

Residential satisfaction, social capital and place attachment. Case study: Sahar Residential Tower, Tehran

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Received: 24.02.2026; Revised: 13.05.2026; Accepted: 20.05.2026; Available online: 31.07.2026

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Abstract:

Satisfaction with the residential neighbourhood environment – residents' perceptual-affective evaluation of physical, social, security, and service quality – plays a key role in fostering place attachment and building social capital. In high-rise residential towers, however, reduced neighbourly interactions and weak social ties often limit the mediating effect of social capital between environmental satisfaction and place attachment. This area has received limited research attention. This quantitative-applied study examined the impact of environmental satisfaction on place attachment, with social capital as a mediator, in Sahar Residential Tower, Sadeghieh, Tehran. A field survey was conducted using a five-point Likert questionnaire. The population consisted of 1,440 residents; a Convenience Sampling of 323 participants was drawn. Data were analysed descriptively in SPSS and via structural equation modelling and path analysis in AMOS. Content validity, construct validity (CFA), and reliability (Cronbach's alpha and composite reliability) were all confirmed. Findings showed that environmental satisfaction significantly influences social capital ($\beta=0.551$, $p<0.001$) and place attachment ($\beta=0.340$, $p<0.001$). Social capital also positively affects place attachment ($\beta=0.171$, $p<0.05$). The indirect effect through social capital was significant but modest ($\beta=0.094$, $z=1.804$), indicating partial mediation. Mean scores were moderately low: environmental satisfaction (2.84), place attachment (2.73), and social capital (2.50). Environmental satisfaction primarily contributes to place attachment by strengthening relationships, trust, and participation. In residential towers, enhancing both physical quality and social bonds simultaneously is essential. Recommendations include designing interactive shared spaces, promoting psychological safety, and supporting local community organisations to improve social ties and deepen residents' sense of place.

Keywords:

environmental satisfaction; place attachment; social capital; high-rise housing; urban housing

1. Introduction

Today, the physical factors that shape social interactions and, consequently, the sense of community in neighbourhoods have been ignored. This seems to be due to the sudden acceleration of neighbourhood growth and development, which has ultimately led to forgetting the social nature of neighbourhoods. This is happening at a time when neighbourhoods have previously played a special role in interactions between urban life and citizens [42]. In such a context, the guaranteed quality of life of residents is no longer limited to the physical components of the residential unit, but is also tied to the level of satisfaction with the neighbourhood environment, the quality of human relationships, and the level of attachment to living spaces. Place Attachment, an individual's emotional bond to the environment, and Social Capital, a network of relationships, trust, and collective participation, are two key concepts that can ensure the social sustainability of residential complexes. Environmental satisfaction is the residents' perceptual and emotional assessment of the quality of the home and neighbourhood in which they live; an assessment that is formed from their daily experience of the physical, social, security, and psychological characteristics of the environment. Jackson et al. consider environmental satisfaction to be part of an individual's cognitive-emotional experience of the residential environment and the assessment of its quality of use and adaptability [24]. Accordingly, the theory of belonging assumes that dependence,

emotional bonding, and place attachment occur when the expectations and needs of residents are met. The more these needs are valued, the greater the likelihood of residents' sense of belonging to the environment [8]. Positive environmental perception affects residents' mental state and ultimately fosters a sense of closeness and mutual connection with the environment, creating positive bonds between residents and the environment and, ultimately, a sense of belonging. This sense depends on the individual's previous experiences, how to access the place, and the activity patterns present in it, and is based on the quality of the environment [9]. Among the aforementioned factors, what transforms a house from a "structure" to a "place" are the human bonds and trust that form between residents [1]. The sense of belonging to the place and life, and attachment to the place of residence in individuals, strengthen the sense of responsibility for improving the living environment. Therefore, a sense of belonging to the place and subsequent social participation can facilitate the implementation of various social and economic programs and ultimately improve the quality of life [6]. One effect of living in high-density complexes with poor environmental quality is the weakening of social bonds between residents, which can lead to reduced sustainable communication, low participation, and the gradual decline of these complexes. Therefore, it appears that social capital serves as a mediating factor in the relationship between environmental satisfaction and place belonging [8].

Looking at the history of research conducted, even though various studies have been conducted to examine the research variables alone or to examine the effects of the variables on each other, few studies have examined the effect of the satisfaction variable (independent variable) on the place belonging variable (dependent variable) with the mediation of the social capital variable. In this regard, two general criticisms are made of the research conducted. On the one hand, research conducted either in the field of urban spaces and neighbourhood scale has examined the issue, and less attention has been paid to the field of architectural space and new types of bio-space, such as towers, despite the importance and focus of urban managers on high-density construction. For example, in a study titled "Residential Environment Satisfaction, Social Capital, and Place Belonging: The Case of Seoul, Korea", it was explained that community-oriented spaces and face-to-face neighbourhood interactions are the main drivers of trust and participation; also, transparency of urban management and institutional accountability are considered critical predictors for promoting social capital in urban communities [28]. On the other hand, the studies conducted have examined the satisfaction variable as a general variable and have not examined its dimensions and components and their effects. Among these studies, a study on the topic of "Place attachment and residential satisfaction mediated by social capital in affordable housing on the Tehran campus" revealed that place attachment has a direct relationship with residential satisfaction; with the difference that social capital, as a mediating variable, strengthens this relationship. Therefore, the sustainability of affordable housing projects requires prioritising social strategies alongside physical issues [1].

Therefore, the main research question is to determine whether satisfaction with the residential environment (with limitations based on physical, security, service, and social) can directly and also through strengthening social capital (trust, participation, transparency, honesty, and commonalities) increase attachment among residents of a high-rise residential tower? In other words, can social capital act as a "bridge" between objective assessments of environmental quality and emotional attachment to places? Based on the statement of the problem and the aforementioned research gap, the main questions of this study are:

1. Does the average satisfaction with the residential environment, social capital, and place belonging among the residents of Sahar Residential Tower differ significantly from the theoretical average level, and what is the status of these variables?
2. Does satisfaction with the residential environment (as an independent variable) have a direct and significant effect on social capital (mediating variable) and place belonging (dependent variable)?
3. Does social capital have a direct and significant effect on place belonging?
4. Does social capital play a significant mediating role in the relationship between satisfaction with the residential environment and place belonging (indirect effect)?
5. Among the four components of satisfaction with the environment (physical, security, services, and social relations), which one plays the greatest role in explaining social capital and place belonging in the context of the residential tower?

This study, focusing on the architectural space and the selection of the type of residential towers, as well as explaining the role of satisfaction components and criteria (physical characteristics of the place, public facilities and services, security

and safety, and social and neighbourhood relations), attempts to examine the issue in detail and architecturally to achieve design criteria. The case study for this study is the Sahar residential tower in the Sadeghieh district of Tehran, a high-rise complex considered a suitable sample for studying residents' social relations and environmental satisfaction. This study, using data from a field survey and statistical methods (such as path analysis and structural equation modelling), and selecting the Sahar residential tower in Tehran due to its convenient location, convenient access to public services, and appropriate population composition, seeks to identify the mediating role of social capital in the relationship between environmental satisfaction and place belonging. The results of this study can provide a scientific basis for formulating policies and strategies to improve environmental and social quality in high-rise residential complexes. This study was conducted with the general objective of explaining the mediating role of social capital in the relationship between satisfaction with the residential neighbourhood environment and place belonging of residents of Sahar Residential Tower in Tehran. Its partial objectives are: assessing the current status of the three variables, testing the direct effects of satisfaction with the environment on social capital and place belonging, as well as the effect of social capital on place belonging, examining the indirect effect and mediating role of social capital, prioritizing the four dimensions of satisfaction with the environment (physical, security, service, and social relations), and finally providing architectural design and social management solutions to simultaneously improve these variables.

2. Literature review

2.1. Concepts, explanation of components, and development of indicators

2.1.1. Residential satisfaction

Wang and Wang show that environmental satisfaction results from the interaction among housing conditions, the physical and social characteristics of the neighbourhood, and the degree to which they meet individual needs [49]. Aksel and İmamoğlu consider environmental satisfaction to be residents' evaluation of the physical, social, and functional characteristics of the residence and the extent to which daily needs are met [2], and components such as security, green space, accessibility, and the quality of the urban landscape have a direct effect on the positive experience of the neighborhood and environmental satisfaction [22]. Enjoying life in the neighbourhood, perceptions of security, and social participation are among the most important elements of environmental satisfaction, and satisfaction with the neighbourhood is considered part of place attachment [14]. Environmental satisfaction is understood in four intertwined layers: first, in the neighborhood structure, where visual order and access to services build the foundation of stability and ease of life [14,49]; second, in the community core, which goes beyond bricks and mortar and is rooted in neighborhood trust and the quality of human relationships [14,27]; third, in the realm of security, which sustains the active presence of residents by removing threats and creating peace in public spaces [24,36]; and finally, in the psychological dimension, which turns "shelter" into "home" by tying an individual's identity to space [2]. Simply put, it is the intelligent interplay between body, community, and security that makes an environment a meaningful and satisfying haven to live in. The components of residential satisfaction (independent variable) and their constituent indicators are:

“Physical Characteristics”: This concept goes beyond solid structures and is a dynamic combination of infrastructure safety, service accessibility efficiency, and urban landscape aesthetics that awakens a sense of stability and tranquillity in the lives of residents [2,22,49]. In fact, the presence of vibrant green spaces and regular walking paths provides a tangible platform for belonging and subjective satisfaction to flourish [17,36]. Smooth and direct access [17,22,36,49], construction quality based on building strength, structural safety, and engineering standards [49], physical integrity, and proper maintenance of buildings [27], efficiency, and proper performance of spaces, services, and access routes in the neighborhood [17,36,49] are among the indicators of the realization of this component.

“Safety and Security”: Beyond the absence of danger, it is a deep experience and emotional connection with the environment that instils a sense of stability and predictability in the lives of residents [2]. This reassurance takes root when favourable lighting and social order provide a safe environment for movement and activity [22], because participating in communal life and enjoying public spaces automatically fosters subjective security [14]. The quality of space and the link between the landscape and spatial order [22,27,49], the lack of fear and danger [14,24], the possibility of rapid assistance [27,49], and the absence of crime-prone spaces [14,24,27,36]. They are effective indicators in explaining this component.

“Public facilities and services”: The realisation of a desirable living environment depends on the intelligent interplay of environmental, physical, and functional criteria that ensure the space's physical health by providing light and air conditioning [49]. This environmental quality forms the basis of urban tranquillity by protecting residents from noise and air pollution [17] and, under the shadow of social surveillance and restrictions on the movement of strangers, gives meaning to the security of the space [14]. On the other hand, the environment's efficiency requires the equitable distribution of services and immediate access to tools and daily necessities, which doubles the neighbourhood's livability by eliminating unnecessary trips [22,27]. Ultimately, continuous monitoring of infrastructure consolidates this cycle of well-being and social sustainability at the heart of urban life [36]. Access to light and ventilation [22,27,49], restriction of the movement of strangers [14,24,36], acoustic tranquility [22,27], absence of air pollution [22,27], easy access to necessities and services [17,36,49], and provision of daily necessities [17,36,49] are indicators of the fulfillment of this component.

“Social Relations and Neighbourliness”: Social relations and neighbourhood, beyond a simple coexistence, are the beating heart of the neighbourhood and a network of positive interactions, active participation, and mutual trust among residents. These relations become meaningful when people, by participating in local activities and dynamic social networks, establish an emotional bond with the environment that not only revives a sense of security and stability in them, but also forms the cornerstone of “attachment to place” [14]. In fact, when the social structure of the neighbourhood is aligned with the expectations and culture of residents, these bonds lead to an increase in the quality of life and create an environment in which people not only do not feel alienated but also see themselves as part of a coherent and satisfying whole [15,24]. Good neighborly relations [15,36], lack of a sense of cultural difference [15,36], neighborhood reputation, and reputation [14,24,36], compliance with neighborhood laws and regulations [14,24,36], access to public facilities [17,22,36,49], public transportation [22,36], and access to open space Green [22,27,49]. These are indicators of the achievement of this component.

2.1.2. Place attachment

Place attachment is the result of the interaction of two components: “place identity” and “place belonging.” Place identity refers to the integration of values and perceptions of place with an individual's self-concept, while place belonging refers to the functional role and use of space in everyday life. Place attachment is formed when an individual experiences a place as meaningful, identifiable, safe, efficient, and culturally valuable [25]. “Place attachment” is the result of emotions being tied to the physical body, manifesting across different layers of identity and meaning. At the core of this concept is a deep-rooted emotional attachment that is sustained in the context of coherent social relationships and everyday interactions, and gives meaning to the living environment [4,11,46]. The physical attractiveness and pleasantness of the space enhance the individual's perception of the environment's quality and, by integrating personal and spatial identity, transform public space into a “self-place” [37,38]. This (dependent) variable includes the following indicators:

“Interest in attachment to residence”: It is the result of the simultaneous perception of emotional, cognitive, and functional needs in the context of everyday residence and is formed when the environment can provide a sense of security, peace, and value in addition to the necessary functions for one's life [39,46].

“Social relations”: Social relations deepen the sense of satisfaction with the environment by strengthening collective identity [3,23]. The more positive the residents' perception of the social environment, the deeper their roots of belonging to that soil will be [39].

“Place attractiveness and pleasantness”: A reflection of the visual and functional qualities of the environment that significantly increases people's desire to stay and participate in the neighbourhood [33]. In fact, the visual richness and beauty of the urban environment enrich people's lived experience and, by enhancing the sense of place, establish a deep connection between citizens and public spaces [3].

“Sense of place”: A state in which the boundary between “individual” and “place” is blurred and space becomes an inseparable part of human personality and existence [4,21,37], which creates the most enduring type of attachment in the heart of a neighbourhood.

“Reluctance to leave the place”: It is the ultimate form of loyalty to the living environment [11,23]. Social roots and shared cultural identity make residents reluctant to leave their environment [3,25].

2.1.3. Social capital

Social capital is defined as a set of social relationships, mutual trust, norms of cooperation and communication networks that strengthen cooperation and collective action in society [1,35], which can increase the quality of human relationships and social functions of urban spaces [16]. It plays a fundamental role in improving the quality of life and resident satisfaction [39,50] and is influential in fostering social cohesion [13,47]. Social capital has two dimensions: structural (social networks, communication patterns, and the number of real interactions between individuals) and cognitive (social trust, norms of cooperation, perception of cohesion, and sense of solidarity). Physical and environmental factors [13], social factors [5,41], cultural factors [1,35], and economic stability [16] are among the factors influencing the formation of social capital. Social capital evaluation indicators (mediating variables) include:

“Trust”: Trust reduces uncertainty and is considered one of the main pillars of resident satisfaction and local cohesion by transforming simple interactions into lasting bonds [13,35,47,50].

“Social participation”: It is the degree of voluntary willingness of residents to improve the quality of life and a network of conscious cooperation [43], which strengthens cohesion and deepens the sense of trust between neighbours [1,5].

“Transparency”: By disclosing information and decisions, it provides a basis for trust, and by eliminating misunderstanding, it revitalises social bonds. It is a factor of voluntary participation [12], which builds social capital by promoting cooperation [40].

“Honesty”: The cornerstone of trust [44] and is a factor in strengthening human bonds and cooperation, and facilitating social participation [12,49].

“Commonalities”: Shared characteristics, beliefs, or interests among individuals that play an important role in the formation of social capital and strengthen the sense of belonging and solidarity among them [12,40,44].

2.2. Residential satisfaction, social capital, and place attachment

Neighbourhood satisfaction is an important predictor of mental health, life satisfaction, perceived safety, and intention to move [19]. Neighbourhoods that fail to adequately meet residents' perceived needs are prone to outmigration to areas that better meet these needs [10]. Neighbourhood satisfaction is not only an element of a socially sustainable neighbourhood, but also an intrinsic component of quality of life (reflected in life satisfaction), which is determined both by the opportunities provided by the built environment and by individual assessments of what is essential in life [34]. When residents are satisfied with a place, they will be loyal to [7]. Residents' willingness to recommend a place and their readiness to promote a place by sharing positive and engaging descriptions of it with others [48], participation and volunteering for its development, and willingness to invest heavily are among the factors that have been emphasised in place loyalty. Social and environmental psychology research has shown that residents' identification with a place leads to several desirable outcomes, such as increased commitment and satisfaction with the place [51]. Neighbourhoods today are multifunctional systems for creating local social ties and networks, and a sense of place and residential satisfaction are positively related to local social ties. Sense of place also mediates the relationship between local social ties and residential satisfaction [21].

Resident satisfaction can be defined as residents' evaluation of their community or place of residence [30]. In a socio-spatial perspective, the neighbourhood environment and the neighbourhood population and its residents, as well as the relationships, groups, and social processes between people living in the neighbourhood, are essential elements of quality of life [29]. Therefore, it can be said that place attachment is a result of

judgments and responses to the resistance of a particular environment, the quality of social relations and relationships, social cohesion, and, in general, social capital [45]. The results of a study have shown that place attachment was found to have a relationship with residential satisfaction. Social capital mediates the relationship between these two variables [1]. Social capital can be said to act as a bridge that connects emotional attachment to places that are transformed from residence to satisfaction. Without presence, participation, and neighbourly relationships, attachment simply cannot be sustained. Therefore, social reinforcement is essential to transform a sense of belonging into a satisfying experience of living in a place. Urban planners and policymakers should prioritise community engagement initiatives that foster place attachment to enhance overall residential satisfaction in traditional neighbourhoods [20].

2.3. Summarising and formulating research hypotheses

According to the studies conducted and according to Fig. 1, it can be said that the urban ecosystem is a dynamic process of the intersection of the body and the community, in which "environmental satisfaction" (independent variable) builds the foundation of everyday interactions through improving physical quality, security, and access to facilities. This physical satisfaction becomes "place belonging" (dependent variable) and a deep sense of attachment to the living environment when it has passed through the filter of "social capital" (mediating variable); because the quality and quantity of friendly relations between neighbours and the existence of mutual trust link satisfaction with the space to a collective identity and a desire for permanence. In fact, environmental characteristics are the primary drivers of social relations, and it is only by simultaneously enhancing these human ties that a physical structure moves beyond a purely service-oriented status and reaches deep layers of emotional attachment and "self-sense of place". Considering the issues raised, the hypotheses are stated as follows:

- Satisfaction with the residential neighbourhood environment has a positive and significant effect on the spatial belonging of the residents of Sahar Residential Tower (main hypothesis)
- Satisfaction with the residential neighbourhood environment has a positive and significant effect on the social capital of the residents of Sahar Residential Tower.
- Social capital has a positive and significant effect on the spatial belonging of the residents of Sahar Residential Tower.
- Social capital plays a significant mediating role in the relationship between satisfaction with the residential neighbourhood environment and the spatial belonging of the residents (indirect effect).
- It seems that the components of satisfaction (physical characteristics, security and safety, public facilities and services, social relations, and the quality of neighbouring units) have a positive and significant effect on social capital and place belonging of residents.

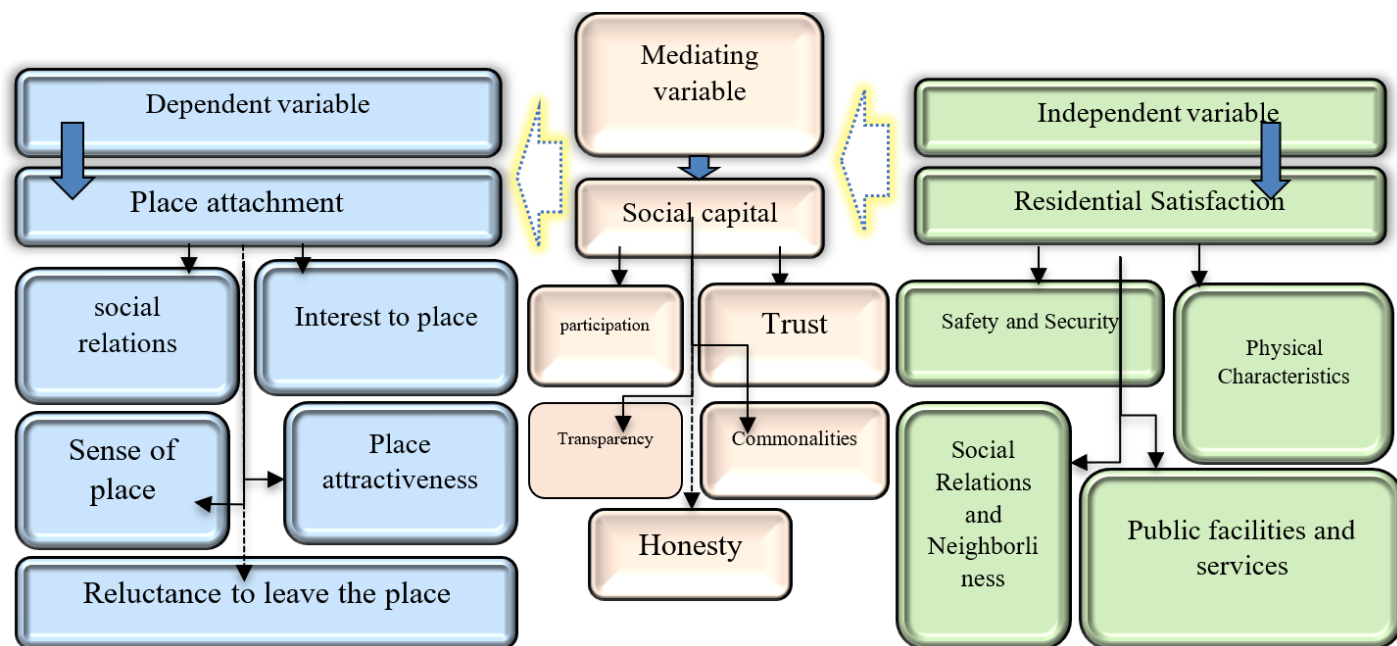


Fig. 1. Research model

3. Research method

3.1. Data collection and analysis

This research is quantitative applied research, and the information required for this research was based on library and documentary studies. In this study, a questionnaire was used, which was reviewed and approved by 15 experts in the field of architecture and urban planning to examine its form validity. The satisfaction variable structure has 4 components, with a total of 24 measurement indicators. For the physical characteristics component, 6 indicators have been developed (Landscape Design and Beautification, Cleanliness and Tidiness, Infrastructure Facilities, Construction Quality, Efficiency / Functionality, Proportion and Scale), for the security and safety component, 5 indicators (Space Quality such as Lighting, Sound, Temperature, physical Condition of the Environment, No Feeling of Fear or Danger, Possibility of Emergency / Aid Response, Absence of Crime-Prone Spaces), for the Public Facilities and Services component, 6 indicators (Access to Lighting and Ventilation, Restriction on the Movement of Strangers, Absence of Noise Pollution, Absence of Air Pollution, access to Required Materials such as Tools, Materials, or Services, Provision of Daily Necessities), and for the social and neighborhood relations component, according to theoretical foundations, 7 indicators (Respect for Neighbors' Rights, No Feeling of Cultural Difference, Reputation and Good Name of the Neighborhood, Compliance with General Laws and Regulations, Access to Public Facilities, Public Transportation, Access to Green Spaces) have been developed. For the social capital variable, 5 indicators (Trust Participation, Transparency, Honesty, Commonalities / Shared Values) and for the place belonging variable, 5 indicators (Interest / Attachment to Living Here, Social Relations among Residents, Attractiveness and Pleasantness or Sense of Place, Sense of Personal / Own Place, No Desire to Leave Even If Possible) have been developed. The statistical population of this study includes residents of Sahar Residential Complex in Tehran's District 2. Based on the latest inquiries, the total number of residents in this complex is estimated at 1,440. To determine the sample size, the Cochran formula was first used, based on which 302 people were

determined as the minimum sample. However, to increase the accuracy and confidence in generalising the results, the final sample size was 323 people, given the multiplicity of hypotheses and the path analysis model. The sampling method was convenience sampling. The questionnaires were distributed and completed non-randomly, based on ease of access (at different times during residents' presence in the building and their willingness to participate). This method was chosen due to practical limitations such as the temporal dispersion of residents, the impossibility of entering the units without coordination, and security issues in the complex. To reduce the effect of incomplete questionnaires and strengthen the statistical power of the analyses, a larger number of questionnaires (323) than the calculated minimum was collected. To increase the representativeness of the sample and reduce the bias resulting from differences in the characteristics of residents on different floors, the questionnaires were distributed and collected by height zones (low floors: 1–5, middle: 6–10, high: 11 and above) and block/tower units. This separation was done to adequately cover the complex's different floors and sections and to strengthen the generalizability of the results. To compensate for potential attrition and improve the accuracy of analyses (especially the path analysis model), 323 questionnaires were distributed. Ultimately, 302 complete and analyzable questionnaires were collected. The Likert scale (from very low to 5 very high) was used to measure the items. Two levels of statistics were used to analyse the findings from the questionnaire. To examine demographic characteristics and describe the status of variables (using SPSS version 26 software), and to test hypotheses and examine relationships between variables, structural equation modelling and path analysis were used using Amos software. Before entering the modelling stage, the data distribution status was examined using two valid tests: Kolmogorov-Smirnov (K-S) and Shapiro-Wilk. The Shapiro-Wilk test was used due to higher accuracy in smaller samples, and the Kolmogorov-Smirnov test was used for greater confidence in medium sample sizes. In this study, two methods were used to determine validity. The content validity of the initial questionnaire was derived from the theoretical literature and research background and was submitted to the supervisor and several experts in urban planning and sociology for approval. After

applying the desired corrections, the items' affinity with the research dimensions was confirmed. Construct validity: Confirmatory factor analysis was used to examine construct validity using the AMOS software. At this stage, the factor loading of each item was calculated to ensure that each question accurately measured its corresponding latent variable (environmental satisfaction, social capital, and place belonging) (factor loadings above 0.4 were accepted). To calculate the questionnaire's reliability, as shown in Table 3, two indices were used: Cronbach's alpha and composite reliability.

3.2. Survey area

Figure 2 shows the location of the case study on the country division map. The Sahar residential complex is located in the heart of District 5, District 2, Tehran, more than a high-rise structure, in the Sadeghieh neighbourhood. The project, which has been hosting its residents since 2005, is built on a land area of approximately 6,266.75 square meters and, with 12 floors and two separate blocks, provides a home for 360 families (over

1,440 people). While access to the capital's vital arteries, such as Yadegar Imam, Shahid Hemmat, and Ayatollah Kashani highways, takes only a few minutes, the site's location at the end of Hamid and Davoud Asadi streets has created a "quiet cul-de-sac." This location strategy has allowed residents to enjoy high privacy and silence resulting from the elimination of through traffic, despite being in the heart of one of the busiest areas in northwest Tehran. Its surroundings are designed to meet daily needs on a walking scale. The presence of the Citizen Park in the south of the complex and the football field on the eastern side has provided vital spaces for citizens to "breathe" and for intergenerational social interactions. These green and sports spots, along with complexes such as the Parnian Pool, have enriched the neighbourhood's recreational potential. Also, the proximity of 12-story towers with old villa houses and newly built 4- and 5-story apartments has given this part of Sadeghieh a visual diversity and a special identity, breaking the neighbourhood's monotony. Figure 3 shows the view of the case study from the entrance and the park.

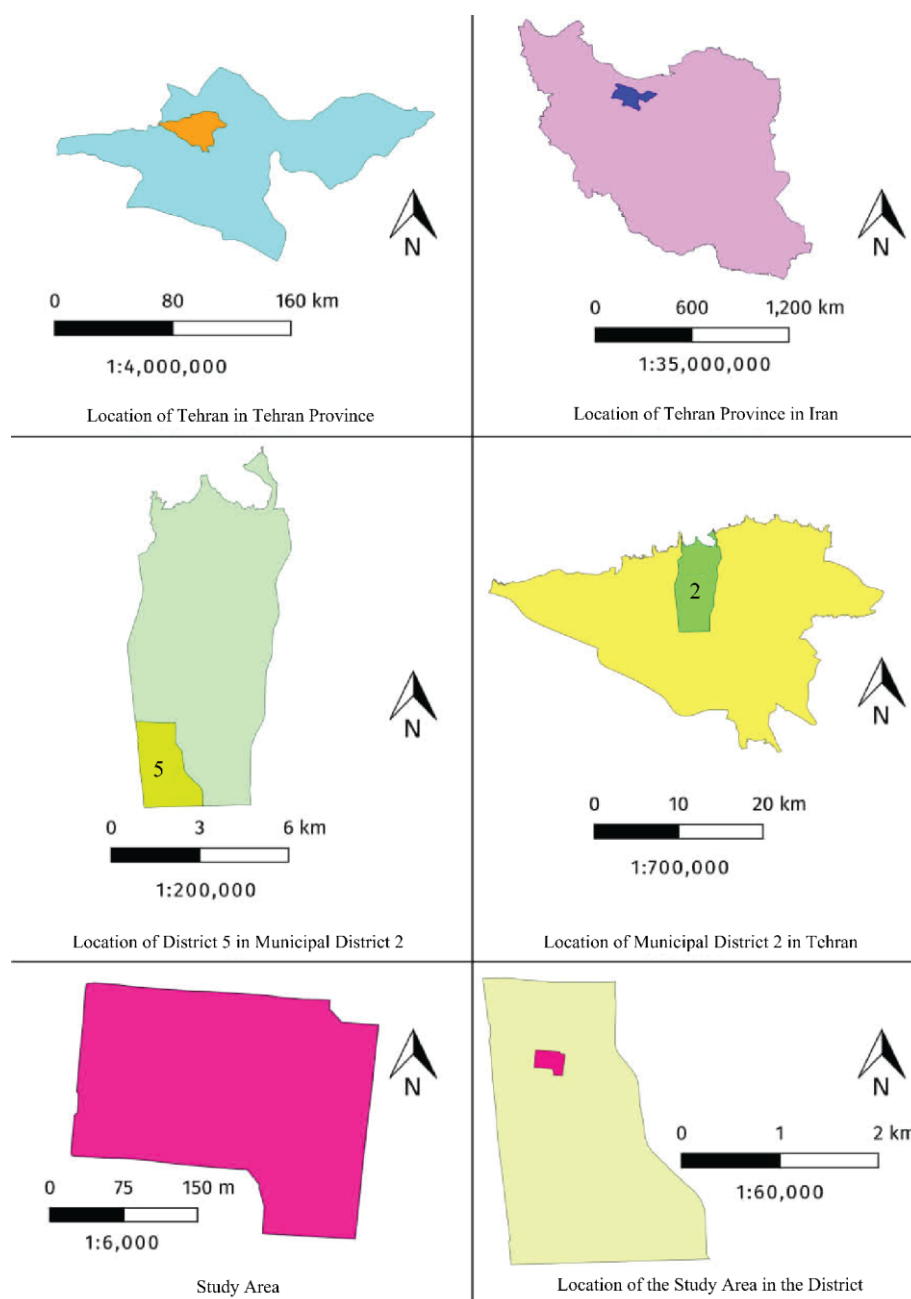


Fig. 2. Location of the research sample in the country, province, municipality, city, region, and urban areas



Fig. 3. Location of Sahar Residential Towers, its entrance view, and view from Shahrivand Park

4. Findings

4.1. Descriptive statistics

Out of a total of 323 people, about 54.5% are male, and 45.5% are female, with no significant difference between the number of men and women. In terms of residence history, the largest number of people are in the "1-5 years" residence history group (41.5%), the number of people in the 6-10 years group is 117 (36.2%), the number of people between 11-15 years is 64 (19.8%), and the smallest number of people are in the "16-20 years or older" group is 8 (2.5%). In terms of education, 114 people (35.3%) have a "bachelor's" education, 78 people (24.1%) have a diploma, 76 people (23.5%) have a post-diploma, 47 people (14.6%) have a master's degree, and 8 people (2.5%) have a "doctorate or higher" education. Most people are in the "married" group (80.2%), and a smaller number are in the "single" group (19.8%). Also, the largest number of people are in the "20-30 years" age group (25.1%), and the smallest number of people are in the "under 20 years" (6.2%) and "60 and over" (6.5%) age groups.

4.2. Study of the status of research variables

Based on the results of descriptive statistics presented in [Table 1](#), all main variables and substructures of the research have

been analysed based on data from valid questionnaires. Examination of the minimum and maximum score indices shows that the range of changes in responses in all variables is wide and ranges from minimums close to the lowest level of the scale to maximums close to the top of the five-point scale. This shows that the research tool has been able to record a diverse range of attitudes and evaluations well and has not faced the problem of excessive concentration of responses at a specific point. At the item level, examination of the central tendency and dispersion indices shows that the average of most items is in the approximate range of 2.6 to 3.1, which indicates the respondents' average to relatively favourable evaluation of various components of the residential environment, place belonging, and social capital. The highest averages were related to items such as "physical condition of the environment", "absence of noise pollution", "access to necessary materials and services", and "interest in residence", while some items in the area of social capital, including "honesty" and "partnerships", showed lower averages, which indicates the heterogeneity of the residents' social experience. From the perspective of the shape of the data distribution, the skewness values of all items are within the acceptable range (less than ± 1) and in most cases are close to zero, which indicates the relative symmetry of the data distribution. Also, the kurtosis values of all variables were reported to be less than ± 2 , which indicates the absence of

kurtosis or abnormal width in the distribution of responses. These results generally confirm the normality of the data distribution and make the use of parametric statistical methods and structural equation modelling statistically justifiable. Overall, the results of descriptive statistics show that the collected data have

appropriate statistical quality, reasonable dispersion, and acceptable normal distribution. This situation indicates the adequacy of the data for conducting advanced inferential analyses and provides a valid basis for testing the measurement model and structural model of the research.

Table 1. Descriptive statistics of components of satisfaction with the quality of the residential environment and factors related to place attachment and capital

Component and Variable / Item		Indicator/Code	Skewness	Skewness SE	Kurtosis	Kurtosis SE	Mean
Satisfaction (SAT)							
Physical Characteristics	Landscape Design and Beautification	SATPH1	-0.79	0.07	1.37	1.17	2.90
	Cleanliness and Tidiness	SATPH2	-0.80	0.11	1.33	1.15	2.93
	Infrastructure Facilities	SATPH3	-0.74	0.06	1.22	1.10	2.89
	Construction Quality	SATPH4	-0.66	0.21	1.24	1.12	2.85
	Efficiency / Functionality	SATPH5	-0.51	0.04	1.14	1.07	2.99
	Proportion and Scale	SATPH6	-0.46	0.20	1.14	1.07	2.95
Safety and Security	Space Quality (Lighting, Sound, Temperature)	SATSAS7	-0.47	0.15	1.05	1.02	2.88
	Physical Condition of the Environment	SATSAS8	-0.22	0.11	0.90	0.95	3.10
	No Feeling of Fear or Danger	SATSAS9	-0.52	0.07	1.16	1.08	2.82
	Possibility of Emergency / Aid Response	SATSAS10	-0.39	0.35	1.07	1.04	2.62
	Absence of Crime-Prone Spaces	SATSAS11	-0.59	0.18	1.20	1.10	2.85
Public Facilities and Services	Access to Lighting and Ventilation	SATPFS12	-0.37	0.19	0.90	0.95	2.80
	Restriction on the Movement of Strangers	SATPFS13	-0.57	0.21	1.11	1.05	2.97
	Absence of Noise Pollution	SATPFS14	-0.74	0.11	1.16	1.08	3.04
	Absence of Air Pollution	SATPFS15	-1.41	-0.08	0.63	0.80	2.04
	Access to Required Materials (Tools, Materials, or Services)	SATPFS16	0.16	0.24	0.67	0.82	3.02
	Provision of Daily Necessities	SATPFS17	-0.61	0.17	1.18	1.09	2.96
Social Relations and Neighborliness	Respect for Neighbors' Rights	SATSNR18	-0.31	0.18	1.04	1.02	2.93
	No Feeling of Cultural Difference	SATSNR19	-0.36	0.34	1.11	1.05	2.78
	Reputation and Good Name of the Neighborhood	SATSNR20	-0.44	0.29	1.09	1.05	2.89
	Compliance with General Laws and Regulations	SATSNR21	-0.33	0.31	1.09	1.05	2.82
	Access to Public Facilities	SATSNR22	-0.33	0.22	1.16	1.08	2.80
	Public Transportation	SATSNR23	-0.35	0.45	1.26	1.12	2.61
	Access to Green Spaces	SATSNR24	-0.92	0.12	1.41	1.19	2.85
Place Attachment (PA)	Interest / Attachment to Living Here	PA25	0.59	0.21	0.51	0.71	3.07
	Social Relations among Residents	PA26	0.30	0.38	0.44	0.66	2.76
	Attractiveness and Pleasantness (Sense of Place)	PA27	-0.19	0.29	0.84	0.92	2.87
	Sense of Personal / Own Place	PA28	-0.15	0.58	1.11	1.05	2.36
	No Desire to Leave Even If Possible	PA29	0.34	0.64	0.54	0.74	2.60
Social Capital (SC)	Trust	SC30	0.10	0.38	0.81	0.90	2.63
	Participation	SC31	-0.14	0.37	1.04	1.02	2.67
	Transparency	SC32	-0.28	0.27	1.04	1.02	2.67
	Honesty	SC33	-0.23	0.79	1.34	1.16	2.20
	Commonalities / Shared Values	SC34	-0.00	0.48	0.89	0.94	2.36

4.3. Examining the status of composite variables

According to Table 2, an examination of the average of composite variables shows that satisfaction with the residential environment is assessed at an average to relatively favourable level, with an average of 2.84 and a standard deviation of 0.50. Among the sub-components of this variable, “physical characteristics of the environment” has the highest average (2.92), followed by the components “security and safety” (2.85), “public facilities and services” (2.80), and “social and neighbourhood relations” (2.80). These results indicate that the respondents’ evaluations of different dimensions of the residential environment are generally homogeneous and at a similar level. The standard deviation values of these sub-

components (in the range of 0.56 to 0.72) indicate the average dispersion of the responses and the existence of acceptable diversity in the residents’ perspectives.

Regarding the dependent and mediating variables of the model, the mean of place belonging was 2.73, and social capital was 2.50. These findings indicate that the sense of place belonging among the respondents is at an average level, while social capital is assessed at a relatively lower level from the perspective of residents. However, the standard deviation of social capital (0.72) indicates greater heterogeneity of responses in this variable compared to other constructs, which could reflect individual and social differences in the experience of local relationships, trust, and participation.

Table 2. Descriptive statistics of main constructs and sub-components

Constructs / Sub-Component	N	Mean	Std. Dev.	Min.	Max.	Variance
Physical Characteristics (Sub-construct of Environmental Satisfaction)	323	2.92	0.72	1.33	5.00	0.53
Safety and Security (Sub-construct of Environmental Satisfaction)	323	2.85	0.63	1.60	4.80	0.39
Public Facilities and Services (Sub-construct of Environmental Satisfaction)	323	2.80	0.56	1.33	4.67	0.31
Social Relations and Neighbourliness (Sub-construct of Environmental Satisfaction)	323	2.80	0.62	1.57	5.00	0.39
Overall Satisfaction	323	2.84	0.50	1.69	4.62	0.25
Place Attachment	323	2.73	0.63	1.00	4.80	0.40
Social Capital	323	2.50	0.72	1.00	4.80	0.53

4.4. Analysis of relationships between variables through structural equations

In the final stage of confirmatory factor analysis (CFA), all constructs (second-order independent, mediator, and dependent variables) were entered into a model simultaneously, and two-way correlations were established between them. To achieve a complete fit, one item from the dependent variable (place belonging) and one item from the mediator variable (social capital) were removed. Also, in the first-order models, one item from the environmental satisfaction construct was removed in the first and second models, and four items were removed in the third

and fourth models to achieve the desired indicators of the model. It should be noted that in the process of factor analysis, items with weak factors have little to no effect on explaining variance with the main construct and mainly add noise to the model. Removing these items not only refines the model, but also significantly increases composite reliability (composite reliability). This indicates that the items form the necessary internal consistency with the desired construct. In contrast, the remaining items fully represent the construct's central entity and strengthen the model's internal validity. In this study, the values: $\chi^2/df = 1.8$, GFI = 0.87, CFI = 0.87, TLI = 0.86, MSEA = 0.05 are the results of the fit indices.

Table 3. Reliability and convergent validity of main constructs

Criterion	Recommended Threshold	Environmental Satisfaction	Social Capital	Place Attachment	Status
Cronbach's Alpha (α)	≥ 0.70 (acceptable), ≥ 0.80 (good)	0.847	0.79	0.87	All acceptable/good
Composite Reliability (CR)	≥ 0.70 (preferably ≥ 0.80)	0.88	0.81	0.89	All good
Average Variance Extracted (AVE)	≥ 0.50 (convergent validity)	0.64	0.51	0.67	All acceptable

According to Table 3, the examined constructs in the final model (environmental satisfaction, place belonging, and social capital) have a desirable composite reliability (above 0.7). The environmental satisfaction and place belonging constructs also exhibit average extracted variances above 0.5, which clearly confirms their convergent validity. By referring to the composite reliability criterion as the main criterion, it can be claimed that the social capital construct also has sufficient validity in the present model. Therefore, the measurement model has acceptable and, in some cases, very strong reliability and convergent validity. The structural equation model (SEM) fit was also good. A set of absolute, relative, and adjusted indices was examined, all of which indicated the model fitted the data well ($\chi^2/df = 1.97$, IFI = 0.903, CFI = 0.902, TLI = 0.889, RMSEA = 0.05).

According to Fig. 4, the results of structural equation modelling showed that satisfaction with the residential environment significantly strengthens social capital ($\beta = 0.551$, $p < 0.001$) and, at the same time, has a significant direct and positive effect on residents' place belonging ($\beta = 0.340$, $p < 0.001$). Also, Social capital, as a mediating social construct, plays a significant role in explaining place belonging, and its positive effect on this variable was confirmed ($\beta = 0.171$, $p < 0.05$). The indirect effects showed that satisfaction with the residential environment through social capital also leads to increased place attachment (indirect $\beta = 0.094$), and the results of the Sobel test confirm the statistical significance of this mediation path ($z = 1.804$). The simultaneous significance of the direct and indirect effects indicates that social capital plays the role of a partial mediator in this model, meaning

that place attachment not only reflects an individual's assessment of the overall quality of the residential environment, but is also strengthened by gradual social processes such as the formation of networks of relationships, mutual trust, and local participation. Based on the statistical findings presented in the article, the proof of the hypotheses is as follows:

1. The main hypothesis (the effect of environmental satisfaction on place attachment): It is confirmed because the direct effect of environmental satisfaction on place attachment is positive and significant, with a coefficient ($\beta = 0.340$) and a significance level ($p > 0.001$).
2. The first sub-hypothesis (the effect of environmental satisfaction on social capital): It is confirmed because the direct effect is positive and significant with a coefficient ($\beta = 0.551$) and a significance level ($p > 0.001$).
3. The second sub-hypothesis (the effect of social capital on place attachment): It is confirmed because the direct effect of social capital on place attachment is positive and significant, with a coefficient ($\beta = 0.171$) and a significance level ($p > 0.05$).
4. The third sub-hypothesis (the mediating role of social capital): It is confirmed because the indirect effect of environmental satisfaction on place belonging through social capital is ($\beta = 0.094$), and the Sobel test has confirmed the value ($z = 1.804$) and statistical significance. Also, the simultaneous presence of direct and indirect effects indicates that social capital is a partial mediator.

5. In Sahar Residential Tower, satisfaction with social relations and neighbourhood (with a mean of 2.80 out of 5) is the most important component for explaining both social capital and place belonging. Although the mean satisfaction with the physical components (2.92), security (2.85), and services (2.80) is slightly higher or equal, the findings of the structural equation model show that satisfaction with the overall environment (in which the social relations dimension has a dominant share) predicts social capital with a coefficient of $\beta = 0.551$ ($p < 0.001$), and social capital also has a direct effect on place belonging with a coefficient of $\beta = 0.171$ ($p < 0.05$). The indirect effect of satisfaction with the environment through social capital on place belonging is 0.094 (significant with the Sobel test, $z = 1.804$). In contrast, although other components (physical, security, service) have a positive effect (their averages range from 2.80 to 2.92), according to path analysis, their effect mainly reaches the final result through strengthening social relations and then social capital. The final research model with good fit indices ($\chi^2/df = 1.8$, RMSEA = 0.05, CFI = 0.87, and TLI = 0.86) confirms that social capital acts as a "bridge" and without it, even the best physical conditions (with an average of 2.92) cannot bring place belonging (with an overall average of 2.73) to the desired level. Also, the average social capital in Sahar Tower is reported to be only 2.50, indicating a serious weakness in neighbourhood relations and confirming the key role of this component.

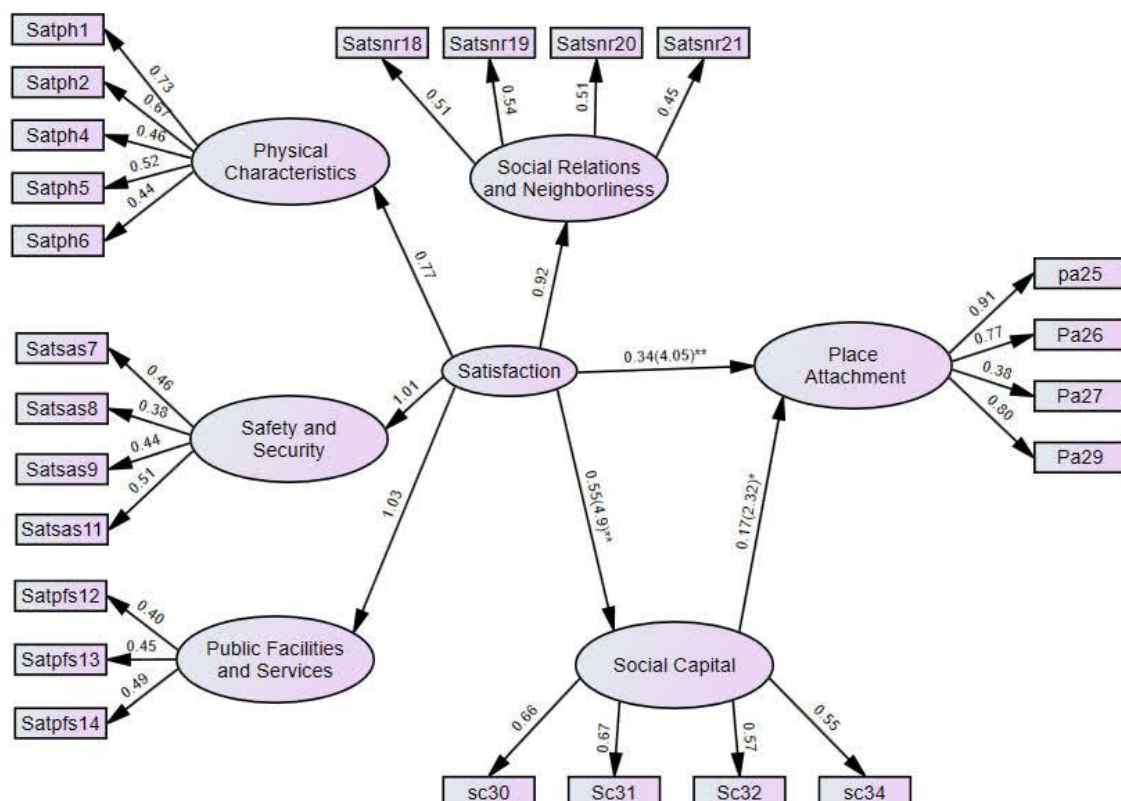


Fig. 4. Structural equation model

5. Discussion

The findings of this study empirically demonstrate that satisfaction with the residential environment, with particular emphasis on the dimension of social relations and

neighbourhood, is a powerful and multifaceted predictor of place belonging. This effect is exerted both directly and immediately, and through the indirect and gradual mechanism of strengthening social capital. The analyses showed that physical satisfaction alone is not the driving force of belonging. In fact, social capital

acts as a “bridge” that connects physical qualities to the hearts and minds of the residents [2]. Without this bridge, even the best landscaping cannot eliminate the sense of alienation in the Dawn Tower.” This finding aligns with the research. A study titled “Residential Satisfaction, Social Capital, and Place Attachment: Case Study: Seoul City, Korea” showed that community-based spaces and face-to-face neighbourhood interactions are the main drivers of trust and participation; also, urban management transparency and institutional accountability are considered critical predictors for promoting social capital in urban communities [28]. It is also consistent with the findings of a study titled “Place Attachment and Residential Satisfaction Mediated by Social Capital in Affordable Housing on Tehran Campus”, which showed that place attachment has a direct relationship with residential satisfaction; with the difference that social capital, as a mediating variable, strengthens this relationship and the sustainability of affordable and affordable housing projects requires prioritizing social strategies alongside physical issues [1]. According to the findings, the average of environmental satisfaction, place belonging, and social capital is all below the midpoint of 3, indicating a “lower-average” situation. The substandard level is rooted in a set of overlapping deficiencies: on the one hand, the service component is associated with poor public transportation, air quality, and access to emergency services. On the other hand, the security component affects the residents’ peace of mind due to the feeling of danger and fear in common spaces and the lack of lighting and surveillance. And most importantly, the social relations component, due to the vertical design and the lack of interiorizing spaces (such as communal living areas, conversational inner courtyards, or inviting lobbies), practically eliminates the opportunity to get to know and meet neighbours face to face without transferring to “communication congestion.” In such a context, social capital, which is based on trust, participation, honesty, and sharing, is severely depleted, and networks of mutual support and norms of cooperation are not formed. They do not know about existing events, do not participate in the community, and feel a lack of transparency towards the building management. This weakness of social capital directly harms place attachment because place attachment is not created by beautiful views or relative safety alone, but requires emotional bonds born from enduring neighbourhood relationships and shared memories. Such bonds have led the residents of the Sahar Tower not only to develop no deep attachment to their place of residence, but also to leave it for long. In other words, vertical architecture, regardless of social stratum, not only lowers satisfaction with the environment but also empties social capital and reduces place attachment to a “tolerable but not desirable” level. This general impression is consistent with research findings that residential and neighbourhood satisfaction is not explained by the physical alone, but rather by a combination of physical, service, security, and social factors, with the “intangible” part (such as a sense of belonging and relationships) playing a decisive role [2,26]. In the substructures of environmental satisfaction, physical characteristics are the highest, and public facilities and services, and social/neighbourhood relations are the lowest. This is exactly what is repeated in neighbourhood research: neighbourhood satisfaction is usually tied to components such as safety, quality of space maintenance and management, quality of the surrounding environment (greenery/cleanliness), and quality of social interactions [2]. Even in studies that have considered satisfaction as multidimensional, it is emphasised that “home” is not just a residential unit; it is a combination of housing, neighbourhood, access, security, and social support [18]. Studies

have shown that place belonging is related to factors such as social ties, greenery, local amenities, environmental quality, and even architectural style/physical identity [2]. On the other hand, research evidence emphasizes that belonging is not just a “feeling”; there is a social mechanism behind it. When social cohesion/cohesion increases, belonging is strengthened and can even play a mediating role. For example, according to the findings of one study, place belonging has a (partial) mediating role between social cohesion and life satisfaction, and belonging is like a loop that transmits the effect of social relationships to psychological outcomes [32].

6. Conclusion

The research findings showed that the average of all three main variables, including satisfaction with the living environment (2.84), place belonging (2.73), and social capital (2.50), is less than the midpoint of 3, which indicates a “downward average” situation and is lower than the theoretical average level. In response to the research questions, the structural equation model test showed that satisfaction with the living environment has a positive and significant direct effect on social capital, with a coefficient of 0.551, and on place belonging, with a coefficient of 0.340. Social capital also has a positive and significant direct effect on place belonging, with a coefficient of 0.171. Regarding the mediating role, the indirect effect of satisfaction with the environment on place belonging through social capital is 0.094, and the Sobel test has confirmed its significance, indicating the partial mediating role of social capital. Among the four components of environmental satisfaction, “physical characteristics” has the highest average of 2.92, and “social and neighbourhood relations” has the lowest average of 2.80. The findings of this study show that satisfaction with the residential environment is a strong predictor of place attachment. In effect, social capital acts as a “bridge” that connects physical qualities to the hearts and minds of residents. Realising a dynamic, human-centred neighbourhood requires a shift from purely technical and physical approaches to “event-centred” design, in which spaces are redefined to improve quality of life and reduce social isolation. Without real opportunities for interaction and without a sense of trust, even the best physical improvements may be “beautiful” but not “alive.” The final result of the three main variables shows that the problem of the residential tower under study is more socio-spatial than purely physical; that is, it is necessary to focus on space and social relationships simultaneously. The downward trend in the levels of the research variables confirms that many residents find the neighbourhood “tolerable,” but not enough to want to be attached to it, participate in it, or rely on neighbours. According to the studies conducted, it is necessary to pay attention to the following strategies:

Improving the level of satisfaction with the place of residence: Satisfaction with the residential environment is a set of physical, security, and service dimensions, the improvement of which requires a comprehensive view. Improving the quality of public services, including easy access to educational and medical centres and transportation stations, is one of the main demands for increasing satisfaction. In addition to services, strengthening subjective and objective security through improving street lighting, eliminating abandoned spaces, and social monitoring doubles the sense of peace in the environment. Also, given that neighbourhood relations are a powerful predictor of satisfaction, architectural design should be such that semi-private spaces and inviting entrances provide opportunities for

short, constructive interactions between neighbours, thereby enhancing the quality of life in non-physical dimensions.

Improving social capital: Social capital, as the most crucial part of this research, requires a serious review of the neighbourhood's interactive structures. To improve this indicator, urban management should focus on creating and supporting local organisations and volunteer groups to strengthen mutual trust among residents. Creating platforms for citizen participation in micro-neighbourhood decision-making can increase the sense of responsibility and transform residents from passive to active actors. Also, holding mass events, local markets, and joint cultural activities provides a space for dialogue and greater familiarity among neighbours, which will result in overcoming social isolation and forming sustainable human bonds in the living environment.

Enhancing the level of place ownership: Place ownership is directly related to identity and creating shared memories in the environment. To enhance this sense, designers should emphasise symbolic elements and physical signs that reflect the local culture and history so that residents feel a sense of distinction and pride in their neighbourhood. Involving people in the process of beautifying, planting trees, and maintaining green spaces near their homes creates intellectual ownership and deepens the emotional bond between the individual and the environment. When an individual plays a role in positive changes in their surrounding environment, the place transforms from a neutral space to a meaningful element that they will strive to preserve and enhance.

In addition to the recommendations specifically made in the case study, it is necessary to pay attention to the following:

- Installing spaces for interaction and mandatory pauses in frequently used routes, such as next to the elevator, at the beginning of the corridor on each floor, near the emergency stairs, to increase short daily interactions to compensate for the weakness of "social relations".
- Creating facilities to restore the colour of personal belongings and the sense of place of the residents and their participation in enhancing the beauty of the environment, and allowing personalisation of the space in the entrances and corridors or the common lobby.
- Using a variety of colours and textures of different materials to make interior spaces legible and give identity to abandoned spaces, and enhance attractiveness and pleasantness, such as changing the colour of the end of the corridor or installing a wall sign with a specific role for each floor, while paying attention to safety and security in times of danger.
- Transforming corridors and purely communication spaces into functions such as a gallery or exhibition of residents' memories of the building where they live.
- Designing two-story balconies or alternating common lodges to increase commonality and developing honesty, such as connecting two vertical units through a shared semi-private space for daily conversations while paying attention to personal and family privacy.
- Placing social furniture on the main walkway and next to the lawns to reduce the feeling of fear and danger and facilitate face-to-face interactions, as well as installing wall-mounted folding chairs at the end of the corridor of each floor without occupying permanent space to create opportunities for sitting and short conversations without reducing privacy and increasing "neighbourly relations".

- Creating shared gardens for residents and the possibility of allocating green space inside the living space to residents to restore the colour of personal belonging and participate in the beauty of the building.
- Installing transparent glass notice boards in the entrance lobby of each block, along with a locked suggestion box to record residents' opinions anonymously to improve "transparency" and "indirect participation" and reduce management misunderstandings.
- Organising the physical qualities of the environment and reducing deficiencies or weaknesses while utilising the participation of residents and paying attention to their opinions in changing or beautifying the environment.
- Using open or semi-open spaces of the building to hold cultural festivals to promote intercultural interactions and reduce conflicts and challenges resulting from cultural differences.
- Periodic rotation of tower management so that all members participate in the management of the complex.

The time limit and cross-sectional nature of the data due to the dynamics of the concept of place belonging, the limitations of sampling and generalizability due to the nature of the context, the focus on quantitative indicators and the necessity of using complementary qualitative methods, and the difficulty in gaining the trust of residents to respond are the limitations and obstacles of the present study. Consequently, the use of longitudinal studies and medium-term monitoring, the development of a theoretical model with new mediating variables, the role of economic pressures or inequality in the distribution of services in the emotional bonds of an individual with a place, the use of mixed assessment methods, the focus on specific groups and less visible strata, and the assessment of the impact of innovative policies and technology such as the role of virtual social networks on the physical interactions of residents and place belonging or social isolation are the axes for future studies.

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