

Assessment of the Relationship between the Iwan in Traditional Buildings of Mazandaran and Place Attachment from the Perspective of Housewives: A Case Study of Rural Houses in Qaem Shahr

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ABSTRACT

The iwan, as one of the prominent elements of vernacular architecture in the traditional buildings of Mazandaran, plays an important role in spatial organisation and the everyday interactions of residents. This study aims to evaluate the relationship between the iwan and place attachment from the perspective of housewives in traditional rural houses in Qaem Shahr. In terms of its objective, this research is applied, and its methodology follows a mixed-methods approach (qualitative–quantitative). Data were collected through library research, field observations, and a researcher-developed questionnaire. The statistical population consisted of 75 housewives residing in traditional rural houses in Qaem Shahr, who were selected through purposive sampling. Data analysis was conducted using descriptive methods and structural equation modelling (SEM) in SmartPLS. The findings indicate that the iwan, as a vital element in traditional houses of Mazandaran, not only contributes to climatic adaptation but also functions as an intermediary space between the interior and exterior of the house, providing an appropriate setting for women's daily activities and social interactions. This spatial element contributes to strengthening their sense of attachment to the house and the surrounding environment. The findings further emphasise that respect for nature, communication among family members, and interaction with the external environment through the iwan play significant roles in improving quality of life and spatial identity. Overall, the results of this study demonstrate that the iwan has a direct and significant relationship with strengthening place attachment from the perspective of housewives. The findings highlight the need to consider indigenous architectural patterns and to reinterpret the role of the iwan in contemporary spatial design. Furthermore, the iwan can be utilised as a valuable model for improving quality of life, reinforcing spatial identity, and achieving sustainable architecture in residential contexts.

Keywords: Iwan, Moderate and Humid Climate, Traditional Buildings, Place Attachment.

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1. INTRODUCTION

In the moderate, humid climate of northern Iran, the short distance between the mountains and the sea has led to high humidity and minimal differences between day and night temperatures. These climatic conditions have significantly influenced the formation, structure, and architectural characteristics of buildings in this region. One of the main outcomes of these environmental conditions is the emergence of the iwan as an important architectural element in northern Iran. As a vernacular architectural pattern, the iwan features an outward-oriented spatial configuration and plays an essential role in traditional buildings, particularly residential houses in moderate, humid climates. Its important functions in this climatic context include reducing humidity, improving natural ventilation and air circulation around and inside the building, and providing an appropriate space for daily human activities. Although the iwan was historically used as a horizontal architectural element to enhance the visual and aesthetic qualities of buildings, its primary role was functional. The simultaneous achievement of functional efficiency and spatial quality is a challenging issue in architectural design; however, the iwan successfully integrates both aspects. In addition to enhancing the aesthetic qualities of Iranian architecture, the iwan contributes to the use of natural daylight, natural energy resources, and passive cooling strategies within buildings (Nasrollahi and Afzali 2013). Balconies are also among the intermediate spaces found in residential buildings, and inappropriate design of these spaces can negatively affect environmental conditions during different seasons (Yousefi et al. 2017). In contemporary urban architecture, balconies and terraces have become common as transitional spaces between indoor and outdoor environments in apartments and residential units. However, due to factors such as unsuitable design, climatic changes, and cultural issues, these spaces have gradually experienced reduced spatial quality or have even been removed from buildings (Matini et al. 2021). The presence of iwans in buildings across different climatic regions is important because the environmental conditions of each region require open and semi-open spaces. In this regard, the use of iwans or surrounding semi-open spaces buildings, along with detached building patterns, has contributed to the formation of more open and extensive urban and rural fabrics (Amirahmadi 2015). This research aims to evaluate the roles of the iwan and place attachment in the formation of traditional and vernacular buildings in moderate, humid climates from the perspective of housewives. The study focuses on the experiences and viewpoints of women who spend a significant amount of their time within the home environment and examines the role of the iwan in shaping traditional residential architecture.

1.1. Research Questions

- What is the position of the iwan in traditional and vernacular buildings from the perspective of housewives?
- Is there a relationship between Iwan and place attachment?

2. LITERATURE REVIEW

This research does not seek to encourage a return to traditional architecture or reproduce historical forms. Instead, its primary objective is to preserve and value historical assets while understanding the mechanisms behind the transformation and decline of spatial concepts in Iranian houses. Within this framework, the study seeks to demonstrate how contemporary spaces may gradually replace these concepts with more limited, less meaningful functions. Another important aspect of this research is to provide lessons for architects and planners by identifying the hidden values embedded in traditional architecture. The findings can contribute to contemporary design approaches and the development of architectural guidelines, thereby clarifying professional decision-making processes. Based on the conceptual and functional perspectives of the iwan in Iranian architecture, this research offers recommendations for future applications (Mahmoudi 2005). Furthermore, another study investigated hypotheses related to the origin and formation of the iwan. Using an analytical approach, this research examined and critiqued different perspectives on this architectural element in Iranian architectural traditions. A more accurate understanding of the origin of the iwan provides a foundation for a better and more realistic interpretation of its functions. The results of these studies indicate that the iwan, as one of the most significant symbols of Iranian culture, simultaneously reflects both its material and spiritual dimensions. Therefore, it contributes to understanding the cultural values and characteristics of society and represents technical skills, artistic creativity, and the refinement of thought in Iranian architecture (Rezaei-Nia and Laleh 2013). The iwan, as one of the main elements of residential spaces and a specific architectural feature of the studied climate, has received considerable attention. Respect for nature, fostering social relationships, and creating connections between the interior and exterior of buildings are among the iwan's major roles in residential environments. As a vernacular architectural pattern, the iwan can significantly contribute to the creation of buildings that respond effectively to functional requirements (Ami Ahmadi 2015). The iwan, as one of the most important elements of residential spaces and a feature specifically associated with the studied climatic conditions, has received considerable attention. Respect for nature, establishing social relationships, and creating connections between

the interior and exterior of buildings are among the major functions of the iwan in residential environments. As a vernacular architectural pattern, the iwan can significantly contribute to the creation of buildings that respond effectively to functional requirements (Ami Ahmadi 2015). This research focused on understanding rural residents' perspectives in Mazandaran regarding refaq and its relationship with their current lifestyles. The results indicate that although some concerns exist regarding people's perceptions of this space, the majority of rural residents have welcomed the presence of refaq in their houses and are interested in using it in new homes. Furthermore, if the concerns related to refaq are addressed and its functions are organised according to rural needs, this space can regain a more significant position. Consequently, it can improve the quality of the living environment and reduce the dependence of houses on mechanical systems, particularly cooling equipment (Yousefi-Nia Pasha and Barzegar 2017). Moreover, the creation and development of intermediate spaces such as balconies are influenced by a range of factors, including cultural, social, artistic, economic, environmental, and functional considerations. These factors vary according to residents' needs and contextual conditions. To address these requirements in residential units, adaptable balconies can be an appropriate alternative to conventional intermediate façade spaces, such as fixed recessed or projecting balconies and windows. The use of adaptable balconies can provide more desirable conditions and higher spatial quality for residents. Each proposed type in this research can serve as a suitable replacement for current fixed balconies, with selection depending on residents' conditions, priorities, and needs (Matini et al. 2021). Built forms and proposed models have been recognised as appropriate examples for strengthening vernacular buildings. These examples demonstrate compatibility with specific natural environmental conditions in local and regional design and illustrate the interaction between humans and the natural environment. The results of this research show that the proposed solutions, tailored to the region's specific climatic conditions, are environmentally compatible and enhance behavioural responses related to thermal comfort (Yousefniapasha 2015). The iwan is a dominant spatial element in the vernacular houses of Yazd. Although it has been widely used historically, it has received less attention in contemporary designs. Findings indicate that traditional iwans are associated with both positive and negative aspects. Positive characteristics demonstrate that these spaces were created to serve the social and cultural needs of residents while also fulfilling aesthetic and comfort requirements. The results suggest that an improved version of the iwan can be incorporated into future housing designs to create more pleasant spaces and reduce dependence

on electromechanical cooling systems (Foruzanmehr 2015). Another study compared and analysed the factors influencing balcony design and the formation of iwans to improve existing conditions. The results indicate the presentation of optimal solutions for balancing climatic conditions during summer and winter and achieving thermal comfort (Mehrinejad, Khotbehsara, and Nourmusavi Nasab 2016). The influence of window position on natural ventilation in the vernacular architecture of Mazandaran was examined through a descriptive-analytical approach. For this purpose, several vernacular buildings located in Sari were studied. The findings indicate that the separation between vernacular and modern architecture has led to the neglect of climatic conditions, and that architects should consider climate-responsive solutions for appropriate development (Galogahi et al. 2016). Balconies contribute to improving the environmental quality of interior spaces through four main factors: thermal comfort, indoor air quality, visual comfort, and acoustic comfort (Ribeiro, Ramos, and Colen 2020). In Iranian vernacular architecture, the iwan has functioned not only as a climatic element but also as a social space for women's presence and interaction. Studies indicate that housewives experience the iwan as a place for conversations with neighbours, relaxation, and childcare, and these experiences contribute to the formation of their emotional attachment to the house and surrounding environment (Mahmoudi 2005; Yousefi-Nia Pasha and Barzegar 2017). Furthermore, the iwan provides a setting for women's daily activities, such as drying agricultural products, sewing, and seasonal cooking. These practical functions strengthen attachment to this space (Foruzanmehr 2015; Mehrinejad, Khotbehsara, and Nourmusavi Nasab 2016). The memorable dimensions of the iwan have also been emphasised in previous studies. Housewives perceive the iwan as part of their family memories and collective experiences, such as evening gatherings and children's play, which contribute to a lasting emotional connection to the home (Low 2000; Relph 1976). Similar international studies have identified semi-open spaces, such as balconies and verandas, as important locations for women's social presence within the home. For women, these spaces function as windows to society, enabling them to observe and interact with the external environment without leaving the house (Chowdhury 2016; Awad 2019). In general, the built environment can influence users and create conditions that enhance human psychological well-being (Rahimi and Razani 2022). The findings indicate that the iwan provides housewives with a combination of daily functions, social interactions, and emotional experiences, which serves as the main basis for strengthening place attachment. The distinction and innovation of this research, compared with related studies, lie in examining the iwan as a semi-open

space from the perspectives of housewives, who spend a significant portion of their time at home, and from a climatic perspective. Through field studies, library research, and questionnaires, this study

examines the presence and significance of the iwan in traditional and vernacular buildings in a moderate, humid climate.

Table 1. Literature Review of Studies related to the Role of the Iwan in Strengthening Housewives' Place Attachment

Criterion	Findings	Source
Social-Communicative	The iwan serves as a space for conversations with neighbours, relaxation, and childcare, thereby strengthening women's emotional connection to the home.	(Mahmoudi 2005; Yousefi-Nia Pasha and Barzegar 2017)
Daily Functional Role in Iran	The iwan provides a space for women's daily activities, such as drying agricultural products, sewing, and seasonal cooking, which increases spatial attachment.	(Mehrinejad and Foruzanmehr 2015; Khotbehsara and Nourmusavi Nasab 2016)
Identity and Memory-Related Aspects in Iran	The iwan forms part of family memories, including evening gatherings and children's play, and contributes to the creation of identity and a lasting attachment to place.	(Low 2000; Relph 1976)
International Studies (Similar Spaces)	Balconies and verandas function as windows to society for women, enabling communication and interaction with the outside environment without leaving the home.	(Awad 2019; Chowdhury 2016)

3. THEORETICAL FOUNDATIONS

According to the Dehkhoda Dictionary, the term iwan is a suffah or vaulted space, usually located at a higher level and roofed. It is also known as the open space in front of an entrance. In the Amid Dictionary, the iwan is defined as a part of a building that is open at the front, without windows, and overlooks the courtyard. The term has a completely Persian origin. During the Sasanian period, the term iwan referred to a quadrilateral space, usually square or rectangular, enclosed on three sides and completely open on one side. In Iranian visual culture, the iwan is also described as a covered space that extends along the external walls of a building, whether located within the interior or on the exterior of the structure (Francis De 2003). From a spatial-functional perspective, in addition to the above definitions, the iwan can create diversity and different qualities of living environments. It enhances the legibility of a building, contributes to the house's distinctiveness and identity, and creates a form of differentiation that maintains continuity between indoor and outdoor spaces (Saremi et al. 1997). In fact, the iwan represents a logical continuation between open and enclosed spaces and is considered a key element in shaping the spatial hierarchy of the house. Due to its ability to provide shade and establish direct connections with the external environment, this architectural component was regarded as an essential feature of Iranian houses until the beginning of the twenty-first century (Pour-Deyhimi 2003). The history of the iwan dates back to the Parthian period. Wide and continuous iwans even have an earlier origin, as numerous examples of this element can be found in the Parthian architectural style. The formation of the iwan has been partly attributed to the structure of nomadic tents during the Parthian era. Following the removal of orsi windows,

architects created columned iwans with wooden columns, capitals inspired by Greek Corinthian examples, and plaster decorations to provide shade and prevent direct sunlight from entering rooms, as well as multi-panelled windows. The roofs were covered with simple yet visually appealing wooden structures (Mahmoudi 2005). An examination of the remains of Iranian architecture, particularly houses and buildings from ancient and historical periods, indicates that, from at least the Achaemenid period onward, buildings with iwans constituted one of the three continuous and fundamental architectural traditions of Iran. The other two traditions included domed structures and column-based buildings. The presence of the iwan, the surrounding arcade around the central courtyard, and the organisation of spaces into three parts were widely repeated in both formal governmental buildings and ordinary structures (Javadi 1984). Among the various perspectives on the origin of the iwan, one theory holds that it evolved from the concept of the "stone tent." According to this interpretation, nomadic communities, after settling in permanent settlements, adopted a three-sided spatial pattern in their houses to maintain their connection to nature. Although the exact origin of the iwan remains uncertain, most architectural historians consider it a distinctive and significant element of Iranian architecture (Taghavi 1984). Evidence of iwans during the Achaemenid period can be seen in the Apadana Palace, the houses in the southern section of Persepolis, the Four-Iwan Palace of Pasargadae, and the architectural remains of Parsu Mash (Masjed Soleyman) (Javadi 1984). This tradition continued during the Sasanian period, when the iwan became a key component of the spatial composition of both ordinary residential houses and aristocratic buildings. The royal iwan (iwan-e shahneshin), which opened

onto an outdoor space and was flanked by an important hall, was one of the prominent features of this period. Examples such as the Sarvestan Palace, Dokhtar Castle, Taq Kasra (Iwan of Ctesiphon), and Khosrow Palace demonstrate this characteristic (Taghavi 1984). Following the emergence of Islam, the tradition of iwan construction continued. Although only a limited number of well-preserved houses from the early Islamic centuries before the Safavid period remain, the Hosseinian House in the Fahadan neighbourhood of Yazd, dating to the Seljuk period, is an important example with its deep iwan and high vaulted structure (Mahmoudi 2005). During the Safavid and Qajar periods, numerous examples of houses have survived, many of which feature iwans on one or more sides of the façade, which serve as a major element of the building's visual identity. The iwans of palaces such as Ali Qapu and Chehel Sotoun also recall the columned halls and iwans of Persepolis and Pasargadae. This continuity demonstrates the preservation of the spirit and identity of Iranian architecture over approximately two thousand years (Javadi 1984). In traditional house architecture, the iwan is generally located at the front of the main façade and functions as the primary space for everyday living activities. In many cases, part of the iwan is expanded, and major family activities are held in this space for much of the year. In the vernacular houses of Mazandaran, the iwan is also considered one of the defining elements of the façade. The enclosed side of this space is usually connected to the rooms, and by opening doors and windows, the boundary between the rooms and the iwan disappears, creating spatial integration. This organisation allows interior spaces to overlook the courtyard and garden simultaneously. Furthermore, a difference in elevation between the iwan and the courtyard is evident in all examples, enhancing the prominence of this element within the overall composition of the building (Pour-Deyhimi 2003).

- Reasons for the Emergence and Importance of the Iwan

The importance of the iwan in this region primarily stems from the need for a semi-open, covered space that allows the flow of fresh air while protecting against sudden, frequent rainfall common in this climate. Another significant aspect of the iwan is its welcoming function. Its quadrilateral form and outward openness allow sunlight to penetrate the space, providing desirable natural illumination easily. Therefore, the iwan is usually the first point of contact between residents, visitors, and the building (Tafazzoli 1985). From a climatic perspective, the iwan also has considerable value, and this factor has influenced its dimensions, form, and even decorative elements. In

addition, the iwan can be considered a response to the need to create an “intermediate space”; a place for pause and temporary transition while moving from an enclosed environment to an open space, or vice versa. In traditional Iranian architecture, which has always considered various human needs and living requirements, even a simple act such as “transition” has been accompanied by spatial sensitivity and careful design, becoming an efficient architectural pattern. This perspective has enabled the iwan to serve not only a functional role but also a formal and aesthetic position within the architecture.

- Form of the Iwan

Depending on its function and its position within the spatial organisation of a building, the iwan varies in terms of form and dimensions. While addressing functional requirements, it also provides a platform for enhancing visual qualities and decorative elements. In the vernacular architecture of this region, the iwan is typically quadrilateral. In interpretations of symbolic geometry, the square shape represents stability, stillness, and an origin in which the opposing forces of existence reach balance. It is considered the first stable manifestation of form (Tafazzoli 1985). The simplest type of iwan is formed by extending the roof slightly outward. To maintain the structural stability of the roof, a combination of beams and columns is used. Therefore, both in smaller examples and in larger forms, a row of columns is usually observed along the front façade (Nozari 2004). Roof coverage is one of the permanent characteristics of the iwan. The depth of its projection is designed to prevent direct, undesirable sunlight penetration during the hot season while avoiding obstruction of beneficial solar radiation during winter. In some examples, an intermediate element is used to distinguish the iwan from the surrounding open space. In certain regions, this element is known as *nal* (Gorji Mahlabani and Daneshvar 2010; Diba and Yaghini 1993).

- Typology of the Iwan in Mazandaran

In this pattern, the iwan is a projecting section located in front of several rooms and functions as a connecting space between them. Usually, a larger room is positioned next to a smaller one, and the two spaces are connected through the iwan. This spatial organisation pattern is repeated in later expansions of the building, and in some cases, the iwan functions as a linking element between two or three rooms. In some examples, the iwan extends over a larger area and surrounds a significant part of the rooms, so that three or even four sides of a room may be enclosed by this space. In such cases, columns are placed around the iwan to provide the necessary support and stability for its roof structure.

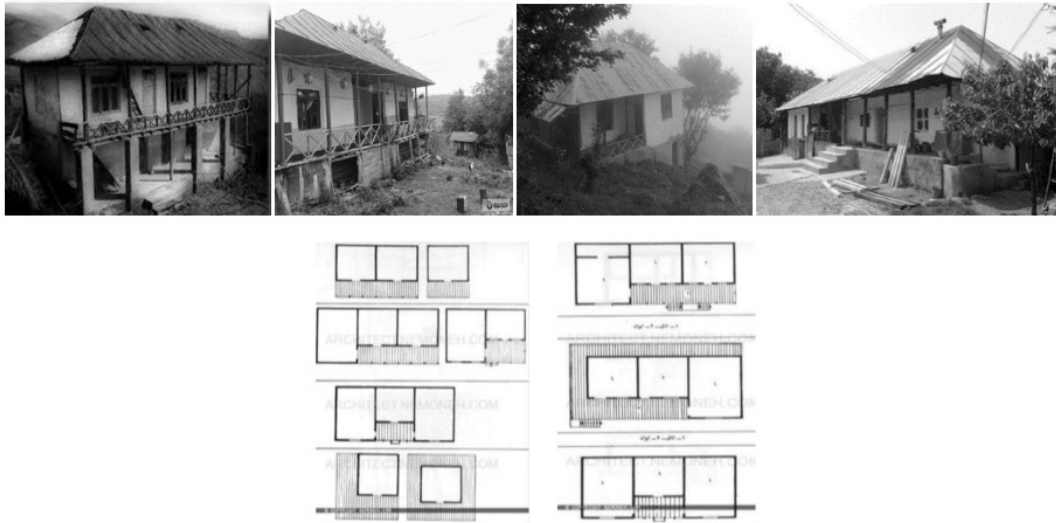


Fig. 1. Classification of Different Types of Iwans in the Rural Architecture of Mazandaran (Images and Plan Patterns)

- Function of the Iwan

In vernacular houses of Tabaristan, residential buildings consist of a combination of interconnected spaces and components, each with a specific function alongside other elements. The iwan is one of these key spaces; due to its multifunctional nature, it serves practical purposes and contributes to comfort and tranquillity within the building. This role is not limited to vernacular houses alone but can also be observed in buildings constructed through the study and adaptation of traditional patterns. One of the most important functions of the iwan is emphasising the entrance of the building and creating an intermediate zone between the exterior and interior. Therefore, the iwan is closely associated with the concept of “entrance transition.” When people move through public spaces and enter the private domain of a house, they need to experience a psychological distance from the external environment before reaching the interior privacy of the home and preparing themselves for entering this space (Christopher 2007). Through this process, an intermediate space is created; a place between outside and inside that enables a change in the mental framework of the user. From a physical perspective, this transition is also achieved through enclosure on several sides and by positioning the house at a higher level than the ground, preventing direct moisture penetration into the interior of the house. Therefore, the iwan can be considered an “entrance transition” space (Francis De 2003). To also create “events of observing the transition,” the iwan floor should be slightly higher than the street or courtyard level, with its front side remaining open. These proportions are important because they are directly related to the way spatial events occur. At the same time, certain characteristics such as the length of the iwan, its height, the colour and material of surfaces, the height of side walls, and the relationship between the iwan and interior spaces can vary according to changing conditions without altering

the fundamental nature of the iwan (Tafazzoli 1985). During the warm seasons, the iwan becomes one of the main functional spaces of the house and provides a setting for various activities, including:

- Using the northern iwan during spring and summer for sitting and resting, especially in the evenings and at night.
- Using southern- and eastern-facing iwans during winter to better benefit from climatic conditions.
- Sleeping at night.
- Having lunch and dinner.
- Enjoying views of gardens, courtyards, and the sky.
- Creating circulation routes and connections between different parts of the building (Haeri 1995).

Furthermore, iwans facing courtyards and gardens contribute to the climatic performance of houses by creating air movement and improving environmental conditions. On the other hand, during cold seasons, they reduce the speed of heat transfer from the interior to the exterior, while during warm seasons, they prevent rapid heat transfer from outside into the building.

The iwan is not merely an attached space; it is a platform that, through “lived experience,” establishes a connection with nature and shapes residents’ spatial perception. Therefore, in terms of physical and functional characteristics, it exists between two domains: part of it reflects the atmosphere of open spaces, while another part is closer to enclosed spaces. For this reason, the iwan plays an important role in improving the quality of life and increasing the value of the house. For example, sleeping under the iwan and experiencing direct contact with trees and flowers are associated with this particular function (Pour-Deyhimi 2003).

In fact, almost any activity usually performed inside a room can also be done in the iwan, including resting, eating, sleeping, receiving guests, and other daily activities. Even household tasks, such as drying clothes and washing dishes, are often carried out in

the iwan, which is a suitable location. The use of the iwan becomes more prominent during summer and other warm periods when temperatures rise and the need for breeze and air circulation increases. Generally, residents' behaviour indicates that whenever conditions make the use of the iwan more desirable, they move towards it; and when staying in rooms becomes more comfortable, they return to the interior. This movement may occur several times throughout the day. Therefore, to facilitate this transition, the iwan is usually designed adjacent to and aligned with the rooms. Additionally, due to the long rainy season in this region and its consequences, such as muddy ground and wet clothing, it is important to prepare before entering rooms. Therefore, removing shoes and clothes and storing them in the iwan are common practices. The importance of the iwan is such that in some regions it is also known as kafshkan (shoe-removing space). From a climatic perspective, the iwan also has a decisive role. On days with direct sunlight, it prevents solar radiation from entering the rooms and creates a cooler space behind it during summer. In colder seasons, the heat accumulated during the day is released into the surrounding environment at sunset, helping the iwan moderate temperatures. Thus, residents use spaces that are appropriate according to seasonal conditions and different times of the day (Pour-Deyhimi 2003).

- Location of the Iwan

The iwan is formed at a point within the building where direct access from all rooms is possible, ensuring that no room is deprived of this shared space. Therefore, the iwan can be considered a "primary space" serving a group of rooms. Furthermore, because some interior spaces lack direct internal connections, the iwan serves as a circulation path and an intermediary space between rooms. In terms of spatial position, the iwan is set higher than the surrounding exterior space. As a result, residents can obtain views and visual access from the iwan towards the courtyard and its surrounding elements, such as flowers, plants, pools, and water features. To allow the iwan to benefit from sunlight during winter while keeping the front sections of rooms shaded during summer, the iwan is usually located on the southern side of the rooms. Regarding dimensions, the iwan is generally designed as a relatively large space, and in some cases, its area can be comparable to that of a room (Mousavi and Talebi 2008).

4. STUDIES AND INVESTIGATIONS

Based on the theoretical foundations of the iwan and its position, the role of this space in the region stems from two main necessities. First, houses require a semi-open, roofed environment; a space that can simultaneously maintain airflow while protecting against intermittent and unpredictable rainfall. Second, the iwan is significant due to its "welcoming" nature. Since the form of the iwan

is generally quadrilateral and its space remains partially open and visible, it also functions as a place for the penetration of light and the provision of natural illumination. Consequently, people's first encounter with the building usually begins from the iwan (Tafazzoli 1985). On the other hand, depending on its functions within a building, the iwan can appear in various sizes and forms. This means that it not only serves practical spatial requirements but also contributes to the richness of the building's form, representing a boundary between function and ornament. In the vernacular architecture of this region, the iwan is recognised as a quadrilateral form. In interpretations of inner geometry, the square is introduced as a symbol of stability and the unchanging "principle or origin"; a place where cosmic conflicts are gathered and resolved, and which refers to the "first and permanent manifestation" (Tafazzoli 1985). From a physical perspective, iwans are generally covered spaces, and their depth is designed to prevent undesirable solar radiation during summer while allowing sunlight to enter during colder seasons (Diba and Yaghini 1993; Gorji Mahlabani and Daneshvar 2010). Ultimately, vernacular housing in Tabaristan consists of a combination of specific components and elements, each performing a particular function while maintaining relationships with other parts. The iwan is one of these elements: a multifunctional space that is both useful and provides a relaxing environment for residents, particularly in houses built on vernacular architectural principles (Christopher 2007).

5. METHOD

In this chapter, the data obtained from the research are first described. These data were collected from the sample population using questionnaires, and the data analysis process is then presented. Following this stage, the research hypotheses are examined to determine whether the obtained results are consistent with the initial assumptions of the study. Considering the research questions and objectives, this chapter is organised into two main sections. The first section covers descriptive statistics. In this part, demographic variables related to the statistical population, including age, marital status, and educational level, are explained. Additionally, descriptive indicators and parameters of the variables included in the questionnaire are analysed. The second section is dedicated to inferential statistics. At this stage, questionnaire data are analysed based on the research hypotheses. Finally, the proposed hypotheses are tested and evaluated using the Structural Equation Modelling (SEM) approach with the assistance of SmartPLS 3 software. The statistical population of this study consists of housewives living in rural houses with iwans in Qaem Shahr. Due to the distribution of these buildings and limitations in accessing all available samples, convenience sampling was selected as the sampling method. The sample size

was determined as 75 participants, considering the minimum adequacy required for analysis through Partial Least Squares Structural Equation Modelling (PLS). The questionnaires were completed both in person and electronically. The criteria for selecting buildings and the sampling procedure were based on purposive sampling and carried out according to specific physical and functional characteristics. Accordingly, houses were selected that possessed the architectural characteristics of the traditional architecture of the region and whose spatial structures had not undergone major changes caused by renovation or modernisation. The presence of an active and usable iwan as one of the main spaces of the house, continuous residential occupation of the building by households, and the daily use of the iwan by housewives were among the primary criteria for selecting the buildings. This selection approach was adopted to ensure alignment between the samples and the research topic and to enable an accurate examination of the relationship between the iwan and place attachment from the perspective of housewives. Furthermore, limiting the samples to houses with relatively homogeneous spatial patterns was considered in order to reduce the effects of intervening variables and increase the accuracy of the analyses.

5.1. Descriptive Statistics of the Research Data

This section of the study is presented in two stages. In the first stage, the demographic variables of the

study are described and introduced. Then, in the second stage, the indicators and results related to the descriptive statistics of the questionnaire items are examined.

- Descriptive Statistics of Demographic Characteristics

In the questionnaire of this study, in order to provide an overall profile of the statistical sample, an independent section entitled “General Characteristics of Respondents” was included. This section collects demographic information about the participants. Therefore, at the beginning of this chapter, frequency distribution tables related to variables such as age, work experience, and educational level, along with relevant charts, are presented to introduce these characteristics. In addition to providing a general overview of the personal characteristics of respondents, the results obtained from this section can, if necessary, serve as a basis for evaluating the influence of these characteristics on respondents’ perceptions of each research variable.

6. RESEARCH FINDINGS

- Age

The analysis of age-related data helps clarify the position of respondents within the specific age categories considered in this study. In this research, the age of respondents was classified into four age groups, and each category is examined in detail in the following section.

Table 2. Frequency Distribution of Respondents by Age

Age Group	Frequency	Percentage
Under 18 Years	12	16.0
19 to 35 Years	38	50.7
36 to 60 Years	22	29.3
Over 60 Years	3	4.0
Total	75	100

According to the findings presented in the table, the highest frequency of respondents belongs to the 19–35 age group. In contrast, the lowest number of participants is related to individuals over 60 years of

age. Respondents within the 36–60 age range rank second in terms of frequency. The following figure provides a visual summary of these findings.

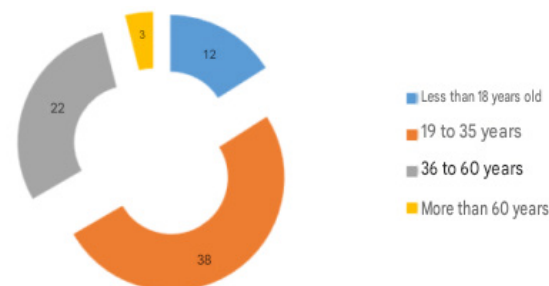


Fig. 2. Frequency Distribution of Respondents by Age

- Educational Level

The educational level of respondents is considered one of the main demographic criteria in this study. This section aims to determine the educational

backgrounds of the participants, ranging from diploma-level education to doctoral degrees. The classification is presented in detail below.

Table 3. Frequency Distribution of Respondents by Educational Level

Educational Level	Frequency	Percentage
Diploma and below	15	18.7
Associate Degree and Bachelor's Degree	22	29.3
Master's Degree	35	46.7
Doctoral Degree	3	5.3
Total	75	100

According to the results, respondents with a Master's degree represent the largest group (35 participants), while those with a Bachelor's degree rank second (22

participants). A summary of the results is presented below.

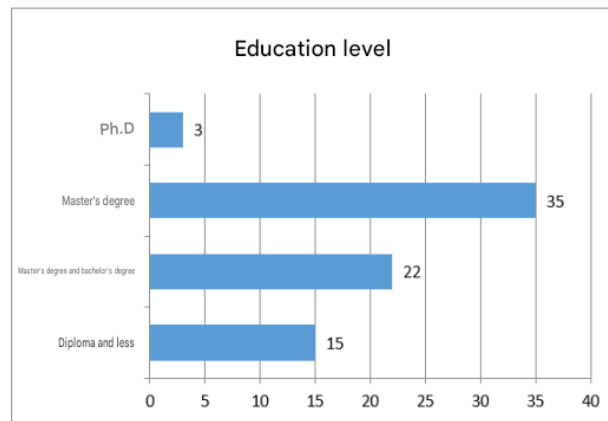


Fig. 3. Frequency Distribution of Respondents by Educational Level

- Years of Residence

The years of residence indicate how long respondents

have lived in their neighbourhood. The following table provides a summary of this condition.

Table 4. Frequency Distribution of Respondents by Years of Residence

Years of Residence	Frequency	Percentage
1 to 5 Years	16	21.3
5 to 10 Years	9	12.0
10 to 15 Years	11	14.7
More than 15 Years	39	52.0
Total	75	100

According to the obtained results, the majority of the sample consists of individuals who have lived in the studied area or neighbourhood for more than 15

years. The following figure also provides an overall representation of the respondents' residence status.

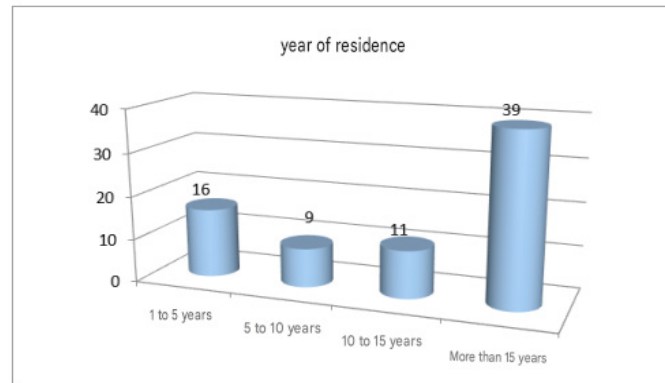


Fig. 4. Frequency Distribution of Respondents by Years of Residence

- Descriptive Statistics of Research Variables

In this section, information related to each of the variables defined in the conceptual model of the research is reported among the studied sample using descriptive statistical methods. Accordingly, for each

variable, a set of indicators, including the mean, standard deviation, mode, as well as minimum and maximum values, has been calculated. The results are presented in Table 5.

Table 5. Descriptive Statistics of Research Variables

Dimension	Symbol	Mean	Median	Mode	Standard Deviation	Minimum	Maximum
Safety	V1	4.21	4.50	4.00	0.726	2.00	5.00
Accessibility	V2	3.92	4.00	4.00	0.935	1.00	5.00
View and Landscape	V3	4.25	4.00	4.00	0.808	1.00	5.00
Aesthetics	V4	4.38	4.00	4.00	0.666	2.00	5.00
Function	V5	4.31	4.00	5.00	0.745	1.00	5.00
Comfort and Relaxation	V6	4.14	4.00	4.00	0.826	2.00	5.00
Cleanliness	V7	3.88	4.00	4.00	0.869	1.00	5.00
Climatic Performance	V8	4.09	4.00	4.00	0.816	2.00	5.00
Attachment	V9	4.18	4.00	4.00	0.700	2.00	5.00

Based on the presented table, it can be concluded that, across all dimensions of the research, the majority of the statistical population is positioned at a moderate level.

- Evaluation of the Research Model Fit

The evaluation of the research model in this study is conducted in three stages. In the first stage, the focus is placed on examining the outer model. In the second stage, the inner model is analysed. Finally, in the third stage, an overall representation of the complete research model is presented and evaluated.

- Evaluation of the Measurement Model (Outer Model)

Within the framework of evaluating the outer model, the factor loadings related to the research items (or indicators) are initially examined. Subsequently, reliability is assessed, and then the validity related to the inner part of the model is evaluated.

- Factor Loadings of Indicators or Questionnaire Items

Regarding the acceptable limits of factor loadings and t-statistics for indicators, different criteria have been proposed in various studies. For example, Hulland (1999) suggested a value of 0.40 for factor loadings and 1.96 for the t-statistic. In contrast, Rivard and Huff (1988) considered 0.50 as an appropriate criterion for factor loadings. Accordingly, following the approach of the mentioned studies, this research considers a minimum factor loading of 0.50 and a t-statistic equal to or greater than 1.96 as the acceptable criteria. Therefore, if any indicator of the model fails to meet these requirements, that indicator will be removed from the model, and the model will then be re-executed using the data from the remaining indicators. The following table presents the calculated results of factor loadings and t-statistics for the research indicators.

Table 6. Factor Loadings of the Research Questionnaire Items (Indicators)

Construct	Questionnaire Item Number	Factor Loading	t-Statistic
Safety	Q1	0.933	6.618
	Q2	0.892	7.375
	Q3	0.612	3.783
	Q4	0.833	5.532
Accessibility	Q5	0.855	2.705
	Q6	0.636	3.397
	Q7	0.609	2.832
View and Landscape	Q8	0.843	9.597
	Q9	0.857	9.868
	Q10	0.811	5.511
	Q11	0.766	2.101
Aesthetics	Q12	0.856	29.575
	Q13	0.911	53.621
	Q14	0.898	44.161
	Q15	0.826	21.426
Function	Q16	0.831	15.319
	Q17	0.835	22.745
	Q18	0.795	13.366
Comfort and Relaxation	Q19	0.895	25.045
	Q20	0.913	29.119
Cleanliness	Q21	1.000	0.000
Climatic Performance	Q22	0.719	10.004
	Q23	0.813	4.330
	Q24	0.811	18.372
	Q25	0.810	19.371
Attachment	Q26	0.763	12.089
	Q27	0.717	12.740
	Q28	0.836	26.635
	Q29	0.797	19.124
	Q30	0.719	12.443
	Q31	0.884	5.998
	Q32	0.871	5.401
	Q33	0.887	5.840
	Q34	0.708	12.848
	Q35	0.862	29.396
	Q36	0.809	21.760
	Q37	0.686	8.617
	Q38	0.693	8.073
	Q39	0.767	15.088
	Q40	0.651	6.960
	Q41	0.751	11.663
	Q42	0.793	20.527
	Q43	0.853	2.203

Construct	Questionnaire Item Number	Factor Loading	t-Statistic
Attachment	Q44	0.803	4.190
	Q45	0.691	10.127
	Q46	0.605	6.053
	Q47	0.774	14.835
	Q48	0.712	12.061
	Q49	0.828	20.676
	Q50	0.755	12.214
	Q51	0.799	19.276

According to Table 6, all research items/questions meet the required criteria in terms of both factor loading and t-statistics, exceeding the threshold values (i.e., 0.50 for factor loading and 1.96 for the t-statistic). Therefore, the research model is accepted and confirmed based on these indicators.

- Reliability of the Outer Model

To evaluate the reliability of the outer model, two main indicators were used: Cronbach's alpha coefficient and composite reliability (CR). In this study, the values of Cronbach's alpha and CR for each dimension of the questionnaire are presented in Table 7.

Table 7. Values of Cronbach's Alpha Coefficient and Composite Reliability

No.	Construct	Cronbach's Alpha	Composite Reliability (CR)	Rho_A
1	Comfort and Relaxation	0.825	0.849	0.855
2	Safety	0.987	0.752	0.778
3	Accessibility	0.725	0.937	0.824
4	Attachment	0.825	0.812	0.881
5	View and Landscape	0.789	0.838	0.865
6	Aesthetics	0.939	0.904	0.809
7	Function	0.752	0.857	0.734
8	Climatic Performance	0.881	0.850	0.849
9	Cleanliness	0.868	0.805	0.745

Table 7 indicates that the Cronbach's alpha coefficient and composite reliability (CR) values for all nine examined constructs are higher than 0.70. These results confirm the desirable reliability of the research model.

- Validity of the Outer Model

To evaluate the validity of the outer model, two types

of criteria were employed: convergent validity as the first criterion and discriminant validity as the second criterion.

- Convergent Validity (AVE)

The values related to convergent validity (AVE) for each research dimension are presented in Table 8.

Table 8. Values of Convergent Validity (AVE) for Research Dimensions

No.	Construct	Convergent Validity (AVE)
1	Comfort and Relaxation	0.737
2	Safety	0.549
3	Accessibility	0.525
4	Attachment	0.687
5	View and Landscape	0.721
6	Aesthetics	0.825
7	Function	0.749
8	Climatic Performance	0.739
9	Cleanliness	0.682

According to the results presented in Table 8, all AVE values related to the research constructs are reported to be greater than 0.50. Therefore, the convergent validity of the research model is confirmed.

- Discriminant Validity

In this study, the Fornell–Larcker criterion was

used to evaluate discriminant validity. This test was performed using the SMART PLS3 software, and the obtained results for all research dimensions are reported in Table 9.

Table 9. Discriminant Validity using the Fornell–Larcker Criterion

	Comfort and Relaxation	Safety	Accessibility	Attachment	View and Landscape	Aesthetics	Function	Climatic Performance	Cleanliness
Comfort and Relaxation	0.859								
Safety	0.514	0.741							
Accessibility	0.560	0.742	0.706						
Attachment	0.267	0.557	0.764	0.829					
View and Landscape	0.671	0.681	0.518	0.664	0.849				
Aesthetics	0.552	0.629	0.670	0.421	0.686	0.908			
Function	0.611	0.514	0.602	0.635	0.632	0.648	0.865		
Climatic Performance	0.768	0.665	0.574	0.639	0.224	0.579	0.749	0.859	
Cleanliness	0.341	0.299	0.190	0.097	0.193	0.173	0.488	0.145	0.826

Based on the data presented in Table 9, the square root values of AVE for each construct are greater than the correlation values between that construct and other constructs. Therefore, according to the Fornell–Larcker criterion, the discriminant validity of the research model is confirmed.

- Evaluation of the Structural Model (Inner Model)

After completing the assessment of the measurement models' fit, the next stage involves evaluating the structural model fit. Unlike measurement models, the structural model does not focus on observable variables/items; rather, it evaluates latent variables and the relationships among them (Davari and Rezazadeh 2013).

- Significance Coefficients (Z Values and t-Values)

Several criteria were used to evaluate the structural

model fit in this study. The first and most fundamental criterion is the examination of significance coefficients (Z or t values). These coefficients must be greater than 1.96 in order to confirm the significance of relationships at the 95% confidence level. It should be noted that t-values only indicate the validity of relationships and cannot measure the strength of the relationship between constructs. Furthermore, when the t-statistic exceeds 2.58, the path coefficient is considered statistically significant at the 99% confidence level (Davari and Rezazadeh 2013). The significance coefficients (Z values) related to the paths existing in the research model are presented in Table 10 and Figure 5.

Table 10. Significance COEFFICIENTS (Z VALUES / T-VALUES)

No.	Path	t-Value
1	Safety Criterion → Sense of Attachment	11.405
2	Accessibility Criterion → Sense of Attachment	6.592
3	View and Landscape Criterion → Sense of Attachment	5.511
4	Aesthetics Criterion → Sense of Attachment	9.098
5	Function Criterion → Sense of Attachment	3.770
6	Comfort and Relaxation Criterion → Sense of Attachment	5.213
7	Cleanliness Criterion → Sense of Attachment	7.357
8	Climatic Performance Criterion → Sense of Attachment	8.770

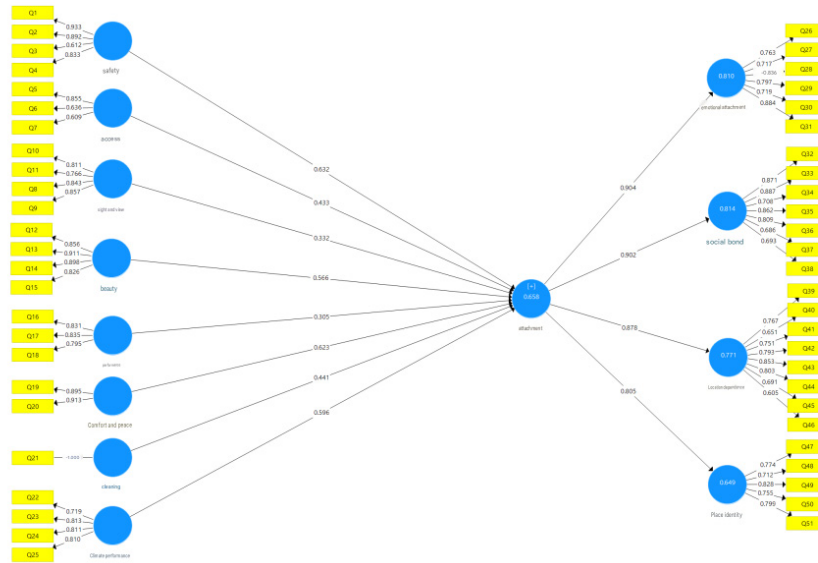


Fig. 5. t-coefficient Value of the Structural Model of the Research

- Regression Coefficients of Paths

To assess the significance of the relationships between the research indicators and their corresponding constructs, the regression coefficient or path

coefficient was used. These results were extracted using SMART PLS3 software and are presented in Table 11 and Figure 6.

Table 11. Regression Coefficients (Beta) of Paths

No.	Path	Regression Coefficient
1	Safety Criterion → Sense of Attachment	0.632
2	Accessibility Criterion → Sense of Attachment	0.433
3	View and Landscape Criterion → Sense of Attachment	0.332
4	Aesthetics Criterion → Sense of Attachment	0.566
5	Function Criterion → Sense of Attachment	0.305
6	Comfort and Relaxation Criterion → Sense of Attachment	0.623
7	Cleanliness Criterion → Sense of Attachment	0.441
8	Climatic Performance Criterion → Sense of Attachment	0.596

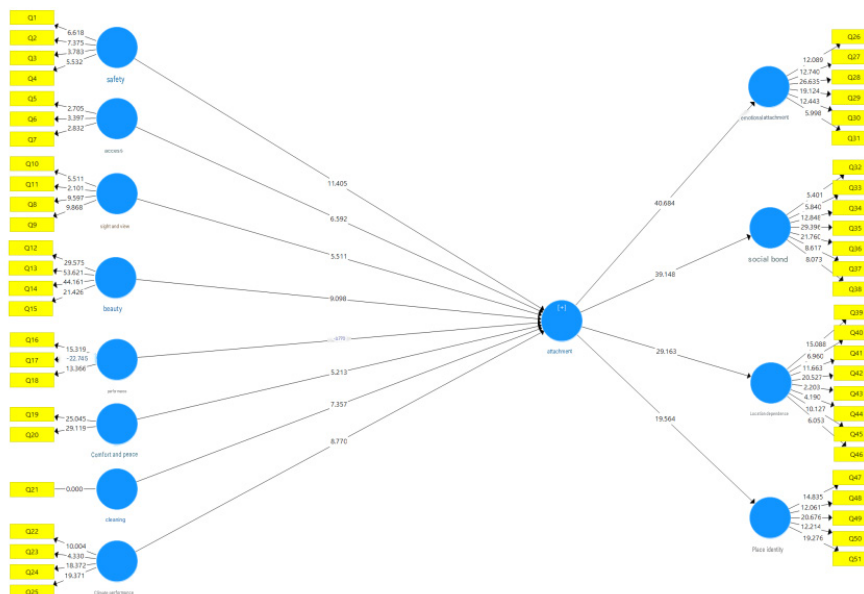


Fig. 6. Regression Coefficient Values of the Structural Model of the Research

- Coefficient of Determination (R^2)

In this study, the values of the R^2 parameter related to the variables of the research model were calculated using SMART PLS3 software. A higher value of R^2 for the endogenous constructs of a model indicates a better model fit. Chin (1998) considers the values

of 0.19, 0.33, and 0.67 as criteria indicating weak, moderate, and strong levels of structural model fit based on the R^2 index. The results of this analysis are presented in Table 12.

Table 12. Values of R^2 for Research Dimensions

No.	Dimension	R^2 Value
1	Attachment	0.658

According to the results presented in Table 12, the research construct regarding the R^2 parameter is greater than 0.67; therefore, it is considered to be at a strong level.

- Effect Size Criterion (f^2)

This criterion determines the strength of the

relationship between the constructs in the model. Values of 0.02, 0.15, and 0.35 indicate small, medium, and large effect sizes of one construct on another, respectively. In this research, the values of the effect size criterion (f^2) related to the research variables are presented in Table 13.

Table 13. Effect Size (f^2)

No.	Path	f^2
1	Safety Criterion → Sense of Attachment	0.534
2	Accessibility Criterion → Sense of Attachment	0.611
3	View and Landscape Criterion → Sense of Attachment	0.685
4	Aesthetics Criterion → Sense of Attachment	0.478
5	Function Criterion → Sense of Attachment	0.496
6	Comfort and Relaxation Criterion → Sense of Attachment	0.524
7	Cleanliness Criterion → Sense of Attachment	0.339
8	Climatic Performance Criterion → Sense of Attachment	0.457

According to the results obtained from Table 13, the effect size of the above-mentioned relationship paths is within the high range and demonstrates a favourable status in terms of the f^2 parameter. Therefore, the research model is confirmed based on the f^2 index.

- Q^2 Criterion

This criterion determines the predictive power of the

model. If the Q^2 value for an endogenous construct reaches the three values of 0.02, 0.15, and 0.35, it indicates weak, moderate, and strong predictive power of the corresponding exogenous constructs, respectively (Davari and Rezazadeh 2013). The Q^2 values related to the research variables are presented in Table 14.

Table 14. Q^2 Values of Research Dimensions

No.	Dimension	Q^2 Value
1	Comfort and Relaxation	0.225
2	Safety	0.482
3	Accessibility	0.347
4	Attachment	0.319
5	View and Landscape	0.244
6	Aesthetics	0.390
7	Function	0.250
8	Climatic Performance	0.217
9	Cleanliness	0.367

According to the results presented in Table 14, the Q^2 values for the research variables demonstrate a

desirable condition, and therefore the research model is confirmed based on the Q^2 criterion.

- Evaluation of the Overall Research Model Fit

In this study, considering that the structural equation modelling process was conducted using the SRMR method, the main model fit was evaluated using the indices of SRMR, rms Theta, and NFI. The value of the SRMR index was calculated as 0.001, which is lower than 0.05. The value of the rms Theta index was obtained as 0.043, which is lower than 0.10. Finally, the value of the NFI index was calculated as 0.992, which is higher than 0.95. Therefore, the model has acceptable fit and generalisability.

7. RESEARCH HYPOTHESIS

7.1. Testing Research Hypotheses

Sense of place attachment is a key concept in environmental psychology and architecture, representing the emotional, cognitive, and functional connection between individuals and their living environment (Relph 1976; Scannell and Gifford 2010). Among housewives, due to their continuous presence and frequent use of residential spaces, this connection has particular importance (Hidalgo and Hernandez 2001). Previous studies have shown that

physical and functional characteristics of space, such as safety, accessibility, environmental comfort, climatic performance, and even aesthetic aspects, can play a fundamental role in strengthening place attachment (Lewicka 2011; Memarian and Brown 2006; Marcus 2016).

Accordingly, the criteria used in this research were extracted through a combination of theoretical literature review and findings from preliminary interviews with housewives. The interviewed women placed the greatest emphasis on safety, ease of access, view and landscape, aesthetics, spatial function, comfort and relaxation, cleanliness, and climatic performance as influential factors in their lived experience of space. Therefore, these criteria were used as the main indicators for developing the research hypotheses.

- First Hypothesis

It is assumed that there is a significant relationship between the safety criterion and housewives' sense of attachment to place. Structural equation modelling was used to examine and verify this hypothesis. The T-Value statistic and path coefficient (Beta) for testing the first research hypothesis are presented in Table 15.

Table 15. Results of t-Value Test and Path Coefficient for the First Hypothesis

Hypothesis	T-Value	Path Coefficient	p-Value	Status
Safety Criterion → Sense of Attachment	11.405	0.632	0.000	Accepted

According to Table 15, the T-Value is 11.405, which is greater than 1.96. Therefore, the first research hypothesis is accepted. The path coefficient (Beta) is 0.632, indicating an acceptable level. In other words, there is a significant relationship between the safety criterion and sense of attachment.

- Second Hypothesis

It is expected that there is a significant relationship

between the accessibility criterion and sense of attachment. Structural equation modelling was used to examine and verify this hypothesis. The T-Value statistic and path coefficient (Beta) for testing the second research hypothesis are presented in Table 16.

Table 16. Results of t-Value Test and Path Coefficient for the Second Hypothesis

Hypothesis	T-Value	Path Coefficient	p-Value	Status
Accessibility Criterion → Sense of Attachment	6.592	0.433	0.000	Accepted

According to the data presented in Table 16, the T-Value is 6.592, which is greater than 1.96. Therefore, the second research hypothesis is accepted. The path coefficient (Beta) is 0.433, which represents an acceptable condition. In other words, there is a significant relationship between the accessibility criterion and sense of attachment.

- Third Hypothesis

It is predicted that the view and landscape criterion is related to housewives' sense of attachment to place. Structural equation modelling was used to examine and verify this hypothesis. The T-Value statistic and path coefficient (Beta) for testing the third research hypothesis are presented in Table 17.

Table 17. Results of the t-Value Test and Path Coefficient for the Third Hypothesis

Hypothesis	T-value	Path Coefficient	p-Value	Status
Visual Quality and View → Sense of Attachment	5.511	0.332	0.003	Accepted

According to the data presented in Table 17, the T-value is 5.511, which is greater than 1.96. Therefore,

the third hypothesis of the study is supported. The path coefficient (β) is 0.332, indicating an acceptable level

of influence. In other words, a significant relationship exists between the visual quality and view criterion and the sense of attachment.

- Fourth Hypothesis

It is assumed that the aesthetic quality of the space has

a significant relationship with increasing the sense of attachment. To examine and validate this hypothesis, structural equation modelling (SEM) was employed. The T-value and path coefficient (β) used to test this hypothesis are presented in the following table.

Table 18. Results of the t-Value Test and Path Coefficient for the Fourth Hypothesis

Hypothesis	T-value	Path Coefficient	p-Value	Status
Aesthetic Quality $\rightarrow$ Sense of Attachment	9.098	0.566	0.000	Accepted

According to the results shown in the above table, the T-value is 9.098, which exceeds the threshold of 1.96. Therefore, the fourth hypothesis is confirmed. The path coefficient (β) is 0.566, demonstrating a favourable effect. In other words, there is a significant relationship between aesthetic quality and the sense of attachment.

- Fifth Hypothesis

It is expected that the functional performance of the iwan contributes to strengthening the sense of attachment. Structural equation modelling was used to examine and verify this hypothesis. The T-value and path coefficient (β) obtained for testing this hypothesis are presented in the following table.

Table 19. Results of the T-value Test and Path Coefficient for the Fifth Hypothesis

Hypothesis	T-value	Path Coefficient	p-Value	Status
Functional Performance $\rightarrow$ Sense of Attachment	3.770	0.305	0.000	Accepted

According to the data in the above table, the T-value is 3.770, which is higher than 1.96. Therefore, the fifth hypothesis is supported. The path coefficient (β) is 0.305, indicating an acceptable relationship. Thus, a significant association exists between functional performance and the sense of attachment.

- Sixth Hypothesis

It is predicted that comfort and tranquillity play

a positive role in the formation of the sense of attachment. To examine this hypothesis, structural equation modelling was applied. The T-value and path coefficient (β) for testing this hypothesis are presented in the following table.

Table 20. Results of the T-value Test and Path Coefficient for the Sixth Hypothesis

Hypothesis	T-value	Path Coefficient	p-Value	Status
Comfort and Tranquillity $\rightarrow$ Sense of Attachment	5.213	0.623	0.000	Accepted

Based on the results of the above table, the T-value is 5.213, which is greater than 1.96. Therefore, the sixth hypothesis is accepted. The path coefficient (β) equals 0.623, demonstrating a desirable level of influence. Accordingly, there is a significant relationship between comfort and tranquillity and the sense of attachment.

- Seventh Hypothesis

It is assumed that environmental cleanliness and hygiene affect the sense of attachment among female residents. Structural equation modelling was used to examine and validate this hypothesis. The T-value and path coefficient (β) obtained for testing this hypothesis are presented in the following table.

Table 21. Results of the T-value Test and Path Coefficient for the Seventh Hypothesis

Hypothesis	T-value	Path Coefficient	p-Value	Status
Cleanliness $\rightarrow$ Sense of Attachment	7.357	0.441	0.000	Accepted

According to the results of the above table, the T-value is 7.357, exceeding the critical value of 1.96. Therefore, the seventh hypothesis is confirmed. The path coefficient (β) is 0.441, indicating an appropriate level of influence. In other words, a significant relationship exists between cleanliness and the sense of attachment.

- Eighth Hypothesis

It is expected that the climatic performance of

the iwan (including ventilation and humidity and temperature regulation) has a direct relationship with the sense of attachment. To investigate and verify this hypothesis, structural equation modelling was employed. The T-value and path coefficient (β) for testing this hypothesis are presented in the following table.

Table 22. Results of the t-Value Test and Path Coefficient for the Eighth Hypothesis

Hypothesis	T-value	Path Coefficient	p-Value	Status
Climatic Performance → Sense of Attachment	8.770	0.596	0.000	Accepted

According to the results presented in the above table, the T-value is 8.770, which is greater than 1.96. Therefore, the eighth hypothesis of the study is supported. The path coefficient (β) is 0.596, indicating an acceptable level of influence. In other words, there is a significant relationship between climatic performance and the sense of attachment.

8. CONCLUSION

The findings of this study indicate that the iwan in traditional rural houses of Mazandaran plays a multidimensional role in strengthening the sense of place attachment and enhancing spatial quality. The collected data, obtained through 75 questionnaires, were analysed using structural equation modelling (SEM) in SmartPLS. The results demonstrated that all research hypotheses were confirmed and that the proposed theoretical framework was able to comprehensively explain the existing conditions.

As an intermediate space between the interior and exterior of the house, the iwan not only performs climatic functions, such as natural ventilation and humidity regulation, but also provides a suitable setting for women's daily activities and social interactions, thereby strengthening their emotional connection with the residential environment. These findings are consistent with previous studies on the importance of semi-open spaces and significant elements of vernacular architecture, emphasising the need to consider successful traditional architectural experiences in the design of contemporary residential spaces.

The iwan in traditional rural houses of Mazandaran is not merely a physical element or a climatic response; rather, it is a meaningful and multilayered space that is closely connected with residents' lived experiences, everyday activities, and emotional perceptions, particularly those of housewives. The results of structural equation modelling show that all extracted dimensions of place attachment derived from the theoretical foundations—including safety, accessibility, visual quality, aesthetics, spatial performance, comfort and tranquillity, cleanliness, and climatic performance—have significant and strong relationships with housewives' sense of attachment to place. This confirms that place attachment is not a one-dimensional or purely subjective concept, but rather the outcome of the simultaneous interaction of physical, functional, and perceptual characteristics of space.

From a theoretical perspective, the findings of this research are consistent with perspectives in place phenomenology and environmental psychology,

where place is not regarded as a neutral container but as a context for human meaning, memory, and identity (Relph 1976; Low 2000). The iwan, as an intermediate space between inside and outside, represents a tangible example of an “in-between space”; a space that enables gradual transition, pause, observation, and interaction, thereby creating a continuous and meaningful experience of living. This characteristic is particularly important for housewives, who spend a considerable amount of their time within the domestic environment, as the iwan allows them to maintain connections with their surroundings, neighbours, and nature without leaving the privacy of the home.

Furthermore, the prominent role of the iwan's climatic performance in strengthening place attachment demonstrates that thermal comfort, natural ventilation, and humidity regulation are not merely technical criteria, but directly influence positive spatial perception and the formation of emotional bonds with a place. This finding supports theories of sustainable and vernacular architecture that emphasise the integration of environmental comfort with human experience. In fact, the iwan in Mazandaran's vernacular architecture represents a successful example of combining climatic intelligence, social function, and spatial meaning. The analysis of the findings also reveals that factors such as safety, cleanliness, and aesthetics, although seemingly obvious at first glance, play fundamental roles in shaping housewives' lived experiences by enhancing feelings of trust, comfort, and attachment. This indicates that place attachment depends not only on distinctive and symbolic spatial elements but also on the quality of maintenance, legibility, and everyday usability of space—an aspect that is often overlooked in many contemporary housing models.

Overall, it can be concluded that the iwan in traditional rural houses of Mazandaran functions as a “spatial-social node” that plays a key role in maintaining social life, improving residential quality, and strengthening place attachment. By focusing on the perspectives of housewives, this study demonstrates that the removal or weakening of this space in contemporary architecture does not merely result in the loss of a physical element, but also leads to a disruption in meaningful residential experiences and a weakening of the emotional relationship between people and their living environment. Accordingly, the conceptual reinterpretation of the iwan—not as a formal imitation, but as a spatial and functional model—can provide valuable guidance for designing contemporary housing that responds to climate, culture, and the actual needs of residents, particularly women.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

MORAL APPROVAL

The authors commit to observe all the ethical principles of the publication of the scientific work based on the ethical principles of COPE. In case of any violation of the ethical principles, even after the publication of the article, they give the journal the right to delete the article and follow up on the matter.

PARTICIPATION PERCENTAGE

The authors state that they have directly participated in the stages of conducting research and writing the article.

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