

Article

Research on the Measurement, Evaluation and Compensation of Traditional Village Residents' Emotional Perception: A Case of 14 Traditional Villages in Guanzhong Region

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Abstract: Traditional village residents' emotional perception is a mapping of the man-land relationship in rural areas, which leads to the attitudes and behaviors of the residents. Against the background of previous studies focusing on technical rationality but neglecting the exploration of "human" emotional factors, it is crucial to carry out research on the traditional village residents' emotional perception to promote people-centered rural development of high quality. The paper selected 123 residents from 14 traditional villages in Guanzhong region and constructs an evaluation index system which includes three dimensions based on the logical framework of "spiritual attachment-functional dependence-developmental cognition". Next, the questionnaire method was used to collect data and the empirical analysis was conducted using the obstacle degree model and the network analysis model. The research shows that: (1) the overall level of the traditional village residents' emotional perception is in the middle-upper class and there are significant differences, and there is a non-equilibrium in different evaluation dimensions. (2) The main obstacle to the improvement of the level of traditional village residents' emotional perception is perception of development, followed by the sense of belonging, and the sense of happiness has a greater supportive role. (3) "Sustainable development of the village" (D-07) is the central node of the network analysis model of traditional village residents' emotional perception. Meanwhile, the nodes "willingness to live" (G-02) and "basic rights are guaranteed" (X-10) are the central nodes of the sub-networks of sense of belonging and sense of happiness. (4) The residents' education level and the frequency of community participation have a significant positive effect on their emotional perception level. Finally, the paper explores the dynamic compensation mechanism of traditional village residents' emotional perception. Our results provide policy guidance for achieving sustainable development of traditional villages.

Keywords: traditional village; emotional perception; evaluation index system; dynamic compensation mechanism



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1. Introduction

Traditional villages which are known as "ancient villages" are an important part of the world's cultural heritage, and the question of how to balance the protection and modernization of traditional villages is a global concern. Rapid urbanization and industrialization have had far-reaching impacts on traditional village areas [1], and common problems such as outflow of labor force, aging population, environmental degradation, unused arable land and insufficient development impetus have become increasingly prominent. In order to promote the sustainable development of traditional villages, some countries have made different exploratory practices according to their national conditions, such as Canada's Agriculture and Rural Development Act, Switzerland's Regional Nature Park Project, the UK's Rural Development Plan, Japan's One Village One Product Movement and Korea's

New Village Movement, as well as China's Rural Revitalization Strategy [2]. As an important part of China's rural society, traditional villages are key areas for the implementation of the rural revitalization strategy. In the process of implementing rural revitalization, the emotional perception of the residents towards the villages they live in is changing, along with the great transformations of social lifestyle, natural ecological environment and production power mechanism of the traditional villages. According to the theory of social psychology, there is an interactive relationship between human's emotions, attitudes and behaviors, and behaviors and decisions are the result of the role of thoughts and emotions [3], so an in-depth research of residents' emotional perceptions is needed.

In 2018, 'Opinions of the CPC Central Committee and the State Council on implementing rural vitalization strategy' pointed out that rural revitalization should focus on enhancing villagers' sense of happiness, sense of belonging, sense of identity and sense of acquisition, which promotes the stability of the rural society [4]; and the Chinese government has incorporated the people's sense of happiness, sense of acquisition and sense of security into an important criterion for judging the performance of leading cadres in promoting high-quality development since 2020. The state's focus has risen from the material level to the emotional and psychological level when it is in the formulation of rural development policies [5], attaching great importance to the satisfaction of the emotional needs of village residents. Traditional villages, as typical rural settlements with coupled man-land relations, need to pay particular attention to the emotional aspects of their governance system [6]. However, research on the development of traditional villages based on the perspective of residents' perception is mostly limited to the residents' perception of the impact of tourism and the mechanism of residents' perception and cultural inheritance. The research on the traditional village residents' emotional perception (TVREP) from the perspective of comprehensive sustainable development is relatively weak, and, to a certain extent, it ignores interactive relationship between the emotional perception of residents from a micro perspective.

Therefore, the paper selects 14 traditional villages in Guanzhong region as the research cases, and combines the results of previous research to determine the following three research objectives: (1) try to construct an evaluation system of the level of TVREP and quantify the abstract TVREP to measure the current level of it; (2) explore the impact of differences in demographic characteristics on the level of TVREP; (3) identify the obstacle dimensions and centrality indexes affecting the improvement of the level of TVREP, so as to provide a scientific basis for the construction of a compensation mechanism for the TVREP. The research examines the results of rural development from the perspective of residents' subjective feelings, hoping to stimulate residents' initiative of consciousness and play their role in village development by responding to their actual needs, provides reference and lessons for in-depth understanding and solving the problem of man-land relations and supplements new perspectives and methods for promoting the revitalization and sustainable development of traditional villages.

2. Literature Review

Since the start of the 21st century, geography has gradually emphasized the influence of emotions on space and society. Anderson and Smith formally proposed the concept of Emotional Geographies and advocated the research of the influence of emotions on spatial and man-land relations in 2001 [7]. The key role of emotions in man-land relations is generally recognized, and scholars have conducted extensive research into them. The research of the traditional village residents' emotional perception centers on the emotional relationship between people and places. Place attachment, which is an important geographic concept in the study of human-land emotions, is the theoretical background for the in-depth exploration needed for this paper [8]. In 1974, Tuan observed and proposed topophilia firstly, and he suggested that places give people a sense of identity and security while providing them with life's necessities [9]. After that, words such as place attachment, sense of place and other expressions of human-land relations continued to emerge [10]. In

1982, Shumaker clarified the definition of place attachment as a positive emotional connection [11]. Williams and Roggenbuck conducted systematic analysis of place attachment firstly, and constructed a two-dimensional scale of place attachment [12,13]. Jorgensen and Stedman considered place attachment as a three-dimensional framework consisting of place dependence, emotional attachment and place identity [14,15]. Hammitt proposed place familiarity, sense of belonging, place rootedness and other factors affecting place attachment [16–18]. Raymond constructed a model containing five dimensions of place identity, place dependence, nature ties, family ties and friend ties to measure the degree of rural landowners' attachment to place [19]. Based on theoretical studies and measurement scale studies of place attachment, scholars have begun to research the different groups' level of place attachment and the influencing factors. Traditional village is the special community [20]. According to Deng Sui, community emotion refers to positive emotions that are conducive to harmonious relationships among community members, such as sense of belonging, sense of identity, sense of intimacy and sense of attachment, among which the sense of belonging is the core of the individual's emotion towards the community [21]. Wu Rong measures the man–land emotions of residents through four dimensions: community trust, community satisfaction, community attachment and urban attachment, and utilizes the independent samples *t*-test method and structural equation modeling to explore the mechanism of the role between the dimensions [22]. Chen Chirui proposes to study the emotions of impoverished farmers through the five dimensions of sense of belonging, sense of happiness, risk aversion and relative deprivation and sense of loss, and constructed a mechanism of emotional reconstruction by using the in-depth interview method and the participatory observation method [5]. Lin Yuancheng measures the emotional connection of rural residents to their place based on the dimensions of place attachment and place identity, and explored the significance of cultural space on the shaping of sense of place [23]. Xing Tenghui explores the influence and constructive role of landscape on the emotions of urban residents [24]. Zou Xueping conducts an empirical study on the emotions of the migrant population and the individual's perceptions of life in the community by using the questionnaire survey method [25]. Lv Long finds that the place attachment of the residents had a significant positive impact on their tendency of inherited behaviors [26]. Finally, Ramkissoon finds that the stronger the residents' place attachment is, the more they will do behaviors that benefits the environment [27]. Conversely, with the booming development of rural tourism and its economic utility, the "human" perception effect has become a new perspective in the research of the development momentum of traditional villages [28]. Scholars have started to focus on the relationship between sense of place and tourism residents [29]. Kim firstly establishes an evaluation model to quantify the perception of tourism destination residents from the positive and negative aspects of tourism impact [30]; Lankford and Howard constructs a tourism impact attitude scale containing two major factor layers and 27 variable index layers, and applied multiple regression analysis to test the effect of variable indicator strata on residents' attitudes [31]; Yoon and Gursoy constructs a scale with four perceptual dimensions of economic, social, cultural and environmental impacts to measure tourism perceptions of residents in tourist destinations, and applied structural equation modeling to analyze the path of influence between the structures [32]. The subsequent studies on the evaluation of the perceptions of residents in tourist destinations are mostly based on the above scale [33], optimize and adjust according to the characteristics of the research object itself.

Previous studies have focused on emotional governance [21,22,24], emotional perception of special groups [25], the mechanism of the interplay between behaviors and emotional perception of rural residents [5,23,26] and tourism impact perceptions [30–32]. These studies lay the foundation for the later studies and constitute a preliminary exploration in terms of human–land emotion research methodology. Traditional village residents are the basic social units in the village integrating production, consumption and bloodline, and their behavioral logic is not only economically rational, but also socially rational [5]. According to the theory of social psychology [3], the degree of satisfaction of residents'

emotional needs governs their behavioral choices, so the emotional perception of residents is a field of concern in the study of human–land relations in traditional villages. Paying attention to the discussion of residents’ emotional factors and improving the level of TVREP which aims to prompt residents to make positive behaviors is of great practical significance to ensure that traditional villages achieve healthy and sustainable development.

3. Connotation Analysis

Emotions, as the center of the individual’s life, can prompt people to keenly perceive changes in the surrounding material environment and social space [34]. Psychology defines it as a person’s attitude towards whether or not objective reality meets the needs of the person. Perception refers to the formation of subjective evaluations that are processed by the brain nervous system when something stimulates the body’s sensory tissue organs [35]. Generally speaking, emotional perception is a person’s attitude and value judgment of objective reality. Combined with scholars’ definitions of residents’ perceptions in tourist destinations [36], the research defines the TVREP as the subjective evaluations of residents’ psychological experiences and attitudinal responses to the impacts brought to traditional villages in the process of rural development. According to social psychology theory, human thoughts and emotions dominate human behavior and decision-making. Accordingly, traditional villages as typical rural settlements coupled with man–land relations, the research argues that the profound influence of residents’ emotional perceptions on the scope of the territory should be emphasized.

Based on the analysis of the connotation of TVREP, combined with the theory of Emotional Geography, the research finds that residents’ emotional perception has two typical features: spatiality and hierarchy. Spatiality means that the formation and change of emotional perception are related to the environment within the territory. Traditional village is a complex system composed of natural landscape, human settlements, economic industry, social culture and other elements, and the elements are in a state of constant evolution under the action of internal and external conditions. In the process of development, they are constantly going through the stages of renewal, decay and abandonment. TVREP changes according to the changes in the village environment, and their perceptual elements are not only limited to material elements such as ecology, habitat and industry, but also include non-material elements such as culture, custom and organization. Hierarchy refers to the process by which primary emotions will be transformed into higher emotions. For example, in the transformation of residents’ place identity to self-identity, residents’ emotional perception of the village at the early stage of village development belongs to spiritual attachment and functional dependence, and grows into willingness to commit and development expectation after long-term social interaction and interpersonal communication.

In the context of complying with the actual needs of the residents and matching with the social development trend, the change of perception elements can improve the level of TVREP, thus enhancing the emotional connection between the residents and the village and stimulating the residents’ consciousness, which is of great practical significance in optimizing the human–land relationship of traditional villages and promoting the sustainable development of traditional villages. The research regards the positive impact of TVREP on the development of traditional villages as an emotional value, which maintains and promotes the living development of traditional villages as an invisible resource. This paper analyzes the connotation and summarizes the characteristics of TVREP, which not only provides a new perspective for the comprehensive understanding of TVREP, but also provides a new way of thinking for the construction of the evaluation index system for the level of TVREP.

4. Materials and Methods

4.1. Research Area

The Guanzhong region is located in the eastern part of Northwest China, bordered by the Loess Plateau in the north and the Qinba Mountains in the south, with the Wei River

which is a tributary of the Yellow River running through the whole area of Guanzhong. It includes the cities of Xi'an, Baoji, Tongchuan, Weinan and Xianyang, and its total area is 55,000 square kilometers. By the end of 2022, the resident population of the Guanzhong region totaled 25.76 million people [37].

Traditional villages in the neighboring areas of Guanzhong region are similar in terms of regional environmental characteristics, residential architectural forms, rituals and customs. Therefore, this paper combines the actual situation and selects a total of 14 traditional villages as the case studies based on the principles of geographic variability and data accessibility (Figure 1). Due to the relative backwardness of infrastructure and social services, the loss of population in traditional villages is extremely serious, with the majority of villages having a resident population of less than 100 households and a structural characteristic of an ageing population, as is the case in the case villages. Based on the results of the pre-survey, age has a significant effect on the TVREP at the 0.05 level of significance, and participants of the same age group corresponded to similar levels of emotional perception. Therefore, we did not distribute too many questionnaires to villages with a single age structure and a small number of permanent residents. However, the case villages not only have excellent natural conditions which made it a developed agricultural region, but also have relatively well-preserved tangible cultural heritage, such as morphological layout, historical streets and alleys, ancient city walls and temples, etc., as well as diverse intangible cultural heritage such as Huayin old chamber, waist drums, paper-cutting and clay sculptures, which are the carriers of the emotional attachments of the residents of the case villages, and provide good samples for the study of the level of TVREP.

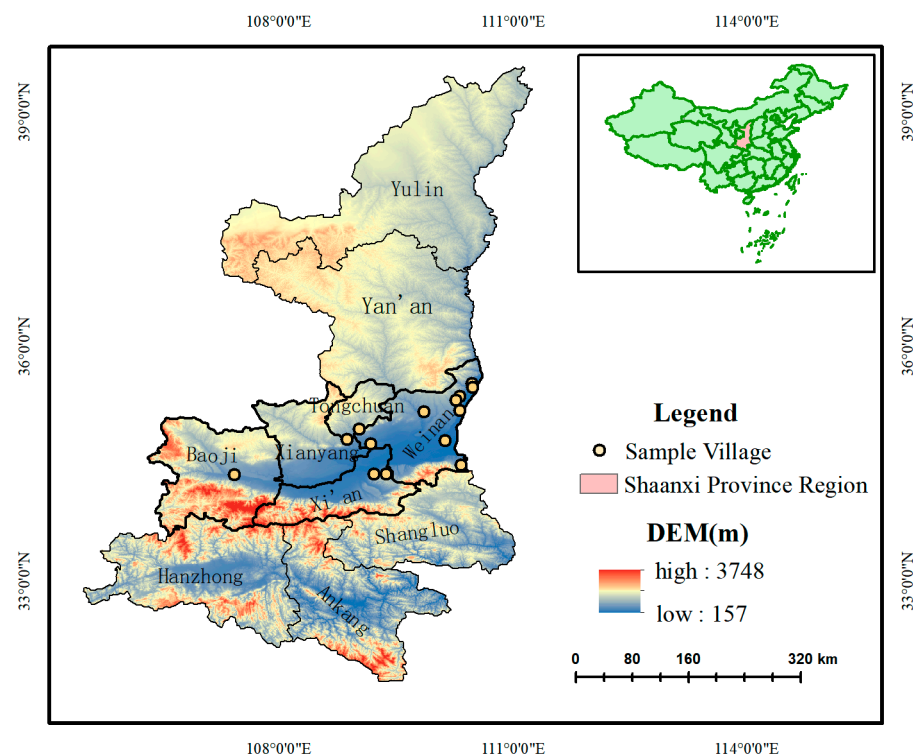


Figure 1. Geographic location of research cases.

4.2. Research Data

4.2.1. Data Collection

The research uses a combination of questionnaires, semi-structured interviews and participatory observation to conduct research on the residents of the cases. The semi-structured interview method can fully understand the emotional experience of the respondents and can be used in combination with the questionnaire method to obtain more comprehen-

sive and accurate data. The members of the research team carried out the research from 29 March 2023 to 5 April 2023 at the research case sited. Firstly, we initially understand the general changes in the natural environment, human settlement, economic and industrial structure, social and cultural aspects of the cases after the implementation of the rural revitalization policy to determine the structure of the research samples and the focus of the interviews. Secondly, we adopted the method of random sampling and took 5–10 households as the target of the survey and distribute the questionnaires in each case place combining with the actual situation. We selected 1~2 interview subjects in each household to understand their emotional experience of living in the village. We determined the number of questionnaires to be distributed according to the number of people in the age group. The number of questionnaires in the study is not large, but it included the resident population of the village with different age stages and other demographic characteristics such as occupation. The questionnaire is divided into two parts: the first part is to understand the basic information of the local residents, and the second part is to measure the residents' emotional perception through subscales which is based on a five-point Likert scale. Each question is scored "5, 4, 3, 2, 1", representing "strongly agree, agree, generally, disagree, strongly disagree". A total of 130 questionnaires are distributed and 123 valid questionnaires are collected, with a validity rate of 95.38%.

4.2.2. Descriptive Statistics

In the research sample (Table 1), the ratio of men to women is 50.41:49.59, and the proportion of people over 65 years old is 35%, and the proportion of people under 45 years old is 14.64%. The aging trend and hollowing out phenomenon are more obvious. 43.09% of the population with elementary school education or below, and the monthly income range is concentrated in the range of less than 2000 yuan, followed by the range of 2000–4999 yuan. Overall, most of samples are engaged in agriculture and service industry, and their education level is on the low side. In summary, the results of the research are in line with the current situation of the development of modern rural society.

Table 1. Demographic characteristics of the research sample.

Demographic Characteristics	Percentage	Demographic Characteristics	Percentage
Gender		once (%)	17.89
male (%)	50.41	twice and above (%)	14.63
female (%)	49.59	Occupation type	
Age		functionary (%)	4.88
24 and below (%)	4.07	factory worker (%)	2.44
25~45 (%)	10.57	farmer (%)	60.98
46~65 (%)	50.41	service worker (%)	16.26
above 65 (%)	34.96	professional (%)	4.07
Education level		student (%)	3.25
primary and below (%)	43.09	others (%)	8.13
junior Middle (%)	29.27	Source of income	
senior Middle (%)	19.51	fixed wage (%)	19.51
bachelor and above (%)	8.13	business (%)	9.76
Health condition		agricultural (%)	56.91
poor (%)	3.25	work outside (%)	7.32
average (%)	17.07	Others (%)	6.50
good and above (%)	79.68	Monthly income	
Political Status		10,000 and above (%)	0.81
party number (%)	14.63	5000–9999 (%)	4.07
masses (%)	85.37	2000–4999 (%)	30.89
Community Participation		2000 and below (%)	64.23
never (%)	67.48		

4.3. Research Methods

4.3.1. Measurement Methods of the TVREP

(1) First of all, we determined the measurement scale of TVREP. The description and measurement of emotion itself has a certain degree of complexity, and the question of how to use models to measure and evaluate complex emotions more accurately remains open. Environmental psychology suggests that the man–land emotion is a measurable and cuttable psychological representation. In the modern assessment system, constructing models and designing scales are important research tools and methods to study the man–land emotion. The paper proposes the design of a Likert scale to measure the level of TVREP, and the selection of measurement dimensions and indicators is the basic work for the design of the scale. On the basis of the existing measurement framework, the research is based on the typical characteristics of residents' emotional perception, taking into account that traditional villages are in the dynamic development of the times, innovatively put forward the logic of "spiritual attachment-functional dependence-developmental cognition", constructed the traditional village residents' emotional perception measurement scale containing three dimensions of the sense of belonging (SOB), the sense of happiness (SOH), and the perception of development (POD). The three dimensions measure the TVREP from an emotional perspective, a material perspective and a developmental perspective, covering residents' attitudes toward the present and future development of the village. Variables are selected based on previous studies and the purpose of the study, and the variables are juxtaposed. Variables under the same dimension measure the level of that dimension. The paper then screens the indexes according to the results of the scale reliability and validity test, and an evaluation index system is formed (Figure 2).

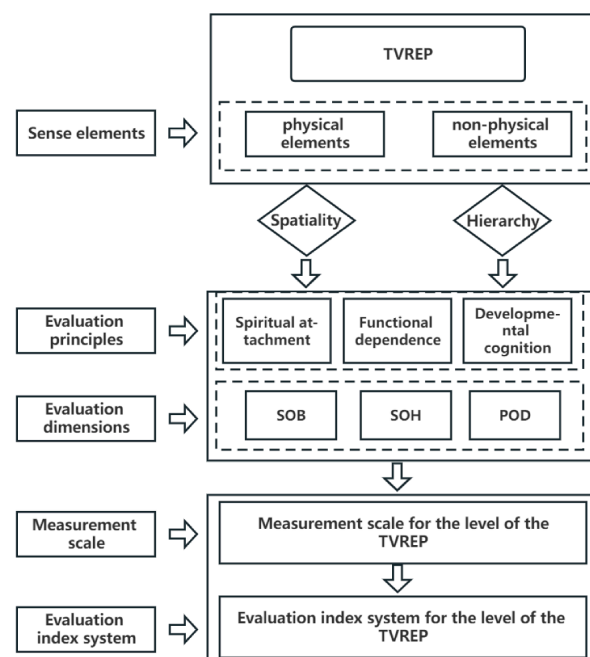


Figure 2. Theoretical framework of evaluation index system of the level of TVREP.

Sense of belonging (SOB). The SOB is a deep emotional bond that connects residents to a place, and refers to the psychological state of categorizing an individual into a certain geographical collection of people. This psychology is both a confirmation of one's identity and is colored by individual feelings, such as emotions of devotion, attachment and fondness for the community [38]. In this paper, the SOB emphasizes a person's psychological emotional attachment to place. The SOB scale is modified on the basis of Williams' place attachment measurement scale, with reference to the studies of Shan Jingjing [39] and Zhou Chaoxing [40], etc. The specific indexes are: G-01 Emotionally attached to the village; G-02 Willingness to live in the village forever; G-03 Willingness to contribute to the village; G-04

I will give my best efforts to protect the village when the collective interests of the village are harmed; G-05 I am proud of the traditional culture of the village.

Sense of happiness (SOH). The SOH refers to the subjective judgment of residents' satisfaction resources and facilities and other service elements provided by the village [41]. In this research, The SOH focuses on people's dependence on elements such as resources and facilities provided by the place, which reflects residents' functional dependence on the place in the physical-spatial dimension. It is the information feedback of rural development and infrastructure construction, as well as the starting point and landing point of policy formulation and improvement. The SOH scale is designed based on the American humanistic psychologist Maslow's hierarchy of needs, which estimates the SOH through the subjective feelings of residents. The specific indexes are: X-01 Satisfied with the level of education; X-02 Satisfied with the situation of medical care; X-03 Satisfied with the accessibility of transportation; X-04 Satisfied with the leisure and recreation facilities; X-05 Satisfied with the living surroundings; X-06 Having harmonious relations with the neighbors; X-07 Having close ties with family members; X-08 Satisfied with natural disaster defense measures; X-09 Satisfied with the situation of public security; X-10 Satisfied with the infrastructure services; X-11 Feeling respected; X-12 Basic rights are guaranteed.

Perception of development (POD). The POD refers to the residents' cognition and judgment of development potential of the village's economy, industry, human settlements, society and culture on the basis of their reflection on the current state of development of the village in the future. Residents' positive POD tends to increase their sense of responsibility and participation in the village, prompting them to make positive responses. The paper sets the following indexes in terms of both economic income and social development: D-01 Increase in household income; D-02 Increase in employment opportunities; D-03 Civilization of social customs; D-04 Efficient government services; D-05 Heritage of traditional culture; D-06 Optimization of human settlements; D-07 Sustainable development of villages.

(2) Secondly, we screened the measurement indexes and constructed the evaluation index system of the level of TVREP based on the results of the scale reliability and validity test. The research uses SPSS 25.0 to analyze the reliability and validity of the scale, G-04 and G-05 of the SOB scale and X-10 and X-11 of the SOH scale are deleted based on the judgment indexes such as the correlation coefficient between the scale indexes and the total score. Eventually, the reliability and validity of the scale reached 0.837 and 0.780 (Tables 2 and 3), respectively, which proved the reliability and stability of the scale (Table 4).

Table 2. Scale reliability statistics.

Subscale	Cronbach's α	Cronbach's Alpha Based on Standardized Terms	Number of Indexes
SOB	0.709	0.709	3
SOH	0.739	0.736	10
POD	0.770	0.770	7
Total	0.836	0.837	20

Table 3. Scale validity statistics.

KMO and Bartlett Test			
KMO value			0.780
Bartlett's Sphericity Test	approximate chi-square		722.481
	degrees of freedom		190
	p-value		0.000

Table 4. Evaluation index system of the level of TVREP.

Dimension		Index	Weight
SOB (0.3319)	Emotional attachment	Emotionally attached to the village	(G-01) 0.0746
	Willingness to live	Willingness to live in the village forever	(G-02) 0.0593
	Willingness to commit	Willingness to contribute to the village	(G-03) 0.0157
SOH (0.3279)	Service facilities	Satisfied with the level of education	(X-01) 0.0864
		Satisfied with the situation of medical care	(X-02) 0.0468
		Satisfied with the accessibility of transportation	(X-03) 0.0447
		Satisfied with the leisure and recreation facilities	(X-04) 0.0807
		Satisfied with the living surroundings	(X-05) 0.0354
	Social relationships	Having harmonious relations with the neighbors	(X-06) 0.0202
		Having close ties with family members	(X-07) 0.0247
	Personal safety	Satisfied with natural disaster defense measures	(X-08) 0.0570
		Satisfied with the situation of public security	(X-09) 0.0345
	Basic right	Basic rights are guaranteed	(X-10) 0.0623
POD (0.3401)	Economic income	Increase in household income	(D-01) 0.0725
		Increase in employment opportunities	(D-02) 0.0690
	Social development	Civilization of social customs	(D-03) 0.0222
		Efficient government services	(D-04) 0.0754
		Heritage of traditional culture	(D-05) 0.0490
		Optimization of human settlements	(D-06) 0.0199
		Sustainable development of villages	(D-07) 0.0497

(3) Thirdly, we calculated the level of TVREP. The entropy method is used to determine the weights of the evaluation indexes. The entropy method is a method of objectively assigning weights to the indexes, which is applicable to the relative evaluation of multiple indexes, and can eliminate the interference of subjective factors in the calculation of weights and make the evaluation results more accurate and scientific. Then, the weighted summation method is used to calculate the level of TVREP. The specific formula is [2]:

$$Y_{ij} = \frac{X_{ij}}{\sum_{i=1}^n X_{ij}} \quad (1)$$

$$e_j = -\frac{1}{\ln(n)} \sum_{i=1}^n Y_{ij} \ln(Y_{ij}) \quad (2)$$

$$d_j = 1 - e_j \quad (3)$$

$$W_j = \frac{d_j}{\sum_{j=1}^p d_j} \quad (4)$$

$$S_{im} = \sum_{j=1}^n X_{ij} \times W_j \quad (5)$$

where X_{ij} denotes the score of the i -th resident on the j -th index, Y_{ij} denotes the weight of the i -th resident's characteristics under the j -th index, n is the number of interviewed residents, e_j is the information entropy of the j -th index, d_j is the redundancy of the information entropy of the j -th index, w_j is the weight of the j -th index, p is the number of indexes ($p = 20$), S_{im} denotes the level of the i -th resident's emotion perception towards the m -th village and m is the number of cases ($m \in [1, 14]$).

4.3.2. Analysis Methods of the TVREP

(1) Obstacle degree model

The research aims not only to measure and evaluate the level of TVREP, but also to clarify the primary obstacle factors that constrain its enhancement in order to formulate targeted policies. In this paper, we use the obstacle degree model and introduce the obstacle degree, factor contribution degree and index deviation degree to identify and diagnose the obstacle dimension of evaluation index system of the level of TVREP. The specific formula is [42]:

$$F = W_j \times P_y \quad (6)$$

$$I_j = 1 - X'_{ij} \quad (7)$$

$$U_y = \sum \frac{F \times I_j}{\sum_{j=1}^n (F \times I_j)} \quad (8)$$

where P_y is the weight of the y -th dimension, I_j is the index deviation, X'_{ij} is the standardized score and U_y is the obstacle degree, which indicates the degree of influence of a single dimension on the level of TVREP.

(2) Network analysis model

The network analysis model is widely used in psychological research, and in recent years it has been extended to the fields of sociology and other social sciences. It takes the observed variables as primary indicators, and adopts the method of graph theory to establish the relationship network between the observed variables, whose nodes are the observed variables such as attitudes, behaviors, feelings, etc., and the connecting lines are the links between the observed variables. The thickness of the connecting lines represents the strength of the relationship between the nodes, and the network structure as a whole highlights the interactive relationship between the observed variables. The centrality node can activate or predict more other nodes in the network and influence the whole network, which is the focus of the network analysis model research analysis [43,44].

Firstly, the research used R 4.3.0 to construct the network analysis model of TVREP. The model takes residents' evaluation responses as "nodes" and the interrelationships between nodes as "edges". The thickness of the edges represents the strength of the relationship between the nodes, which shows the interaction between the nodes. Secondly, the research calculates node centrality to quantify the importance of different nodes in the network. The relevant departments can achieve rapid improvement of the level of TVREP by applying interventions to high centrality nodes to activate or influence more other nodes and the overall network structure.

5. Results and Analysis

5.1. Evaluation of the Level of the Case Residents' Emotional Perception

5.1.1. Overall Evaluation

There are significant differences in the level of emotional perception, because of the different stages of rural development in each traditional village. The research expands the evaluation results by a factor of 20 to present a better visualization of the data. The research categorizes the level of the TVREP into three tiers by using the natural breaks. The low-level values are concentrated in the range (46.701, 62.986], the average level values are concentrated in the range (62.986, 74.662], and the high level values are concentrated in the range (74.662, 92.301].

The level of the TVREP ranges from 46.70 to 92.30, fluctuating above and below a score of 70.01. The research categorizes the level of the TVREP into three tiers by using the natural breaks, in which 29.27% of the respondents has a high level of emotional perception of their villages, 46.34% of the respondents has an average level of emotional perception and 30 respondents are at a low level of emotional perception of their villages, which accounts for 24.39% of the total number of respondents. In summary, the level of TVREP is at the upper-middle class. Residents' emotional perception of the village is based on

their subjective perception of the material environment and spiritual environment of the village, and when residents believe that the existing conditions of the village can satisfy their material needs and spiritual needs, their emotional perception of the village will also increase. With the promotion of the rural revitalization strategy, the relevant departments have carried out various modernization reforms and constructions in traditional villages, improving the quality of life of the residents and substantially improving the infrastructural services, public services and living environment of the villages compared with those of the past.

5.1.2. Dimension Evaluation

The level of residents' perception in different dimensions is non-equilibrium based on the evaluation results of the dimensions. It is found that the mean of the dimension of SOB is greater than the mean of the other two dimensions (Figure 3), indicating that the TVREP mainly originate from the SOB, and this conclusion is consistent with the results of previous research [45]. There is still a big gap between the current level of infrastructure services and the residents' demand for a better life in traditional village, which is more likely to lead to migration and village decline, and is not conducive to the sustainable development of traditional villages. Specific analysis is shown in Figure 4.

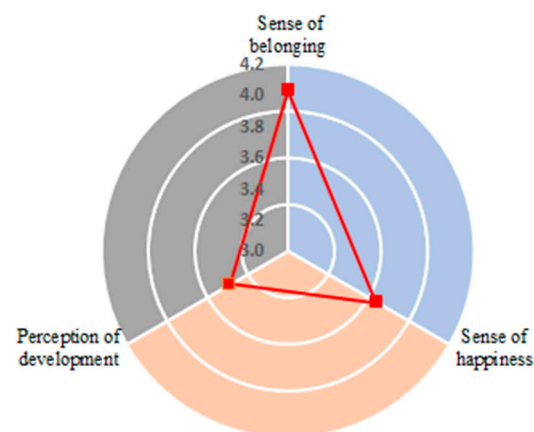


Figure 3. Mean of evaluation dimensions.

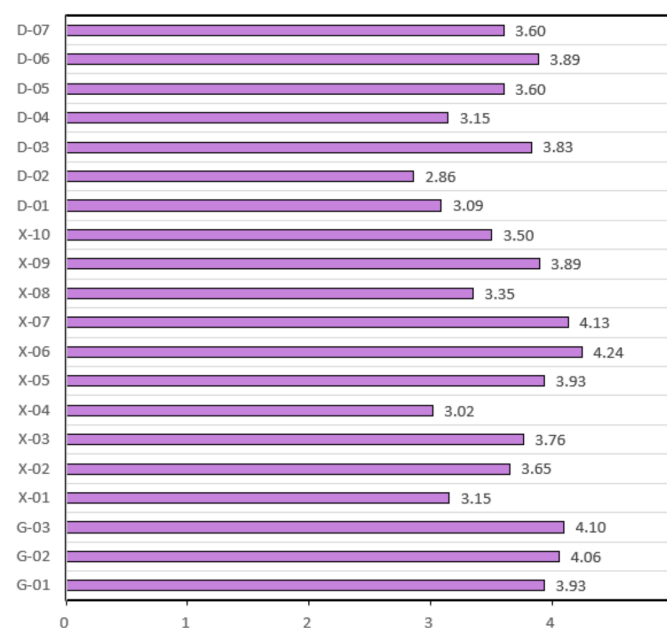


Figure 4. Mean of evaluation indexes.

(1) In the dimension of SOB, residents' emotional attachment, willingness to live and willingness to commit in the village are all at a high level. Residents' willingness to commit in the village in particular has reached a score of 4.10, which indicates that most of the residents are willing to contribute to the conservation, construction and development of the village. It characterizes that the residents have a stronger spiritual attachment to the village which they belong psychologically.

(2) In the dimension of SOH, residents are most satisfied with the current state of social relations in traditional villages, which is consistent with the characteristics of traditional villages as "societies of acquaintances". Comparatively speaking, residents' satisfaction is lower in the four aspects of education level, leisure and recreational facilities, as well as natural disaster defense measures and guarantee of basic rights. The data shows that educational resources, spiritual and cultural life in traditional villages are relatively scarce, and the mechanism for guaranteeing the basic rights of residents is not yet perfect, and because of the climate variability in recent years, natural disasters such as floods are frequent, which is a problem that needs to be emphasized in villages where agriculture is the main economic industry. Against the background of the implementation of the rural revitalization strategy, residents' pursuit of a happy life is not only limited to material needs, but also increasingly demanding in terms of spiritual life. The government needs to provide policy guidance on bridging the gap in educational resources, enriching residents' spiritual and cultural life, optimizing the mechanism for guaranteeing the rights of the residents, and perfecting the mechanism for coping with natural disasters in order to respond to the actual needs of the residents, then their SOH can be enhanced.

(3) In the dimension of POD, residents have a positive attitude towards the future development of social customs, traditional culture and the human environment, and a negative attitude towards the future development of economic income, employment opportunities and government services. This data shows that villages have remarkable results in the construction of rural civilization, traditional culture inheritance and human habitation management. However, due to the problems of industrial homogenization, the economic development of traditional villages is in decline, with fewer jobs and income channels for residents and lower income level, leading to negative perceptions of future economic income, employment opportunities and government services.

5.2. Analysis of the Impact of Differences in Demographic Characteristics

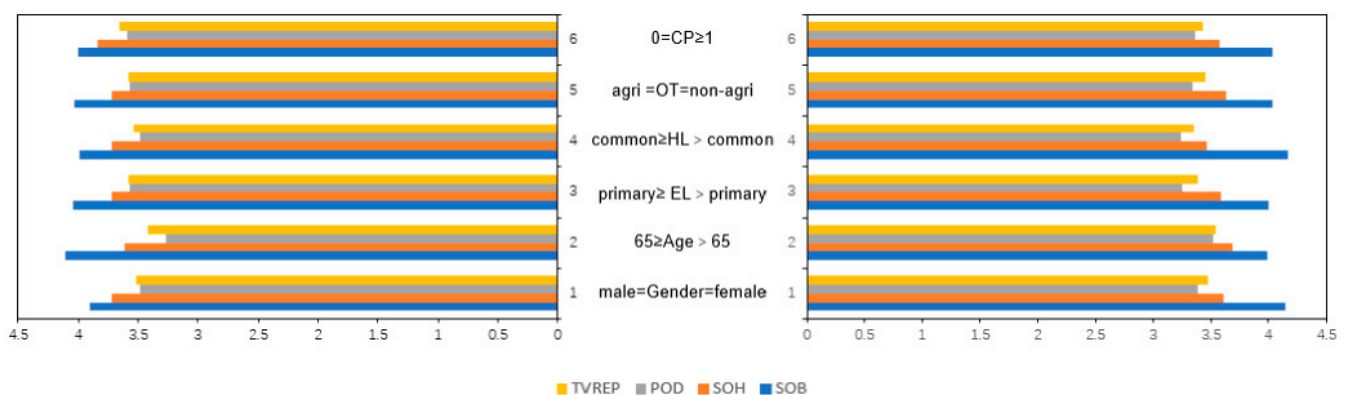
The research uses a combination of independent samples *t*-test and independent samples nonparametric test to examine how demographic characteristics affect the TVREP. We use independent samples nonparametric test to verify whether demographic characteristics have an effect on the SOB, the health level and occupation type, and whether these factors have an effect on the SOH. In addition to that, all other data conforms to a normal distribution, and we applied an independent samples *t*-test to analyze the impact of differences in demographic characteristics. It is found that there is a significant effect of differences in residents' demographic characteristics on the SOH, POD and TVREP (Table 5), and that there is no significant correlation with the SOB, as shown in the following analysis:

(1) Dimension analysis: the SOH of residents with different health level shows a difference at the 0.05 level of significance, and the SOH of residents with a different frequency of community participation shows a difference at the 0.01 level of significance. Demographic characteristics such as age, health level, occupation type and community participation have a significant effect on the POD of traditional village residents at the 0.05 level of significance. The POD of residents with different education levels shows a difference at the 0.01 level of significance. Observing the mean value (Figure 5), age is negatively associated with the POD of residents, non-agricultural residents have a higher POD compared to agricultural residents and the remaining two demographic characteristics and the frequency of community participation are positively associated with the POD.

Table 5. Analysis of the results of independent samples *t*-test and nonparametric test.

Demographic Characteristics		SOB		SOH		POD		TVREP	
		Mean	Z	Mean	T/Z	Mean	T	Mean	T
Gender	male = 1	4.15	−1.326	3.61	−1.353	3.38	−0.983	3.48	−4.43
	female = 2	3.91		3.72		3.48		3.52	
Age	≤65 = 1	3.99	−0.473	3.69	0.851	3.52	2.437 *	3.54	1.320
	>65 = 2	4.11		3.61		3.27		3.42	
Education level (EL)	≤primary = 1	4.00	−0.591	3.59	−1.567	3.25	3.379 **	3.39	−2.245 *
	>primary = 2	4.05		3.72		3.57		3.58	
Health level (HL)	≤common = 1	4.17	−0.878	3.46	−2.391 *	3.24	−2.604 *	3.35	−1.743
	>common = 2	3.99		3.72		3.48		3.54	
Occupation type (OT)	agriculture = 1	4.03	−0.146	3.63	−0.888	3.34	−2.095 *	3.45	−1.510
	non-agriculture = 2	4.03		3.72		3.57		3.58	
Community Participation (CP)	0 = 1	4.04	−0.109	3.58	−2.872 **	3.36	−2.232 *	3.43	−2.419 *
	≥1 = 2	4.00		3.84		3.59		3.66	

Note: * $p < 0.05$, ** $p < 0.01$; emboldened parts are independent samples nonparametric test.

**Figure 5.** Comparison of means based on groups with different demographic characteristics.

(2) Overall analysis: education level and community participation have a significant effect on the TVREP at the 0.05 level of significance. The TVREP increases with the level of education, and the result consistent with Wu Rong's findings [22] that the strength of place attachment is significantly and positively correlated with the level of education. Residents with community participation experience have a higher level of emotional perceptions compared to those without. Observing the means (Figure 5), the total mean for females (3.52) is greater than that for males (3.48), which means that females have a higher level of emotional perceptions of traditional villages, and this result is in line with the findings of previous studies. As age increases, the TVREP decreases, mainly due to the low level of the elderly population, and it has been found that the insecurity of economic income due to increased age is the main reason for the decline in the SOH and the POD. In addition to this, as the level of health improves, so does the level of emotional perception of the population.

5.3. Dimension Obstacle Degree Analysis

The article applies the obstacle degree model to analyze the degree of obstacle of each dimension layer to the enhancement of the TVREP. The interviewed residents' perception levels of different dimensions are scored as mean values, summed and averaged and assigned to the villages to which they belong and the degree of obstacle is ranked in descending order as follows: $POD > SOB > SOH$, which suggests that POD is a key factor impeding the enhancement of the TVREP (Table 6).

Specifically, Qingshui Village, Dangjia Village, Lingquan Village, Yaotou Village, Mukezhai Village and Shangshan Village all have the SOB as the primary obstacle dimension. After the research and visit, we found that these villages have rich historical and cultural resources, but the destruction of the rural landscape and the weakening of the traditional cultural atmosphere have led to the gradual change of the residents' emotional

attachment to their villages from a close one to an estranged one. Simultaneously, most of the working population chose to go out to work for a living and settle down because the existing economic industries of the villages are unable to satisfy their material needs. The weakening of traditional culture and backwardness in the economic industries are the main reasons for the SOB. Renzong Village is the only case village where the SOH is the primary obstacle dimension. Renzong Village is located on Mount Li, the residents are scattered in the mountainous area and make a living by planting, and the public service facilities such as education, medical care and transportation are not perfect. The overall weak economic income and service facilities are the main reasons for the low SOH of the residents. The primary obstacle for Dazhai Village, Zhouyuan Village, Baoshe Village, Nanchangyi Village, Lianhu Village and Xiqin Village and Sunyuan Village is the POD. With the implementation of the policy of precise poverty alleviation and the promotion of the strategy of rural revitalization, these villages have actively developed cultural and tourism industries, improved basic service facilities, public service facilities and welfare protection mechanisms, satisfied the material and spiritual needs of the residents and improved the quality of life of the residents—and the residents' SOB and SOH have been greatly enhanced. However, due to the vulnerability of the existing industries in the villages, as well as the insufficient development of endogenous dynamics and other problems, the residents' POD has generally been low. In summary, due to the disparity in the development level of rural revitalization of traditional villages in different regions, the factors hindering the enhancement of the TVREP are not the same. It is necessary to put forward targeted measures according to the actual situation of the region in which the villages are situated, so as to accurately enhance the TVREP, strengthen the emotional connection between the residents and their villages and increase the enthusiasm of the residents to participate in the protection, construction and development of the villages, then promote the high-quality and sustainable development of the traditional villages.

Table 6. Dimension obstacle degree analysis in different villages.

Name	SOB	SOH	POD	Type
Renzong	26.96	40.74	32.30	H
Qingshui	40.08	25.08	34.84	B
Dangjia	35.80	30.37	33.83	B
Dazhai	0	38.28	61.72	D
Zhouyuan	36.37	25.02	38.61	D
Baishe	30.71	31.31	37.98	D
Lingquan	51.03	21.97	27.00	B
Yaotou	41.89	22.70	35.41	B
Nanchangyi	33.57	27.51	38.92	D
Lianhu	23.14	28.23	48.63	D
Xiqin	20.77	35.86	43.36	D
Sunyuan	31.42	33.57	35.01	D
Mukezhai	41.31	34.54	24.15	B
Shangshan	51.65	47.18	1.18	B
Mean	33.19	31.60	35.21	

5.4. Index Centrality Analysis

We aimed to explore the interrelationships between the evaluation responses of traditional village residents to the index to provide assistance in proposing targeted programs from a micro perspective. The research applies the Gaussian graph theory model to the index data to form a biased correlation network, and constructs an analytical model for the TVREP (Figure 6), as follows:

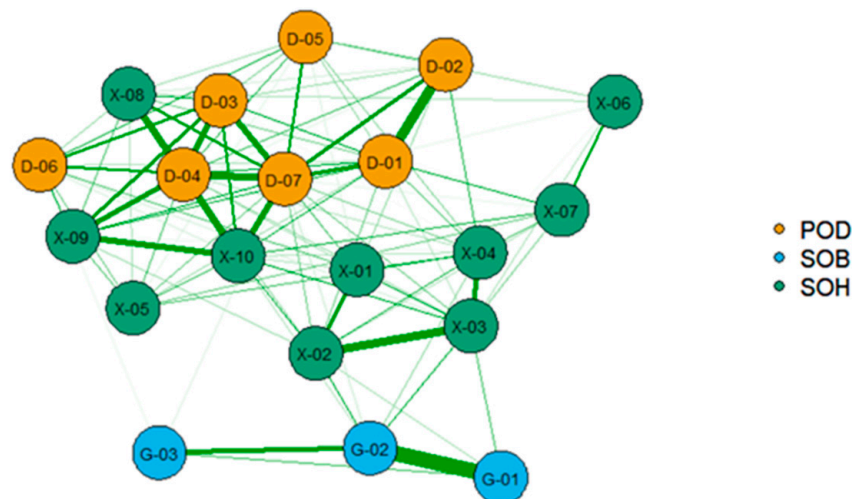


Figure 6. Network analysis model of TVREP.

Firstly, it was found that the three sub-networks of the SOB, SOH and POD shows independent and intertwined relationships, and all indexes are positively correlated with each other. In the dimension of the SOB: G-01, G-02 and G-03 have the large connecting weights, indicating that there is a significant relationship between emotional attachment and willingness to live and willingness to commit in the case site. When the residents' willingness to live in the village changes, their emotional attachment and willingness to commit change in the same direction. In the dimension of the SOH, there is a more significant relationship between X-02 and X-03, indicating that there is a positive correlation between residents' satisfaction with the medical condition and their satisfaction with the accessibility of transportation. In the dimension of the POD, there are more paths of intrinsic linkage between the indexes and the connecting weights is larger, for example, D-01 and D-02, D-04 and D-07 have a significant relationship of mutual reinforcement.

Secondly, the centrality of each node in the network model of the TVREP in the case research area is calculated. In this paper, the three centrality indicators of "strength", "closeness" and "betweenness" are selected to compare the importance of each node in the network structure (Figure 7). The data show that the node "Sustainable development of villages" (D-07) is the center of the network, ranking highest in terms of strength and closeness and second in terms of betweenness. This node has the largest weighted sum of lines with other nodes, and its overall distance from other nodes in the network is relatively close, so its influence will spread to other nodes faster, and has the greatest impact on the network structure. Then the node "willingness to live" (G-02) and "basic rights are guaranteed" (X-10) are the central nodes of the SOB sub-network and SOH sub-network. Therefore, improving the residents' positive perception of the potential for sustainable development of the village is a key way to enhance the level of TVREP and we should also pay attention to the important roles of improving the residents' willingness to live in the village and guaranteeing the basic rights of the residents in the process of enhancing the SOB and the SOH.

Finally, test the stability of the centrality index. With the reduction of the sample size, the stability of the centrality index gradually decreases, and the CS coefficient is above 0.25 (Figure 8), which proves that the data analysis is more accurate, and the node centrality index has better stability.

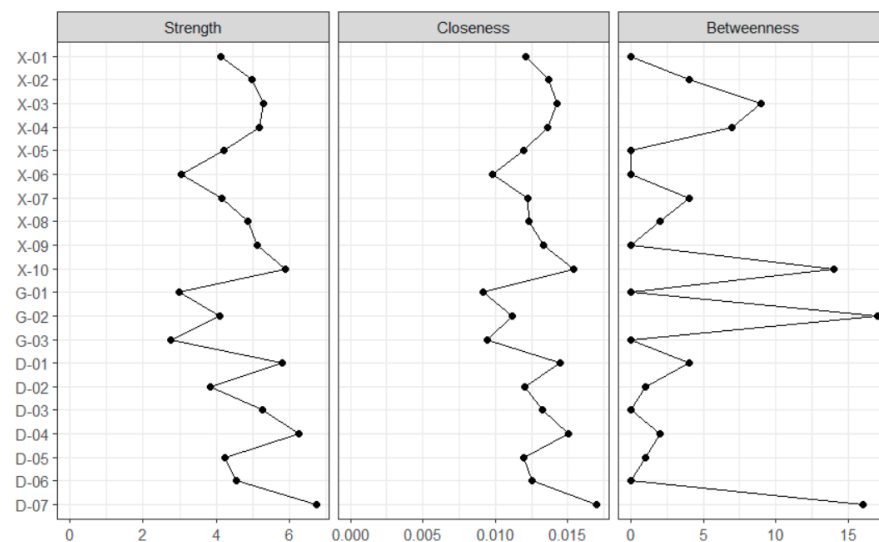


Figure 7. Calculation of centrality index.

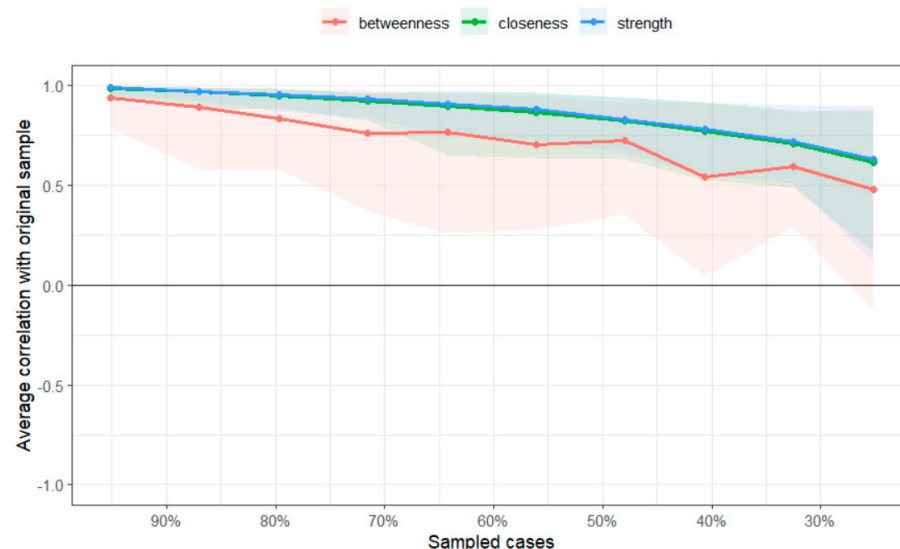


Figure 8. Stability test for centrality index.

5.5. Dynamic Compensation Mechanisms (DCM)

Compensation is to supplement the consumption and loss of resources in the production process in material or non-material form [46]. In order to achieve the sustainable development of traditional villages, it is important to compensate for residents' emotional perception, and to restore and improve the value and function of emotional resources that have been reduced due to uneven development. Therefore, the paper constructs a dynamic mechanism of TVREP based on the above analysis (Figure 9).

(1) The government and business constitute the main body of the compensation mechanism together. As the competent authority and service department for the implementation of the rural revitalization strategy, the government regulates, improves, enriches, optimizes and innovates the industrial structure, service facilities, cultural construction and regulatory system, and participates in the decision-making mechanism through the formulation of policies and the preparation of rules and other measures, and is the driving force for the compensation of the TVREP. Businesses are important forces for promoting the economic development of villages. Under the guidance of the government's investment policy, business have injected modern vitality into the economic, cultural and social development of traditional villages through investment, donations and technical assistance, greatly

improving the efficiency of the revitalization of the villages, and they are an auxiliary force for the compensation of the TVREP.

(2) Residents are the objects of the compensation mechanism, and their material and spiritual needs are the starting point for the development of the compensation path. Residents are both the creators and the bearers of village, and only they can enable the protection and active transmission of cultural heritage such as folklore, beliefs, skills and the human environment. Therefore, the relevant policies must fully meet the needs of the residents.

(3) The level of the TVREP is a mapping of the role of the coupling process of internal and external factors such as geographic environment, resource endowment, development policies, etc. There are differences in the current status of the level of TVREP in different villages; therefore, it is necessary to refine diversified paths of compensation for different types of villages. The relevant departments can select appropriate paths to compensate for the residents of the villages with low level of emotional perception due to the imbalance in the development in accordance with the current status of the villages.

(i) Fast compensation path. The quick compensation path is aimed at traditional villages where the primary obstacle is the SOB or SOH, and Shangshan Village, Lingquan Village and Renzong Village are typical examples of this path. In the context of modernization development, if the village can respond to the material and spiritual needs of the residents in a timely manner, then the foreign workers choose to return to their hometowns for employment, and their identification with the place gradually rises to self-identification under the effect of time, forming a close emotional connection between the residents and the village, and then increasing the SOB. Happiness is the cognitive and emotional subjective evaluation of the quality of life made by the residents, in today's social framework, the residents' daily livelihood demands are increasing, which puts forward higher requirements for the optimization and transformation of the level of "hard" facilities and "soft" management efficiency of traditional villages. The government's efforts to optimize the allocation of resources through administrative means such as policy protection and financial inclination, to improve the system of power protection and to continue to promote the modernization and equalization of public services and the livability of the human settlements, in order to narrow the gap between urban and rural areas, are key measures for improving the quality of life of the residents, and the safeguarding of the basic rights of the residents is an effective way of enhancing the sense of well-being of the residents. A high level of SOB and SOH is the foundation of harmonious people-land relations. The lack of both directly causes a break in the emotional connection between people and land, resulting in problems such as the hollowing out and aging of villages, and thus accelerating the process of village decline. Therefore, the emotional perception of the residents of this type of traditional village needs to be quickly compensated under the leadership of the government.

(ii) Progressive compensation path. The progressive compensation path is applicable to traditional villages where the primary obstacle is the POD, and the typical representatives of this path are Dazhai Village and Lianhu Village. When the residents' SOB and SOH are at a high level, improving the residents' positive perception of the village's sustainable development by enriching the village's economic business and improving the effectiveness of government services is an effective way to enhance the residents' POD. Government and businesses can optimize the allocation of resources through administrative and market means, with the former supporting villages in terms of capital, industry, and management through the improvement of policy mechanisms and financial tilting, and the latter enhancing development efficiency through technical support and capital injection. By combining local and neighboring natural and human resources, the two main bodies innovate the development mode of traditional villages, break through the bottleneck of traditional village development, cultivate the collective economy—with "government + business + village collective + resident" as the main operating body, involving production, leisure, recreation and ecology, etc.—and improve the characteristic agricul-

tural industry chain, so as to provide livelihoods for the relatively unskilled rural laborers. The collective economy will improve the characteristic agricultural industry chain, provide livelihood capital and employment paths for rural laborers who are relatively lacking in culture and skills, promote the common development of multiple livelihoods in agriculture, part-time agriculture and non-agriculture and improve the ability of comprehensive development and sustainable development of agriculture. Industrial prosperity is a driving force for prosperity and development, but it is also a complex issue that involves many aspects, so improving the level of POD is a relatively long and gradual process.

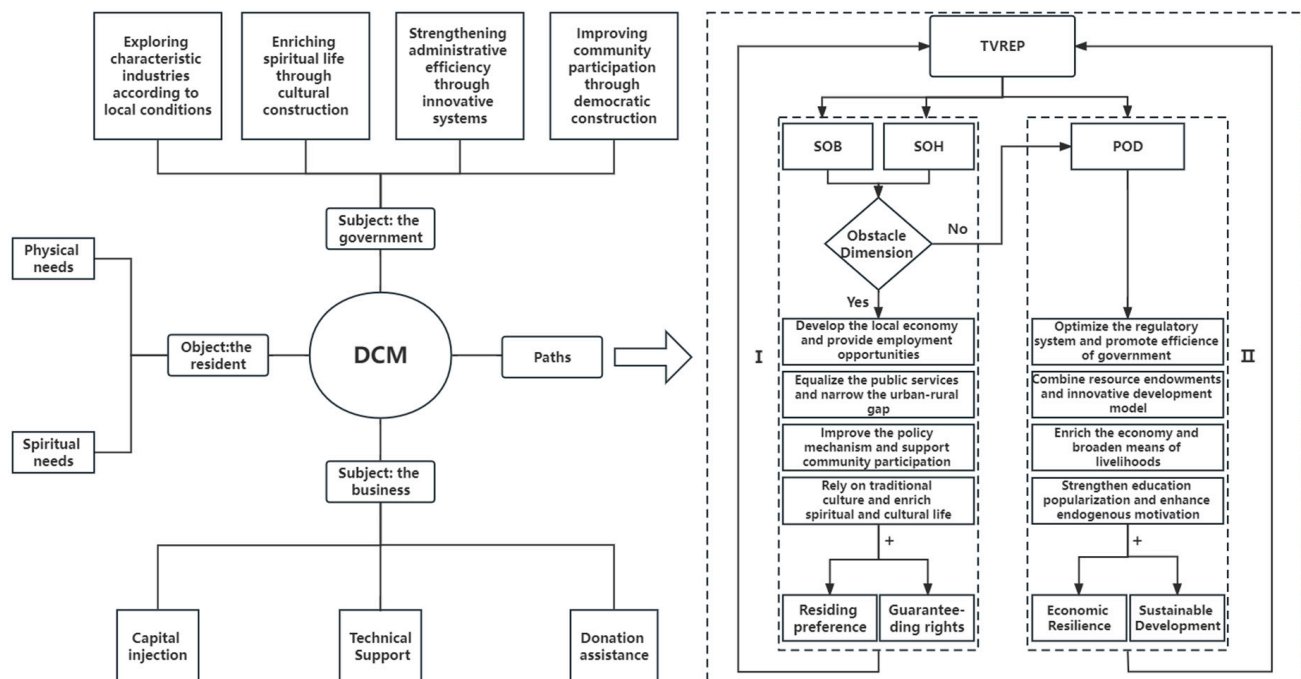


Figure 9. Dynamic compensation mechanisms for the TVREP.

6. Discussion

The research focuses on the “people” who are co-temporal with the development of villages, and suggests that the emotional perception of the residents, as a resource, has the same value as the material heritage in terms of maintenance and utilization. Supported by the theory of place attachment, the paper measures the level of TVREP, reveals the main obstacles hindering the enhancement of the level of TVREP using the obstacle model, identifies high centrality nodes using the network analysis model and constructs a dynamic compensation mechanism in order to provide policy ideas for the human-centered high-quality sustainable development of the traditional villages.

With the “emotional turn” in Western geography, and the joint drive of the society’s increased awareness of sustainable development, scholars’ research on traditional villages is moving towards refinement and interdisciplinary. Village residents’ emotional perception issues, such as place attachment and identity, have been studied in depth [5,26,27]. Scholars explore the traditional village residents’ perception on the impact of tourism [30–32]; formulate the related scales and discuss the internal and external factors affecting residents’ perception [33]; pay attention to the role of the socio-cultural space on the construction of residents’ emotional perception [23]; and the impact of residents’ emotional perception on residents’ behavioral tendencies [24]. Comparatively speaking, this paper measures the level of TVREP from the perspective of comprehensive sustainable development, and cites obstacle degree mode and the network analysis model to identify the obstacles limiting the improvement of the level of TVREP at the dimensional level and explore the interconnections and mechanisms between residents’ perceptual responses to different variables at the indicator level from a micro perspective, and then constructs a compensation

mechanism based on the empirical results and the analysis. It has greatly enriched the content and methodology of the research in this field. In summary, firstly, the research on the TVREP is a cross-discipline involving human geography, environmental psychology and sociology, etc. Based on summarizing the existing research, the paper draws on the research methodology of environmental psychology and sociology to expand the content of the research on the TVREP, which not only provides a more comprehensive technical means for the protection and development of traditional villages, but also follows the trend of interdisciplinary research. Secondly, the paper enriches the micro-scale research on “people” in the context of sustainable development. Based on the logic of “spiritual attachment-functional dependence-developmental cognition”, the paper explores the level of the TVREP to identify genuine concerns of residents to develop corresponding management policies, which is crucial to obtaining the support of local residents for the development of the village. Finally, the paper refines the basic research on the development of traditional villages, form a comprehensive and scientific research framework combined with the current research which focus on the perspective of tangible and intangible cultural heritage for the sustainable development of traditional villages.

Residents’ emotional perception presents different states under the action of different geographical elements, which is a complex problem involving multiple dimensions and layers. There are some limitations to this paper: (1) the paper only selects 14 national traditional villages in Guanzhong area as the research cases, so it is necessary to supplement traditional villages in this area or other provinces and cities to improve the generalizability of the research in the future. (2) The evaluation system of the TVREP constructed in the paper is feasible, but it is still exploratory research. The analysis of connotation, index selection and system construction needs to be further deepened in the future. (3) The technology of facial expression recognition can be used to accurately analyze the residents’ attitudes, experiences and psychological feelings by evaluating the changes in emotions. (4) Residents’ emotional perception has the typical characteristic of spatiality and hierarchy, but due to the problem of data acquisition, the research does not involve the analysis of dynamic changes in the level of the TVREP, which needs to be followed up and supplemented in future studies.

7. Conclusions

The paper takes 14 traditional villages in Guanzhong area as research cases and constructs an evaluation scale and index system which has three dimensions based on the connotation of the TVREP. Then, the research describes the current situation of the level of TVREP and applies the obstacle degree model and the network analysis model to carry out an empirical analysis. In summary, the methodological framework constructed in this paper is feasible, and the results and conclusions are consistent with the reality of village development and recognized by the villagers. However, at present, this methodological framework has geographical limitations, to a certain extent. In the process of practical application, the researchers have to update the indicators according to the local situation in order to adapt to the actual situation of the place. The main conclusions are as follows:

(1) The TVREP is characterized by spatiality and hierarchy. After the test of credibility, validity and empirical research, the evaluation system of the level of the TVREP constructed in this paper has good reliability and validity, provides a framework for quantitative assessment of the TVREP and provides supporting evidence for the test of the results of the rural development.

(2) The overall level of the TVREP in the research area is in the middle-upper class and there are significant differences, and it is unbalanced in different evaluation dimensions.

(3) The results of the dimension obstacle degree analysis show that the POD is the main obstacle that hinders the improvement of the level of the TVREP, and the primary obstacle in villages in different regions is not the same, so villages should accurately identify their own obstacles to accurately improve the level of the residents’ emotional perception.

(4) The results of the analysis of the impact of differences in demographic characteristics show that education level and frequency of community participation have a significant positive impact on the level of TVREP. Specifically, residents' health condition and frequency of community participation have a significant positive effect on the level of the SOH; residents' frequency of community participation, education level and health condition are positively correlated with their POD; and residents engaged in non-agricultural activities have a higher perception of their development potential compared to those engaged in agricultural activities.

(5) The results of the network analysis model show that the three sub-networks of the SOB, SOH and POD are independent of each other but intertwined. "Sustainable development of villages" is the centrality code of the network analysis model of the TVREP, and the two indexes of "willingness to live" and "basic power is guaranteed" are the high centrality indexes of the sub-networks of the SOB and SOH.

(6) The dynamic compensation mechanism for the TVREP is constructed, in which the government and enterprises jointly constitute the main body; the residents are the objects; and two compensation paths, namely, rapid compensation and gradual compensation, are refined. The relevant departments can choose appropriate paths to provide targeted compensation to village residents with low level of emotional perception, so as to restore and improve the value and function of emotional resources that have been reduced due to uneven development.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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