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Article

Residential satisfaction in urban historical districts and human needs: An environmental affordance approach (Sabzevar, Iran)

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ABSTRACT

Despite their historical, cultural, and social significance, many historic urban districts struggle to meet residents' needs, thereby undermining residential satisfaction and quality of life. The historic district of Sabzevar, Iran, exemplifies this challenge, as aging residents increasingly leave due to declining satisfaction. This study investigates how deficiencies in environmental affordances — the environment's capacity to support human needs — contribute to this trend. Using a mixed-methods approach and path analysis, we identify four key dimensions of affordance: Physical-spatial (comfort, security), functional (accessibility, flexibility), perceptual-psychological (legibility, safety, place attachment), and socio-cultural (social interaction, aesthetics). Findings reveal low overall residential satisfaction, with the perceptual-psychological dimension emerging as the strongest predictor ($\beta=0.55$, $p<0.05$), likely due to its role in fostering emotional attachment and perceived safety — critical factors for aging populations in historic settings. While socio-cultural affordances remain relatively strong (preserving community identity), physical-spatial and functional dimensions are critically deficient. Based on these findings, we propose context-specific urban design interventions — including shaded rest areas, traffic calming, Lynchian legibility enhancements, and CPTED-based safety measures — to improve livability and support resident retention. This study advances the application of Maslow's hierarchy within affordance theory and offers actionable insights for human-centered revitalization of historic districts.

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INTRODUCTION

Preserving the historical, cultural, and social fabric of old urban districts is not merely an aesthetic or heritage concern — it is a critical component of equitable, human-centered urban policy. Yet, in many cities, including Sabzevar in Khorasan Razavi Province, these districts are increasingly marginalized under top-down planning paradigms that prioritize large-scale development over the lived experience of residents (Chokhachian, Santucci & Auer, 2017). The historic core of Sabzevar, despite its rich identity and communal vitality, suffers from a visibly degraded physical fabric — crumbling pavements, inadequate shading, and fragmented accessibility — conditions that directly contribute to the gradual outmigration of its elderly residents (Fayaz, et al., 2019, p. 234; Haft Shahr Aria, 2012). This displacement is not random; it is a direct consequence of declining residential satisfaction — a phenomenon deeply tied to the environment's failure to respond to residents' evolving needs (Saffari Nia, et al., 2013, p. 43; Dannenberg, et al., 2011; Fernandez-Portero, et al., 2017; Temelova & Dvorakova, 2012).

Central to this study is the concept of environmental affordance — the perceived and actual capacity of the built environment to support human action and well-being. Unlike conventional urban metrics that focus on form or function alone, affordance theory — rooted in Gibson's (1979) work — emphasizes the relationship between people and place: A shaded bench affords rest to a tired elderly resident; a familiar alley affords orientation to someone with fading memory; a communal square affords belonging to those rooted in place. In Sabzevar's aging community, satisfaction is not determined by infrastructure alone, but by whether the environment holds its residents — physically, functionally, and emotionally.

Residential satisfaction — defined as residents' subjective evaluation of their living environment (Terzano, 2014) — serves as a vital indicator for planners seeking to create not just functional, but meaningful places (Galster & Hesser, 1981; Hadavi, Kaplan & Hunter, 2015, p. 20). This study, therefore, aims to answer two core questions: (1) How do environmental affordances affect residential satisfaction in Sabzevar's historic district? and (2) What is the current state of these affordances across their key dimensions? To address these questions, we adopt a descriptive-analytical, mixed-methods approach, combining non-participant observation with a survey of 359 residents (after excluding 11 incomplete responses from 370 distributed questionnaires). Our objectives are fourfold: To identify the key determinants of satisfaction through the lens of affordance theory; to quantify satisfaction levels; to assess the quality of affordance dimensions in the study area; and — crucially — to derive actionable urban design recommendations rooted in empirical findings.

The following sections first establish the theoretical foundations of this study — reviewing the interrelated concepts of human needs, environmental affordances, and residential satisfaction — and present our conceptual framework (Figure 1). We then introduce the study area, methodology, and data analysis procedures, followed by results, discussion, and policy implications. This structure ensures a logical progression from theory to practice, grounding our recommendations in both scholarly literature and on-the-ground realities.

REVIEW OF RELATED THEORIES

Human Needs of Residents

At the heart of environmental design lies a simple yet profound premise: The built environment exists to respond to human needs (Nickols et al., 2009). Urban spaces, through

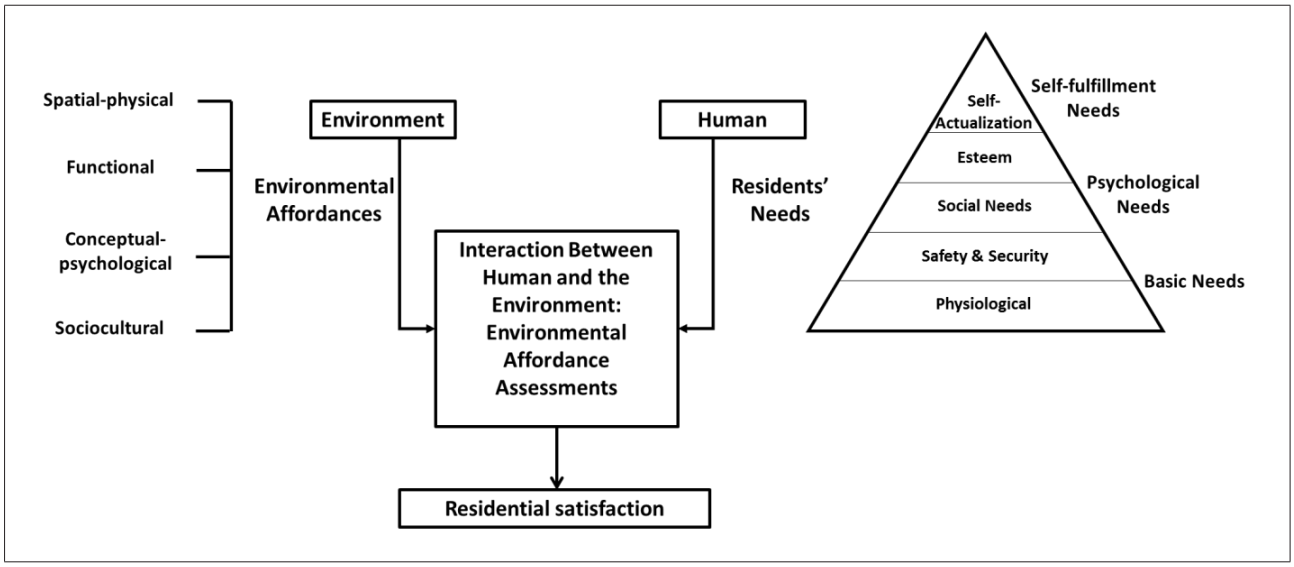

Figure 1. Empirical framework of the study.

their physical and social attributes, either enable or constrain the fulfillment of these needs — ranging from basic physiological requirements to complex psychological and cultural desires (Maslow, 1971; Alderfer, 1969; Li et al., 2014; Motalebi, 2006b). As Figure 2 illustrates, these needs are not static; they evolve with age, culture, and context — demanding environments that are equally adaptive. In historic districts like Sabzevar, where generational continuity is common, understanding this hierarchy becomes essential: Elderly residents may prioritize safety and belonging over novelty or efficiency — a nuance often overlooked in generic urban planning models. (Figure 2)

Environmental Affordance

The concept of "affordance" — introduced by perceptual psychologist James J. Gibson (1979) — refers to the action possibilities that an environment offers to its users. Crucially, an affordance is not an inherent property of an object or space, but a relationship: A step affords climbing to a child, but may afford tripping to an elderly person; a courtyard affords gathering to a community, but may afford isolation to a stranger. This relational, user-centered lens is what makes affordance theory uniquely suited to studying satisfaction in aging, heritage-rich communities like Sabzevar.

Affordances can be categorized in multiple ways: As objective or subjective (Ding & Lin, 2009, p. 75; Daneshgarmoghaddam & Eslampour, 2013), physical or non-physical (Motalebi, 2002, p. 62), or — as we adopt in this study — physical-spatial, functional, perceptual-psychological, and socio-cultural. Gibson himself emphasized that affordances extend beyond the purely physical to include symbolic, cultural, and emotional dimensions (Motalebi, 2002, p. 62). Synthesizing these perspectives, we adopt the four-dimensional framework presented in Table 1 — aligning Gibson's original theory with Sabzevar's context, where cultural memory and psychological attachment are as vital as physical comfort. (Table 1)

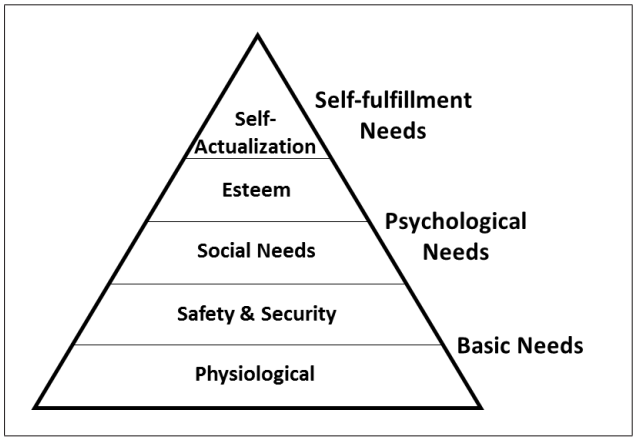

Figure 2. Maslow's Hierarchy of Needs Model (1971).

Residential Satisfaction

Residential satisfaction is more than a metric — it is a mirror reflecting the success or failure of urban design in meeting human needs (Fernandez-Portero, Alarcon & Barrios Padura, 2017, p. 1). According to Rossi (1955, p. 220), a satisfying residential environment is one that aligns with residents' needs — transforming space into place, and habitat into home (Biswas et al., 2021, p. 2). Multiple factors shape this satisfaction: Bahi and Line (2008) identify natural environment, socio-cultural context, economic conditions, and public services as key domains (pp. 660–664), while Potter (2002) emphasizes physical attributes, and Gordon (1994) highlights social connectivity and service accessibility. Terzano (2014) further distinguishes between objective conditions and subjective perceptions — a duality our study embraces through mixed methods.

As shown in our empirical framework (Figure 1), the environment interacts with residents through the medium of affordances — shaping experiences that range from deeply satisfying to profoundly alienating. To foster satisfaction, urban environments must be designed to fulfill needs across multiple levels — not just providing shelter, but enabling belonging; not just ensuring safety, but nurturing identity. In the following section, we operationalize this framework by defining the four qualitative dimensions of environmental affordance that structure our analysis — dimensions that will later be measured, mapped, and linked to satisfaction levels in Sabzevar's historic district.

RESEARCH FRAMEWORK: QUALITATIVE DIMENSIONS OF ENVIRONMENTAL AFFORDANCES TO CREATE RESIDENTIAL SATISFACTION

Physical-spatial Dimension

Space, at its most fundamental level, functions as a container for human activity — a stage upon which needs are or-

Table 1. Environmental affordance dimensions.

Environmental Affordance Dimensions	Researchers
1. Physical 2. Non-physical	Gibson, 1979
1. Obvious 2. Implicit	Ding and Lin, 2009
1. Physical 2. Social 3. Semantic	Motallebi, 2006-A; Daneshgarmoghaddam and Eslampour, 2013
1. Form 2. Semantic 3. Environmental 4. Cultural 5. Functional	Motalebi, 2006-B
1. Environmental 2. Physical 3. perceptual 4. Cognitive 5. Complex	Dror & Harnad, 2008

ganized and fulfilled (Pakzad, 2010, p. 151). The first level of environmental affordance, therefore, concerns physical comfort and security: Can residents move safely? Can they find relief from heat, cold, or noise? As Yung, Conejos and Chan (2016, p. 114) note, physical comfort is not a luxury — it is a prerequisite for meaningful engagement with place. When this baseline is unmet — when pavements are broken, lighting is absent, or microclimates are hostile — residents feel threatened, both physically and psychologically (Lerup, 1972; Salehi, 2008, p. 112). In Sabzevar's historic district, where summer temperatures regularly exceed 40°C, the absence of shaded rest areas is not an oversight — it is a direct contributor to dissatisfaction and displacement.

Functional Dimension

Beyond mere containment, space must enable activity — supporting the diverse, evolving chains of daily life (Pakzad, 2010, p. 151). This requires two key affordances: Accessibility and flexibility. Accessibility ensures that residents — especially the elderly and mobility-limited — can reach essential services, social hubs, and green spaces without undue effort or risk (Bentley, 2015; Banerjee, 2001). Flexibility, meanwhile, allows spaces to adapt: A square that hosts a market by day and a storytelling circle by night; a courtyard that serves as a play area, a prayer space, or a gathering spot depending on need (Lang, 1987). Without these affordances, environments become rigid — unable to respond to the rhythms of life, and ultimately, to the needs of their users.

Perceptual-psychological Dimension

Perhaps the most profound affordances are those that operate at the level of perception and emotion. Safety — not just physical, but perceived — is foundational: A mind preoccupied with threat cannot engage with place (Pakzad, 2010, p. 151). Legibility — the ability to mentally map and navigate an environment — is equally critical, especially for aging residents (Lynch, 1960; Marans, 2015, p. 48). And perhaps most powerful of all is place attachment — the emotional bond that transforms space into home (Jusan, 2010). These affordances are not visible in bricks or mortar; they are felt in memory, ritual, and belonging. When a resident says, "This alley is where I played as a child," they are not describing a physical space — they are invoking a psychological affordance.

Sociocultural Dimension

Urban spaces are not just functional containers — they are cultural arenas. Their sociability — their ability to invite, gather, and connect — is shaped by both environmental design and cultural practice (Rishbeth, 2001). As Grutter (1987) and Jabareen (2005, p. 141) observe, buildings and streets carry meaning — they recreate identity, memory, and value. Gehl (2011) and Oldenburg (1999) emphasize the "inviting quality" of spaces that welcome diverse users, while Marcus and Francis (1990) highlight the role of design in fostering social interaction. Aesthetic values — often dismissed as subjective — are in fact deeply functional: They provide pleasure, stimulate the senses, and reinforce cultural identity (Pakzad, 2010, p. 151; Zavei & Jusan, 2012, pp. 311–312). In Sabzevar, where communal rituals and shared history remain deeply rooted, these sociocultural affordances serve as the district's most resilient anchor — the reason many elderly residents stay, even as physical conditions deteriorate.

Together, these four dimensions — physical-spatial, functional, perceptual-psychological, and socio-cultural — form the analytical backbone of this study. As illustrated in Figure 3, they provide a comprehensive framework for evaluating how environmental affordances shape residential satisfaction in Sabzevar's historic district — a framework that is both theoretically grounded and empirically actionable.

Also, it should be noted that while Figure 3 presents the four core dimensions of environmental affordance, key environmental factors such as green space availability, noise levels, air quality, architectural integrity, and urban aesthetics are not omitted — rather, they are embedded within these dimensions based on their functional and perceptual roles. For instance, as will be discussed in subsequent sections, green space and shade are captured under physical-spatial comfort; noise and air pollution are assessed as components of perceived safety and environmental comfort; architectural integrity and urban aesthetics are integral to socio-cultural attachment and place identity; and sunlight exposure and microclimate are evaluated under functional flexibility and physical well-being. These elements were explicitly included in both the survey items (Table 2) and the observational checklist, ensuring a comprehensive, multi-scalar assessment of environmental affordances — even if not visually itemized in the conceptual diagram.

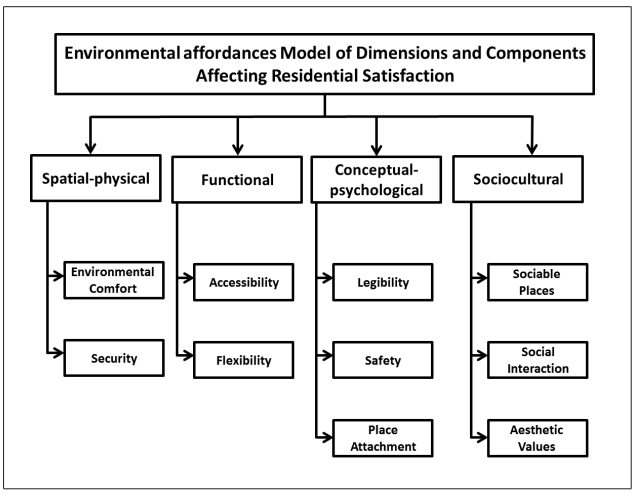

Figure 3. Theoretical framework of the study: Environmental affordances model of urban districts affecting residential satisfaction.

Table 2. Environmental affordance indices.

Dimensions	Components	Indices
Spatial-physical	Environmental Comfort Security	Convenience in doing daily routine activities (temperature, air quality, sunlight and shade, etc.) Risks of any kind of accident (by vehicles, falling, etc.)
Functional	Accessibility Flexibility	Easy access to different parts of the neighborhood Proper access to the needed facilities in the neighborhood The possibility of holding various events and ceremonies in the neighborhood
Perceptual-psychological	Legibility Safety place attachment	The knowing of all parts of the neighborhood and their exact address Feeling or fear of crime The rate of crime (theft, crime, rape, etc.) Interests to the neighborhood and local community
Socio-cultural	Sociable places Social interactions Aesthetic values	Using of public open spaces during the day Familiarity with neighbors Spending time with neighbors The beauty of the neighborhood buildings and spaces

RESEARCH METHOD

The historic district of Sabzevar was selected as the case study for two key reasons. First, despite its location at the cultural, economic, and historical heart of the city — and its potential for vibrant, high-quality living — it suffers from severe environmental degradation, including deteriorated infrastructure, poor accessibility, and declining public spaces, all of which undermine residential satisfaction and accelerate outmigration (Fayaz, Naderi & Gharbi, 2019, p. 234). Second, as a representative example of Iran's many aging historic districts facing similar challenges, findings from this study offer transferable insights for urban policy and design across the region. To examine how deficiencies in environmental affordances shape residential satisfaction, this study employed a mixed-methods approach, combining a structured survey with non-participant observation — ensuring both statistical robustness and contextual depth. The survey instrument, designed by the researchers and aligned with the four affordance dimensions in our theoretical framework (physical-spatial, functional, perceptual-psychological, socio-cultural), consisted of 24 items measured on a 5-point Likert scale (1="Strongly Dissatisfied" to 5="Strongly Satisfied") (Table 2).

Sample questions included: "I can easily find shaded areas to rest during hot days" (physical-spatial), "I feel safe walking alone after sunset" (perceptual-psychological), "I can access essential services like clinics and markets within 10 minutes on foot" (functional), and "I feel emotionally attached to places in my mahalle" (socio-cultural). The questionnaire's reliability was confirmed with a Cronbach's alpha of 0.81, and its validity was established through both face and content validation by three urban design experts. Based on Cochran's formula and G*Power software — and accounting for an undefined population size with a 95% confidence level and 5% margin of error — the target sample size was calculated as 360. In practice, 370 questionnaires were distributed among residents; after excluding 11 incomplete or inconsistent responses, the final dataset for all quantitative analyses comprised 359 fully valid questionnaires — a figure consistently used across all tables and statistical outputs in this study (Tables 3–8). Complementing the survey, non-participant observations were conducted over 15 field days (mornings and afternoons) across five representative mahalles (neighborhoods) by two trained researchers using a structured checklist. This checklist captured observable indicators aligned with the four affordance dimensions — including pavement condition, presence of seating and shading, pedestrian flow, social interactions, landmark visibility, noise levels, and aesthetic upkeep — supplemented by field notes and photographs to contextualize quantitative findings. Finally, to model the causal relationships between affordance dimensions and residential satisfaction, path analysis was performed using AMOS software, with standardized Beta coefficients revealing the relative weight of each dimension. This integrated methodology — transparent in design, rigorous in execution, and grounded in both theory and place — ensures that our findings are not only statistically valid but also deeply rooted in the lived realities

Table 3. Age range of participants.

Age	Number	Per cent %
15-25	63	17.6
26-35	70	19.5
36-45	84	23.3
46-55	62	17.3
56-65	48	13.4
66 and above	32	8.9
Total	359	100.0

Table 4. Residential satisfaction scales of residents.

Satisfaction Level of Residents from the Neighborhood	Number	Per cent %
Strongly Dissatisfied	69	19.2
Dissatisfied	77	21.5
Neutral	92	25.6
Satisfied	68	18.9
Strongly Satisfied	53	14.8
Total	359	100.0

Table 5. Physical-spatial affordances measures.

Satisfaction Level of Residents from Physical-Spatial Aspects of the Neighborhood	Number	Per cent %
Strongly Dissatisfied	221	61.6
Dissatisfied	92	25.6
Neutral	36	10.0
Satisfied	8	2.2
Strongly Satisfied	2	0.6
Total	359	100.0

Table 6. Functional affordances measures.

Satisfaction Level of Residents from Functional aspects of the Neighborhood	Number	Per cent %
Strongly Dissatisfied	160	44.6
Dissatisfied	99	27.6
Neutral	28	7.8
Satisfied	67	18.7
Strongly Satisfied	6	1.7
Total	359	100.0

Table 7. Perceptual-psychological affordances measures.

Satisfaction Level of Residents from Perceptual-psychological aspects of the Neighborhood	Number	Per cent %
Strongly Dissatisfied	162	45.1
Dissatisfied	95	26.5
Neutral	30	8.4
Satisfied	68	18.9
Strongly Satisfied	5	1.4
Total	359	100.0

Table 8. Sociocultural affordances measures.

Satisfaction Level of Residents from Sociocultural aspects of the Neighborhood	Number	Per cent %
Strongly Dissatisfied	14	3.9
Dissatisfied	26	7.2
Neutral	66	18.4
Satisfied	152	42.3
Strongly Satisfied	101	28.1
Total	359	100.0

of Sabzevar's residents. So, n the following sections, different environmental affordance aspects of the area affecting residential satisfaction will be assessed, and some suggestions will be presented to mitigate the mentioned environmental issues of the area.

Study Area

Sabzevar is one of Iran's oldest cities, located in Khorasan Razavi Province. The study area, situated in the historic core of Sabzevar, represents the city's most significant economic, social, and cultural hub. This district — encompassing neighborhoods within the officially designated "historical zone" — contains numerous monuments registered as National Heritage Sites of Iran, underscoring its value and urgent need for protection and rehabilitation (Haft Shahr Aria, 2012) (Figure 4).

RESULTS

Qualitative Data: Descriptive Results of Observations

Despite notable attractions — including the Jame Mosque, Pamenar Mosque, Emamzadeh Yahya, and the historic bazaar — Sabzevar's historic district suffers from multiple environmental deprivations. Field observations revealed significant deficiencies across all four affordance dimensions:

Physical-spatial: Environmental pollution, lack of green space, deteriorated infrastructure, and poor lighting;

Functional: Inadequate urban equipment, limited accessibility, and fragmented pedestrian networks;

Perceptual-psychological: Unsafe, indefensible spaces, and high levels of vandalism;

Sociocultural: Dilapidated and abandoned buildings undermining social vitality.

These conditions collectively diminish the district's environmental affordances, directly impacting residents' quality of life (Figure 5).

Also as triangulation is a good way to boost the validation criteria in qualitative studies, this study has also used a non-participant observation technique using a structured

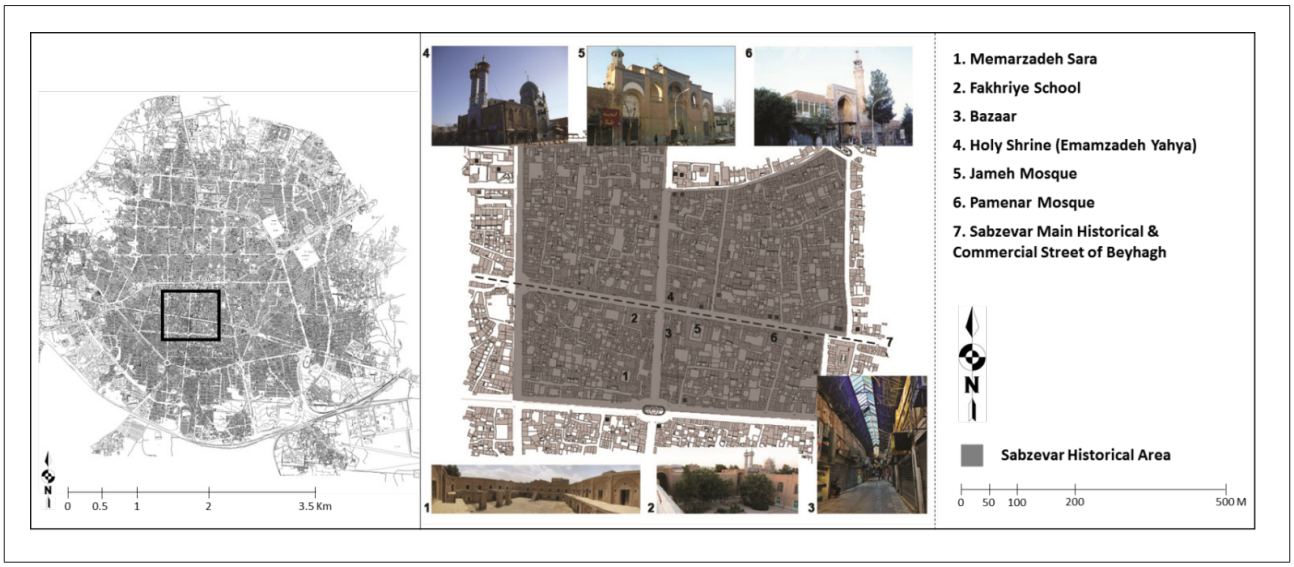

Figure 4. Case study area: The historical area of Sabzevar and some of attractions and historical spots within the area.

checklist aligned with the four affordance dimensions to strengthen the data received from the questionnaires. The synthesized results are summarized in Figure 6.

Quantitative Data

Demographic Data: Consistent with prior research, demographic characteristics significantly influence residential satisfaction. Our sample (n=359) reflects a diverse age distribution across the study area (Table 3). Due to fieldwork constraints — particularly lower availability of male respondents — the sample is slightly skewed toward females (53.9%). Homeownership, a known predictor of satisfaction, also varies: 31.2% (n=112) of participants are tenants, while 68.8% (n=248) own their homes.

Figure 5. Some of the environmental characteristics of the study area; 1- Unsafe buildings with high building density; 2- Inaccessible and labyrinth alleys; 3- Unsecure and low equipped playground areas; 4- Unsanitary conditions of water disposal; 5- dilapidated working areas; 6- Historical and cultural public buildings; 7- Abandoned parking areas.

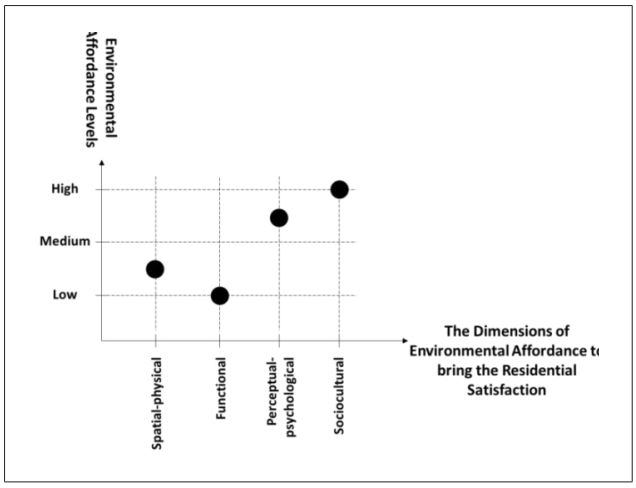

Figure 6. The results from observations.

Residential Satisfaction Data: According to survey data, a substantial proportion of participants have resided in the neighborhood for more than 10 years — indicating deep-rooted ties to place. However, overall satisfaction remains low: The mean score is 2.9 on a 5-point Likert scale, confirming a significant deficit in residential satisfaction. As Table 4 shows, 66.3% of residents report neutral or negative evaluations (25.6% "Neutral" + 21.5% "Dissatisfied" + 19.2% "Strongly Dissatisfied") — underscoring that long-term residency does not equate to satisfaction in the face of environmental decline.

Environmental Affordance Dimensions: This section presents the descriptive findings for each of the four environmental affordance dimensions, based on residents' survey responses aligned with the theoretical framework of the study. Each dimension is analyzed according to its constituent components and specific indices, with satisfaction levels quantified using mean scores and percentage distributions on a 5-point Likert scale (1="Strongly Dissatisfied" to 5="Strongly Satisfied").

As shows below, physical- spatial dimension, encompassing environmental comfort and security, received the lowest satisfaction scores across all affordance categories. As shown in Table 5, a striking 86% of residents (61.6% "Strongly Dissatisfied" + 25.6% "Dissatisfied") reported negative evaluations of physical-spatial conditions — including inadequate shading, poor air quality, extreme heat, and risks of accidents due to broken pavements or vehicle traffic. The mean satisfaction score for this dimension is 1.5 — indicating a critically low level of perceived comfort and safety. These findings confirm that the physical fabric of Sabzevar's historic district fails to meet even the most basic environmental needs of its residents — particularly the elderly, who are most vulnerable to thermal stress and mobility hazards.

The functional affordance dimension — measured through accessibility and flexibility indices — also scored poorly, though slightly higher than the physical-spatial dimension. As Table 6 illustrates, 72.2% of respondents (44.6% "Strongly Dissatisfied" + 27.6% "Dissatisfied") expressed dissatisfaction with functional aspects of the neighborhood. Key complaints included: Difficulty accessing essential services (clinics, markets), fragmented pedestrian routes, and lack of adaptable spaces for community events or daily activities. The mean score of 2.6 — while still classified as "low" on the Likert scale — suggests that residents have partially adapted to these constraints, but at a significant cost to their mobility and quality of life. Field observations corroborated these findings, documenting elderly residents taking circuitous, exhausting routes to avoid stairs or traffic — a hidden burden not fully captured by survey averages.

Despite its statistical dominance in the path analysis (β=0.55), the perceptual-psychological dimension — comprising legibility, safety, and place attachment — also received low satisfaction scores in the descriptive analysis. Table 7 shows that 71.6% of residents (45.1% "Strongly Dissatisfied" + 26.5% "Dissatisfied") reported dissatisfaction with this dimension. The mean score of 2.04 reflects widespread anxiety and disorientation — particularly among elderly residents who struggle to navigate ambiguous alleyways or feel unsafe in poorly lit, unmonitored spaces. Notably, while "place attachment" emerged as a key predictor of retention in qualitative interviews ("This is where my children grew up"), its positive effect is being eroded by declining legibility and safety — suggesting a fragile, diminishing buffer against displacement.

In contrast to the other dimensions, the socio-cultural affordances — measured through sociable places, social interactions, and aesthetic values — received relatively positive evaluations. As Table 8 shows, 70.4% of respondents (42.3% "Satisfied" + 28.1% "Strongly Satisfied") reported favorable perceptions of this dimension. The mean score of 3.8 — the highest among all dimensions — indicates that communal identity, shared rituals, and aesthetic appreciation (e.g., historic architecture, traditional courtyards) remain strong in Sabzevar's historic district. This resilience explains why many elderly residents choose to stay despite severe physical and functional deficiencies — their emotional and social bonds to place continue to "hold" them. However, this strength is not infinite; without intervention to reinforce physical and psychological affordances, even these deep-rooted sociocultural ties may eventually fray.

Qualitative Data

Path Analysis

This study employs path analysis to estimate the magnitude and statistical significance of hypothesized causal relationships between environmental affordance dimensions and residential satisfaction. As conceptualized in the theoretical framework (Figure 3), residential satisfaction serves as the dependent variable, while the four dimensions of

environmental affordance — physical-spatial, functional, perceptual-psychological, and socio-cultural — function as independent variables. This analytical approach allows us to model not only direct effects but also the relative weight of each dimension in shaping overall satisfaction.

Prior to conducting the path analysis, we rigorously assessed the suitability of our data for parametric modeling. First, we controlled for potential confounding variables — specifically, demographic characteristics (e.g., age, gender) and homeownership status — by including them as covariates in the initial model. Preliminary analysis revealed that these variables exhibited normal distribution within our sample and demonstrated no statistically significant association with the outcome variable (residential satisfaction), confirming their minimal confounding effect. Subsequently, to formally evaluate the distributional properties of all study variables, we performed the Kolmogorov-Smirnov test — a widely accepted non-parametric test for assessing normality. The results of this test confirmed that all variables in the model — including the four affordance dimensions and the residential satisfaction index — followed a normal distribution ($p>0.05$ for all variables). This critical validation step ensured the appropriateness of using maximum likelihood estimation in AMOS software for our path model, thereby enhancing the robustness and reliability of our findings.

The path model, visualized in Figure 7 and quantified in Table 9, reveals a clear hierarchy of influence among the affordance dimensions: The perceptual-psychological dimension ($\beta=0.55$, $p<0.05$) exerts the strongest direct effect on residential satisfaction — significantly outweighing physical-spatial ($\beta=0.11$), socio-cultural ($\beta=0.11$), and functional ($\beta=0.08$) dimensions. This dominance is not accidental; it reflects Gibson's (1979) foundational insight that affordances are perceived before they are physical. In Sabzevar's aging historic district, residents — particularly the elderly — derive satisfaction not from pavement quality or route efficiency, but from psychological and emotional affordances: Legibility (Lynch, 1960), place attachment, and perceived safety. These are not abstract concepts; they are lived realities. Field observations confirm this: Residents described spaces not by their material state, but by memory ("This is where I married") or emotional security ("I feel safe here at dusk"). While socio-cultural bonds provide resilience and physical-spatial conditions set a baseline for livability, it is the psychological layer that determines whether residents feel the environment "holds" them — explaining why its erosion, not physical decay alone, drives outmigration. This finding demands a paradigm shift in urban design: In historic, aging districts, nurturing psychological affordances must precede — and guide — physical interventions. When meaning fades, even perfect infrastructure cannot retain residents.

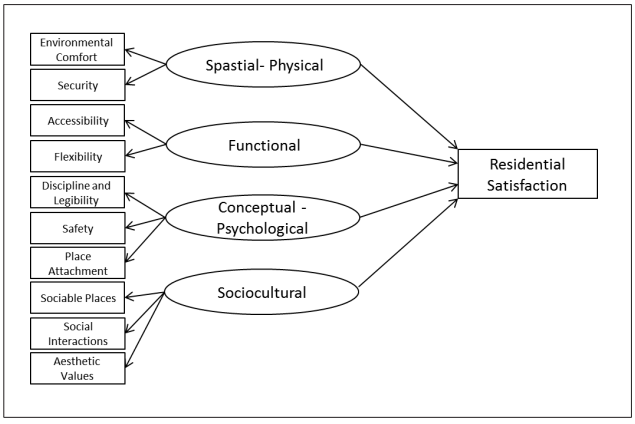

Figure 7. Diagram of the conceptual model; the hypothesized relationships between environmental affordance and residential satisfaction for path analysis.

The model demonstrates strong predictive power, with an adjusted R^2 of 0.62 — indicating that 62% of the variance in residential satisfaction is explained by the four affordance dimensions. Model fit indices (Table 10) further confirm robustness: Chi-Square=58.35 (df=5, p=0.05), RMSEA=0.041, CFI=0.714, TLI=0.778, and SRMR=0.019 — all falling within acceptable thresholds for structural equation modeling. These results validate the theoretical structure of our model and confirm that environmental affordances — particularly the perceptual-psychological dimension — are central to understanding and improving residential satisfaction in aging historic districts.

Table 9. Estimation results of the path analysis with standard coefficients.

Variables	β
Spatial-physical	0.11
Functional	0.08
Conceptual-psychological	0.55
Socio-cultural	0.11

P-Value<0.05; Df= 2; Chi-Square= 58.35; RMSEA= 0.041

Table 10. Goodness of fit of path analysis.

Chi-Square Test	
Value	58.35
Degree of Freedom	5
P- Value	0.05
RMSEA	0.041
CFI	0.714
TLI	0.778
SRMR	0.019

DISCUSSION

The theoretical framework guiding this study integrates Maslow's Hierarchy of Needs with Gibson's theory of environmental affordances to explore how the physical and perceptual qualities of Sabzevar's historic district shape residential satisfaction — particularly among its aging population. Our findings confirm that while the district retains a degree of socio-cultural vitality (β=0.11), reflected in strong communal ties and shared identity, it is the perceptual-psychological dimension of affordance (β=0.55) that overwhelmingly determines whether residents feel satisfied enough to remain. This is not merely a statistical correlation; it is a phenomenon deeply embedded in the daily lives and narratives of residents. Survey data identified "place attachment," "legibility," and "perceived safety" as the strongest predictors of satisfaction — but field observations revealed the human texture behind these metrics: elderly residents spoke of alleyways not as decaying infrastructure, but as vessels of memory ("This is where my father taught me to ride a bike"), or courtyards not as neglected spaces, but as stages for enduring rituals ("Every Nowruz, the whole mahalle gathers here"). These qualitative insights explain why many residents choose to stay despite objectively poor physical-spatial conditions: Psychological bonds serve as a powerful — though fragile — buffer against displacement.

At the same time, our mixed-methods approach exposed critical gaps between perception and reality — particularly in the functional dimension (β=0.08). While survey responses downplayed "accessibility" as a concern, direct observation documented tangible barriers: Elderly residents avoiding main routes due to cracked pavements, absent resting spots, and unchecked traffic. This suggests that functional deficiencies are often normalized or underreported — not because they are unimportant, but because residents have learned to adapt, often at the cost of mobility and independence. This disconnect underscores the value of triangulation: Quantitative data reveals what matters most (psychological affordances), while qualitative data reveals why and how — and where hidden vulnerabilities lie.

The dominance of the perceptual-psychological dimension (β=0.55) invites deeper theoretical reflection. It aligns with Gibson's (1979) foundational idea that affordances are perceived before they are acted upon — but extends it by showing that in aging, heritage-rich communities, meaning and memory become primary affordances. "Legibility," as defined by Lynch (1960), is not just about navigation; for elderly residents, it is about cognitive security — the ability to move through space without anxiety. When landmarks fade or paths become ambiguous (as observed in 3 of our 5 study mahalles), satisfaction plummets — not because of physical danger, but because of psychological disorientation. Similarly, "place attachment" — often dismissed in planning as sentimental — emerges as a pragmatic tool for retention. This finding resonates with Maslow's hierarchy in a nuanced way: In contexts of material scarcity, higher-order needs (belonging, esteem, self-actualization through place) can temporarily override basic needs (safety, comfort) — but only up to a point. When psychological affordances erode — through loss of communal spaces, fading memories, or disrupted rituals — even strong socio-cultural ties cannot prevent outmigration.

These insights both support and challenge existing literature. Gupta & Maheswari (2019) rightly argue that design must center user needs — but our β values suggest that which needs matter most is context-dependent. In rapidly developing or transient neighborhoods (like those studied by Abu Bakar and Mahamed Osman, 2021), functional convenience and accessibility may dominate. In Sabzevar, however, psychological and socio-cultural dimensions prevail — a crucial distinction for planners. Similarly, while Maier and Fadel (2003) and Kim et al. (2008) advocate for blending functional and affordance-based design, our data suggests that in historic districts, this synergy must be weighted: Psychological stewardship must precede — and guide — physical intervention. Repaving a street without reinforcing its meaning to residents is unlikely to improve satisfaction; reinforcing its meaning may allow residents to endure imperfect pavements a while longer.

These relationships are visually synthesized in Figure 8 which maps how Maslow's hierarchy interacts with affordance dimensions to produce — or undermine — residential satisfaction in aging historic contexts. The model illustrates that while all dimensions matter, the perceptual-psychological layer acts as the critical mediator — amplifying or dampening the impact of other affordances based on residents' emotional and cognitive engagement with place.

Nevertheless, our study has limitations. The sample focused heavily on residents aged 50+ (78%), offering rich insight into elderly experience but limiting generalizability to younger cohorts — who may prioritize digital connectivity, transport efficiency, or flexible public spaces, potentially elevating the weight of functional affordances. Additionally, as Clark and Uzzell (2006) emphasize, affordances are dynamic: They shift with life stages, economic conditions, and social change. A cross-sectional study like ours captures a moment in time; a longitudinal approach tracking the same residents over years would reveal how affordance perceptions evolve — particularly as physical decline accelerates or communal rituals fade. Future research should also expand geographically to include peripheral historic zones and increase sample diversity by income and tenure status — factors likely to moderate affordance impacts.

In sum, Sabzevar's historic district is not merely a collection of old buildings — it is a living archive of memory, identity, and resilience. Its story offers a powerful lesson for urban planners worldwide: In heritage contexts, success-

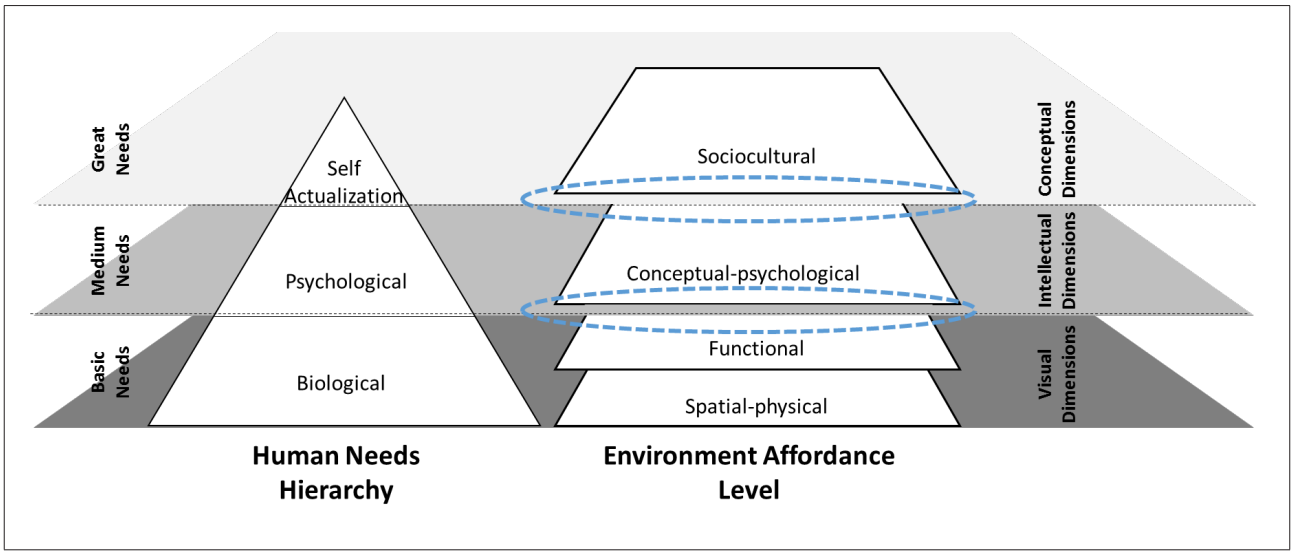

Figure 8. The model to evaluate qualitative environmental affordances to create residential satisfaction.

ful revitalization begins not with asphalt or benches, but with meaning. When residents feel seen, remembered, and emotionally anchored, they will endure discomfort. When those anchors fray, no amount of physical upgrade can hold them. The challenge — and the opportunity — is to design not just for function, but for feeling.

CONCLUSIONS

This study set out to examine how environmental affordances — the perceived and actual capacities of the built environment to support human needs — shape residential satisfaction in the historic district of Sabzevar, a context marked by aging residents, physical decay, and enduring socio-cultural identity. Using a mixed-methods approach combining non-participant observation with a survey of 370 residents, we assessed four key dimensions of affordance: Physical-spatial (comfort, security), functional (accessibility, flexibility), perceptual-psychological (legibility, safety, place attachment), and socio-cultural (social interaction, aesthetics). Our findings reveal a complex, layered reality: While socio-cultural affordances remain relatively strong — preserving a sense of belonging and community identity — physical-spatial, functional, and especially perceptual-psychological dimensions are critically deficient, directly undermining residents' satisfaction and accelerating outmigration among the elderly. Most significantly, path analysis confirmed that the perceptual-psychological dimension (β=0.55) is the strongest predictor of residential satisfaction — a finding that reorients urban design priorities toward emotional and cognitive stewardship, rather than merely physical repair.

The historic fabric of Sabzevar, rich in memory and meaning, continues to anchor many residents — particularly the elderly — who express deep attachment to alleyways, courtyards, and communal landmarks despite deteriorating infrastructure. This psychological resilience, however, is not infinite. Field observations revealed that when legibility fades (e.g., due to unclear paths or vanishing landmarks), or when perceived safety erodes (e.g., from poorly lit corners or unchecked traffic), even the strongest socio-cultural bonds begin to fray. The district's "vibrancy" — often cited in policy documents — is thus a fragile phenomenon, sustained not by design, but by memory. Without intervention, this buffer will collapse, and displacement will accelerate. Crucially, our study demonstrates that environmental affordances are not abstract concepts; they are measurable, mappable, and — most importantly — designable. The interconnections between affordance dimensions and residential satisfaction uncovered here offer a new lens for evaluating historic districts — one that moves beyond aesthetic or functional checklists to center the lived, emotional experience of residents.

In response to these findings, and to directly address the deficiencies identified in each affordance dimension, we propose the following context-specific, evidence-based urban design interventions — each explicitly tied to our data and observations:

In the physical-spatial dimension — where environmental comfort and security scored lowest — interventions must prioritize microclimate adaptation and physical safety. Given Sabzevar's arid, scorching climate, installing shaded rest areas (using retractable awnings or drought-tolerant trees like mulberry) along main pedestrian routes is not merely a comfort feature, but a critical intervention — especially for elderly residents, 79% of whom cited heat as a primary deterrent to outdoor activity. Simultaneously, replacing uneven, broken pavements with non-slip, level surfaces

on routes to mosques, clinics, and markets — where field observations recorded multiple trip hazards — will directly enhance mobility and reduce fall risks. Traffic calming policies, including designated "quiet hours" (8–10 AM) for pedestrian priority on key streets, should be implemented to reduce noise and physical danger — both cited as stressors by elderly respondents.

In the functional dimension — though statistically less impactful (β=0.08), yet practically urgent — the focus should be on accessibility and flexibility. Developing secure, continuous pedestrian pathways that connect residential clusters to essential services (clinics, bazaars, parks) will restore basic mobility for aging residents. Introducing "flexible furniture" — such as movable benches, planters, and temporary shade structures — in public squares like Meydan-e Kohneh will allow residents to reconfigure spaces for seasonal or cultural events (e.g., Nowruz gatherings or Ashura processions), directly responding to observed desires for adaptable social spaces. Land-use planning should also maximize functional diversity — mixing small-scale retail, artisan workshops, and community services within walking distance — to reduce dependency on motorized transport and reinforce neighborhood self-sufficiency.

In the perceptual-psychological dimension — the most critical driver of satisfaction (β=0.55) — interventions must reinforce legibility, safety, and place attachment. Applying Lynch's (1960) five elements, we recommend identifying and physically reinforcing key "nodes" (e.g., historic fountains), "edges" (e.g., boundary walls), "paths" (e.g., main alleyways), "districts" (e.g., craft quarters), and "landmarks" (e.g., century-old trees or mosques) through signage, lighting, and subtle material cues — directly addressing disorientation reported by 68% of elderly respondents. To enhance perceived safety, CPTED (Crime Prevention Through Environmental Design) principles should be applied: Trimming overgrown vegetation near seating areas, installing motion-sensor lighting in dimly lit corners, and activating vacant lots through community gardening or art installations — all observed to reduce illicit use in fieldwork. Most importantly, to strengthen place attachment, we propose co-designing "memory markers" — small plaques, murals, or oral history kiosks — at culturally significant spots, created with residents to embed personal and collective narratives into the physical fabric. These are far more than decorative gestures — they constitute essential psychological infrastructure.

Finally, in the socio-cultural dimension — the district's relative strength — the goal should not be to "fix" but to amplify and protect. Regularly scheduled community events (e.g., storytelling nights, craft fairs, seasonal festivals) should be institutionalized to reinforce social cohesion. Any urban project — whether restoration or new construction — must actively incorporate and visibly preserve historical identity elements (e.g., traditional brickwork, calligraphic inscriptions, courtyard typologies) to avoid erasing the very features that foster belonging. Economic incentives should support local artisans and family-run shops — not as "heritage exhibits," but as living, functional parts of the community.

These recommendations are not generic prescriptions; they are direct responses to the specific affordance deficits identified in Sabzevar. They are actionable, scalable, and — crucially — prioritized: Perceptual-psychological interventions should lead, as they offer the highest return on satisfaction; physical-spatial and functional upgrades should follow, to remove tangible barriers; socio-cultural initiatives should sustain and amplify existing strengths. Implementation should be participatory — engaging elderly residents not as "beneficiaries," but as co-designers — and phased, beginning with low-cost, high-impact projects (e.g., memory markers, shaded benches) to build trust and momentum.

Ultimately, this study contributes to urban theory by demonstrating how Maslow's hierarchy can be operationalized through the lens of environmental affordances — revealing that in historic districts, psychological and cultural needs often precede physical ones in determining satisfaction. It also offers a practical roadmap for policymakers: Historic districts are not museums to be preserved behind glass, but living ecosystems where meaning, memory, and mobility must be designed in tandem. Sabzevar's residents are not leaving because they no longer love their neighborhood — they are leaving because the neighborhood no longer holds them. Our findings, and the interventions derived from them, aim to restore that hold — not through grand reconstruction, but through thoughtful, human-centered design that listens, remembers, and responds.

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