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The influence of rural tourism landscape perception on tourists' revisit intentions—a case study in Nangou village, China

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Rural tourism development has an important impact on optimizing the rural industrial structure and stimulating local economic growth. China's Rural Revitalization Strategy has promoted the development of rural tourism nationwide and emphasized Chinese characteristics in the process of local development. Based on the theoretical analysis of landscape perception, this article uses the external Landscape Perception→Satisfaction→Revisit Intention influence path as a theoretical research framework to construct a structural equation model to analyze the willingness of tourists to revisit rural tourism destinations. We selected Nangou Village, Yan'an City, Shaanxi Province, as a key model village for rural revitalization, and conducted an empirical analysis. The empirical analysis results show that landscape perception has a significant positive impact on satisfaction and revisit intention. Tourist satisfaction has a significant positive impact on revisit intention and plays an intermediary role between landscape perception and revisit intention. The five dimensions of natural ecology, historical culture, leisure recreation, research experience, and integral route under landscape perception are all significantly positively correlated with revisit intention, with historical culture and integral route having the greatest impact on landscape perception. The survey about Nangou Village verifies the relationship between landscape perception, satisfaction, and tourists' revisit intention. Based on the objective data analysis results, this study puts forward suggestions for optimizing Nangou Village's tourism landscapes and improving tourists' willingness to revisit from three aspects: deeply excavating rural historical and cultural resources, shaping the national red culture brand, and creating rural tourism boutique routes. It is hoped that the quantitative research method of landscape perception theory in Nangou Village can also provide a reference and inspiration for similar rural tourism planning.

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Introduction

Rural tourism, which originated in Europe in the mid-19th century (He, 2003), has constructed a new type of urban–rural relationship—the attachment of the cities to the countryside and the integration of the countryside with the city (Liu, 2018). In the 1990s, with the continuous improvement of China’s urbanization level, rural tourism began to rise in response to the demand for returning to nature and simplicity (Guo and Han, 2010). The main body of rural tourism (i.e., the main target) is urban residents, and its object is a combination of enjoying the agricultural ecological environment, agricultural production activities, and traditional folk customs. These are presented through tourism industry planning and landscape product design, which is based on the unique production, life, and ecological resources in the countryside, and integrates sightseeing, participation, leisure, vacation, recuperation, entertainment, shopping, and other tourism activities (Zhang, 2006).

Rural tourism development is of great significance for optimizing the industrial structure in rural areas, realizing the linked development of primary, secondary, and tertiary industries, increasing farmers’ income, stimulating rural economic development, and accelerating the integration of urban and rural areas (Lu et al., 2019). Since the implementation of the Rural Revitalization Strategy, China has taken increasing rural tourism as one of the important ways to achieve it (Yin and Li, 2018) and has launched construction projects nationwide.

Rural tourism in China started with self-organized agritainment, with farming experiences and sightseeing leisure as the main projects (Guo et al., 2000). Early studies have found that rural tourism projects embodying regional characteristics, folklore, and participatory farming activities present stronger competitive advantages in terms of higher rates of tourists’ participation and revisit rates (Wang et al., 2005). In the process of the “localization” of rural tourism in China, rural tourism has undergone a top-down evolution. Since the central government’s comprehensive deployment of new rural construction in 2006, national departments and local governments have issued a series of policies to promote the development of rural tourism, leisure agriculture, and culture, which have promoted the prosperity of diversified, high-quality, and distinctive practices of rural tourism nationwide (Ma et al., 2007). The rural revitalization strategy is a crucial national policy at present in China, driving various initiatives such as the construction of beautiful countryside and the development of the rural tourism industry. This policy has given rise to trends like the inheritance of local culture, the promotion of green ecological concepts, and the integration of industries. However, there are still challenges encountered, such as the homogenization in tourism development and the necessity to coordinate the development of industries, culture, ecology, and economy. Under the policy guidance of developing the agricultural economy and revitalizing national culture, China has explored rural tourism landscape products that fit the national cultural context and market demand of the country. Its characteristics are mainly reflected at two levels: First, it focuses on the integration of ethnic and regional cultural perspectives. Rural tourism planning focuses on identifying geographical cultural aspects (Sun et al., 2008), integrating traditional Chinese red culture and local characteristics (Huang, 2003) into tourism landscape products, and creating Chinese cultural brands. Second, we should focus on upgrading traditional sightseeing, farming, folk customs, and leisure tourism projects, develop in-depth experiential research projects, and create a comprehensive boutique tourism route (Chen et al., 2021).

With the prosperity of rural tourism, the related research has gradually increased. Zhai (2015) pointed out that unique cultural and geographical landscapes are not only objects that should be

emphasized and protected in the construction of the countryside but also important resources for the development of rural tourism. Zhang and Wang (2018) believed that the essence of rural tourism is the cultural experience of tourists in the countryside. Chen (2020) studied the “local sentiment” from an anthropological perspective as an important factor in promoting the development of China’s rural tourism market. Xu and Tang (2016) argued that local characteristics are essential for rural landscape construction, proposing the planning and construction strategy of “livability, suitability for industry, suitability for tourism, and suitability for culture”. Shi (2021) pointed out the significance of ecological aesthetics theory to the planning and design of rural tourism landscapes and proposed the strategy of integrating local characteristics with ecological features and improving the ecosystems through artistic techniques. Most of the research has focused on the development and upgrading strategies of Chinese rural tourism landscapes from the supply-side perspective but lacks studies on what kind of experience and value tourists expect from the demand-side perspective, and the research methods lack scientific quantitative analyses.

Satisfaction and revisit intention are used to evaluate the perception and experience of rural landscapes, which directly reflect tourists’ actual feelings about the resource endowment, operational management effectiveness, social and cultural environment, and rural landscape planning in the area (Zhang et al., 2014). Landscape perception emphasizes the mutual influence of tourists’ perception of the tourism environment (Echtner and Ritchie, 1993), recognition of the location (Middleton and Hawkins, 1998), preferences (Zhang et al., 2017), and other aspects, while the revisit intention reflects tourists’ willingness to experience an activity again (Xu et al., 2014). Strengthening tourists’ revisit intention in rural tourism is of great significance for stabilizing and increasing rural income and promoting sustainable development in rural areas. It is an important measure of whether the quality and style of rural areas have been improved and whether rural revitalization has been promoted (Li et al., 2022). Therefore, based on the objective data analysis results of tourists’ perception and satisfaction with rural tourism landscapes and their revisit intention, we can objectively and reasonably propose upgrading and optimization strategies for rural landscapes. The relationship diagram is shown in Fig. 1.

This study selected Nangou Village in Yan’an City, Shaanxi Province, as the research object. Based on the construction of traditional rural tourism facilities, Nangou Village has developed a certain number of distinctive tourism products that integrate production, learning, and research based on the Ansai folk culture and revolutionary humanistic resources in the region. However, as a key model village in China’s rural revitalization strategy, Nangou Village is still exploring a new round of optimization and upgrading. On the basis of the theory of landscape perception and a demonstrated impact mechanism between landscape perception and satisfaction, as well as revisit intention, combined with the perception results, this article proposes feasible strategies for the planning, design, and optimization of the tourism industry in Nangou Village.

Theoretical foundation

Landscape perception theory. Landscape perception theory originated in the 1950s and is an independent theory developed for environmental psychology research. It combines the research paradigms and methods of environmental psychology and human geography (Deng, 2006) and aims to study people’s preferences (Guo et al., 2004), perception (Crompton, 1979; Fan et al., 2014), and satisfaction levels (Tribe and Snaith, 1998; Chi and Qu, 2008)

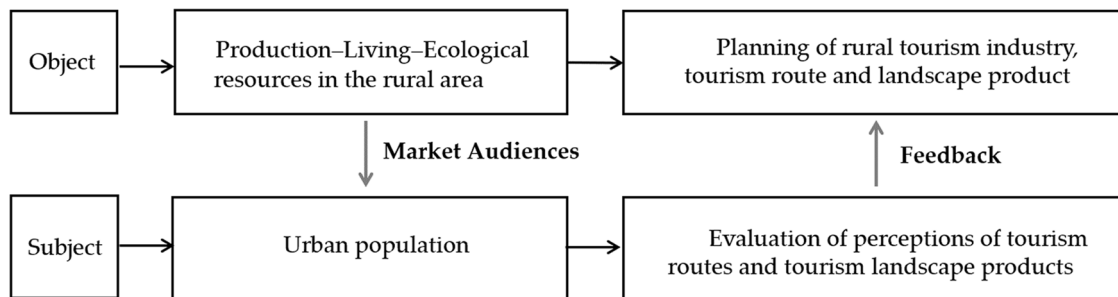


Fig. 1 Rural tourism subject-object relationship diagram. The figure illustrates the interaction between subject and object in rural tourism.

of the objective environment. Ervin Zube et al. (1982) integrated the existing research paradigms of landscape perception—expert paradigm, psychophysical paradigm, cognitive paradigm, and empirical paradigm—and further proposed a theoretical model to unify humans, landscapes, and the results of their interaction into a closed loop. Landscape perception is essentially a process in which the human brain acquires environmental information through the sensory systems and then processes it (Purcell, 1987). In the interactive relationship between people and landscapes, the landscape is the perceived object while people are the main subjects of the environmental perception. The perception of landscapes is related to individual differences, involving experiences, memories, cognitive level, and social-cultural backgrounds (Qin, 2022; Cosgrove, 1984).

Based on subjective feelings and psychological evaluations of the surrounding environment, landscape perception further affects individuals’ emotions and environmental behaviors. An emotional state is a psychological product of individuals’ acceptance of external stimuli, combined with their own experiences and cognition, which is an important driving force that can promote individuals’ interactive behavioral responses. Motloch (2000) proposed that landscape perception will also generate emotional load after observation, recognition, and meaning attribution. Song (2013) summarizes it as a process of landscape stimulation, generation of feelings, sublimation of cognition, and emotional response. For such emotional reactions, scholars commonly use satisfaction and place identity to measure the positive affective state generated by landscape perception (Baker and Crompton, 2000). Behavioral responses are subjective reactions of people to approach or avoid external stimuli, which are especially influenced by their emotional state (Bitner, 1992; Mehrabian and Russell, 1974). Gobster (2008) argues that landscape perception is reflected both in cognitive and emotional aspects and that landscape preferences and emotional experiences can affect environmental behavior. Ostoic et al. (2017) believe that landscape perception emphasizes the mutual influence of tourists’ perceptions, recognition, preferences, and other aspects of the tourism environment, which can directly reflect the effectiveness of the tourism environment’s planning and design, and thus affect tourists’ behavior. In short, there are interactions between landscape environmental stimuli, emotional states, and behavioral responses, and landscape perception has a significant impact on an individual’s sense of environmental responsibility, environmental protection intention, and intention to revisit a destination (Wu et al., 2019).

Landscape perception and satisfaction, revisit intention. Satisfaction is a comprehensive feeling experienced by tourists during and after visiting a tourist destination (Chon, 1989). It can be an evaluation of a single dimension such as landscape products, tourism services, transportation accessibility, etc., or a comprehensive measure of overall satisfaction in multiple dimensions

(Cole and Scott, 2004; Sailesh et al., 2023). Among them, the physical landscape environment is one of the most important dimensions that affects overall satisfaction (Chi and Qu, 2009). Oliver (1980) proposed the “expectation discrepancy model”, which refers to the process in which tourists form certain expectations based on their previous experiences before traveling, and then compare their expectations with their actual feelings during the travel process to determine their level of satisfaction. If the expectations are met, the tourists are satisfied; otherwise, they are not. The tourism landscape studied in this article is an important component in the study of tourist destination satisfaction, which directly affects the tourists’ selection of tourist destinations, consumption of tourism products and services, and willingness to revisit.

Behavioral intention is the result of rational cognitive processing of situational information by tourists, resulting from psychological comparison and judgment (perception value or satisfaction). In the existing research, tourists’ behavioral intentions are often described as tourists’ recommendation behavior and revisiting intention. Revisit intention refers to the behavioral intention of tourists to visit the destination again in the future (Hung and Petrick, 2011). Chen proposed that revisit intention should include two levels of behavioral intention: the intention of the tourists themselves to revisit this place, and the intention to recommend this place to their acquaintances. Xiu, on this basis, included whether tourists would prioritize this attraction in their travel choices into the evaluation indexes of revisit intention (Guo, 2016). In addition, some scholars have demonstrated that destination image perception, especially landscape perception, is a direct driver of tourists’ recommendation behavior and intention (Chew and Jahari, 2013; Nisco et al., 2015; Prayag et al., 2017), and satisfaction with the tourism destination is one of the strongest factors affecting revisiting behavior (Campo-Martinez et al., 2010; Humagain and Singleton, 2021).

In summary, the relationship between landscape perception, satisfaction, and revisit intention has been demonstrated in relevant studies. In spite of this, it remains necessary to further the research on the influence paths of these three factors. For example, Xu et al. (2023) took the Qilian Village landscape renovation project as the subject of a case study to identify users’ perceptions of landscape characteristics through structural equation modeling. Although they explored the impact of landscape perception on satisfaction, no further study was conducted on users’ behavioral intentions via the influence paths. Similarly, Qu et al. (2023), referring to the ancient villages in southern Anhui as an example, explored the path to high-quality development of rural tourism from the perspective of the authenticity of rural landscapes. Despite the SPSS data analysis conducted to verify the positive correlation between satisfaction and revisit intention, they ignored the optimization strategies of landscape as the carrier of tourism, which thus affects the applicability of this research. Additionally, in China, there are few

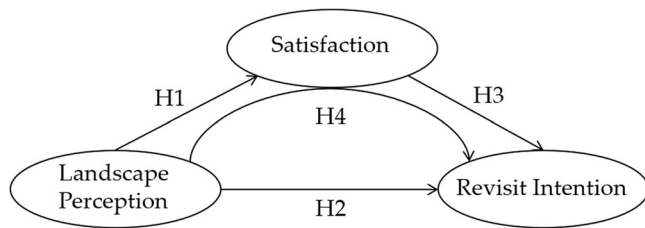


Fig. 2 The theoretical framework. The figure presents the hypothesized relationship between the three variables.

papers that quantitatively present tourists' landscape demands and support planning strategies, with most research focusing on the subjective discussions of tourism landscape planning strategies from the perspective of the supply side. In conclusion, it remains imperative to conduct further research on the strategies of optimizing the design of rural tourism landscapes based on a complete demonstration of the influence paths of landscape perception, satisfaction, and revisit intention, with the results of quantitative data analysis as guidance.

Research hypotheses. Landscape perception theory has been widely applied in tourism-related research and has gradually permeated into the research on rural tourism landscapes (Yang et al., 2022; Fan, 2020). The rural tourism landscape studied in this article, perceived as a physical environment, usually includes rural ecological landscapes, authentic historical and cultural landscapes, agricultural leisure and entertainment facilities, and experiential red revolutionary landscapes, and it also involves diachronic overall tourism routes.

Some scholars have explored the rationality of the path mechanism of the landscape perception–satisfaction–revisit intention in related studies, and they used the relevant results as a strategic basis for optimizing the development of rural tourism. For example, Acharya et al. (2023) showed that the better the tourism ecological environment is, the higher the satisfaction and revisit intention of tourists are, and the path from the ecological environment to the revisit intention of tourists needs to be connected by satisfaction. Geng et al. (2010) analyzed and demonstrated the positive impact of rural natural landscape satisfaction and sightseeing route satisfaction on tourists' revisit intention using logistic model analysis. Queiroz (2017) found that cultural experiences can better reflect the authenticity of rural areas, and tourist satisfaction can be improved through the enhancement of cultural facilities, thereby promoting tourists' willingness to revisit. Yang et al. (2022) believe that developing recreational activities with rural characteristics can stimulate tourists' interest and participation, thereby enhancing their satisfaction and willingness to return. Zhou et al. (2016) posited that recreational facilities and entertainment activities are both important factors that attract tourists to choose rural tourism; in addition, a higher attractiveness of the tourism landscape increases the satisfaction of tourists, creating a greater impact on revisit intention.

Some scholars have further proposed and demonstrated that satisfaction plays a mediating role in the impact path of tourists' landscape perception on their revisit intention. For example, Kim et al. (2013) conducted a survey in rural areas and found that satisfaction plays an intermediary role between tourists' rural image perception and tourists' revisit intention. Tu et al. (2017) proposed that the internal mechanism of tourists' behavioral intentions based on destination image perception may be achieved through the mediating effect of positive emotions such as satisfaction. Meng (2018) argued that in rural tourism, rural landscapes, and related service facilities are important

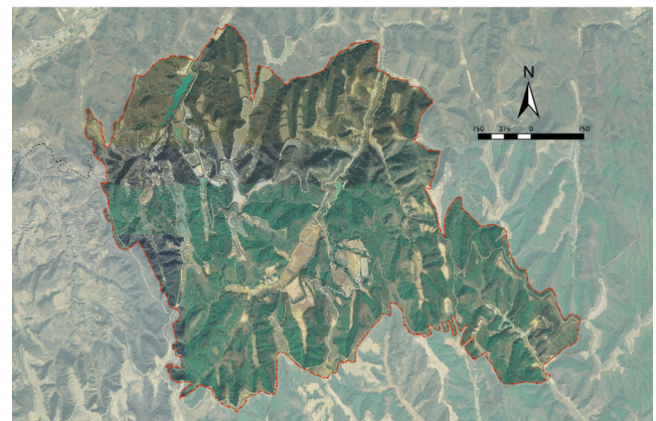


Fig. 3 Location of the study area. The figure presents the geographic location of the Nangou village.

manifestations of rurality, which affect tourists' satisfaction with their travel experience and indirectly affect their revisit intention.

In summary, this study took Nangou Village as a research sample to explore the influence mechanism between rural tourism landscape perception and its associated satisfaction and revisit intention, and the following hypotheses were made (Fig. 2).

Hypothesis 1 (H1). Rural tourism landscape perception will positively affect the overall satisfaction of rural tourism.

Hypothesis 2 (H2). Rural tourism landscape perception will positively affect the rural tourism revisit intention.

Hypothesis 3 (H3). Rural tourism satisfaction will positively affect the rural tourism revisit intention.

Hypothesis 4 (H4). Satisfaction will act as a mediator in the relationship between rural tourism landscape perception and revisit intention.

Study design

Study area. Nangou Village, the research object of this study, is located in Gaoqiao Town, Ansai District, Yan'an City, Shaanxi Province, China, covering approximately 1716 hectares with seven natural villages under its jurisdiction, which are typical loess hilly villages (Fig. 3). As a key model village for rural revitalization, Nangou Village has a good natural ecological foundation and abundant agricultural and regional culture resources and has achieved preliminary linkages between the primary, secondary, and tertiary industries. In the first rural tourism development, Nangou Village built the Nangou Paradise for sightseeing and its supporting facilities, the Nangou Soil and Water Conservation Demonstration Park of Ansai District of Yan'an City, and the Agricultural Picking Experience Park, the red military camps based on Yan'an Red Culture, and various characteristic landscape pieces under the influence of Ansai's unique regional culture, which form a comprehensive cultural

Table 1 Measurement items.

Latent construct		Index	Measurement items	Reference(s)
LP	Natural Ecology	NE1	The rural tourism landscapes reflect the characteristics of rural pastoral scenery.	Xie et al., (2002); Marianna et al., (2023)
		NE2	The rural tourism landscapes reflect a good natural ecological environment.	
		NE3	The rural tourism landscape facilities are well integrated with the natural ecology.	
	Historical Culture	HC1	The rural tourism landscapes reflect the characteristics of regional history and culture.	Huang et al., (2015)
		HC2	The cultural symbols of the rural tourism landscapes are recognizable.	
		HC3	The cultural preservation of the rural tourism landscapes is authentic.	
	Leisure Recreation	LR1	The recreational facilities of the rural tourism landscapes are suitable.	Yuan, (2017)
		LR2	The recreational activities of the rural tourism landscapes are attractive.	
		LR3	The recreational and leisure facilities in the rural tourism landscapes are abundant.	
	Research Experience	RE1	The research experiences in the rural tourism landscapes are attractive.	Fan and Liu, (2016); Wang and Wang, (2010); Huang et al., (2018)
		RE2	The research facilities built in the rural tourism landscapes are very abundant.	
		RE3	The research facilities built in the rural tourism landscapes have a brand value.	
		RE4	The research experiences in the rural tourism landscapes are impressive.	
	Integral Route	IR1	The theme features of the integral routes of the rural tourism landscapes are prominent.	Li, (2003); Yan, (2021)
		IR2	The sceneries and experiences in the integral routes of the rural tourism landscapes are abundant.	
IR3		The integral routes of the rural tourism landscapes are attractive.		
SA	SA1	Are you satisfied with the overall quality and experience of the rural tourism landscapes?	Chen, (2012); Wang et al., (2005)	
	SA2	Do you think the rural tourism landscapes fully meets your expectations?		
	SA3	Do you think that rural tourism landscapes are more attractive than other similar tourist destinations?		
RI	RI1	You have a high loyalty to this place.	Wang et al., (2006); Stylos et al., (2015)	
	RI2	Are you willing to revisit this place.		
	RI3	You will recommend this place to others.		

tourism village. With the deepening of rural revitalization in China, Nangou Village will serve as a key area for the Ansai District to build a five-billion-level cultural tourism industry cluster, further expanding and upgrading the existing tourism landscape facilities. Therefore, this article aims to propose a scientific strategy for the upgrading and transformation of Nangou Village through subjective evaluation methods.

Evaluation index construction. Based on the analysis and organization of the existing literature and the construction of the theoretical framework mentioned earlier, this study constructed evaluation indicators for three variables: landscape perception, satisfaction, and revisit intention (Table 1).

LP—The research on rural tourism landscape perception is not yet perfect; this study tentatively divided the LP scale into five dimensions on the basis of previous research and combined with a review of the literature. Among them, the Natural Ecology sub-dimension involves the evaluation of the rural landscape’s pastoral characteristics, the quality of the ecological environment, and the integration of landscape facilities and natural ecology (Xie et al., 2002; Marianna et al., 2023). The Historical Culture sub-

dimension involves the evaluation of the regional history and culture of the rural tourism landscapes, the recognizability of the cultural symbols, and the authenticity of the cultural preservation (Huang et al., 2015). The Leisure Recreation sub-dimension involves the evaluation of the suitability, attractiveness, and abundance of recreational facilities in rural tourism landscapes (Yuan, 2017). The Research Experience sub-dimension involves the evaluation of the attractiveness, abundance, brand value, and impressiveness of the research experiences for tourists (Fan and Liu, 2016; Wang and Wang, 2010; Huang et al., 2018). The Integral Route sub-dimension involves the evaluation of the prominent theme features in the routes, an abundance of sceneries and experiences, and the attractiveness of the integral route (Li, 2003; Yan, 2021).

SA—This is the evaluation of whether the overall quality and experience of the rural tourism landscapes meet expectations. Here, the overall satisfaction, expectation, and competitiveness of rural tourism landscape quality and experience are used as the evaluation indexes (Chen, 2012; Wang et al., 2005).

RI—This is the evaluation of tourists’ loyalty to rural tourism destinations, with loyalty, willingness to revisit, and

Table 2 T-Results of reliability analysis.

Latent construct reference value	Cronbach's α	Number of terms
LP	0.861	3
NE	0.831	3
HC	0.805	3
LR	0.863	4
RE	0.822	3
IR	0.898	16
Total	0.803	3
SA	0.845	3
RI	0.913	22
Overall		

recommendation behavior as the evaluation indexes (Wang et al., 2006; Stylos et al., 2015).

Questionnaire design and collection. The questionnaire was designed in four parts. The first part covers the demographic characteristics, including gender, age, education level, and occupation. The second part is the evaluation of cultural image perception, while the third part is the evaluation of environmental design, and the fourth part is the evaluation of place perception. The items in these last three parts corresponded to the evaluation indexes shown in Tables 2–4, respectively, and a 5-point Likert scale was used to rank the perception level.

In November 2022, the study conducted a field survey in Nangou village, complemented by an online questionnaire from November 15, 2022, through September 12, 2023. The introduction section of the questionnaire included the research objectives, the anticipated societal benefits, and the scope of information that would be collected. Before proceeding, participants were asked to review this introduction; their agreement to participate was taken as informed consent. In total, the study received 344 valid responses, serving as the sample data. The sample size satisfies the requirements for structural equation modeling that a desirable sample size should be over 200, with at least ten responses correlating to each variable under observation (Barrett, 2007).

Quantitative analysis methods. The data were analyzed using SPSS (version 27.0) and AMOS 27.0. Frequency analysis of the demographic characteristics and reliability analysis were conducted.

In this study, structural equation modeling (SEM) was used as the core method, and the three concepts of landscape perception, satisfaction, and revisit intention were set as latent variables, and SEM was utilized to verify the hypotheses on the relationship between the three aspects. First, a confirmatory factor analysis (CFA) was introduced to test whether the relationship between the factors and the corresponding measurement items was as expected, and to further revise the relationship model between the latent variables and the indicator question items and between the indicator question items (Li and Chen, 2010). Second, the interaction mechanism between the latent variables was analyzed by SEM to verify or falsify the research hypotheses (Gu et al., 2022). Finally, the bootstrap method was used to validate and analyze the indirect effects (Wen and Ye, 2014).

Results analysis

Demographic variables and statistical results of travel characteristics. Using SPSS software to analyze the demographic characteristics of the 354 questionnaires, the sample was found to be well-balanced in terms of gender. The age distribution was broad and predominantly consisted of young and middle-aged

people. The occupational status covered various fields, while most respondents had received middle and higher levels of education. The middle-income group accounted for a larger proportion of the sample, which is a good representation of the population (Fig. 4).

The survey results showed that tourists preferred to choose research experience and historical culture landscape projects at the destination, followed by natural ecology and leisure recreation. In terms of tour length and size, tourists who chose one-day and two-person tours accounted for most of the tourists, and very few tourists chose multiday tours. The majority of tourists who came to this destination came as a unit, and the least frequent response was as individual tourists. The majority of tourists visited this village for the first time, and the number of tourists choosing to revisit the place again was very few (Fig. 5).

Reliability analysis results. In this study, the latent variables were tested using Cronbach's α (Table 2), which showed that the Cronbach's α values of landscape perception, satisfaction, and revisit intention were 0.898, 0.803, and 0.845, respectively, and the scales' overall Cronbach's α value was 0.913. The Cronbach's α values of the sub-dimensions under landscape perception ranged from 0.805 to 0.863, which are all greater than 0.8. In summary, the reliability test coefficients of each sub-dimension scale exceed 0.7, which indicates that the internal consistency of the data was good (Eisinga et al., 2013).

Latent variable evaluation results. As shown in Fig. 6, the overall average landscape perception score was 3.748, which is close to a good level. Comparing the average evaluation score, the five latent variables can be ranked as NE > HC > RE > LR > IR, with scores of 3.976, 3.906, 3.889, 3.836, and 3.826, respectively. The overall average score for satisfaction was 3.625, between average and satisfactory. The overall average score for revisit intention was 3.452, between average and willing, but not reaching the desired level.

CFA result. This study examined the relationship between the latent and observed variables in the measurement model through CFA to determine the reasonableness of the scale construction by convergent and discriminant validity. For convergent validity, there are usually three discriminating criteria: (1) standardized factor loadings are all greater than 0.5 (Bailey and Ball, 2006); (2) average variance extracted (AVE) is greater than 0.5 (Bagozzi and Yi, 1988); and (3) composite reliability (CR) is greater than 0.7 (Fornell and Larcker, 1981). Satisfying the above criteria indicates good convergent validity. As shown in Table 3, the standardized factor loading ranged from 0.686 to 0.891, which meets the criterion of greater than 0.5. The minimum value of CR was greater than 0.8, which is greater than the threshold value of 0.7, and the AVEs were all greater than 0.5, which indicates that the scale has a good convergent validity.

For discriminant validity, if the correlation coefficients between a factor and the other factors are all less than the square root of its AVE value, it indicates good discriminant validity between the factors (Hair et al., 2010). As shown in Table 4, the correlation coefficients between landscape perception and the two factors of its sub-dimension are only slightly larger than the square root of the AVE, and the square root of the AVE values of the rest of the factors is higher than the correlation coefficients between the factor and the other factors, which indicates that the present scale has good discriminant validity.

Theoretical model validation. Under the premise of ensuring the reliability and validity of the measurement model, structural

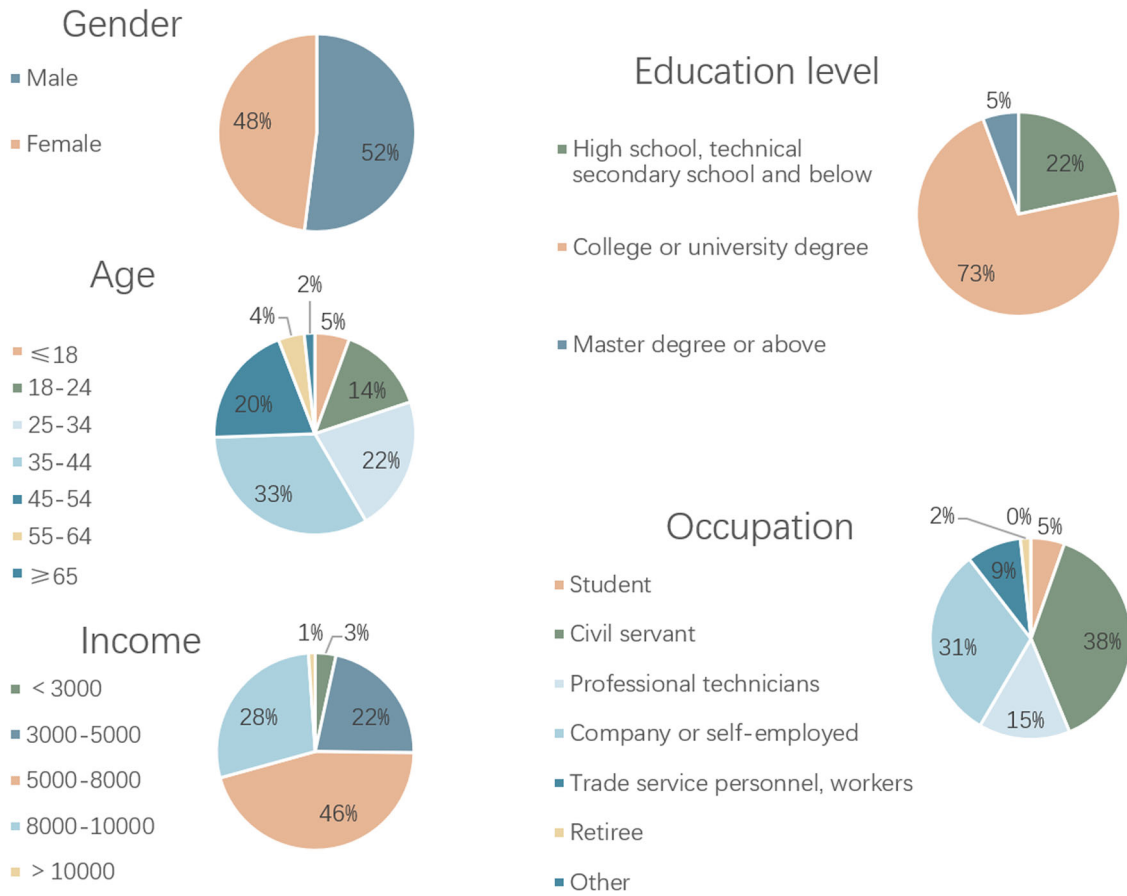


Fig. 4 Demographic profile of the respondents. The figure presents the statistical results of the demographic variables for the 354 questionnaires.

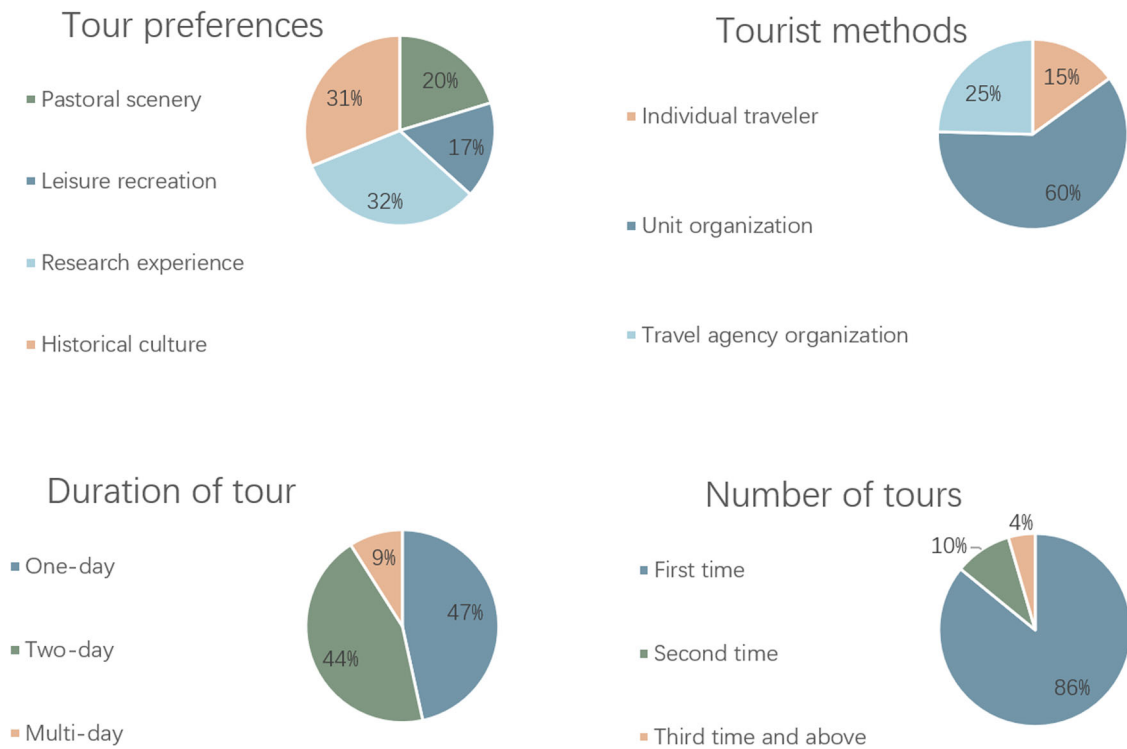


Fig. 5 Travel characteristics. The figure presents the statistical results of the travel characteristics for the 354 questionnaires.

The average score of the scale

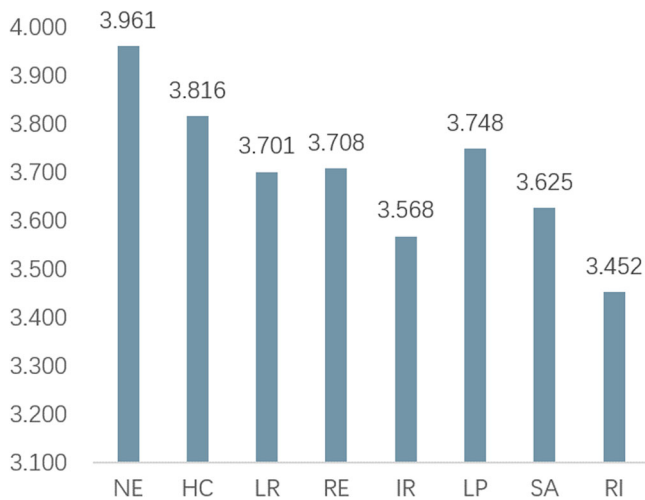


Fig. 6 The average score of the latent variables. The figure presents the statistical results of the latent variable average scores. NE Natural Ecology, HC Historical Culture, LR Leisure Recreation, RE Research Experience, IR Integral Route, LP Landscape Perception, SA Satisfaction, RI Revisit Intention.

Table 3 Results of reliability and validity analyses.

Latent construct reference value	Indicator	P-value	Std. >0.5	CR >0.7	AVE >0.5
LP	NE		0.704	0.835	0.503
	HC	***	0.721		
	LR	***	0.707		
	RE	***	0.688		
	IR	***	0.725		
SA	SA3		0.799	0.807	0.584
	SA2	***	0.686		
	SA1	***	0.801		
	RI		0.765		
RI2	***	0.843			
RI1	***	0.808			
NE	NE3		0.757	0.865	0.682
	NE2	***	0.824		
	NE1	***	0.891		
HC	HC3		0.751	0.816	0.597
	HC2	***	0.718		
	HC1	***	0.844		
LR	LR1		0.760	0.805	0.580
	LR2	***	0.756		
	LR3	***	0.768		
RE	RE4		0.767	0.863	0.612
	RE3	***	0.794		
	RE2	***	0.791		
	RE1	***	0.776		
IR	IR3		0.781	0.823	0.608
	IR2	***	0.784		
	IR1	***	0.774		

Note: *** $p < 0.001$; Std. refers to the standardized factor loadings; CR refers to composite reliability; AVE refers to average extracted variance.

modeling was further performed to verify the hypothesized relationships among the three variables of landscape perception, satisfaction, and revisit intention. First, the results of model fit showed that $CMID/DF = 1.097$, $GFI = 0.949$, $AGFI = 0.936$,

$CFI = 0.995$, $TLI (NNFI) = 0.994$, $RMSEA = 0.017$, and $SRMR = 0.037$ (Table 5), and all the indexes were in line with the standard, which indicated that the model had a good fit (Hayduk, 1987; Scott and Willits, 1994).

This study further used AMOS 27 to establish a structural model and measure the causal relationships between the three latent variables, LP, SA, and RI. As shown in Table 6 and Fig. 7, (1) Landscape perception has a positive and significant effect on Satisfaction, with a path coefficient of 0.559 ($P < 0.001$); (2) Landscape perception has a positive and significant effect on Revisit Intention, with a path coefficient of 0.434 ($P < 0.001$); and (3) Landscape Satisfaction had a positive and significant effect on Revisit Intention, with a path coefficient of 0.377 ($P < 0.001$) (Cabrera-Nguyen, 2010). This proves that hypotheses H1, H2, and H3 are supported.

Mediation analysis of satisfaction. This study adopted the bootstrap method suggested by McKinnom to test the possible mediating effect of SA in the relationship between LP and RI, and the bootstrap sample size was set at 5000 (MacKinnon et al., 2002). Usually, if the bootstrap confidence interval does not contain 0, then the corresponding indirect, direct, or total effect exists (MacKinnon et al., 2004). The test results show that at a 95% confidence level, the confidence interval of indirect effect was [0.141, 0.314], the confidence interval of direct effect was [0.456, 0.755], and the confidence interval of total effect was [0.682, 0.961], which all exclude 0, indicating that the indirect effect exists, and the ratio of the indirect effect was 0.27. The results of the mediation test support hypothesis H4 (Table 7).

Discussion and recommendations

Discussion

Coupling relationship among LP, SA, and RI. This study established a hypothesis model based on the a priori theory of the influencing relationship between Landscape Perception → Satisfaction → Revisit Intention, and explored and confirmed the influence paths of LP on SA and RI with Nangou Village as the research object. In the SEM results, the coefficient of LP's influence path on SA was 0.559, and the coefficient of LP's influence path on RI was 0.434. LP influences tourists' revisit intention to the destination through the overall satisfaction of the tourist landscapes, which confirms that the landscape quality and experience of the destination is an important influencing factor that affects tourists' satisfaction, which then enhances tourists' revisit intention. This result is consistent with that of many previous studies, such as those conducted by Cao (2019) and Li (2022), in which quantitative analysis is conducted under different contexts to investigate the influence paths of landscape perception. Their research also confirms that tourists' perception of the landscape contributes to enhancing satisfaction and revisiting intention. At present, the intention to revisit Nangou Village has not reached the desired level. Based on the LP → SA → RI influence path, this study concludes that it is necessary to upgrade the tourism landscapes as a whole in the new round of rural tourism planning, to effectively improve the attractiveness of the destination from the environmental level.

Coupling relationship among LP and its sub-variables. Different from previous studies, we defined LP as a second-order variable containing five sub-dimensions: natural ecology, historical culture, leisure recreation, research experience, and integral route. The fitted data showed that the five sub-variables were an accurate representation of the LP structure. In the results of the structural equation, all five latent variables involved in the LP dimension showed significant positive correlations with LP

Table 4 Results of discriminant validity analyses.

	LP	RI	SA	IR	RE	LR	HC	NE
LP	0.709 ^a							
RI	0.644	0.806 ^a						
SA	0.558	0.620	0.764 ^a					
IR	0.725	0.467	0.405	0.780 ^a				
RE	0.688	0.443	0.384	0.498	0.782 ^a			
LR	0.707	0.455	0.395	0.512	0.486	0.762 ^a		
HC	0.721	0.465	0.403	0.523	0.496	0.510	0.773 ^a	
NE	0.704	0.454	0.393	0.510	0.484	0.498	0.508	0.826 ^a

Note: ^arepresents the square of the average variance.

Table 5 Goodness-of-fit test for the structural model.

Fitness index	CMID/DF	GFI	AGFI	CFI	TLI	RMSEA	SRMR
Reference value	<3	≥0.9	≥0.9	≥0.9	≥0.9	<0.08	<0.08
Model fit	1.097	0.949	0.936	0.995	0.994	0.017	0.037

CMIN/DF chi-square/degrees of freedom, GFI goodness-of-fit index, AGFI adjusted goodness-of-fit index, CFI comparative fit index, TLI Tucker-Lewis index, RMSEA root mean square error of approximation, SRMR standardized root mean square residual.

Table 6 Path coefficients and hypothesis results.

Influence path	S.E.	C.R.	Std.	P-value	Result
H1: LP-SA	0.096	7.164	0.558	***	Supported
H2: LP-RI	0.116	5.551	0.433	***	Supported
H3: SA-RI	0.085	5.374	0.378	***	Supported

Note: ***P < 0.001; Std. refers to the standardized factor loadings.

($P < 0.01$), and the influence path was $IR > HC > LR > NE > RE$. In the correlation analysis, IR, HC, LR, RE, and IR also showed significant positive correlations with revisit intention, with correlation coefficients in the order of $NE > IR > HC > LR > RE$ (Table S1), and the correlation coefficients in the order of $IR > LR > LR > RE$ (Table 2). All of these results emphasize the important influence of historical culture and integral route on landscape perception and revisit intention. In the actual evaluation of landscape perception, the evaluation results of the five sub-dimensions did not reach a satisfactory level; therefore, in order to further increase the revisit intention of the destination, it is necessary to upgrade the landscapes of Nangou Village in all dimensions as a whole, and in particular, it should focus on upgrading the historical culture, the integral routes, as well as the facilities of the research experience that tourists are more inclined to choose.

Recommendations

Deeply excavating rural historical and cultural resources. Rural tourism itself is a large-scale cultural exchange; any tourism product or tourism mode has its own cultural connotation, which is a necessary condition to attract tourism (Li and Wang, 1999). Rural culture is both productive and fragile; therefore, cultural protection and inheritance in rural tourism development is essential. Emphasizing the characteristic regional culture can not only improve the visibility, dissemination, and attractiveness of rural tourism destinations, but also enhance the vitality, efficiency, and effectiveness of rural development. The rural

landscapes are both the end product of rural tourism and the carrier of rural culture. Based on the principle of protecting the authenticity of rural culture, integrating the elements of native culture into the tourism landscape designs of traditional villages and optimizing the tourism content is conducive to strengthening the attractiveness of traditional villages to tourists (Sun and Zhang, 2020). The results of the survey on the preference of tourism types in Nangou Village show that the historical culture and landscapes are popular aspects. Meanwhile, the SEM model results show that historical culture is an important factor influencing tourists’ revisit intention. Therefore, future tourism planning in Nangou Village should strengthen the development of vernacular cultural landscapes and highlight its own distinct characteristics. The tourism landscapes developed in the first round in Nangou Village have problems such as low cultural taste and inconspicuous characteristics. The new tourism planning for Nangou Village should sufficiently mobilize the regional cultural resources of the Ansai District, utilizing the region’s primitive village landscapes and folk cultural resources to create a rich “composite vernacular complex” type of landscape facilities. For example, we could introduce traditional activities such as horse riding, cattle riding, and Paper Cuttings with Ansai characteristics to the local culture experience hall; renovate cave dwelling homestays with distinctive Shaanxi characteristics; and integrate agricultural and folk activities such as tasting farmhouse meals and picking agricultural products into the homestay experience. In summary, the new tourism landscape should showcase the inherent qualities of Nangou Village, such as locality, authenticity, and humanity, from four aspects: food, housing, transportation, and work.

Shaping the National Red Culture Brand. Red cultural resources, as the Chinese excellent culture refined during the revolutionary era, play a prominent role in enhancing national self-confidence and building a strong nation. Meanwhile, the red tourism industry, which inherits and carries forward the red culture, has also become a unique path in China’s rural revitalization (Liu, 2020). The purpose of rural red tourism is to jointly develop traditional green ecological resources and red resources with

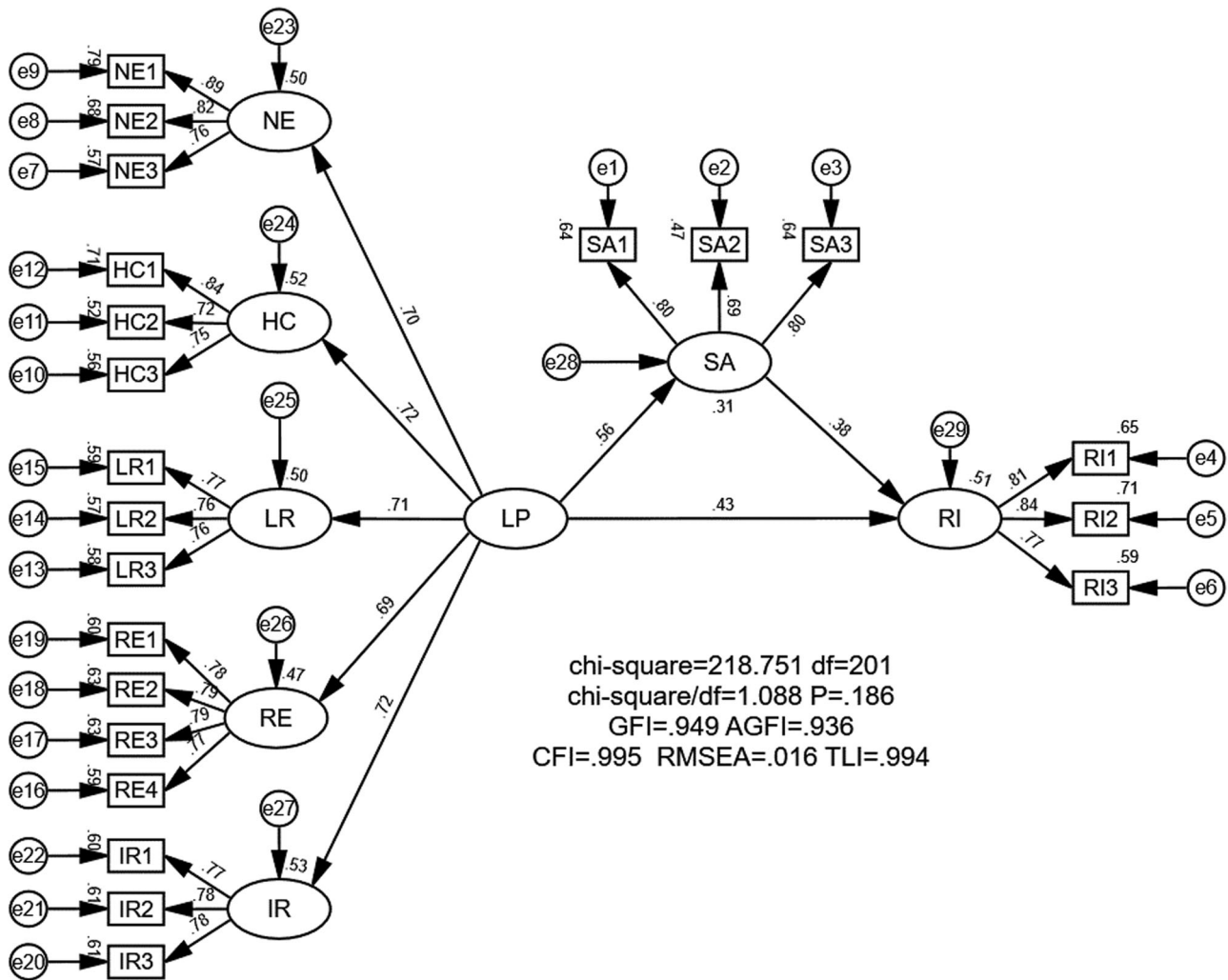


Fig. 7 Structure diagram of load and path coefficient. NE Natural Ecology, HC Historical Culture, LR Leisure Recreation, RE Research Experience, IR Integral Route, LP Landscape Perception, SA Satisfaction, RI Revisit Intention.

Table 7 Results of the mediation effect.

	Effect	BootSE	BootLLCI (95%)	BootULCI (95%)	Relative effect value
Indirect effect	0.221	0.044	0.141	0.314	26.79%
Direct effect	0.603	0.076	0.456	0.755	73.21%
Total effect	0.823	0.071	0.682	0.961	

humanistic characteristics. Through the development model of red and green integration, we can carry forward the narrative and dissemination power of the red spirit concept. At the same time, based on the comprehensive development of red tourism routes, sites, events, symbols, and other resources, we can enhance the popularity of rural tourism brands, expand market entities, and attract more visitors (Hong, 2021). Nangou Village is located in the red Yan'an revolutionary hometown, which occupies a place in China's revolutionary history. In the first round of development, Nangou Village built red culture experience facilities, mainly serving units with red education and training needs in the surrounding areas. However, Nangou Village has insufficient scheduling of classic resources such as red sites, red stories, red history, and red characters, and has not established a more competitive and penetrating red tourism culture brand that serves

a comprehensive audience. Therefore, we suggest that Nangou Village expand the scale of red travel facilities, create multi-dimensional red tourism experience scenarios, enhance the cultural connotation of red tourism scenic spots, and create educational and training routes with prominent themes of the red spirit. In addition, rural culture, red tourism resources, and natural ecological resources should be integrated under specific local conditions, for example, temperature-controlled greenhouses, characteristic agricultural planting, folk culture experiences, and other projects around the red tourism areas can be incorporated. This is conducive to enhancing the "red tourism integration" brand effect for its greater influence on surrounding facilities. Therefore, the connection between the cultural dimension and tourists' perception of landscapes can be reinforced. In turn, it enhances the favorability and visibility of the "Red Yan'an" brand,

which gives full play to its economic potential while promoting the inheritance of red cultural genes.

Creating rural tourism boutique routes. Rural tourism boutique routes are an arrangement and scientific organization of characteristic tourism landscapes, which is an important strategy for rural tourism destinations to attract tourists. The creation of boutique tourism routes is based on the integration of regional resources, forming a “string of points into a line, with a line leading to the surface, the overall promotion” of the joint development of the countryside, which is able to better utilize and display rural resources, and promote the integrated development of industries and the cultivation of new business models (You, 2014; Wang, 2015). According to the SEM results, it can be seen that the integral route sub-dimension of Nangou Village had the greatest impact on landscape perception. However, at present, tourists gave the lowest rating for aspect, which affected their satisfaction and led to a low willingness to revisit. At present, the tourism landscape projects in Nangou Village have problems, such as dispersion, small scales, individual operations, a single rural tourism product, and imperfect industrial and economic structures. Therefore, the upgrading strategy should incorporate the cultural theme of “Ansai Five Business Cards” into the integral tourism routes, and form the regional tourism development routes, rural tourism routes, and red knowledge education and training routes in the Greater Nangou area, which rely on the characteristic resources of Nangou Village. Moreover, it should connect the regional construction with the routes, and form a diversified tourism industry integrating “agricultural science popularization + folklore experience + parent-child amusement + leisure agriculture”. Finally, the tourism route planning should make full use of the Nangou Village brand, taking rural culture and tourism as the engine to optimize and expand primary industries, achieve coordinated development of the village and urban economy, and focus on the development of tertiary industries, in order to cooperate with the new rural industrial development system in Nangou Village.

Conclusions

With the gradual evolution of urbanization and the extensive promotion of China’s Rural Revitalization Strategy, rural tourism has become more and more popular and has developed rapidly. Landscape perception is the process of human interactions with the landscape, and the positive or negative results of this perception will directly affect the satisfaction of the tourists with the destination, thus affecting the tourists’ revisit intention. This study was based on the theory of landscape perception, and selected Nangou Village as the research object, on the basis of validating the influencing relationship of Landscape Perception→Satisfaction→Revisit Intention, to put forward reasonable suggestions for the optimization and upgrading of Nangou Village. The results of the research show the following: (1) Tourists’ landscape perception significantly influences tourists’ satisfaction and revisit intention. (2) Tourists’ satisfaction with the destination plays an intermediary role in the influence of landscape perception on revisit intention. (3) Landscape perception contains five dimensions (natural ecology, historical culture, leisure recreation, research experience, and integral route), all of which significantly influence tourists’ satisfaction and revisit intention. Among these dimensions, historical culture and integral route have the greatest influence, which indicates that the cultural and integral nature of the landscape is the core element that drives tourists to generate positive emotions. (4) Tourists prefer landscape projects with historical culture and research experience. (5) The overall land-

scape planning of Nangou Village was not evaluated highly, and it needs to be upgraded in a focused way. Using the empirical results as a reference, this study proposes strategies for upgrading the tourism landscapes of Nangou Village: deeply excavate rural historical and cultural resources, shape the national red culture brand, and create rural tourism boutique routes. Therefore, exploring the factors affecting revisit intention and thinking about the construction of rural tourism landscape perception elements can provide theoretical guidance for solving the next stage of rural tourism planning in Nangou Village and providing a direction for the construction of beautiful villages in the future.

The methodology of empirical research as applied in this study, along with the corresponding data analysis conducted in the case study of Nangou Village, aims to reveal the influencing factors for revisit intention. By adopting a reverse-thinking approach to constructing the elements of rural tourism landscape perception, theoretical guidance is provided for the next phase of rural tourism planning in Nangou Village. Meanwhile, it gains the strategic insights crucial for local governments and collaborative planning agencies to develop, manage, and market rural tourism destinations. Additionally, the research methods used in this study provide a reference for relevant government and planning agencies to carry out rural tourism planning. Firstly, rural tourism relies heavily on tourism landscape facilities as its primary support system. Therefore, rural tourism is supposed to focus on increasing the attention paid to tourists’ demands from the perspective of the supply side. This can be achieved by constructing landscape perception scales that are more tailored to the advantages and characteristics of tourism destinations. Through the surveys of rural tourism landscape perception elements based on combined scale analysis, tourists’ expectations and demands can be better satisfied. Thus, their satisfaction and revisit intention can be enhanced. Secondly, in the practice of rural tourism marketing, the SEM (structural equation modeling) quantitative results of landscape perception, satisfaction, and revisit intention can be referenced to guide targeted promotion and advertising efforts for landscape elements perceived more strongly by tourists. In this way, the attractiveness to tourist groups can be improved. Lastly, planning agencies can apply the scale developed in this study to measure the satisfaction level of rural tourism industries in tourists’ minds at various stages. By assessing the scores in different dimensions, planning agencies can better identify their strengths and weaknesses, which enables them to maintain their advantages while making improvement.

Some limitations should be noted, which need to be addressed in the future. Firstly, the division of landscape perception dimensions in this study was somewhat subjective and innovative, and there are some immaturity issues. Secondly, the data collection time was short, which may not represent the average situation throughout the year. Finally, this article intended to propose optimization suggestions for Nangou Village at the landscape level, but this should be integrated with the industrial transformation, planning and propaganda, and enhancing service quality and other influencing factors of tourism destinations in the overall tourism planning.

Data availability

The original contributions presented in the study are included in the article/Supplementary Material (S2. Dataset), further inquiries can be directed to the corresponding author/s.

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Author contributions

Conceptualization, YK and XX; methodology, XX; software, YK; validation, YK and XX; formal analysis, YK; investigation, YK; resources, XX; data curation, YK; writing—original draft preparation, YK; writing—review and editing, XX; visualization, YK; supervision, XX; project administration, XX; funding acquisition, XX All authors have read and agreed to the published version of the manuscript.

Competing interests

The authors declare no competing interests.

Ethical approval

This study was conducted with approval from the Ethics Committee of the primary author's institution, School of Art and Design, Xi'an University of Technology. All procedures involving human participants in the research were performed in accordance with the ethical standards of the institutional research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable standards.

Informed consent

The informed consent was obtained from all participants before the study started.

Additional information

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