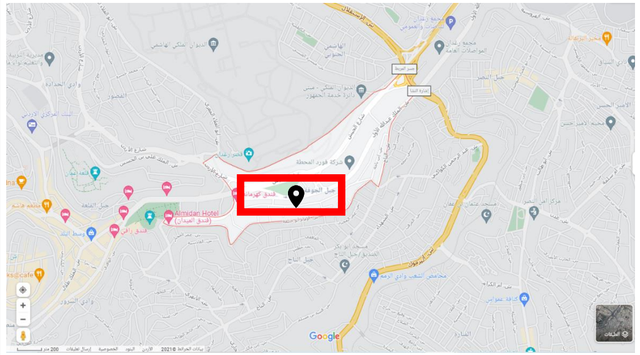
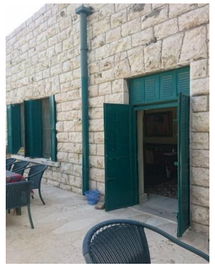
General Plan



Address: Amman- Rainbow Street

Table 10: Analyze Shibli- Bisharat House According to the Old Traditional House

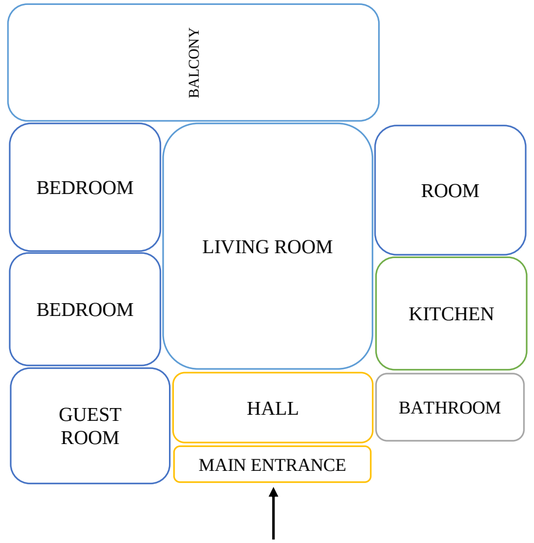
<table>
<tr><th colspan="4">Sample 6: Old Traditional House</th></tr>
<tr><td colspan="3">Name of the House: Shibli- Bisharat House</td><td>Plan and Map of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td><td rowspan="2"> 

General Plan
 
Address: Amman- Downtown- Jabal Al-Joufeh</td></tr>
<tr><td>Photos of the House:
 




 </td><td colspan="2">Interior Space Organization</td><td>- The spaces have issues caused by their not properly the furniture organized and exploited.
- There are not enough passages between furniture.</td></tr>
<tr><td></td><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- Usage of the house's natural stone covering.
- To build a house, use local materials such as stone and sand.
- Use ordinary paint for walls.
- At indoor, use of natural wood in doors, windows, chairs, and tables.
- Use the glass in the large windows, and hanging lamps.
- Use Iron in the main door, in window protection, and hanging lamps.</td></tr>
<tr><td></td><td>Lighting
- Artificial light
- Natural light</td><td>- Effective utilize of natural lighting by large windows at the house.
- Bring natural light to the house through the side balcony.
- Use artificial light through hanging lights and simple lights Yellow-lit.</td></tr>
<tr><td></td><td>Finishing</td><td>- Use of rising ceilings to provide good ventilation for the house.
- Model different abstract floor shapes.
- The safety through the iron door and iron forms on the windows.
- The house is not resistant to earthquakes and fires.
- House ceilings are not resistant to moisture.</td></tr>
</table>

Table 11: Analyze Gilani House According to the Old Traditional House

<table>
<tr><th colspan="4">Sample 7: Old Traditional House</th></tr>
<tr><td colspan="3">Name of the House: Gilani House</td><td>Plan and Map of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td><td rowspan="2"></td></tr>
<tr><td colspan="3">Photos of the House:
 
The House from Outside & Entrance
 
Wooden Doors and Upper Glass Windows
 
 
Balcony
 
Large & Big Windows
 
Interior the House
 
Hanging Lights and Simple Lights Yellow-Light.
  </td></tr>
<tr><td>Interior Space Organization</td><td></td><td>- The interior spaces are designed with two regular shapes: square for rooms and rectangular shape for living room.</td><td rowspan="4"> 

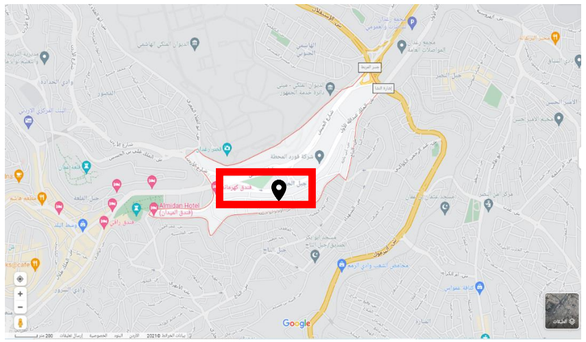
General Plan
 
Address: Amman- Downtown- Jabal Al- Joufeh</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- The use of natural stone in the cladding of the house.
- A contrast is created with the use of stone and clay in the build house.
- The Iron element is used in two ways of, the window protection frames, and the main door.
- Inside the house:
• Timber is the structural material of the doors and frames windows.
• Use the glass in the wide and big windows and hanging lights.
• For floors, use tiles with different shapes.
• The aluminum door is used as an entrance for the balcony.
• The walls are painted white.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Get natural light to the house through the wide balcony.
- Provide natural lighting in the house by large windows.
- Use artificial light through hanging lights and simple lights Yellow-light.</td></tr>
<tr><td>Finishing</td><td>- For safety:
• A camera was put above the main door.
• Use iron door and iron forms on the windows.
- Use of rising ceilings to provide good ventilation for the house.
- The house is not resistant to earthquakes and fires.</td></tr>
</table>

Table 12: Analyze Aladdin House According to the Old Traditional House

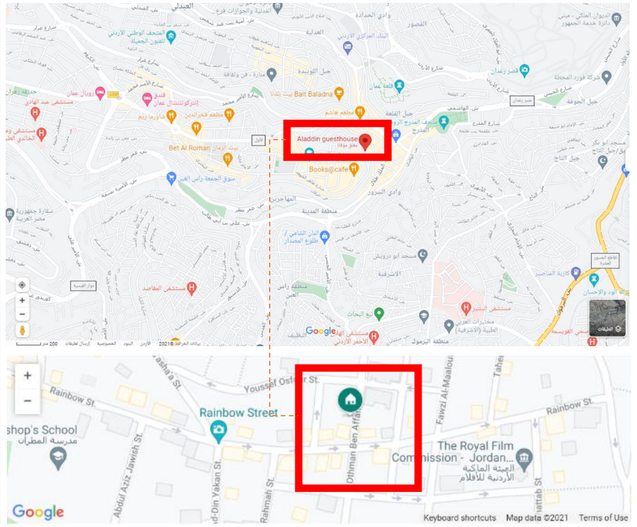
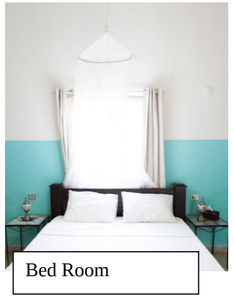
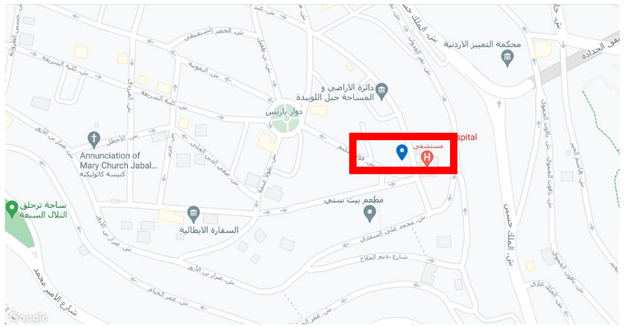
<table>
<tr><th colspan="4">Sample 8: Old Traditional House</th></tr>
<tr><td colspan="3">Name of the House: Aladdin House</td><td rowspan="2">Map of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td></tr>
<tr><td rowspan="4">Photos of the House:
  
  
  
Photos Credit: @tripadvisor.ie</td><td colspan="2">Interior Space Organization</td><td>- The interior spaces are designed in one shape, which is square.
- Usage of the space and organize the furniture simply.</td><td rowspan="4"> 
Address: Amman - Othman ben Affan Street</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- Employ the natural stone in the cladding of the house.
- Wood is the structural material of the doors, frames the windows, and furniture.
- Use glass in the big windows, hanging lights, and table.
- For floors, use tiles with different shapes.
- Iron is used in shutters the windows and furniture.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Use natural light to the house through the wide windows.
- Extend natural light in the house by small holes in the wall for the main entrance.
- Use artificial light through hanging lights with yellow light.</td></tr>
<tr><td>Finishing</td><td>- The house is not resistant to earthquakes and fires.
- The safety through iron forms on the windows.
- Design different geometric forms on the floors.</td></tr>
</table>

Table 13: Analyze Hawa House According to the Old Traditional House

<table>
<tr><th colspan="4">Sample 9: Old Traditional House</th></tr>
<tr><td colspan="3">Name of the House: Hawa House</td><td rowspan="2">Map of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td></tr>
<tr><td>Photos of the House:
 
House from Outside
 
Living Room
 
Bed Room
 
Kitchen
 
Bed Room
 
Locker
 
Bath Room</td><td colspan="2">Interior Space Organization
- Space is composed of sleeping rooms, living room, basic kitchen and equipped with heating.
- The spaces have problems caused by their not properly organized and exploited.

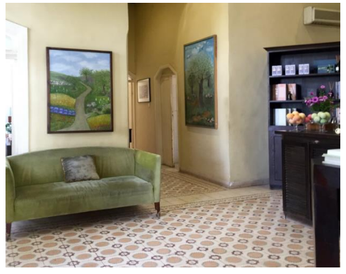
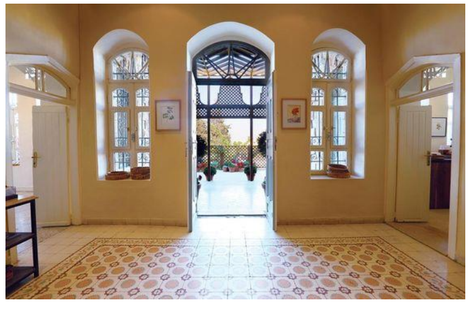
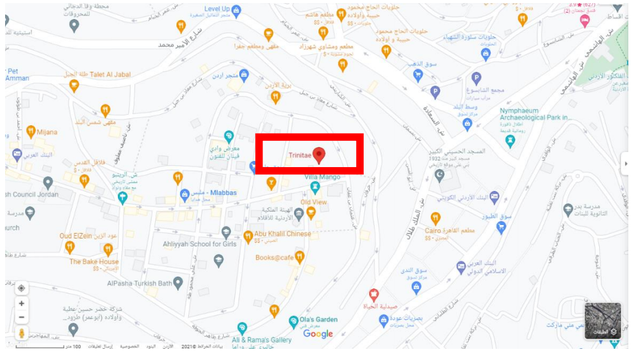
Interior Space Components
Material
- Furniture
- Building materials
- Employment of the house's natural stone covering.
- On the inside, use of natural wood in beds, doors, chairs, and tables.
- Use tiles with different outlines on the floors.
- Use the iron in shutters windows.
- Use glass in the windows and main door.
- Use the marble in the bathroom.
- The furniture is simple and normal.

Lighting
- Artificial light
- Natural light
- Use natural lighting through wide windows, doors, and yards.
- Use artificial lights non-energy saving through hanging lights.

Finishing
- The house is not resistant to earthquakes and fires.
- Use the ventilation effectively.
- A yard creates privacy for the house.
- House ceilings are not resistant to moisture.</td><td> 

Address: Amman- Abdel Moneim Samara Street</td></tr>
</table>

Table 14: Analyze Soup House According to the Old Traditional House

<table>
<tr><th colspan="4">Sample 10: Old Traditional House</th></tr>
<tr><td colspan="3">Name of the House: Soup House</td><td rowspan="2">Map of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td></tr>
<tr><td rowspan="4">Photos of the House:
  
  
   </td><td colspan="2">Interior Space Organization</td><td>- Use of open space at the extreme level.
- The spaces have problems due to their inadequate organization and exploitation.</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- Usage of the house's natural stone cover.
- Employment local materials like stone and mud to build the house.
- Use of a wood cover for the main entrance for sun protection and improve aesthetic appearance.
- Use of natural wood in doors, windows, locker, shelves, and tables.
- Use the glass in the big windows.
- Use tiles on the floors with different engravings.
- Iron is used to protect the windows.</td><td rowspan="3"> 

Address: Amman- Rainbow Street</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Use natural light through a lot of big windows, and front yard.
- Use artificial lights non-power saving.</td></tr>
<tr><td>Finishing</td><td>- A yard makes privacy for the house.
- The house is not resistant to earthquakes and fires.</td></tr>
</table>

Table 15: Comparative Analysis between the Chosen Ten Samples for Old Traditional Houses (Created by the Researcher)

Old Traditional House											
The criteria		**Sample 1**	**Sample 2**	**Sample 3**	**Sample 4**	**Sample 5**	**Sample 6**	**Sample 7**	**Sample 8**	**Sample 9**	**Sample 10**
Interior Space Organization	Spatial dimensions										
	Quality of the interior organization										
	Flexibility										
	Privacy										
Lighting	Natural light										
	Artificial light										
Material	Wood /Timber										
	Concrete										
	Stone										
	Clay/ Mud										
	Glass										
	Steel										
	Iron										
	Aluminum										
	Marble										
	Sand										
	Tiles										
Finishing	Sound insulation										
	Insulation materials										
	Resistant to wet and mildew										
	Water and heat insulation										
	Aesthetical										
Security	Safety against fire										
	Earthquake safety										

Very Good Good Medium Bad Not Used

5.3 New Residential

The house is one of the most important architectural spaces in which the residents spend their time, so should create a comfortable environment suited to the needs and requirements of residents, to help them to practice their activities in full comfort.

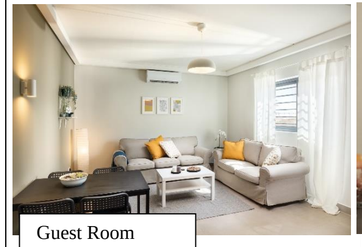
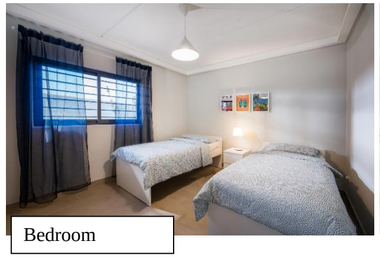
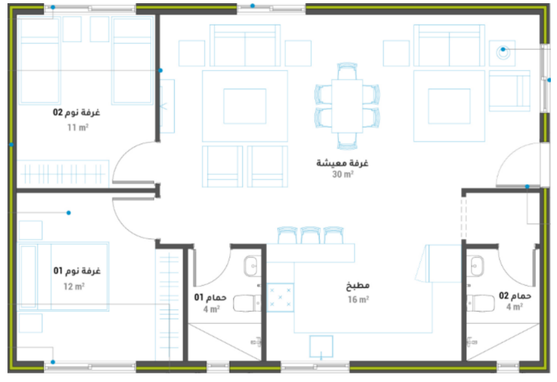
The new residential house in urban areas has become a theme of modern life. It is modern, esthetic, and gives you a sense of belonging (Susanka, 1998). Where these modern spaces are designed to reach human well-being. Also, it focuses on how to organize the spaces and establish priorities with attractive, private, and flexible spaces.

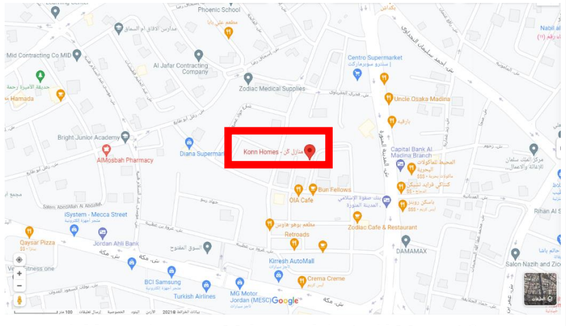
The new residential house can be defined as the create a comfortable and good environment, and determined through integration when furniture is integrated with materials, lighting, finishing, and space-saving through flexibility and better organization of space, which provides many possibilities to change the shape and size of the interior space, to achieving the requirements of residents and adapt to the environment. In addition, it is sustainable and thus a safe and healthy environment, the new residential houses have the ability to develop or change to meet all the needs of residents in the interior spaces and use furniture with high quality to employ more effectively to provide all needs and solve most problems.

The research reviews case studies of the New Residential in Amman's. The designs draw from the blend of a modern form interpreting the mystical Arabian Culture. The houses represents a new form of architecture in Jordan; the designs is integrated with the landscape, with contrasts between solids and voids.

5.3.1 Samples: Location, Information's, Materials, Ventilations, Comparative

Table 16: Analyze Konn House According to the New Residential Organization

<table>
<tr><th colspan="4">Sample 1 : New Residential</th></tr>
<tr><td colspan="3">Name of the House: Konn House</td><td rowspan="2">Plan and Map of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td></tr>
<tr><td colspan="3">Photos of the House:
 
Guest Room
 
Living Room
 
Bedroom
 
Master Bedroom
 
Kitchen
 
Bathroom
Photos Credit: @Konn. Homes</td><td>Interior Space Organization</td><td>- The area looks comfortable and refreshing through the use of white paint on most walls and the wood throughout the house.
- Usage of space the house at the maximum level.</td><td rowspan="4"> 

Plan of the House: Scale 1:50
 

Address: Amman- Mohammad Amin Al Momani Street</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- Using the new different materials that have good values such as concrete, wood, insulating materials for doors and windows, and porcelain for floors.
- Furniture is appropriate for the new residential organization, as they are comfortable, suitable in size, and high-quality.
- The design use wood as the main material for furniture in the house.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Using Energy-saving luminaires.
- Using natural lighting through windows.</td></tr>
<tr><td>Finishing</td><td>- House-made of reinforced concrete.
- Resistant to wet and mildew.
- Earthquake resistant.
- For infrastructures, the house is insulated from water and heat.</td></tr>
</table>

Table 17: Analyze Mushahwar House According to the New Residential Organization

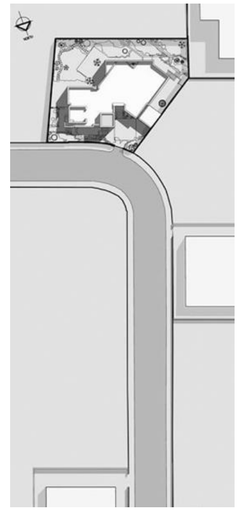
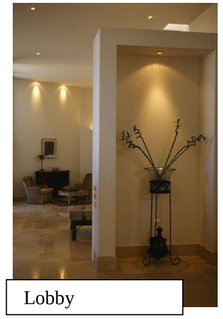
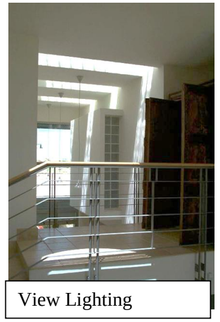
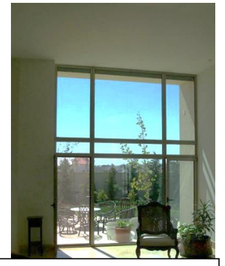
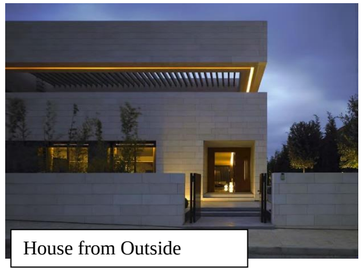
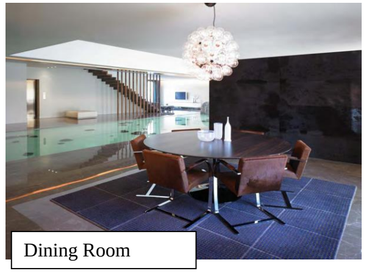
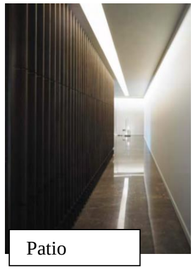
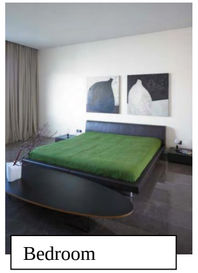
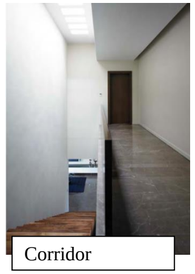
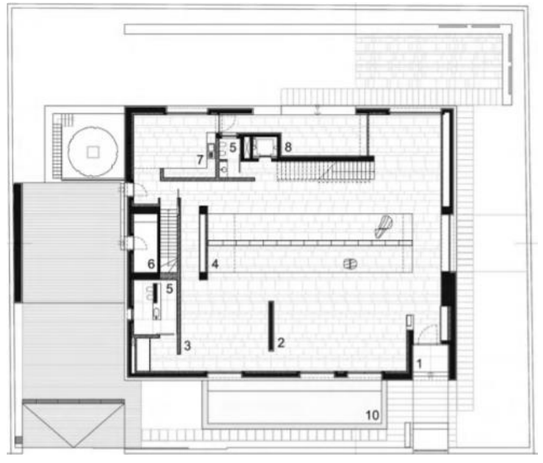
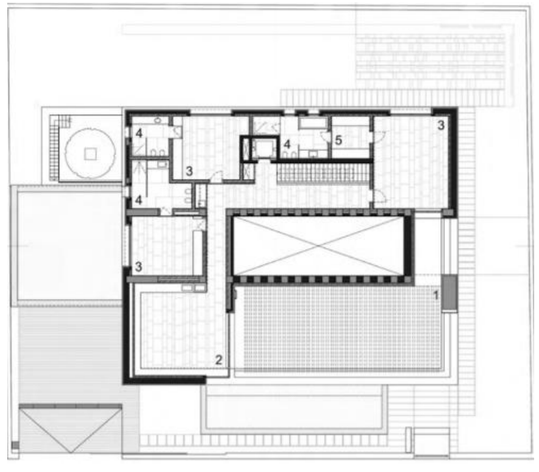
<table>
<tr><td colspan="4">Sample 2 : New Residential</td></tr>
<tr><td colspan="3">Name of the House: Mushahwar House</td><td>Plan and Site of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td><td rowspan="5"> 
Plan of the House: Scale 1:50
 
Site Plan</td></tr>
<tr><td colspan="3">Photos of the House:
 
House from Outside
 
Living Room
 
Entrance
 
Corridor
 
Lobby
 
View Lighting
 
Reception
 
View from Reception Towards Rear Garden</td><td>Interior Space Organization</td><td>- The interior spaces are flexible, in keeping with the lifestyle of the residents.
- The hub of the house is a big hall covering family, reception, and circulation areas, all opening up to embrace the rear garden.</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- The house used the basic construction materials that are commonly employed but in a new and more modern way through merging current local practices with European approaches and techniques.
- Use of stone cladding for the house.
- The concrete frame is completely internalized so that it is a part of the interior of the house.
- It contains rendered walls, aluminum blinds, steel balustrades, and expanses of glass.
- Use the wood in the furniture and doors.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Using natural lighting through large and wide windows.
- Employing glass facades on the ceiling and walls to increase the natural light.
- Using Energy-saving luminaires in the ceilings and walls.</td></tr>
<tr><td>Finishing</td><td>- Efficient thermal insulation and reduced to a minimum the high danger of wet penetration and mold growth.
- Earthquake resistant.
- High-security system.</td></tr>
</table>

Table 18: Analyze S House According to the New Residential Organization

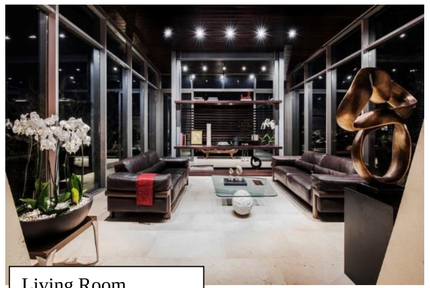
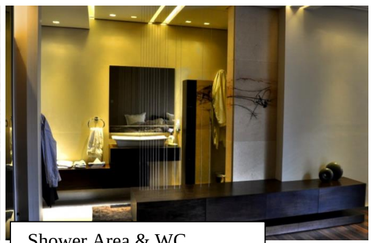
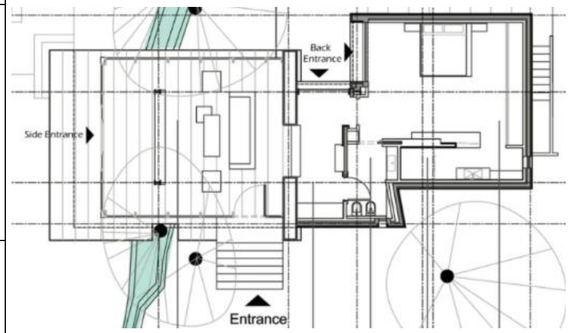
<table>
<tr><th colspan="4">Sample 3 : New Residential</th></tr>
<tr><td colspan="3">Name of the House: S House</td><td rowspan="2">Plans of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td></tr>
<tr><td rowspan="4">Photos of the House:
 
House from Outside
 
Dining Room
 
Patio
 
Facade Glass
 
Reception
 
Bedroom
 
Corridor
 
Living Room</td><td colspan="2">Interior Space Organization</td><td>- The interior spaces are adaptable, regarding the lifestyle.
- Structural arrangement for the house lets for most of the ground floor to be used as an open, column-free space.
- A bridge-comparable structural element supports the first floor, letting an open-plan living space at ground level with a large reflecting pool and a double-height space that draws in filtered light.</td><td rowspan="4"> 

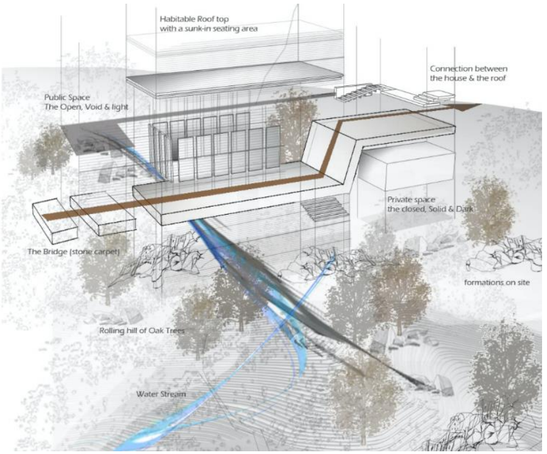
Ground Floor Plan: Scale 1:50
 

First-Floor Plan : Scale 1:50</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- The stone-clad exterior.
- Use the concrete blocks are mainly used for interior dividing.
- The house contains a lot of materials like aluminum, stainless steel, wood, glass, stone, and marble.
- Furniture is convenient for the house, as they are comfortable, modern, and high-quality.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Using Energy-saving luminaires.
- The use of artificial lighting extensively inside and outside the house on the ceiling and walls.
- Using natural lighting through big windows and glass roofs vents.</td></tr>
<tr><td>Finishing</td><td>- The construction of S. HOUSE involves a reinforced bridge-like structural element and a reinforced shell (the four facades).
- Heat insulation.
- Earthquake resistant.
- Double-glazing aluminum windows.
- Stainless steel folded floor.
- Gutter for rainwater drainage.</td></tr>
</table>

Table 19: Analyze Maani House According to the New Residential Organization

<table>
<tr><th colspan="4">Sample 4 : New Residential</th></tr>
<tr><td colspan="3">Name of the House: Maani House</td><td rowspan="2">Plan and Specification of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td></tr>
<tr><td colspan="3">Photos of the House:
 
House from Outside
 
Entrance for House
 

Close-up of the Materials
 
Living Room
 
Lighting from Glass Façades
 
Shower Area & WC
Photos Credit: world-architects.com</td><td>Interior Space Organization</td><td>- The interior spaces are characterized by flexibility, comfortable.
- The private space is enclosed by the folded stone roof whereas the open living space is covered by a floating timber roof.
- Private space the closed solid and dark.
- Usage and organization of space in the house at the most level.
- The furniture is properly organized perfectly with the interior space design.</td><td rowspan="4"> 

Plan of the House: Scale 1:50
 

House Specification</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- Use the stone, wood, metal, and glass mixture for the surrounding nature.
- The bridge (stone carpet).
- The interior, contains rendered walls, a wooden ceiling, PVC ceiling, and facades of glass.
- Use the wood in the ceiling, doors, and accessories.
- The furniture is suitable for the house, as they are restful, new, and high-quality.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Using natural lighting through large glass façades.
- Using Energy-saving luminaires on the ceiling and accessories light.</td></tr>
<tr><td>Finishing</td><td>- The construction includes a modern structure is built from several different materials.
- Habitable rooftop with a sunken seating area.
- Resistant to wet and mildew.
- Have heat insulation.
- Use air conditioning.</td></tr>
</table>

Table 20: Analyze Mahrakani House According to the New Residential Organization

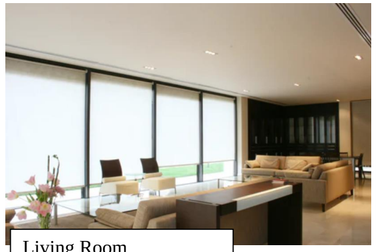
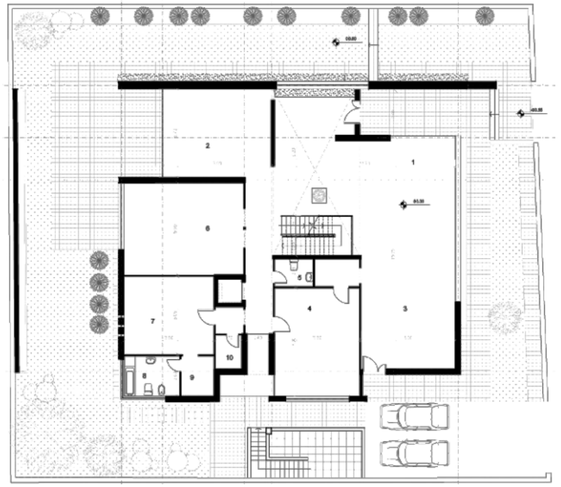
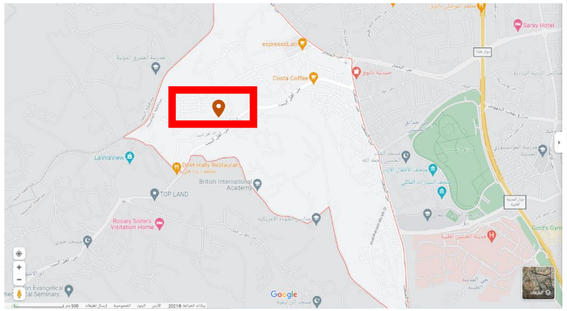
<table>
<tr><td colspan="4">Sample 5 : New Residential</td></tr>
<tr><td colspan="3">Name of the House: Mahrakani House</td><td rowspan="2">Plan and Map of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td></tr>
<tr><td rowspan="4">Photos of the House:
 
House from Outside
 
Large Glass Façades
 
 
Entrance
 
 
Living Room</td><td>Interior Space Organization</td><td>- The indoor spaces are characterized by flexibility, privacy, and comfort thus effectively influence residents.
- Use the furniture and organization of space in the house at the extreme level.
- Structural arrangement for the house is designed suitably and regularly.</td><td rowspan="4"> 
Plan of the House: Scale 1:50
 
Address: Amman – Dabouq - The Residential Neighborhood</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- Use stone, wood, steel, and glass for building the house.
- The stone is the main material:
• The stone-clad exterior.
• Use the stone at part indoors on the wall.
- The interior contains painted walls and stone ones, marble floors, a wooden staircase, facades of glass and glass handrail.
- The furniture is made of wood, glass, fabric, and iron.
- The furniture seems for the house, as they are convenient, modern, and high-quality.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Provide natural lighting through large glass façades and the glass ceiling.
- The different window balance purposefully diffuses and dilutes light to create a warm and friendly feeling to the house.
- For artificial light, use energy-saving luminaires at the house range.</td></tr>
<tr><td>Finishing</td><td>- The elements, which include stairs, balconies, and façades are designed and situated in such a way that merge the realms of the interior and the outside.
- A steel and glass façade makes the house lighting, airy and open.
- The high-security system through steel blinds and durable doors.
- Resistant to wet and mildew.</td></tr>
</table>

Table 21: Analyze Skyline House According to the New Residential Organization

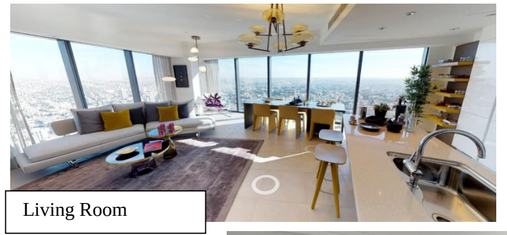
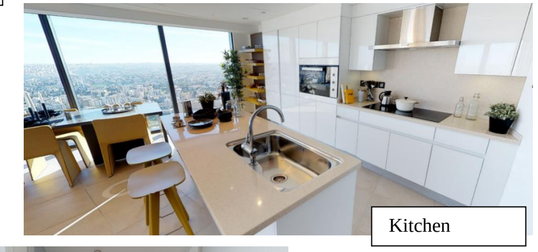
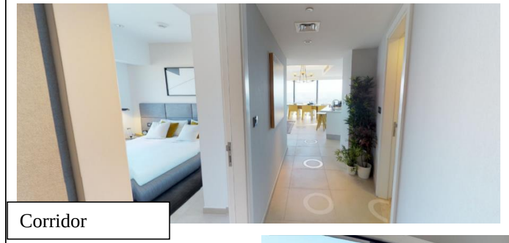
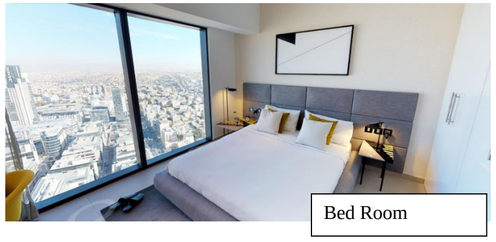
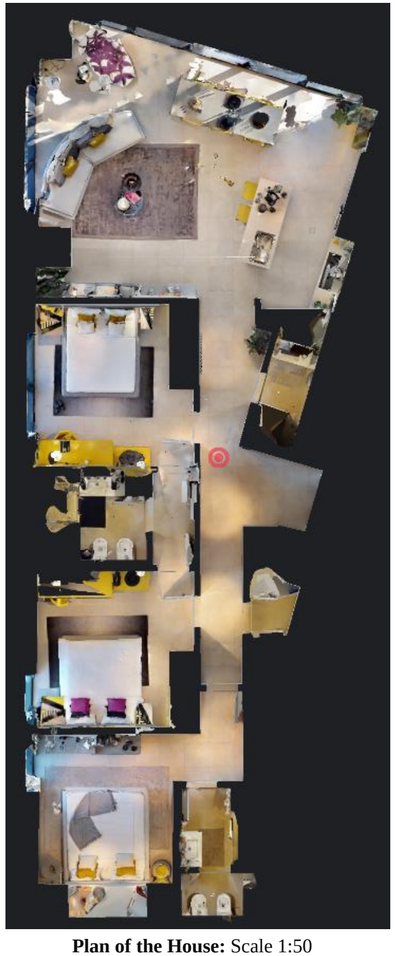
<table>
<tr><th colspan="4">Sample 6 : New Residential</th></tr>
<tr><td colspan="3">Name of the House: Skyline House</td><td rowspan="2">Plan of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td></tr>
<tr><td>Photos of the House:
 
Living Room
 
Kitchen
 
Corridor
 
Bed Room</td><td>Interior Space Organization</td><td></td><td>- Use the furniture and organization of space at a high level.
- Flexibility, privacy, and comfort define the indoors spaces.
- Allocating part from the wall open shelving next to the kitchen provides plenty of space for adding boxes and accessories.
- Employ the locker in the wall.
- Do good use of spaces, such as corridors between rooms.</td><td rowspan="4"> 
Plan of the House: Scale 1:50</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- The interior contains painted walls, marble floors, wooden doors and chairs, a Formica Kitchen, and facades of glass.
- The furniture is made from wood, glass, fabric, and iron.
- The furniture is sustainable, modern, functional, and of great quality.
- Use some covers, small pillows, and rugs for comfort and elegance.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Afford natural lighting through the wide glass façades.
- Big window distribution and employ it in the house make a good balance of the natural lighting.
- For artificial light, use energy-saving luminaires, hanging lights, and accessories light.</td></tr>
<tr><td>Finishing</td><td>- Have high security.
- Reluctant to wet and rot.
- Have heat insulation.
- Use air conditioning.</td></tr>
</table>

Table 22: Analyze K. Barghouti House According to the New Residential Organization

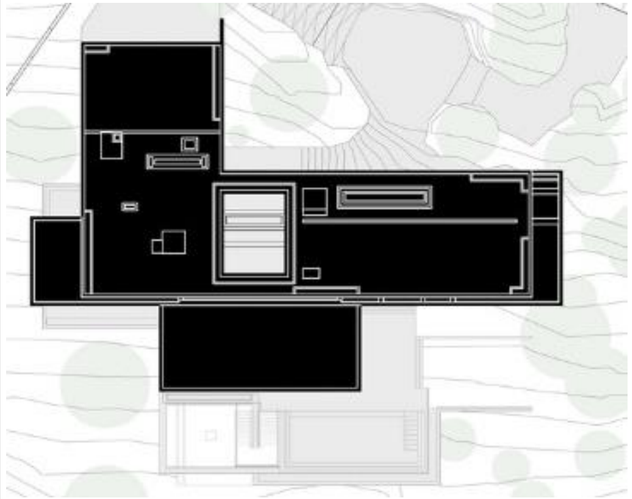
<table>
<tr><td colspan="4">Sample 7 : New Residential</td></tr>
<tr><td colspan="3">Name of the House: K. Barghouti House</td><td>Plan and Site of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td><td rowspan="5"> 
Plan of the House: Scale 1:50
 
Site Plan</td></tr>
<tr><td colspan="3">Photos of the House:
 
House from Outside
 
Wide Glass Façades
 
Main Door
 
Entrance Hall
 
Living Room
 
Dining Area
Photographs: Pino Musi, Sosthen Hennekam</td><td>Interior Space Organization</td><td>- Use the furniture and organization of space at a high level.
- Flexibility, privacy, and comfort define the indoors spaces.
- Do perfect use of spaces, such as corridors.</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- The body of the house consists of a series of thick concrete.
- The interior contains wood walls and painted ones, marble floors, and big facades of glass.
- Use wood, iron, and glass as a mirror for the main door.
- The furniture is made from wood, fabric, and marble.
- The furniture looks comfortable, modern, and high-quality.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Use the natural lighting through the wide glass façades.
- Using Energy-saving luminaires.</td></tr>
<tr><td>Finishing</td><td>- House-made of reinforced concrete.
- Resistant to wet and mildew.
- Earthquake resistant.
- For infrastructures, the house is insulated from water and heat.</td></tr>
</table>

Table 23: Analyze Abu Samara House According to the New Residential Organization

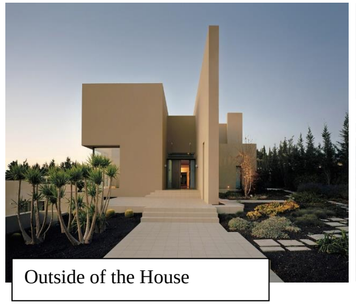
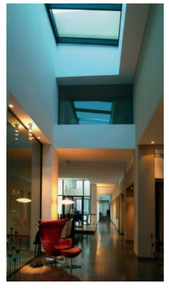
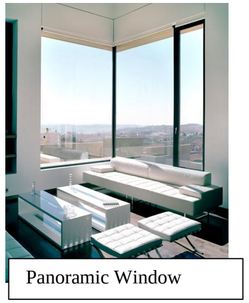
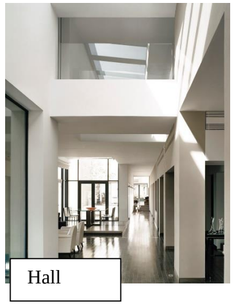
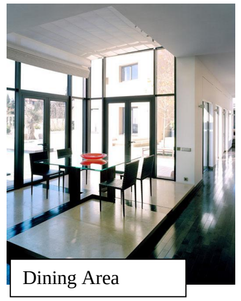
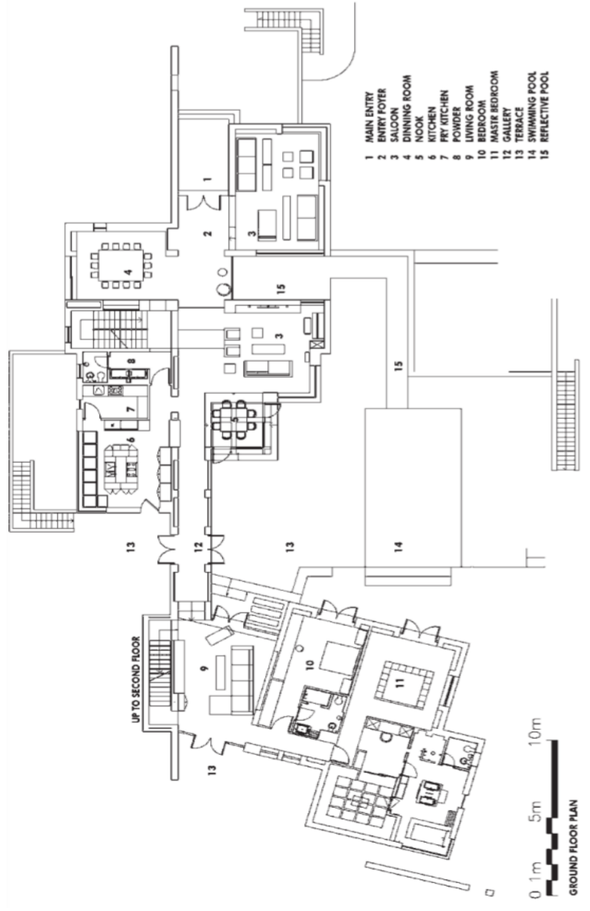
<table>
<tr><th colspan="4">Sample 8 : New Residential</th></tr>
<tr><td colspan="3">Name of the House: Abu Samara House</td><td rowspan="2">Plan of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td></tr>
<tr><td rowspan="5">Photos of the House:
 
Outside of the House
 
Living room
 
 
Panoramic Window
 
Hall
 
Dining Area
 
Stairs
 
Bathroom
Photographs: Arnaldo Genitrini, Osman Akuz, Ghassan Aqel</td><td colspan="2">Interior Space Organization</td><td>- The interior spaces of a house influx freely, both horizontally and vertically, emphasizing views to the outside through glass facades.
- Flexibility, privacy, and comfort define the organization of the interior spaces.</td><td rowspan="4"> 
</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- Uses plastering as a high-quality house finish.
- The interior contains painted walls, marble floors, and large glazed window panes.
- Employ the wood, iron, on the stairs.
- The furniture is made from Wood, Fabric, Marble, and Glass.
- The furniture appears relaxing, modern, and high-quality.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Use the natural lighting through the wide panes of glass and the simple rectangular windows.
- For artificial light, use energy-saving luminaires at the house range and the stairs.</td></tr>
<tr><td>Finishing</td><td>- Panoramic window.
- Electronic control of blinds for glass facades and ceilings.
- Reluctant to wet and rot.</td></tr>
</table>

Table 24: Analyze Abdulwahab House According to the New Residential Organization

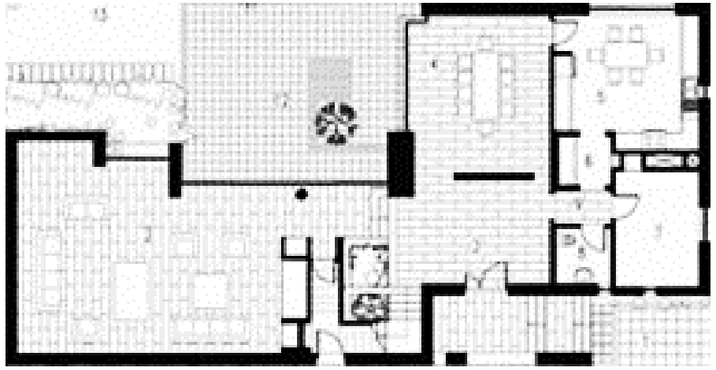
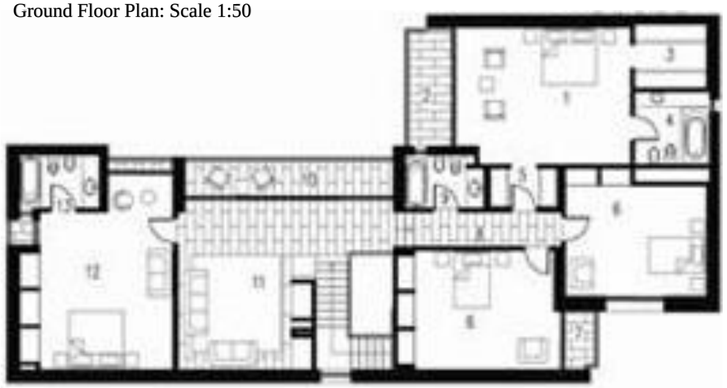
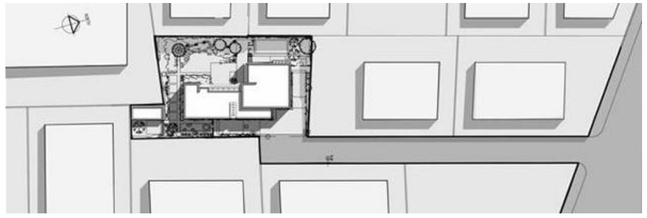
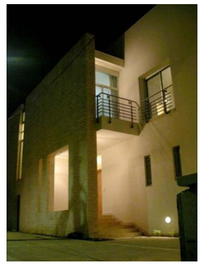
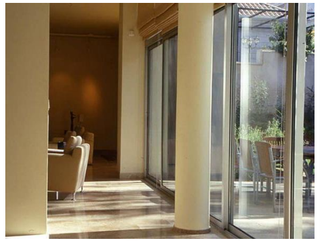
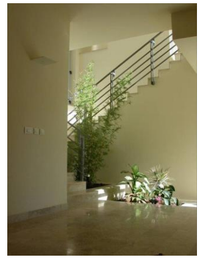
<table>
<tr><td colspan="4">Sample 9 : New Residential</td></tr>
<tr><td colspan="3">Name of the House: Abdulwahab House</td><td>Plans and Site of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td><td rowspan="5"> 
Ground Floor Plan: Scale 1:50
 
First Floor Plan: Scale 1:50
  </td></tr>
<tr><td rowspan="4">Photos of the House:
 
 
 
 
 
 
 
  </td><td colspan="2">Interior Space Organization</td><td>- Flexibility, privacy, and comfort define the organization of the interior spaces.</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- Outside contains:
• Stone-clad exterior.
• Rendered walls, a concrete frame, natural aluminum roller shutters, and glazed screens.
- The interior contains:
• Rendered walls, steel balustrades, aluminum shutters, and expanses of glass.
- The furniture is made from wood and fabric.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Use natural lighting through the wide windows, and expanses of glass.
- Use energy-saving luminaires with yellow color for the night.</td></tr>
<tr><td>Finishing</td><td>- A concrete-framed, double-skinned walling system.
- The system achieved real thermal insulation and reduced to a minimum the high danger of wet penetration and mold growth.
- Use waterproofing.
- Employ a concrete-backed exterior stone leaf.</td></tr>
</table>

Table 25: Analyze H Saket House According to the New Residential Organization

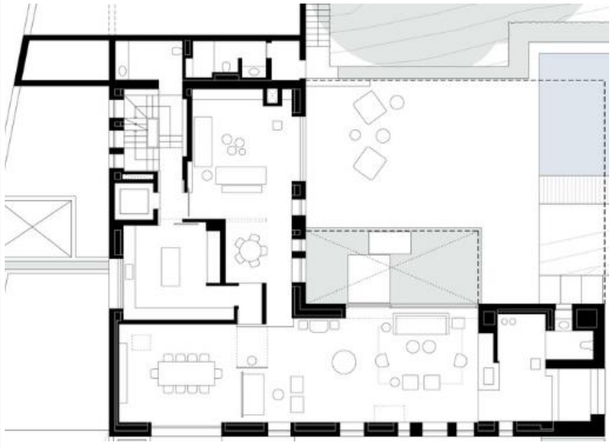
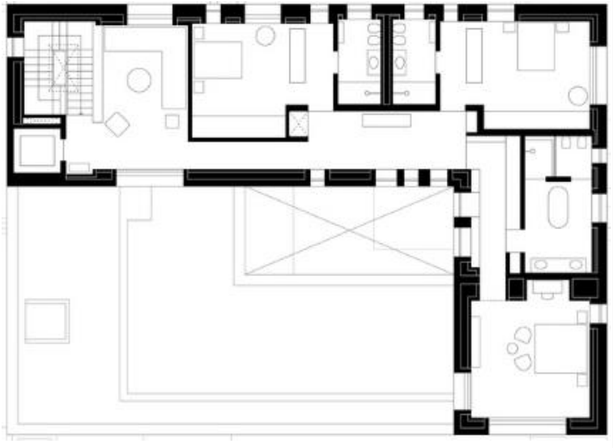
<table>
<tr><td colspan="4">Sample 10 : New Residential</td></tr>
<tr><td colspan="3">Name of the House: H Saket House</td><td>Plans of the House</td></tr>
<tr><td colspan="3">Location : Jordan- Amman</td><td rowspan="4"> 
Ground Floor Plan: Scale 1:50
 
First Floor Plan: Scale 1:50</td></tr>
<tr><td colspan="3">Photos of the House:
  
  
  
  
Photographs: Pino Musi, Roland Halbe, Sami Haven</td></tr>
<tr><td>Interior Space Organization</td><td></td><td>- Organization the plan of the house around one constant movement that creates a rectangular form with a central yard.
- The smaller and more domestic spaces of the interiors are brought back to the idea of a basic house.</td></tr>
<tr><td rowspan="3">Interior Space Components</td><td>Material
- Furniture
- Building materials</td><td>- The body of the house consists of thick concrete and limestone.
- Use natural wood and Plywood for:
• Walls and ceiling.
• Balustrades.
• Pieces of Furniture.
- Use glass in the big facade and windows.
- Use marble for floors.
- Use aluminum for windows shutters and facades shutters.
- The furniture is made from wood and fabric.
- The furniture looks comfortable, modern, and high-quality.</td></tr>
<tr><td>Lighting
- Artificial light
- Natural light</td><td>- Use natural lighting through the big and broad glass façades.
- Window distribution and use in the house make a perfect balance of the natural lighting.
- Usage energy-saving luminaires, hanging lights, and accessories light.</td></tr>
<tr><td>Finishing</td><td>- The house is insulated from water and heat.
- Resistant to wet and mildew.
- Electronic control of blinds for facades and windows.</td></tr>
</table>

Table 26: Comparative Analysis between the Chosen Ten Samples for New Residential (Created by the Researcher)

New Residential											
The criteria		**Sample 1**	**Sample 2**	**Sample 3**	**Sample 4**	**Sample 5**	**Sample 6**	**Sample 7**	**Sample 8**	**Sample 9**	**Sample 10**
Interior Space Organization	Spatial dimensions										
	Quality of the interior organization										
	Flexibility										
	Privacy										
Lighting	Natural light										
	Artificial light										
Material	Wood /Timber										
	Concrete										
	Stone										
	Clay/ Mud										
	Glass										
	Steel										
	Iron/ Metal										
	Aluminum										
	Marble										
	Sand										
	Tiles										
Finishing	Sound insulation										
	Insulation materials										
	Resistant to wet and mildew										
	Water and heat insulation										
	Aesthetical										
Security	Safety against fire										
	Earthquake safety										

Very Good Good Medium Bad Not Used

The researcher provides the results according to the analyzes of the house samples. Besides, the goals and objectives of the study were to compare old traditional houses and new residential through quality for sustainable design as a tool for interior architecture houses design. Which provides some criteria about the materials used in houses and furniture to reach the best design for houses to achieve user's needs and comfort in their residential space.

The previous sections suggested one-by-one comparison criteria inspired by the 20 selected samples of houses between old and new to achieve the quality, user's needs, and comfort in their residential space through the concept of sustainability.

The researcher created tables in the previous pages that provide the selected criteria to compare between the old traditional houses and the new residential like interior space organization, furniture, lighting, materials, and techniques.

Where the employment of these criteria was determined as follows: Very good in green, good in yellow, Medium in orange, bad in red, and finally not using in blue.

The results show that the levels were similar in terms of material used for both older and newer houses. In addition, the older Houses used in this study were rated low in terms of interior space organization, artificial lighting, maintenance, furniture quality, house design, aesthetics, and level of privacy. Such factors were of greater satisfaction in newer houses.

While research questions focus on why the concept of sustainability is important for interior design and especially for house units, and how the traditional houses and new residential are organized and what kind of material and furniture were used in both of them.

The researcher has thus employed a table that shows the comparison between traditional and new residential spaces to explain the differences and similarities between both of them.

Table 27: The Comparison between Traditional and New Residential Space

The Criteria	Traditional House	New Residential
Interior Space Organization	- Each room/space in the old traditional house is designed with a shape and a single purpose to accomplish a single task. - It is possible that the dimensions and disorganization of the spaces will have a direct impact on their internal functions.	-New residential space includes sustainability, quality, and comfort, which affect resident's needs by provides many possibilities to change the organization and shape of the interior space, thus positively influence them.
Furniture	-The furniture in a traditional house is calm and simple, with one function for each piece of furniture with restricted creativity.	- Furniture is suitable for the new residential organization, as they are sustainable, durable, and high-quality.
Lighting	-Traditional houses usually have wide windows and skylights that provide plenty of natural light.	- The new residential have windows that allow passage of natural light. -Energy-saving luminaires.
Material	-The design in the traditional houses typically used local materials, simple construction methods ,and local skills.	-The design in the new residential used different materials such as concrete, wood, insulating materials for doors and windows, and porcelain for floors.

The Houses must appear the data in design, space, and materials they contain. Unity must be achieved between the old traditional house and new residential either with agreement or difference.

The case studies of selected new residential houses, in general, are major cases that have satisfied many of the design specifications as described in the table.

Generally, reinforced concrete is the most used material in new residential because it is adopting a solid and durable shape over time, in addition to being highly resistant, economical in maintenance work, and resisting fire. Also, it is a wonderful complement for the stone walls in terms of contrast. In addition, wood and glass are used to achieve the balance between new and traditional. There are different techniques.

As a result, the organization of the new residential improves the quality of life and creating a comfortable environment for users in addition to the appearance of a decent, flexible, functional living space. A new residential house is prepared of space with furnishing that has duly quality and good materials for resident well-being.

Moreover, provide space in new residential houses affected in the modern lifestyle. In addition, it is sustainable and therefore a safe and healthy environment.

House plans for new residential spaces have been updated to make better use of available space, include multi-purpose rooms, and are environmentally friendly to conserve natural resources.

COMPARING OF THE OLD TRADITIONAL HOUSES AND NEW RESIDENTIAL IN AMMAN
Step 1: Observation • Observation of the houses (Interior Space Organization, Materials, lighting, Finishing). • Photographing.
Step 2: Preparing the Tables for Analysis • Creating Tables in ILLUSTRATOR Software for Every House. • Placing the Photos and plans in the Tables. • Placing the Information for Every House. • Creating Tables about Comparative Analysis between Samples for both Types. • Creating Table Comparison between Traditional and New Residential Space.
Step 3 : Comments

Figure 32: Summary Table for Chapter Five

Chapter 6

FINDINGS: THE RESULT OF THE ANALYZES, GRAPHICS, EXPLANATIONS

Providing satisfactory, perfect or quality homes for resident, has always been a major challenge and task for most designers in the world. As a result, different steps have been taken to eradicate this issue.

Assessing the house and the environment is a major section in the process of design. The assessment may be based on a variety of reasons. For example, it can be based on the residents' judgment and their opinions on the quality of the interior atmosphere of their houses.

This study analyzed several houses in order to discover to what extent they influence user satisfaction. The data gathered is considered to be important for future design and housing arrangements.

In the first part of this study, samples of residential houses were analyzed in terms of their organization of interior space, materials, furniture and lighting.

Environmental qualities like ventilation, natural light, thermal comfort and acoustical performance are all important for a sustainable internal designing (LEED, 2009, p.405).

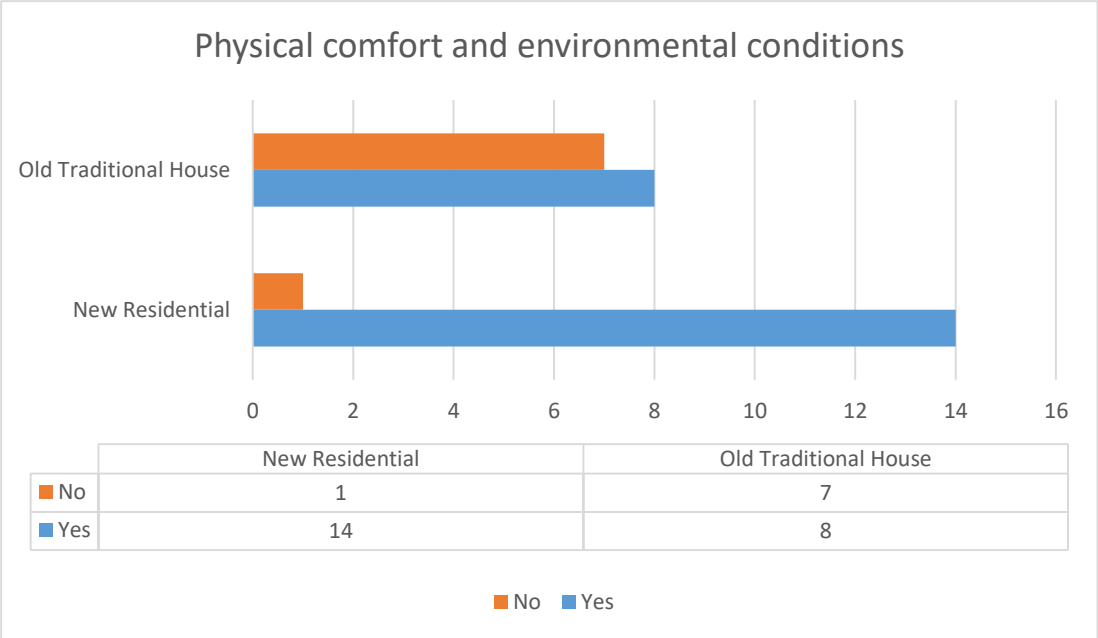
The goal is to explore the areas that plays a part in user satisfaction and what comes to mind when we say "housing quality". Also, to explore the relationship between quality and user satisfaction. Taking all these into consideration, analysis and evaluation were made by applying survey on the residents.

The survey was divided into five different sections, each contained a number of questions. The first, part includes personal questions about the respondent. The second part contains close-ended questions about physical parameters (climate-size-light) for houses. The third part requires the respondents input about the interior environmental quality based on materials, furniture and organization of the interior spaces in their house. The fourth part is about the furniture and how to choose quality and materials needed while the final part includes sustainability.

Residents have always been concerned with having a safe and comfortable place to live. Where these objectives are attained by concentrating on several factors that contribute to the high quality and sustainability of housing, and where the study of physical parameters and resident satisfaction is a critical component.

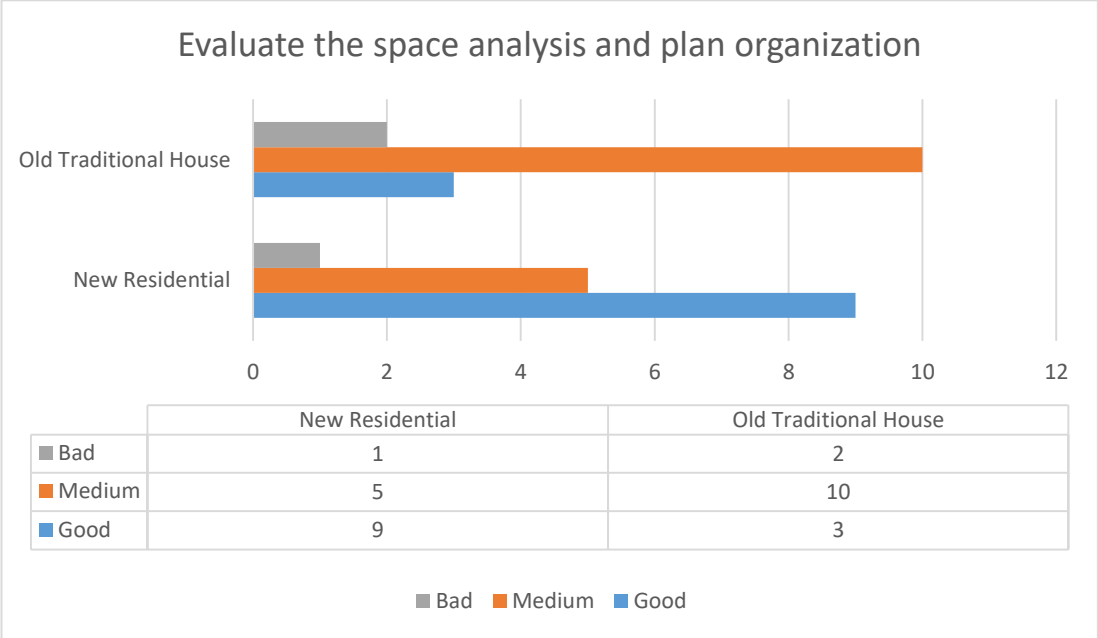
The physical parameters of the old traditional house and the new residential space are compared in this section using the questionnaire. Cases were examined independently and compared to one another.

Table 28: Physical Comfort and Environmental Conditions



The outcome of the survey shows that the percentage of satisfactory and non-satisfactory between residents of the old traditional houses were almost equal. As shown in the diagram above, 8 votes for" Yes", while the answer to "No" acquired 7 votes. On the other hand, the percentage of satisfaction in the new residential houses was very high. The answer to "Yes" acquired a total of 14 votes and the answer for "No" acquired only 1.

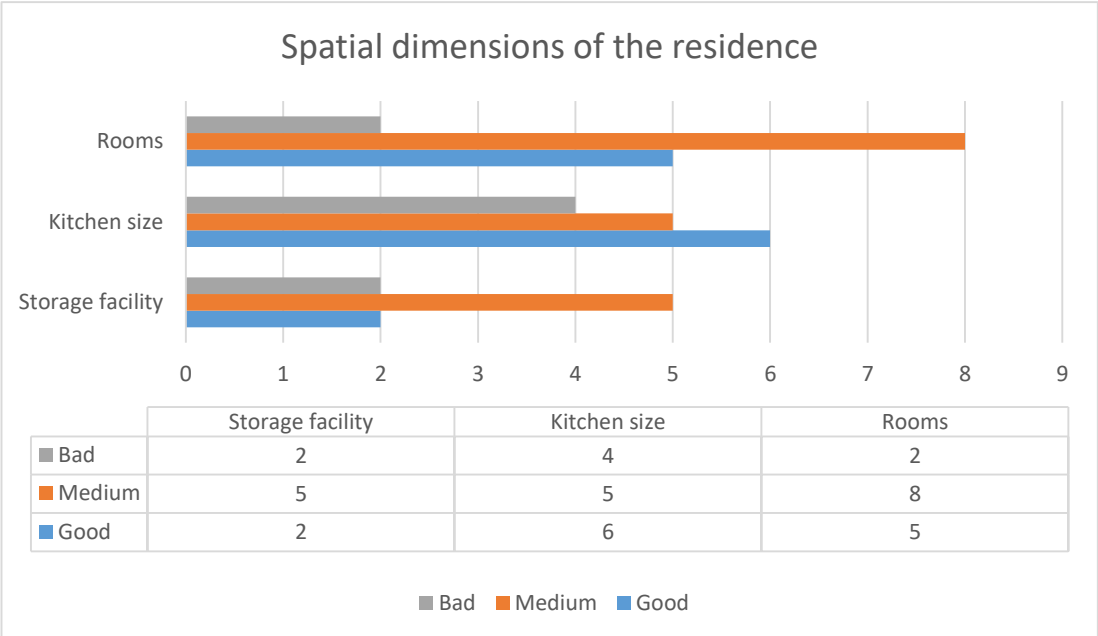
Table 29: Evaluate the Space Analysis and Plan Organization



	New Residential	Old Traditional House
Bad	1	2
Medium	5	10
Good	9	3

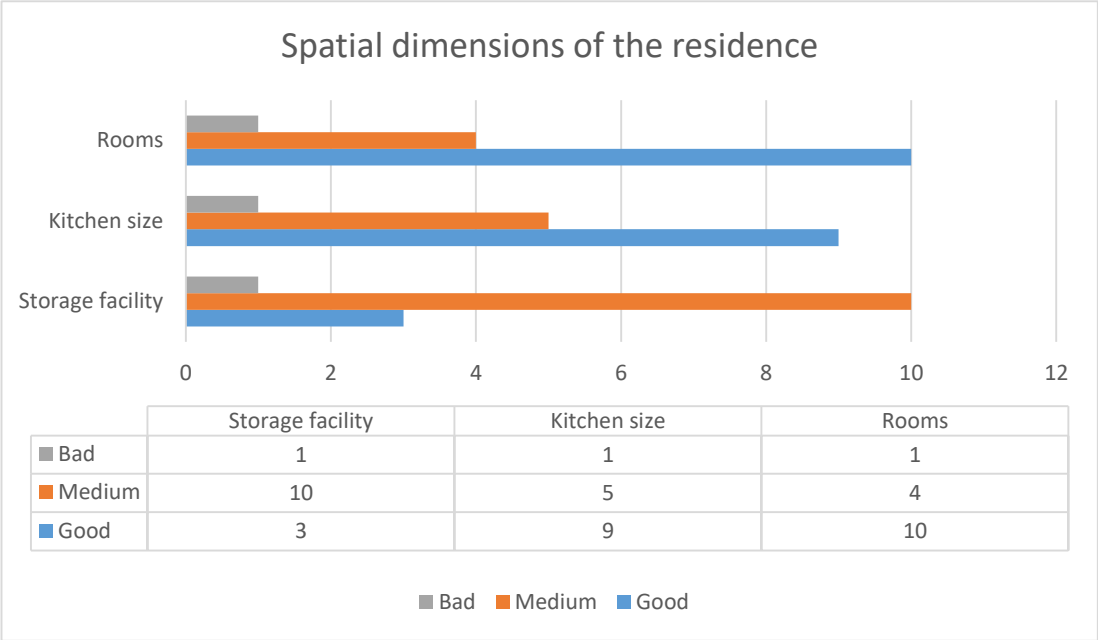
The result from the above table, shows that the (Medium) evaluation of old traditional houses in terms of the space analysis and plan organization, occupied the highest percentage with 10 votes, while the (good) evaluation of new residential houses got the highest percentage with 9 votes.

Table 30: Spatial Dimensions of the Residence for Old Traditional House



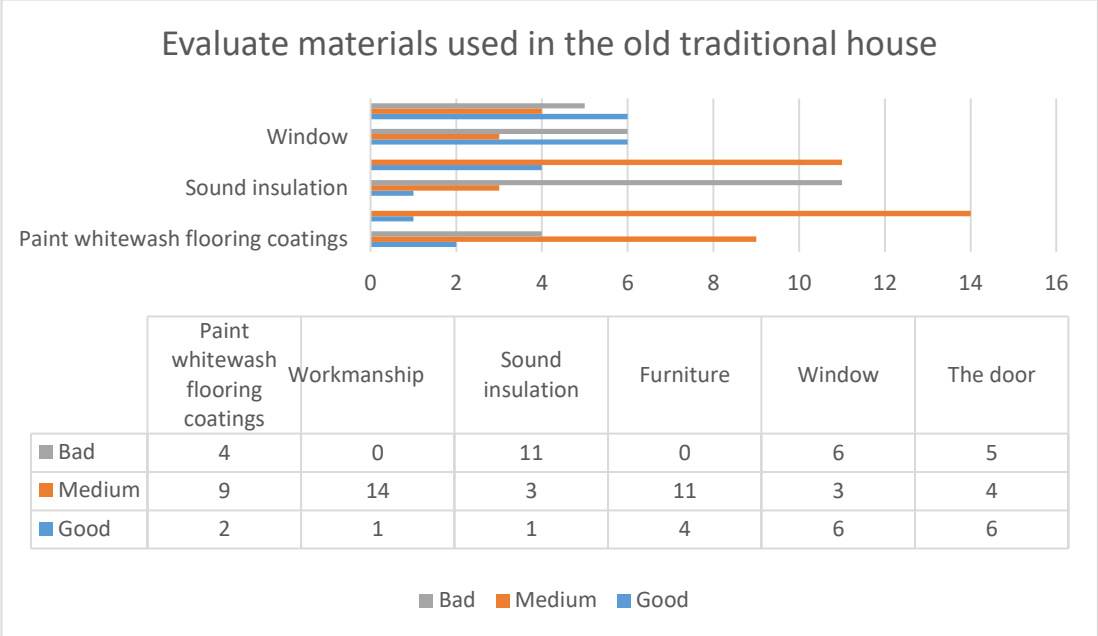
	Storage facility	Kitchen size	Rooms
Bad	2	4	2
Medium	5	5	8
Good	2	6	5

Table 31: Spatial Dimensions of the Residence for New Residential



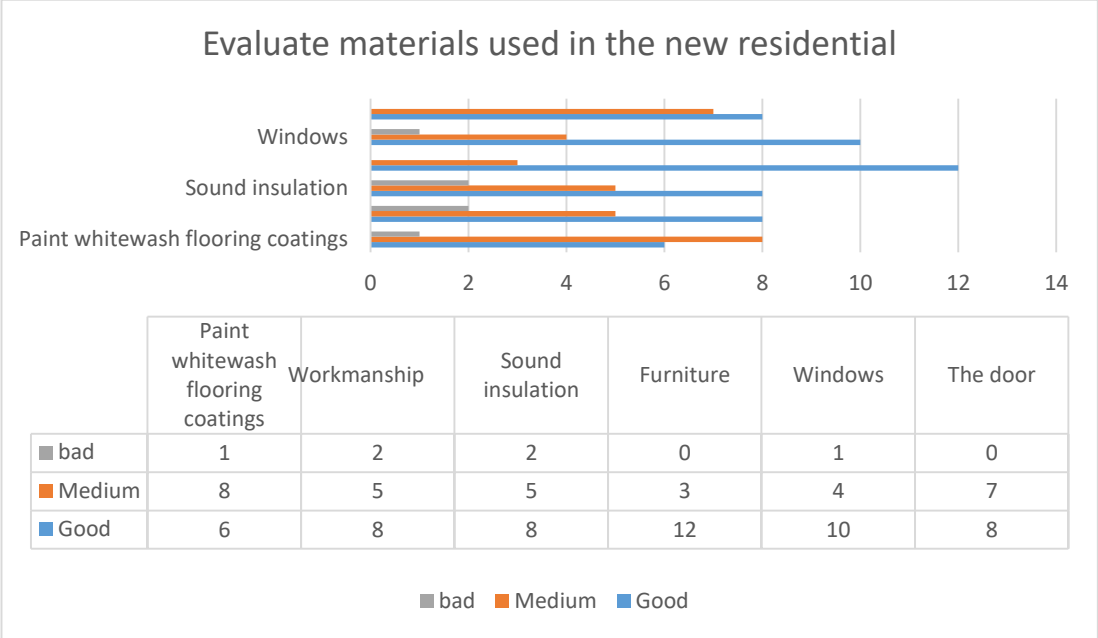
	Storage facility	Kitchen size	Rooms
Bad	1	1	1
Medium	10	5	4
Good	3	9	10

Table 32: Evaluate Materials Used in the Old Traditional House



	Paint whitewash flooring coatings	Workmanship	Sound insulation	Furniture	Window	The door
Bad	4	0	11	0	6	5
Medium	9	14	3	11	3	4
Good	2	1	1	4	6	6

Table 33: Evaluate Materials Used in the New Residential



	Paint whitewash flooring coatings	Workmanship	Sound insulation	Furniture	Windows	The door
bad	1	2	2	0	1	0
Medium	8	5	5	3	4	7
Good	6	8	8	12	10	8

Table 34: Provide the Security of the Residence

	Earthquake safety	Safety against fire	New Residential	Earthquake safety	Safety against fire	Old Traditional House
Bad	3	0	0	10	12	0
Medium	4	2	0	4	1	0
Good	8	13	0	1	2	

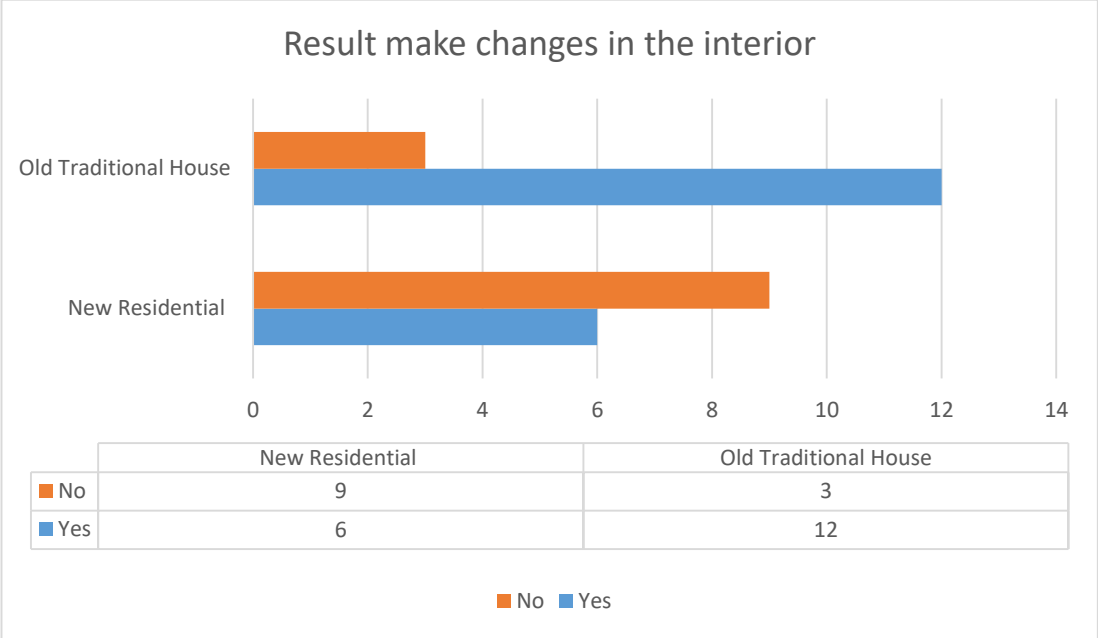
The results of the survey showed the residents' opinions on both old traditional houses and new residential houses.

Table 35: The Result of the (Physical Parameters) between the Old Traditional House and New Residential Space

	The Criteria	Old Traditional House	New Residential
1	Physical comfort and environmental conditions	• Good evaluation for physical comfort in old houses surroundings.	• Good evaluation for the physical comfort of new residential houses and environmental conditions indoor.
2	Evaluate the space analysis and plan organization	• The evaluation of the space analysis and plan organization is medium.	• The evaluate the space analysis and plan organization is good for new residential.
3	Spatial dimensions of the residence - Rooms - Kitchen size - Storage facility	• Rooms are medium in size. • Good spatial dimensions for kitchen in old houses. • Bad evaluation for storage facility.	• More equitable spatial allocation and space features. • Good spaces for rooms and kitchen. • Medium evaluate for storage facility.
4	Evaluate materials used in the house - The door - Window - Furniture - Sound insulation - Workmanship - Paint whitewash flooring coatings	• The quality of the door and window materials is good. • The materials used in the furniture are of medium quality. • Increased noise as a result of missing sound insulation materials for doors and windows. • Medium workmanship. • Paint whitewash and floor covering performance assessment is medium.	• The quality of the materials used in the doors and windows is good. • High quality furniture materials. • Use of sound insulation materials. • Good workmanship. • Performance evaluation for Paint whitewash flooring coatings is medium.
5	Provide the security of the residence - Safety against fire - Earthquake safety	• Not resistant to fire and earthquake.	• Earthquake resistant. • Fire resistant because of the materials used.

As a result, 60% of residents felt that they need to make some changes in the interior.

Table 36: Result Make Changes in the Interior



Regarding organization of the interior space in old traditional houses as they face difficulty in moving inside. One of the main changes that residents want to make is to the kitchen's interior.

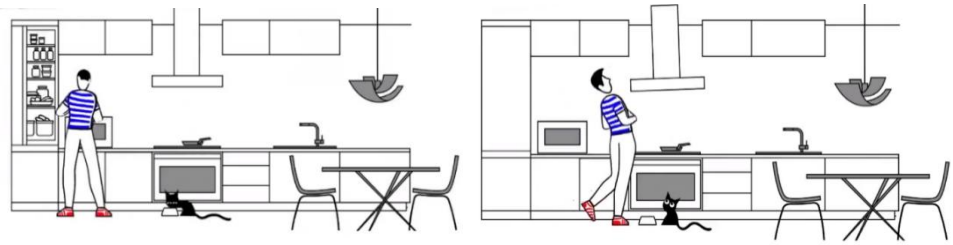


Figure 33: Kitchen (Before) (URL 24)

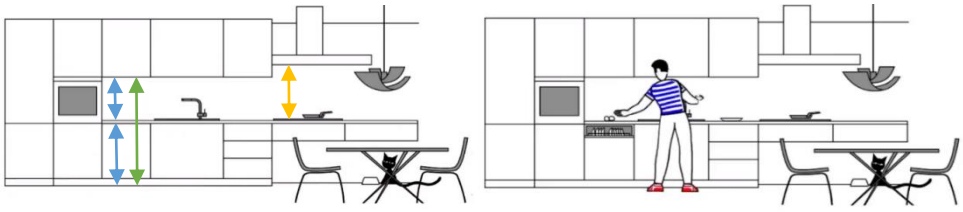


Figure 34: Kitchen (After) (URL 25)

In the first figure depicted above, there are some problems in the kitchen's interior, in terms of space and dimensions that limits free movement, which also reduced the quality of the interior. As you can see, in the second figure, we see things are going in the right way after making the required changes.

Other changes were also made in the bedrooms. it included some changes to the interior design in order to make it more flexible that allows the maximum use of space so as to employ the use of sound insulation materials, use of LED lights to feel more relaxed and to make the bedroom more comfortable.

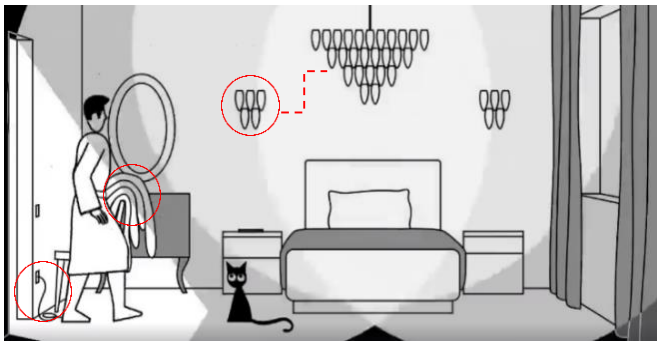


Figure 35: Bedroom (Before) (URL 26)

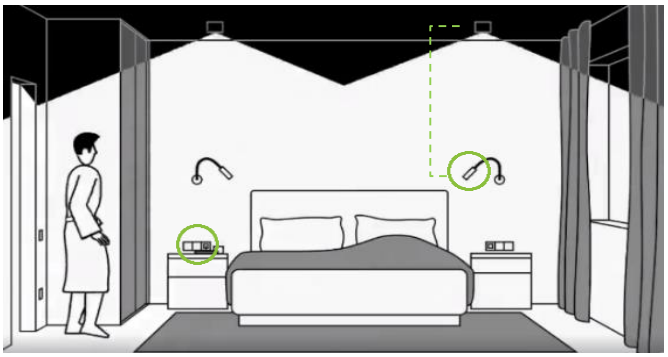


Figure 36: Bedroom (After) (URL 27)

For example, in figure (1) the bedroom lacks flexibility, bad organization of furniture, artificial lights. While in figure (2) the design contains more flexibility than figure (1)

with an electric unit, organized furniture and use of LED lights in order to make the room more comfortable and relaxing.

Also, a number of residents wants to make changes to a specific part of their house plan in order to take advantage of the space because the original plan did not maximize the space and as a result, the house looked smaller.

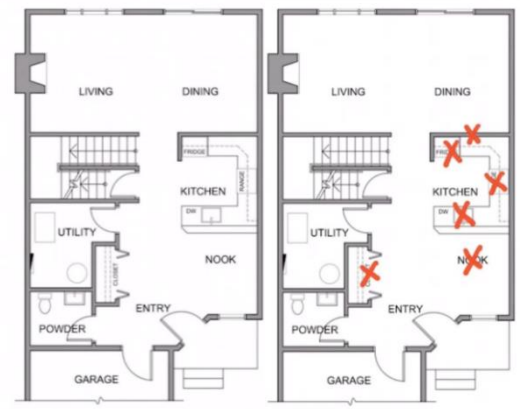


Figure 37: House Plan (Before) (URL 28)

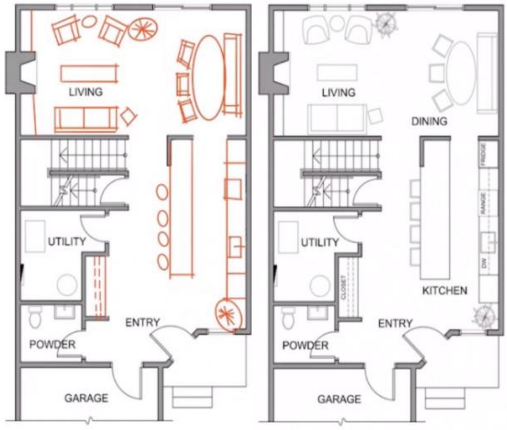


Figure 38: House Plan (After) (URL 29)

For example, in figure (1) the problem appears in the design of the kitchen, some walls, and the nook, which make space seem smaller. However, in figure (2) space seemed larger and more flexible than before through the new organization.

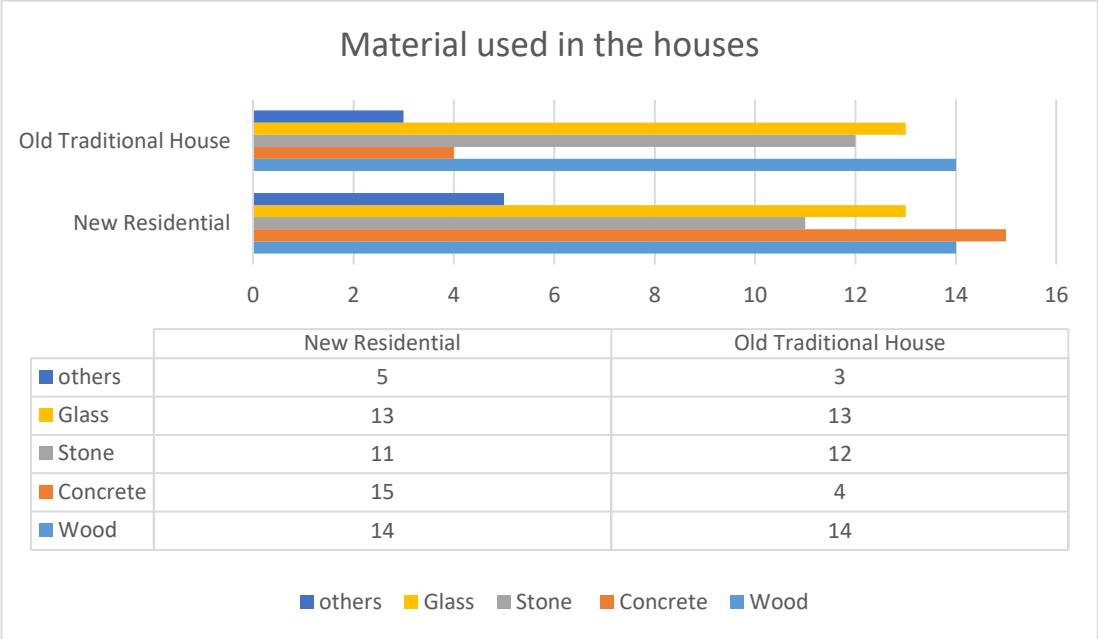
According to the information provided in the survey for new residential houses, the change that some residents want to make is related to the space of the living room. They want to make it larger to feel more comfortable in the house.

Figure 39: Living Room (URL 30)

For example, consider the living room in the figure above, which appears to have two distinct shapes due to the, organization of furniture, the number of pieces of furniture and the quality of furniture. As a result, it is possible to utilize existing space while organizing it properly to ensure the required quality and user satisfaction.

The term "interior environment quality" refers to the conditions found within the home. In general, wood, glasses and stones are the primary and most widely used materials in both old traditional and new residential constructions due to their high resistance, ease of maintenance, and durability. Additionally, they coordinate with one another in terms of walls and furniture, achieving the desired level of quality.

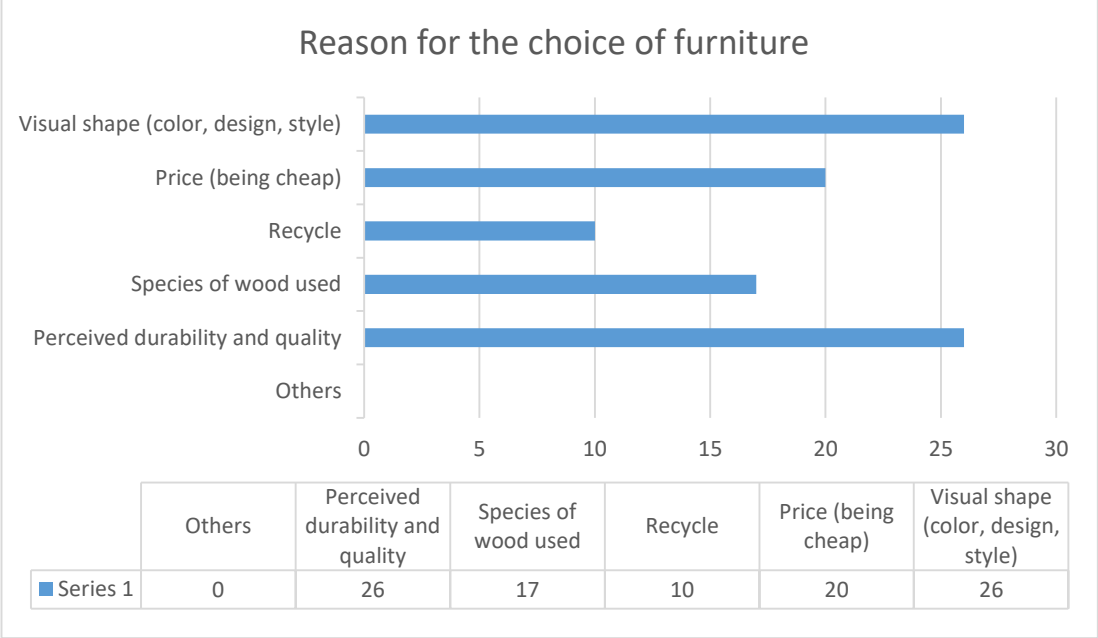
Table 37: Material Used in the Residents' Houses



	New Residential	Old Traditional House
others	5	3
Glass	13	13
Stone	11	12
Concrete	15	4
Wood	14	14

On the other hand, the employment of concrete appeared remarkably in the new residential houses and some of the old ones because of the features that concrete offers such as moisture resistance, fire resistance, and hardness.

Table 38: Reason for the Choice of Furniture



	Others	Perceived durability and quality	Species of wood used	Recycle	Price (being cheap)	Visual shape (color, design, style)
Series 1	0	26	17	10	20	26

A successful furniture design begins with the product's quality and the impact it may have on residents. That is why we strive to develop and offer high-quality and durable furniture, as well as satisfying combinations of design, color, and style. Thus, we believe that beautiful and functional furniture is the foundation for a happy home.

Result shows that the resident’s satisfaction with furniture for the old traditional houses is (medium) while the resident's satisfaction with furniture for new residential houses was evaluated (good).

As for the resident’s choices regarding their preferences for specific materials over others when considering the furniture of their houses, according to the answers from the survey, the wood has achieved the highest selection, followed by iron and then, glass.

Figure 40: Furniture Material (URL 31)

Table 39: Reasons for Preference and Choice According to the Opinion of the Residents

Materials	Figures	Reasons for Preference and Choice
Wood	  	• Wood is characterized by the presence of an infinite collection of different colors and shapes, suitable for many uses in the field of furniture. • Gives a sense comfortable in the space. • The wood combines high quality and beauty. • It is easy for cleaning.
	   	• Wood is the most used material in furniture because it is adopting a solid and durable shape and it has a perfect match in terms of contrast with other materials as glass, iron, fabric, and marble.
	 	• Wood is suitable material for recycling and reuse. • Stylish and long-lasting.

Materials	Figures	Reasons for Preference and Choice
Iron	  	• It can be used in all types of furniture and is suitable for old and new designs. • Adds beauty to furniture. • Ease of care.
Glass	  	• Using it in house decorations and walls for houses gives them elegance and distinction. • Recyclable. • Allows natural light to enter the space.

Results from the questionnaire, shows that good design improves the quality of life for house residents and users. This includes features such as organization, security, flexibility, privacy, sustainability and adaptability which contributes to the ease of use of houses.

Houses that are well-designed are efficient and cost-effective to operate. They contribute to the resolution of issues and gaps by incorporating features that support sustainable lifestyles. They have adequate ventilation, sound insulation, and heat insulation, as well as a pleasant atmosphere that provides comfort for their residents.

House spaces that are well-designed provide an adequate amount and quality of interior space. This includes the size and dimensions of the kitchen and room, as well as storage space, natural light, and ventilation. In higher-density developments, the interior space's quality must be prioritized, particularly in family homes, where access, privacy, lighting, and amenities are critical.

As with furniture, it entails utilizing high-quality furniture that is defined by its strength, durability, and ability to be recycled, as well as a focus on price and visual shape (color, design, style) in order to achieve user satisfaction. Additionally, the quality of the lighting used improves the user experience.

Also, well-designed houses take safety requirements into consideration, so as to provide a secure and safe environment for residents.

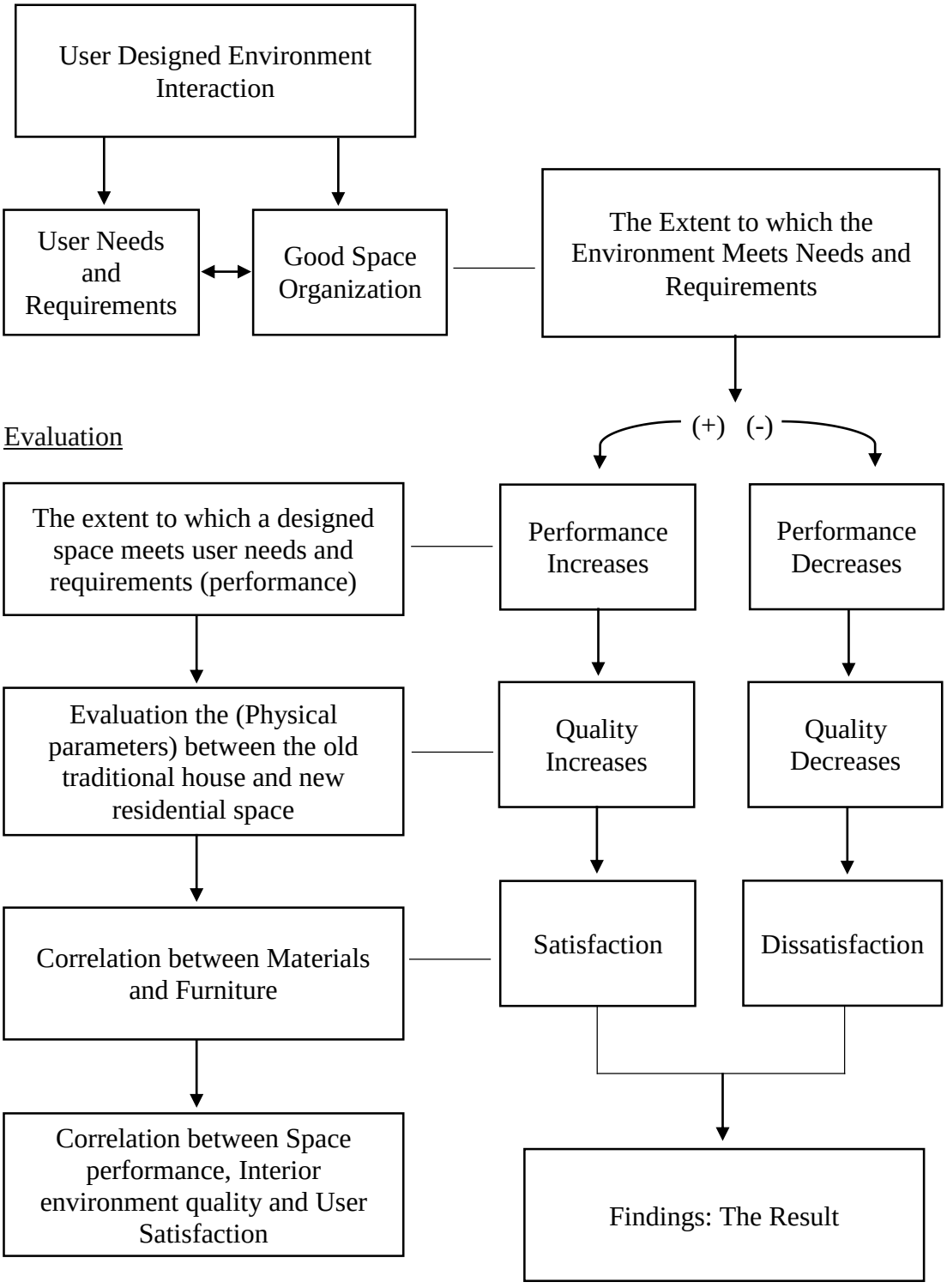


Figure 41: Summary Table for Chapter Five

Chapter 7

CONCLUSION

This chapter concludes the study. The last chapter of the thesis explains the summary of the literature review and provides results for the research questions that were clarified through the survey analysis. In addition to what was obtained through the questionnaire that was prepared, some recommendations and suggestions that would enhance similar research topics were discussed.

Interior design is an important component in any construction process, most notably in the process of house design. Interior design is not an exception when it comes to sustainability. The interior designer is a significant factor in determining whether a house design is sustainable. The fundamentals of sustainable design encompass materials, equipment, and systems as well as innovative solutions. These characteristics can contribute to the creation of an exceptional interior that deviates from the norm.

The purpose of the study is to demonstrate the concept of sustainability in houses by improving and developing sustainability standards in order to meet the requirements of the occupants, also providing a healthy, and comfortable environment of high quality. Sustainability criteria based on the literature review, includes interior space organization, building materials, furniture, lighting, thermal insulation and more.

This research studied and evaluated both the old traditional houses and new residential houses in Jordan as well as its other elements, including interior space organization, building materials, furnishings and lighting in relation to sustainability its principles has been applied in these houses.

Conducting a field study on a group of people living in the city of Amman in order to find out how their comfort and satisfaction are affected by the quality and composition of their houses. Additionally, knowledge of the effect of these factors on residents' performance is necessary, as is knowledge of the level of satisfaction as perceived by sample members.

Following the inclusive study that was listed during the previous chapters, which was interspersed with the theoretical background of the sustainability and houses, after clarifying the general and main concepts of each of them. A detailed examination of the criteria and their effects, a review of previously conducted research, a list of selected case studies and comparisons, and an analysis of the opinions and data gathered.

The study confirmed that the design of the house has an impact on quality and user satisfaction and that employing the elements of sustainability in the house creates a high level of importance for residents. In addition, it was discovered that residents, place a high value on the design of the house based on interior environment, quality, furniture, and finishing.

Also, the study confirmed that paying attention and focusing on both natural and artificial lighting has a positive effect on both the house and its inhabitants.

These findings corroborate previous research indicating that sustainable design has a significant impact on residents. It also shows that the residents have a perspective on home design. This study shows that a strong positive correlation exists between the house design and the resident.

The organization and design of the interior space of the house is a critical factor in establishing a connection between the resident and the house. The materials, furniture, lighting and finishes used in the house have all become significant factors in determining the house's efficiency and resident satisfaction.

These principles were chosen based on resident experimentation because they are readily available, affordable for the majority of users, and applicable to the majority of Jordanian homes. The significance of analyzing and evaluating those strategies in older traditional houses is that they are simple to implement in new residential construction. This makes houses easier to build, more affordable to maintain, and improves the quality of their interiors.

Interior designers worldwide have evolved a more a major awareness of sustainable strategies with increasing demand for sustainable interior design solutions. In this context, interior designers can employ new design techniques and improve the quality of indoor air. Through their judgments in the design process, including material chosen, building methods, furniture, and lighting.

Sustainability has been recognized as an important issue in many fields, including interior design. Due to the enormous resources needed for interior design, sustainability in interior design is becoming an essential consideration.

Sustainable design is an approach that has an impact on the environmental and human well-being. Interior design is a vital aspect of any construction or restoration process and the choices made in interior design, especially for housing units, affects the environment and resident's well-being.

Sustainable interior design in this aspect can be defined as the rationalization of natural resources employed in a way that tackles the effects of whole design concept (Rashdan, W., & Ashour, A. F., 2017, p.1). In addition, sustainability in houses includes the determination of well-organized and active use of space, the selection of building materials with low environmental effects, and energy consumption.

Sustainability aims to minimize a building's negative impact on the environment, as well as on the health and comfort of its occupants, while simultaneously improving the building's performance and quality. Sustainability is critical for lowering energy consumption and fostering the development of healthy, productive ecosystems.

On the other hand, sustainability in design entails creating interior environments that prioritize human interaction through the use of functionality, accessibility, and esthetics. To summarize, the importance of sustainability in interior design should begin with the designers and end with the residents.

The design of old traditional houses was centered on the use of appropriate building materials such as stone, clay, and wood, which helped maintain thermal comfort in the space and improved space ventilation. Additionally, the courtyard serves as a means of distributing natural air throughout the house in the majority of Jordan's older traditional homes. On the other side, the major emphasis on the use of appropriate

Building materials such as stone and concrete were used in the design of new residential houses due to their extreme resistance, ease of maintenance, and resistance to fire. The contrast with the stone walls is also quite lovely. Additionally, to utilizing metal in buildings and relying heavily and attractively on glass.

Along with lighting, which is the most important factor in determining the atmosphere we experience in a room, older traditional houses placed a premium on natural lighting and occasionally overlooked the importance of artificial lighting. On the other hand, new residential buildings incorporated both natural and artificial lighting, making them more sustainable.

The findings of this study are consistent with the literature review in that they are sustainable and provide a higher standard of living for residents. The principles of old traditional houses in terms of interior architectural design may be applied to new residential construction, such as the courtyard concept and the utilization of large spaces in houses, but with appropriate organization. Additionally, the principles of the traditional house can be applied to the concept of new houses through the use of modern building techniques in terms of the use of building materials such as stone and clay.

The optimal design and organization of the interior space enables residents to customize the design and purpose of the space to meet their specific needs. The disorganized design was abandoned when new residential houses were designed because it solved numerous problems, such as the lack of storage space in some traditional houses. As a result, by maximizing the use of available space, the ideal

environment can be created. Also, employing a vast range of organized spaces in one space to pleasure the resident's needs is the matter that new residential houses targeted.

As well, many of the problems facing residents can be solved by organizing the space. Also, furniture through its quality and providing various possibilities to change the interior space and its shape.

A sustainable house is a well-organized and effective house designed or renovated to ensure resources are respected, energy and water consumption are optimized, and achieve quality. Low-impact, high-performance materials are used in sustainable houses.

Sustainable houses will play an essential part in future housing types in Jordan by increasing the quality of life and producing a comfortable atmosphere for occupants.

7.1 Recommendations

At the end of the study and after revising the results from the analysis, the study recommends the following:

- Encouraging researchers to study and develop by creating interior spaces that provides comfort and depth in finding other ideas and solutions that contribute to the sophistication and elevation of the interior environment.

- It is recommended that a continued emphasis on sustainability should be the main factor in any design process. Only in that way, can the spaces be efficient in solving problems and also effective to the contribution of gaining the satisfaction of the residents.

- A Recommendation towards the main objective of interior space organization, is to create quality through a focus on spatial dimensions of the house, more storage, and providing the security as well as privacy of the house.

- It is recommended to pay close attention to the quality of the interior environment by selecting comfortable, sustainable, durable, and high-quality furniture.

- It is recommended that the use of natural lighting in the houses be adopted as well as artificial lighting through the use of energy-saving lighting devices.

- It is recommended that the use of modern construction techniques, which are the use of sound and moisture insulation materials as well as water and heat systems be utilized inside the house

- It is recommended that reliable information must be obtained from the residents to allow designers make the best decisions on how to organize spaces, use materials and manage them.

REFERENCES

Altman, I., & Gauvain, M. (1981). Cross-cultural and dialectic analysis of homes. *Spatial representation and behavior across the life span: theory and application/edited by LS Liben, AH Patterson, N. Newcombe.*

Dovey, K. (1985). Home and Homelessness. Home Environments. I. Altman and CM Werner.

Franklin, B. (2006). *Housing transformations: shaping the space of twenty-first-century living*. Routledge.

Sixsmith, J. (1986). The meaning of home: An exploratory study of environmental experience. *Journal of environmental psychology*, 6(4), 281-298.

Alkhawaldeh, Q. M., & Akbalik, E. (2018). Architectural Story of Jordan. *Journal of Engineering Sciences & Information Technology* – AJSRP – Issue (4), Vol. (2)

Sassi, P. (2006). Strategies for sustainable architecture. *Taylor & Francis*.

Konn Tech. (2021). Konn Homes. Retrieved from https://konn.tech/en/

Aga Khan Award for Architecture. (2007). Mushahwar House Presentation Panels. Retrieved from https://archnet.org/sites/6105/publications/1586.

Aga Khan Award for Architecture. (2007). Abdulwahab House Presentation Panels. Retrieved from https://archnet.org/sites/6104/publications/1585.

Aga Khan Award for Architecture. (2010). S House Presentation Panels. Retrieved from https://archnet.org/authorities/1325/publications/2222.

Al-Asad, M. (2012). "Small-Scale Residential Projects: The Region's Architectural Laboratories". In Contemporary Architecture and Urbanism in the Middle East, 21-45. Gainesville: University Press of Florid.

Maisam Architects. (2015). Residential Projects. Retrieved from http://www.maisam.com.

Eagle Hills. (2021). The Skyline Residences. Retrieved from https://eaglehillsjordan.com.

Sahel Al Hiyari Architects. (2020, May 19). K. Barghouti House. Retrieved from https://www.archdaily.com.

Sahel Al Hiyari Architects. (2020, May 24). H Saket House. Retrieved from https://www.archdaily.com.

Wicks, A. M., & Roethlein, C. J. (2009). A satisfaction-based definition of quality. *The Journal of Business and Economic Studies*, 15(1), 82.

Tarrad, M., Al-Omari, O., & Mohammed, A. R. (2012). Natural stone in Jordan: characteristics and specifications and its importance in interior architecture. *Journal of Environmental Science and Engineering. B, 1*(6B), 720.

Abdelsalam, T., & Rihan, G. M. (2013). The impact of sustainability trends on housing design identity of Arab cities. *HBRC Journal*, 9(2), 159-172.

Levine, R., & Hughes, M. (2008). Sustainability Over Time: the New Imperative for Future Urban Development. *Architecture Urbanism & Time, Vision for the Future, proceedings of ARUP*.

Goell, E. (2007). Becoming Sustainable: Suggestions for Local Sustainability Initiatives. Thesis, Federal Education and Networking Congress for Local Sustainability Initiatives, Federal Ministry for the Environment.

Rassia, S. T., & Pardalos, P. M. (Eds.). (2012). *Sustainable environmental design in architecture: impacts on health* (Vol. 56). Springer Science & Business Media.

Haddad, R. (2014). Research and methodology for interior designers. *Procedia-Social and Behavioral Sciences,* 122, 283-291.

Yalçin, M. (2015). "Exploratory" and "Descriptive" Aspects of Environmental Psychology Course within the Interior Design Education. *Procedia-Social and Behavioral Sciences, 174,* 3531-3541.

Reham, M. M., & Eldin, M. (2017). Sustainable Interior Design for Homes. *Indian Journal of Science & Technology*, *10*(15), 1-9.

Childs, K., Argeles, C., Henderson, H., Horst, S., & Malin, N. (2007). Beyond Interior Design-Interior Design and Global Impacts. *American Society of Interior Designers United States of America*.

Alotibi, A. (2019). *Determining the Designer's Awareness of Sustainable Interior Materials in Saudi Arabia*. Arizona State University.

Foster, K., Stelmack, A., & Hindman, D. (2012). *Sustainable residential interiors*. John Wiley & Sons.

Moxon, S. (2012). *Sustainability in interior design*. Laurence King Publishing.

Kazamia, K. I., & Kafaridou, M. O. (2010). How a designer can support sustainability in a creative way. In *DS 60: Proceedings of DESIGN 2010, the 11th International Design Conference, Dubrovnik, Croatia* (pp. 573-580).

Madanmohan, M. (2019). Sustainable Interiors- How Can Interior Designers Do Their Part. Retrieved from https://www.re-thinkingthefuture.com.

McDonough, W. (2004). Teaching Design That Goes From Cradle to Cradle. *Chronicle of Higher Education*, *50*(46), B6-B6.

Byarchyi. (2019, April 30). Sustainable Architecture and Interior Design Solutions: Sustainability Is Not a Trend, it's a Duty. Retrieved from https://www.archyi-inspiration.com.

Matrouk, M., & Goussous, J. (2011). Recipient Cognition and House Identity in Jordanian Architecture. *The Anthropologist*, *13*(4), 271-281.

Sokienah, Y. (2020). Aspects of Sustainability in the Design Elements of Traditional Jordanian Houses. *Civ. Eng. Arch*, *8*, 1194-1201.

Al-Asad, M., Khammash, A., & Lyons, B. (1997). *Old Houses of Jordan: Amman, 1920-1950*. Turab.

Barbulianno. (2020, Feb 10). The Importance of Sustainability in Interior Design. Retrieved from https://www.barbuliannodesign.com.

World energy. (2014, August 20). A Brief History of Sustainability. Retrieved from https://theworldenergyfoundation.org.

Labin, A. M. J. E., & Aldeek, Z. A. (2017). The design elements and building techniques at the traditional Jordanian dwellings. *International Review of Engineering and Computer Sciences, 2*(3), 12-20.

Rousan, A. & Al-Rajoub, A.K. (2010). *Irbid: Archaeological, historical and heritage study*, 1st ed. Amman Jordan.

Helmedag, I. (Ed.). (2012). *Stone and architecture in the mountainous regions of Jordan and Syria*. DAAD.

Britannica, T. Editors of Encyclopedia. (2021, February 11). Amman. *Encyclopedia Britannica*. Retrieved from https://www.britannica.com/place/Amman

Ghazal, M. (2016). Population stands at around 9.5 million, including 2.9 million guests. *The Jordan Times, 30.*

Dumper, M. (2007). *Cities of the Middle East and North Africa: a historical encyclopedia.* ABC-CLIO.

Potter, R. B., Darmame, K., Barham, N., & Nortcliff, S. (2009). "Ever-growing Amman", Jordan: Urban expansion, social polarisation and contemporary urban planning issues. *Habitat international*, *33*(1), 81-92.

Lavergne, M. (2004). Face à l'extraversion d'Amman, un réseau urbain en quête de sens. *Les Cahiers de l'Orient*, (75), 139-154.

Rashdan, W., & Ashour, A. F. (2017). Criteria for sustainable interior design solutions. *WIT Transactions on Ecology and the Environment, 223,* 311-322.

Sidi, N. S. S. (2010). Quality affordable housing: A theoretical framework for planning and design of quality housing. *Journal of Techno social, 2*(1).

Soen, D. (1979). Habitability—occupants' needs and dwelling satisfaction. *Ekistics*, 129-134.

United Nations (1977). *The Social Impacts of Housing: Goals, Standards, Social Indicators and Population Participation*. Department of Economics and Social Affairs. New York.

Almeida-Silva, M., Wolterbeek, H. T., & Almeida, S. M. (2014). Elderly exposure to indoor air pollutants. *Atmospheric Environment*, *85*, 54-63.

Streimikiene, D. (2015). Quality of life and housing. *International Journal of Information and Education Technology*, *5*(2), 140.

Lucas, R. E. (2007). Long-term disability is associated with lasting changes in subjective well-being: evidence from two nationally representative longitudinal studies. *Journal of personality and social psychology*, *92*(4), 717.

Ashour, K. N. (2016). Urban Regeneration Strategies in Amman's Core: *Urban Development and Real Estate Market* (Doctoral dissertation, Universitätsbibliothek Dortmund).

Garg, Y., Dhagat, N., & Shrivastava, B. (2014). Housing quality and customer satisfaction with reference to delivery methods. *Global Journal of Engineering, Design & Technology*, *3*(1), 1-4.

Guley, K., Damgaci, A.Y., (2019). “Importance of the User during Mass Housing Design Process: Cases of Famagusta Alasya Park and Gossip Zaimler Housing Estates” presented in 9th Annual International Conference on Architecture, 8- 11 July 2019, Athens, Greece.

Hamdy Mahmoud, H. T. (2017). Interior architectural elements that affect human psychology and behavior.

Dima Stouhi.(January 31, 2019).How to Design for Optimal Thermal Comfort (And Why it Matters).Retrieved from https://www.archdaily.com.

Der, V. (2005). Konut uygulamalarında kaliteyi arttırıcı bir yöntem olarak tasarımda kullanıcı katılımı: Düzce-Beyciler Evleri örneği.

Ekholm, A., & Fridqvist, S. (2000). A concept of space for building classification, product modelling, and design. *Automation in Construction, 9*(3), 315-328.

Belganeh, A. (2019). *Concept of Space in Architecture & Interior Design*. Retrieved from https://www.bluebeigedesigns.com.

Stanek, Ł. (2012). „Architecture as Space, Again. *Notes on the ‘Spatial Turn’,” SpecialeZ, 4,* 48-53.

Vali, A. P., & Nasekhiyan, S. (2014). The concept and sense of place in architecture from phenomenological approach. *Indian Journal of Fundamental and Applied Life Sciences, 4,* 3746-3753.

Maskell, D., Thomson, A., & Walker, P. (2018). Multi-criteria selection of building materials. *Proceedings of the Institution of Civil Engineers–Construction Materials, 171*(2), 49-58.

URL1:https://connect2local.com/l/780587/c/5021234/definition-of-sustainable-design

URL 2: https://www.archdaily.com/908320/how-to-design-for-optimal-thermal-comfort-and-why-it-matters/5c20894408a5e5c8b9000a38-how-to-design-for-optimal-thermal-comfort-and-why-it-matters-photo

URL 3: https://hispanopress.blogspot.com/2015/04/jordania-mapas-geograficos-de-jordania.html

URL 4: https://universes.art/de/art-destinations/jordanien/art-events/darat-al-funun-30-2/expo-21

URL5:https://www.researchgate.net/publication/281034443_Jordanian_vernacular_architecture

URL 6: https://www.hrpub.org/download/20201130/CEA4-14891612.pdf

URL 7: https://www.safarway.com/property/arar-s-cultural-house_14064

URL 8: https://eis.hu.edu.jo/deanshipfiles/pub10271101408.pdf

URL 9: https://eis.hu.edu.jo/deanshipfiles/pub10271101408.pdf

URL 10: https://www.alamy.com/old-stone-house-in-madaba-jordan-image224997326.html

URL 11: http://asadhousing.com/Project/OurProjects

URL 12: https://aqar-emlak.com/property/villa-for-sale-in-amman-jordan/

URL13:https://commons.wikimedia.org/wiki/File:Amman_House_of_Jordanian_Poetry.jpg

URL 14: https://depositphotos.com/15345561/stock-photo-reinforced-concrete-structure-of-building.html

URL 15: https://www.123rf.com/photo_46982317_stone-surfaces.html

URL16:https://www.academia.edu/14393776/Stone_and_Architecture_in_the_mountainous_regions_of_Jordan_and_Syria

URL17:https://www.academia.edu/14393776/Stone_and_Architecture_in_the_mountainous_regions_of_Jordan_and_Syria

URL18:https://www.academia.edu/14393776/Stone_and_Architecture_in_the_mountainous_regions_of_Jordan_and_Syria

URL19:https://www.academia.edu/14393776/Stone_and_Architecture_in_the_mountainous_regions_of_Jordan_and_Syria

URL 20: https://revitalization.org/article/amman-jordan-renovates-public-spaces-to-support-arriving-refugees-and-foster-harmony/

URL21:https://www.researchgate.net/publication/320839143_Urban_Regeneration_Strategies_in_Amman's_Core_Urban_Development_and_Real_Estate_Market

URL 22: https://de.wikipedia.org/wiki/Datei:Amman_in_Jordan.svg

URL23:https://www.researchgate.net/publication/320839143_Urban_Regeneration_Strategies_in_Amman's_Core_Urban_Development_and_Real_Estate_Market

URL 24: https://www.pinterest.com/

URL 25: https://www.pinterest.com/

URL 26: https://www.facebook.com/watch/?v=3644764532282330

URL 27: https://www.facebook.com/watch/?v=3644764532282330

URL 28: https://www.pinterest.com/

URL 29: https://www.pinterest.com/

URL 30: https://www.pinterest.com/pin/335025659787019826/

URL 31: https://www.123rf.com/photo_136858738_flooring-and-furniture-materials-colorful-floor-carpet-and-wooden-laminate-samples.html

APPENDICES

Appendix A: Questionnaire

EASTERN MEDITERRANEAN UNIVERSITY
Faculty of Architecture / Department of Interior Architecture/ Master of Science Interior Architecture

E-mail: Nawwar.lababneh@yahoo.com
Tel: +962791987168

"Comparing & Evaluating the Sustainability of the Old Traditional Houses Organization and New Residential Organization through User Satisfaction and Quality"

This research is an academic study conducted by Nawwar Lababneh under the supervision of AHENK YILGIN DAMGACI at Eastern Mediterranean University, Department of Interior Architecture, Master of Science in Interior Architecture program. The purpose of the questionnaire is to explore the effect of sustainability on the Old Traditional Houses Organization and New Residential and understand quality and quality in housing and methods to increase quality were examined on the basis of the relationship between satisfaction and quality.

The confidentiality of the information of the participants is based on and the study does not include the name - surname of the participants. The answers you will give to the questions will not be used for any other purpose other than the thesis. The study is voluntary and participants have the right to participate or not. Participants can leave the study at any time. Participants can easily ask questions about the study to the person conducting the study before, during, or after the questionnaire. In addition, participants have the right to ask the result of the research or to ask questions about the research via phone or e-mail provided. It is important to answer the questions thoroughly and sincerely in order to achieve the purpose of the research.

Researcher: Nawwar Lababneh

Supervisor: ASSIST.PROF.DR. AHENK YILGIN DAMGACI

Please put (X) in the box for your answer

Section 1: General information:

1. **Sex**: - Male ☐ - Female ☐
2. **Marital status:** - Single ☐ - Married ☐
3. **Family size:** - 1-5 ☐ - 5-10 ☐ - >10 persons ☐
4. **Status of residence:** - Tenant ☐ - Landlord/owner ☐
5. **Type of House:** - Old Traditional House ☐ - New Residential ☐
6. **Income status:** - Bad ☐ - Medium ☐ - Good ☐

7. **How long have you lived in your house?**

- Less than one year (12 months) ☐
- 1-5 years ☐
- 5-10 years ☐
- 10-20 years ☐
- 20 years or more ☐

8. **Educational level:**

- Never schooled ☐
- Primary ☐
- Middle school ☐
- High school ☐
- University graduate ☐
- Vocational training ☐

Section 2: Physical parameters (climate-size-light)

9. **Are you satisfied with physical comfort and environmental conditions?**

- Yes ☐ - No ☐

10. **How do you evaluate the space analysis and plan organization?**

- Bad ☐ - Medium ☐ - Good ☐

11. **What do you think about the spatial dimensions of the residence?**

11.a. Rooms - Bad ☐ - Medium ☐ - Good ☐
11.b. kitchen size - Bad ☐ - Medium ☐ - Good ☐
11.c. Storage facility - Bad ☐ - Medium ☐ - Good ☐

12. **What are your thoughts on the materials used in your house?**

12.a. The door - Bad ☐ - Medium ☐ - Good ☐
12.b. Window - Bad ☐ - Medium ☐ - Good ☐
12.c. Furniture - Bad ☐ - Medium ☐ - Good ☐
12.e. Sound insulation - Bad ☐ - Medium ☐ - Good ☐
12.f. Workmanship - Bad ☐ - Medium ☐ - Good ☐
12.g. Paint whitewash flooring coatings - Bad ☐ - Medium ☐ - Good ☐

13. Does your house provide the security of the residence?

13.a. Safety against fire - Bad ☐ - Medium ☐ - Good ☐

13.b. Earthquake safety - Bad ☐ - Medium ☐ - Good ☐

14. Are the spaces other than fixed spaces such as the kitchen, bathroom, and the flexibility suitable for changes in the economic socio-cultural, or demographic structure of the family?

- Yes ☐ - No ☐

15. Have you ever felt the need to make changes in the interior?

- Yes ☐ - No ☐
- If yes, Where? And Why? ----------.

Section 3: interior environment quality

16. With respect to the quality of the interior organization, quality of furniture and fixtures, and quality of infrastructures, do you think things in your house are generally going in the right?

- Agree ☐
- Disagree ☐
- Neutral ☐
- Strongly Agree ☐
- Strongly Disagree ☐

17. **Which material you have and use in your house?** (You can select more than one)

- Wood ☐
- Red Brick ☐
- Concrete ☐
- Stone ☐
- glass ☐
- Others, please mention ---------- ☐

18. The use of materials renewable in houses like wood, red brick, glass, and concrete increases the efficacy of the residents.

- Agree ☐
- Disagree ☐
- Neutral ☐
- Strongly Agree ☐
- Strongly Disagree ☐

Section 4: Furniture

19. What was the reason for the choice of furniture that you bought?

- Visual shape (color, design, style) ☐
- Price (being cheap) ☐
- Recycle ☐
- Species of wood used ☐
- Perceived durability and quality ☐
- Others, please mention ---------- ☐

20. In your opinion, comment on the quality of furniture you bought.

- Bad ☐
- Medium ☐
- Good ☐

21. Why did you prefer to choose a specific material, such as wood or another material for furniture?

- ----------

22. Mention any idea that you feel can be useful to improve the quality of furniture in particular and house in general.

- ----------

Section 5: Sustainability

23. Please indicate how familiar are you with sustainability towards the end of the questions.

- Not at all familiar ☐
- Not very familiar ☐
- Somewhat familiar ☐
- Very familiar ☐

24. What do you think is the use of sustainability on houses?

- Houses with green plants indoors ☐
- Houses that are healthier and comfortable ☐
- Houses with energy-saving, material-saving ☐
- Other ☐

The questionnaire ended here

Other notes you want to add: ----------

Appendix B: Research Volunteer Participation Form

This study was conducted by Nawwar Lababneh "Comparing & Evaluating the Sustainability of the Old Traditional Houses Organization and New Residential Organization through User Satisfaction and Quality" The purpose of this study is to discuss the ways to improve user satisfaction of their housing coditions and underline the significance of quality in the design of housing in Jordan. In this regard, the concept of quality and value in housing and methods to increase quality is examined based on the relationship between satisfaction and quality.

- Your participation in this research is free.
- For the study, data will be collected from you therefore, please respond comfortably to the questions below, so we can help you in the future.
- The data collected within the scope of research are for scientific purposes only.
    - It will not be used for purposes other than the purpose of research or in other research.
    - If necessary, do not share it with others without your (written) approval.
    - You have the right to review the data collected from you upon your request.
- The data collected from you will remain closed and protected at the end of the search it will be archived or destroyed.
- For any reason, any information that may disturb you during the data collection process(s) you can stop the answer.
    - If you feel uncomfortable, you can stop answer anytime you want.
    - If you drop out, the data collected from you will be excluded and destroyed from the study.

Thanks for your time to read the volunteer participation form. No doubt, your answers will help me to make the analysis more careful and knowledgeable.

Researcher Name: Nawwar Lababneh

E-mail: Nawwar.Lababneh@yahoo.com

Tel: +962791987168

I voluntarily accept the information I have provided for this study, knowing that I can finish the study if I want, for scientific purposes.

(Please fill out the form and give it to the data collector after the sign).

Name and surname

Signature:

Date:

Appendix C: Application for Ethical Approval

Doğu Akdeniz Üniversitesi
"Erdem, Bilgi, Gelişim"

Eastern Mediterranean University
"Virtue, Knowledge, Advancement"

99628, Gazimağusa, KUZEY KIBRIS / Famagusta, North Cyprus, via Mersin 10 TURKEY
Tel: (+90) 392 630 1995
Faks/Fax: (+90) 392 630 2919
E-mail: bayek@emu.edu.tr

Etik Kurulu / *Ethics Committee*

Reference No: ETK00-2021-0104 13.04.2021

Subject: Your application for ethical approval.

Re: Nawwar Lababneh (18500130)

Faculty of Architecture

EMU's Scientific Research and Publication Ethics Board (BAYEK) has approved the decision of the Ethics Board of Architecture (date: 12.04.2021, issue: 09) granting Nawwar Lababneh from the Faculty of Architecture to pursue her MA thesis titled **"Comparing & Evaluating the Sustainability of the Old Traditional Houses Organization and New Residential Organization through User Satisfaction and Quality"** supervised by Asst. Prof. Dr. Ahenk Yılgın Damgacı.

Best Regards

Prof. Dr. Yücel Vural

Chair, Board of Scientific Research and Publication Ethics - EMU

YV/şk.