An Empirical Study on Resident Engagement in Service Innovation for Wellness Tourism Sustainable Development: An Analysis Based on SEM and fsQCA

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Abstract

As wellness tourism destinations face increasing competitive pressures and environmental challenges, there is a heightened emphasis on implementing innovative service strategies that promote community engagement and sustainable development. The study proposes an integrated model grounded in generativity and service innovation theory to investigate the factors influencing resident engagement in service innovation performance (SIP). Four hundred-eight valid responses are using a snowball sampling technique. This research employed structural equation modeling (SEM) to assess the impact of individual variables, complemented by fuzzy-set qualitative comparative analysis (fsQCA) to explore the synergistic effects of multiple variables. The SEM results indicate that place attachment, generativity, and digital technology significantly enhance resident engagement in SIP, whereas knowledge management does not exhibit a statistically significant effect. Furthermore, fsQCA identifies three configurations linked to high-quality SIP and two configurations associated with low-quality SIP. The complementary insights gained from SEM and fsQCA enhance theoretical frameworks and provide practical implications for stakeholders in the tourism sector.

Keywords: service innovation, generativity, resident engagement, digital technology, wellness tourism

Recent global concerns regarding environmental sustainability and public health have underscored the need for wellness businesses to embrace innovative service practices (Adams, 2016). While tourism development can foster economic, social, and environmental benefits in destinations worldwide (Hall, 2008), it often brings challenges, including rising living costs, congestion, cultural heritage deterioration, and shifts in local lifestyles (Erul, 2023). It is essential to integrate the perspectives of multiple stakeholders into sustainable development strategies for the tourism industry (Erul, 2023). Wellness tourism is travel to maintain or enhance personal well-being (GWI, 2023).

1. Introduction

The wellness tourism destination contains a core and support area, which should have strong functional connections. The core area has unique resource advantages, while the support area can provide an industrial linkage platform for the core area and strong guarantees for public service systems such as public leisure, information consultation, tourism safety, and leisure education (NTA, 2016). Wellness tourism champions the long-term sustainability of environmental resources and the welfare of stakeholders (Wiltshier, 2020). The industry must actively involve local communities in decision-making processes, prioritize the protection of resources, and recognize the significant challenges these communities encounter during development, especially in wellness tourism (Moayerian, 2022). The

cultural resource endowments of wellness tourism destinations can protect cultural heritage resources and revitalize resource elements by developing the wellness industry (Liu, 2022). Sustainable management of cultural heritage resources requires a collaborative approach incorporating diverse input from all segments of society, including government, local communities, tourism organizations, and visitors. This engagement fosters value co-creation among stakeholders, essential for the long-term success of wellness tourism and facilitation.

Community support is crucial for the success of service innovation, leading to significant research on its determinants. Studies show that a sense of place fosters meaningful memories and connections. Place attachment develops through place-based identity and dependence, helping individuals form self-identities aligned with specific community goals (Cross, 2011). Generativity also influences intentions to preserve environments, driven by emotional ties to destinations and anticipated sustainability benefits (Han, 2024). These elements collectively form the basis for residents' emotional engagement in sustainable initiatives.

Despite this understanding, some scholars emphasize the need for a deeper exploration of service innovation performance from the residents' perspective (Kabus, 2022). They advocate for a refined understanding of how place attachment and generativity translate into motivation, perceived value, and engagement behaviors (Wang, 2023). This insight is essential for effectively leveraging the factors to encourage residents' support for service innovation in wellness tourism.

Service innovation represents organizations' care about future production capacity and engagement in practical activities that benefit long-term sustainable development. Service innovation motivates community residents' intentions to cooperate in ways that preserve their cultural environment and their concern for valuable, sustainable utilization for generations. This dynamic motivation creates an essential link between the generative-based community concept and resident engagement in sustainable development. However, earlier studies have examined the influence of service innovation in the wellness tourism sector, such as destination attraction (Andreu, 2021), industry performance (Li_a, 2023; Li_c, 2023), employment of community residents (Page, 2017), and sustainable development of tourism communities (Esfandiari, 2020; Wang, 2024). There is limited investigation into the relationship between generative-based community engagement and service innovation from residents' perspective.

This study seeks to develop and validate a framework examining different factors that affect service innovation from residents' perspectives to fill this research gap. The research poses three key questions: (1) How does place attachment influence generativity? (2) In what ways does generativity influence residents' engagement in service innovation? (3) What strategies can be implemented to manage a generative-based community group to enhance sustainable development effectively? This research takes Gongtan Town, in southeastern Chongqing, a small town with a thousand-year history surrounded by beautiful mountain scenery and the Wujiang River, as a case study to explore these questions. Specifically, this study analyses the questionnaire survey data from residents through a comprehensive examination, employing diverse methodologies such as structural equation modeling (SEM) and fuzzy-set qualitative comparative analysis (fsQCA) to provide a nuanced understanding of the intricate relationships and potential synergies between the variables. This research advances theoretical insights into generative-based service innovation through a sustainability lens. Moreover, the findings offer critical guidance for practitioners and policymakers dedicated to enhancing and balancing sustainable development.

This overview investigates the realm of service innovation, emphasizing the principal theoretical frameworks identified in the literature. It is succeeded by meticulously describing the research methodologies employed, guaranteeing clarity and the possibility of replication. Afterward, the results section offers an extensive analysis utilizing SEM and fsQCA. Lastly, the discussion integrates these findings into the broader research context. The paper concludes this research by proposing future suggestions for service innovation, sustainable attempts, and implementation activities.

2. Literature Review

2.1 Service Innovation Theory

Innovation is the creation of a new product or process, the improvement of an existing product or process, or a combination thereof (MSTIA, 2018). It represents a substantial departure from the unit's prior products or processes. It is available to potential users (for products) or implemented in practice (for processes) by the respective enterprises (units). According to Tidd (2003), innovation entails improving or redeveloping products and services for organizational survival. It manifests as endowing products with new value or providing unique service experiences, such as through business process innovation. Under the service-dominant logic (SDL), services are the basis of all economic exchanges, and products are the carriers for providing services. Therefore, services are not merely comparable to products; rather, services represent the fundamental basis of exchange, constituting an expanded

exchange concept. Building on this foundation, service innovation theory has evolved from a focus on single-dimensional innovation towards a framework emphasizing value co-creation within a service ecosystem (Tran, 2021). In the research of the service innovation ecosystem, researchers must analyze not only dynamic capabilities (Helfat, 2003) derived from the resource-based view (Wernerfelt, 1984), but also incorporate perspectives encompassing customers, competitors, inter-functional coordination, and market orientation (Chikerema, 2021). Moreover, the growing prominence of service-dominant logic and the knowledge-based view within service innovation research has spurred significant interest among researchers at individual, firm, and country levels (Chopra, 2021). Although the enablers of service innovation have been extensively summarized, there is a growing interest in customer value (Heymann, 2019), aspects of enterprise management, employee engagement (Schultz, 2019), and community engagement (Anthony, 2024) have been recognized and identified as critical drivers of service innovation. Studies in management research underscore the significance of identifying essential factors and central themes from various angles. It includes developing new services, implementing service innovations, sustainability-driven approaches, and the influence of social media and information technology on digitization and service innovation (Peixoto, 2023).

2.2 Generativity Theory

Generativity is an individual's desire to establish connections with and mentor the next generations during mid-adulthood (Escalona, 1951). Kotre (1984) expanded this concept, proposing that generativity reflects a person's wish to invest in daily life and activities that will benefit themselves and others beyond their death, a drive that emerges throughout an individual's lifespan. In a cross-cultural study, some scholars identified various motivational sources and features of generativity, including cultural expectations, inner desires, concern for others, specific beliefs, commitments, actions, and storytelling (McAdams, 1992). Moreover, Gergen described generativity as the individual's capacity to challenge the status quo, transform reality, and initiate change (Gergen, 2009). At its core, generativity encompasses the ability to originate, produce, or procreate, involving rejuvenating, reconfiguring, reframing, and revolutionizing processes. Rejuvenating and reconfiguring involve generating new configurations or altering existing possibilities, while reframing pertains to how we perceive and interpret the world. Conversely, revolution entails challenging established norms and practices. Hofer has proposed and explored positive relationships between inner desire, generative concern, and generative commitment in his work (e.g., Hofer, 2008, 2016, 2020). Subsequently, Hofer conducted a cross-cultural study on successful aging. His research proposes that specific reminiscence functions (e.g., using experience to solve current problems) motivate generative behavior, and demonstrates the universal effects of implicit motive identity commitment on well-being (Hofer, 2024). Moreover, the components of generativity have been conceptualized and examined in specific domains and more general goals (e.g., community volunteerism), forms of engagement, and perceptions of achievement (Villar, 2024). This conceptualization aligns with the perspective of the present study, providing a theoretical foundation and identifying key antecedents for generative-based community sustainable development.

2.3 Place Attachment and Generativity

Place offers individuals stability and a sense of meaning in their lives (Hallak, 2013). The interactions between people and their environments foster emotional connections, reinforcing that place is not merely a physical location but a significant center of human existence (Relph, 1976; Lewicka, 2011). Place attachment, a concept central to human geography and environmental psychology (Gu, 2008), refers to the positive emotional bond individuals develop with a particular place. Stokols (1981) suggested that place attachment comprises two subdomains: place dependence, which reflects the functional role of a place in helping individuals meet their needs and achieve their goals, and place identity, which encompasses a resident's beliefs and sense of self related to a specific location (Jorgensen, 2001). This duality suggests that place attachment motivates generative actions aimed at maintaining the place's current state (Han, 2024). Furthermore, place attachment can enhance tourism communities' social capital and cohesion, foster a sense of place stability among residents, as well as promote a positive awareness and desire to transmit culture and history (Zhang, 2014). Place attachment forms the essence of personal identity and pride in one's place (Luo, 2020). Thus, place attachment is an essential source of regional economic resilience for tourism communities facing long-term structural change, particularly in historical towns possessing millennia-old heritage, which is the focus of this research. Based on these insights, here propose the following two hypotheses:

H1. Place-Based Identity has a positive impact on Resident Generation Capacity.

H2. Place-Based Dependence has a positive impact on Resident Generation Capacity.

2.4 Generativity and Resident Engagement

Engagement has traditionally been examined from customers' interactions with focal objects, such as firms or brands (Viglia, 2018). However, there is an emerging recognition that residents now have new opportunities to engage meaningfully in municipal decision-making processes related to community development (Friedman, 2023). Insights from residents who are actively involved in Resident Associations (RAs), particularly those serving as executive officers (RAEMs) can highlight strategies to make critical knowledge more accessible to the community within community-based sustainable development frameworks. This enhanced accessibility strengthens residents' capacity to provide input and participate in local issues (Butt, 2021). Resident engagement is a complex and long-term process fostering both community members' internal connections and external societal relationships. Johnston (2024) proposes that such engagement promotes the sharing, increases awareness, improves access, and cultivates a social orientation (Johnston, 2024). Generativity fosters shared responsibility by promoting individual participation in social learning and experiential engagement. Research has shown that generativity positively influences resident engagement (Guo, 2018). For instance, Luo (2020) examined how generativity affects residents' hopes and expectations regarding the heritage site's conservation and restoration in tourism destinations. This finding implies that fostering generativity toward future generations influences residents' value perceptions, thereby affecting their capabilities, motivations, and behaviors concerning engagement and development initiatives. Therefore, the following hypothesis is proposed.

H3. Generativity toward future generations positively influences residents' engagement behaviors.

2.5 Generativity, Resident Engagement, and Service Innovation

Service innovation is driven by various factors. For residents, the ultimate goal is enhancing quality of life while achieving environmental sustainability. Previous studies indicate that community-based sustainable development is influenced by residents' perceptions and value co-creation among tourism companies, residents, tourists, and employees (Li_a, 2023; Li_c, 2023). For instance, Lee (2013) proposed that resident engagement enhances perceived tourism development benefits, positively influencing residents' engagement behavior. Subsequent studies corroborate this (Luo, 2020; Kim, 2021), demonstrating that residents` concerns about the future impacts of cultural and environmental protection on their living environment significantly shape their engagement behavior. Therefore, the following hypothesis is proposed:

H4. Generativity positively influences service innovation performance.

This hypothesis suggests that fostering generativity, which is residents` sense of responsibility for future generations, can improve service innovation performance, aligning with community development goals. Community sustainable development is also driven by resident engagement behavior, which stems from their motivation, value perception, and capabilities (Han, 2024). Furthermore, a correlation exists between residents` motivation, value perception, and their support for environmental protection policies (Sharpe, 2021). Indeed, individual concern for cultural/ environmental protection and engagement in service innovation originate from generative motives and place attachment (Brown, 2014), aligning naturally with community-based sustainable development principles. Therefore, the following hypothesis is proposed:

H5. Residents' engagement positively influences service innovation performance.

Collectively, these hypotheses suggest that enhancing residents` motivation, value perception, and place attachment can lead to more significant support for cultural and environmental protection policies, as well as greater involvement in service innovation efforts, ultimately achieving sustainable development outcomes.

2.6 Moderating Effect of Digital Technology and Knowledge Management System

When developing the concept of community engagement, RAs and RAEMs analyzed the progression of knowledge formation within the community. Scholars studying community engagement posit that resident engagement drives digital technology innovation through generative (Hopkins, 2011). However, research indicates that variations in individual engagement can stem from the use of digital technology and knowledge management systems. For instance, digital technology enhances communication and collaboration among residents, tourists, and stakeholders. This facilitates the co-creation process and enables more effective sharing of knowledge and resources. Knowledge management systems further support individuals by providing access to relevant information and expertise, empowering them to engage more meaningfully in cultural, environmental protection, and service innovation initiatives. These tools reshape how individuals interact with their environment and each other, influencing engagement levels wihthout geographical constraints (Cennamo, 2020). Therefore, the following hypothesis is proposed:

H6. Digital technology positively influences resident engagement.

Research also reveals knowledge management differences in resident engagement (Li_b, 2023). Schmitt (2020) proposed that knowledge management systems promote community knowledge transactions grounded in generativity. Muniz (2021) found these systems enhance residents` communication capabilities with tourists. Collectively, these studies demonstrate that knowledge management systems as external environmental conditions, facilitate community knowledge flow, thereby influencing the generativity-based service ecosystem of communities. Thus, the hypothesis regarding the impact of knowledge management systems on resident behavior is as follows: The research model of this research is shown in Figure 1.

H7. knowledge management positively influences resident engagement.

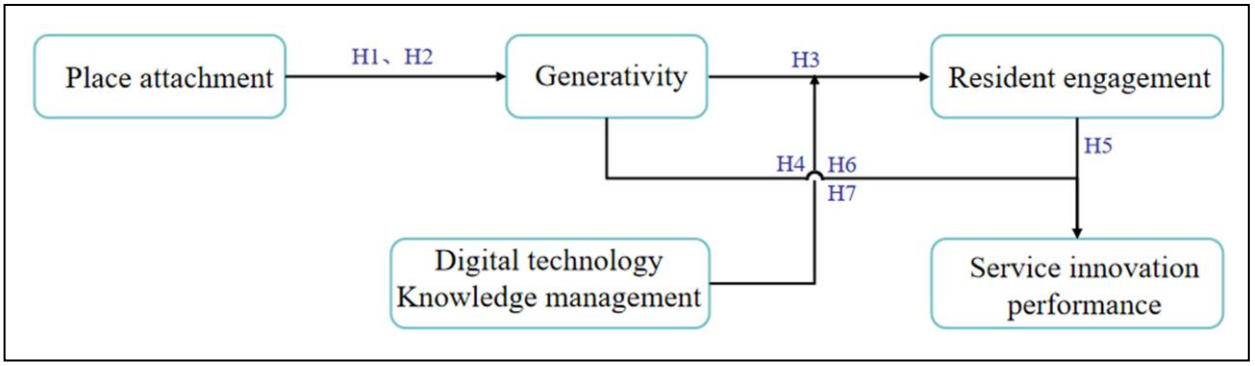

Figure 1. The research model of this research

3. Materials and Methods

3.1 The Research Site

Located in Youyang County, Chongqing Municipality, Gongtan Town exemplifies China`s cultural-based wellness tourism model. Renowned for its profound cultural heritage, spectacular natural landscapes, and distinctive local traditions, the town has emerged as a premier destination for culturally immersive wellness experiences. Visitors engage with traditional Chinese therapeutic, including herbal medicine, acupuncture, and tai chi, all of which have been integrated into structured wellness programs targeting holistic mind-body health. Complementary immersive cultural offerings, such as participation in indigenous festivals, exploration of historical sites, and gastronomic experiences with regional cuisine, collectively constitute multidimensional wellness encounters.

Central to Gongtan`s tourism strategy is its commitment to preserving cultural authenticity and ecological integrity. Local communities actively maintain cultural continuity while advancing sustainable tourism practices. This dual approach not only enhances visitor experiences but also cultivates resident pride and place attachment, consequently strengthening grassroots support for cultural heritage conservation and sustainable development initiatives. Therefore, Gongtan Town demonstrates how the strategic integration of wellness practices, cultural preservation, and community co-creation establishes a sustainable paradigm for cultural wellness tourism. This model contributes substantively to regional sustainable development goals while offering transferable insights for China`s broader tourism industry transformation.

3.2 Methods

This research employed a mixed-methods approach to investigate factors influencing service innovation promotion. Initially, this research conducted a quantitative survey to collect residents' perspectives, which aimed to test a conceptual model predicting residents' support for service innovation. Subsequently, expert interviews were conducted to understand better the interactions among variables and the mechanisms. More detailed descriptions of each method can be found as follows.

3.3 Quantitative Survey

This research utilized a quantitative approach through a questionnaire survey administered to residents of Gongtan town, which consisted solely of closed-ended questions. The survey items assessed various dimensions relevant to service innovation of wellness tourism, including place attachment, generativity, factors influencing resident

engagement, and service innovation performance. Place attachment was measured through two dimensions: place-based identity (comprising four items) and place-based dependency (also four items), following the frameworks established by Ramkissoon et al. (2013) and Chen et al. (2024). Generativity was evaluated in four parts, drawing on the work of Urien et al. (2011) and Wells et al. (2016). Many items measure the level of engagement among residents based on the methodology outlined by Wang (2020). The category of service innovation performance encompassed a range of indicators, including financial, customer-related, and internal indicators, with twelve items adapted from Storey & Kelly (2002) and Hsueh et al. (2013). This research utilized a five-point Likert scale (1 = strongly disagree to 5 = strongly agree) to rate the survey items, and a comprehensive overview of the items can be found in Appendix Table 1.

A professional translator translated all initial English-language items into Chinese to enhance the questionnaire's accuracy and reliability. Subsequently, a back-translation was performed to compare the translated Chinese version with the original English items. Three master`s students specializing in tourism management reviewed the items to assess their appropriateness for measuring individual support for service innovation. Following this, seven undergraduate students completed a preliminary survey to evaluate their understanding of the questions and the time required to complete the questionnaire. This process ensures the questionnaire`s comprehensibility.

3.4 Sampling and Data Collection

From July 10 to September 24, 2024, researchers employed a snowball sampling technique using the Raosoft sample size calculator to recruit residents of Gongtan town for this study (Goldenberg, 2009; Stevens, 2013). The calculator determined that a sample size of 376 respondents would achieve a 5% margin of error at a 95% confidence level with a 50% response distribution, based on the town's population of 17,665 residents. Three experienced researchers explained the study`s purpose to potential participants. Prior to the survey, all participants received a consent form detailing key information. They were informed about the study`s objectives, the voluntary nature of participation, and their right to withdraw at any time without consequence. Participants were assured of confidentiality and privacy throughout the research process. Information was also provided regarding the number of questions and the estimated completion time. Researchers emphasized that all data would remain private and be used exclusively for academic purposes. Finally, participants were informed that they could access the research findings upon the study's conclusion. This informed consent process aimed to build trust and facilitate voluntary participation. A total of 455 residents participated in the survey. The actual completion time was significantly shorter than anticipated, leading to the exclusion of responses from individuals who identified as non-residents of Gongtan town. Consequently, the study yielded 408 valid questionnaires, resulting in an effective response rate of 89.6%.

3.5 Data Analysis

As shown in table 1, the sample had a higher proportion of males, likely reflecting the prevalence of manual workers and small business entrepreneurs along the Wujiang River. The age distribution was primarily skewed toward older adults, particularly those aged 51-60, while most respondents had attained a secondary school education. The reported annual income predominantly clustered around 80,000 yuan (approximately US$11,320), consistent with the living standards of the town`s older residents and students. Structural Equation Modeling (SEM) has gained increasing recognition as a methodology for data analysis in social science empirical research (Chatterjee, 2020). Accordingly, this study employs SEM to empirically test the proposed model. Complementing the SEM analysis, this research also utilizes Qualitative Comparative Analysis (QCA). QCA is an empirical method grounded in Boolean algebra and fuzzy set theory (Ragin, 2009) designed to examine causal complexity. Unlike purely correlational approaches, QCA analyzes the relationships between conditions and outcomes from a configurational perspective (Senyo, 2021). It is particularly suited for identifying the combinations of conditions (causal recipes) that lead to a specific outcome, especially in studies with small to intermediate sample sizes (Ragin, 2009). QCA helps elucidate the essential factors contributing to events and explores the complex causal relationships among them (Ragin, 2009). Common variants include crisp-set QCA (csQCA), fuzzy-set QCA (fsQCA), and multi-value QCA (mvQCA) (Ragin, 2009).

Table 1. Demographic Profile

Characteristics		Num.	Per.	Characteristics		Num.	Per.
Gender	male	229	56.13%	Education	primary school	77	18.87%
	female	179	43.87%		secondary school	260	63.73%
Age	less than 18	61	14.95%		undergraduate	45	11.03%
	18-30	113	27.7%		post-/graduate	26	6.37%
	31-40	37	9.07%	Employment	student	89	21.81%
	41-50	55	13.48%		unemployed	36	8.82%
	51-60	119	29.17%		manual worker	15	3.68%
	more than 60	23	5.64%		administrative	32	7.84%
Income	less than 8 [a]	233	57.11%		business entrepreneurs	148	36.27%
	8-10 [a]	69	16.91%		tourism employee	16	3.92%
	11-20 [a]	61	14.95%		retired	72	17.65%
	more than 20 [a]	45	11.03%		other	0	0%

Notes: a represents RMB 10,000/year income.

4. Results

The measurement model was validated using Confirmatory Factor Analysis (CFA). Subsequently, the data were analyzed using Structural Equation Modeling (SEM) to estimate both the measurement and structural models.

In addition, the fsQCA analyses the same data to identify the configurations of antecedent conditions leading to the specified outcomes (Ragin, 2009; Hair, 2019). Additionally, fuzzy-set Qualitative Comparative Analysis (fsQCA) was applied to the same dataset to identify configurations of antecedent conditions leading to the specified outcomes (Ragin, 2009; Hair et al., 2019).

4.1 CFA Results

The seven-factor CFA measurement model demonstrated an acceptable fit to the data. As proposed by Hair et al. (2011), goodness-of-fit indices fell within acceptable thresholds. The chi-square (χ^2) statistic was significant (χ^2 = 1124.366, $\rho < .001$), which is common with larger sample sizes and should be interpreted alongside other indices. Supporting good model fit, the normed chi-square (χ^2/df) ratio is 1.103, the Root Mean Square Error of Approximation (RMSEA) score is 0.018, along with the Standardized Root Mean Square Residual (SRMR) and Root Mean Square Residual (RMR) values of 0.016 and 0.05. All values were below their respective recommended thresholds for good fit (e.g., RMSEA < 0.05, SRMR < 0.08, RMR < 0.05). Further evidence of adequate fit was provided by the Goodness of Fit Index (GFI = 0.91), Adjusted Goodness of Fit Index (AGFI = 0.905), Normed Fit Index (NFI = 0.901), Tucker-Lewis Index (TLI = 0.989), and Comparative Fit Index (CFI = 0.99), all meeting or exceeding conventional standards for acceptable model fit (Byrne, 2001).

4.2 PLS-SEM Analysis Results

The Kaiser-Meyer-Olkin (KMO) measure yielded a 0.767 value, within 0.7 and 0.8, signifying suitable data for factor analysis (See Appendix Table 2). Indicator reliability was confirmed as the standardized factor loadings (SFL) for all items exceeded 0.68, surpassing the recommended threshold of 0.6 (Hair et al., 2019). Internal consistency reliability was assessed using both Cronbach's alpha (α = 0.888) and composite reliability (CR). Both values exceeded 0.8 (Cronbach's alpha) and 0.7 (CR) for all constructs (see Table 2), indicating high reliability (Fornell & Larcker, 1981; Hair et al., 2019). Convergent validity was established as the average variance extracted (AVE) for each construct exceeded the recommended threshold of 0.5 (Hair et al., 2019).

Table 2. The Assessment Indicator and Discriminant Validity

Items	SFL	CA	CR	AVE	Items	SFL	CA	CR	AVE
PAI1	0.736	0.886	0.901	0.565	GEN1	0.756	0.883	0.953	0.576
PAI2	0.767				GEN2	0.757			
PAI3	0.761				GEN3	0.762			
PAI4	0.724				GEN4	0.773			
PAD1	0.779				GEN5	0.717			
PAD2	0.750				GEN6	0.791			
PAD3	0.743				GEN7	0.821			
CNN1	0.787	0.887	0.893	0.582	GEN8	0.766			
CNN2	0.776				GEN9	0.730			
CNN3	0.721				GEN10	0.739			
ATT1	0.787				GEN11	0.762			
ATT2	0.759				GEN12	0.764			
ATT3	0.743				GEN13	0.726			
SIF1	0.696	0.885	0.929	0.544	GEN14	0.740			
SIF2	0.758				GEN15	0.770			
SIF3	0.773				DT1	0.699	0.887	0.817	0.527
SIC1	0.745				DT2	0.785			
SIC2	0.726				DT3	0.71			
SIC3	0.719				DT4	0.708			
SIC4	0.734				KM1	0.680	0.888	0.821	0.534
SII1	0.713				KM2	0.741			
SII2	0.726				KM3	0.749			
SII3	0.751				KM4	0.752			
SII4	0.771								

Discriminant validity was assessed using the Fornell-Larcker criterion (Fornell & Larcker, 1981). As shown in Table3, the square root of the AVE for each construct was greater than its correlations with other constructs, confirming the discriminant validity of the measurement model (Hair et al., 2019).

Table 3. The Square root of AVE [b]

	PA	GE	RE	DT	KM	SIP
PA	0.752					
GE	0.035	0.759				
RE	0.069	-0.006	0.763			
DT	0.054	0.092	-0.115	0.726		
KM	-0.067	0.045	0.037	0.028	0.731	
SIP	0.012	0.025	-0.069	0.083	-0.011	0.738

Notes: The values b represent each construct's square root of the AVE. The square root of the AVE is greater than the correlations, confirming validity.

4.3 Common Method Bias

This study assessed potential for Common Method Bias (CMB) using Harman's single-factor test, following Podsakoff et al.'s methodological guidance. As shown in Table 4, the first factor accounted for 19.464% of the total variance. This value falls below the critical threshold of 40%, indicating that CMB is unlikely to compromise the validity of our results.

Table 4. Harman's one-factor test results

Component	Total	Initial eigenvalues		Extraction Sums of Squared Loading		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.148	19.464	19.464	9.148	19.464	19.464
2	6.543	13.92	33.384			
3	4.555	9.692	43.076			
4	3.891	8.28	51.356			
5	2.665	5.671	57.027			
6	2.436	5.182	62.209			

4.4 Structural Model

The findings from the SEM analysis demonstrate a robust fit for the proposed model, as indicated by various fit in-dices: $\chi^2/df = 1.774$, GFI = 0.906, CFI = 0.989, NFI = 0.900, RMSEA = 0.009, SRMR = 0.052. Together, these indices indicate that the model adequately represents the data. The final structural model is depicted in Figure 2. The analysis reveals that both place identity ($\beta = 0.182$, $\rho < 0.05$) and place dependence ($\beta = 0.117$, $\rho < 0.05$) significantly influence generativity, thereby providing support for Hypotheses 1 (H1) and 2 (H2). In contrast, while generativity ($\beta = 0.231$, $\rho < 0.001$) and digital technology ($\beta = 0.265$, $\rho < 0.001$) showed relationships with resident engagement, the relationship between knowledge management ($\beta = 0.055$, $\rho > 0.05$) and resident engagement did not reach statistical significance. This lack of significance may be attributable to the absence of an effective knowledge management system in Gongtan Town. Additionally, residents communicate information to tourists based on personal experiences and memory rather than structured knowledge transfer. Consequently, Hypotheses 3 (H3) and 6 (H6) are supported, while Hypothesis 7 (H7) is not. Furthermore, regarding the direct impact of individual psychological factors and behavioral characteristics on service innovation performance, the results presented in Figure 2 indicate that both generativity ($\beta = 0.215$, $\rho < 0.01$) and resident engagement ($\beta = 0.223$, $\rho < 0.001$) significantly contribute to the outcome variable. Thus, Hypotheses 4 (H4) and 5 (H5) are substantiated.

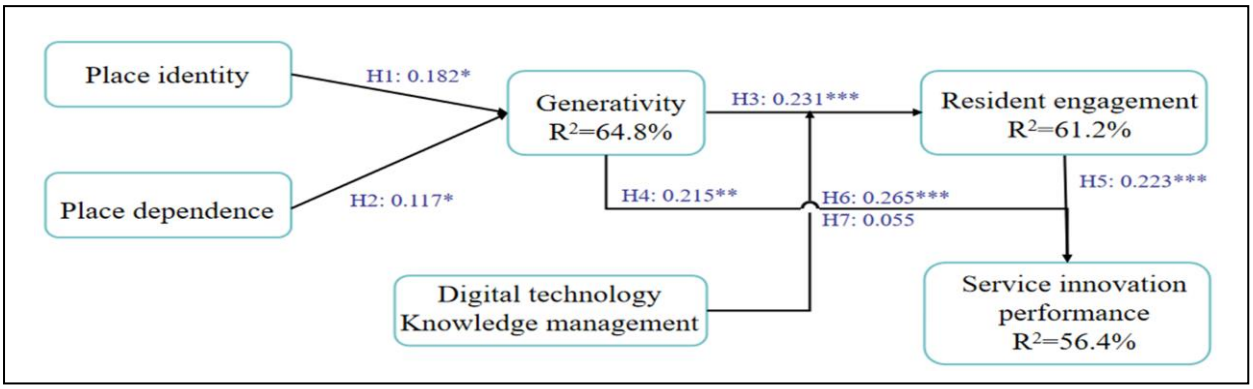

Figure 2. The structural model results

*$p < .05$, **$p < .01$, ***$p < .001$.

4.5 fsQCA Analysis Results

This research utilizes fsQCA to explore the causal processes that yield specific outcomes and to address causal complexity. The analysis follows six key steps. First is model construction, which involves establishing the theoretical framework and identifying relevant causal factors. The second step is sampling, which involves selecting diverse cases to provide a robust analysis. Third is data calibration, which involves converting raw data into fuzzy sets to accurately reflect variable membership scores. Next is necessary condition analysis, which involves

identifying conditions that must exist for the outcome to occur. Fifth is sufficient condition analysis, which involves checking for combinations of sufficient causal conditions that produce the desired outcome. Finally, the last step is result interpretation, which involves analyzing and contextualizing the results to draw meaningful conclusions about the relationships among causal factors. By following these steps, the study aims to reveal the intricate configurations contributing to successful outcomes.

4.6 Calibration

This study employs fsQCA 4.0 software to calibrate the data. The dataset is transformed into fuzzy sets before analysis. In this calibration process, 0 indicates full non-membership in the set, while 1 signifies full membership.

4.7 Necessary Conditions Analysis

The necessary conditions analysis checks the factors essential for producing a specific outcome. According to previous studies, a consistency value exceeding 0.9 indicates that a condition is necessary for the corresponding outcome variable (Ragin, 2009). As shown in Table 5, no factors satisfy this criterion for high quality of service innovation performance (SIP) or for low quality (~SIP).

Table 5. Analysis of Necessary Conditions

Outcome	**SIP (Service innovation performance)**		**~SIP (Negation of Service innovation performance)**	
Conditions	**Consistency**	**Coverage**	**Consistency**	**Coverage**
PA	0.727852	0.671478	0.661988	0.631553
~PA	0.655491	0.684935	0.655646	0.611135
GE	0.649602	0.672783	0.674673	0.623313
~GE	0.636292	0.686771	0.645820	0.621803
RE	0.634854	0.655998	0.677636	0.624611
~RE	0.636709	0.688876	0.626794	0.604936
DT	0.883037	0.711478	0.650291	0.604241
~DT	0.620061	0.665291	0.689489	0.659917
KM	0.874736	0.693155	0.668331	0.612453
~KM	0.622751	0.677925	0.665160	0.645918

4.8 Result Interpretation

This study employs a truth table to systematically show the various conditions and combinations that may cause the desired outcome, specifically, the high quality of service innovation performance (SIP). Constructing this truth table is a prerequisite for prioritizing core factors and identifying the most plausible combinations associated with SIP. In this analysis, the frequency threshold for consistency is conventionally set at 0.8. Rows that do not meet this threshold are coded as one and subsequently eliminated from further consideration. For the raw consistency, a threshold of 0.8 is established, while the PRI consistency is set at 0.7.

4.9 Sufficient Conditions Analysis

The standard analysis conducted using fsQCA software yields complex, intermediate, and simple solutions that elucidate the combinations of conditions leading to the high quality of SIP and the negative result, as summarized in Table 6. It is important to emphasize that no individual condition is sufficient to achieve high-quality SIP. Furthermore, the consistency scores for all three identified pathways exceed the threshold of 0.8, indicating that each variable contributes sufficiently to the outcome. This study employs a truth table to systematically show the various conditions and combinations that may cause the desired outcome, specifically, the high quality of SIP. Constructing this truth table is a prerequisite for prioritizing core factors and identifying the most plausible combinations implicated in SIP. In this analysis, the frequency threshold for consistency is conventionally set at 0.8. Rows that do not meet this threshold are coded as one and subsequently eliminated from further consideration. For the raw consistency, a threshold of 0.8 is established, while the PRI consistency is set at 0.7.

Table 6. Solutions for the negation of outcome

Conditions	SIP			~SIP	
	a	b	c	d	e
PA	●	●	⊗	⊗	●
GE	⊗	·	⊗		●
RE	·	⊗	·	⊗	⊗
DT		●	●	●	⊗
KM	●	●		●	⊗
Raw coverage	0.602495	0.403747	0.406065	0.326471	0.246621
Unique coverage	0.054767	0.056019	0.102393	0.169006	0.089156
Consistency	0.876276	0.856209	0.869565	0.808677	0.858332
Solution consistency	0.560907			0.515627	
Solution coverage	0.846377			0.791349	

Notes: ● or ● is the presence of a condition. ⊗ or ⊗ is the absence of a condition. A "blank" entry denotes that the causal condition in the configuration can be both present and absent. Furthermore, ● or ⊗ is classified as a core condition, while ● or ⊗ a peripheral condition.

4.10 High Quality of SIP Results

As illustrated in Table 6, place attachment, digital technology, and knowledge management emerge as core conditions across multiple configurations. This finding underscores residents' motivation to drive wellness tourism service innovation, with digital technology and knowledge management being essential for enhancing SIP. Solution a demonstrates that when place attachment and knowledge management serve as core conditions, while generativity and resident engagement are absent as peripheral conditions, high-quality SIP can be achieved. Solution b suggests that place attachment, digital technology, knowledge management, and generativity can collaboratively yield favorable outcomes for SIP. Solution c reveals that prioritizing digital technology as the core condition, supplemented by resident engagement as a peripheral condition while excluding other factors, sufficiently achieves significant adoption in service innovation practices. The fsQCA results show that the presence or absence of a single factor is not necessary for achieving high-quality SIP. In the three configuration paths analyzed, no individual element is consistently present or absent across all cases. Furthermore, knowledge management emerges as a core condition in solutions a and b. In contrast, the SEM analysis indicates that the impact of knowledge management on SIP is significantly mediated by resident engagement. This pattern is also observed with the digital technology variable. These findings highlight that fsQCA provides a complementary perspective to the net effect approach commonly utilized in SEM, emphasizing the complex interplay of conditions that influence service innovation performance.

4.11 Low Quality of SIP Results

In contrast to traditional SEM and regression model methods, fsQCA is particularly adept at addressing causal asymmetry (Ragin, 2009). This study applied the same threshold settings to investigate the conditions combined to negate the outcome (~SIP) in Table 6. It indicates that two configurations are sufficient and empirically relevant in explaining it. It is supported by the consistency and coverage of each configuration, which exceeds 0.8. Moreover, these configurations collectively account for 79% of the sample, demonstrating a significant association with low quality of SIP. Upon examining Table 6, it becomes clear that two configurations contribute to negating low-quality SIP. In the first configuration (solution d), place attachment and resident engagement are absent as core conditions. Meanwhile, the second configuration (solution e) highlights the absence of resident engagement, digital technology, and knowledge management as core conditions. These findings illustrate an asymmetrical relationship with low-quality SIP, whereby the absence of these critical factors uniquely contributes to diminished performance. This series of results further underscores the phenomenon of causal asymmetry, indicating that the lack of certain conditions, rather than the presence of neutral factors, plays a significant role in adversely affecting SIP.

5. Findings and Discussion

5.1 Findings

5.1.1 The Antecedents of Resident Engagement

This study investigates the antecedents of resident engagement (RE) and its role in fostering service innovation performance (SIP) within wellness tourism destinations. While prior research predominantly emphasizes RE`s positive outcomes, understanding its root causes is essential for strategic planning and implementation. RE behavior stems from positive emotional states, catalyzing active participation in environmental protection, cultural heritage enhancement, service innovation, and economic development. Building on existing literature, this study establishes both outcomes and precursors of effective RE. SEM analysis reveals four key antecedents significantly influencing RE. First is place attachment. Residents' emotional bonds to their locality foster engagement, as strong identity and belonging prompt proactive contributions to community initiatives. Second is generativity. Residents' motivation to contribute to community sustainability reinforces engagement efforts. Third is digital technology. Prevalent digital tools facilitate communication and knowledge sharing, creating interactive engagement platforms. Last is knowledge management. Effective systems enhance information flow, empowering meaningful community participation (Zhang, 2014; Li, 2023). Complementing these findings, fsQCA identifies distinct factor configurations yielding varying SIP outcomes. This approach highlights the complexity of RE dynamics and invites further optimization of these configurations across contexts.

5.1.2 Antecedents of Service Innovation Performance

This study integrates insights SEM and fsQCA to identify key antecedents of SIP in wellness tourism. Findings confirm RE is a significant determinant of the high quality of SIP. Conversely, the absence of RE is a fundamental condition linked to low-quality SIP outcomes. It emphasizes the essential role of fostering RE, aligning with prior research (Sharpe, 2021). Therefore, service innovation design must prioritize enhancing RE through two core mechanisms. Firstly, strengthening place attachment to foster ownership and regional pride (Luo, 2020). Secondly, leveraging generativity to build community-oriented networks that facilitate intergenerational communication (Bird, 2021). In this context, cultivating a distinctive and unique sense of place identity and place dependence is essential for instilling a sense of responsibility among residents.

Furthermore, digital technology is critical to information exchange within these generative community networks. Interestingly, while SEM analysis did not find a direct effect of knowledge management on SIP, diverging from previous studies (Hopkins, 2011), the fsQCA results reveal a more nuanced relationship. Although these factors may not act as primary determinants in isolation, they become critical when combined with other variables. It suggests integrating digital technology and effective knowledge management under specific conditions, such as place attachment and generativity, can significantly enhance RE (Cennamo, 2020). The fsQCA analysis also indicates that the absence of digital technology and knowledge management constitutes a core condition for low-quality SIP. This observation raises considerations regarding the influence of individual behaviors on SIP. Residents may be less inclined to engage in service innovation initiatives without access to valuable, engaging information, mainly through digital platforms and social media. Therefore, it is essential to prioritize the development of media and platforms that facilitate effective information transmission. Service innovation designs should focus on precise delivery and communication strategies, particularly regarding intergenerational knowledge flow and engagement, to ensure that residents are well-informed and motivated to participate.

In summary, the SEM analysis results indicate that place attachment, generativity, and digital technology significantly influence RE, ultimately enhancing the quality of SIP. This analysis also identifies predictive factors for SIP within wellness tourism destinations, including place attachment, generativity, digital technology, knowledge management, and resident engagement. Moreover, the findings from the fsQCA complement the SEM results by providing deeper insights into the complex causal relationships at play. The fsQCA identifies three configurations associated with high SIP and two configurations associated with low SIP, which are not captured by the SEM approach. It illustrates the value of considering combinations of conditions to understand SIP's intricacies better. A comparative analysis with existing literature reveals that some findings align with established research, under-scoring that scholars widely recognize certain factors as critical. However, notable discrepancies arise regarding the impact of digital technology and knowledge management on SIP. These differences may stem from the specific context of this study and a more comprehensive analytical method. Furthermore, the impact of specific factors evolved alongside community social network development. Thus, this research aims to provide new insights into SIP while advocating for establishing a generative-based community model, emphasizing the significance of resident engagement in fostering service innovation.

5.2 Theoretical Implications

This research advances service innovation theory in generative-based community wellness tourism through three key contributions. Firstly, it addresses a notable gap in the existing literature, which has not systematically explored service innovation performance through the lens of resident engagement. By linking sustainable development to the concept of generative communities, this study enhances the understanding of the factors influencing service innovation. The findings confirm the substantial roles of place attachment and generativity in shaping residents` sense of responsibility, thereby influencing service innovation performance outcomes within the wellness tourism context. It enriches the theoretical discourse surrounding resident engagement and SIP. Secondly, this study adopts a holistic and integrative framework for examining the relationship, contributing to the broader literature. A singular perspective is often insufficient to capture the complexity of these relationships. Therefore, this study employs multiple theoretical lenses to understand SIP in this context comprehensively. While previous research has primarily addressed it from the viewpoints of customers or employees, this study distinguishes itself by focusing on resident engagement characteristics and integrating generativity theory to analyze the impact of place attachment. Additionally, by exploring the antecedents and incorporating service innovation theory, this research overcomes the limitations of using a single model, thereby deepening the understanding of generative-based community service innovation. Lastly, from a methodological standpoint, this study highlights the complementary strengths of SEM and fsQCA in investigating SIP. Many prior studies have relied on various methodologies, including multiple regression models, SEM, and PLS, to examine the net causal effects of individual antecedents on dependent variables. However, these approaches often lack a comprehensive understanding of the complex relationships involved. By employing fsQCA alongside SEM, this study reveals diverse configurations that illustrate causal conditions' complex, non-linear, and asymmetric effects on outcomes. This methodological innovation adds depth to the existing research, facilitating a more nuanced exploration of the underlying mechanisms at play.

5.3 Managerial Implications

This research offers valuable management insights to enhance SIP within generative-based communities. Firstly, the findings illustrate that the community environment influences residents' motivation. When residents feel a sense of ownership and attachment to their community, they are more likely to actively identify their roles, take pride in their contributions, and become more responsible. This fosters a strong focus on activities related to service innovation, significantly boosting resident engagement in the sustainable development of wellness tourism destination. To capitalize on this, wellness tourism vendors should prioritize experiential aspects of service innovation. Collaborative initiatives aimed at enhancing residents` sense of place identity and dependence are vital, as is promoting awareness of service innovation through inter-generational outreach.

Secondly, the study underscores the close link between resident engagement and their receptiveness to service innovation information from external sources. While residents may not actively engage in service innovation primarily for information acquisition, insufficient information flow can lead to rejection of innovation efforts. Utilizing community-focused social media platforms can enable timely dissemination of service-related information, fostering trust and interest in innovation among residents. Therefore, enhancing the efficiency of social media use and stabilizing the community's knowledge management system are critical. Consequently, managers should develop comprehensive strategies to manage community information flow through technology and management systems. These strategies will enhance resident engagement and build a more informed community capable of supporting service innovations.

5.4 Limitations and Future Directions

This research predominantly focused on residents as the primary actors in service innovation performance, while existing literature has highlighted the importance of multi-actor engagement, including customers and employees. Future studies could therefore seek to integrate these multi-actor dynamics to explore a more comprehensive set of influencing factors, thereby addressing a limitations of the current research. A second limitation is that this study is geographically limited to Gongtan town and does not examine relationships across other cities or countries. Variations in cultural, social, and economic contexts may lead to different engagement patterns and outcomes. Thus, future research should aim to conduct surveys across multiple cities and countries to facilitate a broader and more universal understanding, enhancing the applicability of the findings to diverse settings.

6. Conclusions

This study highlights the transformative role of service innovation in advancing sustainable development. Residents' engagement in service innovation is vital not only for enhancing their quality of life but also for safeguarding

cultural heritage for future generations. Despite the growing importance of this topic, research on resident engagement in service innovation is still in its early stages, necessitating further exploration. Building on generativity theory and service innovation theory, this study seeks to provide a nuanced understanding of resident engagement in service innovation performance within generative-based communities. Utilizing SEM and fsQCA, it examines both the direct effects and configuration pathways influencing SIP. These findings contribute to the theoretical discourse and offer practical implications for stakeholders in wellness tourism. By identifying key factors, this research provides actionable insights for practitioners aiming to foster resident engagement and promote sustainable tourism development. In summary, this study advances the understanding of how RE in service innovation can drive sustainable development in wellness tourism, highlighting the need for continued research to further explore this dynamic interplay.

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Authors' contributions

All authors contributed equally.

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