From Community Belonging to Ecological Resilience: The Mediating Role of Social Capital in Traditional Villages of Yunnan, China

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Abstract

With the sustainable development of rural communities, ecological resilience has become a key concern. Although earlier studies focused on environmental and institutional factors, the role of social and psychological mechanisms in community-level resilience formation had been underestimated. Specifically, the role of community belongingness among residents in fostering ecological resilience via relational mechanisms remained poorly understood.

Based on socio-ecological resilience theory, this paper derived and empirically evaluated a model that described how the sense of community belonging translated into community ecological resilience through the mediating effect of social capital. The empirical analysis was based on a survey of 605 residents in traditional villages in Yunnan Province, China, and employed partial least squares structural equation modeling (PLS-SEM).

Findings revealed that a sense of community belonging played an important role in increasing social capital, which, in turn, promoted ecological resilience within the community. Although belonging also directly affected ecological resilience, its indirect impact through social capital was more significant, suggesting that social capital was the primary mechanism by which belonging was translated into collective adaptive capacity.

By explaining this process, the paper contributes to knowledge of the social microfoundations of ecological resilience, showing how psychological attachment (belonging), relational structures (social capital), and collective outcomes (resilience) are systematically related in the traditional village setting. The results also provide practical implications for community-based environmental governance, the conservation of traditional villages, and rural development.

Keywords: Sense of Community Belonging; Social Capital; Socio–Ecological Resilience; Community Ecological Resilience; Traditional Villages

Introduction

The sustainability of rural communities and the ecosystems around them is increasingly threatened by ecological degradation, climate variability, and environmental disturbances (Flood et al., 2022). To address these issues, ecological resilience has been a valuable subject in sustainability studies, rural development, and environmental governance (Hayes et al., 2019). Generally, resilience is the ability of a system to absorb shocks, adapt to changing conditions, and sustain key functions over time (Folke, 2006). In social–ecological systems, however, resilience is not merely an ecological characteristic; it emerges from dynamic interactions among ecological processes, institutions, and human activities (Berkes & Ross, 2013).

This approach is particularly applicable in the countryside, where ecological change is closely connected to daily community life, place–based activities, and localized social relationships (Flood et al., 2022). Even existing studies acknowledge that resilience is not based solely on environmental resources or physical infrastructure, but also on communities' capacity to learn, restructure, collaborate, and adapt under uncertainty (Berkes & Ross, 2013). It is thus not peripheral but a practical mechanism through which resilience is created and sustained through community–level social processes. For example, rural communities can become change agents by engaging in community activities and place–based collective behaviors that support ecological systems in the long term (Flood et al., 2022).

The case of Yunnan Province in Southwest China is a particularly interesting context to study these dynamics. Yunnan is also home to more than 19,000 higher plant species and has a biodiversity index that is more than fourfold higher than that of the rest of the country, with a complex topography and a considerable biodiversity (Yunnan is a region with a high index, and it occupies only about 4.1% of China, Qian et al., 2020). Meanwhile, habitat destruction, environmental pollution, and excessive exploitation of natural resources remain threats to biodiversity conservation (Qian et al., 2020). Furthermore, rural social–ecological systems in Yunnan are to varying degrees vulnerable to climate change pressures, suggesting that ecological resilience is uneven and highly context–dependent (He et al., 2021). These circumstances indicate that intricate and changing social–ecological interactions underlie rural development in the province.

The traditional villages of Yunnan are among the most obvious places where this socio-ecological tension is evident. There are now 777 villages on the national list of Chinese traditional villages in the province, the most of any province (Yunnan Provincial Department of Housing and Urban-Rural Development, 2026). These villages are usually situated in geographically constrained areas and are characterized by strong social networks, rich cultural traditions, and long-term interactions between communities and the surrounding ecological systems. The literature also reveals spatial agglomeration and regional differences in tourism activation within these villages (Xu & Dong, 2022). The institutional support has also been reinforced in recent years, especially with the adoption of the Measures for the Protection of Traditional Villages in Yunnan Province (Yunnan Provincial Department of Justice, 2025), which focuses on coordinated conservation, utilization, and rural revitalization.

Although the research on ecological resilience has increased, most of the available literature remains focused on structural, spatial, environmental, or institutional determinants, with relatively less attention given to the social and psychological processes by which the resilience is executed at the community level (Berkes & Ross, 2013; Folke, 2006). Social capital is one of the social dimensions widely recognized as an important factor in fostering trust, reciprocity, participation, information sharing, and coordinated responses to common problems (Aldrich & Meyer, 2015; Chen et al., 2024). Social capital enables communities to mobilize resources and act in concert in response to environmental change through networks of relationships and cooperation.

Nevertheless, there is one crucial conceptual flaw. The current literature tends to view social capital as a structural resource or a product of community interaction, without adequately answering the question behind it:

Why do people want to engage, believe, and put money in social relations in the first place?

Explanations of the role of social capital in ecological resilience cannot be complete without understanding these underlying drivers.

The feeling of belonging to the community might be a vital answer to this question. It shows people's emotional attachment, identity, and a sense of belonging to a community (Mannarini & Fedi, 2009; Cramer & Pawsey, 2023). Those with a stronger sense of belonging are more likely to perceive themselves as part and parcel of the community, to participate in group activities, and to maintain interpersonal relationships throughout their lives. According to previous research, belonging is linked to social participation, well-being, and cooperative behavior (Cramer

& Pawsey, 2023) and can serve as a psychological foundation for the development of social capital (Ahn & Davis, 2020). Simultaneously, belonging remains conceptually distinct from social capital, as it embodies affective and identity-based attachments rather than the relational resources inherent in social networks (Mannarini & Fedi, 2009; Ahn & Davis, 2020).

In this regard, belonging may be viewed as a pre-relational state that triggers people to socialize, trust, and join community networks, thus contributing to the generation of social capital. Nonetheless, although its role may be vital, little literature has investigated the role of sense of community belonging in improving ecological resilience through relational processes. Specifically, there is a lack of research on how emotional attachment is translated into collective adaptive capacity, particularly in traditional village settings where social relationships and ecological practices are interwoven.

Even though it has been previously discussed that the spatial development of traditional villages in Yunnan has been studied (Xu & Dong, 2022) and the vulnerability of the rural social-ecological systems in the area has been discussed (He et al., 2021), few attempts have been made to systematically examine how a sense of community belonging, social capital, and ecological resilience are interrelated. Consequently, the social micro-underpinnings of ecological resilience, particularly the connection between individual psychological attachment and group ecological performance, are not well defined.

To address this gap, this research paper examines the relationships among sense of community belonging, social capital, and community ecological resilience in traditional villages in Yunnan Province, China. The research, based on the socio-ecological resilience theory, attempts to explain the role of belonging in the development of social capital and the reverse effect of social capital in allowing communities to build on ecological resilience. In this way, the research moves towards a more holistic conceptualization of the underlying social processes of resilience and provides empirical support for classic village conservation, rural revitalization, and sustainable rural tourism.

Research Objectives

This paper seeks to articulate the role of a sense of community belonging in community ecological resilience in traditional villages in Yunnan Province, China, by discussing social capital as a relational process linking individual psychological attachment to the community and adaptive processes. Instead of treating social capital as a given structural resource, the research aims to

explain how it is produced through a series of psychosocial processes and how it enables communities to address ecological issues.

The creation and empirical testing of this mechanism contribute to understanding the social microfoundations of socio–ecological resilience, especially in heritage–based rural settings where social relationships and ecological practices are closely interconnected. By doing so, it offers a more coherent description of the systematic relationship among belonging, social capital, and ecological resilience and provides new information applicable to community–based environmental governance and rural revitalization.

Literature Review

Socio–Ecological Resilience Theory

Socio–ecological resilience theory provides a useful lens for understanding the dynamic relationships between human communities and ecological systems. Unlike engineering–based views that emphasize stability and rapid return to equilibrium, this perspective defines resilience as the capacity of interconnected social and ecological systems to absorb disturbances, adapt to change, and reorganize while maintaining essential functions (Hayes et al., 2019). Resilience therefore emerges through interactions among ecological processes, human activities, institutions, cultural practices, and community relationships.

Socio–ecological systems are commonly understood as complex adaptive systems characterized by non–linear dynamics, feedback loops, and multiple equilibrium states. Accordingly, resilience depends not only on environmental resources and infrastructure, but also on social capacities such as learning, cooperation, and governance arrangements that enable communities to respond effectively to disturbances (Hayes et al., 2019). Recent studies further show that ecological resilience is shaped by multidimensional interactions involving ecological protection, adaptive capacity, environmental governance, and regional coordination (Wang et al., 2025), while also displaying marked spatio–temporal variation and path–dependent dynamics across regions (Chang et al., 2025).

This suggests that resilience cannot be explained by ecological indicators alone; it must also account for the social processes through which communities engage with their environments. Research on rural socio–ecological systems similarly highlights the importance of stewardship, shared resource management, and collective adaptation in sustaining resilience (Flood et al.,

2022). Therefore, examining the social foundations of ecological resilience remains an important direction in socio–ecological resilience research.

Community Ecological Resilience in Traditional Villages

Traditional villages represent a distinctive type of socio–ecological community in which social relationships, cultural heritage, and ecological environments are closely intertwined. Compared with urban settings, they often preserve stronger resident ties and closer links with surrounding landscapes, making them especially suitable for exploring how community–level social dynamics shape ecological resilience.

Community ecological resilience refers to the capacity of local communities to maintain, restore, and adapt ecological functions in the face of environmental disturbances and socio–economic change. In rural socio–ecological systems, resilience is often supported by local knowledge, community cooperation, and shared stewardship practices that promote sustainable resource management and environmental protection (Flood et al., 2022). Cultural heritage and local traditions may further strengthen this capacity. Fontanella Pisa et al. (2025) suggest that heritage–rich communities build resilience through shared cultural memory, collective identity, and locally embedded knowledge systems that guide environmental practices and decision–making. However, existing studies on ecological resilience have largely focused on regional ecological systems, tourism development, or governance structures, while paying less attention to village–level social processes (Chang et al., 2025; Wang et al., 2025). As a result, the role of psychosocial and relational factors in shaping ecological resilience in traditional villages remains underexamined.

Sense of Community Belonging and Social Capital

Sense of community belonging refers to individuals' emotional attachment, identity, and perceived connection to the community in which they live. Individuals with a stronger sense of belonging are more likely to regard themselves as important members of the community and to participate in collective activities. Prior research shows that stronger community belonging is associated with greater well–being, social participation, and cooperative behavior (Cramer & Pawsey, 2023).

A strong sense of community belonging may also contribute to the development of social capital. Social capital refers to the relational resources embedded in networks of trust, reciprocity, and social interaction that facilitate cooperation and collective action (Hocking et al., 2025). Although belonging and social capital are closely related, they are conceptually distinct. Ahn and

Davis (2020) argue that belonging reflects affective and identity–based attachment, whereas social capital concerns the relational structures and cooperative resources formed through social interaction. Townley et al. (2011) likewise emphasize that sense of community is grounded in perceived connection, identification, and shared meaning. In this sense, belonging can provide a psychological basis for participation in community networks and the building of trusting relationships. Individuals who feel attached to their community are more likely to engage in social activities, establish interpersonal ties, and participate in collective initiatives, thereby fostering trust, reciprocity, and cooperation over time. Therefore:

H1. Sense of community belonging positively influences social capital.

Social Capital and Community Ecological Resilience

Social capital has long been recognized as a key factor in community resilience. Through networks of trust, communication, and cooperation, it enables communities to mobilize resources and coordinate responses to environmental challenges. Hocking et al. (2025) show that social capital plays a vital role in preparedness, response, and recovery by promoting information sharing and coordinated action.

Within socio–ecological systems, social capital may strengthen ecological resilience by supporting collective environmental stewardship and adaptive resource management. Communities with strong social networks are better able to organize activities such as environmental monitoring, ecological restoration, and sustainable resource management. Social capital also facilitates knowledge sharing, cooperation, and collective learning, all of which are important for adapting to changing ecological conditions (Hayes et al., 2019; Flood et al., 2022). Through trust and cooperation, community members are also more likely to support shared environmental goals and participate in environmental governance. Therefore:

H2. Social capital positively influences community ecological resilience.

***Sense* of Community Belonging and Community Ecological Resilience**

Sense of community belonging may also directly affect community ecological resilience. Individuals who feel emotionally attached to their community often develop stronger connections to local environments and shared resources, which may encourage environmental stewardship and support for ecological conservation.

Research on socio–ecological systems indicates that community identity and place attachment can stimulate collective environmental action. Flood et al. (2022) show that rural communities build resilience through everyday stewardship practices and community–based

environmental initiatives rooted in strong social ties and shared identity. Fontanella Pisa et al. (2025) similarly emphasize that community identity and cultural heritage reinforce residents' commitment to protecting local environments and maintaining ecological systems. In traditional villages, where residents often maintain long-term relationships with both community and landscape, a strong sense of belonging may therefore motivate participation in ecological conservation and collective environmental initiatives. Therefore:

H3. Sense of community belonging positively influences community ecological resilience.

The Mediating Role of Social Capital

Although a sense of community belonging may directly influence community ecological resilience, its effect may also operate indirectly through social capital. A stronger sense of belonging encourages individuals to participate in community life and build interpersonal relationships, which help generate trust, reciprocity, and social networks. In turn, these relational resources enable communities to mobilize collective resources and coordinate actions that support ecological resilience.

From the perspective of socio-ecological resilience theory, resilience emerges through interactions between social and ecological subsystems. In this process, social capital serves as an important mechanism by which community relationships translate into collective environmental action. Through trust, communication, and cooperation, social capital supports environmental stewardship and adaptive responses to ecological disturbances (Hocking et al., 2025). Therefore, individuals with a strong sense of community belonging are more likely to contribute to the formation of social capital, thereby enhancing community ecological resilience.

H4. Social capital mediates the relationship between sense of community belonging and community ecological resilience.

Conceptual Framework

Drawing on socio-ecological resilience theory, this study conceptualizes community ecological resilience as a socially embedded adaptive capacity emerging from interactions between ecological systems and community relationships. This perspective emphasizes that resilience depends not only on ecological resources and environmental conditions, but also on social processes such as collective learning, cooperation, and coordinated responses to environmental disturbances (Folke, 2006; Hayes et al., 2019).

Within this framework, a sense of community belonging is treated as a psychosocial basis of community attachment, reflecting residents' emotional connection, shared identity, and perceived membership in the community (McMillan & Chavis, 1986). In traditional villages, where long-term social ties and shared cultural practices remain central, a stronger sense of belonging may encourage participation in community activities and cooperation in addressing local issues.

However, emotional attachment alone may not translate into collective environmental action without relational structures that support cooperation. Social capital provides such a mechanism. It refers to the relational resources embedded in networks of trust, reciprocity, and cooperation that facilitate coordination, knowledge exchange, and resource mobilization toward shared goals (Nahapiet & Ghoshal, 1998; Putnam, 2000; Adler & Kwon, 2002). In rural communities, strong social capital can support environmental stewardship, knowledge sharing, and coordinated responses to ecological disturbances (Hocking et al., 2025).

Accordingly, this study proposes that sense of community belonging strengthens social capital, social capital enhances community ecological resilience, and sense of community belonging may also directly influence ecological resilience. Geographic location is included as a control variable (Flood et al., 2022; Wardekker et al., 2023). The proposed relationships are illustrated in Figure 1.

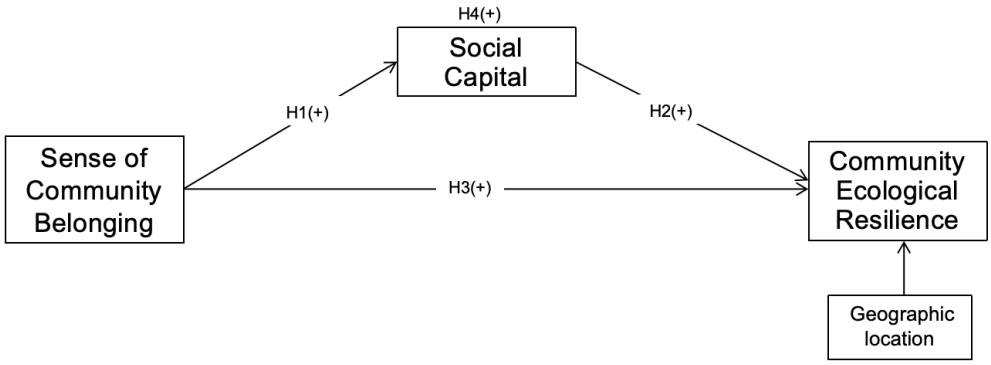


Figure 1 Conceptual Framework

Research Methodology

Research Design

This study adopts a quantitative research design to examine the relationships among sense of community belonging, social capital, and community ecological resilience in traditional village communities in Yunnan Province, China. Such a design is appropriate for testing theoretically derived hypotheses and for analyzing associations among latent variables using

statistical methods. The study relies on a survey-based approach, with primary data gathered from residents of traditional villages to capture their perceptions of community belonging, social capital, and ecological resilience.

To evaluate the proposed relationships, the study applies structural equation modeling using the partial least squares approach (PLS-SEM). Within social science research, PLS-SEM is widely used to investigate complex associations among latent constructs, particularly when mediating relationships are involved, and the research emphasizes prediction and theory building (Hair et al., 2022).

Study Area and Sampling

The empirical study was conducted in traditional villages located in Yunnan Province, China, where long-standing social relationships, shared cultural heritage, and close interactions between communities and local ecological environments remain important features of village life. Traditional villages in Yunnan Province provide an appropriate context for examining community ecological resilience because social relationships and ecological practices are often deeply intertwined within local governance, resource management, and daily livelihood activities.

The study population comprised residents from traditional village communities. Data were collected through a structured questionnaire distributed in selected villages. To ensure that respondents were familiar with local social relationships and environmental conditions, only individuals who had lived in the community for a sufficient period were included.

A total of 605 valid questionnaires were retained for analysis. This sample size is sufficient for PLS-SEM and is above the recommended minimum for structural equation modeling (Hair et al., 2022).

Measurement of Constructs

The constructs in this research were operationalized through measurement items adopted and refined from previous literature. Responses to all items were recorded on a five-point Likert scale, ranging from 1 ("strongly disagree") to 5 ("strongly agree").

Sense of community belonging was assessed using items drawn from community psychology research that reflect residents' emotional attachment to the community, identification with it, and perceived membership (McMillan & Chavis, 1986; Cramer & Pawsey, 2023).

Social capital was measured using items that reflected trust among residents, reciprocal relationships, and cooperation within the community. These indicators capture the relational resources embedded in social networks that enable collective action (Putnam, 2000; Pretty & Ward, 2001; Adler & Kwon, 2002; Hocking et al., 2025).

Community ecological resilience was measured using indicators capturing the community's capacity to respond to environmental disturbances, maintain ecological balance, and adapt to ecological change. These measures reflect the adaptive capacity of socio–ecological systems emphasized in resilience theory (Hayes et al., 2019).

In addition, geographic location was included as a control variable to account for potential contextual differences across villages.

Data Analysis

To examine the proposed model, this study used partial least squares structural equation modeling (PLS–SEM). In line with the methodological recommendations of Hair et al. (2022), the analytical procedure consisted of two main phases. The first phase involved assessing the measurement model to determine whether the constructs demonstrated acceptable reliability and validity. Cronbach's alpha and composite reliability were used to evaluate reliability. Average variance extracted (AVE) was applied to assess convergent validity, whereas discriminant validity was verified using the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT).

The second phase focused on assessing the structural model and the proposed associations among the study constructs. The evaluation included path estimates, R^2, and Q^2 to assess the model's explanatory capacity. Bootstrapping was used to determine the significance levels of the hypothesized effects. In addition, mediation analysis was performed to examine whether social capital operates as an indirect mechanism linking sense of community belonging to community ecological resilience.

Research Results

Respondent Profile

The demographic information of the respondents is reported in Table 1. The analysis was based on 605 valid questionnaires collected from residents of traditional villages in Yunnan Province, China.

With respect to gender, the sample was nearly balanced, consisting of 303 male respondents (50.10%) and 302 female respondents (49.90%). In terms of age, 67.1% of the respondents were between 18 and 45 years old, including 33.55% aged 18–30 and 33.55% aged 31–45. Those aged 46–60 accounted for 24.96% of the sample, whereas respondents aged 60 and above made up 7.94%.

As for educational attainment, the largest proportions were respondents with primary school education or below (26.30%) and those with junior high school education (25.80%). These were followed by respondents with senior high school or vocational education (21.20%). Participants with a college education accounted for 16.00%, while those with a bachelor's degree or higher accounted for 10.70%.

Overall, the demographic profile reflects the typical characteristics of residents in traditional rural villages, where education levels vary, and community members span multiple age groups.

Table 1 Respondent Profile

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	303	50.10
	Female	302	49.90
Age	18–30	203	33.55
	31–45	203	33.55
	46–60	151	24.96
	Over 60	48	7.94
Education Level	Primary school or below	159	26.30
	Junior high school	156	25.80
	Senior high school / vocational	128	21.20
	College	97	16.00
	Bachelor's degree or above	65	10.70
Total		**N =605**	**100%**

Measurement Model Assessment

Construct reliability and convergent validity were assessed through the measurement model, with the detailed results reported in Table 2. The loading values for all indicators exceeded 0.70, indicating that the observed items were well aligned with their corresponding latent constructs. In particular, the loadings ranged from 0.781 to 0.869, supporting acceptable indicator reliability.

Internal consistency reliability was evaluated by means of Cronbach's alpha and composite reliability (CR). The Cronbach's alpha values were between 0.855 and 0.888, which were all above the recommended minimum of 0.70. Similarly, the CR values ranged from 0.902 to 0.915, indicating strong internal consistency across the items measuring each construct.

Average variance extracted (AVE) was used to verify convergent validity. The AVE scores ranged from 0.641 to 0.714, with all values exceeding the recommended level of 0.50. These results indicate that each latent construct accounted for more than half of the variance in its measurement items.

In summary, the evidence suggests that the measurement model met the required standards of reliability and convergent validity, indicating that the constructs were appropriate for further testing of the structural model.

Table 2 Measurement Model Assessment

Construct	Item	Loading	Cronbach's α	CR	AVE
SCB	SCB1	0.836	0.867	0.909	0.714
	SCB2	0.841			
	SCB3	0.835			
	SCB4	0.869			
SC	SC1	0.800	0.888	0.915	0.641
	SC2	0.790			
	SC3	0.811			
	SC4	0.817			
	SC5	0.781			
	SC6	0.805			
CER	CER1	0.832	0.855	0.902	0.697
	CER2	0.835			
	CER3	0.848			
	CER4	0.824			

Note: SCB = sense of community belonging; SC = social capital; CER = community ecological resilience; CR = composite reliability; AVE = average variance extracted.

Discriminant Validity

Discriminant validity was examined through the heterotrait–monotrait ratio (HTMT), and the corresponding results are reported in Table 3. All HTMT values across the constructs were below the recommended cutoff of 0.85, supporting acceptable discriminant validity. More specifically, the HTMT value was 0.721 for sense of community belonging and social capital, and 0.663 for sense of community belonging and community ecological resilience. The HTMT value for social capital and community ecological resilience was 0.804. These findings suggest that the constructs are empirically distinguishable and represent different conceptual dimensions within the model.

Table 3 Discriminant Validity (HTMT)

Construct	SCB	SC	CER
SCB	—	0.721	0.663
SC		—	0.804
CER			—

Note: SCB = Sense of Community Belonging; SC = Social Capital; CER = Community Ecological Resilience

Structural Model and Hypothesis Testing

The structural model was tested in PLS–SEM using the bootstrapping method to examine the hypothesized relationships among the constructs. The corresponding results are reported in Table 4, and the structural model with standardized path coefficients and coefficients of determination is shown in Fig. 2. The findings show that sense of community belonging has a significant positive effect on social capital (β = 0.633, t = 19.726, $p < 0.001$), thereby supporting Hypothesis 1. This result suggests that residents who feel emotionally attached to their community are more likely to form stronger networks of trust, reciprocity, and cooperation with other community members. The findings also indicate that social capital has a significant positive effect on community ecological resilience (β = 0.565, t = 12.807, $p < 0.001$), thus supporting Hypothesis 2. This means that communities with stronger social relationships and greater collective cooperation are better able to maintain ecological functions and respond to environmental disturbances.

Moreover, a sense of community belonging has a significant direct effect on community ecological resilience (β = 0.215, t = 4.844, p < 0.001), which supports Hypothesis 3. This finding suggests that emotional attachment to the community can directly encourage residents to support ecological protection and environmental stewardship activities.

The mediation results further show that social capital significantly mediates the relationship between sense of community belonging and community ecological resilience (indirect effect β = 0.358, t = 11.466, p < 0.001), supporting Hypothesis 4. The indirect effect exceeds the direct effect, indicating that social capital is the primary mechanism by which community belonging strengthens ecological resilience.

The explanatory ability of the model was evaluated using the coefficient of determination (R^2). The findings show that sense of community belonging accounts for 40.1% of the variance in social capital (R^2 = 0.401). In addition, sense of community belonging and social capital jointly account for 52.0% of the variance in community ecological resilience (R^2 = 0.520). These values suggest moderate to substantial explanatory ability for the structural model.

The effect size (f^2) results further indicate that the influence of sense of community belonging on social capital is large (f^2 = 0.668), whereas the influence of social capital on community ecological resilience is moderate (f^2 = 0.398). The direct effect of sense of community belonging on community ecological resilience is relatively small (f^2 = 0.058), suggesting that much of its influence is mediated by social capital.

Overall, the findings provide strong empirical support for the proposed research model, confirming that community belonging strengthens social capital, social capital enhances ecological resilience, and social capital mediates the relationship between community belonging and ecological resilience in traditional village communities.

Table 4 Structural Model and Mediation Results

Hypothesis	Path	Direct Effect (β)	Indirect Effect (β)	t-value	p-value	f^2	Result
H1	SCB ⟶ SC	0.633	—	19.726	<0.001	0.668	Supported
H2	SC ⟶ CER	0.565	—	12.807	<0.001	0.398	Supported
H3	SCB⟶ CER	0.215	—	4.844	<0.001	0.058	Supported
H4	SCB ⟶ SC ⟶ CER	—	0.358	11.466	<0.001	—	Supported

Note: R^2 values: SC (Social Capital) = 0.401, and CER (Community Ecological Resilience) = 0.52

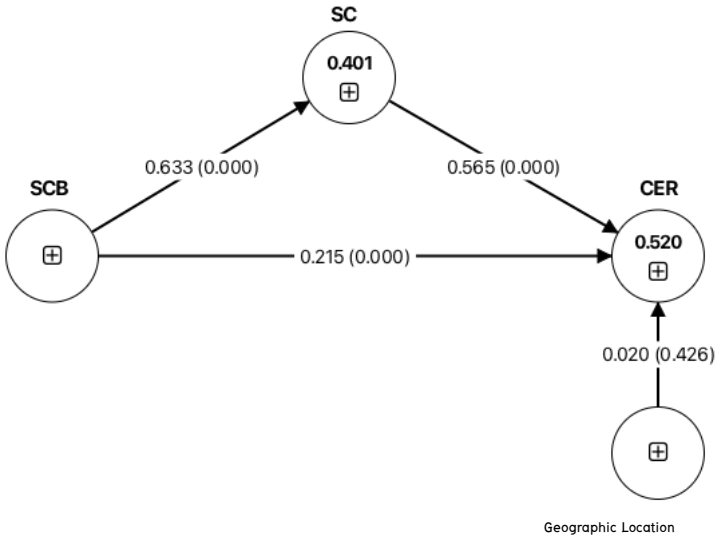


Figure 2 The PLS–SEM Paths

Note: SCB = Sense of Community Belonging; SC = Social Capital; CER = Community Ecological Resilience. Path values are standardized coefficients (β) with p–values in parentheses; values inside circles represent R^2.

Discussions

The findings of this study provide clear empirical evidence that a sense of community belonging and social capital play distinct but interconnected roles in shaping community ecological resilience. As shown in Figure 2, sense of community belonging significantly enhances social capital, and social capital, in turn, exerts a strong positive effect on community ecological resilience. While a sense of community belonging also directly contributes to ecological resilience, its indirect effect through social capital is stronger, indicating that relational mechanisms are central to the formation of resilience in traditional villages.

First, the positive relationship between sense of community belonging and social capital suggests that emotional attachment to the community is a key driver of the formation of relational resources. This finding aligns with prior research that emphasizes that shared identity and perceived membership foster trust, reciprocity, and social interaction (McMillan & Chavis, 1986; Putnam, 2000). However, this study extends existing work by empirically demonstrating that belonging is not only an outcome of social relationships but also a precursor to the development of social capital. In traditional villages, where social ties are historically embedded, a strong sense of belonging appears to motivate residents to invest in and sustain social networks that support collective action.

The field observations illustrated in Figure 3 provide concrete insights into how a sense of community belonging is enacted through everyday social and cultural practices in traditional villages. Collective activities such as traditional performances, ritual games, and shared public gatherings are not merely cultural expressions but also important social arenas where interpersonal trust, mutual recognition, and a sense of shared identity are continuously reinforced. Participation in these activities reflects more than passive cultural inheritance; it demonstrates active engagement in community life, where individuals reaffirm their membership and emotional attachment to the village. At the same time, these repeated interactions create opportunities to build and sustain social ties, facilitating communication, cooperation, and informal coordination among residents. In this sense, such culturally embedded practices function as micro-level mechanisms through which a sense of belonging is translated into social capital, providing the relational foundation necessary for collective action and, ultimately, for strengthening community ecological resilience.

Second, the strong positive effect of social capital on community ecological resilience confirms that relational structures are critical for enabling coordinated responses to environmental challenges. This result is consistent with studies showing that trust, cooperation, and networked relationships facilitate knowledge sharing, resource mobilization, and adaptive capacity in rural and environmental contexts (Adger, 2003; Folke, 2006; Hocking et al., 2025). At the same time, the findings add nuance by highlighting that social capital is not merely a background condition, but an active mechanism through which communities organize and respond to ecological disturbances. In traditional villages, where formal institutional capacity may be limited, these relational structures become particularly important for sustaining ecological governance and resilience.

Third, the finding that sense of community belonging has both direct and indirect effects on ecological resilience suggests a dual pathway. The direct effect indicates that emotional attachment may independently motivate pro-environmental attitudes and behaviors, such as stewardship and participation in local ecological practices. This is broadly consistent with research linking place attachment to environmental responsibility and conservation behavior. However, the stronger indirect effect observed in this study indicates that belonging alone is insufficient to generate sustained collective outcomes without being embedded in relational networks. This highlights the importance of distinguishing between individual-level motivation and collective-level capacity, with social capital serving as the bridge between them.

Taken together, these findings contribute to socio-ecological resilience research by clarifying the internal social dynamics through which resilience is formed. While prior studies have emphasized environmental resources, institutional arrangements, or governance systems, this study shows that resilience in traditional villages is fundamentally rooted in the interaction between psychosocial attachment and relational structures. In this sense, community ecological resilience can be understood as a socially constructed capacity that emerges from the alignment of emotional belonging and networked cooperation within the community.

Theoretical implications

This study complements the current body of literature on socio-ecological resilience by providing a more fine-grained understanding of how individual psychological states translate into collective adaptive capacity through relational mechanisms. The paper is a theoretically informed explanation of how social capital, known to impact resilience outcomes, is rooted in psychosocial processes, specifically the notion of belonging.

To start with, this study contributes to socio-ecological resilience theory by redefining belonging as a key antecedent to the development of relational resources, rather than merely a consequence of cohesive communities. The resilience research that exists is largely based on structural and institutional factors, including governance, infrastructure, and ecological conditions, and social cohesion and connection have been given a second or lesser place. This paper empirically demonstrates that belonging has both direct and indirect effects on resilience, with the indirect effect mediated by social capital being stronger. It shifts the emphasis back to the micro-preconditions of resilience formation, and individual experience of connection stimulates broader processes.

More importantly, drawing on recent conceptualizations of belonging as a socially constructed, relationally mediated process (Leach et al., 2026), this study deepens the theoretical understanding of the belonging–social capital linkage. Belonging is not a fixed emotional connection but an ongoing state created through interpersonal recognition, participation, and interaction within a community (Leach et al., 2026). In this respect, belonging is a process that generates and helps people to transform passive identification of the place into active participation in the social network. This opinion aligns with recent research suggesting that belonging is not only a feeling but is operationalized through social interactions (Nery Vale et al., 2026) and sustained by two-way relations, thereby developing trust, norms, and mutual expectations that constitute social capital.

Second, this study contributes to social capital theory by helping to understand its psychosocial sources at the local level. Even though social capital has traditionally been explained through network structures and the assets of relations (Murphy, 2023), the psychological reasons that cause individuals to join, sustain, and invest in these networks have not received sufficient attention. The results of this study have shown that belonging is a crucial motivational and emotional source of social capital, as individuals who experience a stronger sense of belonging are more likely to engage in community activities, develop interpersonal relationships, and build trust-based relationships. In this sense, belonging may be considered a pre-relational trigger that prompts the processes of action and thought underlying the development of social capital.

Furthermore, by situating the analysis within rural traditional villages, this study highlights the contextual embeddedness of the belonging–social capital–resilience nexus. Rural communities are often characterized by both structural constraints—such as geographic isolation and limited access to resources—and relational strengths, including dense social ties and shared cultural identity (Tan & Sitikarn, 2018; Tan & Sitikarn, 2019). In such settings, belonging plays an even more important role, as it can help people come to terms with these conditions of dualism by fostering emotional attachment and social integration. This duality supports the idea that belonging is not an individual-level perception alone, but a contextually conditioned process, shaped by space, culture, and relations, which, in turn, affects the development and quality of social capital.

Lastly, this research builds on theoretical knowledge of resilience by showing that psychological attachment is not directly correlated with resilience, but that resilience is achieved mainly through relational routes. This implies that belonging alone may not yield resilience outcomes unless it is converted into material social resources and social capabilities, as indicated by the stronger mediating effect of social capital. This observation supports the view that resilience can no longer be considered an individual trait or an ecologically determined state of being, but rather a relationally practiced capacity generated through the relationship between individual perceptions and community structures. Combined, this research contributes to theory by synthesizing knowledge from socio-ecological resilience and social capital approaches and by identifying belonging as a crucial bridging concept linking individual psychological conditions to collective adaptive outcomes. By doing so, it promotes a more process-oriented concept of resilience creation and highlights that the perception–adaptation process is mediated by social interaction, relational engagement, and context-specific dynamics.

Practical Implications

The practical implications of this research's findings offer valuable insights into rural development, tourism governance, and policy design in traditional village settings, especially when viewed through the lens of social capital formation, relational embeddedness, and collective adaptive capacity.

To begin with, there is the positive contribution of a sense of community belonging, which implies that this sense is not merely an emotional response but a mechanism for building and mobilizing social capital. Available sources show that belongingness enhances relational networks, trust, and mutual involvement, hence allowing individuals to internalize group objectives and engage more in collective action. For example, a study of social interaction settings demonstrates that the motive to belong enhances the influence of connectivity on behavioral consequences, thereby increasing loyalty, engagement, and cooperative behavior within communities. In rural settings, creating a sense of belonging can be seen as a mechanism for mobilizing dormant social capital, turning passive citizens into active co-creators of eco-resilience.

This, in effect, means that community-based cultural practices, heritage revitalization efforts, and participatory governance systems ought not to be considered as token or auxiliary efforts. Rather, they ought to be strategically planned as social infrastructural investments that develop identity, shared meaning, and relational cohesion. When residents feel they are part and parcel of a given group, their readiness to participate in environmental custodianship, knowledge exchange, and collaborative administration increases significantly.

Second, the results indicate that tourism development in traditional villages should not remain limited to infrastructure, visitor numbers, or immediate economic benefits. Instead, we need to think of tourism as a system of relationships and regeneration, with social relations, the exchange of local knowledge, and community engagement as the main focuses of long-term sustainability. The experience of rural tourism and regenerative models suggests that sustainable tourism is developed when local actors are included in co-creation activities rather than passive beneficiaries.

This means that tourism planning must include mechanisms that empower co-design among residents, policymakers, and tourism stakeholders, inculcate local ecological know-how into environmental management, and promote long-term engagement between tourists and host societies, thereby enhancing social capital and environmental consciousness. In this regard, tourism

is not only an economic operation but also a medium of enhancing community unity and adaptive strength.

Third, in terms of governance, the paper points out that ecological resilience in the countryside is profoundly reliant on the form and quality of social connections, rather than on material infrastructure or environmental interventions. The complementary studies on rural systems show that information sharing, connectivity, and network responsiveness greatly increase collective capacity to respond to uncertainty and environmental change. This implies that the density of interaction and the ability to coordinate are the sources of resilience, rather than the availability of resources.

In this regard, the policy design should focus on creating community communication platforms and knowledge–sharing networks, institutional arrangements that facilitate stakeholder collaboration, and mechanisms that increase transparency, trust, and collective decision–making, thereby enabling rural communities to be better placed to address environmental and socio–economic issues.

Lastly, the results show that rural revitalization policies can be strengthened significantly when community belonging, social capital, and governance capacity are viewed as interdependent and mutually reinforcing, rather than as policy objectives in isolation. Social capital is based on belonging; cooperation is based on social capital; and ecological and economic resilience is based on cooperation.

In a broader sense, as this paper proposes, the change in policy logic is a transition from a resource–based and infrastructure–driven policy approach to a relationship–based and capability–based model of rural development. This practice acknowledges that rural transformation cannot be attained by what communities possess, but, more importantly, by the way communities relate to each other, how they identify with each other, and how they behave as a unit over time.

New Knowledge from Research

This research produces valuable knowledge outputs for socio–ecological resilience studies by offering a more sophisticated view of the social microfoundations of resilience in the traditional village setting. In particular, the paper shows that community ecological resilience cannot be defined solely by environmental resources or institutional set–ups; it is deeply rooted in the psychosocial processes of daily community life.

Firstly, the findings confirm that the sense of community belonging must be theorized not as an affective condition but as a generative social one, enabling the creation and mobilization of social capital. Here, belonging is a supportive mechanism that reinforces connections, solidifies shared identity, and enhances people's desire to act collectively. This shifts the analytical position of a peripheral social variable from mere belonging to that of a central antecedent of collective capacity formation in socio–ecological systems.

Second, the paper elucidates the mechanistic pathway by which belonging is converted into ecological resilience, with social capital as the key mediating process. Instead of viewing social capital as a fixed resource, the results indicate that it is a relational infrastructure, i.e., the presence of trust, reciprocity norms, and network connectivity, which facilitates coordination, cooperation, and responsive actions to environmental challenges. This gives a clearer account of the process of converting intangible social processes into tangible resilience products at the community scale.

Third, the research contributes to resilience theory by empirically showing that ecological resilience in traditional villages is co–produced through the combined actions of emotional attachment, social relationships, and collective ecological practices. This connected vision goes beyond the disjointed views of social, cultural, or ecological aspects, which are often addressed individually; resilience is an emergent quality of socially embedded interactions within community systems.

Moreover, the results support the traditional village conceptualization as a socio–ecological community, in which traditional cultural continuity, localized knowledge, and high–density social interactions are not remnants of underdeveloped systems but rather contribute to adaptive capacity and long–term sustainability. In this regard, the research shifts the status of heritage–based rural populations from passive consumers of development initiatives to a perceived, internally dynamic system with endogenous resilience.

Lastly, by identifying social capital as the essential link between belonging and ecological resilience, the study advances toward a more organized, theoretically grounded explanation of resilience formation. It adds to the literature by explaining the linear and chain relationships among psychological attachment (belonging), relational structures (social capital), and collective outcomes (ecological resilience). This provides a more analytical framework for future research investigating resilience processes across various rural and community–based settings.

Conclusion

This study examined how a sense of community belonging contributes to community ecological resilience in traditional villages and clarified the role of social capital as the underlying relational mechanism. Based on survey data from residents in Yunnan Province, China, the findings show that a sense of community belonging enhances social capital, which in turn strengthens community ecological resilience. While belonging also affects resilience, its influence primarily operates through social capital, with the indirect effect exceeding the direct.

These findings offer a clearer explanation of how ecological resilience is formed within rural communities. Rather than being determined solely by environmental conditions or institutional arrangements, resilience emerges from the interaction between psychological attachment and relational structures. Specifically, the study demonstrates that a sense of community belonging functions as a foundational psychosocial driver, while social capital serves as the key mechanism that translates this attachment into collective adaptive capacity. In this way, the study advances understanding of the social micro–foundations of socio–ecological resilience and reinforces the view that traditional villages are best understood as socially embedded socio–ecological systems.

From a practical perspective, the findings highlight the importance of strengthening community relationships alongside physical and environmental interventions. Efforts to promote rural revitalization and ecological governance should therefore place greater emphasis on fostering a sense of belonging, trust, and cooperation within communities, as these social processes underpin sustainable collective action.

Several limitations should be acknowledged. The cross–sectional design restricts strong causal inference, and the focus on traditional villages in Yunnan may limit generalizability to other contexts. In addition, although social capital is identified as a central mechanism, other factors—such as governance capacity and institutional support—may also shape resilience processes. Future research may adopt longitudinal, comparative, or mixed–method approaches to further examine how psychosocial and institutional dynamics interact in the formation of ecological resilience across different rural settings.

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