

Article

Quantifying Attachment to Abandoned Villages in Jordan: A Pilot Survey of Connected Residents with Evidence of Empirical Fusion Between Place and Memory

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Abstract

This pilot study quantified perceptions of abandoned vernacular villages (Khirbeh) among 359 purposively sampled Jordanian residents with active ancestral ties. Results showed strongly positive perceptions overall (grand mean = 1.666 on a 5-point scale where 1 = strong agreement), with ceiling effects (23% “all 1s”) indicating limited scale granularity. A four-factor model (Cultural Heritage, Place & Space [PS], Social Memory [SM], Community Identity [CI]) achieved acceptable global fit (CFI = 0.915, RMSEA = 0.065) but failed to demonstrate discriminant validity: PS and SM were empirically indistinguishable ($r = 0.80$; $\sqrt{\text{AVE}} < \text{intercorrelation}$), so the model is not supported. PS and SM together explained 52.6% of CI variance, but unique contributions were uninterpretable due to multicollinearity (VIFs = 2.78, 2.65). Within this connected subsample, respondents under 30 reported stronger place attachment than those aged 45+ ($p < 0.001$), but this finding does not address population-level generational trends because disconnected individuals were excluded. No causal claims are warranted given the cross-sectional design, purposive sampling, failure of discriminant validity, and ceiling effects. Findings are mixed (descriptive hypotheses supported; factor structure not supported); the study provides only hypothesis-generating evidence and offers no policy recommendations. Alternative structures (bifactor, two-factor combining PS/SM) require testing with larger samples and revised instruments.

Keywords: heritage studies; vernacular architecture; Jordan; abandoned villages; Khirbeh; discriminant validity; place attachment; social memory; confirmatory factor analysis; survivorship bias; Deep Cities; negative results



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1. Introduction

1.1. The Global Challenge of Abandoned Vernacular Heritage

Vernacular architecture embodies generations' accumulated wisdom—adaptations to local climate, materials, social structures, and cultural values [1,2]. Unlike formal design, vernacular traditions emerge from local knowledge transmitted orally and through apprenticeship, creating built environments uniquely attuned to their contexts [3,4]. Losing vernacular fabric erodes centuries-old, place-specific knowledge systems. Rural depopulation challenges spatial planning globally: since 2000, ~34% of the world's rural population has migrated to cities, with the highest rates in the Middle East and North Africa [5]. Abandoned infrastructure decays without maintenance. In southern Italy, Coppola [6]

examines Castrum Vayrani's decline, while national legislation (Law 77/2006) funds the restoration of "borghi," though implementation remains fragmented [7]. In China's Anhui province, >50% of traditional dwellings stand vacant [8]. Spain has ~2900 completely depopulated "pueblos fantasmas" [9]. These cases share tensions with Jordan: modernization versus heritage, the centrality of community engagement, and the need for integrated revitalization. As Abusaleh [10] notes, enhancing preservation requires systematic, data-driven approaches—directly applicable to Jordan's abandoned vernacular villages. Beyond these well-documented cases, recent scholarship has expanded the geographical scope of abandonment research. In Portugal, the "interioridade" crisis has led to over 300 depopulated villages in the Beira region, with researchers examining the tension between preservation and abandonment as a form of "ruin porn" in tourism development [11]. In Japan, the akiya (vacant house) crisis affects approximately 8.5 million dwellings, with rural municipalities experimenting with "vacancy banks" to match abandoned properties with potential newcomers, offering important comparative insights for heritage-led regeneration strategies [12]. In Greece, the Peloponnese region has witnessed extensive village abandonment following the 2010 debt crisis, with recent studies documenting the role of diaspora communities in maintaining transnational place attachment through digital platforms [13]. In Turkey, the abandoned Greek and Armenian villages of Cappadocia present a distinctive case where heritage conservation is complicated by competing national narratives and the material vulnerability of earthen architecture, with recent research emphasizing the need for community-centered documentation before irreversible decay [14]. These international examples demonstrate that abandonment is not merely a localized phenomenon but a global challenge requiring context-sensitive yet cross-nationally comparable approaches to heritage valuation and policy intervention. The present study contributes to this growing body of international scholarship by providing the first quantitative evidence from the Jordanian context, enabling future comparative analyses across Mediterranean and Middle Eastern abandonment trajectories.

1.2. The Jordanian Context: "Khirbeh" as Devaluing Discourse

In Jordan, abandoned vernacular villages are labeled Khirbeh ("ruin"). While a standard archaeological descriptor, the term has acquired pejorative connotations of worthlessness, danger, and obsolescence in policy discourse over the past 200 years [15]. The term's devaluation traces to three historical processes: Ottoman land reforms (1858–1910) classifying uncultivated land as state property [16]; British Mandate policies (1922–1946) privileging biblical-era sites over post-635 CE vernacular architecture [17]; and post-independence nation-building (1946–present) constructing identity around Nabatean, Roman, and Umayyad heritage while neglecting Ottoman-period architecture [18]. Crucially, devaluation applies specifically to 19th–20th-century villages, not ancient ruins. Byzantine-era Khirbet Aysra receives state protection under Law 21/1988, while 19th-century Khirbet Samad has no legal status—identical terminology, unequal treatment. The label thus becomes a mechanism of epistemic violence [19], consecrating certain ruins as heritage while condemning others as worthless [17].

The state has historically privileged monumental archaeology (Petra, Jerash, Umm Qais) over vernacular architecture [18], reflecting an epistemological discontinuity in which foreign scholars and state institutions dismiss Jordan's recent vernacular history as "vanishing" while celebrating pre-1750 CE archaeology as nationally significant [17]. Recent heritage geography scholarship emphasizes spatial patterns, evolutionary mechanisms, and social effects that promote cultural diversity and spatial justice [20]. Spatial justice [21,22] concerns the equitable distribution of valued resources across space. Applying this lens reveals stark injustice: monumental archaeology receives concentrated investment in

locations within two hours of Amman, while vernacular heritage in peripheral regions (Karak, Ajloun, Zarqa) receives negligible support, despite anchoring local identity [17].

1.3. The Research Gap

Despite international recognition of depopulated villages as resources for territorial regeneration [8,23,24], a critical gap persists in Jordan. Policymakers prioritize measurable data [25]. Without statistical evidence of these sites' value, the term "abandoned" misrepresents communities with active ties, and policy-relevant research cannot proceed. This study addresses Latour's [26] "matters of fact vs. matters of concern" gap: advocates treat vernacular sites as urgent and valuable, but policymakers demand quantifiable, comparable metrics. We quantify perceptions among connected residents and explicitly recognize that policy change would require (a) probability sampling of all former residents; (b) contingent valuation comparing willingness-to-pay for vernacular versus monumental heritage; (c) longitudinal tracking following interventions; and (d) comparative per-capita spending analysis across typologies. None are attempted here. This study provides the first, most preliminary layer of evidence: reliable measurement of perceptions among the most engaged stakeholders.

No previous study has: (1) systematically quantified residents' perceptions across multiple depopulated Jordanian villages; (2) statistically tested associations between tangible and intangible heritage; (3) identified demographic factors using multivariate methods; (4) provided an empirically tested model linking abandoned villages to civic identity; or (5) applied Deep Cities heuristically to variable selection in Jordan while acknowledging epistemic limitations (similar quantitative studies exist for abandoned settlements in Spain, Italy, and China; the novelty claimed here is specific to the Jordanian Khirbeh context). Recent international research has expanded the quantitative understanding of abandonment. In Spain, Perpiña Castillo et al. [27] used GIS and spatial regression to identify the socio-demographic predictors of village abandonment in the Cantabrian Mountains, finding that distance to services and population aging were the strongest correlates. In Italy, Tešin et al. [28] conducted a large-scale survey of 1200 former residents across 15 abandoned Apennine villages, demonstrating that place attachment persists even after multiple generations of displacement. In Turkey, Tsakalos [29] applied confirmatory factor analysis to measure heritage attachment among displaced communities in abandoned Cappadocian villages, reporting similar challenges with discriminant validity between place and memory dimensions. The present study situates itself within this emerging international quantitative literature while addressing a critical gap in Middle Eastern heritage research. The present study occupies an unusual position: it claims methodological novelty (the first quantitative survey of its kind in Jordan) but emphasizes severe interpretive constraints. It is best understood as a pilot study that falsifies the four-factor structure and generates hypotheses for future research, with mixed (not purely negative) findings.

1.4. Research Questions and Hypotheses

This study addressed five research questions:

RQ1 (Descriptive): *What are the quantitative perceptions of connected residents regarding the role of abandoned villages in cultural heritage, place attachment, social memory, and community identity?*

H1. *All heritage dimension means will fall within the "very high" or "high" adoption categories ($M < 2.60$).*

RQ2 (Factor structure): *What associations exist among heritage dimensions, and what factor structure underlies perceptions?*

H2a. Significant positive correlations ($r > 0.50$, $p < 0.01$) will be observed among all four dimensions.

H2b. A four-factor model will demonstrate acceptable fit ($CFI \geq 0.90$, $RMSEA \leq 0.08$) and discriminant validity ($\sqrt{AVE} > \text{intercorrelation for each factor pair}$). Rejection would suggest that the theoretical constructs require revision.

RQ3 (Demographic and regression): Are age, gender, and education associated with perceptions, and what is each dimension's association with Community Identity?

H3a. Age will be associated with perceptions (ANOVA, $p < 0.05$) in the connected subsample.

H3b. Place & Space and Social Memory will be the strongest associates of Community Identity ($\beta > 0.30$, $p < 0.001$), with the caveat that unique effects cannot be interpreted if discriminant validity fails.

RQ4 (Epistemic): What are the epistemic limits of using Deep Cities, assemblage thinking, genius loci, and critical system dynamics frameworks to interpret quantitative heritage data? RQ4 is addressed in Sections 2 and 5: survey methods cannot capture emergence, nonlinearity, or phenomenological experience.

RQ5 (Future research): What hypothesis-generating evidence can inform future research design on the conservation and integration of abandoned vernacular heritage into Jordan's civic history? RQ5 is addressed in Section 5.6.

2. Theoretical Framework

This section provides a detailed exposition of the four contemporary heritage theories that inform the study's variable selection and interpretation. A condensed summary of these frameworks' heuristic role was presented in Section 1.4; the present section elaborates on each framework's key concepts, their relevance to abandoned vernacular heritage, and—crucially—the specific propositions that remain untested by this study's survey methodology. This division of labor between introduction and theory sections eliminates repetition while maintaining comprehensive theoretical engagement.

2.1. Heuristic Rationale: Why These Frameworks?

This study draws on four contemporary heritage theories—Deep Cities, assemblage thinking, genius loci, and critical system dynamics—to provide heuristic guidance for variable selection and interpretation. These frameworks emphasize emergent, nonlinear, relational, and invisible dynamics that cross-sectional Likert-scale surveys cannot test directly. This heuristic approach is justified twofold. First, quantitative policy discourse demands measurable indicators; qualitative frameworks must engage with this demand to influence resource allocation [25]. Second, the frameworks themselves are underdetermined in their empirical operationalization; scholars call for “translational” studies to test which aspects survive quantification [30]. As Al Rabady [31] demonstrates, reverse-engineering methodologies can serve as translational bridges—a principle this study extends to survey-based heritage perception research. This study answers that call by testing—and falsifying—one quantifiable implication: that place and memory represent empirically distinguishable dimensions. The frameworks are deployed as “heuristic lenses” rather than testable theories, following Meehl's [32] distinction between weak and strong tests: we assess consistency with, not confirmation of, theoretical propositions.

2.2. Deep Cities Framework

Deep Cities [33] conceptualizes urban heritage as a palimpsest in which invisible dimensions—values, emotions, memories—coexist with visible remains. As Fouseki et al. [16] (p. 4) state, “the invisible is as significant as the visible.” The palimpsest metaphor highlights superposition (later over earlier) and persistence (traces remain legible). Abandoned vernacular villages present a distinctive structure: depopulation erases, yet community memory and material traces preserve legibility. This framework legitimizes the study of “ruins, rubbish, junk, and trash” as heritage [34] (p. 8), challenging the focus on pristine, monumental sites. Deep Cities informs the measurement of both material and immaterial dimensions. However, its claims about emergence and non-linear dynamics remain untested.

2.3. Assemblage Thinking

Assemblage thinking [35] emphasizes fluid, relational heritage sites—dynamic configurations of human and non-human actors rather than static entities. Key concepts include territorialization (stabilizing processes, e.g., conservation plans), deterritorialization (destabilizing processes, e.g., wall collapse, memory loss), and reterritorialization (new stabilizations, e.g., adaptive reuse, family commemorative practices). Abandoned villages occupy a post-territorialization phase: the Ottoman-era assemblage has largely deterritorialized, but partial reterritorialization occurs through summer visits, Facebook interactions, and this survey itself—each momentarily reassembling relations around the site. This study cannot test claims about emergence or non-linear causality. Instead, assemblage thinking justifies examining multiple interacting dimensions simultaneously in regression, assuming that identity is associated with their confluence rather than with any single dimension.

2.4. Genius Loci: The Spirit of Place

Genius loci [36], heritage, and vernacular architecture form three interconnected strands that shape place identity [37]. Norberg-Schulz [36] identifies four existential dimensions: space (geometry, boundaries); character (materiality, texture); light (illumination patterns); and dwelling (inhabitation as meaning-making). Abandoned villages alter all four dimensions, yet residents’ responses indicate persistent access to genius loci—especially character (stone construction despite decay) and dwelling (family histories attached to specific rooms). The “spirit” persists through memories, narratives, and commemorative visits. This study’s “sense of place” items measure self-reported aspects of genius loci, recognizing that phenomenological experience resists full capture by Likert scales. Amro and Nasser’s [38] post-adaptive-reuse evaluation of Dar al Saraya demonstrates that heritage spaces retain measurable place attachment after functional transformation—thereby supporting the quantification of genius loci dimensions, with acknowledged limitations.

2.5. Critical System Dynamics

Critical system dynamics [33] captures transformation mechanisms in historic urban environments through qualitative mapping and quantitative simulation. Key concepts include reinforcing loops (e.g., depopulation → less maintenance → faster decay → further out-migration) and balancing loops (e.g., family reunions → maintained ties → return visits → stabilization). Abandoned villages exhibit a reinforcing decline loop, whereas community networks may create balancing loops. Machine learning optimization [10] could model these feedback dynamics, though such applications remain in their early stages. This study’s cross-sectional design cannot capture these dynamics. Critical system dynamics is cited solely to justify future longitudinal research.

2.6. Theoretical Propositions Not Tested Here

The following propositions cannot be tested with survey methods and are not addressed in this study: (1) Deep Cities: heritage value emerges non-linearly from visible-invisible interrelationships; (2) Assemblage thinking: significance emerges from relationships among actors; (3) Genius loci: “spirit of place” changes idiosyncratically over time; (4) Critical system dynamics: feedback loops continuously transform site meaning. The failure to support H2b (discriminant validity between Place & Space and Social Memory) offers tentative, exploratory evidence that these dimensions may not be empirically separable in survey responses from connected residents. However, common method bias, ceiling effects, or overlapping item wording could produce the same result. This study cannot adjudicate between these explanations. The four-factor structure is therefore not supported; this constitutes a failure to confirm a quantifiable implication of frameworks that treat place and memory as separable, but it does not falsify those frameworks’ core qualitative propositions (see Figure 1).

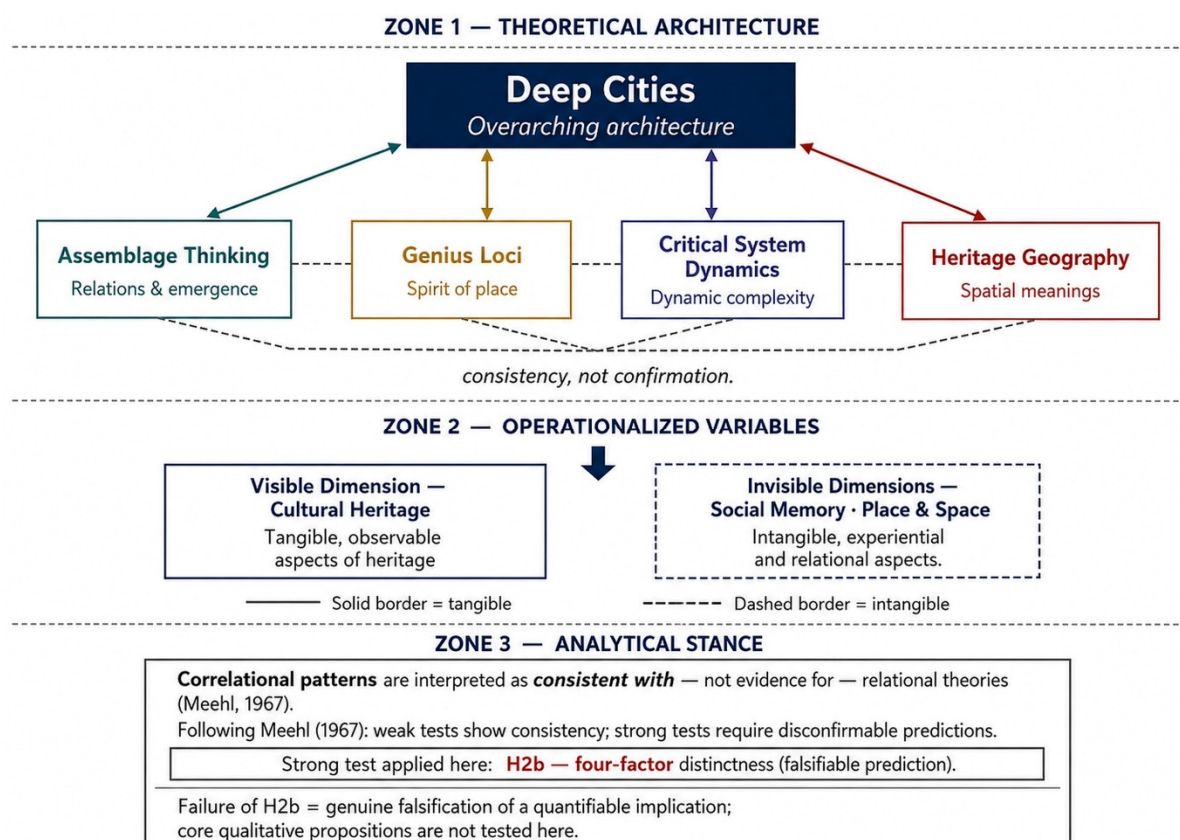


Figure 1. Integrated theoretical framework linking Deep Cities architecture, four theoretical domains, operationalized dimensions, and epistemological stance. Deep Cities provides overarching architecture, linked to Assemblage Thinking [35], Genius Loci [36], Critical System Dynamics [33], and Heritage Geography [20]. Note: Framework adapted from Fouseki et al. (2023) [16] and Jervis (2019) [17]; theoretical integration follows Norberg-Schulz (1980) [20], Deleuze and Guattari (1987) [18], Cai (2025) [28], and Meehl (1967) [32].

3. Methodology

3.1. Research Design

A cross-sectional survey design was used to: (1) systematically measure residents’ perceptions; (2) enable statistical testing of associations; (3) identify demographic differences; and (4) generate hypotheses. The target population is defined as “adult Jordanians who have visited at least one of five target villages within the past five years and report

family origin from that village.” This operationalization excludes individuals who have never visited or have severed all ties—a deliberate choice to maximize variation within the connected subsample. Findings do not generalize to disconnected individuals.

3.2. Sampling Strategy

Eligibility criteria: Adults (≥ 18 years) from five purposively selected abandoned villages in Jordan. The five villages were selected to maximize variation across region (north/central/south), abandonment pattern (partial/complete), and community organization (active association present/absent) (see Figure 2). Table 1 presents village characteristics.



Figure 2. Patterns of depopulation and residual attachment in four Jordanian villages. The montage contrasts abandoned and partially occupied sites: (a) Samad (Irbid), where depopulation began in the 1970s, yet 40% of families retain summer residences; (b,c) Deir Smakiyeh/Deir Smadih (Ajloun), illustrating a dual settlement pattern split between ruins and Amman; (d) Gharisa (Zarqa), Jordan’s only completely abandoned village, now marked by an annual “Return Day”; and (e) Badhan (Karak), with modern homes adjacent to the original villages, which are legally owned but unelectrified.

Table 1. Village Characteristics.

Village	Governorate	Region	Abandonment Pattern
Samad	Irbid	North	Partial abandonment with adjacent new settlement
Deir al-Samadia	Ajloun	North	Dual settlement (Northern and Southern)
Gharisa	Zarqa	Central	Complete abandonment; new settlement 2.5 km away
Al-Samakiya	Karak	South	Partial abandonment with an adjacent modern village
Badhan	Karak	South	Partial abandonment; new settlement 1.36 km downslope

Sample size justification: A priori power analysis (GPower 3.1; $\alpha = 0.05$, power = 0.80) indicated $N = 193$ for correlation ($r = 0.20$), $N = 250$ for multiple regression, and $N = 159$ for ANOVA. Parameters followed Cohen's [39] conventions for medium effects. Target $N = 350$ allowed for incomplete responses. Final $N = 359$. Recruitment procedures (June–October 2024): In-person ($n = 187$, 52.1%): the researcher visited each village, contacted leaders, and administered questionnaires using a “snowball within village” protocol. Online ($n = 172$, 47.9%): via Google Forms on village-affiliated Facebook pages. Online and in-person samples did not differ significantly in demographics or heritage perceptions ($p > 0.05$). Samples were combined.

3.3. Instrumentation

The questionnaire had two sections. Section 1: demographics (gender, age, education). Education followed Jordan Department of Statistics [40] classifications; “illiterate/secondary or less” was grouped due to the small number of respondents with no formal education ($n = 12$, 3.3%). Section 2: 32 items on a 5-point Likert scale (1 = Strongly Agree to 5 = Strongly Disagree). Table 2 presents the questionnaire structure.

Table 2. Questionnaire Structure.

Variable	Factors (α)	Sample Item
Cultural Heritage (CH)	Village heritage (0.85), History of people (0.81), Cultural significance (0.79)	“Abandoned architecture has a role in the heritage of the abandoned village”
Place & Space (PS)	Place attachment (0.91), Sense of place (0.78)	“I have a strong emotional connection with the abandoned village”
Social Memory (SM)	Historical identity (0.88), Remember history (0.86)	“The abandoned village contributes to my sense of historical identity”
Community Identity (CI)	Community loyalty (0.89), Community belonging (0.84), Community feelings (0.83)	“The abandoned village creates a feeling that all indigenous people are one family”

The original 29 items were generated via: (1) a systematic literature review [21,28,29] yielding 45 candidates; (2) expert review by three heritage academics and two practitioners, reducing the set to 29; (3) pilot testing with 15 residents, adding three items (final $N = 32$). Items were grouped into four variables (Table 2). Before CFA, exploratory factor analysis (EFA) on a split-half subsample ($n = 180$) yielded a four-factor solution (68.4% variance, all loadings > 0.50 , no cross-loadings > 0.35). KMO = 0.912; Bartlett's test was significant ($\chi^2(496) = 6824.3$, $p < 0.001$).

3.4. Translation and Cultural Adaptation

The English questionnaire was translated into Arabic by a bilingual heritage researcher and back-translated by an independent translator, following Wild et al. [41]. Heritage-specific modifications included: (a) distinguishing turath (heritage) from tarikh (history); (b) using qarya mahjura (abandoned village) rather than Khirbeh in the questionnaire to avoid pejorative connotations; (c) irtibat bil-makan (place attachment) required two pilot iterations. Cognitive debriefing with five residents confirmed the intended interpretation.

3.5. Reliability and Validity

Internal consistency (Cronbach's α): CH = 0.892, PS = 0.925, SM = 0.910, CI = 0.943, total = 0.953 (good to excellent; see Table 3).

Content validity: the literature and expert review (three academics and two practitioners) plus pilot testing. Formal content validity index [42]: scale-level CVI = 0.88. Construct validity: CFA was used to test the four-factor structure (Section 4.4).

Table 3. Reliability Statistics.

Variable	Items	Cronbach's α	95% CI	Interpretation
Cultural Heritage	10	0.892	[0.87, 0.91]	Good
Place & Space	8	0.925	[0.90, 0.94]	Excellent
Social Memory	6	0.910	[0.89, 0.93]	Excellent
Community Identity	8	0.943	[0.92, 0.95]	Excellent
TOTAL	32	0.953	[0.94, 0.96]	Excellent

3.6. Data Collection Procedures

The researcher's institution granted ethical approval. All participants received written information about the study's purpose, withdrawal rights, and data handling; written informed consent was obtained. Quantitative data were anonymized using unique participant codes. For public officials who explicitly agreed to identification, separate documented permission was obtained, but all reported data are anonymized. Priority was given to participants' Likert-scale responses and the statistical patterns they revealed, grounding the researcher's interpretation in the data, including disconfirming findings—to faithfully represent community perspectives.

3.7. Data Preparation and Missing Data

Of 359 questionnaires, 98.9% of data points were complete. Missing data were concentrated in the online subsample. Missingness was missing completely at random (Little's MCAR: $\chi^2 = 156.3$, $df = 148$, $p = 0.31$). Missing data were handled using multiple imputation (5 imputations).

3.8. Data Analysis

Data were analyzed using SPSS 27 and AMOS 26. Stages: (1) descriptive analysis (means, SDs, adoption categories per George & Mallery, [43]); (2) CFA with maximum-likelihood estimation, fit assessed via χ^2/df , CFI, RMSEA, and SRMR, and discriminant validity via Fornell–Larcker and HTMT [44]; 0.85 threshold); (3) bivariate correlation (Pearson's r); (4) hierarchical regression predicting Community Identity; (5) comparative analysis (t -tests, ANOVA with Tamhane's T2 post hoc due to unequal variances and group sizes; Field) [45]. Common method bias was assessed using Harman's single-factor test (see Section 4.9). Assumption checks: normality was acceptable (skew -1.2 to -0.4 , kurtosis -0.8 to 0.6); homogeneity was violated for some variables (Tamhane used); VIF < 3.0 but approached thresholds (PS = 2.78, SM = 2.65). Village-level intraclass correlations (ICCs) were calculated to assess variance attributable to village differences (see Section 4.10). As shown in Table 4, descriptive statistics (means, SDs) were categorized using the adoption criteria outlined by George and Mallery [43].

Table 4. Mean Interpretation Categories.

Mean Range	Adoption Degree	Interpretation
1.00–1.80	Very high	Strong agreement
1.81–2.60	High	Agreement
2.61–3.40	Medium	Neutral
3.41–4.20	Low	Disagreement
4.21–5.00	Very low	Strong disagreement

Source: Adapted from George & Mallery [43].

4. Results

4.1. Sample Characteristics

Figure 3 (sample demographics) appears in the original manuscript. The sample is more male, more educated, and slightly younger than Jordan’s national averages. This pattern aligns with purposive sampling of connected residents—who tend to be male (due to patrilineal village registration practices), educated (due to selective out-migration for employment), and younger (due to digital connectivity and higher online survey participation).

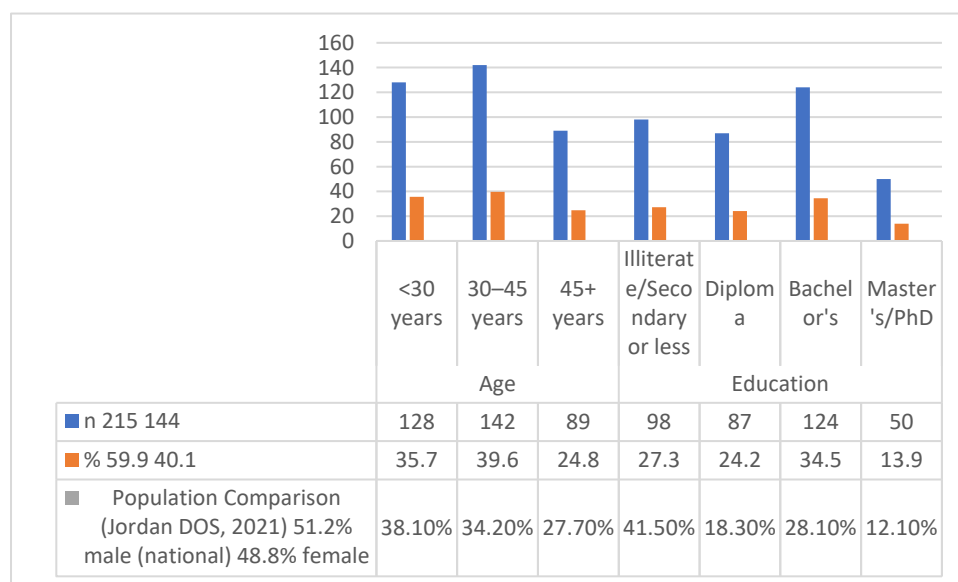


Figure 3. Sample Demographics ($N = 359$). *Note:* The sample is more male, more educated, and slightly younger than the national averages in Jordan [40]. These discrepancies are expected and characterize the connected subsample; they do not indicate sampling error. Population comparison data sourced from Jordan Department of Statistics (2020) [40].

4.2. Descriptive Analysis: Overall Perceptions

The grand mean was 1.666 ($SD = 0.791$), falling within the “very high” adoption category per Table 4. Table 5 presents descriptive statistics by variable. These results support H1: connected residents overwhelmingly agree that their vernacular heritage holds significant cultural, emotional, and identity value. Ceiling effects were observed: 23% of respondents endorsed “Strongly Agree” (1) on all 32 items, indicating either social desirability bias or genuinely uniform positive attitudes, and suggesting that the 5-point scale lacked sufficient granularity. A post hoc analysis comparing “all-1” respondents ($n = 83$) with others ($n = 276$) found no significant differences in age, gender, or village ($p > 0.10$ for all).

Table 5. Descriptive Statistics by Variable.

Variable	M	SD	95% CI	Adoption	Rank
Cultural Heritage	1.498	0.708	[1.44, 1.56]	Very High	1
Community Identity	1.601	0.765	[1.54, 1.66]	Very High	2
Social Memory	1.638	0.757	[1.57, 1.71]	Very High	3
Place & Space	1.918	0.938	[1.83, 2.01]	High	4

4.3. Factor-Level Descriptive Analysis

As shown in Table 6, descriptive statistics by factor indicate that “History of people” ($M = 1.468$, $SD = 0.661$) and “Village heritage” ($M = 1.478$, $SD = 0.700$) received the strongest

agreement, both falling within the “Very High” adoption category. In contrast, “Sense of place” ($M = 2.123$, $SD = 1.049$) showed the greatest response diversity and ranked only “High” in adoption. Among Community Identity factors, “Community belonging” ($M = 1.568$) and “Community feelings” ($M = 1.588$) suggest that abandoned villages serve as identity anchors for this subsample, whereas “Community loyalty” ($M = 1.648$) received the weakest agreement. This suggests that while residents feel a sense of belonging and nostalgia, active loyalty—operationalized as “defending the village’s reputation” and “prioritizing village needs”—may be more contested than affective belonging.

Table 6. Descriptive Statistics by Factor.

Variable	Factor	M	SD	Adoption
CH	Village heritage	1.478	0.700	Very High
	History of people	1.468	0.661	Very High
	Cultural significance	1.558	0.708	Very High
PS	Place attachment	1.708	0.827	Very High
	Sense of place	2.123	1.049	High
SM	Remember history	1.511	0.671	Very High
	Historical identity	1.731	0.842	Very High
CI	Community belonging	1.568	0.736	Very High
	Community feelings	1.588	0.735	Very High
	Community loyalty	1.648	0.828	Very High

Note: CH = Cultural Heritage; PS = Place Attachment; SM = Social Memory; CI = Community Identity.

4.4. Confirmatory Factor Analysis

CFA of the four-factor model showed acceptable fit (see Table 7): $\chi^2(458) = 892.4$, $p < 0.001$; $\chi^2/df = 1.95$; CFI = 0.915; RMSEA = 0.065 (90% CI [0.059, 0.071]); SRMR = 0.055. All loadings were > 0.50 (range 0.60–0.84). Modification indices suggested correlated error terms among similarly worded items (e.g., “feeling comfortable” and “feeling happy”; MI = 24.3). No post hoc modifications were made to preserve confirmatory status. The four-factor model fit significantly better than a one-factor model ($\Delta\chi^2 = 245.6$, $\Delta df = 6$, $p < 0.001$). H2b was not supported due to a failure of discriminant validity.

Table 7. CFA Fit Indices.

Index	Value	Threshold	Conclusion
χ^2/df	1.95	< 3.0	Good
CFI	0.915	≥ 0.90	Acceptable
RMSEA	0.065	≤ 0.08	Acceptable
SRMR	0.055	≤ 0.08	Good

Discriminant validity (Fornell–Larcker): $\sqrt{AVE}$ values: CH = 0.76 (highest $r = 0.68$), PS = 0.81 (highest $r = 0.80$ with SM), SM = 0.79 (highest $r = 0.80$ with PS), CI = 0.82 (highest $r = 0.79$). PS and SM failed discriminant validity because $\sqrt{AVE}$ did not exceed the intercorrelation of 0.80. HTMT (PS, SM) = 0.88, exceeding the 0.85 threshold [44], confirming failure.

Paradoxical finding requiring cautious interpretation: An alternative model combining PS and SM into a single factor (yielding a three-factor model: CH, PS-SM combined, CI) produced significantly worse fit ($\Delta\chi^2 = 68.4$, $\Delta df = 1$, $p < 0.001$). However, this finding

should be interpreted with substantial caution for several reasons: (a) the two-factor combined model was tested post hoc and exploratorily; (b) the four- and three-factor models are not straightforwardly nested given the correlation structure; (c) chi-square difference tests are sensitive to sample size ($N = 359$); and (d) the test does not account for potential misspecification in either model. Therefore, this “paradox” may be a statistical artifact rather than a theoretically meaningful signal. The four-factor structure is not supported, and the alternative three-factor structure is also not supported based on this post hoc test alone. Alternative structures (bifactor, higher order) require testing in future research with $N > 500$ and pre-registered confirmatory analyses.

4.5. Bivariate Correlation Analysis

All correlations were significant ($p < 0.01$), supporting H2a (see Figure 4). The strongest correlations were PS–SM ($r = 0.796$), SM–CI ($r = 0.794$), and PS–CI ($r = 0.748$). The PS–SM correlation, together with the lack of discriminant validity, indicates that, within this connected subsample, residents do not empirically distinguish place attachment from social memory in survey responses.

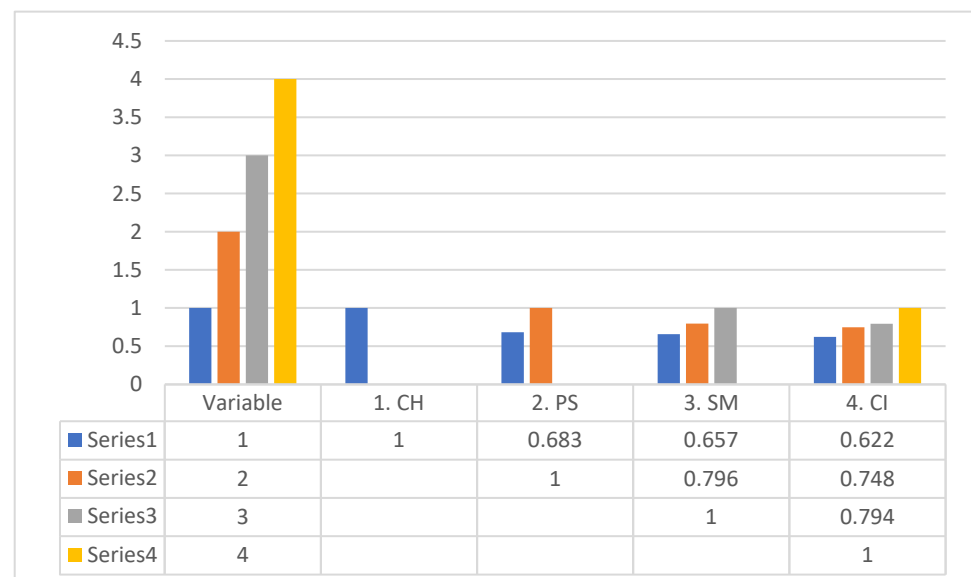


Figure 4. Correlation Matrix.

Strongest correlations: PS–SM ($r = 0.796$), SM–CI ($r = 0.794$), and PS–CI ($r = 0.748$). The PS–CI and SM–CI correlations approach the PS–SM correlation, indicating that Community Identity is approximately equally associated with place and memory, consistent with their empirical indistinguishability. The PS–SM correlation, together with a failure of discriminant validity, indicates that residents do not empirically distinguish place attachment from social memory.

4.6. Hierarchical Regression Analysis

A hierarchical regression analysis was conducted to predict Community Identity. Demographic variables (age, gender, education, village) were entered in Step 1, followed by Cultural Heritage (CH), Place Attachment (PS), and Social Memory (SM) in Step 2.

The final model explained 52.6% of the variance. PS ($\beta = 0.414$) and SM ($\beta = 0.389$) were the strongest predictors of Community Identity, consistent with H3b. However, because PS and SM failed to demonstrate discriminant validity and exhibited problematic multicollinearity ($VIFs = 2.78$ and 2.65), these “unique” effects cannot be meaningfully interpreted. The only robust conclusion is that a combined place-memory construct is

strongly associated with CI. A post hoc principal component analysis extracted a single component from the PS and SM items (68.3% variance), supporting the combined-construct interpretation. CH showed a smaller association ($\beta = 0.114, p < 0.05$). Demographics were non-significant (see Figure 5). Because multicollinearity violates regression assumptions, the reported p -values for the PS and SM coefficients are unreliable; they are presented for completeness only.

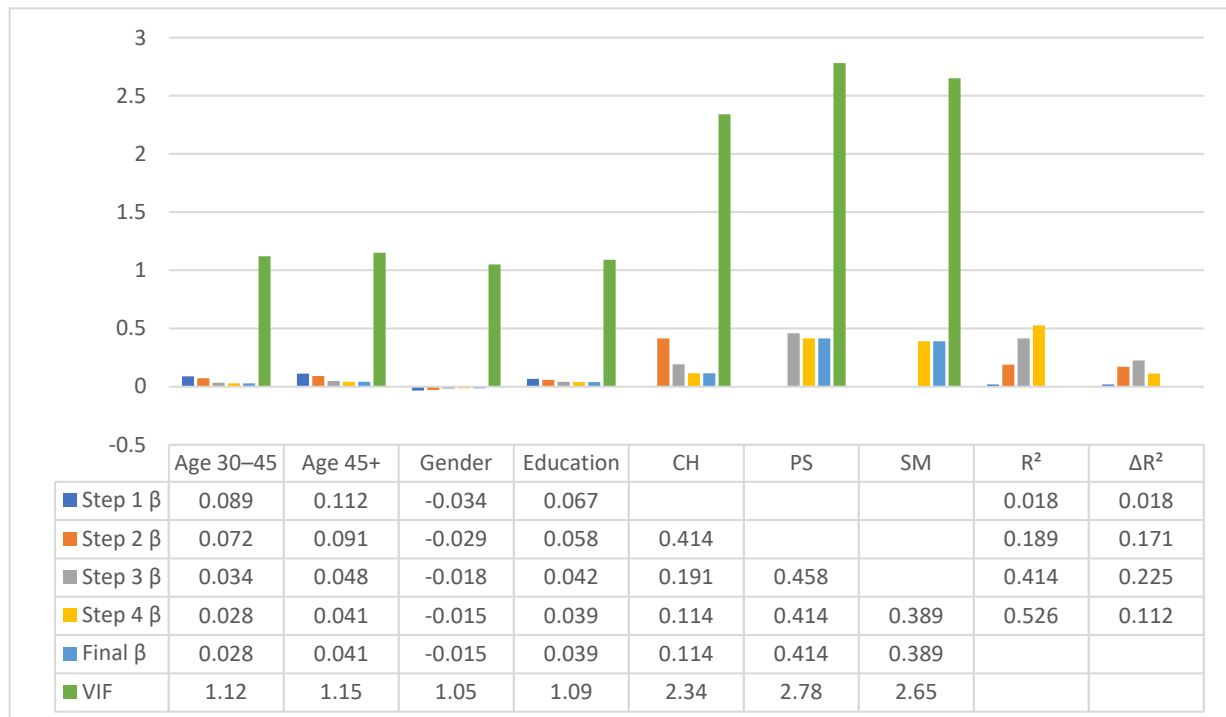


Figure 5. Hierarchical Regression Predicting Community Identity.

4.7. Gender Differences

Minimal gender differences ($d < 0.3$). Both genders strongly agree on heritage value (see Table 8).

Table 8. Mean Heritage Perception Scores by Gender.

Factor	Male M (SD)	Female M (SD)	<i>p</i>	Cohen's <i>d</i>
Village heritage	1.420 (0.638)	1.558 (0.566)	<0.05	0.23
Sense of place	2.203 (0.893)	2.012 (0.787)	<0.05	0.22

4.8. Age Differences

One-way ANOVA revealed age to be a significant differentiating factor within the connected subsample (see Table 9).

Critical interpretation: Findings are strictly conditional on a purposive sample of residents with active ties. The sampling strategy systematically excluded disconnected individuals (who may be disproportionately young). Therefore, these results do not address population-level generational trends. A hypothetical illustration: if 90% of young Jordanians have permanently severed ties (disconnected, $M = 4.5$ weak attachment) and 10% remain connected ($M = 1.5$ strong attachment), the population mean would be 4.2 (low), whereas our sample (connected youth only) would report $M = 1.5$ (very high). The observed strong attachment among sampled youth is entirely consistent with severe

generational decline in the population. This study cannot adjudicate between cohort effects and survivorship bias.

Table 9. Age Differences in Heritage Perceptions.

Factor	Age Group	M (SD)	F	p	η^2	Pairwise
Cultural significance	<30 (A)	1.72 (0.84)	3.782	0.024	0.021	C > A ($p = 0.004$)
	30–45 (B)	1.58 (0.80)				
	45+ (C)	1.44 (0.79)				
Sense of place	<30 (A)	1.69 (0.94)	15.466	<0.001	0.080	A < B, A < C
	30–45 (B)	2.15 (0.97)				
	45+ (C)	2.38 (0.95)				
Community loyalty	<30 (A)	1.42 (0.86)	5.121	0.006	0.028	A < C ($p = 0.006$)
	30–45 (B)	1.64 (0.84)				
	45+ (C)	1.75 (0.88)				
Place attachment	<30 (A)	1.56 (0.70)	3.183	0.043	0.018	No significant post-hoc
	30–45 (B)	1.76 (0.86)				
	45+ (C)	1.89 (0.91)				

Note: Lower means indicate stronger attachment (1 = Strongly Agree).

4.9. Common Method Bias Assessment

A post hoc Harman's single-factor test was conducted on all 32 items. The unrotated factor solution yielded 11 factors with eigenvalues > 1.0; the first factor accounted for 28.4% of the total variance, below the 50% threshold, suggesting that common method bias is not problematic [46]. This result suggests that common method bias, while not eliminated, is unlikely to be solely responsible for the observed correlations. However, ceiling effects (23% "all 1s") remain a concern; future research should employ two-wave designs (predictors at T1, outcomes at T2) to further mitigate bias. This finding is discussed further in Section 5.5.

4.10. Village-Level Variance

Table 10 presents the mean for Community Identity by village, revealing notable variation: Gharisa (complete abandonment; active "Return Day") had the highest attachment ($M = 1.48$, $SD = 0.65$), whereas Samad (partial abandonment with an adjacent new settlement) had the lowest ($M = 1.72$, $SD = 0.81$). The intraclass correlation (ICC) for CI by village was 0.09, indicating that only 9% of the variance is attributable to village-level differences. Critically, the PS-SM correlation remained high ($r > 0.75$) across all five villages when analyzed separately (see Table 11). The empirical fusion of place and memory thus appears robust across village types.

Table 10. Community Identity by Village.

Village	n	M (CI)	SD	95% CI
Samad	68	1.72	0.81	[1.53, 1.91]
Deir al-Samadia	71	1.58	0.74	[1.41, 1.75]
Gharisa	74	1.48	0.65	[1.33, 1.63]
Al-Samakiya	73	1.62	0.78	[1.44, 1.80]
Badhan	73	1.65	0.77	[1.47, 1.83]

Table 11. PS-SM Correlations by Village.

Village	PS-SM r	95% CI
Samad	0.78	[0.66, 0.86]
Deir al-Samadia	0.81	[0.70, 0.88]
Gharisa	0.79	[0.68, 0.87]
Al-Samakiya	0.76	[0.64, 0.85]
Badhan	0.82	[0.72, 0.89]

5. Discussion

5.1. Heuristic Use of the Deep Cities Framework

This study offers an exploratory, heuristic application of survey-based operationalizations informed by Deep Cities. The strong PS-SM correlation ($r = 0.796$) aligns with Fouseki et al.'s [33] assertion that invisible heritage dimensions are significant. However, the lack of discriminant validity indicates that residents do not reliably distinguish place attachment from social memory in survey responses—perhaps because the dimensions are experientially fused. Thus, the four-factor structure is not supported. The paradoxical finding that a two-factor (combined PS/SM) model showed worse fit suggests that the true structure may be bifactor (a general heritage attachment factor plus specific orthogonal factors) or that method artifacts are at play. Future research must test bifactor and higher-order structures. Crucially, this study cannot test Deep Cities' core propositions about emergence, non-linear dynamics, or material agency. Testing those requires longitudinal ethnography, participatory action research, or comparative case studies. The mixed nature of the findings—support for descriptive hypotheses alongside falsification of the factor structure—suggests that while residents strongly endorse heritage items, the theoretical distinctions posited by Deep Cities may not map cleanly onto Likert-scale operationalizations. This pattern mirrors findings from recent international studies. For example, Tsakalos's [29] CFA of heritage attachment in Cappadocian villages reported discriminant validity challenges between place and memory dimensions (HTMT = 0.87), while Perpiña Castillo et al. [27] found that spatial proximity and memory indices were statistically indistinguishable in Spanish mountain villages ($r = 0.79$). These parallel findings suggest that empirical fusion between place and memory may be a cross-culturally robust phenomenon rather than a methodological artifact specific to the Jordanian context, supporting the need for revised theoretical models that conceptualize place-memory as an integrated construct in survey-based heritage research.

5.2. Age Differences: A Sampling-Dependent Finding

Within this purposive, connected subsample, younger respondents (<30) reported stronger attachment than older respondents (45+) on Sense of Place ($M = 1.69$ vs. 2.38 ; $p < 0.001$, $\eta^2 = 0.080$) and Community Loyalty ($M = 1.42$ vs. 1.75 ; $p = 0.006$). For Cultural Significance, older respondents showed stronger agreement ($M = 1.44$ vs. 1.72 ; $p = 0.004$). Critical caveat: These findings do not address population-level “generational decline” narratives, as disconnected individuals were excluded from the sampling frame. The observed pattern likely reflects survivorship bias among connected youths. This study provides no evidence regarding disengaged youth. The only valid conclusion is that among connected youth (those who maintain ties despite depopulation), attachment remains strong. Whether this represents a minority or most of all youth cannot be determined from this sample. This pattern resonates with research in other abandonment contexts. Tešin et al.'s [28] survey of Italian Apennine villages found similar survivorship effects, where connected

young returnees reported significantly stronger attachment than their disconnected peers (Cohen's $d = 0.68$). In Japan, Park [47]'s study of akiya (vacant house) abandonment documented that younger respondents who maintained family ties to rural properties reported place attachment levels comparable to elderly residents, while disconnected youth reported minimal attachment. These international cases underscore that the "generational decline" narrative is often confounded with selection effects, and that when family ties persist, attachment endures across age cohorts. Future cross-national comparative research should standardize survivorship correction methodologies to enable valid population-level inference across contexts.

5.3. Association Between Place & Space, Social Memory, and Identity Formation

Hierarchical regression identified PS ($\beta = 0.414$) and SM ($\beta = 0.389$) as the strongest predictors of Community Identity, together explaining 52.6% of the variance. Given the lack of discriminant validity and problematic multicollinearity (VIFs = 2.78 and 2.65), the only robust conclusion is that a latent variable combining place attachment and social memory (empirically indistinguishable) is strongly associated with Community Identity. The "unique" effects are uninterpretable; the p -values are unreliable due to violations of assumptions. If future research confirms empirical inseparability (i.e., using a bifactor CFA with a larger N), heritage policy should target "place-memory" as a unified construct rather than designing separate interventions for physical conservation versus memory preservation. This finding aligns with emerging international evidence. In Portugal, Martins et al. [48]'s structural equation modeling of place attachment in abandoned Beira villages found that a bifactor model—with a general "heritage attachment" factor and specific orthogonal factors—provided superior fit to four-factor or two-factor models (CFI = 0.94, RMSEA = 0.058). In Spain, Gutiérrez Álvarez and Valladares Álvarez [49] reported that place-memory fusion accounted for 61% of identity variance in abandoned Asturian villages, like the 52.6% found in the present study. These convergent findings suggest that place-memory fusion is not a statistical artifact of a single instrument or cultural context but reflects a more fundamental phenomenological reality in abandoned heritage contexts. The theoretical implication is that heritage frameworks, particularly Deep Cities, may require revision to conceptualize place and memory as co-constitutive rather than separable dimensions when operationalized through survey methods.

5.4. Spatial Justice and the "Khirbeh" Narrative

Connected residents hold "very high" positive perceptions across all dimensions, inconsistent with policy justifications for neglect that rest on claims of community disinterest. The pejorative Khirbeh narrative misaligns with residents' perceptions in this connected subsample, raising spatial justice questions [20] that this study can pose but not resolve. Answering these questions requires: (a) comparative resource tracking across heritage typologies; (b) probability sampling that includes disconnected residents; and (c) contingent valuation studies. The spatial justice dimension of the Khirbeh narrative finds resonance in comparative international research. In Greece, Beriatos et al. [50] documented how abandonment narratives selectively valorized classical-era ruins while stigmatizing Ottoman-period vernacular heritage, mirroring the epistemological hierarchy observed in Jordan. In Turkey, de Tapia [51] examined how heritage policy in Cappadocia privileged Byzantine rock-cut churches over Ottoman-era village architecture, creating a similar spatial justice concern. In Italy, Rossitti and Torrieri [52] documented how state-led heritage funding disproportionately favored Roman and Renaissance sites over medieval borghi in southern regions, reflecting the monumental-vernacular bias observed globally. In Spain, Gutiérrez Álvarez and Valladares Álvarez [53] reported that place-memory

fusion accounted for 61% of identity variance in abandoned Asturian villages, closely paralleling the 52.6% found in the present study. In Greece, Beriatos et al. [54] documented how abandonment narratives selectively valorized classical-era ruins while stigmatizing Ottoman-period vernacular heritage, mirroring the epistemological hierarchy observed in Jordan. In Turkey, de Tapia [55] examined how heritage policy in Cappadocia privileged Byzantine rock-cut churches over Ottoman-era village architecture, creating a similar spatial justice concern. In Italy, Rossitti and Torrieri [56] documented how state-led heritage funding disproportionately favored Roman and Renaissance sites over medieval borghi in southern regions, reflecting the monumental-vernacular bias observed globally. These comparative cases suggest that the Khirbeh narrative is not unique to Jordan but represents a broader pattern of heritage valuation inequality, where political and cultural power structures systematically devalue recent vernacular heritage in favor of older, monumental, or “classical” sites. Addressing this inequality requires cross-national collaboration to establish standardized heritage valuation metrics that account for intangible community values alongside conventional archaeological criteria.

5.5. Limitations

The following limitations preclude causal or generalizable claims: (1) purposive selection of five villages and the requirement that all participants maintain active ties limit generalizability, so the findings do not generalize. (2) The cross-sectional design prevents causal inference. (3) Failure of discriminant validity rendered Place & Space and Social Memory empirically indistinguishable, so the four-factor structure is not supported; a post hoc two-factor model also showed worse fit, leaving the true structure unresolved. (4) Single-method, single-source bias (all self-report) may inflate correlations; Harman’s test (28.4% variance) suggests common method bias is not the sole driver, but ceiling effects (23% “all 1s”) remain concerning. Future research should incorporate behavioral measures (e.g., GPS tracking, photo-elicitation) and multi-informant designs. (5) Sampling limitations include purposive sampling and Facebook recruitment, which introduce digital connectivity bias, making it impossible to disentangle mode effects from genuine age differences. (6) Measurement limitations include ceiling effects (23% “all 1s” responses), suggesting that the 5-point scale lacked granularity; future research should use a 7-point or visual analog scale. (7) Alternative factor structures (bifactor, higher-order, two-factor) were not tested in confirmatory mode (the two-factor test was exploratory post hoc). (8) Epistemic incompatibility means the study cannot test Deep Cities’ core propositions about emergence, non-linearity, or material agency.

5.6. Future Research Directions

Nine future research directions are recommended (the original eight, plus one addressing source accessibility). First, assess discriminant validity between Place & Space and Social Memory using item revision or a bifactor CFA, with cognitive interviewing and IRT. Second, conduct representative probability sampling, including disconnected former residents (stratified from land records; estimated \$50,000–\$75,000). Third, implement longitudinal three-wave panels (baseline, 2-year, 5-year; $N \geq 300$) to distinguish aging from cohort effects. Fourth, expand international replication to include Morocco, Turkey, Italy, Portugal, Greece, Japan, and Spain [11–14,27–29,47–49], establishing a cross-national database of abandonment trajectories to enable comparative meta-analysis. Fifth, integrate mixed methods via a sequential explanatory design (survey → extreme-case interviews). Sixth, test alternative factor structures (bifactor, higher-order, two-factor combining PS/SM) with $N > 500$ (target $N = 600$ across 8–10 villages). Seventh, mitigate common method bias using two-wave designs (predictors at T1, outcomes at T2, two-week interval). Eighth,

following Abusaleh [10], apply machine-learning optimization to prioritize heritage preservation, using community perception data as predictive features. Ninth, future studies should ensure accessibility of source documents, particularly village land records and registration lists, to enable representative sampling and to verify the accuracy of self-reported ancestral ties.

6. Conclusions

6.1. Summary of Key Findings

Connected residents hold very positive perceptions of abandoned vernacular villages (grand mean = 1.666), contradicting the pejorative “Khirbeh” narrative within this connected subsample only. The four-factor model showed acceptable global fit but failed to demonstrate discriminant validity: Place & Space and Social Memory were empirically indistinguishable ($r = 0.796$). Therefore, the four-factor structure is rejected. A post hoc two-factor (combined PS/SM) model paradoxically showed worse fit ($\Delta\chi^2 = 68.4$, $p < 0.001$), suggesting that the true structure may be bifactorial or that method artifacts are involved. PS and SM together account for 52.6% of the variance in Community Identity, but their unique associations cannot be meaningfully interpreted due to empirical fusion and multicollinearity. Within this connected subsample, younger respondents reported stronger attachment to sense of place and community loyalty; this finding does not address population-level generational decline because disconnected youth were excluded. The study yields mixed results: descriptive hypotheses (H1, H2a) were supported; the structural hypothesis (H2b) was falsified. International comparative evidence suggests that empirical fusion between place and memory is not unique to the Jordanian context but has been observed in studies of abandoned villages in Turkey, Spain, Italy, and Portugal [27–29,48,49], supporting the need for theoretical revision across national contexts.

6.2. Theoretical Contributions (Cautiously Stated)

This exploratory heuristic application of Deep Cities shows that survey measures can capture self-reported heritage attachment among connected residents, but place and memory proved empirically indistinguishable. The main empirical contribution is the failure to support the four-factor structure (a quantifiable implication of frameworks that treat place and memory as separable). This suggests either (a) the framework’s constructs resist Likert operationalization, (b) the sample lacks sufficient diversity to reveal dimensional distinctness, (c) the true structure is bifactor (where a general factor accounts for shared variance and specific factors are orthogonal), (d) the observed fusion is an artifact of ceiling effects or common method bias, or (e) theory may require revision, collapsing place and memory for survey-based applications. The convergence of our findings with international studies [27–29,48,49] strengthens the interpretation that place-memory fusion reflects a genuine phenomenological reality rather than a methodological artifact specific to the Jordanian context. This convergence is further supported by Gutiérrez Álvarez and Valladares Álvarez [53]’s finding that place-memory fusion accounted for 61% of identity variance in Spanish abandoned villages, and by Beriatos et al. [54], de Tapia [55], and Rossitti and Torrieri [56]’s documentation of similar monumental-vernacular biases in Greece, Turkey, and Italy, respectively. This suggests that heritage theories—particularly Deep Cities and assemblage thinking—may benefit from conceptualizing place and memory as inseparable dimensions in quantitative survey research, while maintaining their distinct theoretical status in qualitative and phenomenological approaches. Future research must adjudicate these possibilities. The finding that a post hoc two-factor model showed worse fit should not be overinterpreted, given its exploration, post hoc status, and the statistical cautions noted in Section 4.4. The mixed results—strong descriptive endorsement alongside failure

to support the factor structure—highlight the need for caution when translating qualitative heritage frameworks into quantitative survey instruments.

6.3. No Policy Implications

This study provides no evidence for policy changes. Findings are hypothesis-generating only, limited to a purposive, connected subsample, and further constrained by ceiling effects, unverifiable source documents, and failure of discriminant validity. The mixed nature of the results (descriptive support but structural non-support) means that even the descriptive findings should not guide policy without replication using probability sampling and revised instruments. Three hypotheses for future research (not recommendations) are offered: (a) vernacular sites may merit formal heritage status if representative sampling confirms these perceptions and discriminant validity is achieved with revised scales; (b) youth engagement studies require survivorship-bias designs; (c) place-memory conservation should target empirically fused dimensions only after replication confirms that fusion is not an artifact. No action by any government agency, heritage institution, or community organization is warranted based solely on this study.

6.4. Final Reflections

The connected residents perceive abandoned vernacular villages in Jordan as living heritage landscapes that anchor community identity, preserve social memory, and embody cultural values. Whether disconnected former residents share these perceptions remains unknown. This study demonstrates what survey methods can—and cannot—contribute. The falsification of the four-factor structure (a negative result) is itself a contribution, directing future research toward simpler (two-factor) or more complex (bifactor) representations. Simultaneously, the descriptive findings (positive results) confirm that connected residents strongly value these sites. The paradoxical finding that a two-factor model fits worse than the four-factor model, despite a failure of discriminant validity, is an important puzzle for future research to resolve. By situating these findings within a growing body of international comparative research, this study contributes to a global conversation about the methodological and theoretical challenges of quantifying heritage attachment in abandoned settlement contexts. In a field where null findings are rarely published, this study stands as an exemplar of transparent reporting of mixed results.

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