Comparative Assessment of the Change in Privacy Levels in the Adaptive Reuse of Listed Iranian Traditional Houses from Qajar Era (1789 to 1925) According to Different Functions

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ABSTRACT

In recent decades, adaptive reuse is one of the key strategies for conserving cultural heritage and its significance. Tabriz, as one of the historical cities of Iran, includes many cultural heritage sites and buildings. In this regard, the traditional houses of Tabriz, as a source of heritage values, play an important role in presenting these values to the present generations and transferring them for future generations as well. Therefore, the re-use of traditional Tabriz houses with new contemporary functions can be an effective way of conserving and expanding their heritage significance.

Besides, privacy as an intangible aspect of culture has played a major role in the spatial organization of traditional Iranian houses and provided the hierarchy of access to the interior spaces. Therefore, setting the most appropriate function in terms of accessibility as a consequence of reusing traditional Iranian houses, provide the opportunity to sustain and present their heritage significance. In addition, limiting access (high level of privacy) is one of the obstacles that arise from the inappropriate private function, which may prevent presenting heritage significance.

The purpose of this study is assessing the level of privacy in original and reused states of selected traditional houses in Tabriz in order to contribute to a better understanding of compatibility of the new function in terms of accessibility for both visitors and inhabitants within adaptive reuse of cultural heritage buildings.

A combination of quantitative and qualitative approaches are used for the data collection and analysis in this research. The qualitative approach of the research contains the observation of each case study by taking the photo of component spaces. In addition, by considering the analytical approaches of "space syntax methodology", "justified graphs" have been provided based on plans of each case. Likewise, the

privacy layers graphs have been prepared according to the justified graphs. Numerical outputs related to the syntactic properties are calculated through Excel software. In addition, the comparison of the depth of each space are illustrated in linear charts and compared with privacy layers graphs both in original and reused states of Tabriz traditional houses from the Qajar period.

The findings show that, by changing the use of these traditional houses, the level of privacy in interior spaces has been reduced. In this regard, the findings of the numerical analysis and "justified graphs", which are obtained by space syntax methodology and the comparison of features such as the relative depth of spaces and the integration values, show that the depth of space (Privacy) has decreased in re-use mode. Besides, the graphs of privacy levels determine that the degree of privacy varies in the spatial organization of new contemporary functions such as cultural, educational, commercial, administrative function, etc.; which directly affect the level of access of both visitors and inhabitants to the interior spaces of the cultural heritage.

Keywords: Heritage buildings, adaptive reuse, traditional Iranian houses, spatial organization, interior space, level of privacy, public accessibility

ÖZ

Son yıllarda, uyarlamalı yeniden kullanım, kültürel mirası ve değerlerini koruma stratejilerden biridir. İran'ın tarihi kentlerinden biri olan Tebriz, birçok kültürel miras alanı ve tarihi bina içermektedir. Bu bağlamda, bu miras değerlerinin bir kaynağı olarak Tebriz'in geleneksel evleri, bu değerleri mevcut kuşaklara sunmada ve gelecek kuşaklara aktarmada önemli bir rol oynamaktadır. Bu nedenle, geleneksel Tebriz evlerinin yeni çağdaş işlevlerle yeniden kullanılması, miras değerlerini korumak ve yaymak için etkin bir yol olabilmektedir.

Ayrıca, kültürün somut olmayan bir yönü olan mahremiyet, geleneksel İran evlerinin mekân örgütlenmesinde önemli bir rol oynamaktaydı ve iç mekanlara erişim hiyerarşisini sağlamaktaydı. Bu nedenle, geleneksel İran evlerinin yeniden kullanılmasının bir sonucu olarak erişilebilirlik açısından en uygun işlevi belirlemek, bu evlerin miras değerini sürdürmek ve aktarmak için olanak sağlamaktadır. Buna ek olarak, uygun olmayan özelleşmiş yeni işlevden kaynaklanan sınırlı erişim (yüksek düzeyde mahremiyet), mirasın önemini ortaya koyma konusundaki engellerden biridir.

Bu çalışmanın amacı, kültürel miras binalarının yeniden işlevlendirilmesi kapsamında, yeni işlevin hem ziyaretçiler, hem de kullanıcılara sunulan erişilebilirlik açısından uygunluğunun tartışılabilmesi için Tabriz'deki seçilmiş geleneksel evlerin orijinal ve yeniden kullanılmış durumlarındaki mahremiyet düzeyini değerlendirmektir.

Bu araştırmada veri toplama ve analiz için nicel ve nitel yaklaşımların bir kombinasyonu kullanılmıştır. Araştırmanın nitel yaklaşımı, örnek binaları oluşturan tüm mekanların fotoğraflanıp gözlemlenmesini içerir. Ayrıca, "mekan dizimi metodu"nun analitik yaklaşımları dikkate alınarak her örneğin planları üzerinden

"mekansal geçiş grafikleri" oluşturulmuştur. Aynı şekilde, mahremiyet katmanları grafikleri de mekansal geçiş grafiklerine göre hazırlanmıştır. Sentaktik (sözdizimsel) özelliklerle ilgili sayısal çıktılar Excel yazılımı ile hesaplanmıştır. Aynı zamanda, Qajar döneminden kalma Tebriz'in geleneksel evlerinin hem orjinal hem de yeniden kullanım durumlarında her bir alanın derinliğinin karşılaştırılması doğrusal çizelgelerle gösterilmiş ve mahremiyet katmanları grafikleriyle karşılaştırılmıştır.

Bulgular, bu geleneksel evlerin kullanımlarının değiştirilmesiyle iç mekanlardaki mahremiyet düzeyinin azaldığını göstermektedir. Bu bağlamda, mekan dizimi metodolojisi ile alanların bağıl derinliği ve entegrasyon değeri gibi özelliklerin karşılaştırılmasıyla elde edilen sayısal analiz ve "mekansal geçiş grafikleri"nin bulguları, mekan derinliğinin (mahremiyet) yeniden kullanım modunda azaldığını göstermiştir. Ayrıca, mahremiyet seviye grafikleri, mahremiyet derecesinin farklı işlevlerin mekan örgütlenmesinde farklılaştığını belirlemekte; ve hem ziyaretçilerin, hem de kullanıcıların kültürel mirasın iç mekanlarına erişimini doğrudan etkilemektedir.

Anahtar Kelimeler: Miras binaları, uyarlamalı yeniden kullanım, Geleneksel İran evleri, iç mekan, mekan örgütlenmesi, mahremiyet düzeyi, kamusal erişilebilirlik

DEDICATION

I dedicate this thesis to my husband who has been supportive and has constantly

encouraged me throughout the duration of my study

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INTRODUCTION

1.1 Background Study

Heritage is our preserved past for the present, and also it is inherited by future generations. Heritage is conceived as the significance connected to the past in the present and is considered a knowledge identified in the cultural, social and political context (Graham, Heritage as Knowledge: Capital or Culture, 2002). Cultural heritage is classified into tangible and intangible aspects. Tangible aspects include the groups of buildings, areas, and monuments. Intangible heritage contains all non-physical aspects such as culture, norms, beliefs, rituals. There is a close relationship between these two aspects of cultural heritage that is strongly influenced by each other. Thus, the intangible aspects of heritage must be regarded as a broader framework in order to display the significance of the tangible heritage (Bouchenaki, 2003). The desire to privacy is directly linked to the cultural and social values of society, which is generally reflected in lifestyle; therefore, it can be regarded as a specific part of cultural values in the physical form of architectural heritage (Rapoport, 1969; Madanipour, 2003).

The relationship between users and buildings has always been highlighted in the architecture of traditional Iranian houses (Nabavi, Ahmad, & Goh, 2012). Culture and religious beliefs were deeply connected and also these factors are concerned with Iranian users to meet their requirements. Accordingly, privacy as a significant part of the Iranian culture had a key role in forming and characterizing the spatial organization of traditional Iranian houses (Hosseini , Ethegad, Guardiola, & Aira, 2015).

Over recent years, a large number of traditional houses, which belong to politicians and businessmen, and well-known families, have been registered as cultural heritage. Although some of these traditional houses are privately owned and used as their original functions, most of those houses were reused for another function with the aim of physical and cultural continuity. In this regard, adaptive reuse is one of the main strategies toward conservation of precious heritage buildings that lead to transfer the heritage values to the present and future generations and also result in cultural sustainability by infusing life to them (Wong, 2016, p. 92). There are many factors that determine the success of adaptive reuse projects such as new function compatibility with the building (Langston, Wong, Hui, & Shen, 2008; Conejos & Langston, 2010; Department, 2012; Shehata, Moustafa, Sherif, & Botros, 2015; Günçe & Mısırlısoy, 2019), basic environmental qualities (Elzeyadi, 2001; Douglas, 2006; Conejos, Langston, & Smith, 2012; Shehata, Moustafa, Sherif, & Botros, 2015), economic and intangible benefits (Hansen, Haugen, & Leaman, 2005; Plevoets & Cleempoel, 2011; Shehata, Moustafa, Sherif, & Botros, 2015), and accessibility of heritage resources by visitors and local community (ICOMOS, 2000; UNESCO, 2007; Shehata, Moustafa, Sherif, & Botros, 2015), and minimal adaptation cost (Shull, Fringe Benefits: Reclaiming Forgotten Marginal Space, 2005; Douglas, 2006; Bullen & Love, 2011; Shehata, Moustafa, Sherif, & Botros, 2015).

Over the past decades, a considerable amount of literature has been conducted about traditional Iranian courtyard houses. Generally, these studies are based on environmental sustainability (Behbood, Taleghani, & Heidari, 2010; Cho & Mohammadzadeh, 2013; Khalili & Amindeldar, 2014; Soflaei, Shokouhian, & Shemirani, 2016; Soflaei, Shokouhian, & Zhu, 2017), vernacular Iranian architecture (Foruzanmehr & Nicol, 2008; Maleki, 2011; Keshtkaran, 2011; Mohammadabadi &

Ghoreshi, 2011; Foruzanmehr & Vellinga, 2011; Sahebzadeh, Heidari, Kamelnia, & Baghbani, 2017; Heidari, Sahebzadeh, & Dalvand, 2017) and the climate issues (Pourvahidi, 2010; Saljoughinejad & Sharifabad, 2015; Shahamipour & Farzanmanesh, 2015; Soflaei, Shokouhian, & Shemirani, 2016; Foroughi, 2017). Moreover, several studies concerned about the socio-cultural aspects of traditional Iranian houses, such as Shabani, et.al (2011) "Relation of cultural and social attributes in dwelling, responding to privacy in Iranian traditional house", which identified the cultural impacts on the architecture of Iranian traditional houses in order to achieving privacy by defining the public and private domains ,another research that is conducted by Hosseini , Ethegad, Guardiola, and Aira (2015) under the topic of "Iranian courtyard housing: The role of social and cultural patterns to reach the spatial formation in the light of an accentuated privacy" that argue about the effects of socio-cultural patterns such as privacy in order to respond the users requirements and improve the life quality. Nayyeri Fallah, Khalili, and Rasdi (2015) have focused on "Privacy as a Cultural Value in Traditional Iranian Housing; Lessons for Modern Iranian High Density Vertical Development (HDVD) Housing" by considering the privacy as a cultural value that may results in modern houses as well. Likwise, "Assessing The Role of Courtyards in The Spatial Organization of The Traditional Houses of Kashan" has been carried out by Halleh Nejadriahi (2015) and also in (2018), the study have been conducted by Amir Reza Farahbod with topic "An Integrated Framework for The Architectural Evaluation of The Identity of Qajar Houses", which was focused on the identity of architecture in traditional houses of Qajar period.

On the other hand, adaptive reuse is known as a conservation approach and also there are many studies that have been carried out about assigning the most appropriate

function as a new use of heritage building from different points of views (Langston, Wong, Hui, & Shen, 2008; Conejos & Langston, 2010; Bullen & Love, 2011; Yıldırım, 2012; Vackier, 2014; Shehata, Moustafa, Sherif, & Botros, 2015; Wong, 2016; Mısırlısoy & Günçe, 2016; Matos, 2018).

In this respect, looking at the topics and discussions of previous studies that have been carried out, affirms that there is a gap between the investigations on the cultural continuity of traditional Iranian houses and the impact of adaptive reuse on the continuity of intangible values in such houses that are listed as cultural heritage buildings.

1.2 Problem Statement

The new uses that are assigned to the heritage buildings should transfer the cultural values of the heritage building to future generations; enrich the local culture; and enhance the community's economic levels (Pearson & Sullivan, 1999; Yıldırım, 2012). One of the key concepts of ICOMOS charters is related to making heritage buildings accessible to the local community and visitors (ICOMOS, 1999; McKercher & Du Cros, 2002).

According to the ICOMOS (1999), "cultural heritage is a material and spiritual resource, providing a narrative of historical development. Cultural heritage has an important role in modern life and should be made physically, intellectually, and/or emotively accessible to the general public" (Principle 1.1). Therefore, limiting access as a result of setting an inappropriate function may prevent from presenting the heritage significance.

In this way, traditional Iranian houses, as a source of cultural heritage values, play an important role in presenting and transferring heritage significance to present and future generations. Therefore, setting an appropriate function with the reflection of

privacy and enough accessibility is essentially required for the presentation and transfer of heritage values and also leads to the continuity of the cultural aspects and spirit of the heritage.

1.3 Aims and Objectives

The main goal of this thesis is to assess and compare the level of privacy in original and reused states of selected Iranian traditional houses in order to contribute to a better understanding of the appropriateness and compatibility of different new functions in terms of change of privacy levels and accessibility to visitors and inhabitants within adaptive reuse of cultural heritage buildings. The research has three objectives: First, understanding the spatial organization of traditional Iranian houses. Secondly, examining the compatibility between the new contemporary function (such as cultural, educational, commercial, administrative function) and existing residential building by comparing the accessibility to inhabitants and visitors within interior spaces of reused buildings. Thirdly, comparing the privacy levels within original and reuse modes of the corresponding houses.

This research attempts to answer the main research question in order to achieve the specified goal, which is as follows:

Which type of new functions is more appropriate for reusing the traditional Iranian houses that are listed in cultural heritage?

And also, some sub-questions are explored:

What is the impact of new function on changing the level of privacy (depths) of the interior spaces in the reuse process?

What is the impact of new function on changing the public access to the interior spaces in the reuse process?

1.4 Methodology

The methodological approach taken in this study is first based on a literature review about adaptive reuse of heritage buildings and the privacy impacts on the spatial configuration of traditional Tabriz houses. Data for this part of the study were collected from articles, books, journals, and web sources. The second part depends on mixed quantitative and qualitative research methods. The qualitative approach of the research contains the observation of each case study by taking photographs from each space. Plan layouts are also reached from the website of "Administration of Cultural Heritage in Tabriz". Moreover, the justified graphs (access graphs) have been provided by means of "Edraw Mind Master" software based on the house plans and sections. Afterwards, analytical approaches of space syntax methodology (Hillier & Hanson, 1984) has been used in this study through a comparative analysis of justified graphs, which express the relative depth and the integration values of interior spaces in the heritage buildings both in the original and reused states. Numerical outputs related to the syntactic properties are calculated through Excel software. Additionally, the comparison of the depth of each space are revealed in linear charts. Additionally, the graphs that illustrate the privacy degrees and their variations for different new functions given to these houses, have been provided based on justified graphs.

1.5 Limitation of the Study

Tabriz city was the second capital of Iran during the Qajar period and also had a political and socio-cultural significance. Therefore, prominent individuals such as merchants and political people used to live in this city (Hanachi & Yadollahi, 2011). The form and structure of the houses in Qajar era were based on the geographical and climatic conditions and certainly had been influenced by the culture and lifestyle of people. Nowadays, most of the Tabriz traditional houses have been registered as

valuable historic buildings in the Cultural Heritage Organization and are being preserved and restored as immovable tangible cultural heritage. Some of these houses have been re-used concerning their original form and structure by replacing new uses. Whereas, others are still used as a residence. Case studies have been selected in this research from the buildings that have been reused to different function from the original use. The case studies selection was based on the variety of mix functions including one or more of cultural, educational, administrative and commercial functions.

The issue of privacy is a personal and social issue that originates from culture and is an intangible feature of physical space to control the public access through opening and closing of the borders in architectural spaces. In this way, the research has focused on only two of the success criteria for the reuse process. For comparing the compatibility of new function in terms of accessibility and the comparison of privacy levels in different reused functions to determine the most appropriate reused state function.

1.6 Thesis Structure

The thesis consists of five chapters. The first chapter presents the study background, problem statement, aims, and objectives, methodology, and limitations. The second chapter reviews the literature about adaptive reuse as a contemporary strategy toward conservation and the important criteria for the success of new uses in order to choose the compatible and the most appropriate functions for reuse process. Third chapter describes a review of the privacy issue and how the residential spaces in traditional Iranian houses are arranged according to the degree of privacy as well as the impact of privacy in the spatial organization of Iranian houses has been discussed. In chapter four, after describing the reasons to select the case studies and identifying the specific

methodology for conducting field surveys, the case studies have been examined and

compared. Finally, the fifth chapter identifies the main issue arising from case-studies

analysis and explores the possible future directions (Figure 1).

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Figure 1: Thesis structure

Chapter 2

ADAPTIVE REUSE OF HERITAGE BUILDINGS THROUGH ASSIGNING THE MOST APPROPRIATE NEW CONTEMPORARY FUNCTION

This chapter provides an overview of previous research and theories on the heritage buildings' adaptive reuse as well as the factors that contribute to the success of the adaptive reuse projects. In this regard, firstly, explanation of the basic concepts, including heritage conservation and intervention range in conservation approaches, have been presented. Secondly, the evaluation of adaptive reuse theory from the starting point to the contemporary approaches have been reviewed. Through reference to the ICOMOS charters and cultural continuity and sustainability, the success criteria for adaptive reuse project have been explored.

2.1 Importance of Conservation of Tangible and Intangible Cultural Heritage

Heritage is some kind of legacy, which refers to the past, whatever is lived at present, and whatever is conveyed to the future generations. However, heritage has several meanings, but actually the concept of the heritage is directly related to history (Rodwell, 2008).

Graham, Ashworth, and Tunbridge (2000, p. 212) give a description of the heritage as "the contemporary purposes of the past" or the socio-cultural, political, economic

part of the past, while we tend to choose that heritage due to reuse for contemporary purposes in the present.

However, according to Loulanski (2006), the most arguing point in heritage definition is related to the controversial duality of consisting both economic and cultural subjects with economic and cultural values, as well as illustrating economic and cultural functions. The term has two completely different meanings divided into a positive and negative side. From a positive point of view, the heritage is identified as the landscape and culture that the community cares about; meanwhile transferred it to the future in order to improve the individual's sense of belonging and identity. Whereas, from the negative point of view, heritage is taken into account as "heritage industry", which means the utilization and manipulation of the past have been only done for commercial purposes (Loulanski , 2006).

The major legislative regulation at the international level about the historical monuments were recognized with the "Athens Charter" in 1931, which also proposed sensitive urban planning within areas of historical monuments, mentioning that special consideration should be given to aesthetic values of the heritage currently built (ICOMOS, 1931). After that, in "Venice Charter" in 1964, general responsibilities were taken into account for the preservation of the future generations' cultural heritage (ICOMOS, 1964). This charter gives a description of heritage as historic monuments. Although, UNESCO and ICOMOS both agreed that heritage should not be limited to historic monuments and buildings, and should be expanded to 'group of buildings' and 'historic quarters' (Ahmad, 2006). The definition of monuments and sites are mentioned in ICOMOS (1965). Afterward, the cultural heritage definition was presented in first article of UNESCO (1972). Accordingly, cultural heritage is classified in three main sets, which include 1) "Monuments"; 2) "Groups of buildings"; and 3) "Sites". (Table 1)

Table 1: Cultural heritage classification according to UNESCO (1972)

"Monuments"	"Groups of buildings"	"Sites"
"Architectural works." "Works of monumental sculpture and painting." "Elements or structures of an archaeological nature." "Inscriptions" "Cave dwellings." "Combinations of features." "Which are of privileged universal value from a historical, art or scientific point of view."	"Group of separated or connected buildings in terms of their architecture, their homogeneity, or their place in landscape which are of privileged universal value from a historical, art or science point of view."	"Work of man, nature, or combined works of nature and man." "Areas including archeological sites." "Which are a privileged universal value from the historical, aesthetic, ethnological or anthropological point of view."

The mentioned classification states the physical aspects of heritage, while the heritage has another aspect that is perceived as meaning by "individuals, groups, communities, nations and a range of institutions, since they use to create and define identity" as well as to define "the social and cultural meaning in and about the present" (Smith, 2006, p. 87). "All cultures and societies are rooted in particular forms and means of tangible and intangible expression which constitute their heritage, and also both tangible and intangible aspects of heritage should be respected." (ICOMOS, 1994)

Therefore, UNESCO's convention (Article 2.2) in 2003 states that "intangible cultural heritage means the practices, representation, expressions, knowledge, and skills, as well as the instruments objects, artifacts, and cultural spaces associated therewith that communities, groups, and in some cases, individuals recognize as part of their cultural heritage." Intangible heritage requires some forms, which are including "oral expressions and traditions; performing arts; social practice ritual and

festival events; knowledge and practices concerning nature and universe; traditional craftsmanship" (UNESCO, 2003, article. 2)

The intangible heritage are considered as a broader framework in order to display the significance of tangible heritage through form, space organization and architectural elements (Bouchenaki, 2003) (Figure 2).
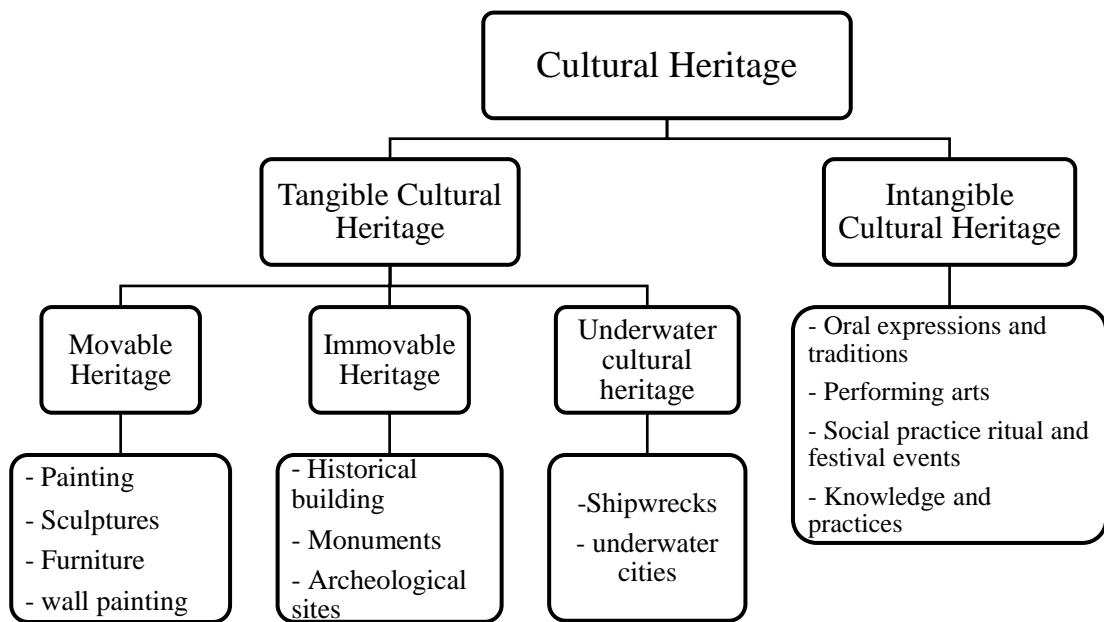
Figure 2: Cultural heritage classification from UNESCO (2003)

Kalmer (2003) clarified that when a place is classified as UNESCO World Heritage List of Cultural Heritage, the people's attitude will change about that heritage. Consequently, any listed heritage does not only serve to ensure that monuments are preserved, but also helps make people aware of the determined heritage values (Mignosa, 2005). In brief, heritage definitions related to heritage significance and also that significance is actually identified through heritage values. Table 2 illustrates the typologies for cultural heritage values from the perspective of various researchers from 1982 to 2008 that is collected by Fredheim and Khalaf in (2016).

Table 2: The list of typologies for cultural heritage values (Fredheim & Khalaf, 2016, p. 468)

Riegl (1982)	ICOMOS (1979)	Lipe (1984)	Darvill (1995)	Carver (1996)
"Age" "Historical Historic" "Commemorative" "Use" "Newness"	"Aesthetic" "Scientific" "Social"	"Economic" "Archaeological" "Associative/ Symbolic" "Informational"	"Use" "Research" "Scientific Research" "Creative Arts" "Education" "Recreation and Tourism" "Symbolic Representation" "Legitimation of Action" "Social Solidarity and Integration" "Integration Monetary & Economic" "Gain" "Option" "Stability" "Mystery & Enigma" *"Existence"* "Cultural Identity" "Resistance to Change"	"Market" "Capital/Estate" "Production" "Commercial" "Residential" "Community" "Amenity" "Political" "Minority/Disadvantaged/Descendant" "Local Style"" "Human" "Environmental" "Archaeological"
Frey (1997)	Ashley-Smith (1999)	Pye (2001)	Throsby (2001)	Mason (2002)
"Monetary" "Option" "Existence" "Bequest" "Prestige" "Educational"	"Economic" "Informational" "Cultural" "Emotional" "Existence"	"Historic" "Artistic" "Scientific" "Cultural" "Contextual" "Condition" "Economic"	"Aesthetic"" "Spiritual" "Social" "Historical" "Symbolic" "Authenticity"	"Historical" "Cultural/Symbolic" "Social" "Spiritual/Religious" "Aesthetic" "Market" "Existence" "Option" "Bequest"
Feilden (2003)	Keene (2005)	Appelbaum (2007)	English Heritage (2008)	Orbaşlı (2008)
"Emotional" "Wonder" "Identity" "Continuity" "Spiritual & Symbolic" Cultural" "Documentary" "Historic" "Archaeological, "Age & Scarcity "Aesthetic & Symbolic" "Architectural" "Townscape, Landscape & Ecological" "Technological & Scientific Use" "Functional" "Economic" "Social" "Educational" "Political & Ethnic"	"Social" "Aesthetic" "Spiritual" "Historical" "Symbolic" "Authenticity"	"Art" "Aesthetic" "Historical" "Use" "Research" "Educational" "Age" "Newness" "Sentimental" "Monetary" "Associative" "Commemorative" "Rarity"	"Evidential" "Historical" "Aesthetic" "Communal"	"Age and Rarity" "Architectural" "Artistic" "Associative" "Cultural" "Economic" "Educational" "Emotional" "Historic" "Landscape" "Local Distinctiveness" "Political" "Public" "Religious & Spiritual" "Scientific/Research/ Knowledge" "Social" "Symbolic" "Technical" "Townscape"
Stubbs (2009)	Gómez Robles (2010)	Szmelter (2010)	ICOMOS New Zealand (2010)	Lertcharnrit (2010)

"Universal" "Associative" "Curiosity" "Artistic" "Exemplary" "Intangible" "Use"	"Typological" "Structural" "Constructional" "Functional" "Aesthetic" "Architectural" "Historical" "Symbolic"	Cultural" "Identity, Emotive" "Artistic/Technical, Evidence" "Rarity, Administrative" "Contemporary" "Socio-Economic" ""Economic, Resource" "Functional, Usefulness" "Educational, Tourism" "Social, Awareness" "Political, Regime"	"Aesthetic" "Archaeological" "Architectural" "Commemorative" "Functional" "Historical" "Landscape" "Monumental" "Scientific" "Social" "Spiritual" "Symbolic" "Technological" "Traditional"	"Informational" "Educational" "Symbolic" "Economic" "Entertaining/Recreational"

A value-based conservation approach is recommended by various researchers, where values are considered to decide on a range of interventions in conservation approaches. In addition, there is such a close relationship between tangible and intangible cultural heritage. Since, the intangible aspects directly effects on the formation of tangible cultural heritage. In this respect, the conservation process should cover tangible and intangible cultural heritage aspects (Ito, 2003).

2.2 Range of Interventions in Conservation Approaches

Conservation comprises all processes and procedures that are specifically to protect the values of cultural heritage and prolong their physical life through safeguarding the elements that express the character of cultural heritage (Provincial & Collaboration, 2014).

The Burra charter (2013, Article 1.4) states that, "Conservation means all the processes of looking after a place to retain its cultural significance" and also the main purpose of conservation is to preserve the cultural significance. Conservation activities on heritage buildings about intervention may lead to a physical change and also affect the character-defining elements. Obviously, heritage value must be respected and protected during any intervention (Provincial & Collaboration, 2014).

Range of intervention in conservation approaches has been introduced by several sources, which is mentioned in Table 3. As it is evident, the ICOMOS (2010) contains the last classification of conservation in terms of intervention levels. Thus, the conservation approaches in terms of intervention levels are presented according to the ICOMOS Charter.

Table 3: Intervention degrees for conservation purposes

ICOMOS (2010)	Douglas (2006)	Ahunbay (1996) cited in (Türker, 2002)
• Preservation - Stabilization - maintenance - repair • Restoration - reassembly - reinstatement - removal • Reconstruction • Adaptation	• Preservation • Conservation • Refurbishment • Rehabilitation • Renovation • Remodeling • Restoration • Demolition	• Preservation - Protection - Maintenance - Cleaning, liberation • Restoration - Repair - Consolidation - Reintegration - Renewal of fabric - Reconstruction - Replication - Reconstitution • Rehabilitation - Revitalization - Renovation - conversion

Intervention levels for different kinds of conservation purposes are different. Increasing intervention degrees is evident in each conservation strategies according to the ICOMOS (2010, p. 6), which follows:

1) "Preservation", through "Stabilization", "Maintenance", or "Repair";

2) "Restoration", through "Reassembly", "Reinstatement", or "Removal";

3) "Reconstruction"; and

4) "Adaptation"

2.2.1 Preservation

Preservation requires the least possible intervention to ensure its survival in the long term and therefore, continued value of its cultural heritage (ICOMOS, 2010). Weeks and Grimmer (1995, p. 16) give a description of preservation that is a kind of process to "sustain the existing form, materials, and the integrity of historical properties" through applying the necessary measures. Preservation includes the primitive activities toward protecting and Stabilizing property that usually focuses on maintaining and repairing historical characteristics and materials, instead of making new construction (Aplin, 2002). The stabilization includes the process of preservation while reducing the process of decay (ICOMOS, 2010). "Maintenance is the single most important conservation process. Whether the place is architectural, mechanical, or botanical, prevention is better than cure." (Kerr Semple, 1996)

Preservation is comparable to maintenance, even though it includes extensive works and programs of fabric maintenance and reduce or eliminate damage programs as well (Aplin, 2002). Repair activities that are carried out with special regard to preservation are justified when the physical and material stability of the building is increased, as well as the new materials are compatible with the original ones and the cultural significance and value of the heritage building are not diminished (ICOMOS, 2010).

2.2.2 Restoration

The restoration process usually includes reassembly and reinstatement and also removal of incompatible parts, which may reduce the value of cultural heritage. The restoration process is based on the maintenance of the existing fabric with exploration and analysis of all evidence that is available, which results in recovering or revealing the significance of cultural heritage (ICOMOS, 2010).

Restoration implicates "reinstating the physical and decorative condition of an old building to that of a particular date or event" (Douglas, 2006).

Reassembly, as one of the restoration terminologies, uses existing material and returns the heritage to its former position through the reinstatement process. Reassembly is usually involved in working on a specific part of the place instead of the whole place (ICOMOS, 2010).

Douglas (2006, p. 589) states that reinstatement includes the major works to restore a building to its condition before major damage.

The minimal interventions are applied, since "balancing the removals and recreations to ensure the preservation of the authenticity of the place" is respected in the restoration process (Ureche-Trifu, 2013).

2.2.3 Reconstruction

According to the British standards, reconstruction is defined as "The re-establishment of what occurred or what existed in the past, based on documentary or physical evidence" (BS 7913, 1998; Douglas, 2006). In other words, reconstruction creates missing or non-surviving asset parts for interpretive purposes (Weeks & Grimmer, 1995; Douglas, 2006).

Reconstruction differs from restoration by introducing new material to replace lost materials. However, reconstruction can be an appropriate strategy if it is required to the function, integrity, and understanding the intangible values of the place as well as preserving the symbolic and memory values of cultural heritage. Reconstructed elements should not include most of a site or structure generally (ICOMOS, 2010).

2.2.4 Adaptation

"Adaptation" is originated from the Latin *ad* (to) and *aptare* (fit). Any works beyond the maintenance shall be included in order to meet new conditions or

requirements through intervention to adjust or reuse (Chudley, 1983). As respects, the adaptation of existing buildings has become more meaningful, suggesting mainly some form of change in use (Douglas, 2006). Generally, Changing in use is accrued during the adaptive reuse that is a kind of "conversion of the facility or a part of the facility" to be used differently from the original design (Iselin & Lemer, 1993, p. 46). Also, adaptation may include the conversion of a building or renovation process for achieving suitable and acceptable condition through assigning the similar or another use to the building (Douglas, 2006).

According to Burra Charter (2000), process of adaptation refers to any modification of place, in addition to a selection of the compatible use with the preservation of its cultural heritage value. Similarly, rehabilitation is considered as an act or process to enable a property to be used in a compatible manner by repairing, altering and adding, while preserving those parts or characteristics that express its values and significance (Weeks & Grimmer, 1995, p. 60). Department of Planning Sydney in 1995 determined that the proposals for a place's adaptation might result from continued use or a suggested change of use. Any interferences and alternations where compatible use of buildings or sites is required, are necessary (NSW Heritage Office, 2002). Moreover, as ICOMOS (2010) states, the changes should be substantially reversible and therefore, have a much lower or negative impact on the place's cultural heritage value. Additionally, the compatibility of alternations with the original fabric and form of place, and omitting "inappropriate or incompatible contrasts of form, scale, mass, color, and material", must be taken into account (ICOMOS, 2010, p. 8).

2.3 Evolution of Adaptive Reuse Concept for Heritage Buildings

Since the 19th century, the theoretical discussions started about the adaptive reuse concept to protect the historical monuments, and two opposing views arose. One

ideology may be depicted as the "restoration movement" contributed by Viollet - le - Duc (1814 - 79) in France, while the others can be described as the "conservation movement" prompted by John Ruskin (1819 - 1900) and his student William Morris (1834 - 96) in England. However, this discussion has turned over the previous century, where different conservationists and theoreticians have targeted to identify the best way of coping with existing structures (Plevoets & Van Cleempoel, 2013).

Within the conservation idea after the "French Revolution" in 1789, conservation and reconstruction made no difference, and ideas like the works of "Viollet - Le – Duc" advocated "Stylistic Restoration" (Zeayter & Mansour, 2018).

Viollet - le - Duc included new materials to the structure, which maintains the original feel and look in mind, during the reconstruction of the Gothic cathedrals (Hearn, 1997). Plevoets (2013) discusses the ideas of Viollet - le - Duc's work that can be applied to contemporary adaptive reuse because Le-Duc believed that the best approach to protect a structure's heritage, culture and spirit was to make a new use for those by considering its original style.

When Viollet - le – Duc (1814-1879) identified that adaptive reuse is considered as a technique to protect the historical monuments. He claimed that the most appropriate way of persevering a building is to provide a use to it, and make sure that all needs are satisfied by that use and no further changes will be needed to the buildings (Braziller, 1990).

In the mid-19th century, John Ruskin (1849) in "Seven Lamps of Architecture" introduces the concept of protecting as follows again, "it is no question of the convenience of feeling whether we are going to preserve the structures of the past or not. "We do not have the right to make any changes in those buildings because they

are not ours; they belong partly to those who built them and partly to all the generations of mankind who are to follow us" (Ruskin, 1849, p. 332).

Ruskin's approach is in contrast with Viollet-le-Duc, who identified that restauration is the finished mechanism of the building that may not have been existed before and also gives us as a sense of history and place. Viollet-le-Duc advocates historical consistency and the idea of maintenance as a process that continues. On the other hand, Ruskin calls for restoration and revitalization (Khan, 2015).

Ruskin (1849) criticized the restorers for destroying the buildings "historical authenticity". Also, he advocated "protection, conservation, and maintenance" for minimum intervention. William Morris (1977) introduced a new Manifesto Society, which is now the formal basis for a contemporary conservation strategy that he was the head of the "Society for Protection of Ancient Buildings (SPAB)." SPAB had leading following principles: "conservative repair" and to "stave off decay by daily care."

John Ruskin (1849) and William Morris (1977) both implied that restoration is similar to the destruction of a building, which results in eliminating the original spirit and uniqueness of a building. Furthermore, restoration could not be as a suitable option because it destroyed the building's historical authenticity and disconnected it from those who built it (Jackson, 2006).

In the early twentieth century, Alois Riegl (1982), who was an art historian, described the conceptual conflict with the different value system that forms the basis of Ruskin and Morris views on historical sites. Riegl characterized different kinds of principles that he listed as follows:

- "Memorial Values", which coped with "Historical Value" and "Age Value";

- "Present-day Values" characterized as "Use Value", "Art Value", "Newness Value", and "Relative Art Value" (Riegl, 1982).

For Riegl, the followers of the restoration movement sought to compound newness value with historical value. They aimed to remove traces because of natural decline and to restore each element to develop a historical entity. However, followers of the anti-restoration movement admire monuments for their age value. For this movement, the damage look of an artifact must be maintained as signs of natural deterioration. This was believed to give evidence to the reality that a monument may not have been built recently, but at a certain time in history (Plevoets & Van Cleempoel, 2013).

Camillo Boito (1836-1914) the took discussion further and suggested that the technique of restoration used for any specific project could rely on the building or monument's specific circumstances. He differentiated between three techniques, which he named as "Archaeological Restoration (for Antique monuments), Picturesque Restoration (for Medieval monuments) and Architectural Restoration (for Renaissance and other monuments)" (Jokilehto, 1986, p. 337). Boito's effect on Italian and international conservation practice was to show essential key factor in 1931 adaptation of the Athens Charter to support contemporary conservation strategy (Chung & Kim, 2010). The charter, developed after World War I to evaluate heritage conservation problems and, more explicitly, the reconstruction of buildings and even entire towns, heavily damaged in the First World War (ICOMOS, 1931). However, the demolition of the war also made it possible to extend the concepts of modernist architects, not only on a building scale, but also on an urban scale (Jokilehto, 1986, p. 399)

The concepts of CIAM (International Congresses of Modern Architecture) in 1933 discussed that; historical buildings should be preserved under the special condition and should be considered as isolated monuments in the modern fabric of the city (CIAM

'Statements of the Athens Congress, 1933). It can be concluded that there is a specific gap between restoration and conservation versus modern architecture. While, conservation and renovation experts cope with scientific restoration and value assessment in order to preserve the remaining historical fabric after the First World War and adapt it to the needs of the contemporary world, modern architecture's argumentative belief in the future and new technologies excluded existing architecture and what it was seen as an obstacle to development and improvement (Plevoets & Van Cleempoel, 2013).

Until the 19th century, the heritage idea was constrained in ancient and medieval structures, but as a consequence of the destructiveness of the both First and Second World Wars, there was a growing awareness of the significance of buildings from other periods in history. Besides, there was a growing interest in various typologies deserving preservation. Industrial buildings, Vernacular architecture, and even entire historical towns started to be within the scope of the conservation. The growth in the number of buildings that would need to be conserved in this current and extended scope was immense (Lamprakos, 2014). Undoubtedly, a reassessment of the concept of conservation was represented in the Venice Charter of 1964, which refers to the significance of adaptive reuse as a type of conservation strategy. According to this charter, the sustainability of historical sites is always aided by using them for some socially beneficial intent (ICOMOS, 1964).

Machado (1976) uses the phrase "remodeling" to call attention to "adaptive reuse". He argued that, adaptive reuse is an act of creation in itself, that neither destroyed the current context nor was totally limited by it (Machado, 1976). Table 4 illustrates the adaptive reuse movements from the starting point of this concept at the beginning of the 20th century.

Table 4: Adaptive reuse movement

Initiators	Conservation approach	Characteristics
Viollet-Le Duc (1854)	Stylistic restoration	Restoration implies re-establishing to make finished of building
John Ruskin (1849)	Anti-restoration (conservative repair)	Protection, conservation, maintain, recommended minimal intervention
Alois Riegl (1903)	Classic essay "The Modern Cult of Monuments: Its Character and Origin."	Restoration strived for combining newness value (unity of style) and historical value (originality of style) value theories : "memorial values": "age value" and "historical value" "present-day values": "use value", "art value", "newness value", and "relative art"
William Morris (1977)	Society for Protection of Ancient Buildings (SPAB)	Protection instead of restoration
Camillo Boito (1914)	Scientific restoration	Archaeological restoration Picturesque restoration Architectural restoration
Athens Charter (1931)	modern conservation policy	Material-based approach: minimal interventions to heritage concerning the material structure
CIAM (International Congresses of Modern Architecture) (1933)		historic buildings should only be preserved as "isolated monuments" in the modern urban fabric
Venice Charter (1964)		importance of "adaptive reuse" as a form of "conservation" practice
Sherban Cantacuzino, (1975)	The book "New uses for old buildings."	set the foundations for the emergence of a new discipline in adaptive reuse
Rodolfo Machado (1976)	"Architecture as Palimpsest"	Employs the term "remodeling" to refer to "adaptive re-use". Overlaying of formal interventions within an existing form, adaptive re-use, as a creative act in and of itself

2.3.1 ICOMOS Charters Covering Adaptive Reuse Concept

The International Council on Monuments and Sites (ICOMOS) is a professional organization working to preserve and protect cultural identity sites all around the world. The basic idea for ICOMOS charters is related to the 1931 Athens Conference

on the Restoration of Historic Buildings, organized by the International Museums Office. Over the years, the formation of ICOMOS has developed, and a number of other charters and doctrinal texts have been adopted, and also provide guidance to professionals in heritage conservation (ICOMOS, The role of ICOMOS in the World Heritage Convention, 2019). The ICOMOS charters and other doctrinal texts about heritage buildings and sites are mentioned in Table 5.

Table 5: ICOMOS Charters and other doctrinal texts about heritage buildings and sites

Charter	Date	Characteristic (purposes)
"Athens Charter for the Restoration of Historic Monuments"	(1931)	"It is the first attempt was made to set down a code of ethics and the conservation movement took on a truly international mantle" (ICOMOS, 1931).
* "International Charter for the Conservation and Restoration of Monuments and Sites (The Venice Charter)"	(1964)	"In 1964, the Congress of Architects and Specialists of Historic Buildings approved a text for an International Charter for the Conservation of Monuments and Sites" (ICOMOS, 1964).
* "Resolutions of the Symposium on the introduction of contemporary architecture into ancient groups of buildings, at the 3rd ICOMOS General Assembly"	(1972)	It introduces contemporary architecture of ancient buildings, "Contemporary architecture should be implemented into groups of ancient buildings and should not impact the qualities of structural or esthetic of the ancient setting" (ICOMOS, 1972).
The Declaration of Amsterdam	(1975)	"Europe's unique architecture is the common heritage of all her peoples and which declared the intention of the Member States to work with one another and with other European governments for its protection" (Amsterdam Declaration , 1975).
* "The Australia ICOMOS Charter for the Conservation of Places of Cultural Significance - (The Burra Charter) (Australia ICOMOS)"	(2000)	In 1981, Australian ICOMOS adopted the Burra Charter. "The charter was the first to identify the importance of Cultural Significance. The charter set down definitions of commonly used terms and conservation principles" (ICOMOS, 2000).
*Declaration of Dresden	(1982)	"Reconstruction of Monuments Destroyed by War. Socio-cultural developments after the war Where monument protection and careful preservation go hand in hand with restoration efforts" (Dresden Declaration , 1982).
"Charter for the Conservation of Historic Towns and Urban Areas (The	(1987)	"Charter on the Conservation of Historic Towns and Urban Areas. The charter, together with their natural and man-made environments, concerns historic urban areas, large and small, including cities, towns and historic centers or

Washington Charter)"		quarters. These areas embody the values of traditional urban cultures beyond their role as historical documents" (ICOMOS, W, 1987).
"Charter for the Protection and Management of the Archaeological Heritage"	(1990)	"Charter for the Protection and Management of the Archaeological Heritage, which is the fundamental record of past human activities. Therefore, its protection and careful management are essential in order to enable archeologists and other scholars to analyze and contextualize it on behalf of present and future generations and for their benefit" (Archaeological Heritage charter, 1990).
*"Nara Document on Authenticity"	(1994)	"The Nara Document on Authenticity is conceived in the spirit of the Charter of Venice, 1964, and builds on it and extends it in response to the expanding scope of cultural heritage concerns and interests in our contemporary world" (ICOMOS, 1994).
"International Cultural Tourism Charter - Managing Tourism at Places of Heritage Significance"	(1999)	"International Charter on Cultural Tourism that encourages making accessibility of heritage for visitors and local community" (ICOMOS, 1999). "The natural and cultural heritage is a material and spiritual resource and also should be made physically, intellectually and/or emotively accessible to the general public." (principle 1.1)
"Preservation of Historic Timber Structures"	(1999)	"Principles for the Preservation of Historic Timber Structures. The purpose of the document is to identify fundamental and universally applicable principles and techniques for the protection and preservation of historical timber structures with consideration to their cultural significance" (ICOMOS, 1999)
"Charter on the Built Vernacular Heritage"	(1999)	"Charter on the Built Vernacular heritage. The built heritage of the vernacular is significant; it is the specific expression of a community's culture, its connection with its territory, and at the same time the cultural diversity of the world expression" (ICOMOS, 1999).
"ICOMOS Charter – Principles for the Analysis, Conservation and Structural Restoration of Architectural Heritage"	(2003)	"Principles for the analysis, conservation and structural restoration of architectural heritage. Because of its nature and history (material and assembly), architectural heritage structures present a number of diagnostic and restorative challenges that restrict the application of universally accepted codes and building standards" (ICOMOS, 2003).
"ICOMOS Principles for the Preservation and Conservation-Restoration of Wall Paintings"	(2003)	"Throughout history, wall paintings have been cultural expressions of human creation from the earliest beginnings, such as rock art, spreading to the present - day murals. Their deterioration, unexpected or accidental destruction is a loss that impacts a significant part of the cultural heritage of the world" (ICOMOS, Wall Paintings, 2003).
"ICOMOS Charter on the Interpretation and Presentation of Cultural Heritage Sites"	(2008)	The aim of the Charter is to "identify the fundamental interpretation and presentation principles as key components of heritage conservation projects and as a means of improving public appreciation and understanding of cultural heritage sites" (ICOMOS C. H., 2008).
"The ICOMOS Charter On Cultural Routes"	(2008)	"The new Cultural Routes concept demonstrates the progression of ideas regarding the perception of cultural properties and the rising significance of values directly relevant to their setting and territorial scale and indicates the macrostructure of heritage at various levels" (ICOMOS C. H., 2008).
* Charter for the Conservation of Places of Cultural Heritage Value (ICOMOS New Zealand)	(2010)	"Conservation of Places of Cultural Heritage Value. The Charter sets out principles to follow the cultural heritage sites conservation in the different aspects of conservation work, such as owners, guardians, managers, developers, planners, architects, engineers, craftsmen, heritage practitioners and consultants, and local and central authorities" (ICOMOS, 2010).

"Joint ICOMOS – TICCIH Principles for the Conservation of Industrial Heritage Sites, Structures, Areas, and Landscapes"	(2011)	TICCIH principles for the "conservation of industrial heritage sites, structures, areas, and landscapes". ICOMOS and TICCIH consider expanding their cooperation by adopting and promoting the dissemination and use of the Principles to help "document, protect, preserve and appreciate industrial heritage" as part of the heritage of human societies around the world (ICOMOS, 2011).
*The Valletta Principles for the Safeguarding and Management of Historic Cities, Towns and Urban Areas	(2011)	This document's main aim is to "introduce principles and strategies that apply to any intervention in historic towns and urban areas". "These principles and strategies are intended to safeguard the values and settings of historic towns and their integration into the social, cultural and economic life of our time" (ICOMOS, U, 2011).
The Florence Declaration	(2014)	"Declaration of the principles and recommendations on the value of cultural heritage and landscapes for promoting peaceful and democratic societies" (ICOMOS, Florence, 2014).
Principles for the conservation of wooden built heritage	(2017)	Principles For The Conservation Of Wooden Built Heritage. This document proposes to "use the "Underlying principles of the Venice Charter (1964), the Amsterdam Declaration (1975), the Burra Charter (1979), the Nara Authenticity Document (1994) and related UNESCO and ICOMOS doctrines on the protection and wood - built heritage conservation. The aim of this document is to identify the underlying principles and practices relevant to the protection and conservation of wood - built heritage internationally concerning its cultural significance in the widest variety of cases" (ICOMOS, 2017).

The charters marked with * are charters that are related to the adaptive reuse, reuse, and adaptation during the conservation process, which are thoroughly explained in Table 6: Articles, definitions and principles of adaptive reuse in ICOMOS Charters.

It is clear that the charters' fundamental role is to provide declarations or ethics and rules for the conservation and management of places of historical importance where conservation is considered to be an essential part of the management of these areas. Therefore, charters are considered as professional ethics in guiding the practice of preserving cultural heritage. They always discuss the implications of items such as heritage values, conservation, significance, and the steps engaged in heritage conservation planning process. Now every country has regional legislation that protects its heritage, but not all have a guiding method to execute conservation practice effectively (Taylor, 2004)

Adaptation means any work beyond the maintenance of a building to change its capability, role, or performance (Douglas, 2002). The Environment and Heritage Department (2004) describes adaptive reuse as "a process that transforms a disused item into a special item which can be used for a different purpose" Cambell (1996) represents adaptive reuse as transferring an existing building to suit user needs. ICOMOS Charters that include any definitions and articles about adaptation and reuse are mentioned in Table 6.

Table 6: Articles, definitions and principles of adaptive reuse in ICOMOS Charters

ICOMOS Charter	Date	Articles, Definitions, and principles
"International Charter for the Conservation and Restoration of Monuments and Sites (The Venice Charter)"	(1964)	"The conservation of monuments is always facilitated by making use of them for some socially useful purpose. Such use is therefore desirable, but it must not change the layout or decoration of the building. It is within these limits only that modifications demanded by a change of function should be envisaged and may be permitted".(ICOMOS, V; Article 5)
"Resolutions of the Symposium on the introduction of contemporary architecture into ancient groups of buildings, at the 3rd ICOMOS General Assembly"	(1972)	• "Acceptance of the existing fabric as the framework." • "Appropriate use of mass, scale, rhythm, and appearance in use of present-day techniques and materials." • "Authenticity of historical monuments must be taken as a basic criterion." • "The revitalization of monuments and groups of buildings by finding new uses for them."
"The Australia ICOMOS Charter for the Conservation of Places of Cultural Significance - (The Burra Charter) (Australia ICOMOS)"	(1981)	"Adaptation definition" (ICOMOS,1981;Article 1.9) "Definition of compatible use" (ICOMOS,1981; Article 1.11) "Where the use of a place is of cultural significance it should be retained" (ICOMOS, 1981; Article 7.1) "A place should have a compatible use" (ICOMOS, 1981; Article 7.2) "The amount of change to a place and its use should be guided by the cultural significance of the place and its appropriate interpretation" (ICOMOS, 1981; Article 15.1) "The contributions of all aspects of the cultural significance of a place should be respected" (ICOMOS, 1981; Article 15.4) "Adaptation is acceptable only where the adaptation has minimal impact on the cultural significance of the place" (ICOMOS, 1981; Article 21.1) "Adaptation should involve minimal change to significant fabric, achieved only after considering alternatives" (ICOMOS, 1981; Article 21.2) "Retaining, modifying or reintroducing a significant use may be appropriate and preferred forms of conservation"(ICOMOS, 1981; Article 23)
"Declaration of Dresden on the "Reconstruction of	(1982)	"Restore a monument because of its meaning and impact, in addition to mere preservation."

Monuments Destroyed by War"		"Increasing awareness of the spiritual value of monuments by continuing the traditional use of a building." "efforts to find a use of great public significance to residential use" (Dresden Declaration , 1982)
"Charter for the Conservation of Historic Towns and Urban Areas (The Washington Charter)"	(1987)	"New functions and activities should be compatible with the character of the historic towns or urban area." (ICOMOS, W, 1987).
"The Nara Document on Authenticity"	(1994)	"Depending on the nature of the cultural heritage, its cultural context, and its evolution through time, authenticity judgments may be linked to the worth of a great variety of sources of information. Aspects of the sources may include form and design, materials and substance, use and function, traditions and techniques, location and setting, and spirit and feeling, and other internal and external factors" (ICOMOS, 1994).
"Charter for the Conservation of Places of Cultural Heritage Value (ICOMOS New Zealand)"	(2010)	"Degrees of intervention for conservation purposes." "Proposals for adaptation of a place may arise from maintaining its continuing use, or from a proposed change of use." "Adaptation should not dominate or substantially obscure the original form and fabric, and should not adversely affect the setting of a place of cultural heritage value" (ICOMOS, 2010)
"The Valletta Principles for the Safeguarding and Management of Historic Cities, Towns and Urban Areas"	(2011)	"All interventions in historic towns and urban areas must respect and refer to their tangible and intangible cultural values."(intervention criteria, a) (ICOMOS, U, 2011, p. 7) "The introduction of new activities must not compromise the survival of traditional activities or anything that supports the daily life of the local inhabitants. This could help to preserve the historical, cultural diversity, and plurality, some of the most valuable elements in this context."(proposal and strategies,b) (ICOMOS, U, 2011, p. 12)

2.3.2 Adaptive Reuse Concept in Contemporary Era

Brand (1995) discussed adaptive reuse in detail and put the way forward in contemporary practice. He assumed three major reasons for adaptation that was included technology, fashion, and money. Additionally, the Brand strategy to adaptive reuse reveals how, over time, the meaning of adaptive reuse of heritage buildings has shifted from preserving values to financial reasons, and now to improve the technology (Yazdani Mehr, 2019).

Brooker and Stone (2004) describe the adaptive reuse as "the function is the most obvious change, but other alterations may be made to the building itself such as the circulation route, the orientation, the relationships between spaces; additions may be

built, and other areas may be demolished". And also identify the adaptive reuse in some terms include "remodeling", "retrofitting", "conversion", "adaptation", "reworking", "rehabilitation" or "refurbishment". Adaptive reuse is also considered an essential approach for cultural heritage conservation in theory and practice of contemporary conservation (Machado, 1976; Jessen & Schneider, 2003; Brooker & Stone, 2004).

Two main contemporary approaches of adaptive reuse include "within-use adaptation" and "across-use adaptation". Within-use adaptation refers to the adaption of a building, which is based on its primary or original function of that building. Whereas, in across-use adaptation, building experience the substantial adaptation due to the functional change (Aplin, 2002; Ellison & Sayce, 2007; Conejos, Langston, & Smith, 2012; Wilkinson, Remøy, & Langston, 2014; Yazdani Mehr, Holden, & Skates, 2017). Comparing the adaptive reuse theories in the 19th and 20thcenturies by Yazdani Mehr (2019) illustrate that theorists focused mostly on "within-use adaptation" by presenting some intervention degrees based on the original function of the heritage building. However, an across-use adaptation that was derived from the Venice charter considered as an effective approach to preserve the cultural significance of the heritage building, which is further addressed in this research.

2.4 Goals of Adaptive Reuse of Heritage Buildings

Since before the early 1930s, conservation charters have mainly viewed adaptive reuse as a strategy for preserving and maintaining architectural heritage buildings, while respecting their heritage significance (ICOMOS, 1931). During that period, the main aim of adaptive reuse was the heritage buildings' preservation for future generations through producing adequate financial resources due to the restoration and maintenance (Cantacuzino, 1975; ICOMOS, 2013). The benefits of adaptive reuse in

terms of building preservation were discussed almost specifically up to the 1950s (Jokilehto, 1986; Plevoets & Cleempoel, 2011).

Bullen & Love (2010), Department of the Environment and Heritage (2004) both argue that adaptive reuse of heritage buildings was considered as a common issue around the world for its wide range of advantages. The purpose of adaptive reuse projects is to improve the economic, environmental, and social performance of heritage buildings and their surrounding communities (Rodwell, 2008; Bullen & Love, 2011).

Shehata, Moustafa and Sherif (2015) emphasize the three main target for adaptive reuse of heritage buildings, which include the 1) conservation of heritage building; 2) the sustainable development; 3) new function's success.

According to Burra charter (2000), in particular, adaptive reuse relates to the preservation of unused heritage structures by converting to the new contemporary functions that are more appropriate. Although, some transformations occurred during the adaptive reuse process, the heritage building's structure, original identity and authentic and significance of heritage for future generations should be retained as much as possible (ICOMOS, 2000)

Conservation strategies, which are based on a range of interventions, as well as guidelines and standards for conserving the tangible and intangible aspects of cultural heritage buildings, were reviewed in the previous sections. In this respect, awareness of conservation strategies to maintain and improve the tangible aspects, by considering the preservation of heritage values and significance is one of the primary goals of adaptive reuse.

2.5 Balance between Sustainability Pillars in the Adaptive Reuse of Heritage Buildings

Sustainable development is one of the most widely discussed concepts in current years aimed at maintaining communities and the recent resources for coming generations. It has different dimensions, like environmental, economic, socio-cultural pillars, which behave, complement, and interpret one another (Throsby, 2009; Türker, 2011; Murzyn-Kupisz, 2012; Atun, Nafa, & Türker, 2018; Günçe & Mısırlısoy, 2019)

The concept of conservation and reuse adaptation represents a framework of sustainability, continuity, and cultural property dynamism (Aydin, Yaldız, & Sıramkaya, 2015). The definition of sustainability is "development, which meets the needs of the present without compromising the ability of future generations to meet their own needs" (Bruntland, 1987, p. 43).

The Department of Environment and Heritage (DEH) has outlined heritage buildings' adaptive reuse as "essential component of sustainable development", while giving a view into the past through defining the buildings' characteristic and mentioning the history (DEH, 2012; Dyson , Matthews, & Love, 2016). In addition, the heritage building's new function is depicted as one of the parameters to ensure its sustainability (Yaldız, 2010).

A balance between environmental, economic, and socio-cultural needs should be included within all measures and strategies to achieve Sustainable utilization of resource (Atun, Nafa, & Türker, 2018). Furthermore, sustainability involving "the concepts of time, continuity, preservation, and adaptation change." (Teutonico & Matero, 2003; Sarp, 2007; Aydin, Yaldız, & Sıramkaya, 2015).

In the adaptive reused process, old buildings are produced for the cultural significance while getting new uses of a sustainable environment that are

economically, socio-culturally, and environmentally sustainable (Persaud, 2017; Joudifar & Türker, 18-20 April 2017). The reuse of heritage buildings should be regarded as the strategy to provide cultural sustainability with a specific social reference. Therefore, socio-cultural sustainability depends on people's awareness of the heritage building's new function that can be as the landmark in the region. Hence, adaptive reuse of heritage buildings improves the living quality through providing social and cultural activities according to the community needs and requirements (Rodwell, 2008; Mısırlısoy & Günçe, 2016)

Furthermore, the statement of cultural sustainability in adaptive reuse is defined through transferring the cultural significance from the past to the next generation as well as interfacing with new cultures (Yaldız, 2010).

Within this scope, the protection and reuse of heritage buildings as a cultural history become an important aspect, which it should be taken into account in the context of environmental "sustainability". Protecting buildings before being ruined is a feature of sustainable development in terms of material and energy conservation. Adaptive reuse is a way to protect heritage buildings from the destruction that will support the existence of a "sustainable environment" (Yaldız, 2009)

Regards to the economic sustainability, Yaldız (2009), Bullen and Love (2011) imply that the reuse of the buildings creates significant economic input on the basis of material, energy, and resources. New sustainable economic dynamics such as tourism can be formed through reusing the heritage buildings, as much as they have been used and make a contribution to tourist industry with their properties; these buildings cause an economic revival in their environment.

In the following sections, the relation between cultural sustainability and adaptive reuse of heritage buildings has been reviewed specifically.

2.5.1 Cultural Sustainability through Adaptive Reuse

Duxbury & Gillette (2007) pointed out the 'economic', 'social', and 'environmental' issues become understandable through culture, and also develop the ideas on how they should be addressed by society (Duxbury & Gillette, 2007, p. 10)

Cultural sustainability, which is originally regarded as an integral part of social sustainability, now is frequently considered as a separate and equally important component of other sustainability concerns (Hawkes, 2001)

Heritage buildings are described as cultural entities, which provide sustainability with the signs they carry between past and future. Thus, these buildings keep providing historical continuity as a document in a socio-cultural significance (Murzyn-Kupisz, 2012).

Culture is not only an essential part of a society or particular social group, but it is also what is produced using 'comprehending' and 'implementing' in order to improve human ideas that are necessary to make society more sustainable (Hawkes, 2001, p. 25). As such, UNESCO (2013) now contribute to the protection of cultural heritage resources in terms of tangible and intangible forms, which provide a fundamental means of transmitting cultural values and significances with the aim of cultural sustainability (Loach, Rowley, & Griffiths, 2017).

According to Yaldız (2009) the assessment of heritage buildings with the purpose of contemporary usage is an essential strategy that leads to form a cultural connection between present and past by maintaining cultural heritage and also ensure the cultural continuity of heritage buildings.

The Egyptian architect of the 20th century, Hassan Fathy (1980), states that it is important to understand that the importance of conservation is not limited to the preservation of heritage structures in their physical form, conservation is also a process

for the transmission of old traditions from both the conceptual and the functional point of view (Fathy, 1980, p. 103). Therefore, conservation is not only a tool to achieve physical continuity, but it might also be a mechanism for cultural continuity and survival (Khan, 2015). Similarly, adaptive reuse is a way to ensure the cultural continuity that is characterized by changing the present day conditions concerning cultural values that are acquired from the past and transferred to the future generations effectively (Cebeci & Çakılcıoğlu, 2002; Yaldız, 2010).

2.5.2 Cultural Sustainability/Continuity through Visitor Attraction

Most countries promote cultural heritage preservation for all community, as an asset. It can be beneficial in order to evoke the senses in the case of cultural continuity and enrich the peoples lives through enhancing their awareness about past heritage significance (Du Cros, 2001). Cultural heritage makes a contribution to different types of user groups, such as inhabitants and visitors. For various reasons, these groups may value the heritage and search for the different advantage of using (McKercher & Du Cros, 2002).

Swarbrooke (2011, p. 5) identified four main types of attractions (Table 7):

1. "Natural environment features"

2. "Man-made buildings and sites" designed for an intent other than to attract visitors, like religious and residential buildings, but now attracting large numbers of visitors who are using them as a facility for leisure or other uses.

3. "Man-made structures, buildings, and sites" designed to draw visitor's attraction and designed to meet their needs, like parks.

4. Social events

Table 7: Types of attractions by Swarbrooke (2011)

"Natural environment"	"Man-made buildings and sites that are originally designed primarily to attract visitors"	"Man-made structures, buildings, and sites that are designed to attract tourists"	"Social events"
- Beaches - Caves - Rock faces - Rivers and lakes - Forests - Wildlife: flora and fauna	- Cathedrals and churches - Stately homes and historic houses - Archaeological sites and ancients monuments - Historic gardens - Industrial archaeology sites - Steam railways - reservoirs	- Amusement parks - Theme parks - Open-air museums - Heritage centers - Country parks - Marinas - Exhibition centers - Garden centers - Craft centers - Factory tours and shops - Working farms open to the public - Safari parks - Entertainment complexes - Casinos - Health spas - Leisure centers - Picnic sites - Museums and galleries - Leisure retail complex - Waterfront development	- Sporting events: watching and participating - Arts festivals - Markets and fairs - Traditional customs and Folklore events - Historical anniversaries - Religious events

The word visitors covers all individuals who are visiting the heritage from local community residence to tourists coming from abroad or another city. In this way, the 'natural environment features' and the 'man-made building' that is not designed for visitor attraction, both emphasize on visitor management in order to prevent the problem that may be caused by visitors (Swarbrooke, 2011). The cases selected for analyzing in this study are found in the second group that was built as the residential purposes even though they attract the visitors at present.

Group of heritage buildings within an urban, rural, or historic fabric play a key role in attracting visitors to heritage sites. It is therefore important to understand the tourism function in providing the conservation of the historic buildings and sites of the nation (Tourism & Transport Forum, 2017). Heritage Tourism Essence is based on to recognize the unique characteristics of the area to derive the best cultural and economic benefits from it (Türker & Dinçyürek, 2007, p. 229). Conservation is an essential part of the management of areas of historical importance and would be a continuing responsibility. Thus, the accessibility of cultural heritage sites enables visitors to comprehend the significant values and expand their cultural experiences (Tourism & Transport Forum, 2017).

Heritage buildings that are not publicly accessible lead to losing the opportunity to better represent their cultural significance and also those values and significance are experienced by visitors (Throsby, 2010, p. 43) Culture and heritage tourism is related to past experiences, either is considered as a main tourism experience or as accidental to other experiences (Throsby, 2009).

There seems to be a growing interest in tangible historical heritage like locations, structures, memorials, and historical landscapes, as well as intangible forms of heritage such as stories and previous realistic life appreciation. As a result, heritage assets are an essential part of the traveler economy, driving visitors, increasing visitor yields and improving the visitor experience (ICOMOS, 1999)

McKercher and Du Cros (2002) argue that Places of cultural importance enhance people's life and frequently giving a deep and inspirational feeling of connection with experiences. In this way, adaptive reuse of heritage buildings creates an opportunity free access with a place of cultural importance subsequently limited because of the nature of its use. Encouraging free access to a historical site contributes to providing

opportunities for academic and community involvement as well as building civic pride in a destination. Moreover, many previously unavailable buildings may, for the first time, be open to the public through adaptive reuse for tourism purposes (McKercher & Du Cros, 2002).

Tourism makes it possible to find the experience of life, history, culture, traditions within heritage buildings that are remained from the past. The protection and restoration of the cultural and historical heritage of 'man-made', 'natural' and 'traditional landscapes' help to sustain historical and national values. Historical and cultural centers provide not only economic beneficial for the community, but also give local people the opportunity to be proud of their special identity and share it with visitors (Ismagilova, Safiullin, & Gafurov, 2015)

McKercher, McKercher, and Du Cros (2002) emphasize on increasing the public awareness and public support for protecting, preserving and managing the heritage resources due to making the community and visitors physically and intellectually aware of their significance. National and international tourism is among the major tools for cultural exchange, offering a personal experience of what has overcome from the past, as well as modern society and life. It can depict the economic advantages of cultural assets and when managed successfully it is an important generator of economic development (McKercher & Du Cros, 2002).

A successful project of adaptive reuse may provide the opportunity to spread the heritage values by contributing to cultural tourism. The factors, which are involved in the success of adaptive reuse and the new function, are reviewed in the following section.

2.6 Success of Adaptive Reuse Process

The Department of the Environment and Heritage (DEH) declares that adaptive reuse projects that are most successful are those that respect and preserve the heritage significance of the buildings besides including a contemporary layer that provides benefits for the future (DEH, 2004). Adaptation is considered as an effective way in order to preserve and maintain the building's fabric and its heritage significance, while a "building can no longer function with its original use" (Bullen & Love, 2011).

Successful heritage building conservation tends to provide a balance between the level of conservation and the sort of adaptive reuse. Not all heritage buildings can be converted to another use and selecting an appropriate function is crucial to minimizing the possible problem between maintaining the heritage significance and adapting the building to present standards to make it appropriate for new usage (Department, 2012).

An adaptive reuse project's success is strongly based on the New Use Success (Douglas, 2006). Accordingly, the success of new use is one of the main goals of adaptive reuse of heritage buildings, as discussed in the previous section.

Programming the Architectural space can help to identify appropriate new functions to the morphology of the heritage building (Langston, 2011; Campbell, 1996). Worthing and Bond (2008) propose that effective management plays a vital role in preserving and improving the historic environment for the effective reuse of a historical pattern. In order to manage and preserve a building with heritage significance, it is first necessary to consider the heritage significance and then to identify and articulate the different elements of the place that are directly related to that significance (Worthing & Bond, 2008).

Multiple factors should be considered in order to make an appropriate decision between different factors for reuse. Sustainable reuse leads to transferring the value of

heritage buildings to the future generations, enriching local culture and raising the community's economic level (Yıldırım, 2012). Two adaptive reuse approaches that were discussed by Pearson and Sullivan (1999) include 'compatible reuse' and 'most appropriate reuse'. Compatible reuse is a strategy that does not negatively impact the site or its cultural significance. However, the most appropriate reuse is not only use that is compatible but also causes to enhance and reinforce the awareness of cultural significance (Pearson & Sullivan, 1999).

The success of adaptive reuse and the new function are assessed by two main approaches: 1) continuity of function versus discontinuity and 2) appropriateness of new function. The first examines the new function appropriateness concerning the old one, and the second investigates the architectural spatial supply compared to the new functional program (Shehata, 2014).

2.6.1 Continuity of Function versus Discontinuity

The first strategy examines primarily the correspondence between the particular function and the building's original function. Regards to Douglas (2006, p. 98), adaptation projects serve three distinct groups of conversions which include "adaptation to the same use", "conversion to an alternative use" and "mixed-use" (Table 8).

Table 8: Classification of conversion during the adaptation process

"Adaptation to the same use" (refurbishment)	"Conversion to an alternative use"	Mixed use
"Adapting to the same use usually involves some form of internal layout modification" (Douglas, 2006). "Refurbishment just involves minor changes to the first design and morphology of the structure" (Shehata, Moustafa, Sherif, & Botros, 2015)	Walters and Brown (2008, p. 148) stress that the same building form can accommodate several different functions throughout its lifetime through a process of conversion and adaptive reuse.	"Having a mixture of old and new functions provides a function in some sense related to the original one" (Douglas, 2006).

Generally, the adaptive reuse process contains any intervention works to adjusting, equipped with new services, upgrading in order to adapt to the functional requirements desired while the place is being protected. The process is applied in the building while preserving the structure, original character and identity and authentic significance for next generations (Elkerdany, 2002) Many conservatives believe that successful projects are those whose new use is different from the original use while the initial use is obsolete (Douglas, 2006). In this respect, is seems essential to identify the most appropriate uses for heritage building, which is based on conservation principles in order to preserve the heritage significance and transmit them to the future generation with providing the socio-cultural, environmental and economic sustainability.

2.6.2 Appropriateness of New Function

In any conversion scheme, supply and demand matching is one of the most important requirements. According to Aydin and Yaldiz (2010), spatial compatibility is about attempting to find the most appropriate Compatibility of the building's original spatial-physical characteristics (supplies) with the occupants' needs and the functions and space usage (demands). An existing building planned for conversion has a certain space needed to accommodate the new use. This is the supply side of the equation conversion. The demand side depends on socio-cultural needs and considering the environmental and economic requirements. The success criteria for the assessment of the new function is classified by Shehata (2014) that are mentioned in Table 9.

Table 9: The most appropriate new function

1. "Basic Environmental Qualities"	Basic environmental qualities reflect everyday qualities (such as - Olfactory comfort - Thermal comfort - Auditory comfort, - Lighting, - Visual comfort, etc. That facilitate individuals and groups to carry out their basic activities through appropriate and predictable action in an adapted heritage building irrespective of any particular function (Douglas 2006).
2. Economic and Intangible Benefits	Return on investments, recovery of costs, increase in efficiency of work, high levels of productivity, increase in the tourists and visitors numbers, etc. (Plevoets & Cleempoel, 2011). Economic efficiency is reached when the project's tangible and intangible benefits exceed its costs (Elzeyadi, 2001).
3. Minimum Adaptation Costs	Adaptation costs depend on several factors like size, quality, difficulty, technology, and work location (Serageldin , 2002). The heritage buildings adaptation for reuse shall compromise the selection of the most appropriate use for preserving cultural values with the adaptation expenses expected to adopt the morphology of the building to this desired function (Douglas, 2006, p. 199).
4. "compatibility between building and new function"	The compatibility of the new function with the heritage building's spatial - physical characteristics should show the form's property with new functional requirements as a result of successful architecture by trying to ensure functional efficiency (Hansen, Haugen, & Leaman, 2005; Shull, Fringe Benefits: Reclaiming Forgotten Marginal Space, 2005)
5. Public Access	One of the main relationships between heritage reuse and sustainable conservation is that the local community and visitors access to heritage resources (Nasser, 2003). Additionally, one of the main reasons for any manifestation of conservation "is to make the significance of that heritage accessible to the host community and visitors" (ICOMOS, 1999, p. 2)

2.6.2.1 Basic environmental qualities

Basic environmental qualities are which allow groups and individuals in the adapted heritage building to act appropriately and predictably in carrying out their basic activities (Elzeyadi, 2001). The ability to conduct everyday tasks and human fulfillment requires basic ecological qualities such as with 'sensory comfort' (like

'olfactory', 'thermal', and 'auditory comfort'), 'lighting', 'visual', and 'ambient comfort' (Elzeyadi, 2001; Douglas, 2006)

2.6.2.2 Economic and intangible benefits

Many researchers argue that finding an appropriate use or multi-uses to make the heritage building economically sustainable, is the key to reinforce the heritage (Langston, Wong, Hui, & Shen, 2008; Plevoets & Cleempoel, 2011). An adaptive reuse project's economic sustainability means that the investment of the project will be sufficient to cover its adaptation, including its expenditures, with very little reliance on other sources of financing, while at the same time achieving a profit for specified recipient groups (Yaldız, 2009). This requirement should evaluate one or more of the following: cost recovery, increased work productivity, higher productivity rates, increased tourist and visitor numbers to indicate economically the success of the new function (Fund, 2009). Economic efficiency is reached when the project's tangible and intangible benefits exceed its costs (Elzeyadi, 2001)

2.6.2.3 Minimum adaptation costs

Adaptive reuse projects should benefit from specific characteristics of existing buildings and minimize the cost of adaptation by selecting the appropriate new use (Fund, 2009). Adaptation costs depend on a number of factors like 'size', 'quality', 'difficulty', 'technology', and 'work location' (Serageldin, 1984). Douglas (2006) sets total costs per square meter for the rehabilitation of major types of buildings in the United States, where these estimates can function as evaluation thresholds. Furthermore, material recycling is highlighted as an effective strategy for reducing the cost of adaptation (Heritage Lottery Fund, 2009).

This study evaluates the compatibility between building and new function through public accessibility issue. About choosing a new use for cultural heritage buildings, in

addition to complying new function compatibility with existing building spatial organization, the access to the building, which serves as a source of information and values, has been given special regard.

2.6.2.4 Compatibility of new use

If a site is to be used for a new purpose, it should be compatible (Delafons, 1997). Along with this form, the functionality could be assessed by how the new possible use has the least intervention with the historical fabric and described by any use that can fulfill its function without affecting the building's existing fabric (Yıldırım, 2012). The Washington Charter (1987) stated for the first time that building reuse needs to be compatible with architectural heritage identity and that conservation problem should take precedence over new user requirements. In 2010, New Zealand ICOMOS Charter emphasized that "the conservation of a place of cultural heritage value is usually facilitated by its serving a socially, culturally or economically useful purposes" and that adaptations can be appropriate when necessary for continued use. The need to select new appropriate uses, congruent with the original layout and importance of heritage buildings and sites, is highlighted and reaffirmed in the twenty-first century charters (e.g. in the "Principles for the Conservation and Restauration of the Built Heritage (2003), and in the Australia ICOMOS Burra Charter (2013:article 7.2) for Places of Cultural Significance."

There should also be such cultural compatibility of a historic building with its new function by preserving the cultural significance of heritage building. This needs both assessing the needs of future users and detecting the building transformation constraints posed by the culture of a building (Pinto, Medici, Senia, Fabbricatti, & Toro, 2017)

2.6.2.5 Public Access

One of the main relationships between heritage reuse and sustainable conservation is that the consideration accessibility of the local community and visitors to heritage resources (Nasser, 2003). The classification of accessibility contains two scales: site and urban accessibility (Figure 3) (El-Halafawy & Soliman, 2002).

Accessibility of the site is acceptable as the fulfillment of the basic accessibility right, for all users as set out in Australia ICOMOS Incorporated (2000) and ENAME Charter (2007). Public accessibility to the site is mentioned in both meanings as in physical ease of accessibility for people, and open access to cultural heritage information and resources (ICOMOS, 1999). Accordingly, "the natural and cultural heritage is a material and spiritual resource, providing a narrative of historical development. So, it should be made physically, intellectually and/or emotively accessible to the general public" (ICOMOS, 1999, p. 3). Some factors are contributed in accessibility from universal design perspective, which are include finding ways easily, enclosure of the entire site, clearness of routs for circulation, clearness of signs and labels and spaces free of barriers due to easy access for the elderly and physically disabled (El-Halafawy & Soliman, 2002; Douglas, 2006; Shehata, *et al*., 2015)

Urban accessibility refers to the facility with regard to public transportation and the leading routs appropriateness in order to provide accessibility for a large number of visitors (Talen, 2003). The new function of historic buildings adaptively reused defines the different kinds of expected users and visitors and the way they are transported and the distance and time of transportation to the site (Shehata, 2014).
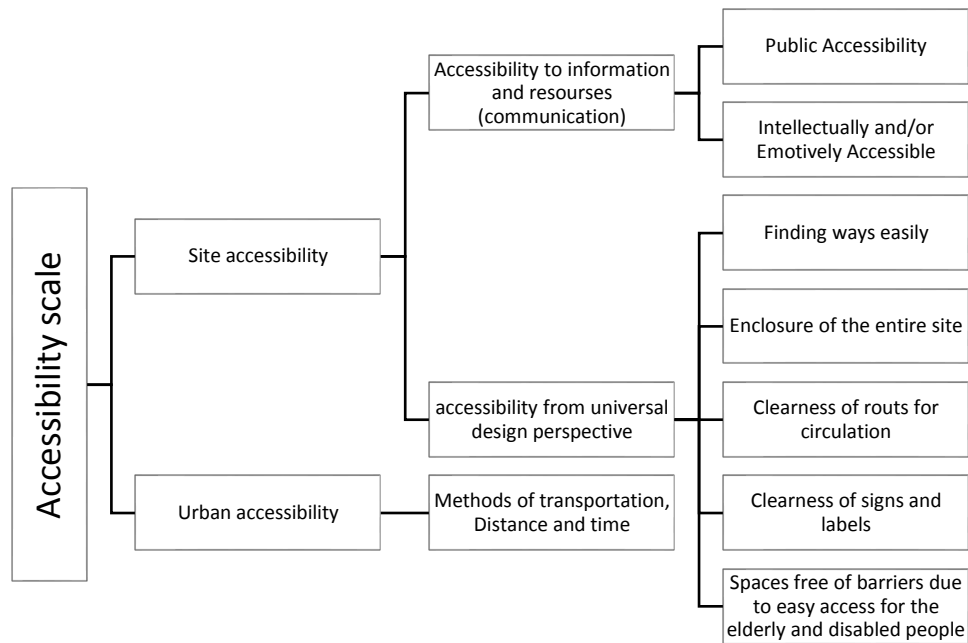
Figure 3: Accessibility scale adapted from Shehata (2014)

According to ICOMOS International Cultural Tourism Charter (1999), the main concept is providing access to the cultural heritage building, in order to increase the awareness and to promote the mentioned values in Table 2. Thus, the public accessibility of the cultural heritage building should be considered as one of the main indicators in selecting the most appropriate and compatible function in the reuse process.

2.7 Chapter Conclusion

The purpose of this chapter is to reveal the concept of heritage and the main reason for its conservation, as well as to review adaptive reuse as one of the current and effective conservation strategies. It is evident that the concept of adaptive reuse has been developing starting with the earliest theorists, including Viollet-le-Duc (1814-1879), Ruskin (1819-1900) and Morris (1834-1896) to contemporary approaches. It ultimately extends to the two major forms of adaptive reuse, which are 'within-use adaptation' and 'across-use adaptation' (Aplin, 2002; Ellison & Sayce, 2007; Conejos,

Langston, & Smith, 2012; Wilkinson, Remøy, & Langston, 2014; Yazdani Mehr, Holden, & Skates, 2017). The 'within-use adaptation' points to the reuse of the building with the same original function, while, the 'across-use adaptation' discuss converting the building to a different function. In this way, Douglas (2006) describes three classifications of adaptation process which, follows 'adaptation to the same use (refurbishment)', 'conversion to an alternative use', and 'mixed use'. The range of intervention in each case is determined according to the significance of heritage according to the heritage values. The case studies selected in this research are all from the second group and are converted to a different function.

According to the collected literature, the main goals of the adaptive reuse include 1) the conservation of heritage buildings; 2) sustainable development; 3) new function's success. Therefore, the heritage buildings' conservation through adaptive reuse, considers the principles and guidelines for heritage building conservation and its significance. Likewise, the new function as a consequence of adaptive reuse, act as a tool for ensuring the sustainability of heritage buildings within socio-cultural, economic, and environmental dimensions.

In addition, it is evident that setting an appropriate function in the adaptive reuse of heritage buildings is directly linked to the sustainability of cultural values and cultural continuity as well. Many guidelines of conservation have been initiated and adopted by international organizations like UNESCO and ICOMOS in the form of charters, recommendations, and resolutions. Using all those guidelines and principles during the adaptive reuse process as a conservation strategy, result in preserving the values and significance of heritages. The success of adaptive reuse is based on selecting the most appropriate new function besides, preserving the physical, socio-cultural, and economic aspects. The success of the new function is assessed by two main

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approaches: 1) continuity of function versus discontinuity and 2) appropriateness of new function. These two approaches contain all relevant aspects that are mentioned previously in Table 8 and Table 9. However, this research emphasizes on the compatibility of new contemporary function with the existing building and the site accessibility in terms of public accessibility to heritage building (Figure 3). Heritage is considered as a valuable resource, which belongs to the whole world and hence must be accessible for both the visitors and the local community.

Chapter 3

ROLE OF PRIVACY IN SPACE ORGANIZATION OF IRANIAN TRADITIONAL HOUSES

This chapter provides some review of literature about the role of privacy in the space organization of traditional Iranian houses. Firstly, the concept of privacy as a cultural feature and its effects on defining the boundaries in social space and also the privacy layers in residential function have been reviewed. Secondly, the principles of traditional Iranian architecture including the effects of privacy in space organization of traditional houses are explored. Finally, by defining the component spaces within traditional houses and categorizing them in different levels of privacy, the framework which is used in the fourth chapter has been determined.

3.1 Privacy as a Cultural Parameter in Defining the Boundaries

"Culture" comes from the term "cultivation," which means to have "grown" through knowledge or experience. Therefore, culture should be understood as containing more than a group of people's values and needs, but the whole of society is a "way of life" (Stephen & Kenney, 1994).

Spencer-Oatey (2004) defines culture as a multi-layered factor that can be categorized into four layers (1.basic assumptions and values; 2.beliefs, attitudes, and conventions; 3.systems and institutions; 4.rituals and behavior, artifacts and products). Nayyeri Fallah, Khalili, and Rasdi (2015) adapted Spencer-Oatey classification. Accordingly, architectural works (buildings) are considered as cultural products and are placed in outer layers (Figure 4). Likewise, privacy, as one of the components of

cultural values and beliefs has an impact on the architectural works (Nayyeri Fallah, Khalili, & Rasdi, 2015).
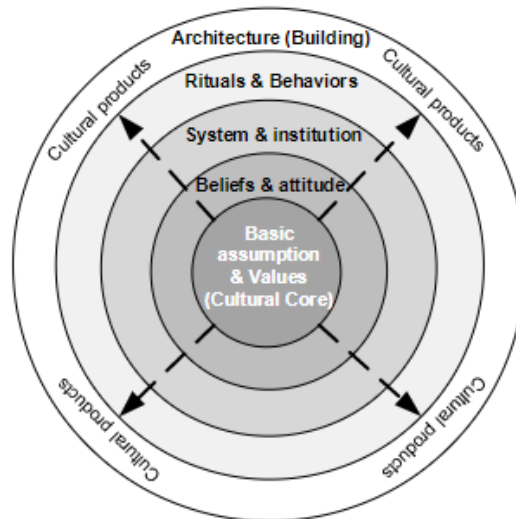
Figure 4: Layers of culture (Nayyeri Fallah, Khalili, & Rasdi, 2015, p. 199) adapted from Spencer-Oatey (2004)

Edward Hall (1966), an anthropologist, introduced proxemics theory in terms of communicating with others, a theory that refers to how people use space. He suggested four different categories of spatial zones:

- Intimate distance (0-50 cm); distance to "fight, comfort or protect"

- Personal distance (50 cm – 1 m)

- Social distance (1 m – 3.4 m); business and social contact is generalized

- Public distance (beyond 4 m); formal or public speaking occasions

Either a person's inner core and outer body space are built primarily through interaction with others. The permeability of the personal boundary is therefore directly related to the privacy levels around the individual (Altman, 1975; Vassilaki & Ekim, 2015)

Webster's Online Dictionary also provides a definition; "privacy is the quality of being isolated from the presence or view of others or the condition of being hidden or concealed" (Webster, 2006). The term is associated with the word seclusion and compared with the common, public and social words (Georgiou, 2006).

Altman (1975) argued the privacy is a process to control the level of interactions with others by defining the interpersonal boundaries. Privacy is a dualistic process containing both a restriction of interaction and the quest for interaction. Additionally, he argued that privacy is a dynamic process that leads to a certain degree of closeness to openness or accessibility or inaccessibility and also the strength of each opposing one may vary according to different circumstances (Altman, 1975, pp. 10-12).

Spaces and their elements should enable users to increase or decrease their privacy in line with their user needs. Nathan Witte (2003) proposes that "The environment needs to be supportive of the user's privacy regulation, supporting control over contact with others and supporting the behavioral processes used to regulate privacy" (Witte, 2003, p. 28).

3.2 Level of Privacy within Social Space

According to Rapoport (1969), privacy is one of the essential aspects of culture and also affects the architectural form. A range of architectural responses can be determined by degrees of privacy within a society. Privacy has particular importance rather than other aspects because of the relationship and impact with each factor separately. The Desire for privacy depends on socio-cultural values, and also it can be considered as a specific part of cultural values within the architecture. (Rapoport, 1969)

Privacy is a dynamic space topology property, not a static on. Therefore, spaces can be classified depending not only on their level of privacy but also on their ability to

regulate privacy (Georgiou, 2006). The private sphere begins to form from the person's mind and extends to the body's personal space. Every person needs to feel in control of his or her life to be able to show and hide parts of their lives. That is why people need to construct borders, which should not be strict and impenetrable. Therefore, it is necessary to achieve a balance between the two spheres of privacy and the public realm (Madanipour, 2003; Vassilaki & Ekim, 2015).

Madanipour (2003) has divided the social space into private and public contexts, which are characterized by symbolic and physical boundaries. Additionally, the boundaries between the two domains are also included semi-private and semi-public spaces (Figure 5).
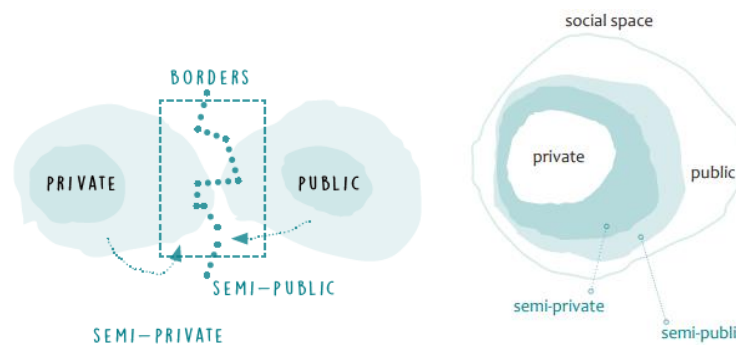
Figure 5: Levels of privacy (Vassilaki & Ekim, 2015, pp. 11, 24)

The level of meetings between public and private realms is their boundaries. As mediators between the spheres, they take two different roles. They decode and separate them in this way, while on the other hand, they connect them (Madanipour, 2003).

Wagstaff (2012) discusses that methods of privacy are depicted by different forms between physical access to space and personal space cultural notions. Most often, space boundaries regulate physical privacy. These physical limits between the individual and the society traditionally consist of systematically organizing bounded space, with the fundamental boundary of a three-dimensional sphere, such as rooms,

being the architectural features of doors, ceilings, floors, and walls. Formal organizations act as a hierarchical separator between the public and the private, according to their culture (Wagstaff, 2012, p. 20).

3.3 Privacy Levels for Residential Function

Rapoport (1969) discusses that the communities and buildings express a visible manifestation of different and significant aspects of life. Likewise, the architecture of building originates from the social and cultural and religious values which govern the society and the lives of people. The concept of *genre de vie* or "the mode of the living of people" that proposed by Max Sorre (1962), covers all the cultural, spiritual, material and social aspects that have an impact on the form of houses. In another word, houses and settlements are the physical representation of *genre de vie*. Rapoport (1969) determined five major aspects of *genre de vie* which are effective on dwelling form: 1. some basic needs. 2. Family. 3. The position of women. 4. Privacy. 5. Social intercourse. The basic needs contain the simple habits and needs that derive from the cultural norms such as sitting, eating and etc. The family structure affects the form of the house significantly (Rapoport, 1969, pp. 61-63). For example, in traditional Iranian houses, the number of family members or staff members affects the spatial organization of houses so that each part of the house belonged to the specific activity. The position of women has a particular impact on the organization of house spaces especially in Islamic culture where women need more privacy. Human beings as social animals need to interact with each other. The level of interaction is directly related to the cultural issues and also have a main role in forming the house (Rapoport, 1969, p. 65).

As Madanipour (2003) points out, the level of privacy or publicness is determined by the accessibility and interaction levels. In this way, the diversity of publicness

degrees can be recognized, and a different relative character can be identified through the relationships of the classified spaces in the social realm, thus, The level of privacy for each certain space in a particular spatial bulk is measured relatively based according to spatial configurations and characteristics of space (Madanipour, 2003). According to Georgious (2006), there are five effective parameters including accessibility, visibility, proximity, vocals, and olfactory parameters that influence on people's perception of their environment and therefore affects the way of privacy control. Spatial boundaries are the additional means by which the person's connection to his surroundings can be regulated. Public space is defined as space which does not restrict communication, whereas the separate space restricts communication totally (Table 10). There is intermediate level of privacy between all other levels (Georgiou, 2006, p. 19).

Existence of the connection between physical accessibility to space and cultural beliefs are considered as essential points to reach privacy. Certainly, physical boundaries of space can systematically form and control the physical privacy between the person and the surrounding environment that originates from the culture (Wagstaff, 2012).

Table 10: Five parameters affect the privacy level of spaces, adapted from (Georgiou, 2006, p. 19)

	Accessibility	Visibility	Proximity	vocals	Olfactory
Public space "Unrestricted communication"	In communication ✓	In communication ✓	In communication ✓	In communication ✓	In communication ✓
In between space "Semi-restricted communication"	No communication ✗	in communication ✓	in communication ✓	Low level of communication ✓	No communication ✗
Private space (isolation) "Restricted communication"	No communication ✗	No communication ✗	No communication ✗	No communication ✗	No communication ✗

According to Oakley (1961),"the spatial arrangement is influenced by the size and nature of the family and by many social, economic, cultural and religious factors, which vary in accordance with the country in which the house is to be built." (cited in Shabani *et al.*, 2011)

Taking into account cultural elements that include values, national standards, customs, myths and religious beliefs as the main criteria, spatial hierarchy, internal and external consistency, privacy and communication with nature and nature of planning, this conclusion is drawn that architects pay adequate attention to resident culture and the impact it has upon them, despite all operational and regional constraints. Culture is an extremely important factor in building design (Farshchi *et al.*, 2016).

A house is a symbolic place, offering concepts of domesticity, comfort, and well-being through intimacy and privacy (Rybczynski, 1987). By ensuring families ' security and by separating private life from public interactions, house design must meet the privacy requirements (Alkhazmi & Esin, 2017).

Madanipoor (2003) states that houses can be considered to be distinctive spaces in which the intimate relationship between inhabitants is a requirement for the control of the privacy and comfort of those spaces. Although the number of these inhabitants are few, the relationship between them takes several forms, and therefore, the space for their relationship takes different levels of privacy. The interpersonal forum is less private than their private worlds and creates the combination of the private, semi-private, and sometimes even semi-public spaces (Madanipour, 2003).

Boundary areas have a semi-public, semi-private, and public and private sector character. The transition area between intimate human space and the exposed common zone is semipublic or semi-private. According to Benn and Gaus (1983), the public and private levels are defined by degrees of access (physical access, access to activities

and intercourse, information, resources), by interest (whose interests) and by agency (the standing of an agent as an agent takes decisions or acts on these degrees). In other words, this space is defined as more public if additionally people use the space, or can access the space. The intermediate space acts as a link between the user and the building or as a barrier to protect the inner space from outside, depending on the level of permeability within a part of the semi-public zone (Figure 6) (Vassilaki & Ekim, 2015).
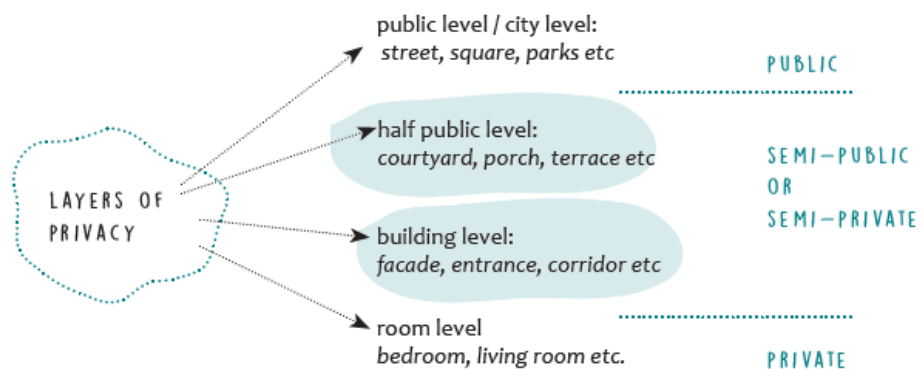
Figure 6: Privacy levels in housing function (Vassilaki & Ekim, 2015, p. 28)

Julia W. Robinson's approach perceives privacy as a static, inherent property with various spaces (Robinson , 2001). By following typical Midwestern house plans and using Space Syntax (accessibility charts) methodologies, she first specified that "their distinctive arrangements seem to reflect three distinct spatial categories, and territorial types, public activities linking to the outside world, private activates relating to community activities within the residence, and intimate activities linked to the individual" (Robinson, 2001, p. 4). Those three territorial types are being extended by Robinson to seven. Accordingly, the model defines seven degrees of privacy (zones) which include the regional gradient ("public municipal territory", "public neighborhood domain", "semi-public or collective domain", "semi-private domain",

"private domain", "semi-intimate domain", and "intimate domain") (Figure 7) (Robinson , 2001, p. 4).
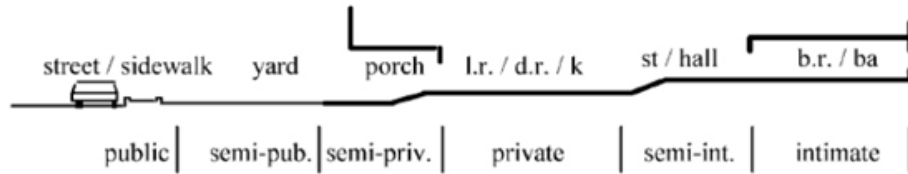
Figure 7: Gradient of privacy by Robinson (2001, p. 4)

Four types of space are essentially found both internally and externally in the traditional Islamic house: • private, • semi-private, • semi-public, and • public. One of the major features of the house concept is the hierarchy of spaces and the sequence of private, half-private, semi-public, and public. The major focus on inner space is typically expressed in Islamic houses. Usually, Muslim residence units are arranged around an inner courtyard. A single low door with high walls interrupts the façade of those houses. (Hwaish, 2015)

The study on privacy layers that have been carried out by Nayyeri Fallah, Khalili, and Rasdi (2015) indicates that the traditional Iranian middle-class housing has six different layers in terms of privacy, based on the analysis and interpretation of the plan. Therefore, this spatial organization is the response to the higher level of requirements based on residents ' cultural values. These layers are "public, men social layers, woman social layers, semi-private, private and personal" (Nayyeri Fallah, Khalili, & Rasdi, 2015). In addition, each layer is cultural and spatially consistent to provide ideal confidentiality. These houses were therefore culturally favorable to their residents (Table 11).

Table 11: Privacy levels for housing function from different authors' points of view

Benn and Gaus privacy level classification (1983) cited in (Vassilaki & Ekim, 2015)	public	Semi-public or semi-private			private		
	1-Street 2-Square 3-Park	1-Half-public level (courtyard, terrace, porch, etc.) 2-Building level(façade, entrance, corridor)			1-Bedroom 2-Living room		

Robinson privacy level classification (2001)	public	Semi-public		Semi-private	private	Semi-intimate	intimate
	Street sidewalk	courtyard		Porch	1-Living room 2-Dining room 3-kitchen	Hall Sitting room	Bedroom Bathroom

Nayyeri Fallah, Khalili, and Rasdi privacy level classification (2015)	public	Semi- public		Semi-private	Private	Personal zone	
		Men social layer	Woman social layer				
	1-Pre space of entrance 2- Vestibule (Hashti)	1- Corridor (Dalaan) 2-waiting room (Gholam-ghozar) 3- reception hall (Tanabi)	1-Corridor (Dalaan) 2- Outdoor Courtyard 3- Family Room (Women Room) 5- servant room (female) 7- Pesto (Closet) 8-porch (Iwan) 10- Outdoor yard cellar	1- Man work Room 2-Guest Room (Goushvar)	1- inner courtyard 2- Women Working Room 3- Living Room (Five doors room) 4- Kitchen 5- Houz Khaneh 6- Storage 7- Toilet 8- Main Cellar	Bedroom (three doors room)	

Due to the spatial configurations, the degree of privacy provided by each area can be measured relatively in certain spatial aggregations. However, the cultural, ethnic, climate, and other differences affect such spatial aggregations (Georgiou, 2006).

3.4 The Components of the Traditional Iranian Houses

Iranian traditional houses are based on the spaces with architectural definitions that can be employed in various ways according to the needs of the day or the different times of the year (Gharavi Alkhansari, 2015).

Iranian traditional houses are composed of two main part: the internal part (Andarooni) and the external part (Birouni). Pirnia (2005) states that 'Birouni' consist of the external part that was connected to the entrance section; and 'Andarooni' is identified as the parts that were specified for family members and also the female members were the priority to specify this part. In addition, the internal part was where the female visitors were also served. In essence, the main purpose of defining these two parts is to detach the inhabitants from the outside, while the central courtyard (outer courtyard) is the main interface between the internal and external parts (Figure 8) (Pirnia, 2005).
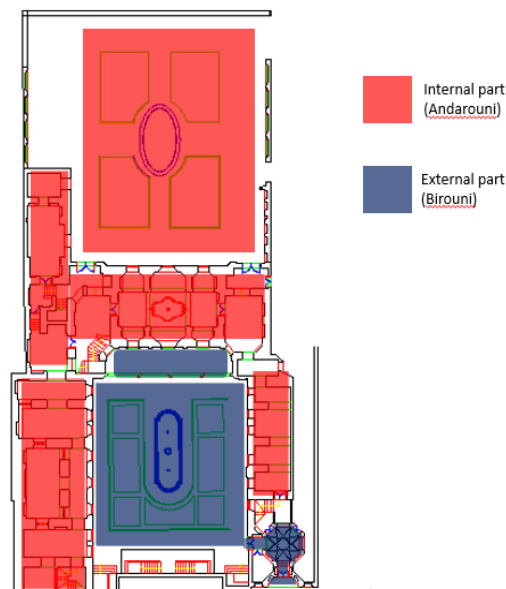
Figure 8: The external and internal part of the house based on plan by (Tabriz C. H., 2007)

3.4.1 External Parts of the House (Birouni)

According to Pirnia (2009), the external parts of traditional Iranian houses consist of:

- Entrance (including Platform (Sakoo) and head of the door (Dargah)

- Vestibule (Hashti)

- Corridor (Dalan)

- Porch (Iwan)

- Courtyard (with pool and gardens)

3.4.1.1 Entrance (Voroodi)

Twin types of entrance doors exist in most traditional houses, and each has an especial doorknocker, which was provided for males and females separately. The doorknocker for females has a lower sound than that of men's (Figure 9). Therefore, the gender of the person who wants to enter the home is recognizable (Eskandari, 2011).
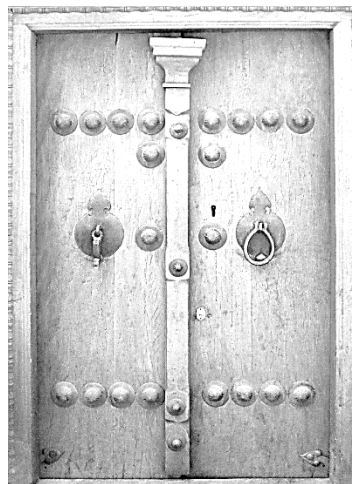
Figure 9: Entrance door of traditional Iranian houses and doorknockers for women and men (Fallah, 2016)

3.4.1.2 Platform (Sakoo)

Platforms are like the seat elements on both sides of the house's main entrance. These platforms may be used as a seat to wait, to rest or to meet up with your neighbors (Figure 10) (Eskandari, 2011).

Figure 10: The entrance space (platforms)

3.4.1.3 Vestibule (Hashti):

The vestibule, mostly in the form of an octagon or half octagon or sometimes square, is the first space after the entrance. In this room there is a narrow ceiling porch and sometimes a dome-shaped ceiling. This room is used to distribute various accesses to the other parts of the house (Figure 11) (Eskandari, 2011).

It normally has the main access to the roof of the house and the corridors to the courtyards. Vestibule would have access to both courtyards in dual courtyards, and also platforms for sitting would normally be provided for people (Hosseini , Ethegad, Guardiola, & Aira, 2015).

Figure 11: Vestibule space in traditional Iranian houses

3.4.1.4 Corridor (Dalan)

A narrow passage leads the entry from the porch to the yard. This labyrinth corridor provides the house with privacy, and the guests never immediately understand the activities happening at the house (Hosseini, Ethegad, Guardiola, & Aira, 2015).

3.4.1.5 Hallway (Dehliz)

Space, which provides for indoor transition and circulation (Mansouri & Ünlü, 2018).

3.4.1.6 Courtyard (Hayat)

The courtyard plays the role as the main element of the spatial organization of the house to connect the external parts of the house (Birooni) to the internal parts (Andarooni). The middle of the courtyard flanked by various trees and flowers is usually a long, rectangular pool. The proportion of the courtyard was usually the golden ratio (Gharavi Alkhansari, 2015).

The courtyard actually has a working role to play in uniting the inner rooms of the house. The courtyard is encircled by very high and thick walls, allowing acoustic and visual confidentiality (Hosseini *et al*., 2015).

3.4.1.7 Porch (Iwan)

The porch is a semi-open space at the main site of the courtyard and acts as a space between the courtyard and building (Hosseini *et al*., 2015). Generally, the porch is located where is on the main axes of the building (Akbari Namdar *et al.,* 2012). And also distribute access to the different parts of the house (Figure 12) (Eskandari, 2011).

Figure 12: Porch in traditional Iranian houses

3.4.1.8 Service section

The services part is generally located on the west and south side of the house. This section is the easiest part of the house and contains kitchen, dining room, food, and fuel stores and servants 'rooms and waiting for guests' rooms (Gholam gozar) (Hosseini *et al*., 2015).

3.4.2 Internal Parts of the House (Andarouni)

The internal parts of the traditional Iranian houses consist of:

3.4.2.1 Reception hall (Tanabi / Otagh Oroesi)

The name of this room is taken from the window on the bottom side. The window is wooden and is folded up in its opening style, and various types are used for their decoration with colored glass and painting on walls (Akbari Namdar *et al*., 2012). Generally, distinguished guests were welcomed in the reception hall (Eskandari, 2011).

3.4.2.2 Triple door room (Se-Dari)

Typically, this room named after its triple division and also has three doors in front of the yard. Indeed, the triple division, which can be seen in the face opposite to the other, is more necessary than three doors for this space (Akbari Namdar *et al*., 2012)**.**

3.4.2.3 Five-door room (Panj-Dari)

This space is also named for its division. Also, this room is consist of five doors or windows (Akbari Namdar *et al*., 2012). Family gatherings in these rooms are actually happening. These rooms are designed based on 'golden proportion' principles (Ghasemi, 2015).

3.4.2.4 Back storage (Sandoq-khaneh / pastoo)

The paces called 'Pastoo' or 'Sandoq-khaneh' had been placed at the rear of the main rooms. Storage room at the back of the main rooms (Gharavi Alkhansari, 2015).

3.4.2.5 Pool room (Hoez-Khaneh)

Generally, this space was located at the basement with a pool inside the building for the summer housing (Figure 13). There were also these features in most of Tabriz's traditional houses, which were normally located at a small height difference compared to the yard floor and received some light from the yard. Because of its underground position, it has a brick body, and its roof was typically built in the shape of four parts and its plan was cut down like the cross-like belly (Akbari Namdar *et al*., 2012).
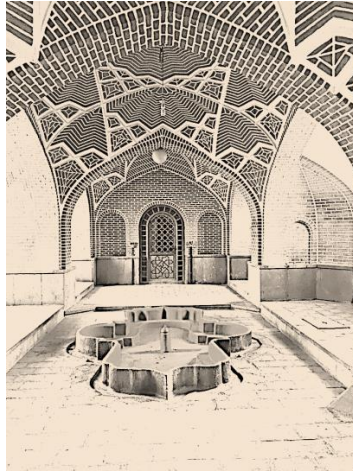
Figure 13: Poolroom in traditional Iranian houses

3.4.2.6 Cellar (Sardab)

It is a storage area, where food has recently been stored and prevented from being damaged, which is located underground and is also known as a cellar (Sardabe) (Akbari Namdar *et al*., 2012).

3.4.2.7 Cistern (Ābanbār)

A place for storing the water that is usually placed in the underground floor. It worked as a management system that enabled inhabitants to have water the whole year, especially during the hot and dry season (Fanood, 2014).

3.4.2.8 Upper room/ Guest room (Bala-khaneh / Goushvar)

This is a room located on the second floor and definitely has a high ceiling on a veranda or alcove (up to two floors) for those one-story buildings. The two-story area can, therefore, be a two-story structure; the second story space is called the Bala-khaneh room in that instance. However, in the case of the two floor buildings with multiple rooms on the second floor, it is not known as the upper room (Akbari Namdar *et al*., 2012).

3.4.2.9 Terrace (Bahar-khab/Mahtabi)

A type of roof used in warm seasons to sleep in the night (Figure 14) (Gharavi Alkhansari, 2015).

Figure 14: Terrace in traditional Iranian houses

3.4.2.10 Inner courtyard (Hayat-Andarouni)

It is called 'inner' because it is the house's private part. In houses with several yards, there is usually such division. Generally, the inner courtyard was surrounded by private rooms (Gharavi Alkhansari, 2015).

The constructions of traditional Iranian houses can be classified in the open spaces, semi-open spaces and closed spaces (Figure 15) (Taleghani, Tenpierik, & Dobbelsteen, 2012). However, each of the spaces in these three categories may have different degrees of confidentiality.
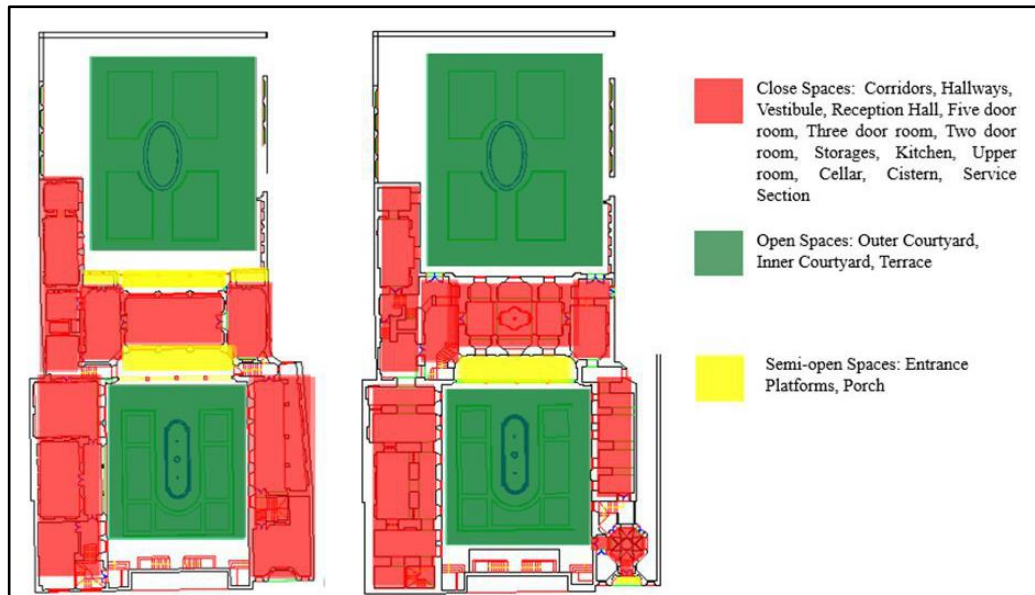
Figure 15: Semi-open, open, and close spaces in traditional Iranian houses based on plans by (Tabriz C. H., 2007)

3.5 Levels of Privacy in the Spatial Organization of Iranian Traditional Courtyard Houses

The relationship between users and buildings has always been highlighted in the architecture of traditional Iranian houses. The natural, cultural, and occupying requirements are reflected in the physical features of traditional Iranian houses (Nabavi, Ahmad, & Goh, 2012). Culture and religious beliefs were deeply concerned that Iranian users had an adequate residence to meet their requirements. In order to create privacy, this impact by culture on architecture was caused to organize a house spatial layout (Shabani *et al*.,2011). Pirnia (2005) represented Iranian architecture according to five principles, which have been shown in   Figure 16. These principles demonstrate how architecture responded to the needs, culture, and convictions of individuals.

67
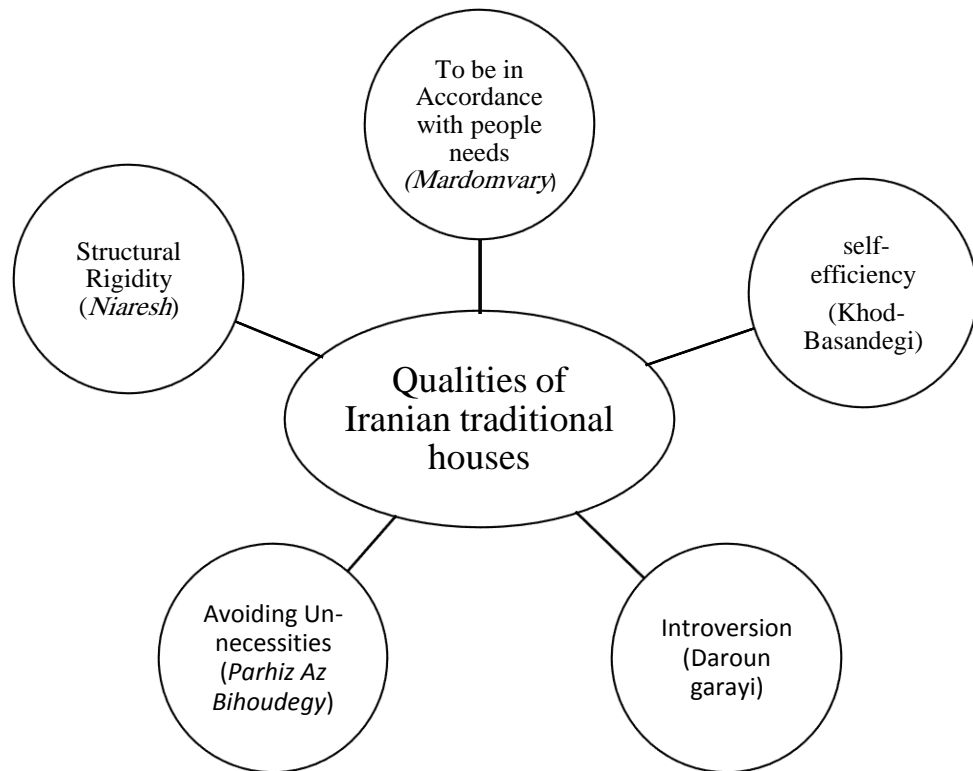
Figure 16: Principles of Iranian architecture

In general, people living in the traditional Iranian courtyard can be categorized into two major groups. First, a large family, consisting of "mother", "father", "children", "grandparents", "uncles", and "aunts", and second workers working for an owner (Yazdanpanah & Walker, 2010, p. 264; Hosseini , Ethegad, Guardiola, & Aira, 2015). On this basis, two types of privacy are included in the traditional Iranian housing: privacy from outside of the house and privacy from common areas in the house on the next level. The architects were trying to create privacy for the house from the outside in traditional Iranian architecture (Eskandari, 2011).

The real value of the core and apparent core in Iranian architectural culture is a figurative core, which protects a reality and whose essence and existence is determined by the internal and the closed space, and can not be compared to the external space and the aspect. Introversion aims towards protecting the environment in which physical conditions have become balanced and high order in order to gain origin and

relaxation through thought, deliberation, and worship. (Hashemi, 2009; Habib, Alborzi, & Eteesam, 2013)

Traditional houses in Iran include a variety of different open and closed spaces to communicate the combination of nature and space (Figure 15). The people's social and cultural patterns are key elements to the identification of architecture. Iranian courtyard houses illustrate a distinctive space organization, which is created by the connection of religious and socio-cultural values as well as physical considerations (Hosseini *et al*., 2015).

The traditional architecture and residential buildings of Iran have been constructed on more than one floor. Without any opening in the outside façades, the high altitude of the house has blocked the view from the outside and caused the building to look inside with visual and acoustic privacy. In this way visual privacy has been created in the inner areas of the house by creating the level difference between interior living spaces and courtyard; thus, the view from the courtyards into the rooms has been breached. In addition, it has created more privacy by placing the rooms upstairs as individual areas. The important thing is that the direction of view in the traditional Iranian house was observed more easily from private to public. (Shabani *et al*., 2010)

Houses can be described as specific areas for familiar people, with feelings of privacy and comfort. People organize an interpersonal forum, even within small families, less privately owned than their privacy and combine private spaces with semi-private ones. As their relationships have different intimacy levels, the spaces in which they use have different privacy levels (Shabani, 2011).

The main introspection and privacy of traditional Iranian homes are successfully established through the use of various elements like yard, porch, a hallway, crossed windows that open to the main yard. The basic housing characteristics of the traditional

Iranian house are the tendency to maintain privacy without visual relation with urban spheres outside the house, making the house space attractive, separate sections of the day and the night and managing space by using a yard. Another feature of privacy is that appropriate spatial relationships are developed so that internal spaces are not only removed from foreign visits, but also respect family territories (parents, children, females, and males) (Naghizade , 2000; Farshchi, Sediqi Arfaei, Askari Kashan, & Jamali, 2016).

In fact, no one can enter the house in the Iranian courtyard architecture, since there are two intermediate spaces (hallways and corridors) hierarchically arranged with the aim of improving confidentiality (Shabani *et al*., 2011). Overall, the application of the hierarchy principle in urban and architectural space systems, with separation between public and private territory and usage classifications, play an increasingly important part in stressing spatial continuity within space organizations (Heydaripour, Hesamizade, & Nasr Esfahani, 2017). The traditional Iranian houses reflect the style of living, based on a wide range of human activities, which were happened between two public and private zones. Some places, including an outer courtyard, reception hall (Tanabi) and upper rooms (Goushvar) where some activities can take place, such as hosting, mourning and holding ceremonies, were also included in the semi-public and semi-private domains. The family domain contains areas, such as inner courtyard; five/three door rooms and poolroom where activities are carried out, such as family gathering, as well as doing homework and personal works. Private areas include areas like back storage, two-door room, and cellar or certain activities, such as sleeping, relaxation, and privacy attendance of one or two people. Inside and outside the house, the domain border is not a separating line. These two domains distinguish a set of consecutive portal spaces, lobbies, and corridors (Heydaripour *et al*., 2017).

In short, one of the most significant spatial hierarchical role in traditional Iranian courtyard is to achieve privacy. Space organizations, especially for women, are formed to safeguard family privacy. Consequently, the traditional Iranian courtyard is not only a physical shelter. Social and cultural values have its meaning. Such values reform space hierarchy to the demands of residents and promote the improvement of the hierarchy of privacy and improve the quality of life at long last (Hosseini *et al.*, 2015).

3.6 Chapter Conclusion

The review of the privacy issue in this chapter indicates that the desire for privacy comes from the human mind and manifests itself as an essential aspect of culture in architectural works. House, as the most private place, contains the highest level of privacy. Thus, the impact of privacy on the spatial configuration of houses and the hierarchy of access to internal spaces is clearly recognizable.

The spatial organization of traditional Iranian houses is also strongly influenced by religious beliefs and cultural factors, and privacy is clearly recognized as one of the basic foundations in the spatial configuration of these houses. Moreover, the traditional Iranian houses reflect the style of living based on a wide range of human activities, and also there is a direct link between the inhabitants' needs and the spatial organization of those houses.

Therefore, the level of privacy is required due to separating the inhabitants from the outside world. In this respect, the four main types of privacy levels are described in Table 11 and also the following classification originated from combining the other three approaches. In the next chapter, the Tabriz traditional houses are evaluated in both the original state and reuse state in terms of depth value and the level of privacy in each state. According to the mentioned approach in relation to the privacy levels (public, semi-public, semi-private, private zones), which was reviewed under sub-

heading 'privacy levels for residential function', the specified privacy level has been determined for each space of traditional houses. This classification has been applied to the case examples of this research in the Fourth Chapter (Table 12).

Table 12: The privacy layers as the framework of this research

Public	Semi-public		Semi-private	Private
	Men social layer	**Woman social layer**		
Outer entrance space which includes the sitting platforms and main door	• Vestibule • Corridor (Dalan) • Outer courtyard • Porch • Waiting room • Male Servant room	• Vestibule • Corridor (Dalan) • Outer courtyard • Porch • Waiting room	• Reception hall (Tanabi) • Female servant room • Inner courtyard • Hallway (Dehliz) • Corridor • guest room (Goushvar)	• Five-door room • Three door room • Two door room • Pool room (Houz-khane) • Back storage (pastoo) • Toilet • Cistern • Cellar • Kitchen

Chapter 4

ANALYZING THE CASE STUDIES

Tabriz, as one of the important cities, has historical significance, which goes back to the pre-Islamic era (Sultanzade, 1997). In 1780, due to the huge earthquake, the city was destroyed, and eighty thousand inhabitants of the city lost their lives (Khamachi, 1991). The city's reconstruction began in the Qajar period. Also, Tabriz was the second capital of Iran in early years of Qajar dynasty (from 1789 to 1925) and also was considered as a formal encampment for one of the Qajar princess (Khamachi, 1991; Boudagh, Ghaemmaghami, & Habib, 2012)

It is evident that some the climate and socio-cultural factors had a strong impact on the architecture of Tabriz traditional houses in the Qajar era (Shahamipour & Farzanmanesh, 2015). In that period, the building's direction was selected according to the climate and direction of sunlight, which generally was facing the south. Somehow, about the buildings with two fronts, the south front was usually used during the summer. For avoiding the ungrateful westerly sun, the westerly front was an appropriate choice. (Boudagh, Ghaemmaghami, & Habib, 2012) The orientation to the south of those buildings covered up the main parts of living spaces such as reception hall (Tanabi), side rooms (Goushvar or five-door rooms), and pool room (Havouz-khane) to the desirable southern light in different seasons (Shahamipour & Farzanmanesh, 2015).

Obviously, the form, structure, and space organization of traditional houses in Tabriz originated from socio-cultural, economic, and political factors. In addition to

climate and geographical conditions, some of the traditional houses were used as a working place as well as a residential function, so the spatial organization of those houses was influenced by lifestyle including economic factors. Moreover, the architects' loyalty to the Iranian principles and concept of spaces as well as the non-use of European components and motives within decoration were the key factors in characterized Qajar buildings (Kamali & Shahlavi, 2014).

4.1 Conservation framework of Cultural Heritage Buildings in Iran

The Cultural Heritage, Handicrafts and Tourism Organization in Iran is a kind of educational and research institution, Which works in the fields of science, research and study and oversight in three specific areas of cultural heritage, crafts and tourism. It is administered and financed by Iran's government. In addition, the center of each province also includes an organization under the main organization, which functions within the framework of the main organization's guidelines and principles, taking into account the geographic location and specific weather conditions of each province.

Cultural heritage activities in Iran can be classified in three stages including identification, conservation and presentation. There are some important criteria in identification and registration process as cultural heritage, which follows:

1. Having heritage values such as cultural, historical, and scientific

2. Placing the location to consider the availability of the audience

3. An attitude of the society to the heritage value passed through the heritage building

4. Capacity of tourist attraction

5. Relationship of the legacy inherited with the needs of society in order to improve the quality of society (Hodjat, 1995, p. 82).

After identifying and registering the cultural heritage, it is essential to go through the conservation process in order to transmit them to both present and future generations.

In the process of cultural heritage conservation, not only the physical and tangible aspects of the building must be preserved, but also the heritage values and intangible features must be conserved (Tabriz C. H., 2007).

Some of the principles and standards for cultural heritage conservation are as follows:

1. The conditions of the building must be carefully documented before any interventions and all the techniques and materials used during the intervention and restoration are accurately documented.

2. Historical evidence should not be erased, altered or faded.

3. The scope of any intervention should be as minimal as possible.

4. Any works of interventions must respect the aesthetic, physical, and historical integrity of the heritage building (ICHTO, 1986).

According to the Iranian Cultural Heritage, Handicrafts and Tourism Organization (ICHTO), range of interventions and methods that are employed is directly related to the climate conditions and the damage incurred. Additionally, environmental pollution and traffic-induced vibration and natural disaster recovery should be considered (ICHTO, 1986). Interventions will intensify and weaken based on the physical conditions, the causes of erosion, and the prediction of future environmental conditions that will be affected (ICHTO, 1986).

In a conservation process in Iran, several degrees of intervention may be performed simultaneously summarized in Table 13:

Table 13: Intervention levels for cultural heritage conservation in Iran (Adapted from ICHTO, 1986)

Prevention	Preventing actually deals with controlling environmental factors such as humidity, temperature, light, fire prevention and pollution and vibrations
Preservation	Preservation directly affects the heritage building itself and protects against losses and possible damage
Consolidation	Consolidation means conservation of physical structure of heritage building through using supporting material in order to maintain its structural integrity.
Restoration	Restoration involves activating and revitalizing the original concept of building that leads to keep the original identity of place by using the supporting material
Rehabilitation	The best way to conserve a heritage building is to continue to use it (in the original use or in contemporary function in accordance with community needs). Certainly, the minimum of intervention to preserve heritage values should be taken into consideration
Reproduction	Reproduction requires the copying of the existing structure by replacing the missing parts in the building's facade or the decoration .
Reconstruction	Reconstruction of the heritage buildings with new materials in the physical structure of a heritage that has been affected by natural disasters such as floods, earthquakes, wars, and so on. Reconstruction is like a repair, which must be based on accurate evidence, not based on speculation

In each of the three examples discussed in this research, the least amount of intervention have been made in space organization, which was definitely based on Iranian rules and regulations on the conservation of cultural heritage. All three examples are conserved through having minimum interventions and also preserving the heritage values such as cultural, historical, communications, aesthetics, symbolic, social and etc.

These buildings contribute to live through exerting contemporary usage during rehabilitation (adaptation) process in order to preserve the mentioned heritage values of buildings. Besides, these buildings were required to repairs in order to replace

depreciated parts of the building's facade and decorations with a special consideration about preserving the authenticity of those buildings.

In the process of presentation, the relationship between cultural heritage and the audience is focused. In this context, cultural heritage through presenting the heritage values and significance and keeping the spirit of the place, try to make a relation with the audience. In this sense, the well managed tourism industry has a key role in presentation of cultural heritage values because the audience contains the tourists besides the local community (Hodjat, 1995, p. 107).

4.2 Method of the Case Studies Analysis

This study sough to analyze the case studies in three parts. At first, the space continuity analysis has been conducted based on in-situ observations and taking the photos of spaces that are involved in space organization of reuse state of each case. In this respect, after introducing each case as a brief, the existence or non-existence of every single space in original state, the state before reuse process, and state after reuse process have been identified and illustrated in tables for each case separately. Also, the new function of those spaces is mentioned as text supported by photos. In the next step, space syntax method is applied as an analytical framework to analyze the accessibility by means of "justified permeability graphs." In this way, justified graphs are provided based on house original plans and the hierarchy access in space organization of both original and reuse states of each house. Regards to the quantitative approach of the research, the degree of privacy and the ease of accessibility are calculated. Henceforth, by focusing on the relative depth (Relative Asymmetry) of the spaces in both original and reused, the linear states graph is obtained to make a comparison between the depth of spaces in original and reuse modes. The issue of privacy as a personal and social issue that originates from culture and as an intangible

feature of physical space enable the person to control the access through the opening and closing of the borders in architectural spaces. In this way, the privacy levels of spaces during before and after reuse are explored in this research, and also through the privacy graphs, the possibilities for accessibility of visitors and inhabitants are clarified.

4.2.1 Space Syntax Methodology

Social relations explore human activities within space. These activities and relations which create social and cultural logics are the central points in space formation (Hanson, 2003). The interior space of the building carries the specific way of accessibility in its spatial system. In this way, spatial relation can be investigated according to space syntax theory (Hanson, 2003; Shahbazia, Bemanian, & Lotfi, 2018).

Since the theory of social aspects of space by Bill Hiller (1984) was developed, the new concept introduced under the heading "spatial configuration theory" in 1996 which focus more on spatial feature and buildings function by graphical exposure and attributing the analytical tools and process (Hillier, 1996). For Hillier and Hanson (1984), space is defined by human behavior. The relationship between human and space is found in the cultural formation, and it creates a specific configuration of space. On the other hand, the patterns and principles in the spatial configuration are shaped by society, which consists of the groups of people and their social relations rather than individual persons alone (Hillier, 1996).

Space syntax by its manifestation in spatial systems identifies the logic of society. So, the space configuration is directly related to the perception of people, Moving through and using all kinds of spatial systems, from small domestic settlements to large urban settlements (Hillier and Hanson, 1984; Hanson and Hillier, 1987; Hillier, 1996).

In this sense, space syntax present a configurative description either in urban scale and architectural spaces and attempts to describe human behavior and social activities from a spatial perspective (Hillier & Hanson, 1984).

"Justified plan graph" (JPG) is one of the main methods under heading space syntax methodology. Many alternative titles have been used for this method, such as "planar graphs"; "plan graph", or "access graph" (March & Steadman, 1971; Stevens 1990: 208). Despite the particular definition of "plan graph "and "access graph" by Steadman (1973) where these two concepts were widely used correlative, Hillier and Hanson determine the two different analyses according to space syntax methodology which include "alpha-analysis" (1984: 90) in urban scale and analysis and "gamma-analysis" (1984: 147) for analyzing the interiors. It implies that, the plan graph can also be illustrated as a "gamma map" (1984: 147), "justified graph" or a "justified permeability graph" (Hanson 1998: 27, 247), which refer to the subset of interior analysis instead of being a particular sort of graph (Ostwald, 2011).

In the most studies using the space syntax method is related to the urban spaces. Although, the method can be used for both urban and interior spaces; it also helps the architects to find out the spatial system of interior spaces of the buildings (Hanson, 2003). Generally, the basic concept of space syntax in interior spaces is based on depth analysis which is directly linked to the degree of privacy.

In this way, privacy is a dynamic spatial topology property. Spaces could be classified not only in terms of their degree of privacy but also in terms of their ability to control privacy. Simultaneously, the complementary strategy amplifies the specific classification of spaces into a different level of privacy. From this point of view, architectural space and its multiple components should act as privacy regulators. Space

and its components should be able to maximize or reduce privacy in accordance with its occupants' specific requirements (Georgiou, 2006)

Specifically, most of the studies on space syntax in interior spaces are focused on houses. House as a symbol of culture and the life style of individuals represent the specific spatial system and the sequence of spaces based on desired level of privacy as basic human needs. In this way, the necessity of examining the interior spaces through the method of space syntax, in order to assess the relation between interior spaces and accessibility based on privacy issue, has been carried out in many researches such as Robinson (2001), Edgü and Ünlü (2003), Hanson (2003), Kim,. Et al (2008), Mustafa and Hassan (2010), Alkhazmi and Esin (2017) and Shahbazia,. Et al (2018).

In this contex, "Justified plan graph" (JPG) deals with analyzing the graphs that are brought up from an architectural plan map. The product of this method is to achieve the quality of space configuration by measuring the indicators such as "Depth" , "integration" , "connectivity", " choice" and" control" (Hillier, 1996).

'Depth' property in space syntax methodology serves to show the degree of privacy. This means as much as the depth of space gets increased, space becomes more private, and the possibility of direct access is reduced. Depth from the root takes into account the number of steps that separate a certain space from the front door. 'Integration' is related to each specific space from any other space, which means a broad range of accessibility from one space to others. In other words, the high level of integration demonstrates the easier accessibility from one point to others and also there is an inverse relationship between integration and depth of space (Hillier & Hanson, 1984, p. 115).

'Integration' is an indicator defining the graph network's relativized asymmetry. Integration identifies the ease of accessibility from every node to each space in the

network. Spaces can be classified from the 'most integrated' to the 'most segregated' using integration (Al-Sayed, 2014, p. 15).

'Connectivity' analyses the number of adjacent spaces connected directly to a given space (Hillier and Hanson, 1984). According to Van Nes (2008, p. 63), connectivity "accounts for all the direct connections each space has to other spaces in their immediate vicinity."

'Choice' describes space as a passage, as a movement through space, or as spaces in between. It is used to assess the possibility for persons to choose a specific path to reach all spaces within a certain distance (Al-Sayed, 2014, p. 15).

'Control' analyses are expressed as "the degree of choice that each space represent for its immediate neighbors as a space to move to" (Hillier et al., 1983: 237)

This research examines the privacy degree and ease of accessibility within Tabriz traditional houses' interior spaces according to numerical outcomes.

The idea of presenting the activities sequence from the entrance to the house seems to be interesting because it presents the primary experience of buildings, the most natural movement from home to any particular place in the structure. It can be a useful measure to understand the concept of the "relation between spaces" that are open to visitors and specific spaces that are accessible to the inhabitants (Mustafa & Hassan, 2010).

Generally, the depth of spaces (nodes) is measured from a starting point 'root'. (Ostwald, 2011). According to the justified graph, the total number of nodes (spaces) are defined and marked by 'K' which define the spaces individually, and the dotted lines express the segregation level of spaces (Klarqvist, 1993, p. 11). Levels numbering is begun from the lowest point (the carrier point), and also the lowest level is named 0

level thus the nodes on the next level are directly connected to the root point. Likewise, the number of nodes that are placed on each level is introduced by 'n$_x$' (Hanson, 2003)

This research follows four steps to obtain the required data. Initially, the Total Depth "TD" has been calculated for the specified carrier node by the number of nodes (n$_x$) on the relevant level. Secondly, "MD" shows the Mean Depth, which refers to the average depth of a node, which is in the justified graph. According to the mean depth, when the depth of space is higher than the mean depth, this means that space is less accessible, and the privacy of space is higher (Ostwald, 2011). The mean depth is used to calculate the 'Relative Asymmetry' (RA), what is the mean depth reflected as the maximum depth range possible for any node with the same number in a graph as the system. The range of RA values is from zero to one. This relativization allows the comparison of RA values of graph nodes with different numbers of nodes (Bafna, 2003). Thus, RA outcomes are mostly used for the comparison between two different buildings. However, in this study, the integration level (i) of the nodes has been calculated by taking the RA parameter in JPG. Comparison of the "i" results for each space indicates a space hierarchy between the least integrated and the most integrated space (Hanson, 2003). Furthermore, "Spaces that are, in sum, spatially closest to all spaces (low RA) are the most integrated into a spatial network" (Al-Sayed, 2014, p. 13).

After exporting the justified permeability graphs (JPG) according to the related plans through the Edraw Mind Master Map software[1], numerical analysis has been implemented. In this regard, the Total Depth by considering each node as a carrier node has been calculated as follows:

$$TD = (0 \times n_x) + (1 \times n_x) + (2 \times n_x) + ...$$

---

[1] Mind Master software program (version 2017) is used as a supplementary program to draw the tree graphs manually

where n_x refer to the number of nodes (spaces) being on particular level and K is the number of nodes (spaces) defining the place. "The mean depth (MD) is calculated by dividing the Total Depth TD by the number of rooms K minus one (that is, without itself)" (Ostwald, 2011).

$$MD = TD / (K-1)$$

After obtaining the results of MD and TD, for "normalizing the range of possible results", the depth of the spaces is compared by "Relative Asymmetry" (RA).

$$RA = 2(MD-1) / (K-2)$$

By repeating this calculation for all carriers in each case, spaces can be arranged from the lowest depth to the highest depth (Ostwald, 2011).

By considering the relative depth of each space, the 'integration' may be obtained as follows:

$$I = 1/RA$$

Based on the obtained graphs and the values discussed, it is possible to reach the degree of privacy in the spatial structure of each case study. Examining the values through numerical outcomes reveals which spaces are more accessible or less isolated than others and also the relative depth of each space directly links to privacy.

Depth value has a direct link with the integration of space in the spatial organization of the house. So that the low depth of space indicates the high degree of integration and greater depth of each space provides higher segregation (Manum, 1999). The depth of space is measured according to the distance from the root point ,(which is usually the entrance of the place). The minimum depth is obtained while space is directly linked to the carrier space. The low RA value demonstrates the high integration of space, which means the ease of accessibility from a certain node to other nodes. (Hillier & Hanson, 1984; Hillier, 1996).

This method is particularly useful to achieve some remarkable results related to accessibility in both original and reused modes of the selected houses. Setting the graphs through Mind Master software for each house based on the house plans provides basic syntactic values of the house in numerical outcomes that is calculated by Microsoft Excel.

This study applies space syntax method as an analytical framework to analyze the privacy levels of Tabriz traditional houses interior spaces in two state, before and after adaptive reuse, and the possibilities for visitors and inhabitants accessibility in reused state of houses drawing the justified graphs in "Edraw Mind Master" software. Therefore, the justified graphs are provided to show the hierarchy of access and also to present the syntactic values by numerical outcomes. Likewise, the privacy graphs are prepared according to the justified graphs and also gives the comparative analysis about the privacy levels and the possibility of access for visitors in both original and new function.

4.3 Selection of Case Studies

Tabriz, as the second capital of Iran in the Qajar period had a high political and social significance (Figure 17 and Figure 18). Therefore, prominent individuals, such as merchants and political people lived in this city (Hanachi & Yadollahi, 2011). Nowadays, many of these houses have been registered as valuable historic buildings in the Cultural Heritage Organization and are being preserved and restored. Some of these houses have been re-used with respect to their original form and structure by replacing new uses. In this regard, various uses such as cultural, commercial, educational, administrative and residential functions are now considered as contemporary usages for traditional houses. A number of traditional Tabriz houses from the Qajar era, along with their contemporary uses are illustrated in (Table 14).

Figure 17: The location of Tabriz in Iran map (Asbagh, 2019)
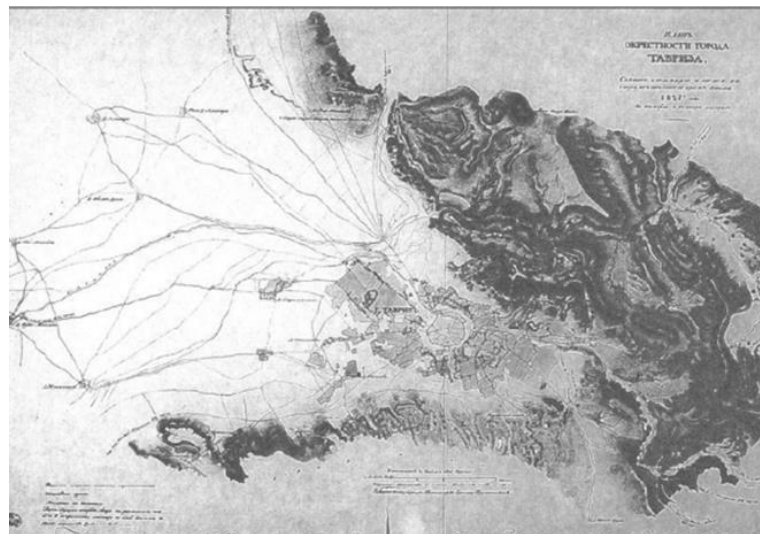
Figure 18: Map of Tabriz Drawn by Russian Engineers in Qajar Dynasty (UNESCO, 2009).

Table 14: List of Tabriz traditional houses from the Qajar era

Houses name	Period / Location	Image	Contemporary use	Type of function
Behnam house	Qajar era, Tabriz		Islamic Art University	Administrative
Gadaki House	Qajar era, Tabriz		Islamic Art University	Educational
Amir Nezam House	Qajar era, Tabriz		Qajar museum	Cultural
Mashroute House	Qajar era, Tabriz		Museum	Cultural
Heidarzade House	Qajar era, Tabriz		Tourism Information Center	Administrative
Sarraflar House	Qajar era, Tabriz		The live Pottery museum and workshop	Cultural Commercial Educational
Hariree House	Qajar era, Tabriz		Museum of Press and Diplomacy	Cultural
Khatai House	Qajar era, Tabriz		Tabriz Artists House	Cultural Educational
Bolourchian House	Qajar era, Tabriz		Bolourchian's family house	Residential

Images source: (Rahbari, 2016)

Out of these examples, three cases, which include the different category of new contemporary functions, are selected. Thus, cultural, administrative, educational, and commercial functions are investigated by the selected cases.

4.4 Space Continuity Analysis of Case Studies According to the New Different Functions

Three of the Qajar houses, which are mentioned in Table 14, are selected as case studies in this research. The first two cases have been converted to the Islamic Art University. However Behnam house has changed to the administrative part of the university and consists of the offices. Gadaki house is where the classrooms, prayer room, and some other offices are placed and also it has an educational function. Behnam house was built in the first period of the Qajar era. Afterward, since Gadaki house was built near to the Behnam house in the middle of the Qajar period, the common entrance was allocated to both these houses. Accordingly, these two houses belonged to one of the well-known families in the past and also had great political and social significance during the Qajar period (Figure 19). The third case study is Sarraflar house that has been converted to the live pottery museum; somehow, it has been used as a pottery workshop place and also has commercial use as well (Figure 20). Therefore, it is considered a multifunctional place. All three case studies are registered in the cultural heritage buildings.

Generally, the space organization of all three cases display the privacy through the hierarchy of access. Accordingly, the hierarchy of access to internal spaces is almost similar in all three examples, so that after crossing the entrance section, which consists of three parts (entrance, vestibule, and corridor), the outer courtyard and the porch become visible and therefore act as the access point to the other spaces of the house. Interior spaces almost consist of those, which are mentioned in previous chapter under

heading 3.4 as "the component spaces of the traditional Iranian houses" and also they usually distributed in more than one floor. Furthermore, the accessibility to each space depends on the type of function and privacy level of that space. in addition, the gender of person that inter to the house was one of the important factors to determined the privacy level of spaces in traditional houses in Qajar period. In this way, the privacy level of spaces based on gender issue is categorized in Table 12 in previous chapter.

Figure 19: Google map of common original entrance and the new entrance of Behnam and Gadaki House
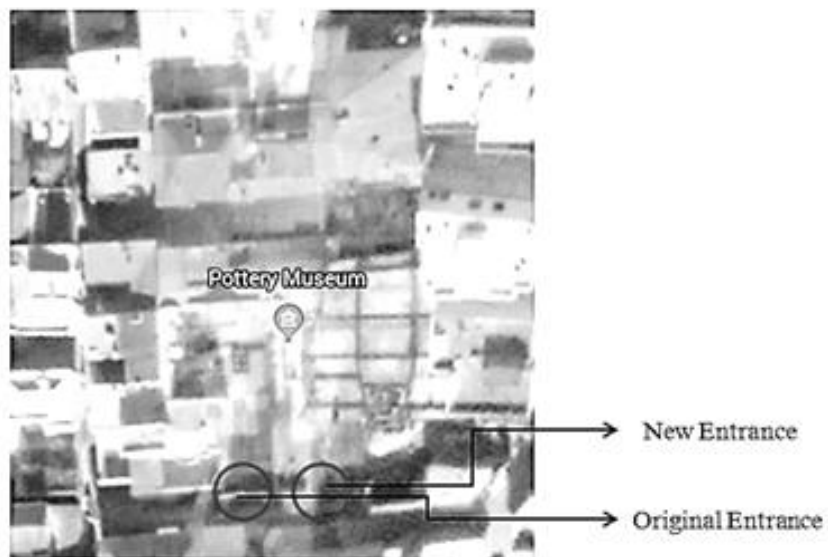
Figure 20: Google map of common original entrance and the new entrance of Sarraflar House

4.4.1 Behnam House

History:

According to Kaynejad and Shirazi (2011), Behnam house is one of the historic houses, which was built during the late *Zandieh* dynasty (1750-1794) and the early Qajar dynasty (1781-1925) in Tabriz. The entrance of the house is through *Moshir Daftar* Allay, where there is in connection with a corridor behind the *Qadaki* house (Tabriz, Fard, & Aliyev, 2012). The overall area of the floors is about 840 m2 in a 900-m2 plot (Behtash , 2018; Kaynejad & Shirazi, 2011).

Space organization:

The space organization of this house is based on privacy and hierarchy of access to internal spaces. The entrance section consists of several spaces that restrict the direct access to the home. Platforms are located at both sides of the door from outside view and after passing through the house, a small corridor and the Vestibule are located respectively and eventually, the central courtyard appears after the corridor. During the kingdom of Nasir al-Din Shah (1848-1896), the house was significantly renovated and decorated with ornamental paintings (Kaynejad & Shirazi, 2011). This house consists of the main building that is called winter building and a summer building that is a smaller one. The western side, which was included the stable, kitchen and toilets, has been destroyed many years ago (there is no exact date on this topic). The main building is constructed symmetrically in two floors from the basement on the northern side (Figure 21 and Figure 22). The ground floor of the building consists of the reception hall (*Shahneshin*) and two symmetrical living rooms and six bedrooms which are located at the inner parts. There are four symmetrical rooms at the first floor that the larger ones were used as a special room for guests staying a few days and the smaller ones were private bedrooms of family members (Figure 21 and Figure 22).

There are two courtyards (inner and central courtyard). Columned porch (*Iwan*) at both the north and south side of the central courtyard is accessible from the courtyard and seven-window reception hall, side room's face to the south (Figure 23). Reception hall (*shah-neshin*) is decorated with impressive ornamentations, wall paintings, niches, fireplace, and color-windows (*Orsi*). The inner courtyard is surrounded by rooms from the east and west.

The date of listing and reusing:

In April 1997, Behnam house was listed to cultural heritage conservation, and finally, it has been refunctioned in October 1999 to the administrative part of the Islamic Art and Architecture University of Tabriz, and the function of each space has been changed.
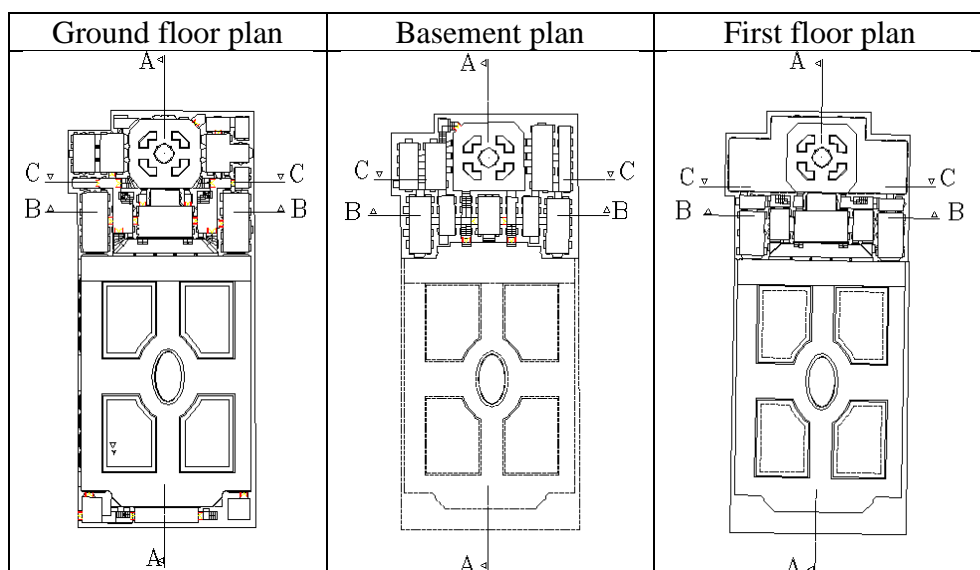
Figure 21: Behnam house plans (Tabriz C. H., 2007)
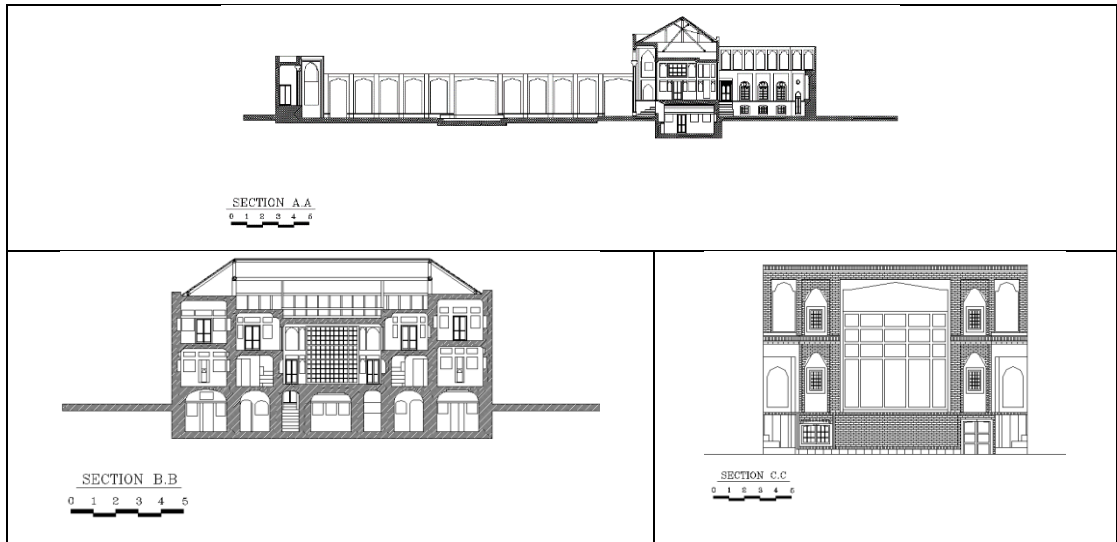
Figure 22: The sections of Behnam house (Tabriz C. H., 2007)
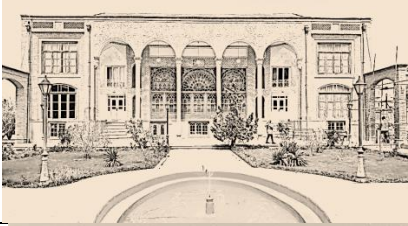
Figure 23: South and north elevation of Behnam house (Tabriz C. H., 2007)

The position of internal and external spaces of traditional Iranian houses in access hierarchy system have been discussed in the previous chapter. However, the continuity or discontinuity of spaces within original, before and after reused state have been analyzed in Table 15. In addition, images of each space in new contemporary function are taken in January-February 2019 during the in-situ observation of current situation of Behnam house.

Table 15: Space continuity analysis of Behnam house spaces

Space	Original state	state before the reused process	state after a reused process	New function	Current Image
Sitting Platform (Pir-neshin)	✓	✓	✓	Sitting Platform	
Entrance door (Dargah)	✓	✓	✓	Entrance door (Dargah)	
Vestibule (Hashti)	✓	✓	✓	Vestibule (Hashti)	
Corridor (Dalan)	✓	✓	✓	Dalan	
Corridor	✓	✓	✓	Corridor	

Hallway (Dehliz)	✓	✓	✓	Dehliz	
Outer courtyard	✓	✓	✓	Outer courtyard	
Porch (Iwan)	✓	✓	✓	Porch (Iwan)	
Reception hall (Tanabi)	✓	✓	✓	Chair's office	
Five-door room 1 (Panj-dari)	✓	✓	✓	Vice chair's office	
Five-door room 2 (Panj-dari)	✓	✓	✓	Teachers'room	
Five-door room 3 (Panj-dari)	✓	✓	✓	Guest room	

Three door room (Se-dari)	✓	✓	✓	Office	
Two door room (Do- dari)	✓	✓	✓	Service room	
Back storage 1 (Pastoo)	✓	✓	✓	Storage	
Back storage 2 (Pastoo)	✓	✓	✓	Kitchen	
Back storage 3 (Pastoo)	✓	✓	✓	Toilet	

Guest room (Goushvar)	✓	✓	✓	Offices	
Roof (Mahtabi)	✓	✓	✓	Roof	
Inner courtyard	✓	✓	✓	Inner courtyard	
Kitchen	✓	✗	✗	✗	Demolished
pool room (Havouz khane)	✗	✗	✗	✗	-
Stable	✓	✗	✗	✗	Demolished
Cellar	✗	✗	✗	✗	-
Storage	✓	✓	✓	Technology Units	
cistern	✗	✗	✗	✗	-
Toilet	✓		✓	✓	Toilet	

Servant room	✓	✓	✓	Offices	
Waiting room	✓	✓	✓	Free space	

According to the space continuity analysis, it can be seen that the eastern part of the Behanm building that was containing the kitchen and the stables was destroyed before the Adaptive Reuse Project while the main space organization of the Behnam House is protected during and after adaptive reuse. The majority of spaces have been changed to an administrative function. Meanwhile, one of the five-door rooms converted to the guest room and also is used for hosting and temporary accommodation for guest professors. The accessibility to spaces and privacy levels within the original and reuse state of the building have been evaluated in the next sections.

4.4.2 Gadaki House

History:

According to Kaynejad and Shirazi (2011), the construction of Gadaki house goes back to a hundred and sixty years ago, which describes the second half of the Qajar period. It covers an 863sq.m floor area. This house was built by Tabriz Governor E'temad os Saltaneh. Figure 26 and Figure 27 show the four main sides elevations of

Gadaki house. During the constitutional revolution, the building was used as an armory.

Space organization:

The space organization of this house is based on privacy and hierarchy of access to internal spaces. The entrance part of Gadaki house is common with Behnam house and also consists of the vestibule (Hashti) and corridor (Dalan) due to access into the house as well as the central courtyard. This building has two courtyards, central and inner one. The main building in two floors' includes the bedrooms, living rooms, and the storage spaces, kitchen and cistern were located in the basement. The reception hall (Tanabi) on the main axis of the building and the side rooms (Goushvar) are placed on the first floor. The spring room that is located in the basement was used during the summer as a place for private family gatherings (Figure 24 & Figure 25).

Date of listing and reusing:

In April 1997, this building was listed as cultural heritage and so from October 1999; it has been changed to the Islamic Art University of Tabriz as an architectural faculty (Kaynejad & Shirazi, 2011).
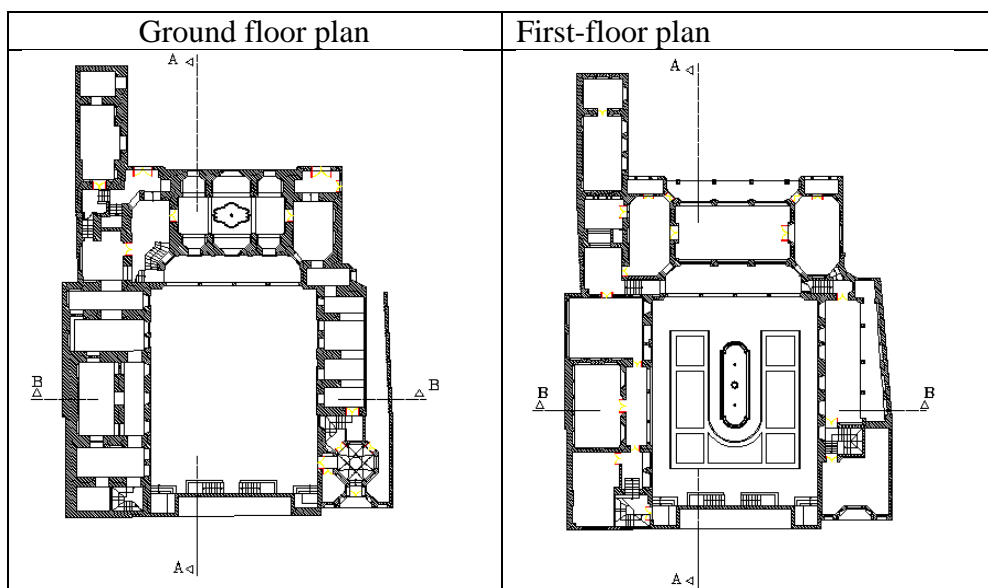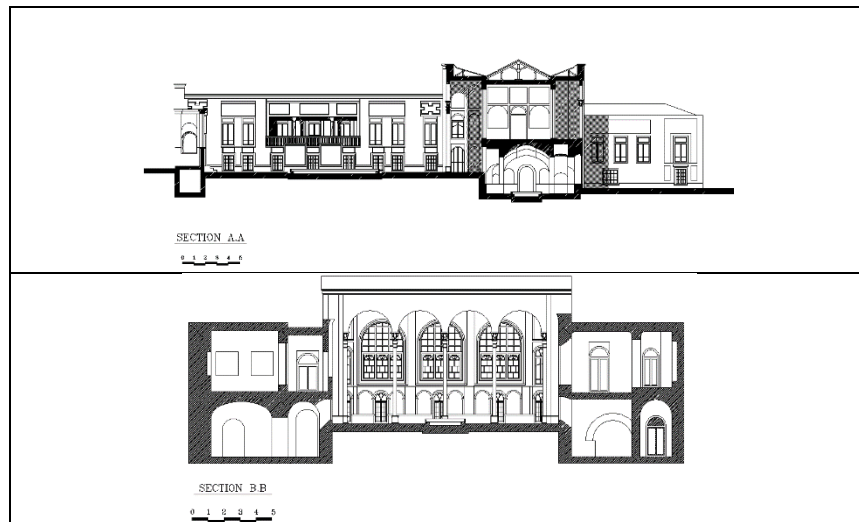

Figure 24: Gadaki house plans (Tabriz C. H., 2007)

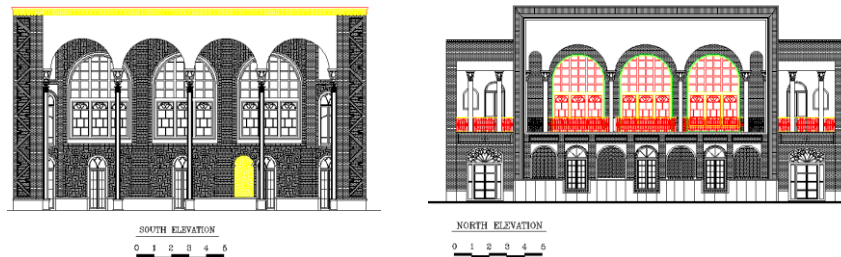Figure 25: Gadaki house sections (Tabriz C. H., 2007)

Figure 26: South and north elevation of Gadaki house (Tabriz C. H., 2007)

Figure 27: East and west elevation of Gadaki house (Tabriz C. H., 2007)
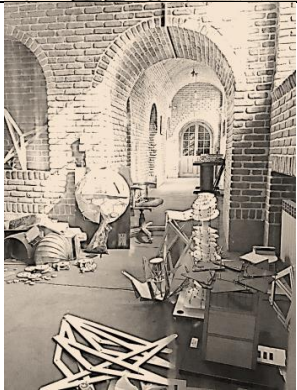
Table 16 indicates the status of the spaces in the traditional houses that were discussed at the previous chapter in terms of the existence or absence of each space within original state of the Gadaki house, as well as before and after the adaptive reuse process. In addition, according to observations, a new usage of each space, along with a photo of the current situation, is mentioned in Table 16.

Table 16: Space continuity analysis of Gadaki house spaces

Space	Original state	state before reused process	state after reused process	New function	Current Image
Sitting Platform (Pir-neshin)	✓	✓	✓	Sitting Platform	
Entrance door (Dargah)	✓	✓	✓	Entrance door (Dargah)	
Vestibule (Hashti)	✓	✓	✓	Vestibule (Hashti)	
Corridor (Dalan)	✓	✓	✓	Dalan	
Hallway (Dehliz)	✓	✓	✓	Free space	

Outer courtyard	✓	✓	✓	Outer courtyard	
Porch (Iwan)	✓	✓	✓	Porch (Iwan)	
Reception hall (Tanabi)	✓	✓	✓	Prayer room	
Five-door room (Panj-dari)	✓	✓	✓	Architectural Studio	
Three door room 1 (Se-dari)	✓	✓	✓	Office	

Three door room 2 (Se-dari)	✓	✓	✓	Classroom	
Two door room 1 (Do-dari)	✓	✓	✓	Copy center	
Two door room 2 (Do-dari)	✓	✓	✓	Publishing office	
Guest room 1 (Goushvar)	✓	✓	✓	Free space	

Guest room 2 (Goushvar)	✓	✓	✓	Praying room	
Roof (Mahtabi)	✗	✗	✗	✗	-
Inner courtyard	✓	✓	✓	✓	
Kitchen	✓	✓	✓	Storage	
pool room (Havouz khane)	✓	✓	✓	Exhibition place	
Stable	✗	✗	✗		-
Cellar (sardab)	✗	✗	✗		-

Cistern	✓	✓	✓	Water pipes network	
Storage	✓	✓	✓	Cultural affairs center	
Toilet	✓	✓	✓	Toilet	
Servant room	✓	✓	✓	Storage	

According to the space continuity analysis, it can be found that Gadaki building is a place of educational spaces. However, some of the spaces of this building are used

as a praying room and the storage spaces; most of the spaces are belong to the classrooms, exhibition, workshop and copy center. The accessibility to spaces and privacy levels within the original and reuse state of the building have been evaluated in the next sections.

4.4.3 Sarraflar House

History:

According to Behtash (2018), Sarraflar house that was built in the Qajar period, owned by Sarraflar family.

Space organization:

The space organization of this house is based on privacy and hierarchy of access to internal spaces. The entrance part has included the vestibule (Hashti) and corridor (Dalan). However, because of the changes made in the entrance part before and during the adaptive reuse, those sections have been removed. Therefore, the new entrance door is directly connected to the central courtyard. Like previous examples, reception hall (Tanabi) is placed in the house main axis with two rooms on each side of it. There is connection through the outer space stairs to the left side room. The three-door on the east side link to the corridors on either side. The basement encompasses the poolroom (Havouz khane) and two other rooms that had been used as a bathroom and storage space (Behtash, 2018). The plans and sections of Sarraflar house in the state, which is before the adaptive reuse process are displayed in Figure 28 and Figure 29.

Date of listing and reusing:

In March 2003, this building was listed as cultural heritage. This house has been converted to a pottery live museum and a workshop place for pottery art and selling pottery products in 2005.

Basement plan	Ground floor plan
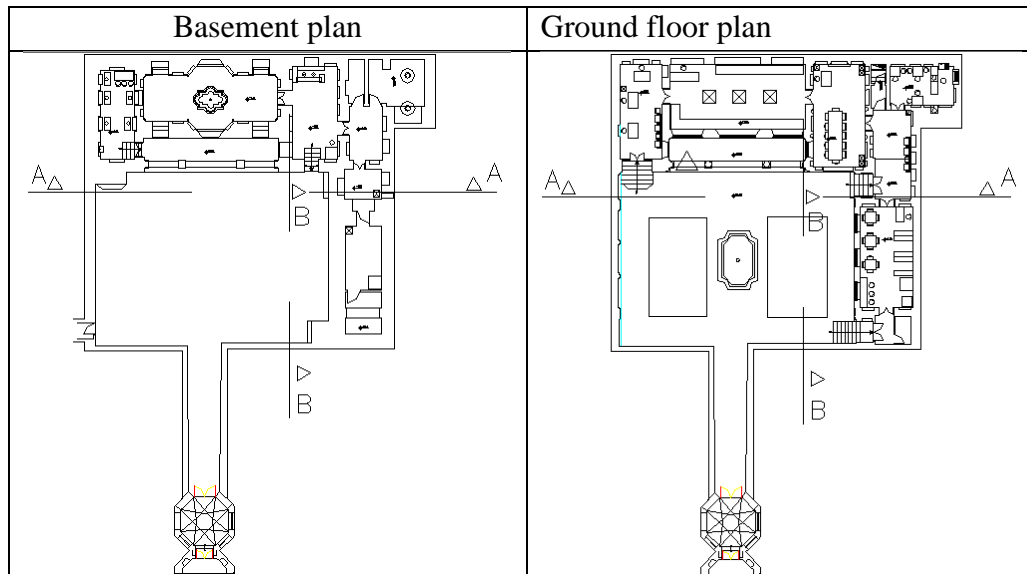
Figure 28: Sarraflar house plan (Tabriz C. H., 2007)

SECTION A.A

0 1 2 3 4 5

SECTION B.B

0 1 2 3 4 5

Figure 29: South and west sections of Sarraflar house (Tabriz C. H., 2007)

Table 17 indicates the status of the spaces in the traditional houses that were discussed at the previous chapter in terms of the existence or absence of each space within original state of the Sarraflar house, as well as before and after the adaptive reuse process. Additionally, according to observations, a new usage of each space, along with a photo of the current situation, is mentioned in the table below.

Table 17: Space continuity analysis of Sarraflar house spaces

Space	Original state	state before the reused process	state after a reused process	New function	Current Image
Sitting Platform (Pir-neshin)	✓	✓	✓	Removed	There is no image from the spaces that are removed
Entrance door (Dargah)	✓	✗	✗	Removed	There is no image from the spaces that are removed
Vestibule (Hashti)	✓	✗	✗	Removed	There is no image from the spaces that are removed
Corrido (Daalan)	✓	✗	✗	Removed	There is no image from the spaces that are removed
Hallway (Dehliz)	✓	✓	✓	Reception	
Hallway (Dehliz)	✓	✓	✓	Museum	
Outer Courtyard	✓	✓	✓	Outer Courtyard	
Porch (Iwan)	✓	✓	✓	Porch (Iwan)	

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Reception hall (Tanabi)	✓	✓	✓	Museum	
Five-door room (Panj-dari)	✓	✓	✓	Museum	
Three-door room (Se-dari)	✓	✓	✓	Maintenance and sale of pottery utensils	
Two-door room (Do-dari)	✓	✓	✓	Service room	
Back storage (Pastoo)	✗	✗	✗	✗	-
Guest room (Gooshvar)	✓	✓	✓	Temporary exhibition space	

Guest room (Gooshvar)	✓	✓	✓	Workshop	
Roof (Mahtabi)	✘	✘	✘	✘	-
Inner courtyard	✘	✘	✘	✘	-
Kitchen	✓	✓	✓	The place of traditional and electric furnace	
pool room (Havouz khane)	✓	✓	✓	Workshop	
Stable	✘	✘	✘	✘	-
Cellar (Sardab)	✘	✘	✘	✘	-
Storage 1	✓	✓	✓	Storage	
Storage 2	✓	✓	✓	Workshop	
cistern	✘	✘	✘	✘	-

Toilet	✓	✓	✓	Toilet	
Servant room	✓	✓	✓	Staff room for resting	

According to the history of the house, the vestibule (Hashti) had been removed from the entrance part of the house before the adaptation process. While the entrance section only includes a long corridor (Dalan), during the adaptive reuse, the corridor section has been removed for the development of the courtyard space. The functional analysis related to Sarraflar houses clarified that building spaces had been re-used with multiple uses. In addition to the museum's use of the pottery artwork, some spaces are also dedicated to the workshops, and training courses of pottery, as well as the purchase and sale of pottery products and raw materials, are along with other uses. The accessibility to spaces and privacy levels within the original and reuse state of the building have been evaluated in the next sections.

In short, the initial spatial organization has been quite similar in all three case studies, based privacy issue and components of the houses, which were discussed in chapter 3. As such, in all three cases, the reception hall (Tanabi) is located on the main axis with the side rooms and the five-door rooms on each side at the ground and first floor. Similarly, in the spatial layout of the Gadaki house and the Sarraflar house, the

poolroom (Havouz khane) space is located on the main axis of the building. As it is clear from the plans of houses, the entrance space in all three houses consists of three main parts: Entrance, the vestibule (Hashti) and hallway (Dalan). Although, with the changes that occurred in the entrance space of the Sarraflar house before and during the reuse process, the entrance door, vestibule, and the hallway have been removed, and so the entrance of the building in the current function includes two new entrance doors.

4.5 Analysis of Change in Space Organization through 'Justified Permeability Graphs' and Numerical Outcomes

In acquired graphs for the houses and also for reused states of houses, mainly the original entrance and the new entrance are defined as a carrier node and other Spaces are placed in sequence levels related to the carrier node. Consequently, each space is given a depth value, where they are accessible through passing the levels from the carrier node. According to the explanations given above, the graphs of each house in two different modes, including the original and reused 'justified graphs' have been examined.

The abbreviations and colors that are used in drawing the graphs are indicated as:

E	E: Entrance	Tb	Tb: Tanabi (Reception Hall)
H	H : Hashti (Vestibule)	5D	5D : five-door room
D	D: Dalan	3D	3D: Three- door room
Cy	Cy: Courtyard	2D	2D: Two – door room
Wr	Wr: Waiting room	P	P: Pastoo (Back storage)
Sr	Sr: Servant room (for males)	G	G : Goushvar (Geust room)
Sr	Sr : Servant room (for famels)	Dz	Dz : Dehliz
wc	Wc: Toilet	Pi	Pi: Privat Iwan
Iw	Iw: Iwan (Porch)	I.C	I.C: Inner courtyard
St	St: Stair	M	M: Mahtabi
Cr	Cr: Corridor	Nc	Nc: Neighbor courtyard
S	S : Storage	Ms	Ms : Middle space
Hz	Hz: Havouz-khane (pool room)	UE	UE: University entrance
K	K: Kitchen	E2	E2: second entrance
Cs	Cs : Cistern	Rs	Rs : Restaurant

Ground floor plan	Basement plan	First-floor plan
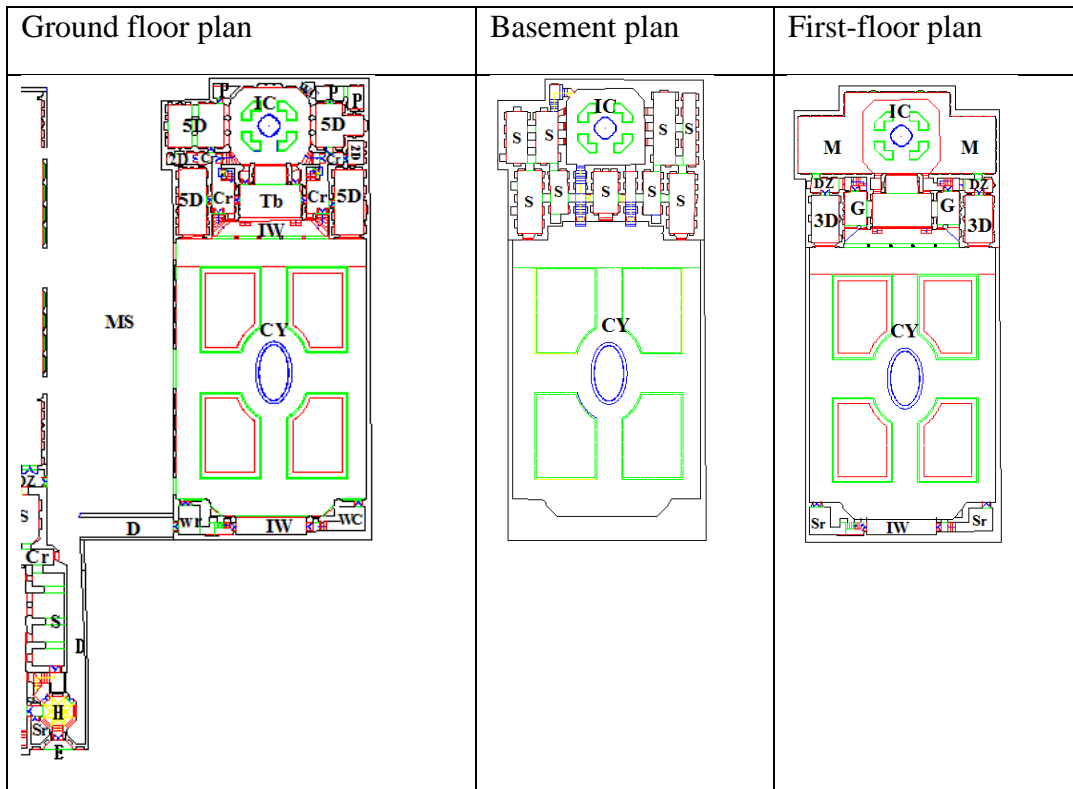
Figure 30: Original plans of Behnam House
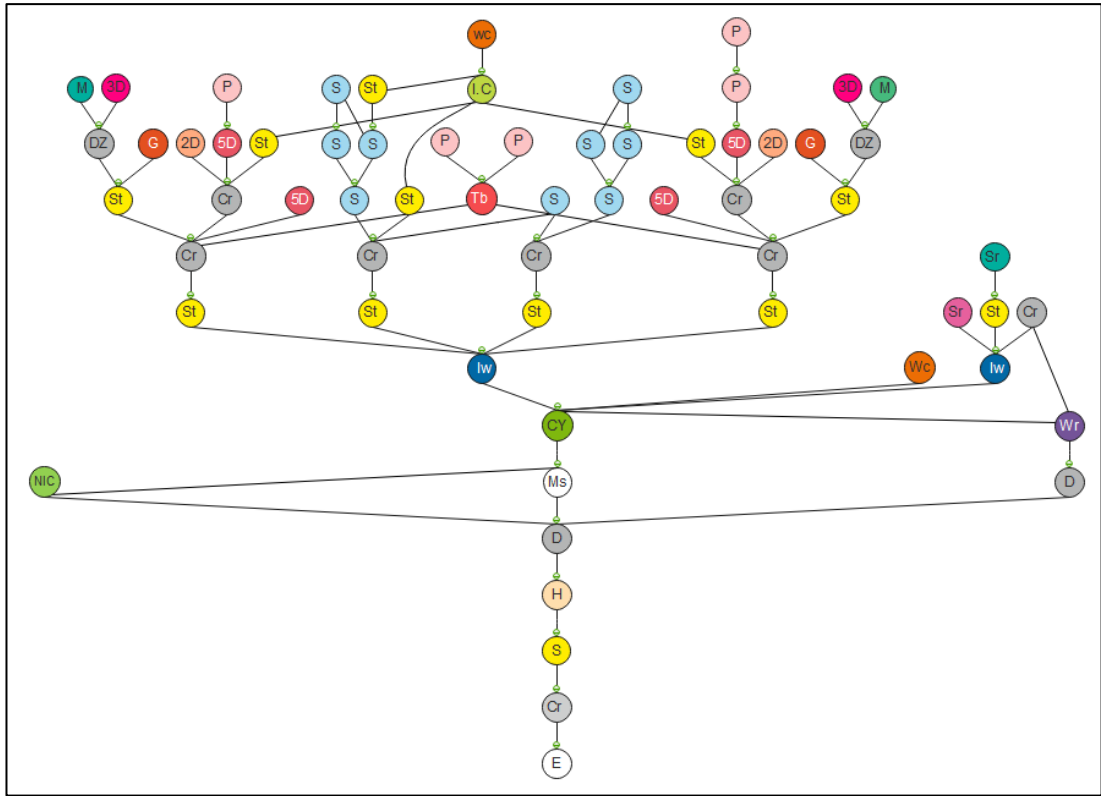
Figure 31: Justified graph of the original state of Behnam House
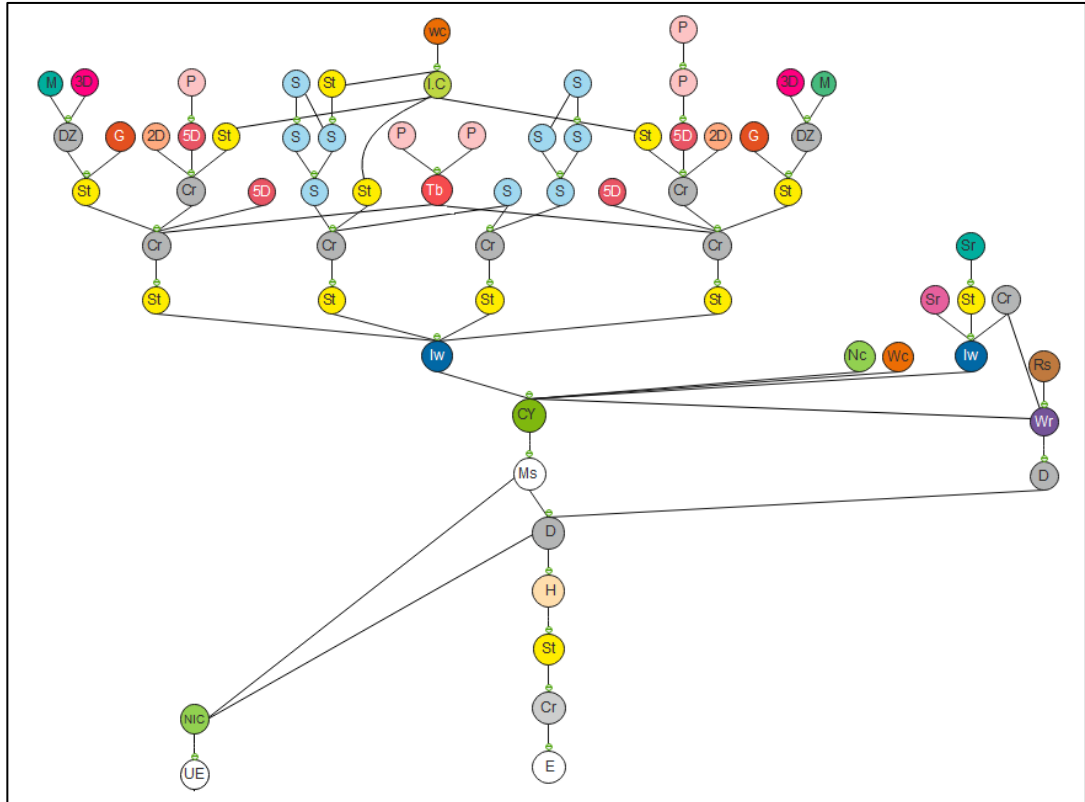
Figure 32: Justified graph of reused state of Behnam House

Ground floor plan	First-floor plan
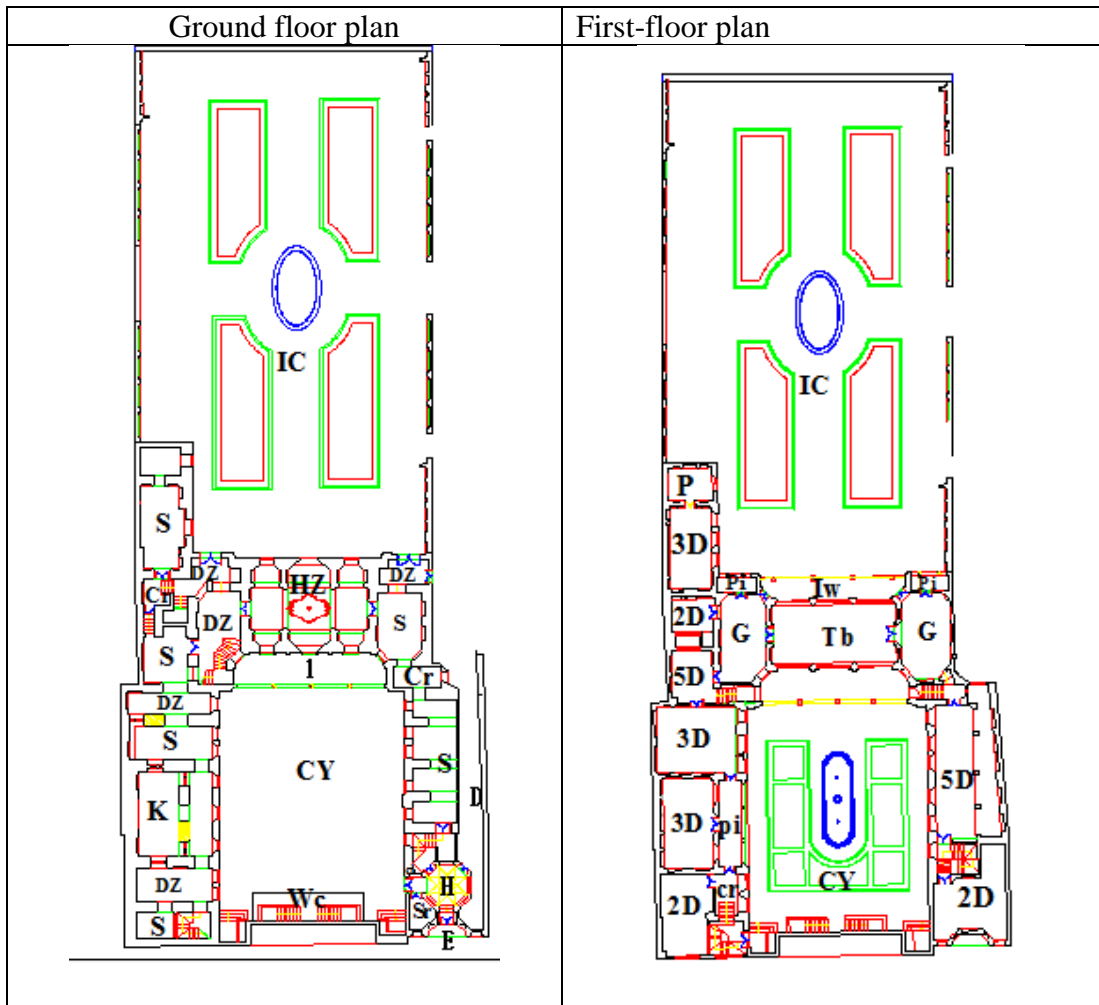
Figure 33: Original plans of Gadaki House

Figure 34: Justified graph of the original state of Gadaki House

Figure 35: Justified graph of reused state of Gadaki House

Ground floor plan	Basement plan
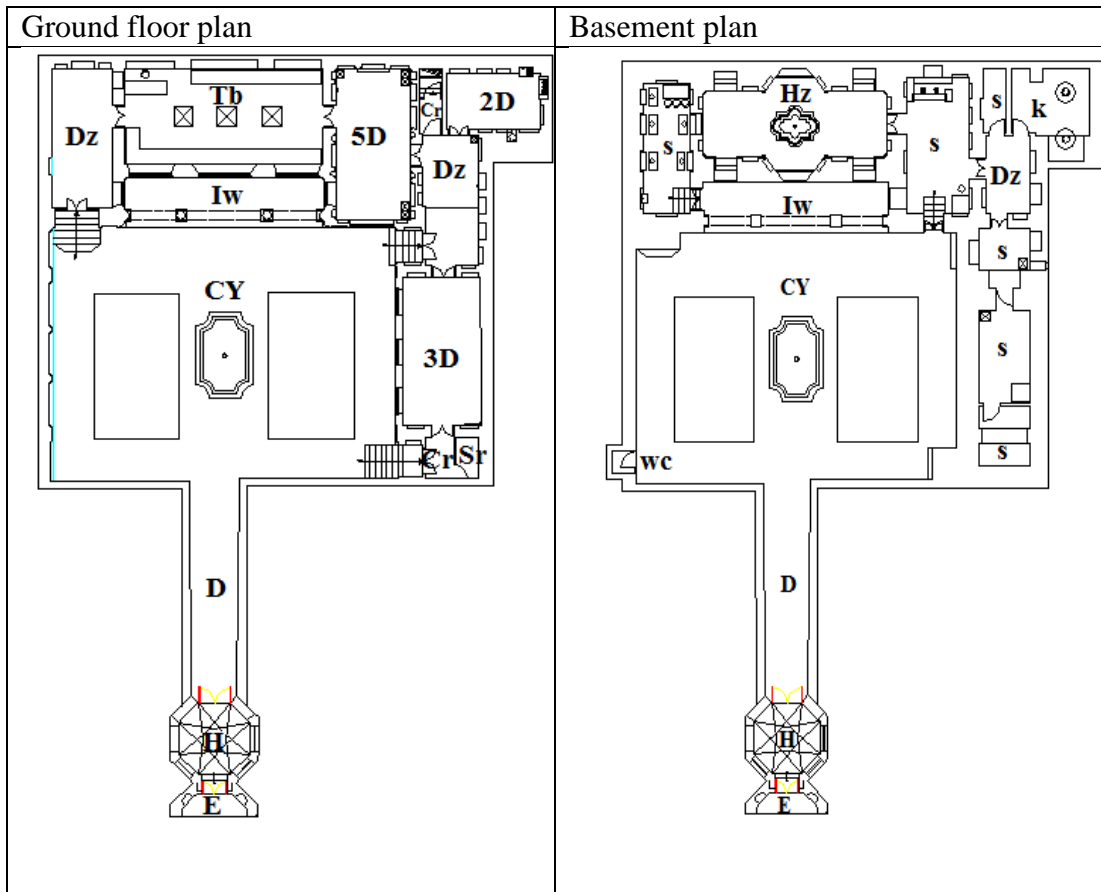
Figure 36: Original plans of Gadaki House Sarraflar House
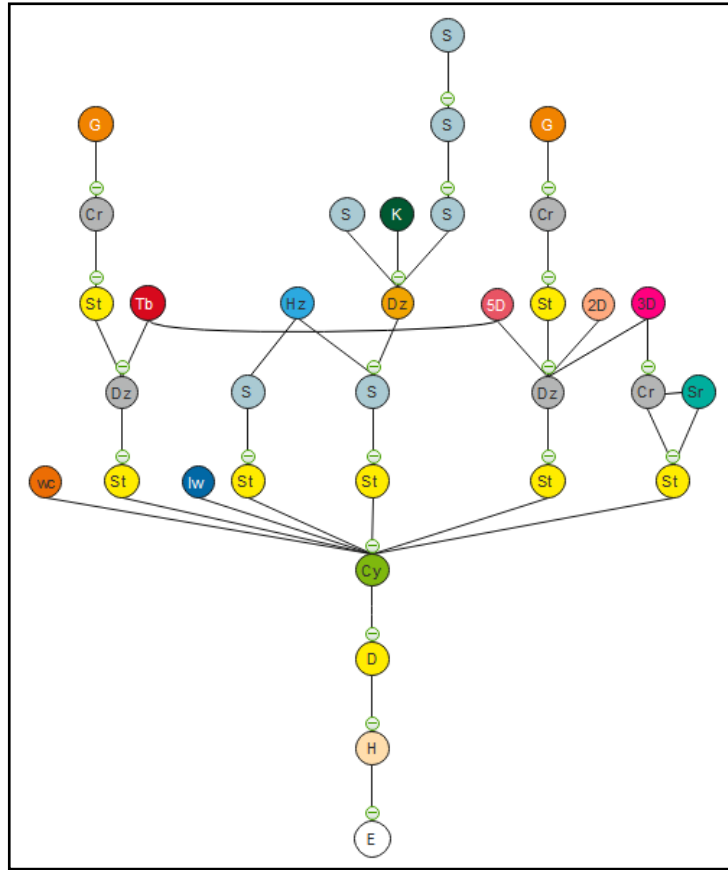
Figure 37: Justified graph of the original state of Sarraflar House
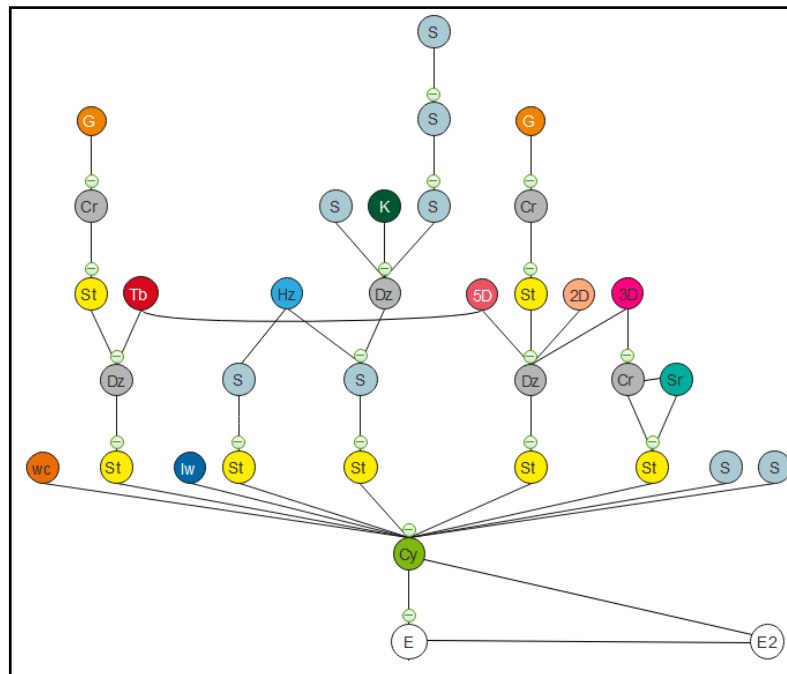
Figure 38: Justified graph of reused state of Sarraflar House

The numerical syntactic values are calculated and also they are presented in appendix. The analysis of justified graphs and numerical syntactic values determine some following issues as:

4.5.1 Behnam House

By comparing the relative depth of the spaces in two different modes of Behnam houses, before and after the reuse, it can be seen that the relative depth of all spaces in the second use has decreased.

In the reused state of Behnam house, the depth value for university entrance (RA= 0.16) is lower than the house's original entrance depth value (RA= 0.24), and also the university entrance (i= 4) is more integrated than the original one (i= 5.9).

According to the obtained graphs (Figure 31 and Figure 32), the accumulation of spaces after the passage of the porch is increasing, so the comparison of data shows the high level of access to the porch space in both states. Therefore, the porch has a significant role in terms of accessibility to different parts of the house.

Interestingly, in reused case of Behnam house, the central courtyard has the second highest degree of integrity and access (I=10.22), and after the central courtyard, the stairs and corridors that branch out of the porch have the most access (10.5 integrity).

It is declared that back storage (pastoo) that is a small space inside the room is one of the isolated spaces, and there is accessibility for neither students as inhabitants nor visitors.

Figure 39 gives information about the relative depth of each space in the spatial configuration of Behnam house. It shows how the depth of the house spaces has changed as a result of the new function in reuse.

As can be seen from the graph, there were different modes for original and reused states of the traditional house. In both modes, the porch by RA= 0.08 in original state

and RA=0.07 in university function and the outer courtyard by 0.09 and 0.08 for the original and reuse state respectively, have the lowest depth and hence, the highest integrity. In contrast with the back storage (pastoo) by 0.20 and the basement storage by 0.21 as the relative depth value in original state and RA=0.18 for the pastoo and the basement storage by 0.19 as depth value in the reused mode of Behnam house, are considered as deepest space.

Overall, the state of the reuse has been defined by a new entrance (university entrance). In addition, the university complex has been identified through the connection with the neighboring courtyard and providing the restaurant space by linking to the side building. This has led to an increase in the number of spaces, as well as reduced privacy and depth in each space in university complex (Figure 39).
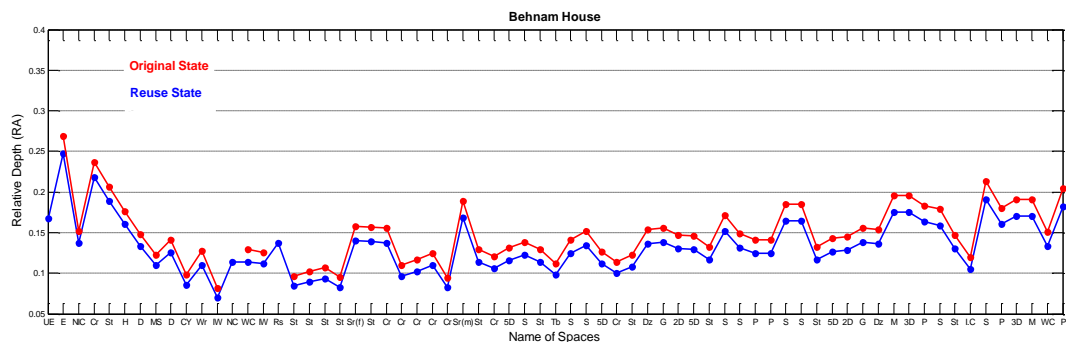
Figure 39: Relative depth values of spaces in original and reused states of Behnam house

4.5.2 Gadaki house

Justified graphs of Gadaki house Figure 34 and Figure 35illustrate that the university entrance that has been assigned to space organization of the house in the reused state, provides the easy access to the inner courtyard of the Gadaki house and the interior spaces of the building as well.

The relative depth value of each space within both modes of Gadaki house has been revealed in Figure 40.

Figure 40 illustrates the relative depth of each space in the spatial configuration of Gadaki house. It shows how the depth of the Gadaki house spaces has varied as a result of the reuse.

Interestingly, the depth values for back storage (pastoo), three door room and storage spaces that are close to the inner courtyard are at the highest level by RA= 0.24, 0.21, 0.20 respectively on spatial house configuration. Therefore, these spaces are less accessible than other spaces. The main entrance and the two-door room on the top of the vestibule are also the deep spaces in the house's space configuration and also considered as more isolated spaces.

According to numerical data in original layout, the corridor leading to the outer courtyard, as well as the outer courtyard, are spaces that were easy to access by the lowest relative depth (0.11) and also by 8.4 integration value as the highest.

Moreover, the evidence shows that the inner courtyard has little depth (RA=0.12) due to its connection with the entrance through the middle space of the two houses (Behnam house and Gadaki house), and there is no need to pass through multiple spaces to access the inner courtyard. Similarly, the depth value of the inner courtyard in the reused spatial configuration is also near to the previous mode only by 0.01 less than the former.

As it can be clearly seen from Figure 40, the trend between original and reused spaces is likely to remain in the same manner while the relative depth is slightly decreased in the reused spaces.
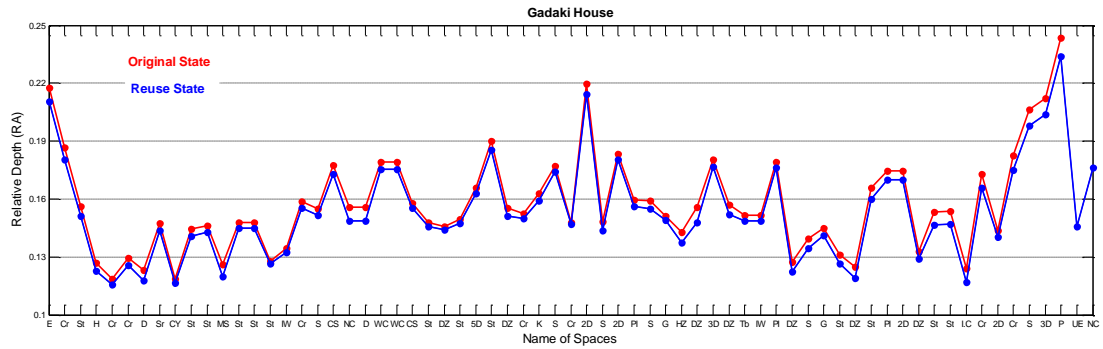
Figure 40: Relative depth values of spaces in original and reused states of Gadaki house

4.5.3 Sarraflar house

According to the comparison of relative depth in two different modes of the Sarraflar house, original and reuse states, there has been a slight decrease in relative depth of reused spaces for museum function compared to the spaces in original house configuration (Figure 41).

The lowest level of depth is related to the courtyard by RA= 0.10 in original layout and RA=0.09 in reused layout, which means the courtyard is the most integrated space in both houses and has the highest level of accessibility.

The depth in the interior spaces has gradually increased, so far as it has reached the highest level in upper rooms (Goushvar) by RA=0.33 and 0.34 as well as in storage space that is located at the basement by RA= 0.36 and 0.38 for the reused and the original statement of the house respectively. Thus, the mentioned spaces have very low integrity in the network.

Some other spaces have been added to the museum complex that includes the new entrance and two other spaces which are near to the new entrance. Moreover, the vestibule and the hallway (Dalan) were removed before and during the adaptive reuse Figure 37 and Figure 38. Therefor, by removing the vestibule (Hashti) and the corridor (Dalan) part that leads to direct access from the entrance to the outer courtyard, the

depth of the outer courtyard has been comparatively reduced from 0.1 to 0.09. Similarly, the depth of the other spaces that are accessible through the courtyard also decreased. In the same way, the central courtyard, which had previous integrity of 9.26, in its new state reached up to10.38
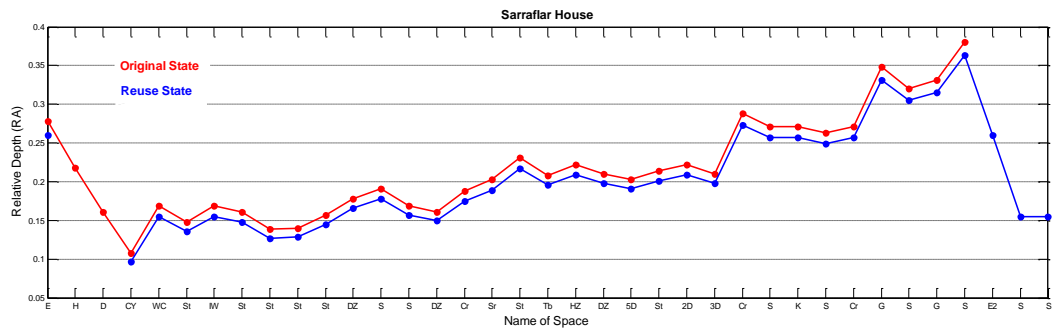
Figure 41: Relative depth values of spaces in original and reused states of Sarraflar house

In all three examples, the level of change is not very radical. Since the number of spaces; space organization; and connecting between spaces are changed in minimal level, however, the level of accesses by visitors and inhabitants have a more considerable level of change due to the change of function that deserves investigating

4.6 Analysis of Change through 'Privacy Graphs'

As discussed in chapter three, the organization of traditional Iranian houses has been based on the highest level of privacy. Meanwhile, these houses are carrying numerous values as cultural heritage at present. Therefore, it was necessary to pay special attention to the to the level of privacy in space within the change in the use of these types of buildings in order to achieve continuity of cultural aspects of the building and to raise the community's awareness of the existing values through providing access to the visitors.

Generally, in the past, privacy had been one of the most significant principles in the spatial configuration of traditional Iranian houses. Therefore, to comply with this principle, the majority of internal spaces had a high degree of privacy. Thus, access to them was only possible for family members. In addition, certain spaces were accommodated for guests and their servants based on gender. For example, the reception hall (Tanabi) was the space for serving male guests and guest room (Goushvar) was used to relax and welcome the female guests. Additionally, there were specific spaces close to the entrance section, which were considered to serve the servants. Thus, according to the diagrams of the previous section, which were obtained from numerical outcomes on the depth of the spaces, it was found that the reuse of traditional houses did not cause a radical decrease in the depth of the interior spaces.

In the present graphs, a color spectrum shows the degree of privacy in the spaces for both the original and the reused layout. The bold color spaces represent the highest level of privacy that means private spaces. The brightness of the node colors respectively defines the semi-private (dark grey), semi-public (light grey) spaces. Likewise, the white color display the public spaces within the system layout.

The degree of privacy in spatial layout in all three case studies is as follows:
The outer entrance is the public space. Afterward, through passing the main door, semi-public spaces are revealed that include the vestibule (Hashti), Hallway (Dalan),

the outer courtyard, the porch, the room of male servants and the waiting room. The reception hall (Tanabi) and the guest room (Goushvar), which are the places for resting and welcoming the guests, and the stairs and corridors that are located inside the building as well as the female servants' room are semi-private spaces. The rest of the rooms consist of bedrooms, five-door rooms, three-door rooms, two-door rooms, toilets, kitchen and storage, cistern, pool room (Havouz-khane) and the roof space (Mahatabi) all included private spaces, which were used by family members only.

This categorization applies to the original use of all case studies in this research. The degree of privacy for reused spaces is based on the usage type of each space as well as access to them are bought in the following part.

4.6.1 Behnam House

As it can be clearly seen from Figure 42 and Figure 43, **Behnam House,** as the administrative building of the Islamic Art University, includes the offices for the Chair and the Vice-Chair and the offices that belong to other professors. Additionally, it includes a private residential studio for the accommodation of the guest professors. In general, in-situ observation shows that most of the spaces are semi-private, and access to visitors is almost difficult because those spaces are locked most of the time. On the other hand, access to the majority of inhabitants who are students is far easier than the visitors, while access to the residential studio is only possible for guest professors and thus the students are not allowed to access to this space.
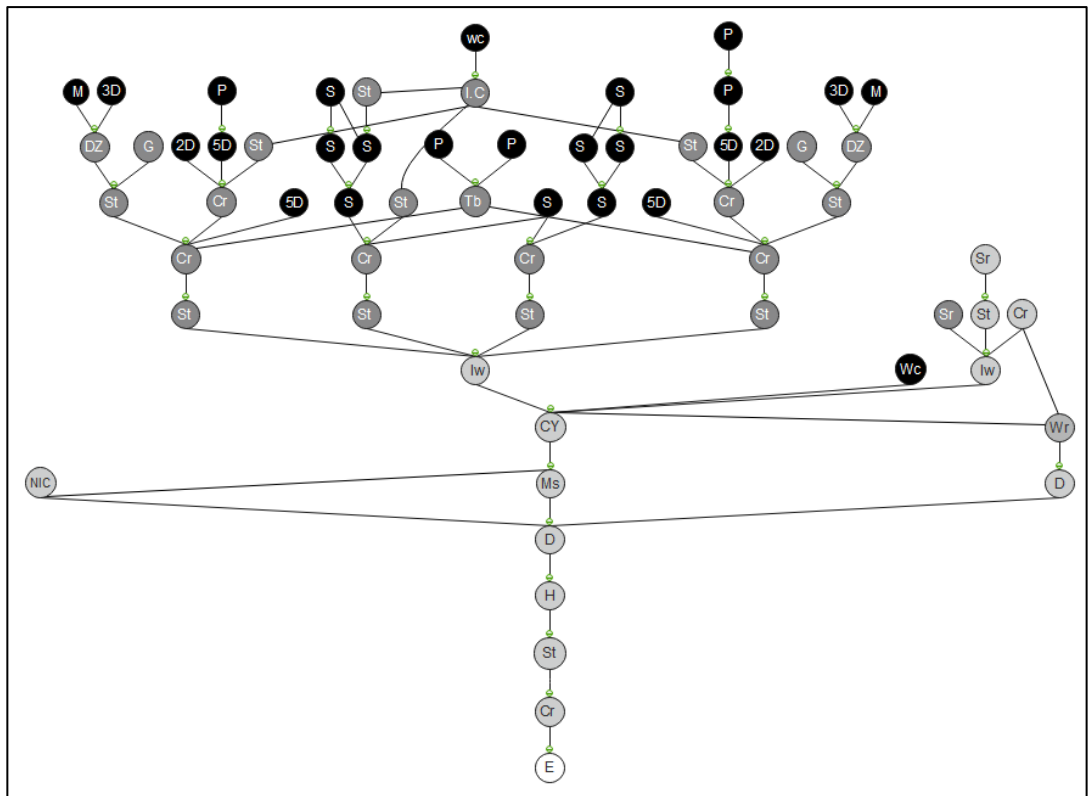
Figure 42: Privacy graphs of Behnam house within the original state
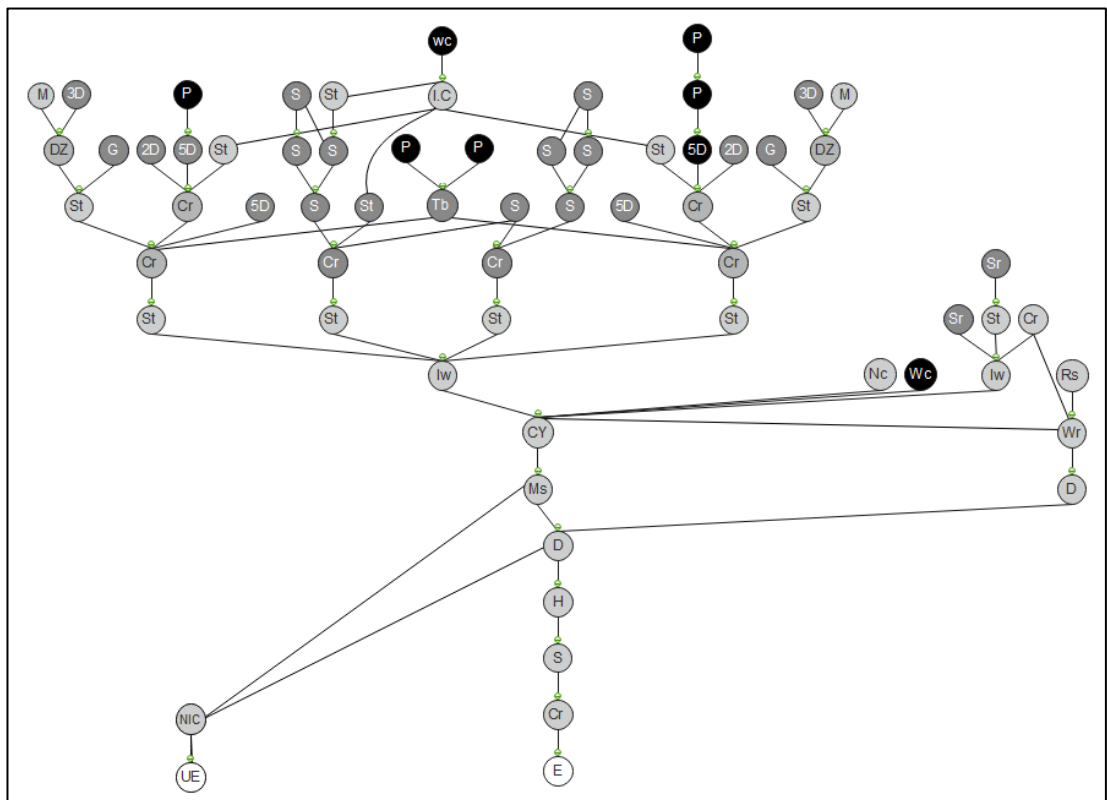
Figure 43: Privacy graphs of Behnam house within reuse state

4.6.2 Gadaki House

Gadaki House like Behnam house, is converted to the Islamic Art and Architecture University complex. Some of the spaces of this building are allocated to classrooms and workshops places that are taken into semi-private spaces. The rest of the spaces, including the reception hall (Tanabi), which is the place of prayer at present and the pool room (Havouz-khane), that is used as the exhibition of student works, are semi-public and accessible spaces for both inhabitants and visitors (Figure 44 and Figure 45)

The number of semi-private and private spaces in Gadaki building is relatively lower than the Behnam house. Accordingly, most of the spaces in this building are accessible and allow visitors to visit the heritage building comparatively.

Figure 44: Privacy graphs of Gadaki house within the original state

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Figure 45: Privacy graphs of Gadaki house within reused state

4.6.3 Sarraflar House

The degree of privacy graph in reused state of **Sarraflar house** (live pottery museum) indicates that most of the spaces are semi-public. Thus, visitor access is at the highest level than the rest.

Similarly, some places are used as educational spaces related to the content of the museum. Hence they are considered as semi-public space and are accessible to visitors as well as the inhabitants.

On the other hand, spaces such as the traditional and electric furnace (formerly in the kitchen area), as well as the storage where the raw materials used for the pottery production are kept, contain as semi-private spaces that can be accessed at a particular time to the visitors. The servant's room on the eastern front of the building is also home

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to the caretaker of the complex. Therefore, this space and toilets are the only private spaces within the museum complex (Figure 46 and Figure 47).
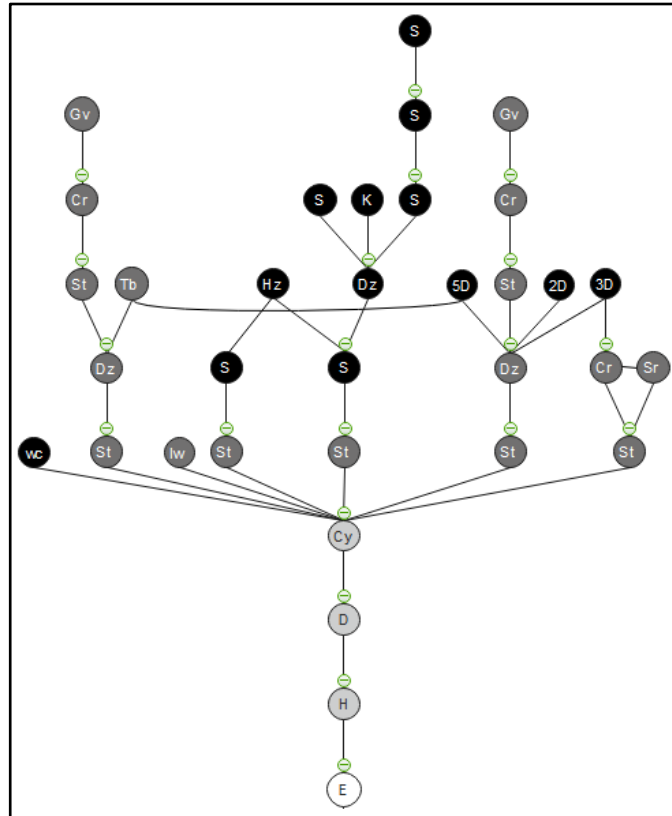
Figure 46: Privacy graphs of Sarraflar house within original state
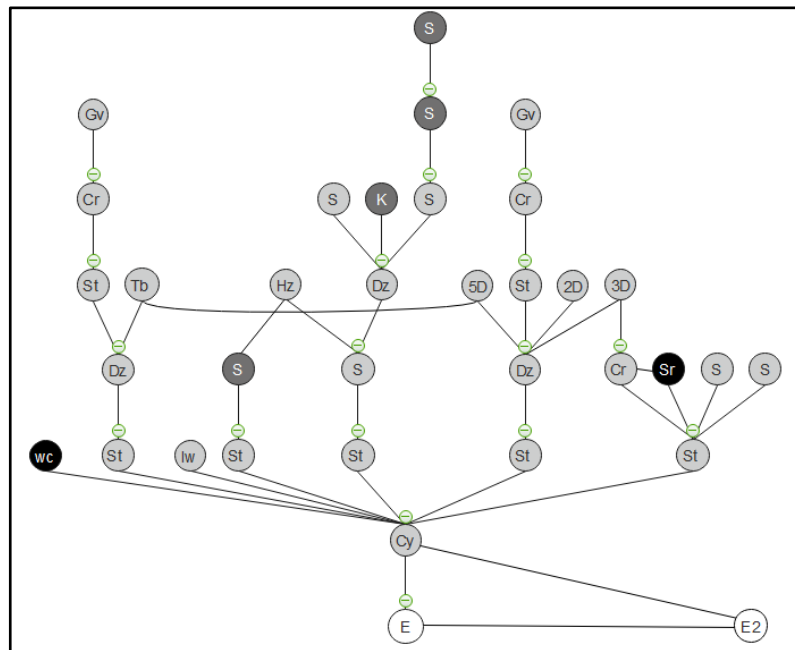
Figure 47: Privacy graphs of Sarraflar house within reuse state

4.7 Summary of Findings

The analyzes that have been carried out based on the spatial organization of traditional Iranian houses in Qajar era, indicate that privacy as one of the main factors of Iranian culture has a significant impact on spatial configuration and access hierarchy in residential buildings from Qajar era. Based on the justification graphs of space syntax method, privacy as one of the main intangible features of culture, affects spatial organization of the selected case studies, not only in the original mode, but also in the reused state of the residential buildings. Hence, based on the justification graphs, it can be seen that the new contemporary functions in each of the three buildings are compatible with the existing original space organization. In this context, the original space organization is maintained in general and applying the least amount of interventions are applied in conservation of these buildings with the aim of preserving the heritage values such as cultural, historical, aesthetic, symbolic, social that are mentioned in Table 2 in Chapter 2 specifically.

In summary, the justified graphs show the hierarchy of access from the entrance to the deeper nodes in interior spaces of the cases. According to the 'justified graph' and numerical outcomes, the relative depth of spaces in all three cases have been reduced as a result of connecting with new spaces or adding the new entrance to the building. Therefore, the possibility of public access for the reuse states of all three heritage buildings has been increased.

The numerical results of the values for the original use of all three buildings indicate that the spaces are in the order of degree of accessibility and the degree of privacy in the spatial layout of the houses. As the distance from the entrance node increases, the level of privacy also increases. For example, in order to access living spaces (five-door rooms), storages, kitchen, and bedrooms (three/two door rooms), pool room and even

inner courtyards, there is an obligation to pass through several degrees. Hence, the level of privacy in residential use is far more than other uses. The comparison of numerical results in both cases before and after the process is described in detail below:

On the other hand, the privacy graphs of the original use (residential use) and the new use of each case show that the number of private spaces in reuse state has been significantly lowered compared to residential use. However, by comparing the privacy graphs in three different new functions, including the administrative function of the Islamic art and architecture university, the educational function of the Islamic Art and Architecture University and the multi-functional use of the pottery live museum, it can be found that the number of semi-public spaces in pottery live museum function is far more than the administrative and educational functions in two other case. Thus, the cultural (museum) function provides a high level of public accessibility in comparison with the other two.

Likewise, in the Gadaki building, the spaces allocated to the classrooms and professors' offices are included as the semi-private spaces and access to them is limited. Also, enormous spaces on the ground floor and close to the outer courtyard being used as storage spaces and also considered as semi-private spaces. Therefore, the number of semi-private spaces of this building is lower compared to the Behnam building and is more than that of the Sarraflar building.

Additionally, the number of semi-private spaces in administrative use is considerably higher than the semi-private spaces in the other two cases. Therefore, Behnam building with its administrative function limits the access for visitors because of containing the majority of semi-private spaces.

Table 18: Summary of findings according to the case studies analysis

	Behnam House	Gadaki House	Sarraflar House
Function in Reused state	Islamic art and architecture university	Islamic art and architecture university	Live Pottery Museum
Type of contemporary function	Administrative function	Educational Function	Cultural, Educational, Commercial function
Compatibility of new function with existing building	The original space organization has been preserved and also the new function is compatible with existing form of building	The original space organization has been preserved and also the new function is compatible with existing form of building	The original space organization has been preserved except the changes in entrance part before and during adaptive reuse and also the new function is compatible with existing form of building
Justified Plan Graphs	Three spaces have been added to reused state	Two spaces have been added to reused state	Three spaces have been added to reused state
Relative Depth Diagram	The relative depth of all spaces in the second use has decreased	The relative depth is slightly decreased in the reused spaces	The relative depth of all spaces in the second use has decreased
Space with lowest depth and the highest integrity	the porch and the outer courtyard have the lowest depth and so the highest integrity (They are easily accessible)	the outer courtyard has the lowest depth and so the highest integrity	the outer courtyard has the lowest depth and so the highest integrity
Space with higher depth and lowest integrity	The back storage and the storage that are placed in depth have the higher depth and lowest integrity (They are not easily accessible)	The back storage and the storage that are placed in depth have the higher depth and lowest integrity (They are not easily accessible)	The storage that are placed in depth has the higher depth and lowest integrity (it is not easily accessible)
Privacy graphs	Most of the private spaces converted to the semi private space in office function	Most of the private and semi-private spaces converted to the semi-public spaces in the contemporary function	Most of the private and semi private spaces are converted to the semi public spaces
Public Access	Access to visitors is almost difficult. Access to the students as inhabitants deals with barrier because the offices are locked	Spaces are accessible and allow the visitors to visit the heritage building Access to the students as inhabitants is almost easy	Visitor access is at the highest level Access to the inhabitants is at the highest level

Chapter 5

CONCLUSION

The charters and guidelines that are discussed in second chapter, contribute to the protection of cultural heritage resources in terms of tangible and intangible forms, which are the key means of transferring cultural values and significances with the aim of cultural sustainability. In this respect, adaptive reuse of heritage buildings through assigning the contemporary function, which arises from the local community needs, leads to maintaining and continuing the cultural significances of heritage buildings. Besides, the ICOMOS principles and guidelines about adaptive reuse that are displayed in Table 6, are approval to reuse the heritage buildings by applying the minimum interventions and preserving the cultural significance of heritage buildings.

Iranian traditional houses constitute an important part of valuable cultural heritage that must be preserved for future generations. Over the past decades, reusing the listed traditional Iranian houses have found great significance. Therefore, selecting the most appropriate function to achieve success in adaptive reuse projects is prioritized. There are many effective issues such as new function compatibility with the building, basic environmental qualities, economic and intangible benefits, public accesses, minimal adaptation cost in relation to the appropriateness of the new function during the adaptive reuse process that were mentioned in the second chapter.

The configuration of traditional Iranian houses affirms the direct impact of the cultural values of society on the spatial organization of those houses.

The purpose of the current study is to determine the level of privacy in original and reused states of selected traditional Iranian houses to contribute to a better understanding of the appropriateness and compatibility of the new function in terms of accessibility of all spaces to visitors and inhabitants within adaptive reuse of the traditional houses. Therefore, the impact of privacy as one of the most important cultural indicators in the organization of traditional Iranian houses is evident. In other words, those houses as a tangible aspect of the cultural heritage are strongly affected by cultural issues such as privacy as an intangible aspect of cultural heritage. Therefore, the examination of the privacy issue as well as the public accessibility within the new function of reused traditional Iranian houses as a common cultural heritage, also play an important role in identifying the compatibility of the new uses in order to achieve the success in adaptive reuse projects.

As illustrated in Table 14 in Chapter 4, three traditional houses form Tabriz with three different functions have been selected as case studies, which include administrative function of the Islamic Art and Architecture University (Behnam house), the educational function of the Islamic Art and Architecture University (Gadaki house) and cultural function as the live pottery museum (Sarraflar house).

In order to achieve the main goal mentioned, the analyses carried out in this study are divided into three parts. Firstly, the analysis of continuity of original spaces and the given new contemporary functions are identified based on observation and the taken photos is required in order to identify the space organization of traditional houses, which was a basis for providing the justified graphs within Space Syntax methodology.

The second part of the analysis, presents the results related with one of the sub-research questions, "What is the impact of the reuse process on changing the depth of

the interior spaces?" This part consists of numerical outputs derived from the syntactic properties of space, including the 'total depth', 'mean depth', 'relative depth' that are related with privacy and integrity that is related to ease of access to each space in the two main modes of the selected house: the original state (with residential function) and the reused state (cultural, administrative, commercial, educational) of the same house. In this section, access graphs were provided first by considering the spatial layout of each house in two different modes according to relevant house plans. Then, by using the Space Syntax method, the relative depth (Relative Asymmetry) related to the privacy and integrity values of each space are calculated. Finally, the relative depth values of each space in two different modes are illustrated in a linear graph for each case-study:

In all case studies, in reused state the relative depth of each space is reduced in comparison to original state due to the possibility of connecting with added adjacent spaces. However, this is quite evident in the linear diagram of the spaces in office building (Behnam house) and Pottery live museum (Sarraflar house). In reused case of the educational building (Gadaki house), due to the interconnectedness with only two adjacent spaces, the change is less than that of the two preceding ones. So converting the residential use to another public function leads to change in depth values (indicator of privacy) of spaces.

Due to the minimum change, which is evident in the justified graphs, it can be pointed out that, there is compatibility between the new function and the original spatial organization. The issue of privacy has been considered as one of the intangible aspects of traditional Iranian houses; however, the change in degree of privacy and the public access levels can not be read only on the justified graphs. This is due to the minimum change in spatial connections because of preserving the physical form and

spatial organization of heritage buildings. Therefore, additional privacy graphs have been prepared for showing the degree of privacy within both the original and reused states.

In the second part of analysis that is concerning the main research question, the privacy graphs in both original functions (residential function) and new functions, illustrate that, in general, the private spaces of the latter state have decreased compared to the former state. Therefore, many 'private' spaces have changed to the 'semi-private' or 'semi-public' spaces after the reuse process, and also the semi-private spaces in original state have been converted to the semi-public because of changing the type of function (Figure 48).
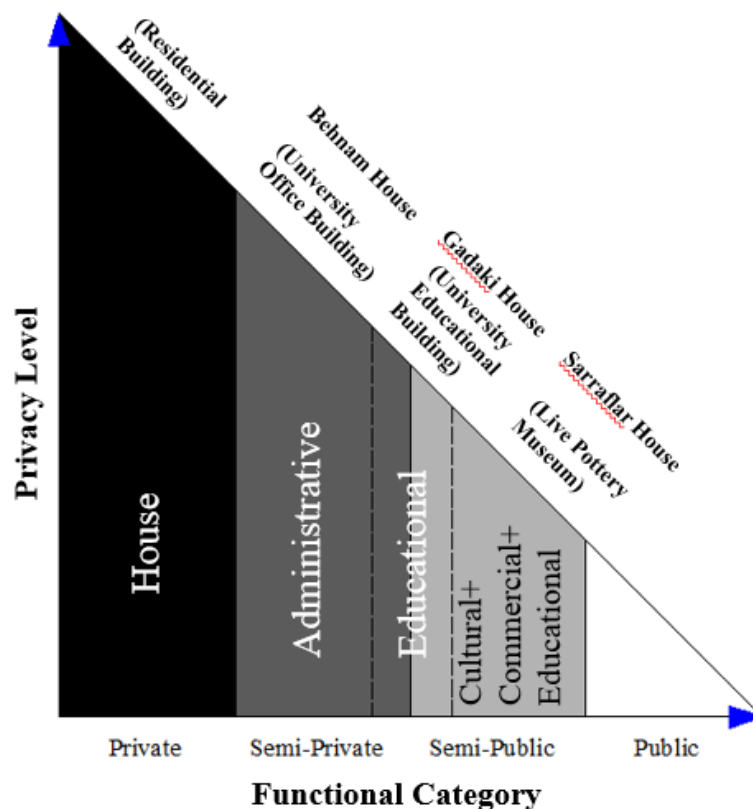
Figure 48: Privacy levels according to the new contemporary function categories

Therefore, by comprising the privacy graphs of heritage buildings in three different functions within reused states, can be concluded that the number of semi-private spaces in the administrative building of the Islamic Art and Architecture Faculty is significantly more than the semi-private spaces in the educational building of that faculty as well as in live pottery museum (Sarraflar house). Therefore, most of the interior spaces of the administrative building (Behnam house) are not accessible to visitors. Additionally, the accessibility for the students as inhabitants of the university is relatively limited, because most of the rooms are dedicated to the instructor offices that are considered as semi-private spaces.

Similarly, in the educational building (Gadaki house), the classrooms and offices are included as semi-private spaces and access to them is limited for visitors, while, the classrooms are accessible to students as inhabitants at the time of lecture hours with very limited public access.

Additionally, in the pottery live museum (Sarraflar house) as a multi-functional center, which contains cultural, educational and commercial usage, most of the spaces are accessible to visitors, and even several workshops provide visitors with the opportunity to visit those originally more private spaces.

Overall, providing the possibility of access to the visitors, including tourists and local residents through presenting the semi-public spaces; enable the heritage building to present its significance and values. Thus, this contributes to people's awareness on the cultural value of the heritage buildings as outlined in International Cultural Tourism Charter and the ICOMOS Charter for the Interpretation and Presentation of Cultural Heritage Sites, which lead to cultural continuity.

In addition, according to conservation framework of cultural heritage in Iran, which is mentioned in section 4.1, the process of presentation is the last and the most

important stage in order to transmit the heritage values and significance to the audience either tourists or local community. In this context, the traditional Iranian houses as resource of heritage values such as cultural, historical, aesthetic, symbolic, social that are required to maintain the original form and space organization with the least amount of interventions in order to present the component heritage values to the both present and future generation. Accordingly, publicly controlled access with regard to type of function is one of the factors influencing the presentation of heritage values.

In this respect, completely private and semi-private functions do not mostly seem to be very effective in reusing a cultural heritage. Because it may limit public access to the cultural heritage building and also prevent the spread of cultural values in society. On the other hand, converting all the traditional houses to the museums for providing maximum visitor access would mean ignoring the community's needs and failing to exploit the potentials of the cultural heritage for refunctioned to other compatible function.

Therefore, semi-public functions can be used as an appropriate use for a cultural heritage building by controlling access to visitors while also containing a particular usage that is presenting the authenticity of the heritage building and a clear manifestation of the heritage values

The research suggests that administrative function with many semi-private spaces that restrict access to cultural heritage building is considered as the least appropriate function for the cultural heritage building since it limits the transfer of values to present and future generations. The educational function of the university also includes a combination of semi-private and semi-public spaces, while, the semi-public spaces such as the exhibition place (pool room) and praying room (reception hall) are more accessible that the semi-private spaces such as classrooms and storage spaces that are

mentioned above. Therefore, it seems that the choice of educational function for the Gadaki house is an appropriate use in terms of providing ease of access for visitors and inhabitants through semi-public spaces.

The multi-functional pottery live museum with cultural, educational, and commercial functions provides accessibility for visitors and inhabitants among the semi-public spaces. However, access to this cultural building has been controlled due to its heritage values and is open to the public during certain times. Therefore, this research suggests that the new use of the live pottery museum as a cultural function is likely the most appropriate function when compared with administrative or educational function.

Thus, Qajar houses of Tabriz, as the legacy of the past, require special attention in terms of conserving not only the space organization with a special focus on levels of privacy and accessibility but also in the case of interior ornamentations, wall paintings and specific architectural elements which are used in the interior spaces of the rooms. A further study with more focus on preserving the specific symbolic interior elements is therefore suggested.

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APPENDIX

Numerical Outcomes for Original and Reused State Of Case Studies

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TDn	:	Total Depth (TD) for actual node
MDn	:	Mean Depth (MD) for actual node
RA	:	Relative Asymmetry
I	:	Integration Value

Original use of Behnam house

		TD	MD	RA	i
1	E	588	9.333333	0.268817	3.72
2	Cr	526	8.349206	0.237071	4.218143
3	St	466	7.396825	0.206349	4.846154
4	H	408	6.47619	0.176651	5.66087
5	D	352	5.587302	0.147977	6.757785
6	NIC	359	5.698413	0.151562	6.597973
7	MS	303	4.809524	0.122888	8.1375
8	D	339	5.380952	0.141321	7.076087
9	CY	254	4.031746	0.097798	10.22513
10	Wr	312	4.952381	0.127496	7.843373
11	IW	222	3.52381	0.081413	12.28302
12	Wc	316	5.015873	0.129544	7.719368
13	Iw	308	4.888889	0.125448	7.971429
14	St	252	4	0.096774	10.33333
15	St	263	4.174603	0.102407	9.765
16	St	272	4.31746	0.107015	9.344498
17	St	249	3.952381	0.095238	10.5
18	Sr (f)	371	5.888889	0.157706	6.340909
19	St	370	5.873016	0.157194	6.361564
20	Cr	368	5.84127	0.15617	6.403279
21	Cr	278	4.412698	0.110087	9.083721
22	Cr	291	4.619048	0.116743	8.565789
23	Cr	306	4.857143	0.124424	8.037037
24	Cr	248	3.936508	0.094726	10.55676
25	Sr (m)	432	6.857143	0.18894	5.292683
26	St	316	5.015873	0.129544	7.719368
27	Cr	298	4.730159	0.120328	8.310638
28	5D	319	5.063492	0.13108	7.628906
29	S	333	5.285714	0.138249	7.233333
30	St	315	5	0.129032	7.75
31	Tb	282	4.47619	0.112135	8.917808
32	S	339	5.380952	0.141321	7.076087
33	S	360	5.714286	0.152074	6.575758
34	5D	311	4.936508	0.126984	7.875
35	Cr	285	4.52381	0.113671	8.797297
36	St	303	4.809524	0.122888	8.1375
37	Dz	364	5.777778	0.154122	6.488372
38	G	367	5.825397	0.155658	6.424342
39	2D	350	5.555556	0.146953	6.804878
40	5D	348	5.52381	0.145929	6.852632
41	St	322	5.111111	0.132616	7.540541
42	S	397	6.301587	0.171019	5.847305
43	S	353	5.603175	0.14849	6.734483
44	P	338	5.365079	0.140809	7.101818

Reused state of Behnam house

		TD	MD	RA	i
1	UE	425	6.439394	0.167366	5.97493
2	E	597	9.045455	0.247552	4.039548
3	NIC	361	5.469697	0.137529	7.271186
4	Cr	533	8.075758	0.217716	4.593148
5	St	471	7.136364	0.188811	5.296296
6	H	411	6.227273	0.160839	6.217391
7	D	353	5.348485	0.1338	7.473868
8	Ms	302	4.575758	0.110023	9.088983
9	D	336	5.090909	0.125874	7.944444
10	CY	249	3.772727	0.085315	11.72131
11	Wr	301	4.560606	0.109557	9.12766
12	IW	217	3.287879	0.070396	14.2053
13	NC	311	4.712121	0.114219	8.755102
14	WC	311	4.712121	0.114219	8.755102
15	IW	305	4.621212	0.111422	8.974895
16	Rs	361	5.469697	0.137529	7.271186
17	St	247	3.742424	0.084382	11.85083
18	St	258	3.909091	0.08951	11.17188
19	St	267	4.045455	0.093706	10.67164
20	St	244	3.69697	0.082984	12.05056
21	Sr (f)	366	5.545455	0.13986	7.15
22	St	365	5.530303	0.139394	7.173913
23	Cr	361	5.469697	0.137529	7.271186
24	Cr	273	4.136364	0.096503	10.36232
25	Cr	286	4.333333	0.102564	9.75
26	Cr	301	4.560606	0.109557	9.12766
27	Cr	243	3.681818	0.082517	12.11864
28	Sr (m)	427	6.469697	0.168298	5.941828
29	St	311	4.712121	0.114219	8.755102
30	Cr	293	4.439394	0.105828	9.449339
31	5D	314	4.757576	0.115618	8.649194
32	S	328	4.969697	0.122145	8.187023
33	St	310	4.69697	0.113753	8.790984
34	Tb	277	4.19697	0.098368	10.16588
35	S	334	5.060606	0.124942	8.003731
36	S	355	5.378788	0.134732	7.422145
37	5D	306	4.636364	0.111888	8.9375
38	Cr	280	4.242424	0.099767	10.02336
39	St	298	4.515152	0.108159	9.24569
40	DZ	359	5.439394	0.136597	7.320819
41	G	362	5.484848	0.137995	7.246622
42	2D	345	5.227273	0.13007	7.688172
43	5D	343	5.19697	0.129138	7.743682
44	St	317	4.80303	0.117016	8.545817

45	P	338	5.365079	0.140809	7.101818	45	S	392	5.939394	0.151981	6.579755
46	S	424	6.730159	0.184844	5.409972	46	S	348	5.272727	0.131469	7.606383
47	S	424	6.730159	0.184844	5.409972	47	P	333	5.045455	0.124476	8.033708
48	St	322	5.111111	0.132616	7.540541	48	P	333	5.045455	0.124476	8.033708
49	5D	342	5.428571	0.142857	7	49	S	419	6.348485	0.164569	6.076487
50	2D	346	5.492063	0.144905	6.90106	50	S	419	6.348485	0.164569	6.076487
51	G	368	5.84127	0.15617	6.403279	51	St	317	4.80303	0.117016	8.545817
52	Dz	364	5.777778	0.154122	6.488372	52	5D	337	5.106061	0.12634	7.915129
53	M	446	7.079365	0.196109	5.099217	53	2D	341	5.166667	0.128205	7.8
54	3D	446	7.079365	0.196109	5.099217	54	G	363	5.5	0.138462	7.222222
55	P	421	6.68254	0.183308	5.455307	55	DZ	359	5.439394	0.136597	7.320819
56	S	412	6.539683	0.178699	5.595989	56	M	441	6.681818	0.174825	5.72
57	St	351	5.571429	0.147465	6.78125	57	3D	441	6.681818	0.174825	5.72
58	I.C	296	4.698413	0.119304	8.381974	58	P	416	6.30303	0.16317	6.128571
59	S	480	7.619048	==0.213518==	==4.683453==	59	S	407	6.166667	0.158974	6.290323
60	P	415	6.587302	0.180236	5.548295	60	St	346	5.242424	0.130536	7.660714
61	3D	436	6.920635	0.190988	5.235925	61	I.C	291	4.409091	0.104895	9.533333
62	M	436	6.920635	0.190988	5.235925	62	S	475	7.19697	==0.190676==	==5.244499==
63	Wc	358	5.68254	0.15105	6.620339	63	P	410	6.212121	0.160373	6.235465
64	P	462	7.333333	==0.204301==	==4.894737==	64	3D	431	6.530303	0.170163	5.876712
						65	M	431	6.530303	0.170163	5.876712
						66	Wc	353	5.348485	0.1338	7.473868
						67	P	457	6.924242	==0.182284==	==5.485934==

Original use of Behnam House
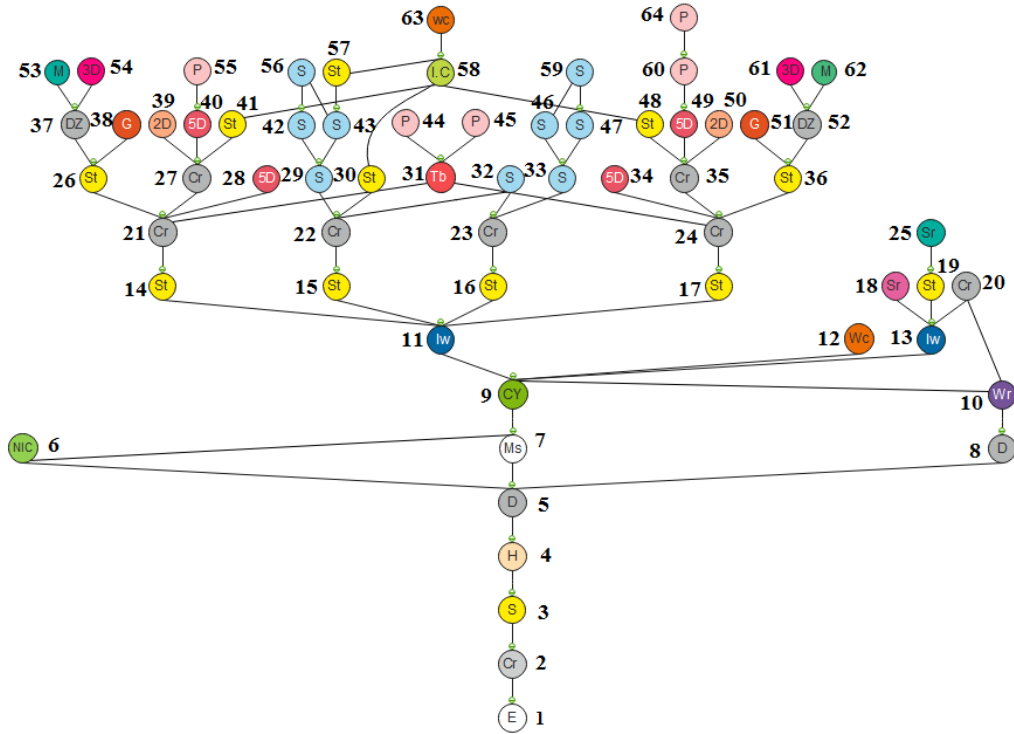
Reused state of Behnam House
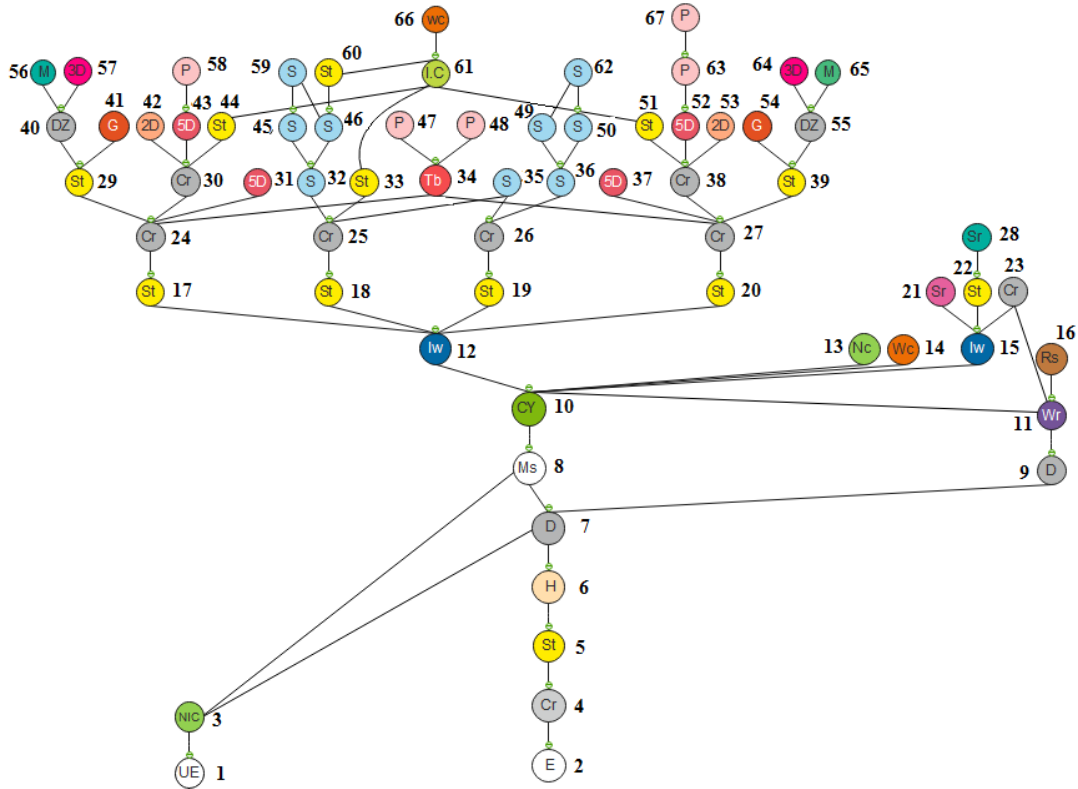
		Original use of Gadaki House						Reused state of Gadaki House			
		TD	MD	RA	i			TD	MD	RA	i
1	E	503	7.859375	0.217758	4.592255	1	E	518	7.848485	0.210723	4.745575
2	Cr	440	6.875	0.186508	5.361702	2	Cr	453	6.863636	0.18042	5.542636
3	St	379	5.921875	0.15625	6.4	3	St	390	5.909091	0.151049	6.62037
4	H	320	5	0.126984	7.875	4	H	329	4.984848	0.122611	8.155894
5	Cr	303	4.734375	0.118552	8.435146	5	Cr	314	4.757576	0.115618	8.649194
6	Cr	325	5.078125	0.129464	7.724138	6	Cr	336	5.090909	0.125874	7.944444
7	D	312	4.875	0.123016	8.129032	7	D	319	4.833333	0.117949	8.478261
8	Sr	361	5.640625	0.147321	6.787879	8	Sr	374	5.666667	0.14359	6.964286
9	CY	303	4.734375	0.118552	8.435146	9	CY	316	4.787879	0.11655	8.58
10	St	355	5.546875	0.144345	6.927835	10	St	368	5.575758	0.140793	7.102649
11	St	359	5.609375	0.146329	6.833898	11	St	372	5.636364	0.142657	7.009804
12	MS	318	4.96875	0.125992	7.937008	12	MS	323	4.893939	0.119814	8.346304
13	St	362	5.65625	0.147817	6.765101	13	St	377	5.712121	0.144988	6.897106
14	St	362	5.65625	0.147817	6.765101	14	St	377	5.712121	0.144988	6.897106
15	St	322	5.03125	0.127976	7.813953	15	St	337	5.106061	0.12634	7.915129
16	IW	335	5.234375	0.134425	7.439114	16	IW	350	5.30303	0.132401	7.552817
17	Cr	384	6	0.15873	6.3	17	Cr	399	6.045455	0.155245	6.441441
18	S	376	5.875	0.154762	6.461538	18	S	391	5.924242	0.151515	6.6
19	CS	422	6.59375	0.177579	5.631285	19	CS	437	6.621212	0.17296	5.781671
20	NC	378	5.90625	0.155754	6.420382	20	NC	385	5.833333	0.148718	6.724138
21	D	378	5.90625	0.155754	6.420382	21	D	385	5.833333	0.148718	6.724138
22	WC	425	6.640625	0.179067	5.584488	22	WC	442	6.69697	0.175291	5.704787
23	WC	425	6.640625	0.179067	5.584488	23	WC	442	6.69697	0.175291	5.704787
24	CS	382	5.96875	0.157738	6.339623	24	CS	399	6.045455	0.155245	6.441441
25	St	362	5.65625	0.147817	6.765101	25	St	379	5.742424	0.145921	6.853035
26	DZ	358	5.59375	0.145833	6.857143	26	DZ	375	5.681818	0.144056	6.941748
27	St	365	5.703125	0.149306	6.697674	27	St	382	5.787879	0.147319	6.787975
28	5D	398	6.21875	0.165675	6.035928	28	5D	415	6.287879	0.162704	6.146132
29	St	447	6.984375	0.18998	5.263708	29	St	464	7.030303	0.185548	5.389447
30	DZ	377	5.890625	0.155258	6.440895	30	DZ	390	5.909091	0.151049	6.62037
31	Cr	371	5.796875	0.152282	6.566775	31	Cr	388	5.878788	0.150117	6.661491
32	K	392	6.125	0.162698	6.146341	32	K	407	6.166667	0.158974	6.290323
33	S	421	6.578125	0.177083	5.647059	33	S	440	6.666667	0.174359	5.735294
34	Cr	362	5.65625	0.147817	6.765101	34	Cr	381	5.772727	0.146853	6.809524
35	2D	507	7.921875	0.219742	4.55079	35	2D	526	7.969697	0.214452	4.663043
36	S	363	5.671875	0.148313	6.742475	36	S	374	5.666667	0.14359	6.964286
37	2D	434	6.78125	0.183532	5.448649	37	2D	453	6.863636	0.18042	5.542636
38	PI	386	6.03125	0.159722	6.26087	38	PI	401	6.075758	0.156177	6.402985
39	S	385	6.015625	0.159226	6.280374	39	S	398	6.030303	0.154779	6.460843
40	G	369	5.765625	0.15129	6.609836	40	G	386	5.848485	0.149184	6.703125
41	HZ	352	5.5	0.142857	7	41	HZ	361	5.469697	0.137529	7.271186
42	DZ	378	5.90625	0.155754	6.420382	42	DZ	383	5.80303	0.147786	6.766562

43	3D	428	6.6875	0.180556	5.538462	43	3D	445	6.742424	0.17669	5.659631
44	DZ	381	5.953125	0.157242	6.359621	44	DZ	392	5.939394	0.151981	6.579755
45	Tb	370	5.78125	0.151786	6.588235	45	Tb	385	5.833333	0.148718	6.724138
46	IW	370	5.78125	0.151786	6.588235	46	IW	385	5.833333	0.148718	6.724138
47	PI	425	6.640625	0.179067	5.584488	47	PI	444	6.727273	0.176224	5.674603
48	DZ	321	5.015625	0.12748	7.844358	48	DZ	328	4.969697	0.122145	8.187023
49	S	345	5.390625	0.139385	7.174377	49	S	354	5.363636	0.134266	7.447917
50	G	356	5.5625	0.144841	6.90411	50	G	369	5.590909	0.141259	7.079208
51	St	328	5.125	0.130952	7.636364	51	St	337	5.106061	0.12634	7.915129
52	DZ	316	4.9375	0.125	8	52	DZ	321	4.863636	0.118881	8.411765
53	St	398	6.21875	0.165675	6.035928	53	St	409	6.19697	0.159907	6.253644
54	PI	416	6.5	0.174603	5.727273	54	PI	431	6.530303	0.170163	5.876712
55	2D	416	6.5	0.174603	5.727273	55	2D	431	6.530303	0.170163	5.876712
56	DZ	332	5.1875	0.132937	7.522388	56	DZ	343	5.19697	0.129138	7.743682
57	St	373	5.828125	0.153274	6.524272	57	St	380	5.757576	0.146387	6.83121
58	St	374	5.84375	0.15377	6.503226	58	St	381	5.772727	0.146853	6.809524
59	I.C	314	4.90625	0.124008	8.064	59	I.C	317	4.80303	0.117016	8.545817
60	Cr	413	6.453125	0.173115	5.776504	60	Cr	422	6.393939	0.165967	6.025281
61	2D	354	5.53125	0.143849	6.951724	61	2D	367	5.560606	0.140326	7.126246
62	Cr	432	6.75	0.18254	5.478261	62	Cr	441	6.681818	0.174825	5.72
63	S	480	7.5	0.206349	4.846154	63	S	491	7.439394	0.198135	5.047059
64	3D	492	7.6875	0.212302	4.71028	64	3D	503	7.621212	0.20373	4.908467
65	P	555	8.671875	0.243552	4.105906	65	P	568	8.606061	0.234033	4.272908
						66	UE	379	5.742424	0.145921	6.853035
						67	NC	444	6.727273	0.176224	5.674603

Original use of Gadaki House
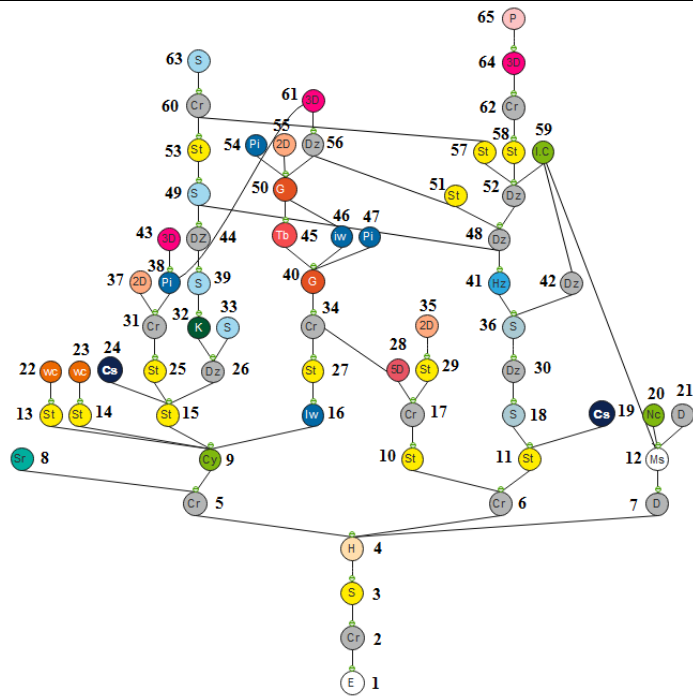
Reused state of Gadaki House
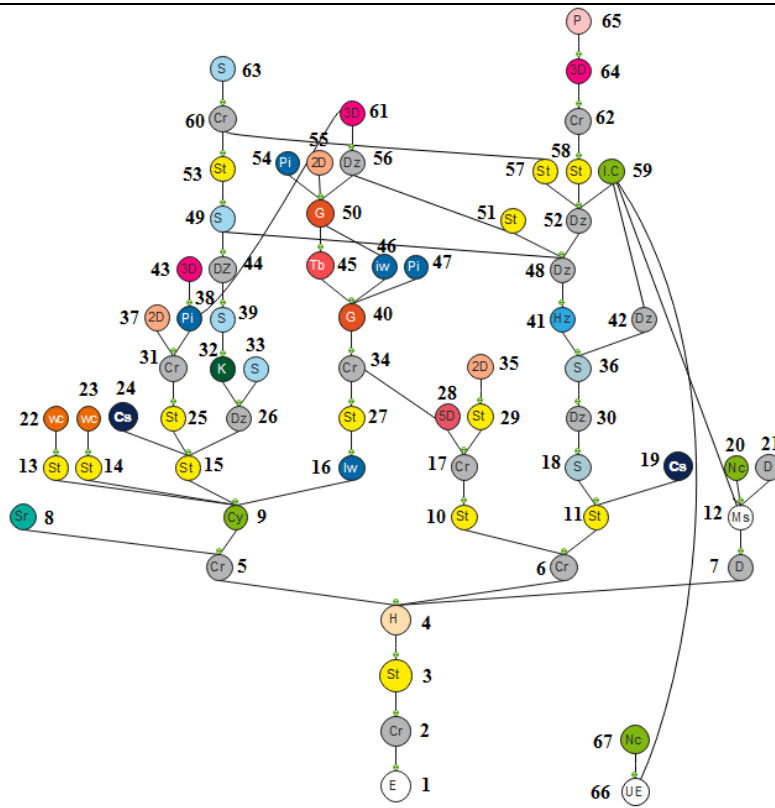
Orginal use of Sarraflar House

		TD	MD	RA	I
1	E	180	5.454545	0.278409	3.591837
2	H	148	4.484848	0.217803	4.591304
3	D	118	3.575758	0.160985	6.211765
4	CY	90	2.727273	0.107955	9.263158
5	WC	122	3.69697	0.168561	5.932584
6	St	111	3.363636	0.147727	6.769231
7	IW	122	3.69697	0.168561	5.932584
8	St	118	3.575758	0.160985	6.211765
9	St	106	3.212121	0.138258	7.232877
10	St	107	3.242424	0.140152	7.135135
11	St	116	3.515152	0.157197	6.361446
12	DZ	127	3.848485	0.17803	5.617021
13	S	134	4.060606	0.191288	5.227723
14	S	122	3.69697	0.168561	5.932584
15	DZ	118	3.575758	0.160985	6.211765
16	Cr	132	4	0.1875	5.333333
17	Sr	140	4.242424	0.202652	4.934579
18	St	155	4.69697	0.231061	4.327869
19	Tb	143	4.333333	0.208333	4.8
20	HZ	150	4.545455	0.221591	4.512821
21	DZ	144	4.363636	0.210227	4.756757
22	5D	140	4.242424	0.202652	4.934579
23	St	146	4.424242	0.214015	4.672566
24	2D	150	4.545455	0.221591	4.512821
25	3D	144	4.363636	0.210227	4.756757
26	Cr	185	5.606061	0.287879	3.473684
27	S	176	5.333333	0.270833	3.692308
28	K	176	5.333333	0.270833	3.692308
29	S	172	5.212121	0.263258	3.798561
30	Cr	176	5.333333	0.270833	3.692308
31	G	217	6.575758	0.348485	2.869565
32	S	202	6.121212	0.320076	3.12426
33	G	208	6.30303	0.331439	3.017143
34	S	234	7.090909	0.380682	2.626866

Reused state of Sarraflar House

		TD	MD	RA	I
1	E	180	5.294118	0.26025	3.842466
2	CY	88	2.588235	0.096257	10.38889
3	WC	121	3.558824	0.15508	6.448276
4	St	110	3.235294	0.135472	7.381579
5	IW	121	3.558824	0.15508	6.448276
6	St	117	3.441176	0.14795	6.759036
7	St	105	3.088235	0.12656	7.901408
8	St	106	3.117647	0.128342	7.791667
9	St	115	3.382353	0.144385	6.925926
10	DZ	127	3.735294	0.165775	6.032258
11	S	134	3.941176	0.178253	5.61
12	S	122	3.588235	0.156863	6.375
13	DZ	118	3.470588	0.149733	6.678571
14	Cr	132	3.882353	0.174688	5.72449
15	Sr	140	4.117647	0.188948	5.292453
16	St	156	4.588235	0.217469	4.598361
17	Tb	144	4.235294	0.196078	5.1
18	HZ	151	4.441176	0.208556	4.794872
19	DZ	145	4.264706	0.197861	5.054054
20	5D	141	4.147059	0.190731	5.242991
21	St	147	4.323529	0.201426	4.964602
22	2D	151	4.441176	0.208556	4.794872
23	3D	145	4.264706	0.197861	5.054054
24	Cr	187	5.5	0.272727	3.666667
25	S	178	5.235294	0.256684	3.895833
26	K	178	5.235294	0.256684	3.895833
27	S	174	5.117647	0.249554	4.007143
28	Cr	178	5.235294	0.256684	3.895833
29	G	220	6.470588	0.331551	3.016129
30	S	205	6.029412	0.304813	3.280702
31	G	211	6.205882	0.315508	3.169492
32	S	238	7	0.363636	2.75
33	E2	180	5.294118	0.26025	3.842466
34	S	121	3.558824	0.15508	6.448276
35	S	121	3.558824	0.15508	6.448276

Original use of Sarraflar House

Reused state of Sarraflar House