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**Original Research**

# Recognizing the Social Pattern of Place Attachment in Informal Settlements: An Empirical Study of the Al-Timor Neighborhood in Mashhad

Nadia Arbab Saljooghi (1), Toktam Hanaee (2) *, Seyyedmoslem Seyyedolhoseini (3), Sanaz Saeidi Mofrad (4)

1- Department of urbanism, Ma.C., Islamic Azad University, Mashhad, Iran

ORCID: 0009-0009-0377-2739

2*-Department of urbanism, Ma.C., Islamic Azad University, Mashhad, Iran

ORCID: 0000-0002-9750-1041

3- Department of urbanism, Ma.C., Islamic Azad University, Mashhad, Iran

ORCID: 0000-0003-0167-3904

4- Department of urbanism, Ma.C., Islamic Azad University, Mashhad, Iran

ORCID: 0000-0003-2619-8695

* Corresponding author: T.hanaee@iau.ac.ir

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## Abstract

### Aims

Rapid urbanization has contributed to the emergence and expansion of informal settlements, often accompanied by socio-economic, cultural, and environmental challenges. One issue frequently observed in such areas is a weakened sense of place attachment, which can influence residents' well-being and their long-term engagement in community life. Place attachment reflects the emotional and cognitive bond individuals form with specific environments and plays an essential role in shaping responsibility, participation, and social stability. Given the diversity of ethnic and kinship networks in informal settlements, subcultures play a central role in shaping social relations and everyday interactions, which directly influence how residents develop or weaken their sense of place. Accordingly, this study aims to identify the social patterns that shape place attachment in informal settlements, with a focus on the Al-Timor neighborhood in Mashhad.

**Methodology:** This study adopts a quantitative research approach. Using a questionnaire-based survey, data were collected from residents of the study area. The collected data were analyzed using SPSS and Partial Least Squares (PLS) software to examine the relationships between sociological, behavioral, and emotional dimensions and place attachment.

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**Findings:** The results show that sociological, behavioral, and emotional dimensions significantly contribute to the formation and reinforcement of place attachment. Furthermore, ethnic- and kinship-based subcultures, particularly through their influence on social interactions, demonstrate a notable effect on strengthening or weakening these dimensions.
**Conclusion:** The findings underscore the importance of subcultural structures and social interaction patterns in shaping place attachment within informal settlements. These insights can support the formulation of urban policies and planning strategies aimed at improving the quality of life and strengthening community cohesion in informal settlements.

**Keywords:** Social pattern, Place attachment, Informal settlement, Al-Timor neighborhood.

## 1. Introduction

Rapid urbanization has often been accompanied by the emergence and expansion of informal settlements, particularly around major cities. In Iran, accelerated urban growth in recent years has contributed to the formation and spread of these areas. This process has resulted in a range of socio-economic, cultural, security, and environmental challenges across many large cities (1)
These settlements frequently attract large numbers of migrants who bring diverse customs, beliefs, lifestyles, and subcultural backgrounds. The coexistence of such heterogeneous groups can create friction and social tension. Over time, these conditions may lead to behaviors such as reduced cooperation, weak environmental responsibility, noncompliance with urban regulations, and limited observance of civic norms across different age groups (2).
Culture plays a dual role: it reinforces identity and diversity, yet it can also become a source of conflict when development initiatives fail to account for local capacities. Cultural dynamics influence a wide spectrum of societal outcomes—from national development to social cohesion—and must balance respect for heritage with adaptability to contemporary needs. Cultural patterns therefore have the potential to offer meaningful responses to social challenges. Subcultural groups may maintain linguistic, ethnic, religious, kinship-based, or economic traditions, often settling together in specific neighborhoods. This concentration contributes to the persistence and visibility of informal settlements as a significant urban concern (2).
Living in informal settlements can, under certain conditions, weaken residents' attachment to their surroundings, which may contribute to social, political, and security challenges. Place attachment refers to the emotional and cognitive bond individuals form with specific locations, shaping their well-being and influencing their long-term presence in an area. Higher levels of attachment often foster a sense of responsibility toward the neighborhood and encourage participation in community development and local planning processes (3).
Previous empirical research in the Iranian context indicates that place attachment in informal and formal settlements may differ significantly due to social capital and interaction patterns (4)
In many informal settlements, inadequate living conditions may reduce residents' sense of belonging. As a result, individuals may experience a disconnect between their physical presence in the city and their perceived inclusion within it. This gap can generate a persistent tension between lived experience and social reality (5). Moreover, the socio-cultural and spatial dimensions of informal environments substantially influence place attachment beyond mere physical conditions (6).
The concept of "sense of place" encompasses individuals' emotional, perceptual, and experiential connections to their environment. It is sometimes described as a "structure of feeling," capturing a complex set of meanings formed through everyday interactions with place. A strong sense of place enhances environmental quality, supports social interaction, strengthens identity, and contributes to the transformation of physical spaces into meaningful locations. Such environments tend to be

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dynamic and engaging, motivating residents to care for and sustain them. This underscores the significant emotional and psychological dimensions of the human–environment relationship (7)(15). According to Gifford (2011), the physical and social aspects of neighborhoods shape residents' perceptions and behaviors. Social interactions and community cohesion are essential for the viability of neighborhoods and the prevention of conflicts, emphasizing the importance of addressing these dynamics.

Residents of informal settlements often lack a strong sense of place. Understanding place attachment in these areas—which face social, economic, and environmental challenges—is crucial from a community-centred planning perspective, as it can enhance participation in neighborhood improvement. Heterogeneous suburban neighborhoods often experience social segregation, reducing attachment and civic engagement, while environmental and spatial disparities are also evident.

Informal settlements are vital living spaces in cities of the Global South. Despite their diversity, they share common characteristics, including the presence of low-income migrant households, insecure land tenure, inadequate sanitation, substandard housing, and limited infrastructure. Such conditions often diminish residents' attachment to their neighborhoods, producing negative consequences and further marginalization. Therefore, investigating place attachment, its dimensions, and its influencing factors is essential for the sustainable development of informal settlements. Place attachment fosters identity, social cohesion, responsibility, and participation, all of which are critical for improving and developing urban spaces.

## 2. Research Background and Theoretical Framework

This study combines two research domains: subcultures and place attachment in informal settlements. While there is extensive research on each topic individually, in Iran, there is limited literature examining place attachment through the perspective of subculture theories within informal settlements.

Recent scholarship on place attachment has expanded significantly, offering diverse theoretical perspectives that emphasize emotional, cognitive–behavioral, and socio-cultural dimensions. Studies by Scannell and Gifford (2010), Manzo and Devine-Wright (2014), Lewicka (2011), and subsequent works published between 2018 and 2024 provide more comprehensive frameworks that explain how individuals and communities develop attachment to place. Integrating these more recent theoretical contributions strengthens the foundation of this study and provides a clearer understanding of the mechanisms through which physical, social, and cultural factors shape place attachment in informal settlements.

Majdi et al. (1400) investigated the role of physical components in shaping the sense of place in residential complexes. The study focused on two residential areas, Kouy-e Ostadan and New Side Town in Ahvaz, aiming to determine the contribution of each physical component to residents' sense of place. Using a mixed-methods approach, the researchers first conducted library research and expert review, followed by the Delphi technique to validate the identified components. These components were then incorporated into a Likert-scale questionnaire distributed among residents. Analysis using SPSS revealed that lighting had a significant impact on place attachment. Spatial variety and the presence of benches increased residents' time spent in communal spaces, thereby enhancing attachment. In New Side Town, spatial diversity and legibility facilitated understanding of the environment, while green spaces improved accessibility and usability, further strengthening residents' sense of place.

Rahimi et al. (1398) examined the relationship between place attachment and civic participation in enhancing social capital within informal settlements. Residents' attachment to their neighborhood contributes to the formation of a spatial identity, which influences civic engagement and social capital. A sample of 371 residents from the Tark neighborhood in Sari—facing social challenges—was selected using Cochran's formula. Correlations among place attachment, civic participation, and

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social capital were analyzed, and structural equation modeling was used to develop two models of inter-variable relationships. Results indicated that an indirect model, where place attachment increases social capital via civic participation, provided the strongest explanation. In other words, strengthening place attachment indirectly promotes participation and the development of social capital.

Razaqi (1398) explored the role of endogenous subcultures in the growth of informal settlements, focusing on the Bahonar Town neighborhood in Mashhad. This descriptive-analytical study used documentary research, semi-structured interviews, and questionnaires to identify key subcultures. Qualitative analysis using MAXQDA and expert input identified 26 dominant subcultures influencing the neighborhood. Quantitative analysis of 384 resident questionnaires revealed a significant correlation between residents' attitudes and cultural behaviors. Attitudes rooted in lifestyle, forward-looking perspectives, and optimism strongly influenced behaviors such as social participation, acceptance, enjoyment, and responsibility.

Torkman Nia et al. (1397) systematically assessed the factors driving the formation and expansion of informal settlements in Mashhad. This descriptive-analytical study employed SPSS and Vensim to construct causal diagrams. Data were collected through questionnaires and interviews with both experts and residents. Findings revealed that economic, social, physical, and governance subsystems are interconnected, forming causal cycles that reinforce each other. Economic cycles, in particular, exert strong influence. Combined with macro-level drivers and management gaps, these cycles lead to social outcomes, including increased migration, settlement growth, and expansion of informal housing.

Regarding subcultures, Dr. Pour Jafar and Arbabzadegan Hashemi's book *Manifestations of Iranian-Islamic Subcultures in Urban Design* studies ethnic subcultures in Iran and extracts cultural concepts for application in urban planning. The book emphasizes reflecting local subcultures in urban design. Additionally, Dr. Fakouhi's *Urban Anthropology* provides an in-depth discussion of various subcultures, while his article *Minority Subcultures and Lifestyles: Trends and Prospects* emphasizes preventing subcultures from becoming countercultures and leveraging their potential for societal benefit. Numerous studies and theses also examine the influence of indigenous and ethnic subcultures, highlighting their significant impact on social and spatial dynamics.

### 2.1. Concept and Definition of Informal Settlements

According to the United Nations (2020), informal settlements can be characterized by four main criteria: (1) residents do not have legal security of tenure over the land or dwellings they occupy; (2) these neighborhoods lack adequate access to basic infrastructure and essential services; (3) housing within these settlements may not comply with existing planning and building regulations; and (4) the settlements are often located in environmentally or geographically hazardous areas (8).

Informal settlements are a common phenomenon worldwide, often associated with poor living conditions, inadequate service provision, and insecure tenure. Rapid population growth in developing countries frequently hinders urban development, and it is estimated that approximately 20% of the global population lacks adequate housing. In these countries, at least one-fifth—and in some cases over half—of the population lives in substandard or unsafe dwellings. In many large cities of the developing world, where populations exceed one million, a significant proportion of residents reside in illegal or informal settlements. This situation, compounded by persistent poverty and limited access to essential resources such as food, clean water, shelter, primary healthcare, and secure tenure, poses a significant challenge to sustainable housing development. The combination of low-quality housing, insufficient infrastructure, and inadequate social services is a defining characteristic of informal settlements (9).

### 2.2. Sense of Place Attachment

Place attachment involves both the physical characteristics of a space and individuals' perceptions of it. The components of perceived space significantly influence residents' sense of attachment and can serve as a guide for planning interventions that enhance the quality of environments. Christian

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Norberg-Schulz (10) emphasizes that "human identity presupposes the identity of a place," highlighting that a place's identity is inseparable from the identity of its inhabitants. Without the awareness and engagement of residents, a location remains merely a physical space. Sensory experiences, emotions, behaviors, culture, and community all contribute to developing a sense of attachment. Since these elements are largely intangible, incorporating them into architecture and urban design poses challenges. Well-designed aesthetic spaces, properly maintained buildings, and clean surroundings foster pride and satisfaction among residents, thereby strengthening their sense of belonging.

Place attachment reflects the personal involvement of individuals with an environment or system, leading them to perceive themselves as integral to that space. It emerges from the impact of the environment on individuals and, in turn, shapes their behavior within it (11).

It has also been described as an individual's sense of identity or position relative to a group or community, which can influence responses and behaviors. This definition highlights the subjective emotional connection of an individual to a group while recognizing the limitations in understanding how external factors shape that attachment (12).

Overall, place attachment—a deep, subjective connection to social groups, physical spaces, and personal or collective experiences—is a fundamental human need. It has significant psychological, social, physical, economic, and behavioral implications (Allen et al., 2021).

Recent research has shown that place attachment functions differently within informal settlements compared to formal urban neighborhoods. Studies conducted in cities such as Mumbai, Lagos, Dhaka, and Bogotá reveal that informal settlements often develop strong social networks, localized cultural identities, and long-term residency patterns that shape emotional and behavioral forms of attachment. Despite physical inadequacies, residents may experience a high degree of social embeddedness, collective identity, and cultural continuity, all of which influence their sense of belonging. These findings highlight that in informal contexts, place attachment emerges not only from physical qualities but from kinship ties, ethnic cohesion, shared struggles, and community-based support systems. Integrating this perspective is essential, as it demonstrates that informal settlements constitute a unique socio-cultural environment where subcultural relations play a central role in shaping attachment.

### 2.3. Subcultures and Informal Settlements

Migration from rural areas to urban centers in developing countries frequently results in the formation of informal settlements. Rural migrants often leave behind tangible physical heritage but carry with them intangible cultural assets and value systems. Over time, some of these intangible assets are absorbed into the social and cultural fabric of informal settlements. Large-scale rural-to-urban migration is driven by factors such as agricultural mechanization, employment opportunities, and access to services and amenities. Informal settlements can thus be regarded as culturally diverse spaces where resilient and resourceful individuals adapt and survive despite limited resources (13).

The high concentration of migrants in peripheral urban areas brings together individuals with varied customs, beliefs, lifestyles, and broader cultural practices. This diversity can create friction and conflict, which over time may result in the emergence of destructive subcultures characterized by a lack of cooperation, weak environmental responsibility, disregard for urban discipline, and non-compliance with civic regulations across different age groups (14).

Thorsten Sellin (1938) defined culture as a set of behavioral norms and the collective ideas, foundations, and outcomes of specific human groups, asserting that each society possesses a distinct culture. He distinguished between simple, homogeneous societies and complex, heterogeneous ones. In simple societies, many behavioral norms are codified into law, reflecting social consensus. In complex societies, behavioral norms among different cultural groups often overlap or conflict. According to Sellin, cultural conflict arises when moral values and behavioral standards clash, and individuals' adherence to cultural norms that contradict legal standards generates social tension. Scholars following this theory argue that such conflicts are not always intentional; individuals act

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according to their traditions and cultural practices, but when these practices are inconsistent with societal laws, they are perceived as legal violations.

### 2.4. Theories and Theorists

Over the years, numerous studies have explored the quality of residential environments as a core element of overall quality of life. This concept encompasses residents' well-being, comfort, and satisfaction with the physical, spatial, social, economic, environmental, and symbolic dimensions of their living spaces. In essence, environmental quality not only addresses the fulfilment of material human needs but also supports social development and community cohesion, influencing patterns of social behavior. As a result, enhancing residential environment quality has become a central goal for urban planners and policymakers. Accordingly, identifying the key components that contribute to environmental quality has been a fundamental objective in research and policy-making focused on improving living conditions.

Despite extensive research on place attachment, much of the existing literature has focused on either its physical determinants or general psychological components. However, limited attention has been paid to the role of subcultural structures—particularly ethnic and kinship-based networks—in shaping place attachment within informal settlements. Recent studies highlight the importance of social and cultural diversity in influencing attachment, yet there remains a lack of empirical evidence on how these subcultural dynamics interact with the physical and social environments of marginalized neighborhoods. This gap underscores the need for a deeper investigation into the specific mechanisms through which subcultures contribute to the formation or erosion of place attachment.

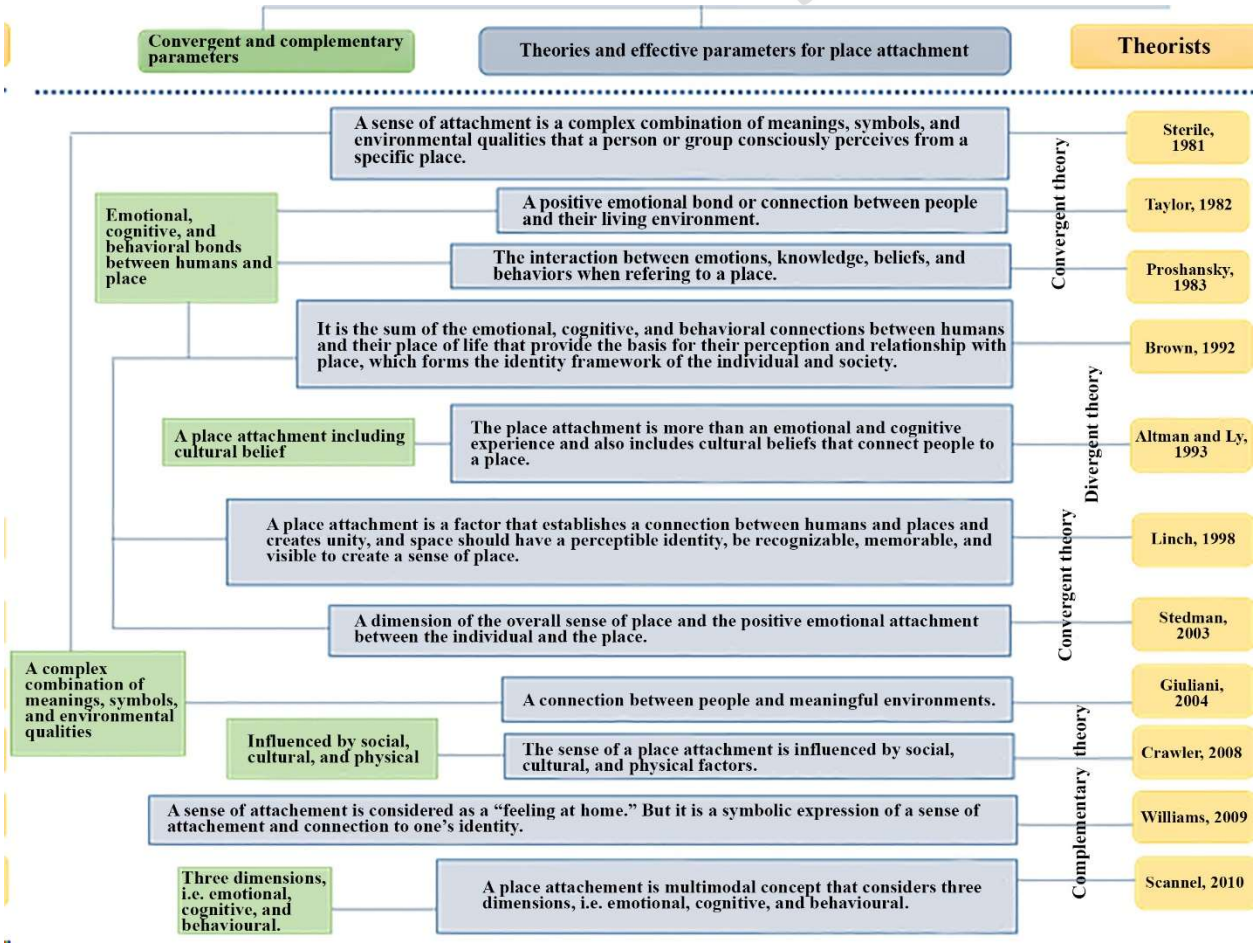


**Figure1. Convergent, Divergent, and Complementary Theories of Place Attachment**

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Figure 1 represents the theoretical foundations that inform the study, focusing on the complementary, convergent, and divergent perspectives on place attachment. It is important to distinguish these theoretical underpinnings from the study's conceptual model. While the theoretical framework outlines the broader scientific perspectives on how place attachment is formed, the conceptual model developed for this research identifies the specific latent variables and indicators used in the empirical analysis. In this study, the conceptual model includes Cultural Community, Physical Form, and Activity as the main predictors of place attachment, each defined operationally through measurable indicators. This distinction clarifies how theory informs the analytical structure of the research**. (Figure 1)**

The present study addresses this gap by integrating subcultural theory with place attachment research and operationalizing this relationship through an empirical model tested in an informal settlement. Unlike previous studies that have examined these variables separately, this research combines sociocultural, physical, and behavioral dimensions within a unified analytical framework. By focusing specifically on the ethnic and kinship diversity of the Al-Teymour neighborhood, the study introduces a novel approach to understanding how subcultural configurations shape attachment patterns in informal urban contexts. This contribution not only advances theoretical understanding but also provides practical insights for community-based urban planning

## 3. Materials and Methods

This study is applied in nature, as it seeks to identify the social patterns of place attachment in informal settlements. In terms of data collection, it employs an exploratory and survey-based approach to investigate cultural constructs within kinship and ethnic subcultures that influence residents' sense of attachment in the Al-Teymour neighborhood. Methodologically, the research is descriptive-analytical, focusing on the cultural and social characteristics of the residents. Questionnaires and interviews were used as the primary tools for gathering data.

The conceptual model of the study is based on three main latent variables—Cultural Community, Physical Form, and Activity—which were examined as the primary predictors of place attachment. Place attachment was considered the dependent variable, while the subcomponents of the three constructs (including social participation, urban safety, physical structure, identity-related indicators, and environmental conditions) served as independent or mediating variables. This structure formed the basis for conducting confirmatory factor analysis and structural equation modeling (SEM) using PLS.

In this study, the impact of each variable was assessed by analyzing the questionnaire data using the t-test with the assistance of PLS software. The quantitative Delphi method was employed to review the questionnaires and categorize the research criteria, while quantitative factor analysis was also applied to analyze the data.

### Study Area

The Al-Teymour neighborhood, located in District 4 of Mashhad Municipality, was selected as the case study due to its significant population of migrants from diverse ethnic backgrounds. The neighborhood is predominantly composed of small, compact plots, with limited observable urban spatial qualities. This study specifically examines the residents' sense of place attachment in relation to kinship and ethnic subcultures.

This neighborhood was selected as the case study due to its high concentration of migrant groups and the diversity of ethnic and kinship-based subcultures, which directly relate to the focus of this research on the social and cultural dimensions of place attachment. Al-Teymour represents one of the most socially heterogeneous informal settlements in Mashhad, where variations in cultural backgrounds strongly influence residents' daily interactions, collective identity, and emotional

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connection to place. These characteristics make the neighborhood a suitable empirical context for examining how subcultural patterns shape and reinforce (or weaken) place attachment.

Al-Teymour is situated in the northeastern part of Mashhad. In 2016 (1395 in the Iranian calendar), the neighborhood had a population of 41,534, including 21,205 men and 20,329 women, distributed across 11,533 households. The neighborhood spans 124 hectares, with a population density of 334 persons per hectare.

Geographically, Al-Teymour lies in the northeastern sector of the city, within Zone 3 of District 4. According to a final review conducted in 2019 (1398) by Naghsh Click International Company (technical consultant), the operational area of Al-Teymour covers 57.047 hectares, accounting for approximately 16% of the city's total area.

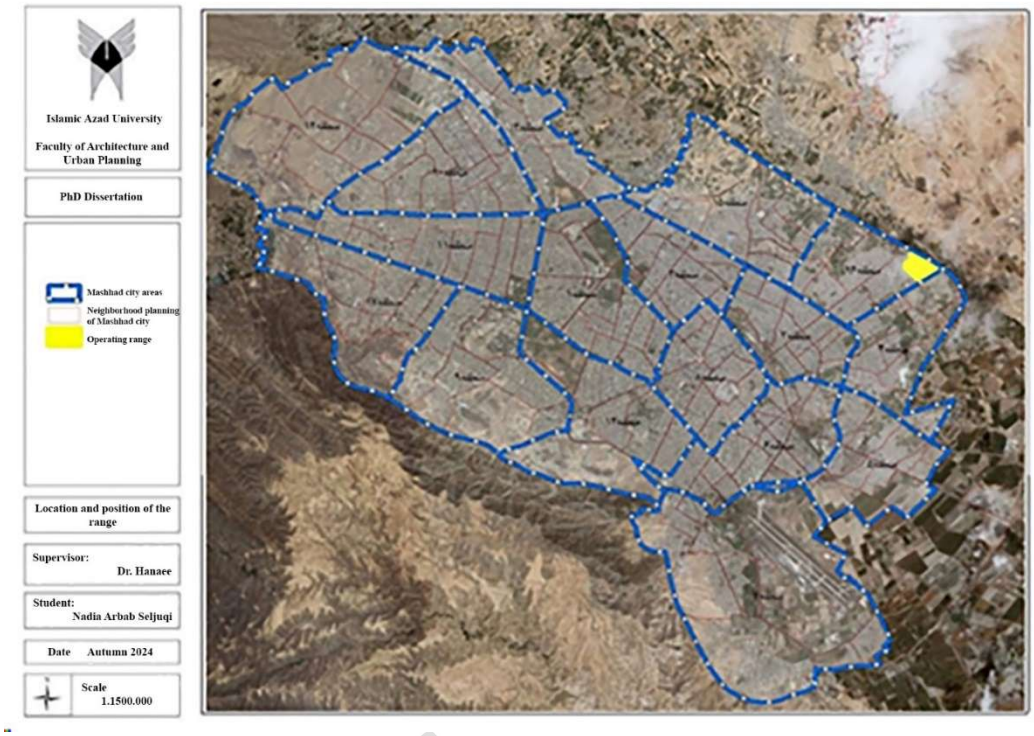


**Figure2. Map of the Study Area Location**

The operational area of the Al-Teymour neighborhood consists of 56 blocks, 3,929 plots, and 356 streets. The average block covers 6,766 square meters. Regarding plot sizes, 3,735 plots (95.15%) range from 16 to 200 square meters. According to the detailed planning divisions of northeastern Mashhad, this operational area is located within Al-Teymour, bordered to the south by Shahid Ghorbani, to the east by Shahid Avini, and to the west by Western Al-Teymour. However, under the latest municipal divisions, the area is considered part of Shahid Ghorbani neighborhood, bordered to the south by Radeh, to the west by Northern Tabarsi, and to the east by Al-Teymour.

**( Figure 2)**

## 4. Discussion and Presentation of Findings

### Analysis of Expert Questionnaires Using the Delphi Method

To identify and prioritize the most influential criteria affecting place attachment in informal settlements, the Delphi technique was employed. Originally developed in the 1950s by the RAND Corporation for a military defense project, the Delphi method became widely recognized as a

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rigorous scientific approach by the mid-1960s. In this study, a panel of six experts with relevant knowledge and experience—including some in decision-making positions—participated in a structured, iterative, and anonymous process using questionnaires and a Likert scale.

**Stage 1: Defining the Topic and Criteria**

The research topic and criteria for evaluating factors affecting place attachment in Al-Teymour were identified, and the initial questionnaire was distributed to the experts.

**Stage 2: Responding to the Initial Questionnaire**

Each participant anonymously listed their ideas succinctly, preferably in one sentence, without providing explanations or justifications. The completed questionnaires were collected for analysis.

**Stage 3: Preparing and Distributing the Second Questionnaire**

The second questionnaire, containing all ideas collected in Stage 1, was sent to participants. Space was provided beneath each idea for respondents to review and comment systematically.

**Stage 4: Responding to the Second Questionnaire**

Participants again completed the questionnaire anonymously. By this stage, they were aware of the collective responses from the first round, which could influence their evaluations. The completed questionnaires were then collected.

**Stage 5: Scoring and Voting**

Experts were asked to score each criterion using a Likert scale to determine their relative importance.

**Stage 6: Final Results**

After reviewing all criteria and sub-criteria, the factors deemed most influential in shaping place attachment in Al-Teymour were finalized, as summarized in the corresponding table. Based on the scores and percentages provided by the experts, criteria such as the presence of other residents in the neighborhood, management of undesirable behaviors, comfort in urban spaces, occupation, literacy level, and gender were excluded due to their lower impact.

In the final round of the Delphi process, experts assigned weighted scores to each component and sub-component to determine their relative importance in shaping place attachment. The results showed a clear prioritization among the criteria. “Emotional attachment,” “perceived safety,” “physical form,” and “social participation” received the highest weighted means, indicating strong expert agreement on their influence. Sub-components such as “sense of identity,” “urban safety,” “landmark elements,” “length of residence,” and “ease of access” also achieved high consensus and retained their positions in the final model with mean scores above the acceptance threshold (≥ 3.5 on the Likert scale).

Conversely, indicators including “presence of others,” “management of deviant behaviors,” and “gender” received the lowest weights and were removed from the final list due to insufficient expert agreement (mean ≤ 2.5).

The aggregated weights demonstrate a hierarchical structure in which emotional and cognitive components received the highest priority (weight: 0.31), followed by socio-cultural factors (weight: 0.27), physical–environmental indicators (weight: 0.24), and activity-related factors (weight: 0.18). These weighted results formed the basis for incorporating the validated components into the subsequent factor analysis and structural modeling stages.( Figure 3)

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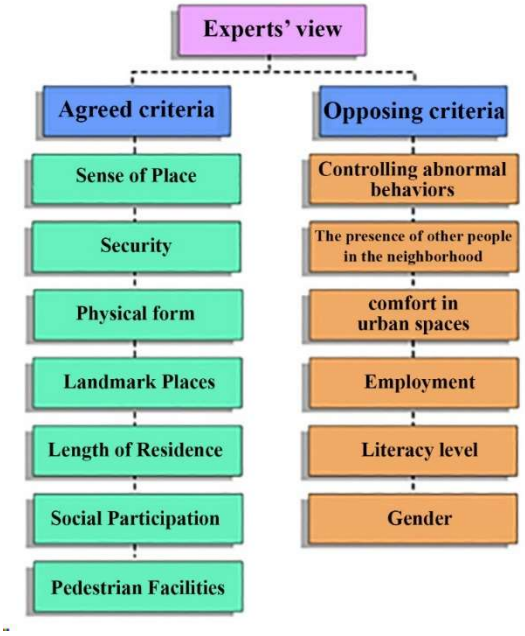


**Figure3.** Location Map of the Study Area

In terms of importance, experts indicated that the most influential criteria for place attachment include emotional attachment to the location, safety, physical form, prominent landmarks, duration of residence, ease of access to services, social participation, and pedestrian-friendliness.

**Quantitative Method: Factor Analysis**

Confirmatory factor analysis (CFA) limits the number of extractable factors and specifies particular patterns of relationships between observed variables and underlying latent factors. This process is conducted a priori, before examining the actual data. Exploratory factor analysis (EFA) is used when there is limited prior knowledge about the structure and relationships among factors.

**Confirmatory Factor Analysis and Assessment of Data Normality**

In this study, a questionnaire was used as the data collection tool. Therefore, the overall structure of the research questionnaires was evaluated for content validity using confirmatory factor analysis (CFA). For CFA and structural equation modeling, the standardized factor loadings and t-statistics were calculated. In general, the following rules apply:

The strength of the relationship between a factor (latent variable) and an observed variable is indicated by the factor loading. Factor loadings range from zero to one. If a factor loading is less than 0.3, the relationship is considered weak and is disregarded. Factor loadings between 0.3 and 0.6 are acceptable, while loadings above 0.6 are highly desirable.

Once correlations among variables are identified, a significance test must be conducted. To examine the significance of the relationships between variables, the t-statistic (t-value) is used. Since significance is assessed at the 0.05 error level, if the observed factor loadings produce a t-value less than 1.96, the relationship is not considered significant.

In SMART-PLS software, the t-value indicates the significance of the effect of variables on each other: if the t-value is greater than 1.96, the effect is significant at the 0.05 level; if it exceeds 2.58, it is significant at the 0.01 level and indicates a positive effect. If the t-value falls between -1.96 and +1.96, the effect is not significant, while a t-value less than -1.96 indicates a significant negative effect.

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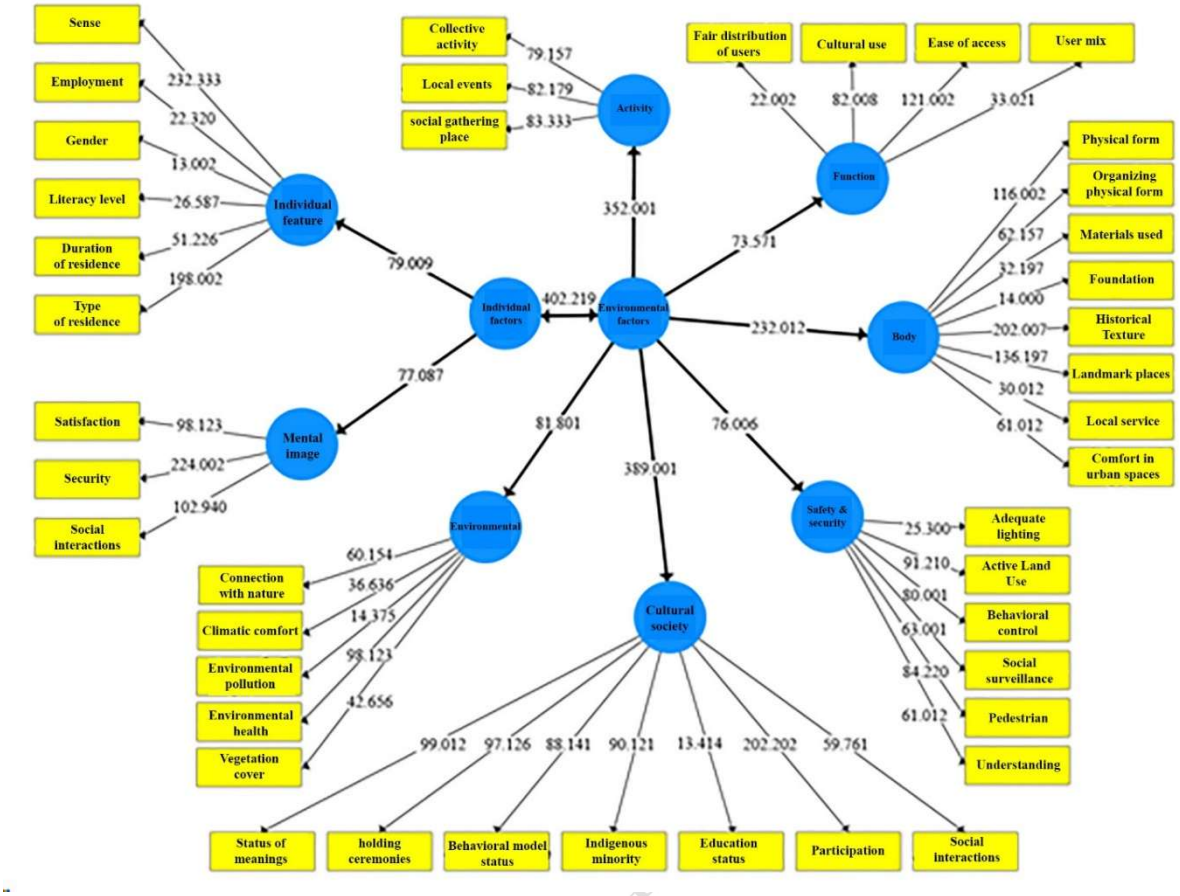


**Figure 4.** Calculated T-Value

In the present study, the calculated t-values exceeded 2.56, indicating that the relationships between variables are significant. Additionally, the path coefficients, which represent the strength of the relationship between two variables, should be greater than 0.5; the higher the coefficient, the greater the effect on the dependent variable. In this study, the calculated path coefficients for the research components were above 72 percent, indicating a satisfactory level of influence.( Figure 4)

**Model Fit**

Structural Equation Modeling (SEM) is employed to examine the influence of factors on each other and to evaluate the fit of the conceptual model. Over the past decade, significant efforts have been devoted to studying causal relationships among variables. One common method for conducting confirmatory factor analysis is SEM, a robust multivariate analysis technique designed for latent variables. SEM is an advanced extension of multiple regression analysis that allows researchers to simultaneously test a set of regression equations. It provides a comprehensive statistical framework for evaluating hypotheses about relationships between observed and latent variables. SEM is sometimes referred to as causal modeling, LISREL, or structural analysis, but the most widely used term today is simply SEM.

**A complete SEM model consists of two main components:**

**a) Measurement Model:** This component specifies the relationships between latent (unobserved) variables and their observed indicators. Latent variables are constructs that cannot be directly observed but are reflected in the covariance among two or more measurable indicators.

**b) Structural Model:** This part represents the causal relationships among latent variables. Early examination of measurement models is useful for assessing research instruments and refining constructs. Analysis of structural models can reveal theoretical weaknesses, guide interpretation of findings, and inform future studies. SEM analysis involves two major stages: model development and model testing.

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In the model development stage, the researcher designs the model based on relevant theories, previous research, and available data, describing causal relationships among variables. These relationships typically reflect hypotheses derived from theoretical frameworks. The subsequent stage involves testing the model fit and evaluating how well the theoretical model corresponds to empirical data collected from the study population.

In this study, SEM was used to analyze causal relationships among latent and observed variables of the conceptual model. Path coefficients indicate the strength of the effect of one latent variable on another, with values closer to 1 indicating stronger influence. One of the strongest paths was the relationship between the "Physical Form" variable and "Environmental Factors," with a coefficient of 0.989, reflecting a very strong influence of physical attributes on residents' perception and experience of their environment. This highlights the critical role of physical conditions—such as urban form, spatial cohesion, and the quality of public spaces—in shaping environmental perception. Indicators like "urban form," "construction materials," and "historical texture," all with factor loadings above 0.9, demonstrate residents' high sensitivity to the tangible and structural aspects of their surroundings. This is especially significant in informal settlements, where formal planning is often absent.

Another notable path was the influence of "Activity" on "Environmental Factors," with a coefficient of 0.944. Indicators such as "local events," "social gathering places," and "collective activities" play a crucial role in enhancing the vitality of urban spaces. Participation in social activities strengthens human interactions, shared meaning, and social cohesion, which in turn shape environmental perception. These findings align with place-making theories, emphasizing that urban spaces acquire meaning not only through physical form but also through social and cultural functions.

The relationship between "Cultural Community" and "Environmental Factors" was also strong, with a coefficient of 0.996. This underscores the substantial role of cultural cohesion and neighborhood social networks in shaping environmental perception. Indicators such as "ethnic minority status," "educational level," "rituals," and "social participation," with factor loadings above 0.9, highlight the importance of social bonds and cultural commonalities in residents' environmental experiences. In environments where individuals share a sense of identity and belonging, the environment is perceived not merely as a physical space but as a lived and meaningful place, consistent with Lefebvre and Boman's social production of space theory.

The path "Environmental Conditions → Environmental Factors," with a coefficient of 0.788, while weaker than other paths, still has a significant impact. Indicators such as "vegetation cover," "environmental hygiene," and "ecological patterns," with factor loadings ranging from 0.74 to 0.95, demonstrate the influence of natural and ecological conditions on residents' perceptions of environmental quality. When visual pollution, litter, and insufficient green spaces are present, positive environmental perception is hindered, which is also significant from an environmental psychology perspective.

Finally, the path "Safety and Security → Environmental Factors," with a coefficient of 0.719, indicates that perceived neighborhood safety substantially affects residents' overall perception of their environment. Indicators such as "social surveillance," "behavioral control," and "adequate lighting" emphasize that a safe and predictable environment fosters psychological security. This finding aligns with Crime Prevention Through Environmental Design (CPTED) principles, which highlight the importance of designing safe and secure urban spaces.

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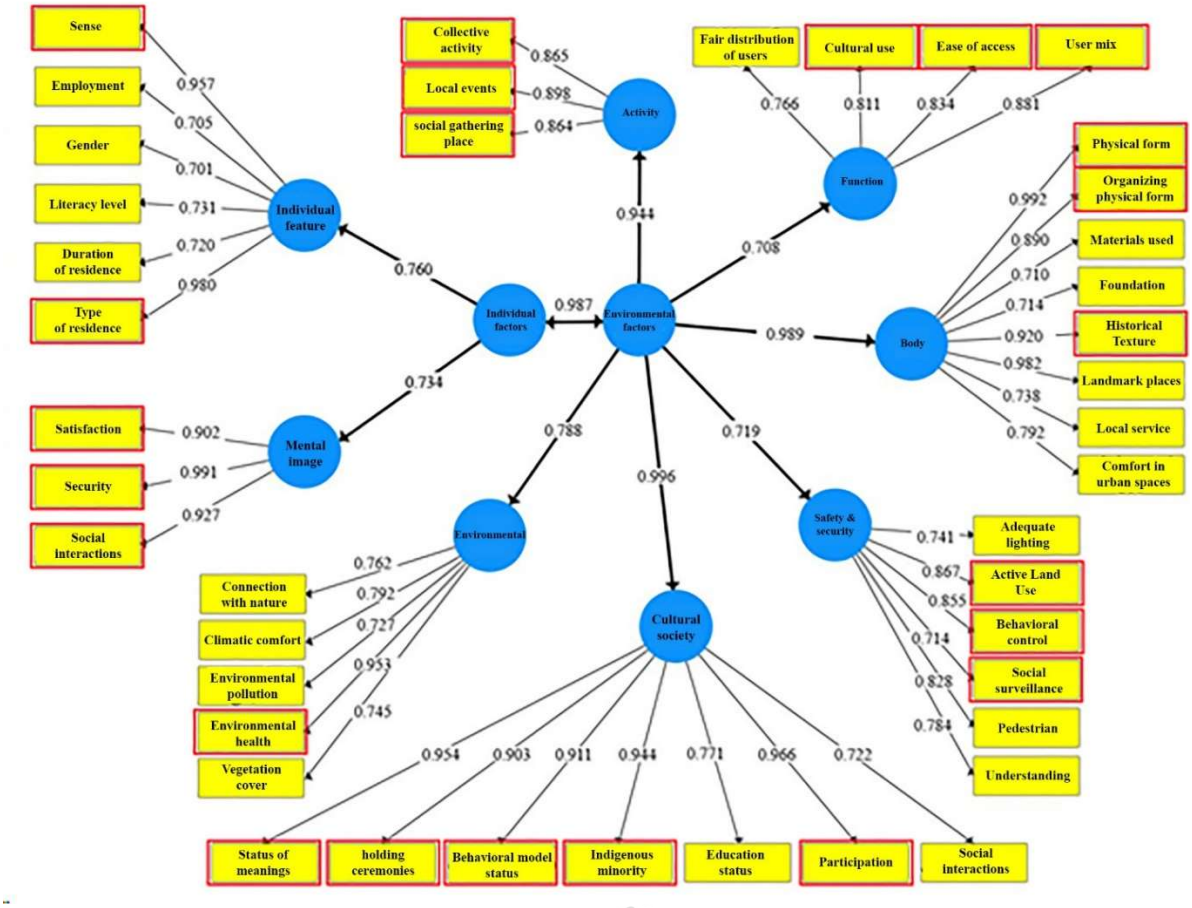


**Figure 5. Calculated Path Coefficients**

According to the developed model, the sub-criteria "Cultural Community" (path coefficient = 0.996), "Physical Form" (0.989), and "Activity" (0.944) have the strongest influence on the environmental factors criterion in the study. Similarly, the indicators "Sense of Place" (0.957), "Urban Safety" (0.991), "Physical Form" (0.992), "Length of Residence" (0.980), "Historical and Identity-forming Texture" (0.920), "Landmark Places" (0.982), "Ease of Access" (0.834), "Active Land Uses" (0.867), "Pedestrian Facilities" (0.828), "Social Participation" (0.966), "Social Gathering Spaces" (0.864), and "Sanitation Status" (0.953) show high influence, while the remaining indicators rank in subsequent order**.( Figure 5)**

## 5. Discussion

This study, focusing on the Al-Timur neighborhood, examines sense of place through three main components: cultural community, physical form, and activity. This comprehensive approach allows for a deeper analysis of the interactions among the various factors affecting sense of place. The findings are compared with similar studies to identify both convergences and differences.

Previous research aligns with some of the present findings. For example, a study in Shanghai showed that the perceived neighborhood environment—including pedestrian facilities and recreational spaces—significantly affects residents' sense of community. It also highlighted the mediating role of neighborhood interactions and community satisfaction in enhancing the sense of belonging. Likewise, a study in Hong Kong found that public and social spaces are key predictors of stronger sense of place, and longer-term residents experience a greater sense of belonging.

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While earlier studies typically examined individual factors, this research takes a more comprehensive approach by integrating social, physical, and cultural components and analyzing their interactions. This multifaceted perspective enables a deeper understanding of how sense of place is formed.

A key innovation of this study is the focus on social participation. While some previous studies emphasized the physical environment or neighborhood interactions, the present research demonstrates that active participation of residents in social activities and local decision-making plays a critical role in strengthening sense of place.

Additionally, this study analyzes specific indicators—including urban safety, length of residence, physical form, and social participation—separately, providing a level of detail rarely seen in prior research. Overall, the study presents a comprehensive framework and detailed analysis of interactions among multiple components, offering a better understanding of the factors shaping sense of place in Al-Timur. The emphasis on social participation and the detailed examination of influential indicators are methodological innovations that can serve as a model for future urban planning studies aimed at enhancing place attachment.

The findings highlight the significant role of socio-cultural factors—such as neighborhood interactions, social participation, ethnic cohesion, and shared lifestyles—as a crucial layer in shaping sense of place in informal settlements, especially considering subcultures and ethnic groups. These results are discussed in comparison with previous studies:

**Comparison with Classical Theories:** Consistent with Relph (1976) and Tuan (1977), who emphasized lived experience and existential perception of place, this study shows that daily experiences and interpersonal relationships fundamentally shape place perception, especially in informal contexts where attachment develops through lived interactions. Unlike earlier studies focused mainly on general "place experience," this research specifically examines subcultural and ethnic layers, showing their heightened importance in informal settlements.

**Alignment with Later Structural Models:** Research by Scannell & Gifford (2010) and Manzo & Devine-Wright (2014) proposed three-dimensional frameworks for sense of place, which align with the present study. The hierarchical structure proposed here (micro to macro) corresponds to their personal, social, and spatial dimensions, particularly in areas related to "place as a platform for social interaction" and "intercultural engagement."

**Emphasis on Ethno-Cultural Components:** Previous studies (e.g., Lewicka, 2011; Hidalgo & Hernandez, 2001) focused on general factors such as length of residence, housing satisfaction, or space usage. In contrast, this study examines ethnic and subcultural components as distinct and influential layers, marking a key difference from both classical and contemporary studies.

**Support from Recent Literature (2021–2024):** Recent research by Dang & Weiss (2021) shows that sense of place is directly linked to behavioral tendencies in multicultural communities. The present study confirms that ethnic identity and intra-cultural cohesion strengthen spatial attachment in informal settlements. Similarly, studies by Kim & Lee (2023) and Zhang & Wang (2023) emphasize the role of urban open spaces in reinforcing sense of place and highlight the significance of neighborhood-specific social fabrics, consistent with the current focus on informal neighborhoods.

**Consideration of Environmental Interventions:** Brown & Raymond (2012) highlighted the interaction between local and global ties in forming attachment. The present study demonstrates that in informal settlements, sense of place is primarily shaped by local and native factors, with minimal influence from external or global trends.

**Analytical Layering Innovation:** The main distinction of this research is the introduction of a hierarchical, layered model based on the intensity of factor effects—a method rarely applied in qualitative studies. The approach, including color-coded layers, multiple levels of analysis, and cross-referencing of cultural, social, physical, and perceptual dimensions, provides a novel conceptual framework for similar studies in developing communities. **( Figure 6)**

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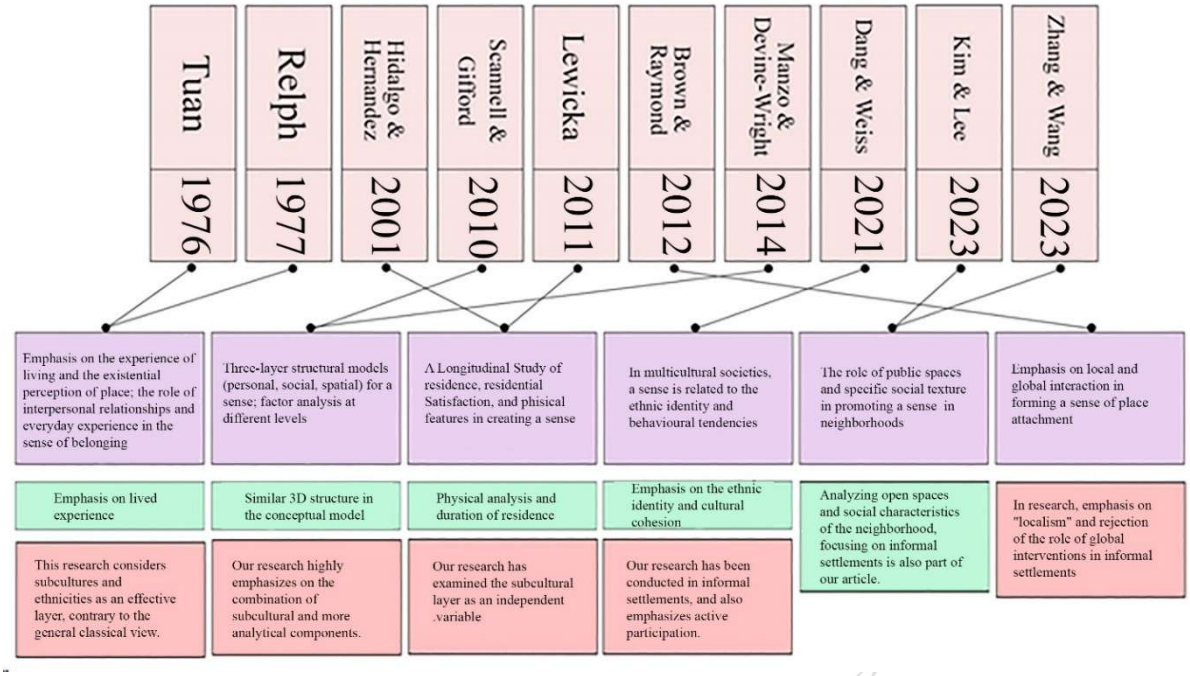


**Figure 6. Research Discussion Diagram**

## 6. Conclusion and Recommendations

The present study aimed to examine the factors influencing sense of place in the Al-Timur neighborhood. Using a conceptual framework and a multi-level analytical approach, it provided a comprehensive understanding of both cognitive and physical mechanisms shaping this sense in urban settings. The findings indicate that sense of place in this neighborhood arises from the meaningful interaction of three key components: physical form, socio-cultural community, and activity-oriented elements. Unlike previous studies that examined these components separately, this research demonstrates that their combined and synergistic effects play a more significant role in shaping sense of place than their individual impacts.

Key contributions of this study include the following: First, the analytical model revealed that **social participation** acts not only as an independent influencing variable but also as a mediator, strengthening the effect of physical form on sense of place. Second, the combined analysis of perceived safety and length of residence shows that prolonged residence in the neighborhood enhances sense of place only when residents perceive a positive level of security. This finding highlights the need to reconsider urban policies focused on population retention and safety-oriented interventions.

Third, by focusing on mid-scale elements of the physical structure—such as semi-public spaces, soft social boundaries, and visual continuity—the study demonstrates that fluid and informal physical forms play a crucial role in facilitating social interactions and reinforcing sense of place, an aspect often overlooked in macro-level studies. Fourth, differentiating between “low-impact” and “no-effect” indicators in the final model provided a more precise identification of influential variables, emphasizing the importance of eliminating ineffective interventions in urban planning processes.

Finally, this research proposes a conceptual model for community-centered, place-based planning, offering a new approach to neighborhood-oriented policy design. The model suggests that urban interventions should move beyond purely physical considerations and integrate cultural, participatory, and lived experiences of residents.

In conclusion, this study not only fills existing gaps in the literature on sense of place but also adapts the analytical model to the local neighborhood context, generating actionable knowledge for policymakers and urban designers to improve the quality of life at the micro-neighborhood scale. **(Figure 7)**

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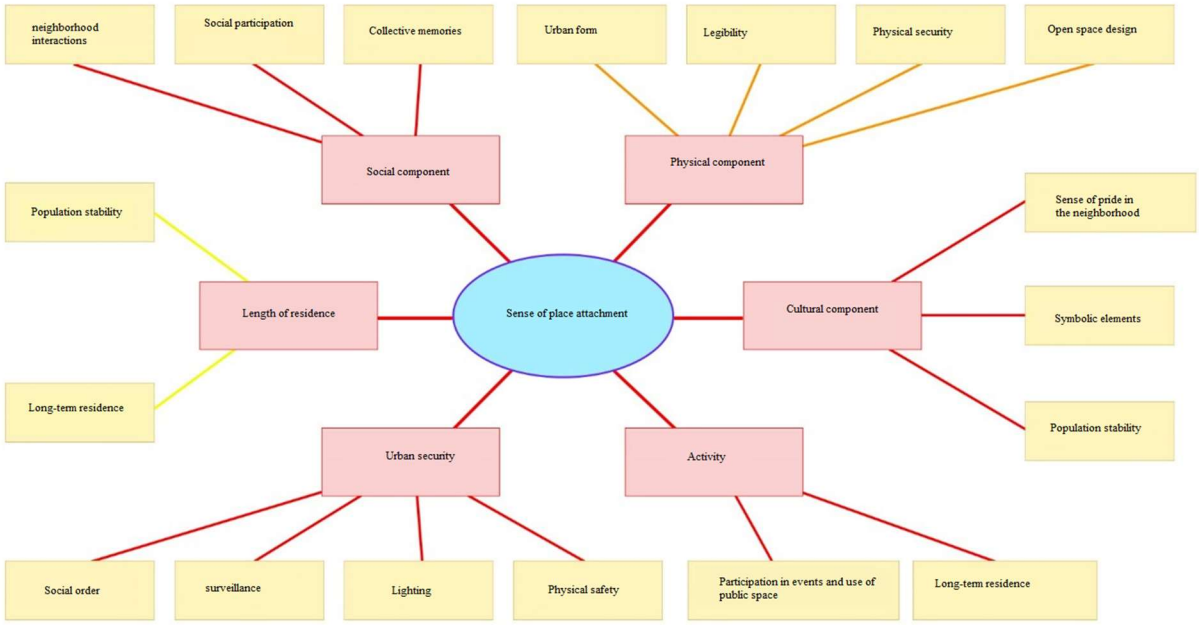


**Figure 7. Conceptual Diagram of the Study**

Based on the analyses conducted in this study and the proposed conceptual model, the recommended strategy for enhancing sense of place in urban neighborhoods, considering the influence level of each component, is as follows:

Primarily, the **social component**, as one of the most influential factors, plays a fundamental role in reinforcing neighborhood cohesion and identity. In this regard, neighborhood interactions, social participation, and collective memories are key elements in this process. The social strategy focuses on institutionalizing neighborhood-centered structures, strengthening voluntary participation, and recording and revisiting collective memories through social and cultural programs. This approach also suggests a transition from centralized management toward participatory governance at the neighborhood scale.

Next, the **physical component**, with a medium-to-high level of influence, is considered an objective platform for social interaction and promoting mental comfort. The proposed physical framework emphasizes redesigning semi-public spaces, improving lighting and environmental safety, enhancing legibility in urban spaces, and revising the form and function of neighborhood open spaces to create conditions conducive to enhancing sense of place.

From a **cultural and identity perspective**, the proposed cultural strategy highlights the revitalization of historical memory and local symbolic elements in a place-based approach. Actions such as representing cultural concepts in architectural forms, installing collective symbols, holding local ceremonies, and preserving significant sites—even at a micro-neighborhood scale—are proposed to strengthen identity and sense of place.

Regarding the **activity component**, active resident participation in public spaces and involvement in social events is directly linked to the vitality and dynamism of the neighborhood. Activity-oriented strategies emphasize neighborhood-based planning, encouraging voluntary activities, and designing flexible public spaces for diverse uses.

**Safety** is considered a fundamental pillar for residential stability and attachment to the place, addressed as a high-impact urban security component. Recommended policies to enhance safety focus on natural surveillance, proper lighting, social order, and increasing residents perceived environmental control.

Concerning **length of residence**, findings indicate that prolonged residence enhances sense of place through strengthened social relations, shared memories, and emotional bonds with the space.

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Therefore, population strategies should focus on creating incentives for residential stability, supporting long-term residents, and providing infrastructure to increase local loyalty.

Finally, during the conceptual refinement of the proposed model, some indicators with minimal impact or non-significant relationships with sense of place were removed. Indicators such as monitoring deviant behaviors, presence of others, and gender were excluded due to their limited influence on final results. This revision is considered part of the conceptual strategy, aiming to enhance analytical precision and theoretical coherence. **(Figure 7)**

**Recommendations**

To improve sense of place in the Al-Timur neighborhood, special attention must be given to social, physical, and cultural dimensions. Strengthening the cultural community through collective spaces and supporting local cultural and ritual activities is a fundamental step. Creating such spaces can reinforce ethnic identity and attachment to the neighborhood.

Additionally, the **physical quality** of the neighborhood—including street design and organization, pedestrian infrastructure improvement, and historic fabric restoration—has a significant impact on sense of place. These interventions enhance both environmental aesthetics and functionality while increasing residents' sense of safety and comfort.

**Social participation** is another critical factor that requires attention. Organizing local meetings and involving residents in decision-making processes not only fosters a sense of ownership but also leads to more informed and coordinated decisions aligned with the community's real needs.

At the **policy level**, supporting subcultures and cultural diversity should be prioritized through cultural and educational programs that promote local and ethnic values. Additionally, providing public education on civic rights and responsibilities can further strengthen community cohesion and attachment.

Future research is recommended to expand the study area to other informal neighborhoods to allow comparison and validation of results. Analyzing changes in sense of place over time and examining the effects of urban interventions can also provide deeper insights. Overall, this study demonstrates that enhancing sense of place requires a comprehensive approach that integrates the social, cultural, and physical dimensions of the neighborhood.

**Authors Contribution**

All the authors have participated sufficiently in the intellectual content, conception and design of this work or the analysis and interpretation of the data (when applicable), as well as the writing of the manuscript.

**Availability of data and materials**

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

**Conflict of interests**

The author states that there is no conflict of interest.

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