ISSN: 2008-5079 / EISSN: 2538-2365
DOI: 10.22034/AAUD.2023.396757.2787

Research Paper

Evaluation of the Relationship Between Sense of Place and Mental Image in Urban Facades; A Case Study of Imam Khomeini Street, Ardabil*

Nasrin Mohammadi Irlou[a]- Rouhollah Rahimi[b]- Vahid Vaziri[c]**

[a] Master's in Architecture, Faculty of Art and Architecture, University of Mazandaran, Babolsar, Iran.

[b] Assistant Professor of Architecture, Faculty of Art and Architecture, University of Mazandaran, Babolsar, Iran (Corresponding Author).

[c] Associate Professor of Architecture, Faculty of Art and Architecture, Mohaghegh Ardabili University, Ardabil, Iran.

Received 10 May 2023; Revised 31 July 2023; Accepted 08 November 2023; Available Online 20 June 2024

ABSTRACT

Enhancing citizen presence in public spaces of a city is vital for urban dynamism and attractiveness, necessitating the establishment of an appropriate foundation. Environmental and physical factors significantly impact the formation of mental images and the sense of place among citizens. Urban spaces are shaped by the presence and activities of individuals, and the elements of urban facades are considered influential environmental factors in this process application of native architectural patterns in urban facades to cultivate a positive mental image and a sense of place is particularly significant in modern cities. For this reason, this study attempts to determine the factors that influence the creation of positive mental images and, by extension, a sense of place, as well as the interrelationships among these factors. This applied research employs a descriptive survey method. Data collection tools included a literature review, field observations, and questionnaires. Pearson correlation and factor analysis tests were used to analyze the questionnaire data. Factor analysis findings indicate that the physical, activity, and perceptual dimensions respectively have the most significant impact on the formation of citizens' mental images of a place. Moreover, the activity, physical, and perceptual dimensions respectively have the greatest influence on the creation of a sense of place among citizens. The findings show that physical diversity and accessibility have a major role in influencing how people see their city and that women's and older people's involvement in public urban activities is essential for creating a feeling of place. Furthermore, a significant coefficient of determination confirms a direct and favorable association between citizens' mental imagery and their sense of place.

Keywords: Mental Image, Sense of Place, Urban Facade, Imam Khomeini Street, Ardabil.

* This article is derived from the first author's M.Sc thesis titled "Reading Citizens' Mental Maps of Urban Façade Patterns with an Approach to Enhancing Sense of Place: Designing a Cultural-Art Complex on Imam Khomeini Street" supervised by the second author and advised by the third author, completed in 2023.

** E_mail: r.rahimi@umz.ac.ir

1. INTRODUCTION

The physical environment and its impacts on people's daily lives have been extensively analyzed and examined by numerous experts in recent years (Canter 1977). Urban areas, by providing a platform for social activities, generate a high level of attachment (Ramkissoon et al. 2012). Urban facades are influential elements in the quality of urban spaces, and their improvement can enhance the objective visual quality of the city. Moreover, cities with desirable visual environments can broaden citizens' aesthetic experiences, thereby enhancing the community's mental image of itself and fostering civic pride (Gospodini 2002). Facades are the face of architecture and the gateway to understanding it (Khatami and Bojari 2020), shaping visual, social, emotional, and psychological connections with the external environment (Amjad et al. 2021). The need for emotional, cognitive, and behavioral interaction with the place where one lives is among the most important dimensions of the human-place relationship (Rahimi and Razani 2022). According to Befrouz (1991), mental maps are representations of awareness, an image of a location or environment that forms in people's brains as a structured representation of reality as a result of information that is received, stored, recallable, and interpretable. These mental maps influence individual decision-making and choice, ultimately determining behavior. If urban design can create an environment that increases people's presence in a space, life gradually returns to the urban space (Ghaffari 2014, 61).

The study area is the western facade of Imam Khomeini Street in Ardabil (from Shariati to Imam Khomeini Square), the main and oldest street in the city. Given that this case study has had environmental capabilities and physical character from the past to the present, it has influenced the mental image of the citizens. Additionally, the street's location within the city's fabric, its interaction with surrounding urban spaces, and the uses and functions performed in this context create a mental image and a sense of place. The existing functions of this facade, through interaction with citizens, can particularly influence the younger generation. One of the most prominent characteristics of this street is that it is a core component of the urban fabric, creating spatial cohesion in the city, and it must possess unique features to create a distinct mental image from other spaces. Therefore, understanding the relationship between mental image and sense of place in urban facades can enhance and comprehend the influential components of an urban facade and strengthen the urban space to create a mental image and sense of place for citizens. The purpose of this research is to identify the urban facade components that influence the mental image and sense of place among citizens, as well as to examine the relationship between mental image and sense of place in urban facades. To achieve these objectives, we seek to answer the following questions: Which urban facade components affect the sense of place and mental image of citizens? What is the relationship between the sense of place and the mental image of citizens in urban facades?

2. LITERATURE REVIEW

Individual and collective values impact the quality of the sense of place, which in turn affects individuals' values, attitudes, and especially their behaviors within a place (Rahimi and Ansari 2020). According to Rapoport, culture not only influences the mental images created in people's minds but also shows that lifestyle, social relations, customs, beliefs, and traditions can be part of the physical and perceptual-psychological factors of mental images, shaping their environment based on these images. Therefore, the mental images formed in people's minds influence the formation of their environment (Shafipour Yourdshahi et al. 2023). The growth of a city is neither the product of a single mind nor the coherent minds of a group; the fabric and structure of contemporary cities result from a process that began long ago (Rahimi et al. 2015). The expansion of urbanization and the emergence of new needs have shifted planning from a purely physical perspective to focusing on the social aspects of urban life. Quality, diversity, security, and the creation of engaging spaces serve as motivations for presence and communication, fostering social interactions (Ebrahimnia et al. 2022).

The influence of the sense of place on the emotional bond between humans and their environment leads to the construction of meanings, symbols, functions, and the character of a place in the human mind, making the place respectable and increasing individuals' desire to preserve it physically (Heidari et al. 2014). The sense of belonging is based on individual emotions and manifests physically in design (Ananahad et al. 2019). Physical and environmental features, including suitable spatial arrangement, form, enclosure, visual aesthetics, and factors such as environmental and aesthetic elements and the location of the place, are crucial in creating a sense of place. There is a direct and significant relationship between citizens' mental images and their sense of place, with the semantic dimension of mental images having the most substantial impact on the sense of place (Balali Oskoyi et al. 2019). Hollander and Anderson believe that enhancing facade quality affects citizens' feelings and perceptions (Hollander and Anderson 2020). Furthermore, studies have examined the impact of cultural and identity elements of facades on enhancing citizens' sense of place (Mahdavinejad and Pourfathollah 2015; Rahimi et al. 2023).

Building facades play a significant role in creating a sense of place. The components of form and size, facade elements, and materials have the greatest impact on fostering a sense of place. Additionally, memory, legibility, tranquility, and climatic comfort enhance the influence of nature in the facade on the sense of place (Amjad et al. 2021). Enhancing

elements such as order, unity, balance, proportion, ratio, scale, harmony, rhythm, coherence, and continuity can increase beauty in urban facades (Esmaili et al. 2020). Certain forms and physical features of buildings are preferred by pedestrians, and there is a positive correlation between aesthetic visual qualities and people's physical preferences (Jennath and Nidhish 2016).

3. THEORETICAL FOUNDATIONS

3.1. Sense of Place

The sense of place provides individuals with feelings of security, pleasure, and identity, thereby enhancing their sense of belonging to a location (Moulay et al. 2018). From a phenomenological perspective, the sense of place is a factor for individuals' feelings of security, pleasure, and emotional perception, which increases their sense of belonging to the place and deepens their connection and interaction with the environment (Ghashghaee et al. 2016; Relph 1976). In environmental psychology, place attachment examines the cognitive and emotional relationship between an individual and their physical and social environment, resulting in emotional attachment and a sense of affection and connection to the place (Hanks et al. 2020). Summarizing the views of scholars (Table 1), the sense of place consists of three components: cognitive-perceptual, physical, and functional, as illustrated in Figure 1.

Table 1. Characteristics of Sense of Place from the Perspective of Scholars

Scholars	Characteristics
Low and Altman (1992)	Interest in place, individual's knowledge and experience of place, individual and group characteristics, cultural and social characteristics, social role, interactions, and cultural and social connections
Steele (1981)	Being part of the place, respectability of the place, conflict, sound, visual diversity, and size of the place
Brown and Perkins (1992)	Emotional, cognitive, and behavioral bonds, and behavioral framework among humans
Raymond et al. (2010)	Identity and place attachment, social bonds, and natural bonds
McMillan and Chavis (1986)	Sense of membership, influence, fulfillment of needs, and emotional attachments
Relph (1976)	Connection with place through understanding symbols, activities, and boundaries
Canter (1977)	Individual and collective values, values, and individual and social behavior
Proshansky (1983)	Emotions, knowledge, beliefs, and behaviors
Maria Lewicka (2011)	Size, enclosure, diversity, scale, symbols, and localization
Schultz (1967)	Enclosure, boundary and territory, centrality, diversity, and continuity
Rapoport (1977)	Symbols, icons, and urban furniture

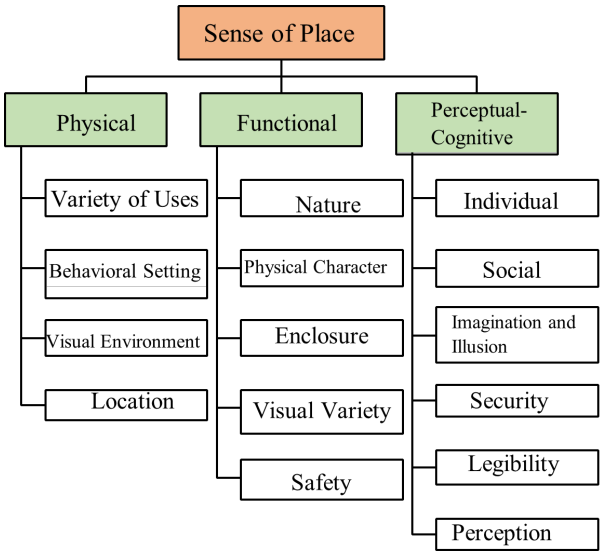

Fig. 1. Components Influencing Place Attachment

3.2. Mental Image

A mental image comprises brief data that individuals create and utilize to observe, comprehend, and represent perceived phenomena in the real world (Zeile et al. 2015). It is intrinsically linked to psychological processes, wherein individuals acquire, encode, store, recall, and retrieve environmental information (Neacşu and Neguţ 2012). Anything that a viewer retains in their mind after seeing a scene is called a mental image. In essence, one could say that an individual's perception of their surroundings is what helps them to navigate and determine their course. The overall pictures that a person's mind captures from the external world are both the result of their immediate feelings and based on the memory of their past experiences (Lynch 1984). The mental image is the foundation of all interactions between individuals and their environment, and it may not fully overlap with the existing reality, yet citizens behave based on their mental image rather than the actual realities.

The mental image of an environment significantly influences spatial behavior. The most effective role of the mental image is enabling an individual to navigate the city to pursue their goals. A key component of every successful city is the environment's exact and clear perceptual comprehensibility, which fosters emotional contentment with urban living. The perceptual clarity of urban spaces is crucial not only from a cognitive perspective but also encompasses emotional, functional, and social aspects (Kaplan 2016). Summarizing scholars' views (Table 2), the mental image consists of three components: cognitive-perceptual, physical, and functional, as illustrated in Figure 2.

Table 2. Characteristics of Mental Image from the Perspective of Scholars

Scholars	Characteristics
Kaplan (2016)	Perceptual Clarity, Functions, Community, and Emotions
Lynch (1960)	Paths, Edges, Districts, Nodes, and Landmarks
Schultz (1996)	Centers, Paths, Districts, Territories, and Meaningful Places
Appleyard (1976)	Sequential Elements, Spatial Elements, and Formal Features
Trieb (1974)	City Functions, City Appearance, and Meaning
Relph (1976)	Experiences, Attitudes, and Memories
Gestalt Theory (2007)	Continuity Components, Distinct Components, Good Form, Proximity, and Similarity
Downs and Stea (1977)	Paths, Boundaries, Points, and Barriers
Rapoport (1977)	Symbols and Signs
Negro (2003)	Signs, Body Contrast, Color, and Façade Elements

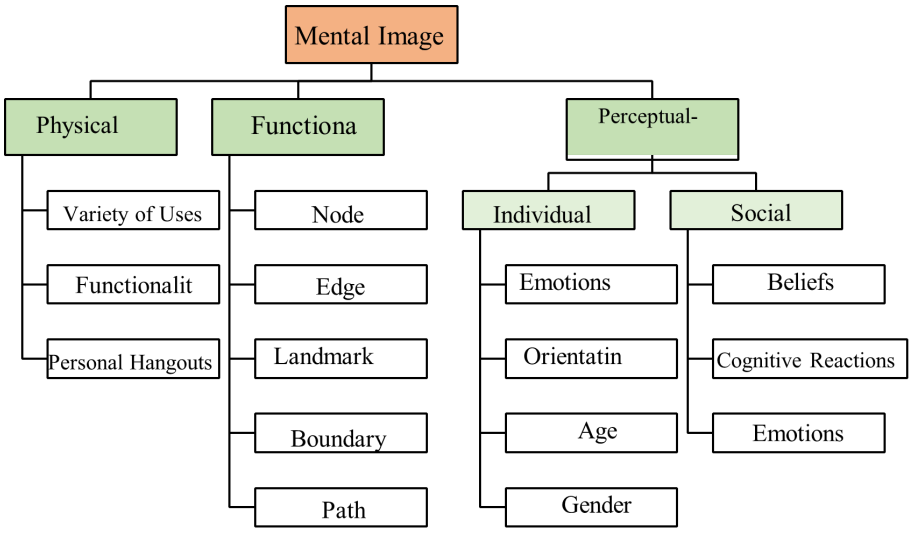

Fig. 2. Components Contributing to Mental Image

3.3. Urban Facade

The physical environment and its impacts on people's lives have been a significant focus for numerous specialists in recent years (Moulay et al. 2018; Scannell and Gifford 2017). The urban facade essentially represents the physical appearance of a building and the optimal exterior image it projects. As a communicative element between the interior and exterior of buildings, the urban facade shapes individuals' perceptions and is subject to evaluation by observers (Ghorbanian et al. 2020; Mutlu Danaci and Kiran 2020). The visual expanse and the initial section of buildings that capture an observer's attention constitute the building facade, forming the urban facade (Alishah et al. 2016). The urban facade reflects the social character of city residents and fosters attachment to the environment (Saadati et al. 2019).

The urban facade, by displaying its physical character and visual and aesthetic domain, occupies a prominent place in the observer's mind. The primary criteria and indicators for evaluating the aesthetics of urban facades include proportions, materials, rhythm, color, form and shape, symmetry, human scale, variety, skyline, details and decorative elements, order, balance of solid and void areas, hierarchy, harmony, memorability, pleasure, satisfaction, flexibility, legibility, vibrancy, imaginability, enthusiasm, and tranquility (Hidalgo and Hernandez 2001; Nasar 1994; O'Connor 2008; Baper and Hassan 2012).

Table 3. Characteristics of Urban Facade from the Perspective of Scholars

Scholars	Characteristics
Pakzad (2003)	Age, Gender, Nationality, and Ethnicity
Bentley et al. (1985)	Legibility, Physical, Functional, and Semantic
Lynch (1960)	Perceptual-Physical and Functional
Mahmoudi (2006)	Sustainability, Identity, and Unity
Abdollah Khan Gorji (2006)	Visual, Physical, Spatial, Activity, and Environmental
Mansouri (2008)	Aesthetics, Functionality, and Identity
Golkar (2002)	Functional, Aesthetic, Environmental, and Perceptual Identity
Karimi Consultant et al. (2010)	Aesthetic, Functional, and Identity
KhakZand et al. (2014)	Function, Beauty, Perception, and Identity

Table 4. Components Creating a Sense of Place Attachment and Mental Image of Citizens in Urban Facade

		Urban Facade Components	
Sense of Place Attachment	Activity	Location, visual Environment, Behavioral Setting, and Variety of Use	
	Physical	Physical Character, Enclosure, Visual Diversity, Safety, and Nature	
	Perceptual	Individual	Vitality, Ownership, Authenticity, and Private Space
		Social	Religion, Cultural-Historical
Mental Image	Activity	Variety of Use, Function, and Personal Hangouts	
	Physical	Node, Edge, Landmark, District, and Path	
	Perceptual	Individual	Emotions, Wayfinding, Age, and Gender
		Social	Beliefs, Intellectual Reactions, and Emotions

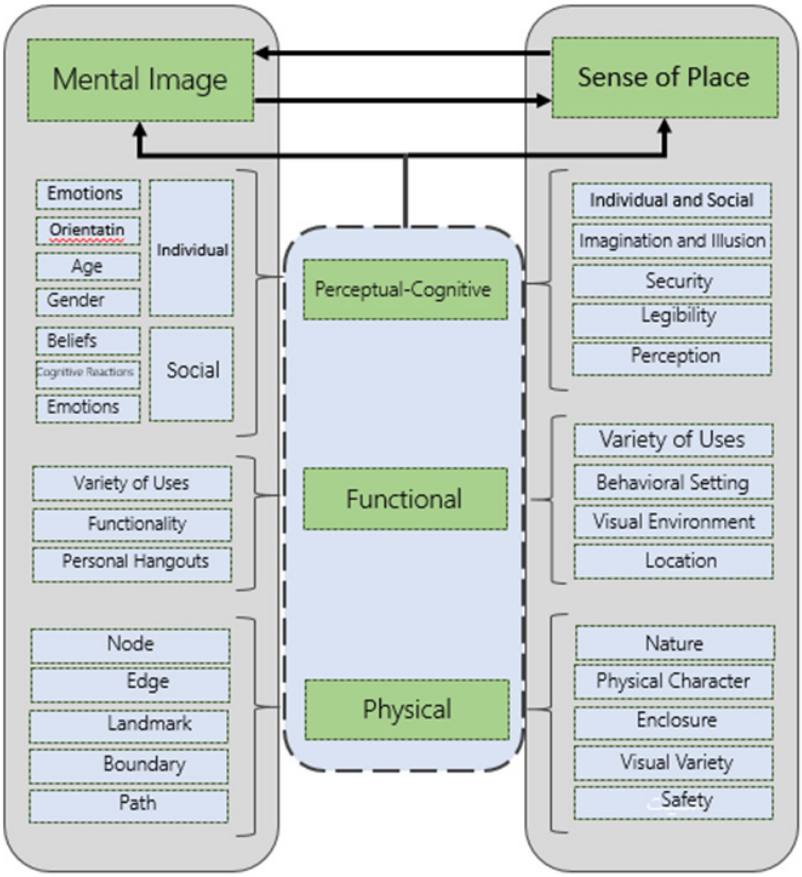

Fig. 3. Theoretical Framework of the Research on the Relationship between Sense of Place and Mental Image

4. RESEARCH METHODOLOGY

This research is applied in nature, aiming to utilize its results to enhance the components of urban facades to increase the sense of place attachment and the mental image of citizens. The research method is a descriptive survey, and data collection has been conducted through library studies, observation, and questionnaires. For analyzing the questionnaire data, Amos and SPSS software were used.

To carry out the research steps, a researcher-constructed questionnaire was designed based on the theoretical foundations (Fig. 3). Professionals in the fields of architecture and urban design validated the questionnaire's validity, and software was used to check its reliability. The questionnaire's strong reliability was indicated by the Cronbach's alpha test, which was employed to establish reliability. In every case, the coefficient was greater than 0.9. The residents of Ardabil City make up the statistical population, and the Cochran method was used to determine the sample size, which came out to be 384 persons. For two months, the questionnaire was disseminated and collected on various days and at varied times. In this study, 410 questionnaires were distributed among the citizens, and after excluding the deviated responses, 384 questionnaires remained.

To assess the validity of the questionnaire indices and ensure the necessary alignment and coherence among the indices (questions), confirmatory factor analysis (CFA) was used. Figure 4 illustrates the first-order factor analysis model.

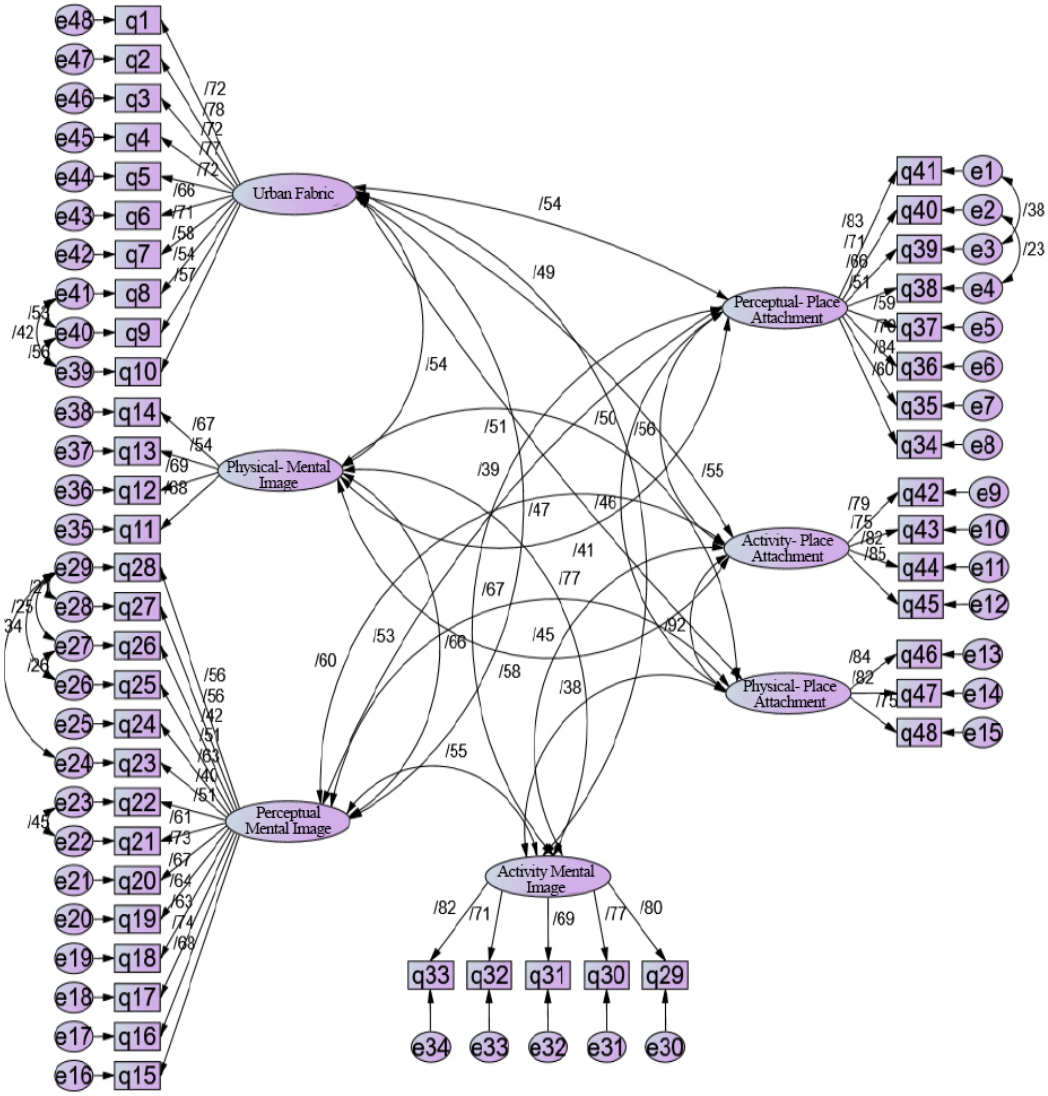

Fig. 4. Standardized Factor Loadings of the First-Order Confirmatory Factor Analysis Model

4.1. Study Area

The present study focuses on Imam Khomeini Street, the main and oldest street in Ardabil. Historically, this street housed prominent locations such as Mellat Park (Shah Baghi), which contributed to its vibrant atmosphere. There were many types of commercial buildings, and the street was a well-liked place for people to socialize and engage in leisure activities. The area served as a behavioral setting and an urban hangout, attracting individuals for face-to-face interactions and strolls.

Situated in the city center, Imam Khomeini Street is close to notable buildings and famous parts of Ardabil, leading to a high volume of foot traffic. This central location enhances its potential to increase and strengthen the sense of place attachment and to create a lasting mental image among citizens.

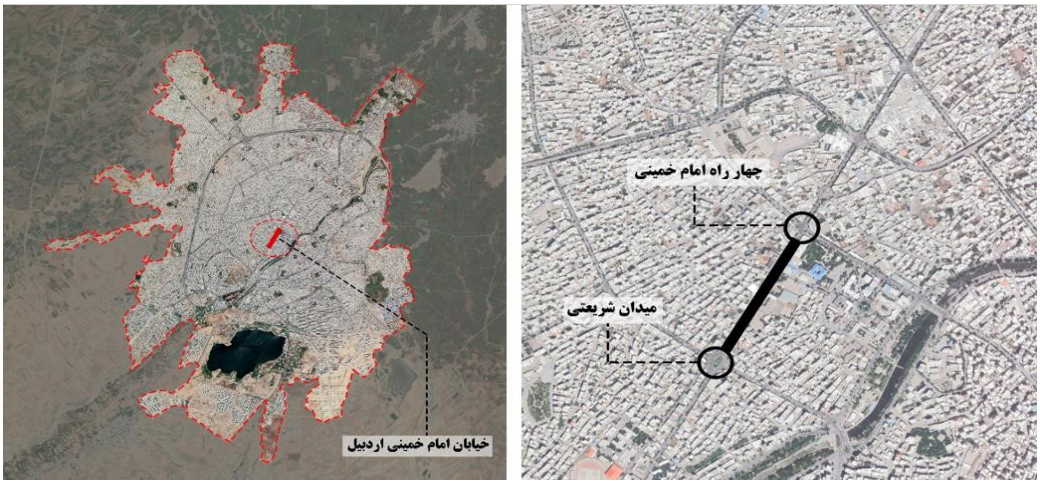

Fig. 5. Study Area Map (Western Side of Imam Khomeini Street, Ardabil, Iran)

(https://earth.google.com/web/@38.2421103,48.31310456,-32375.50485256a,58489.97215499d,35y,0.0129h,0t,0r/data=OgMKATA)

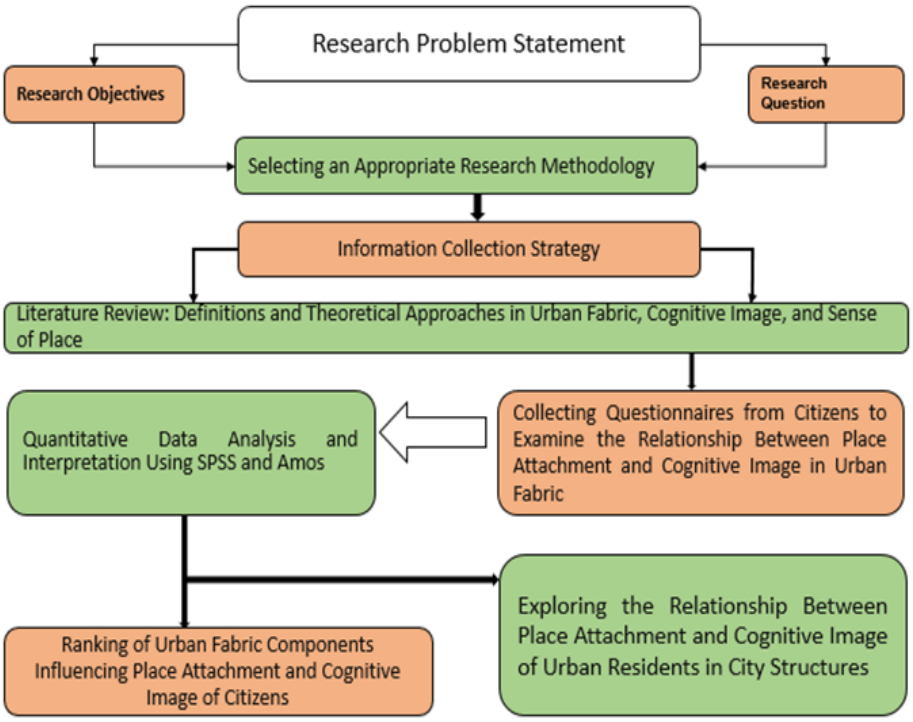

Fig. 6. Research Methodology

5. FINDINGS

Descriptive Statistics: This section presents the demographic statistics of the survey respondents, including residence, gender, marital status, education, and age, as detailed in Table 5.

Based on the skewness test, all studied variables exhibit a normal distribution. Initially, Table 6 utilizes the skewness coefficient to examine whether the data is normally distributed. As shown in the table, the skewness and kurtosis values for all variables fall between -2 and +2. Given that the skewness and kurtosis coefficients for the studied variables are within this range, it can be inferred that there is no significant deviation from normality among the data. Therefore, overall, and based on the conducted analyses, it can be concluded that the distribution of the variables in Table 6 is normal or at least very close to normal.

Table 5. Demographic Statistics

Demographic Characteristics		Number	Percentage
Gender	Male	215	55.99
	Single	169	44.01
Marital Status	Married	258	67.2
	Under 18 years	126	32.8
Age	18 to 25 years	37	9.6
	26 to 35 years	119	31
	36 to 45 years	149	38.8
	46 to 55 years	61	15.9
	56 to 65 years	9	2.35
	Ardabil	9	2.35
Residency	Visitor	238	62.0
	Temporary Residence	62	16.1
	Less than High School	84	21.9
Education	High School Diploma	40	10.4
	Bachelor's Degree	102	26.6
	Master's Degree	133	34.6
	Ph.D.	88	22.9
		21	5.5
Total		384	100

Table 6. Normality Test Results of Research Variables

Variables	Kurtosis		Skewness		Test Result
	Statistical Value	Standard Error	Statistical Value	Standard Error	
Urban Facade	-0.328	0.130	-0.066	0.260	Normal
Mental Image	-0.570	0.130	0.242	0.260	Normal
Sense of Place Attachment	-0.431	0.130	-0.045	0.260	Normal

In the research findings, the relationship between sense of place and mental image and urban form was examined using correlation analysis, as depicted in Table 7. According to this analysis, there exists a direct correlation among the research variables, with respective correlation coefficients of 0.644 between mental image and sense of place, 0.572 between urban form and sense of place, and 0.554 between urban form and mental image.

Additionally, the correlation between the subcomponents of sense of place and mental image is explored in Table 8.

Table 7. Pearson Correlation Test Results Between Variables

Variables		Urban Facade	Mental Image	Sense of Place Attachment
Urban Facade	Correlation Coefficient	1		
	Significance Level	0		
Mental Image	Correlation Coefficient	0.554	1	
	Significance Level	0.00	0	
Sense of Place Attachment	Correlation Coefficient	0.572	0.644	1
	Significance Level	0.00	0.00	0

Table 8. Pearson Correlation Test Between Subcomponents of Sense of Place Attachment and Mental Image

Functional of Sense of Place Attachment		Cognitive-Perceptual of Sense of Place Attachment	Physical Sense of Place Attachment	Functional of Mental Image	Cognitive-Perceptual of Mental Image	Physical Image of Mental Image	Subcomponents
Physical Image of Mental Image	Correlation Coefficient	1					
	Significance Level						
Cognitive-Perceptual of Mental Image	Correlation Coefficient	0.630	1				
	Significance Level	0.00					
Functional of Mental Image	Correlation Coefficient	0.561	0.497	1			
	Significance Level	0.00	0.00				
Physical Sense of Place Attachment	Correlation Coefficient	0.370	0.377	0.351	1		
	Significance Level	0.00	0.00	0.00			
Cognitive-Perceptual of Sense of Place Attachment	Correlation Coefficient	0.589	0.522	0.592	0.394	1	
	Significance Level	0.00	0.00	0.00	0.00		
Functional of Sense of Place Attachment	Correlation Coefficient	0.484	0.531	0.434	0.773	0.513	1
	Significance Level	0.00	0.00	0.00	0.00	0.00	

The results of Pearson correlation analysis between the subcomponents of mental image and sense of place indicate that a significant correlation exists among all subcomponents of mental image and sense of place. The strongest correlation is observed between the functional component of the sense of place and the physical component of the sense of place with a coefficient of 0.773, while the weakest correlation is between the physical component of the sense of place and the functional component of the mental image with a coefficient of 0.351. Components that contribute to the sense of place profoundly influence residents, thereby enhancing the correlation among subcomponents of the sense of place.

Among the physical, cognitive-perceptual, and functional components in the mental image and sense of place, the cognitive-perceptual component shows the highest correlation coefficient of 0.522, while the physical component shows the lowest correlation coefficient of 0.370. Cognitive-perceptual components, which strengthen the sense of place, exhibit a direct relationship with residents' mental images. The similarity of cognitive-perceptual components influencing both sense of place and mental image strengthens the correlation between these two components.

5.1. Ranking Research Components

Ranking the components through factor analysis enables the identification of strengths and weaknesses within these streets from residents' perspectives. This process allows us to strengthen the identified strengths and address the weaknesses, thereby enhancing the sense of place and mental image within the urban fabric of these streets.

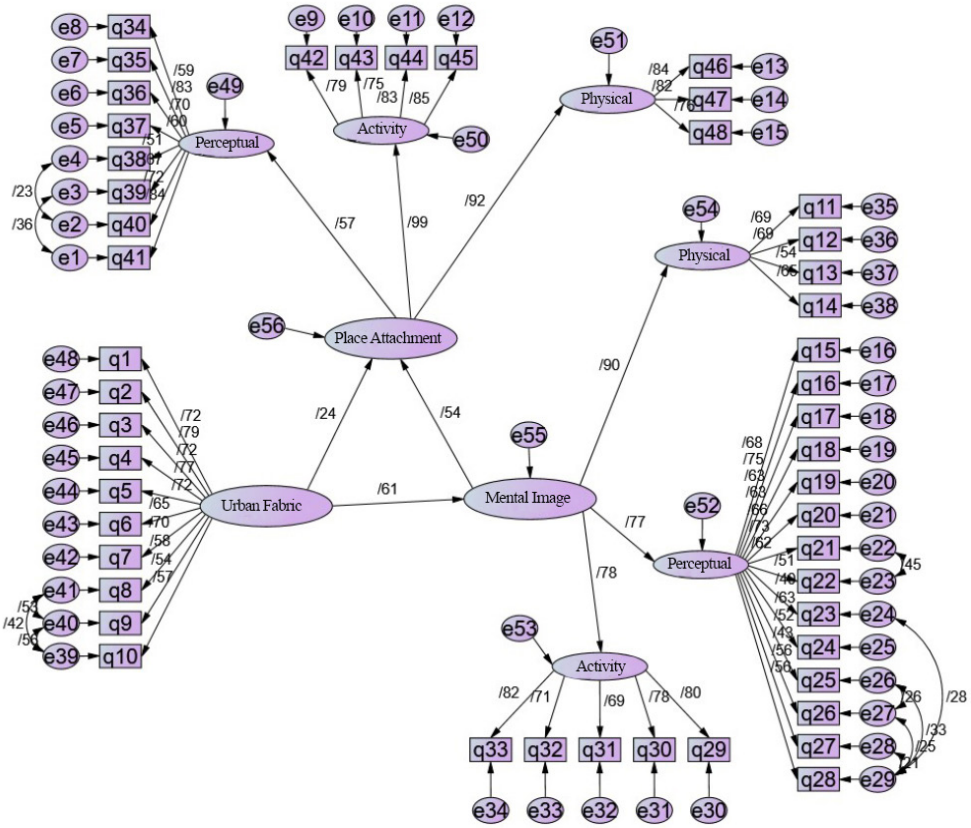

Fig. 7. Confirmatory Factor Analysis

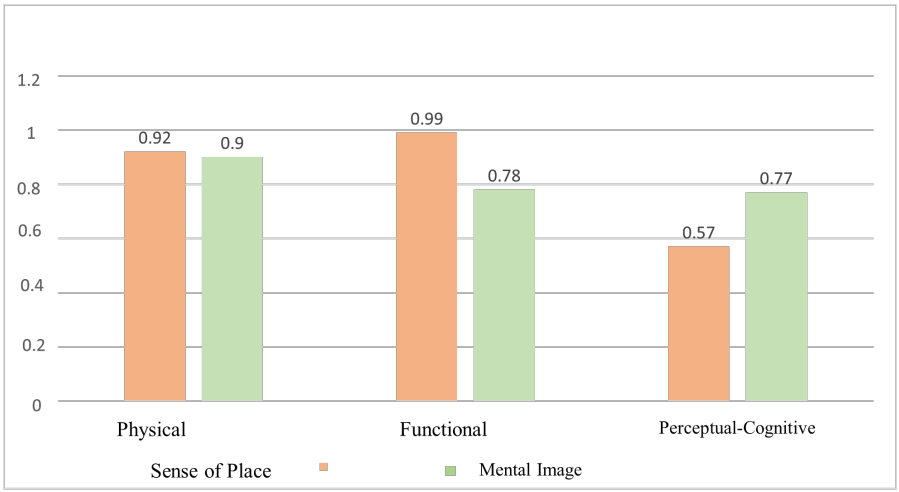

Fig. 8. Rating of Components Influencing Mental Image and Sense of Place among Citizens

The components of physical, functional, and cognitive-perceptual aspects in the mental image and sense of place, respectively, exert varying levels of influence on residents. The functional component of the sense of place has the highest factor loading of 0.990, followed by the physical component of the sense of place with a factor loading of 0.920. Conversely, the cognitive-perceptual component of the sense of place and mental image has the lowest factor loading at 0.570 and 0.770, respectively, indicating lesser impact on residents within this urban context. Thus, due to its location within the city, daily activities, and interactions among citizens, along with the diversity of uses available to people of all ages and backgrounds, this street fosters a sense of place even through obligatory activities. It is noteworthy that aside from commercial and administrative uses, there are no urban furnishings or behavior zones on

this street. Introducing behavior zones could enhance visual aesthetics and improve social interactions among residents. Historically, the presence of older adults on this street was supported by the existence of gathering spots and behavior zones, which strengthened social bonds among individuals. Therefore, creating such spaces could further enhance the sense of place within this urban area. Easy access to this street and its surrounding prominent spaces significantly influences the development of a sense of place. Based on the findings of this study, enhancing green spaces, planting native trees, designing relaxation areas, using suitable urban furniture, reducing crowding, and improving the physical structure of this area can effectively enhance both the mental image and sense of place. Social connections were historically formed through the existence of gathering spots and behavior zones, as well as through national and religious events, shaping the relationship between the urban area and its residents on this street.

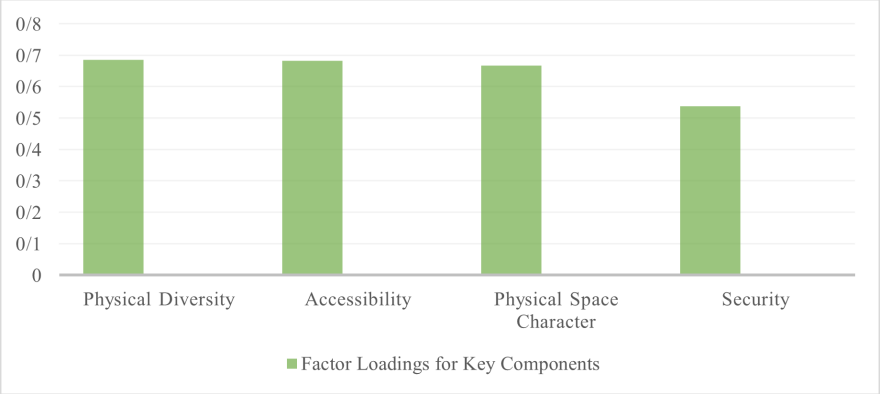

Fig. 9. Factor Loadings of Physical Components on Mental Image

Figure 9 illustrates the factor loadings of physical components on the mental image. Diversity of physical structure, accessibility, physical character of space, and safety are ranked with factor loadings of 0.685, 0.682, 0.667, and 0.537, respectively.

The diversity of uses within the physical structure of this street and accessibility to various points in Ardabil play a crucial role in shaping the mental image of residents. In the past, urban spaces on this street were highly effective, functioning as a city hub. However, today, due to the fragmented nature of street uses and the lack of space for social bonding, none of the segments of this street are considered social or communal activities, and their functions merely attract people to this street. Additionally, the perceived security in this street is not sufficient, and physical measures are necessary to improve the security of this street.

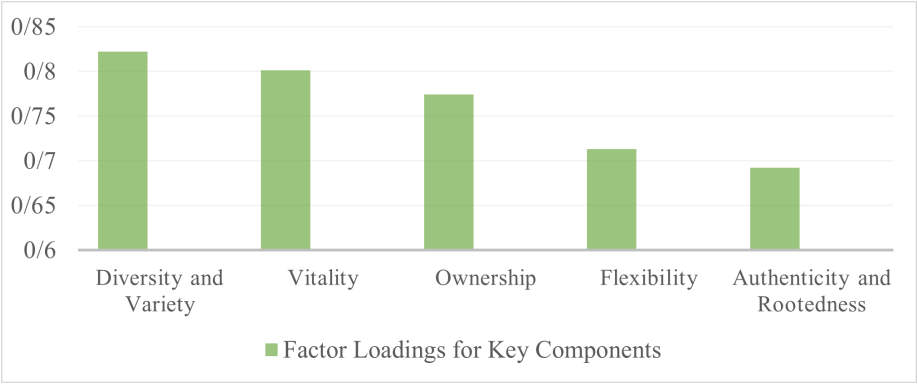

Fig. 10. Factor Loadings of Functional Components on Mental Image

In Figure 10, the factor loadings of functional components on the mental image are as follows: diversity and variety, liveliness, ownership, authenticity (rootedness), and flexibility are ranked with factor loadings of 0.822, 0.801, 0.774, 0.713, and 0.692, respectively.

The most significant factor contributing to the sense of place for individuals is accessibility to this street. The movement of people through this street due to its strategic location and proximity to various population centers has fostered a sense of place. As mentioned earlier, even though natural elements are minimally present on this street, these subtle natural features still contribute to creating a sense of place. The activities

and interactions that occur among residents over time in an urban space contribute to the formation of mental images and a sense of place. Additionally, common social activities and physical signs that develop among residents contribute to citizen satisfaction.

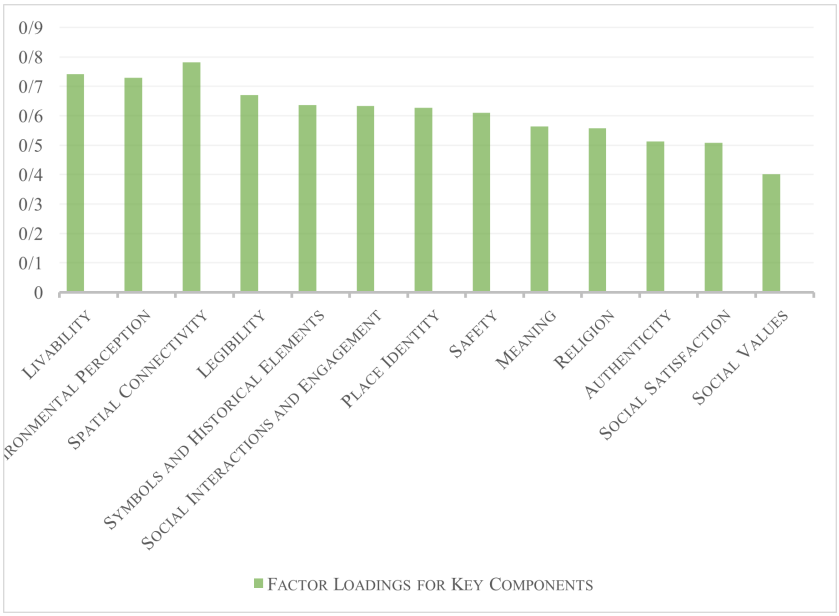

Fig. 11. Factor Loadings of Perceptual-Cognitive Components of Mental Image

As illustrated in Figure 11, the cognitive-perceptual components of the mental image—vitality, environmental perception, and spatial relationships—have factor loadings of 742.0, 729.0, and 681.0, respectively, indicating the highest scores. Conversely, social values, sense of place identity, and social satisfaction have factor loadings of 401.0, 424.0, and 508.0, respectively, indicating the lowest scores.

Imam Khomeini Street in Ardabil is a bustling, vibrant thoroughfare due to its diverse range of activities. Spatial relationships between its various sections are well-established and aligned with the needs and desires of the populace. Unfortunately, in recent years, neglect of Ardabil's historic fabric has consigned the identity markers of this street to oblivion, overshadowed by the mass construction of incongruous and architecturally mismatched new buildings. Consequently, the local identity of this street has faded, altering societal structures and transforming community values into anti-values, thereby reducing public satisfaction with its social fabric.

The relationship forged between this urban space and its inhabitants, shaped by events, social bonds, and their mental engagement within this environment, has contributed to the satisfaction of the people with this street. The diversity and variety of activities on the street foster its vitality, encouraging people to engage and utilize it. The social activities and urban functions on this street exhibit limited flexibility, which could be enhanced to diversify activities further. Architecturally, the transformation of authentic and rooted structures into irregular and unsuitable buildings has compromised the authenticity and rootedness of Imam Khomeini Street.

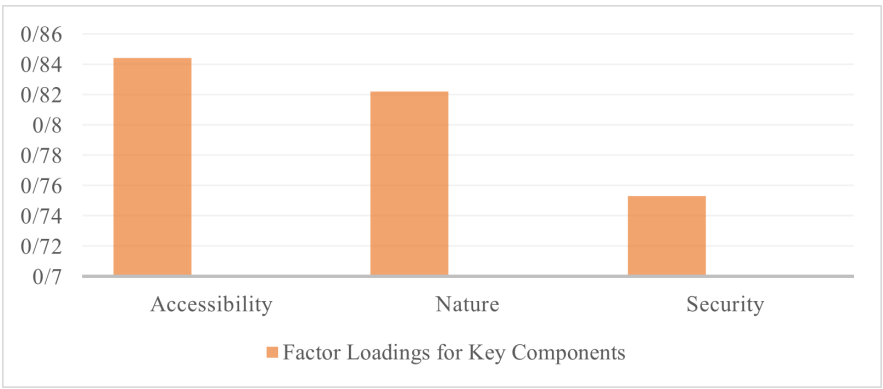

Fig. 12. Factor Loadings of Physical Components on Sense of Place

As depicted in Figure 12, among the physical components influencing the sense of place, accessibility, nature, and safety respectively score the highest with factor loadings of 0.844, 0.822, and 0.753.

The location of this street in the city center and its accessibility to surrounding spaces contribute significantly to residents' satisfaction with its accessibility. The component of nature in this area exhibits the lowest quality. Enhancing the sense of place can be achieved by creating green spaces and incorporating flowering plants within this urban framework. Furthermore, dissatisfaction among residents regarding safety stems from street disorderliness, lack of rest areas, absence of urban furniture, and overcrowding, all of which diminish safety in this area. The physical form and structure of a place also play a significant role in shaping memories and people's perceptions of place.

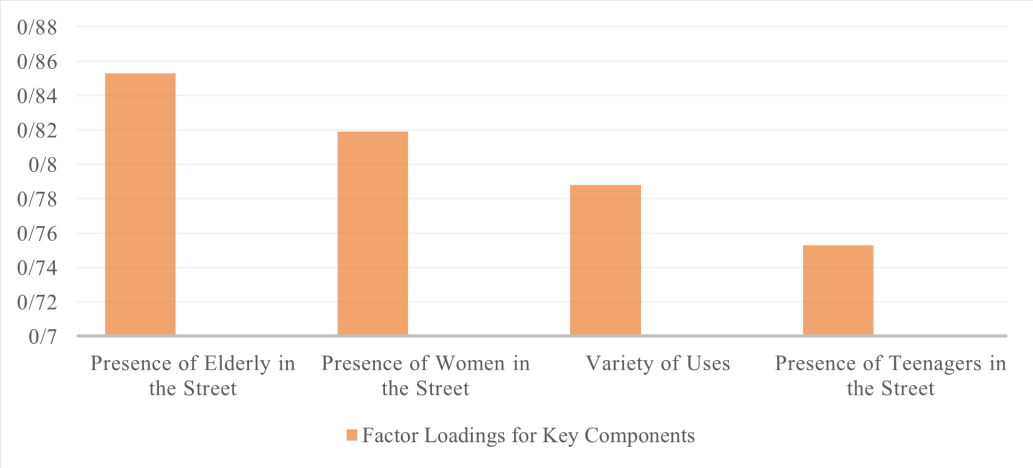

Fig. 13. Factor Loads of Functional Components for Sense of Place

As depicted in Figure 13, the components of activity contributing to the sense of place are ranked based on their factor loads. The presence of the elderly, and women, diversity of uses, and presence of adolescents have factor loads of 0.853, 0.819, 0.788, and 0.753 respectively, highlighting their significance in shaping the sense of place.

The presence of various segments of society and the diversity of commercial and administrative uses on a street are among the most important factors contributing to the sense of place in terms of activity. Residents find the presence of elderly individuals on this street desirable, although adolescents are less frequently present due to inadequate provision of behavioral spaces on the mentioned street. This street's central location and proximity to notable historical buildings draw traffic, which detracts from the street's overall urban quality. Social contacts are restricted on a busy roadway that does not offer enough rest areas, appealing urban environments, or behavioral hubs. Currently, due to the disjointed nature of street uses and the absence of spaces for fostering social bonds among citizens, none of the parts of this street are considered elective or social activities, and only the function leads to the presence of individuals on the street. A city space must meet the needs of citizens for all three of the mentioned activities and respond to different age groups in order to increase the presence of citizens in this area by enhancing these activities on this street and to grow and increase the sense of belonging to the site.

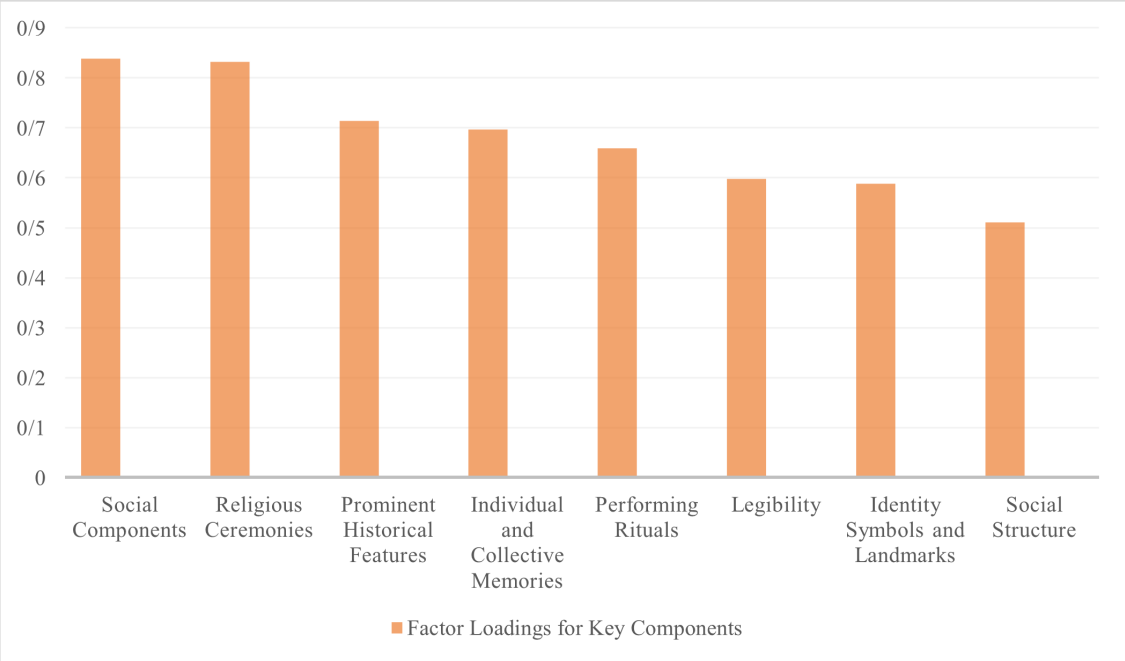

Fig. 14. Factor Loadings of Perceptual-Cognitive Components of Place Attachment

As illustrated in Figure 14, within the perceptual components, social significance, religious ceremonies, and prominent historical characteristics have factor loadings of 0.839, 0.832, and 0.714 respectively, indicating the highest scores. In contrast, social structure, symbols, and identity features have factor loadings of 0.511, 0.588, and 0.598 respectively, indicating the lowest scores.

The holding of religious ceremonies, historical characteristics, and social features has enhanced place attachment in the perceptual dimension. Imam Khomeini Street has historically served as a venue for national and religious ceremonies, creating enduring memories in the minds of the populace due to its rich historical legacy. Today, Imam Khomeini Street operates very weakly in terms of urban planning aspects, yet it remains a destination for fulfilling personal needs. In the past, the urban spaces on this street were highly functional, serving as a communal hub, but today, none of its sections serve as behavioral settings, merely attracting people due to their function. As previously mentioned, the absence of social structures and historical and identity symbols has diminished the legibility of this street's facade, necessitating more extensive improvements. Engaging citizens' perceptions of the environment fosters emotional bonding formation. Furthermore, the utilization of indigenous concepts, symbols, and icons within an urban space significantly contributes to understanding a space and shaping individuals' mental imagery of a significant place. These mental images contribute to the development of a sense of place and place attachment.

6. DISCUSSION AND CONCLUSION

This research aimed to evaluate and analyze the relationship between place attachment and mental image in urban facades. Comparing the research background with the findings and analyzing them reveals that the results of Heydari (2014) and Ananahad (2019), which consider personal emotions as the basis for the formation of place attachment, align with this study. Additionally, this research confirms Amjad's (2021) view that building facades (urban facades) are influential factors in creating place attachment. The current study complements Eskooi et al. (2018), indicating that the relationship between citizens' mental image and place attachment is directly correlated.

In response to the first research question, based on the findings, the activity component of place attachment, with a factor loading of 0.99, has the most significant impact on creating a sense of place attachment among citizens. Similarly, the physical component of the mental image—which has a factor loading of 0.90—has the most impact on how citizens build their mental images. Of the activity components of place attachment in this urban facade, the presence of women and the elderly have had the largest impact, with factor loadings of 0.83 and 0.85, respectively. Because this street has historically served as a hub for social interaction and the development of close relationships between people, it is thought to have a higher concentration of elderly people. These mental memories from the past have encouraged the elderly to frequent this street, reminiscing about their past experiences. Due to its central location in the city and

the daily activities, the diversity of uses in this facade allows people of all ages and backgrounds to utilize this street, resulting in a more noticeable presence of women. Overall, the activities carried out in this street have created a sense of place attachment, aligning with the desires and needs of the citizens.

Among the physical components of the mental image, land use diversity and accessibility, with a factor loading of 0.69, have had the most significant impact on creating citizens' mental images. The physical structure of an urban facade, representing its physical character, function, and identity, contributes to the mental image of this street. Additionally, the diverse land uses and accessibility to prominent surrounding spaces play a crucial role in shaping the mental image of citizens.

In response to the second research question, the relationship between the mental image and place attachment is confirmed with a Pearson correlation coefficient of 0.644. By enhancing and improving the mental image components, place attachment can be increased. When the urban facade activities align with the needs and desires of the people, they create a sense of place attachment. Repeated activities in this street form mental memories, ultimately shaping individuals' mental images. The physical features of a street, including land uses, accessibility, and building facade quality, contribute to creating a mental image. If the physical aspects of a street adequately fulfill visual and functional requirements, they can enhance place attachment by creating a positive mental image. Therefore, the physical characteristics of a street strengthen place attachment. The relationship between this street and the citizens is shaped by national and religious events, social ties, mental engagements, and the characteristics and meanings of the environment, leading to citizens' satisfaction with this facade and street. Based on the research findings, this street has historically served as a social gathering place, fostering social ties and collective memories. Finally, based on the research findings, design strategies for improving the current situation of the case study are presented as follows:

A. Preserving Identity and Enhancing Place Attachment in Urban Spaces by Identifying Site Potential and Characteristics

- Creating unique spaces in terms of function and visual richness.
- Spatial composition and quality of the physical environment.
- Restoration and revitalization of old buildings.
- Creating diverse uses with varying activity times, such as street performers, street theater, and national and religious ceremonies.
- Preserving and highlighting natural and artificial landmarks in the area.

B. Enhancing Place Attachment and Legibility of Urban Spaces by Establishing Landmarks and Prominent Buildings in the Study Area

- Visual differentiation of the space.
- Enhancing opportunities for social gatherings to form new collective memories and encourage citizen participation.
- Conducting specific and diverse activities in the area.
- Evoking collective memories through the creation of social gathering places.
- Inducing identity and local characteristics.

C. Enhancing the Mental Image of Urban Facades

- Positioning urban landmarks in a cohesive cognitive map.
- Aligning the site to design an urban gathering spot as a city landmark.
- Establishing physical landmarks with high visual impact.
- Considering the climate and local context in design.

Future research should focus on assessing the behavioral setting components in this street and proposing strategies for their revitalization. Additionally, by leveraging expert opinions in this field, considering the responses obtained in this research and the conducted analyses, more suitable designs for urban facades can be developed, leading to improved urban spaces for citizens. This research can assist urban designers and city planners in enhancing urban facades based on the needs and desires of citizens, creating spaces that foster a positive mental image of the urban environment and strengthen place attachment among individuals.

ACKNOWLEDGMENTS

This article wasn't supported by any financial or spiritual sponsors.

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.

REFERENCES

- AbdolahKhan Gorji, Mahnaz. 2006. "Urban landscape: Later abandoned by the urban media in Iran" *Abadi* 18(53): 6-19. [in Persian]
- Alishah, Majid, Abdollah Ebrahimi, and Faezeh Ghaffari. 2016. "The role of buildings facades of on urban landscape (case study: Old context of sari)". https://doi.10.7456/1060AGSE/019. [in Persian]
- Altman, Irwin, and S. M. Low. 1992. "Place Attachment Plenum Press." New York-London 262.
- Amjad, Marjan, Farhang Mozaffar, Shirin Toghyani, and Vahid Ghasemi. 2021. "The Effect of Resident's Sense of Belonging to the Place On the Neighboring Facades of Isfahan Maadis." *Journal of Iranian Architecture & Urbanism(JIAU)* 12(2): 119-136. https://doi.org/10.30475/isau.2021.270077.1631. [in Persian]
- Ananahad, Mahmoud, Hamze Golamalizade, and Farzaneh Asadi MalekJahan. 2019. "Measure the sense of belonging to the place and protect the identity of residential units in the urban area. Case study: Old Quarter of Saghrysazan Rasht." *Journal of Urban Ecology Researches* 10(19): 73-88. https://doi.org/10.30473/grup.2019.5645. [in Persian]
- Appleyard, Donald. 1976. "Planning a pluralist city." Conflicting Realities in Ciudad Guayana.
- Balali Oskoyi, Azita, Minou Gharehbaglou, and Mina Heydariturkmani. 2019. "Analyzing the role of mental images in producing the sense of belonging to the neighborhoods, case study: Shotorban neighborhood of Tabriz." *Geography (Regional Planning)* 9(1): 207-228. https://doi.20.1001.1.22286462.1397.9.1.13.3. [in Persian]
- Baper, Salahaddin Yasin, and Ahmad Sanusi Hassan. 2012. "Factors affecting the continuity of architectural identity." *American Transactions on Engineering & Applied Sciences* 1(3): 227-236.
- Bennett, Julia. 2014. "Gifted places: The inalienable nature of belonging in place." Environment and Planning D: Society and Space 32(4): 658-671. https://doi.org/10.1068/d4913p.
- Befrouz, Fatemeh. 1991 "Investigations of Environmental Perception and Behavior in the Realm of Contemporary Behavioral and Human Geography." *Quarterly Journal of Geographic Research* 20. [in Persian]
- Canter, David. 1977. *The psychology of place*. St Martin'S Press.
- Carmona, Matthew. 2010. *Public places, urban spaces: the dimensions of urban design*. Routledge.
- Ebrahimnia, Vahide, Tahereh Shahbazi, and Rouhollah Rahimi. 2022 "The Analysis of Spatial Environment Influencing Social Capital in Neighborhoods of Sari City". *Geography and Urban Space Development* 9(3): 121-140. https://doi.10.22067/jgusd.2022.67168.0. [in Persian]
- Eraydın, Zeynep. 2007. "Building a legible city: how far planning is succesful in Ankara." Middle East Technical University.
- Esmaili, Fatemeh, Farzin Charehjoo, and Nassim Hoorijani. 2020. "Analyzing and Evaluating Facades with a Special Approach to Visual Aesthetics Using the Grid Method (Case Study: Enqelab Street in Sanandaj)." *The Monthly Scientific Journal of Bagh-e Nazar* 17(82): 65-78. DOI: 10.22034/BAGH.2019.165147.3934. [in Persian]
- Ghashghaee, Reza, Khosro Movahed, and Hojatollah Mohammadzadeh. 2016. "Evaluation of sense of place with an emphasis on physical and environmental factors in urban coastal areas (Case study: Boushehr Town)." *Geographical Urban Planning Research (GUPR)* 4(2): 261-282.DOI: 10.22059/JURBANGEO.2016.59163. [in Persian]
- Ghorbanian, Mahshid, Mostafa Behzadfar, and Farshad Shariatpour. 2020. "Analyzing Techniques of Urban Façade Using Developing Topic-based Analysis Approach of Cityscape According to the Factors Affecting it from an Urban Design Perspective." *Journal of Architecture and Urban Planning* 12(27): 99-125. https://doi.org/10.30480/aup.2020.800. [in Persian]
- Gifford, Robert, Donald W. Hine, Werner Muller-Clemm, and Kelly T. Shaw. 2002. "Why architects and laypersons judge buildings differently: Cognitive properties and physical bases." *Journal of architectural and Planning Research*: 131-148. https://www.researchgate.net/publication/228911177
- Golkar, Kourosh. 2001. "Components of urban design quality." [in Persian]
- Gospodini, Aspa. 2002. "European cities in competition and the new'uses' of urban design." *Journal of urban design* 7(1): 59-73. https://doi.10.1080/13574800220129231.
- Hanks, Lydia, Lu Zhang, and Nathan Line. 2020. "Perceived similarity in third places: Understanding the effect of place attachment." *International Journal of Hospitality Management* 86: 102455. https://doi.10.1016/j.ijhm.2020.102455.
- Heidari, Ali Akbar, Ghasem Motalebi, and Fateme Nekoeimehr. 2014. "Finding Relationship between Sense of Place and Place Attachment in Student Dormitory." *Honar-Ha-Ye-Ziba: Memary Va Shahrsazi* 19(1): 15-22. https://doi. 10.22059/JFAUP.2014.55372. [in Persian]
- Hidalgo, M. Carmen, and Bernardo Hernandez. 2001. "Place attachment: Conceptual and empirical questions." *Journal of environmental psychology* 21(3): 273-281. https://doi.org/10.1006/jevp.2001.0221.

- Hollander, Justin B., and Eric C. Anderson. 2020. "The impact of urban façade quality on affective feelings." *Archnet-IJAR: International Journal of Architectural Research*. https://doi.10.1108/ARCH-07-2019-0181.
- Ian, Bentley, G. Smith, S. Mcglynn, P. Murrain, and P. Alocock. 1985. "*Responsive Environments.*" Printed and bound in Great Britain by MPG Books Ltd, Bodmin, Cornwall.
- Jennath, K Aysha, and PJ Nidhish. 2016. "Aesthetic judgement and visual impact of architectural forms: a study of library buildings." *Procedia Technology* 24: 1808-1818. https://doi.10.1016/j.protcy.2016.05.226.
- Kaplan, Stephen. 2016. "Cognitive maps, human needs and the designed environment 5.4." *Environmental Design Research* 1.
- Karimi Moshaver, Mehrdad, Seyed-Amir Mansouri, and Ali Asghar Adibi. 2010. "Relationship Between The Uurban Landscape and Position of Tall Building In The City." *The Monthly Scientific Journal of Bagh-e Nazar* 7(13): 89-99. http://www.bagh-sj.com/article_28_ff41c313eb50f042b5673fef0f137452. [in Persian]
- Khakzand, Mahdi, Maryam Mohammadi, Fatema Jam, and Kourosh Aghabozorgi. 2014. "Identification of factors influencing urban facade's design with an emphasis on aesthetics and ecological dimensions Case study: Valiasr (a.s.) Street –Free Region of Qeshm." *Motaleate Shahri* 3(10): 15-26. https://urbstudies.uok.ac.ir/article_8763.html. [in Persian]
- Khatami, Seyad Mahdi, and Porya Bojari. 2020. "Analysis of the Challenges of Tehran's Urban Views in the Recent Century." *Urban and Rural Management* (58): 111. https://www.researchgate.net/publication/349965801. [in Persian]
- Lang, Jon T. 1987. Creating Architecture Theory: the Role of the Behavioral Sciences in Environment Design. Van Nostrand Reinhold Company, Australia.
- Lewicka, Maria. 2011. "Place attachment: How far have we come in the last 40 years?" *Journal of environmental psychology* 31(3): 207-230. https://doi.org/10.1016/j.jenvp.2010.10.001.
- Lynch, Kevin. 1960a. The Image of the city Mass Cambridge Massachusetts: MIT press.
- Lynch, Kevin. 1960b. "The image of the environment." *The image of the city* 11: 1-13.
- Lynch, Kevin. 1984. Reconsidering the image of the city. Springer. https://doi.10.1007/978-1-4757-9697-1_9
- Mahdavinejad, Mohammadjavad, and Maedeh Pourfathollah. 2015. "New Lighting Technologies and Enhancement in Sense of Belonging (Case Study: Tehran Buildings)." *Human Geography Research* 47(1): 131-141. https://doi.org/10.22059/jhgr.2015.51238. [in Persian]
- Mahmoodi, Seyed Amir Saeid. 2006. "City view, A review of several theories." *Abadi* 18(53): 54-61. [in Persian]
- Mansouri, Maryam. 2008. "landscape, place, history." *The Monthly Scientific Journal of Bagh-e Nazar* 5(9). [in Persian]
- Mansouri, Seyed-Amir. 2007b. "The Spatial Organization of Iranian City in Two Periods: Before and After Islam Based on the Evidences of Kerman City Evolution." *The Monthly Scientific Journal of Bagh-e Nazar* 4(7): 50-60. http://www.bagh-sj.com/article_67_4a7310658ac609e69fa44d458ff60357.pdf. [in Persian]
- Mellor, David, Mark Stokes, Lucy Firth, Yoko Hayashi, and Robert Cummins. 2008. "Need for belonging, relationship satisfaction, loneliness, and life satisfaction." *Personality and individual differences* 45(3): 213-218. https://doi.org/10.1016/j.paid.2008.03.020.
- Michael, Tribe. 1974. Stadtgestaltuxg theorie and praxis Bertel smann.
- Miller, Linn. 2003. "Belonging to country—a philosophical anthropology." *Journal of Australian Studies* 27(76): 215-223. https://doi.org/10.1080/14443050309387839.
- Moulay, Amine, Norsidah Ujang, Suhardi Maulan, and Sumarni Ismail. 2018. "Understanding the process of parks' attachment: Interrelation between place attachment, behavioural tendencies, and the use of public place." *City, Culture and Society* 14: 28-36. https://doi.org/10.1016/j.ccs.2017.12.002.
- Mutlu Danaci, Hacer, and Gamze Kiran. 2020. "Examining the Factor of Color on Street Facades in Context of the Perception of Urban Aesthetics: Example of Antalya." *International Journal of Curriculum and Instruction* (12): 222-232.
- Nasar, Jack L. 1994. "Urban design aesthetics: The evaluative qualities of building exteriors." *Environment and behavior* 26(3): 377-401.
- Neacşu, Marius-Cristian, and Silviu Neguţ. 2012. "City image–Operational instrument in urban space management–A Romanian sample." *Advances in spatial planning. Rijeka: InTech Open*: 247-274.
- Negro, D. Del. 2003. "*The perception of central London by Night*" UCL Bartlett School of Graduate Studies, London, United Kingdom.
- Norberg-Schulz, Christan. 1997. *The Phenomenon of place*. New York: Princton Architectural Press.
- O'Connor, Zena. 2008. "Façade colour and aesthetic response: Examining patterns of response within the context of urban design and planning policy in Sydney." http://hdl.handle.net/2123/4093

- Pakzad, Jahanshah. 2003. "Phenomenology of Residential Building Façade and the Evolution Process of its Expectations." *Journal Honar-Ha-Ye-Ziba* 14(14): 51-62.
- Pakzad, Jahanshah. 2014. *Theoretical Foundations and Urban Design Process*. Vol. 1. Ministry of Housing and Urban Development
- Proshansky, Harold H., Abbe K. Fabian, and Robert Kaminoff. 2014. "Place-identity: Physical world socialization of the self (1983)." In *The people, place, and space reader*, 111-115. Routledge.
- Rahimi, Rouhollah, and Mojtaba Ansari. 2020 "Recreating Place in Iranian Monuments Case Study: Hafez Garden-Tomb (1452-1936 A.D.)." *Iranian Journal of Archaeological Studies* 10(1): 62-82. https://doi. 10.22111/IJAS.2020.6627. [in Persian]
- Rahimi, Rouhollah, Ali Mohammadi, and Shokrollah Hasanzadeh Davoodi. 2015 "Holographic model for the evolution of the city (A case study: Amol)." *The Monthly Scientific Journal of Bagh-e Nazar* 11(31): 89-98. [in Persian]
- Rahimi, Rouhollah, and Razani, Farnaz. 2022 "Assessing the Relationship between Physical Healing Components of Educational Environments and Mental Health of Users (Case Study: Students of University of Mazandaran)." *Journal of Environmental Science and Technology* 24(8): 115-132. https://doi. 10.30495/jest..61216.5410. [in Persian]
- Rahimi, Rouhollah, Seyyed Mohsen Musavi, and Nasrin Mohammadi Irlu. 2023 "Measurement of Place Attachment and Identification of Influential Factors on Urban Body Patterns: A Case Study of the Western Side of Imam Khomeini Street, Ardabil." *Quarterly Journal of Studies on Islamic Iranian Cities* 13(49): 80-63. https://doi.20.1001.1.2228639.1401.13.49.2.1. [in Persian]
- Rahnama, Mohammad Rahim, and Mohammad Mohsen Razavi. 2012. "an Study of Sense of place Effect on Social Capital and Participation in Mashhad's Neighborhoods." *Honar-Ha-Ye-Ziba: Memary Va Shahrsazi* 17(2): 29-36. https://doi.10.22059/JFAUP.2012.30157. [in Persian]
- Ramkissoon, Haywantee, Betty Weiler, and Liam David Graham Smith. 2012. "Place attachment and pro-environmental behaviour in national parks: The development of a conceptual framework." *Journal of Sustainable tourism* 20(2): 257-276. https://doi.org/10.1080/09669582.2011.602194
- Rapoport, Amos. 1977. Human Aspects of Urban Form. New York: Pergamon Press.
- Raymond, Christopher M., Gregory Brown, and Delene Weber. 2010. "The measurement of place attachment: Personal, community, and environmental connections." *Journal of environmental psychology* 30(4): 422-434. https://doi.10.1016/j.jenvp.2010.08.002
- Relph, Edward. 1976a. *Place and placelessness*. Vol. 67. Pion London.
- Relph, Edward. 1976b. "*Place and Placelessness, Pion Ltd.*" Publishing, London.
- Saadati, Sayedeh Poorandokht, Farhang Mozafar, and Isa Hojat. 2019. "Identifying Effective Factors in Creating Home Attachment Based Using Grounded Theory (Case Study: Residential Units in Isfahan)." *Journal of Housing and Rural Environment* 37(164): 85-100. https://doi.10.22034/37.164.85. [in Persian]
- Scannell, Leila, and Robert Gifford. 2017. "The experienced psychological benefits of place attachment." *Journal of Environmental Psychology* (51): 256-269. https://doi.10.1016/j.jenvp.2017.04.001.
- Shafipour Yourdshahi, Pariya, Mostafa Kiani, Sara Hamzeloo, and Manouchehr Moazemi. 2023. "The Influence of "Culture from Rappaport's Viewpoint" on "Mental Image" and Examining the Role of this Influence on the Formation of the Environment." *Armanshahr Architecture & Urban Development* 15(41): 103-118. https://doi.org/10.22034/aaud.2023.294858.2508. [in Persian]
- Steele, Fritz. 1981b. *The sense of place*. CBI publishing company.
- Utaberta, Nangkula, Suhana Johar, and Adi Irfan Che-Ani. 2012. "Building facade study in Lahijan city, Iran: The impact of facade's visual elements on historical image." *International Journal of Humanities and Social Sciences* 6(7): 1839-1844.
- Yeung, Henry Wai-chung, and Victor Savage. 1996. "Urban imagery and the main street of the nation: The legibility of Orchard road in the eyes of Singaporeans." *Urban Studies* 33(3): 473-494. https://doi.org/10.1080/00420989650011870
- Zeile, Peter, Bernd Resch, Jan-Philipp Exner, and Günther Sagl. 2015. "Urban emotions: Benefits and risks in using human sensory assessment for the extraction of contextual emotion information in urban planning." *Planning support systems and smart cities*: 209-225. https://doi.10.1007/978-3-319-18368-8_11

HOW TO CITE THIS ARTICLE

Mohammadi Irlou, Nasrin, Rouhollah Rahimi, and Vahid Vaziri. 2024. Evaluation of the Relationship Between Sense of Place and Mental Image in Urban Facades; A Case Study of Imam Khomeini Street, Ardabil. *Armanshahr Architecture & Urban Development Journal* 17(46): 61-81.

DOI: 10.22034/AAUD.2023.396757.2787
URL: https://www.armanshahrjournal.com/article_182697.html