

## Article

# How Does the Habitat Environment Affect the Life Satisfaction of County Residents? An IPA-Kano Model Analysis Based on Western China

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**Abstract:** Coordinating the construction of villages and towns with the county as the basic unit and promoting the optimal allocation of infrastructure and public utilities within the county is an important measure to improve the rural habitat and enhance the well-being of residents. Using the field survey data from western China and the IPA-Kano model method, this study reveals the importance of the impact of habitat environment on life satisfaction in county seat, town and village communities, and identifies the priorities for improvement and enhancement in light of their actual performance. The empirical analysis found that the three types of communities have some differences in the classification of basic factors, key performance factors and excitement factors, and their priorities for improvement are also different. Overall, the improvement priorities of town and village communities are relatively similar, and the differences between the two types of communities and county seat's communities are obvious. Differentiated improvement measures should be adopted for different types of communities in order to effectively improve the well-being of residents and achieve rational allocation of public resources.

**Keywords:** life satisfaction; habitat environment; urban-rural integration; IPA-Kano model; China



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## 1. Introduction

Improving quality of life and pursuing satisfaction have become the primary goals of human social progress. Research on life satisfaction has long been a hot topic in the fields of urban and geography [1,2]. Life satisfaction, as a key indicator of an individual's quality of life, is defined as an individual's holistic evaluation of the state of life based on his or her own criteria [3]. Current research on life satisfaction is mainly in the fields of psychology and sociology, this research focuses on the qualitative analysis of the current situation and the quantitative analysis of the influencing factors of life satisfaction through modeling. However, existing studies have mostly explored satisfaction from a single perspective, such as demographic socio-economic characteristics, family perspective, and there are few comprehensive analyses of socioeconomics and ecosystems, and our study can fill this gap. At the same time, numerous studies have revealed that the life satisfaction of residents in small towns and rural areas is significantly different from that in big cities [4–6], due to the lack of employment opportunities in rural areas, difficulties in accessing healthcare, education, and public transportation infrastructure, and lack of civic opportunities [7,8], all of which affect the life satisfaction of residents in the periphery. Therefore, an in-depth understanding of the life satisfaction of small towns and rural residents is of great significance for the government to formulate policies that better meet the needs of the people and promote the development of peripheral regions [9].

Habitat environment is the place where human beings gather and live, and the base on which human beings depend for their survival in nature; the core of the habitat environment is “human beings”, and the purpose of human beings’ construction of the habitat environment is to satisfy the needs of “human beings gathering together”. The study of the habitat environment should be able to guide the construction of the habitat environment and satisfy the basic interests of the people, and should not be limited to the understanding of the laws of development [10]. Habitat environment is an entry point to study the life satisfaction of residents in rural areas [11,12]. Improving the rural habitat environment is the core content of enhancing residents’ life satisfaction and building a livable countryside [13,14]. Studies have been conducted to explore the influencing factors of rural habitat environment satisfaction, such as Pang et al. [14] who used structural equation modeling to examine rural livability and its influencing factors in Beijing, and found that the level of public services is the most important determinant of life satisfaction. A study by Rehdanz et al. [15] based on data obtained by the German Socio-Economic Panel examined the relationship between environment quality and life satisfaction and found that severe air and noise pollution reduces residents’ subjective well-being. Wang et al. [12] assessed the characteristics of rural livability satisfaction based on a questionnaire survey of 12 townships in less developed counties in eastern China. The empirical results showed a significant correlation between the level of public services and health conditions and overall satisfaction with rural livability. The above studies on rural habitat environment have focused on objective evaluation perspectives, exploring the factors influencing satisfaction with the rural habitat environment, and fewer studies have been conducted from the perspective of the subjective perceptions of rural residents themselves, especially in developing countries. Farmers are the main beneficiaries of rural habitat environment construction, and their expressed needs may help guide planning and construction more effectively. Therefore, our paper aims to address this shortcoming.

Despite the growing body of research on rural habitat satisfaction [16,17], however, there are certain shortcomings. First of all, existing research has mainly focused on how the objective-level features of the habitat environment affect the life satisfaction of residents in rural areas, while the subjective perception and evaluation of these features have not been emphasized to a large extent. Compared with objective-level characteristics, perceived habitat environment characteristics may also have a more important impact on life satisfaction, and their subjective evaluations can provide us with a more microscopic and nuanced perspective on understanding the life satisfaction of rural area residents. Meanwhile, while some of the literature has also examined the impact of objective or subjective attributes on satisfaction [18,19] focusing on the importance of identifying various types of environmental characteristics, it has not been combined with their actual performance [20]. For example, Ayertey Nanor et al. [9] based on Ghana found that transportation status was perceived by rural dwellers as a key factor affecting life satisfaction, which largely stemmed from its poor physical performance. Therefore, incorporating the importance of habitat environment attributes and physical performance into an integrated analysis can help to reveal the key factors affecting life satisfaction of residents in rural areas and provide a direct basis for improving the rural habitat environment. Finally, much of the existing literature focuses on urban residents [21–24], with less research on rural areas and small towns between urban and rural areas [25,26], as well as a lack of studies that integrate villages and towns. This imbalance in research areas may lead to our inability to gain insight into the life satisfaction of residents in urban and rural areas of counties and towns. In this paper, by focusing the study of habitat satisfaction on the county seat area, a space that includes both small towns and rural areas, we not only make up for the limitations of the existing scale to a certain extent, but also show our concern for the implementation of China’s policy of “urban-rural integration and rural revitalization using the county seat area as a carrier”.

Based on this, this paper uses household survey data from Xingping, a county in western China in 2021, and adopts the IPA-Kano modeling approach to simultaneously

examine the characteristics of the habtiat environment in the three types of urban and rural spaces, namely, county seats, towns, and villages, as well as the importance of their impact on residents' life satisfaction, and to further identify the habtiat environment enhancement priorities of different communities. The focus is to further identify the priorities of different communities for habitat enhancement, with a view to providing a reference basis for coordinating the construction of towns and villages within the county seat, promoting the complementary functions of county seats, towns and villages, and realizing the integrated development of urban and rural areas.

## 2. Data and Methods

### 2.1. Data

The study area of this paper is Xingping (Figure 1), Shaanxi Province, which belongs to Xianyang City, Shaanxi Province, and is located in the middle of Guanzhong Plain in Shaanxi Province. It was formerly Xingping County, which was approved by the State Council to be abolished as a county and set up a city in June 1993, and it is now a county-level city in the custody of Xianyang City, with twelve towns under its jurisdiction, a land area of 507 km<sup>2</sup>, and a resident population of 489,100 in 2022, of which 309,900 are urban, with an urbanization rate of 63.4%. Xingping is located in the north bank of the Wei River and the hinterland of Guanzhong Plain, with superior soil and water conditions, convenient transportation location, and relatively developed industry and agriculture, with a completed GDP of 30.181 billion yuan in 2022, and its county-level economic development level ranked among the top in the province. This study selected Xingping as the study area, mainly for the following reasons: first, the Guanzhong region of Shaanxi is the origin of agricultural civilization, and its traditional villages have a certain degree of representativeness, while Xingping is located in the hinterland of Guanzhong Plain, but also located in the fringe of the metropolis, and the study of Xingping residents' satisfaction with the habitat environment has a strong practical significance for the construction of rural revitalization. Secondly, with the implementation of the rural revitalization strategy, Xingping's agriculture, industry and multi-industry, the county economy in recent years, the development of relatively rapid. Overall, Xingping as a typical case in Guanzhong region, the relationship between its county habitat environment and the environment of residents' life satisfaction needs to be further explored in depth.

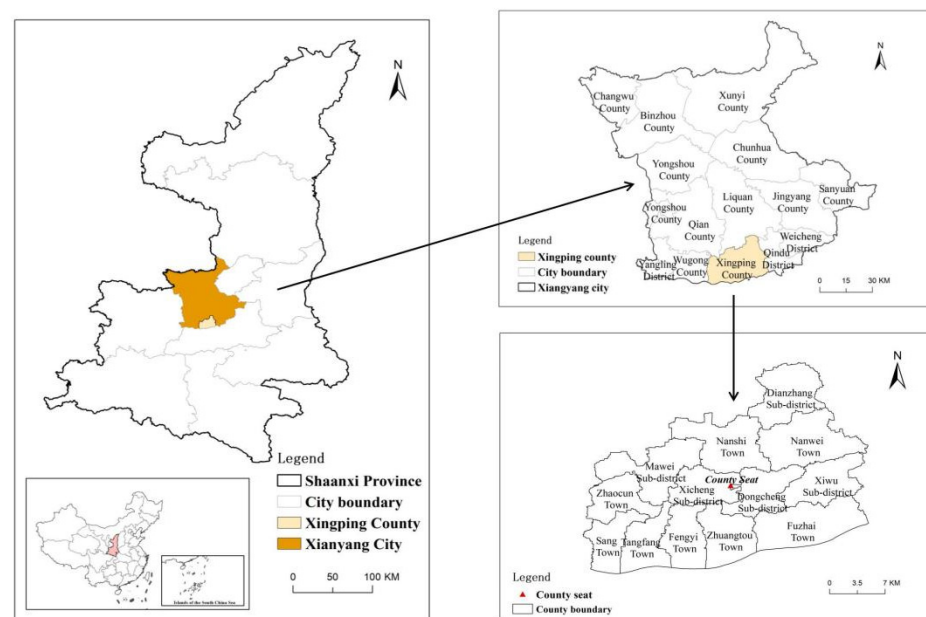


**Figure 1.** Location of Xingping County.

The data of this study mainly come from the data of the farm household survey obtained by the research group in August 2021 in Xingping and the data of the county economic survey (see Appendix A for the questionnaire), the object of the study mainly involves the rural households in the county, the research unit is based on the household, and the form of one-on-one interviews is adopted. Field research was selected to carry out the county seat, town and community (village), respectively, taking a random sampling method for the selection of the town and community (village). The county seats sample was randomly selected from the Dongcheng Street for sampling, community sampling is mainly based on the distance from each community to the center of the street for random sampling, and ultimately determined that the Southeast community, the Southwest community, the Beiguan community, the Northeast community four communities for the county seat sample research, each community selected 20–30 respondents for the survey. Towns (street) research sample selection based on each town (street) to reach the county seat distance for random sampling, and finally selected Xiwu Street, Mawei Street, Dianzhang Street, Tangfang Town, Nanshi Town as the research area. Secondly, based on the number of resident population in each town to determine the number of village samples, due to the Xiwu Street, Tangfang Town, Mawei Street, three towns with relatively large resident population, each towns to extract four villages for research, the remaining Dianzhang Street, Nanshi Town, two towns with relatively small resident populations, each extracted three villages for research. Finally, the city researched a total of 21 communities (villages) in 5 towns (streets) (Figure 2), obtaining 476 valid resident questionnaires, of which 111 questionnaires in the county seat, 125 questionnaires in towns, and 240 questionnaires in villages. The information in the questionnaires specific to this study included: (1) socio-economic attributes of the respondents; (2) Life Satisfaction Scale; (3) Evaluation of the importance of the community habitat environment; and (4) Evaluation of satisfaction with the community habitat environment.

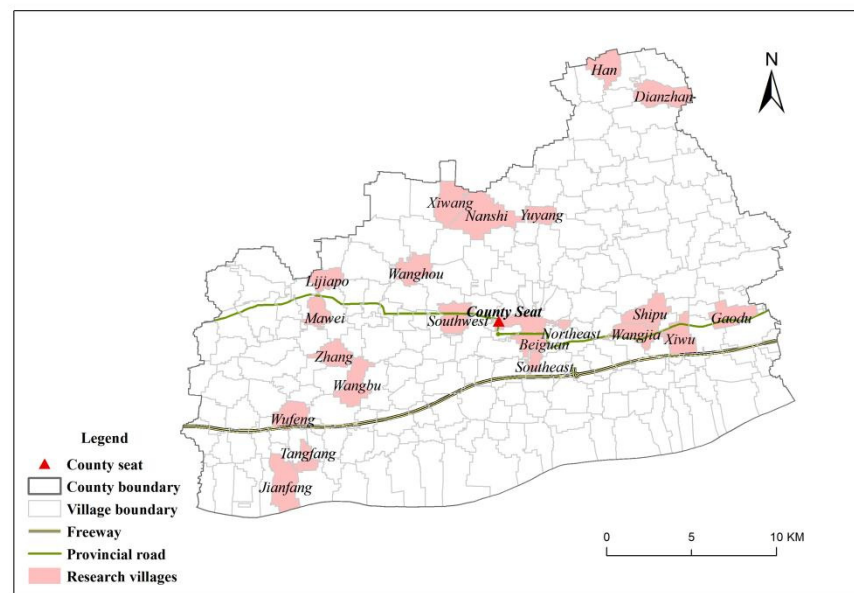


**Figure 2.** Distribution of surveyed communities.

The field survey revealed significant variations in the community environment and supporting facilities across the three types of communities. The residents of the county seat live in a more concentrated area, the street layout is flat, the road is relatively flat, the surrounding environment is clean, and the surrounding infrastructure is more complete. In comparison to the county seat community, the town residents reside in a relatively dispersed manner, with a limited number of large shopping centers and medical facilities in the surrounding area. However, in contrast to the county seat community, the roads

in the town are wider. The overall environment of rural communities is generally less developed than that of urban areas. Some rural roads are narrow and uneven, and the facilities and services available in these communities are often limited. However, the natural environment of rural communities is often more pristine, with access to fresh air. Furthermore, the three types of communities are inextricably linked. The county seat serves as the economic center of the region, often influencing the development of towns and rural areas through a radiation-driven role. Towns act as a bridge between urban and rural areas, exhibiting both the characteristics of the county seat and those of the countryside, effectively connecting the city and the village.

The assessment of life satisfaction is based on a 7-point scale, with 1 indicating a high level of dissatisfaction and 7 indicating a high level of satisfaction. The evaluation criteria of the community habitat environment are primarily concerned with four key aspects: public service, health environment, transportation conditions, and safety. These four aspects are assessed through a total of 21 specific questions. The selection of these aspects as the fundamental considerations of residents' life satisfaction in western counties is primarily based on their comprehensiveness and criticality, which are closely associated with life satisfaction. The effective supply of public services serves as an important indicator of the government's capacity to govern and the quality of life experienced by residents. The health environment is directly related to residents' health and well-being, as well as their overall quality of life. The improvement of transportation infrastructure can significantly enhance the connectivity of a county, as well as the mobility of its residents. Finally, safety is a fundamental prerequisite for residents to live and work in a secure and peaceful environment. These factors are intertwined and collectively constitute an important dimension of residents' satisfaction with the habitat environment in western counties. This is of practical significance in guiding policy formulation and planning implementation.

The survey found that urban and rural residents were generally satisfied with their lives (Figure 3). The percentages of residents who were very satisfied and relatively satisfied were 69.8% and 11.4% respectively, totaling 81.2%, while the percentages of very dissatisfied and relatively dissatisfied totaled only 8.2%. In terms of community type, the satisfaction level of county seats residents is relatively low, with the total percentage of very satisfied and relatively satisfied at 74.7%, which is lower than that of townships (86.4%) and villages (82.8%).

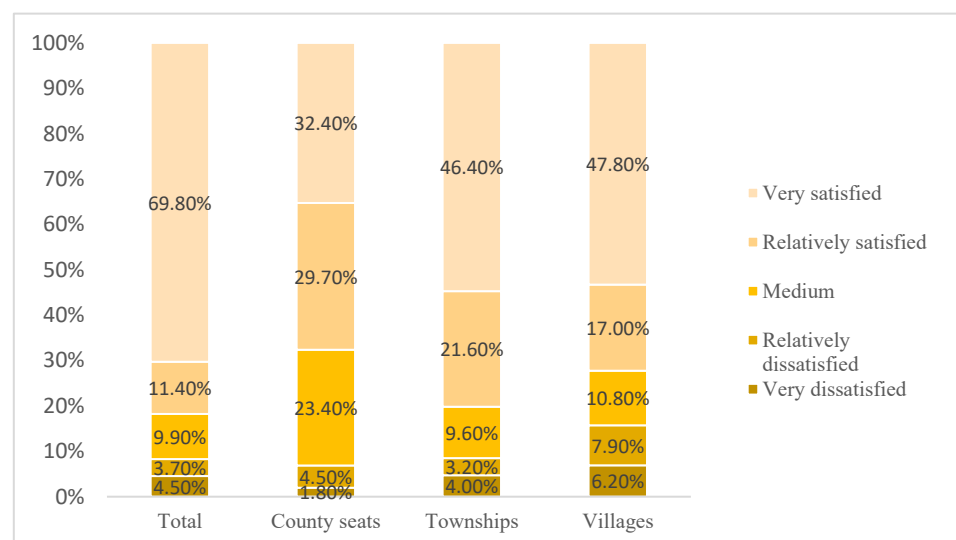


**Figure 3.** Comparison of life satisfaction of residents in three types of neighborhoods.

## 2.2. Methods

Previous studies have employed disparate methodologies to investigate the influence of the habitat environment on residents' life satisfaction. One approach is to inquire directly of respondents as to the importance of each community characteristic [27]. However, as

respondents evaluate community characteristics one by one, they tend to perceive the majority of them as important [28]. An alternative approach is to employ regression analysis to assess the influence of community characteristics on life satisfaction. In a study based on survey data from suburban and traditional communities in Northern California, USA, Lovejoy et al. [29] demonstrated that community appearance and safety are closely related to residents' satisfaction. For example, Zhan et al. [30] employed data from the 2012 residential satisfaction questionnaire for four types of neighborhoods in Beijing to investigate the mechanisms through which satisfaction influences and its relationship with residential mobility. In general, these methods can identify the importance of community human settlement characteristics to life satisfaction. However, for planners and policymakers, the guidance role of these methods in determining which habitat environment characteristics need urgent improvement to more effectively enhance residents' well-being is relatively limited. This highlights the necessity for an integrated examination of the significance and actual functionality of human settlement characteristics.

#### (1) Importance-Performance Analysis

Importance-Performance Analysis (IPA) is a widely utilized technique in the field of consumer satisfaction for evaluating services [31]. It has been employed in numerous industries, including tourism, banking, and information services. Additionally, some studies on rural residents' life satisfaction have employed this method [32–34]. This paper also employs IPA in the study of residents' life satisfaction. In this context, the community's human settlement environment is considered a service provided to its residents, with local governments and developers acting as the providers and residents as the consumers. This method employs a coordinate grid to simultaneously assess the importance and actual performance of the human settlement environment. The vertical axis represents the importance of various human settlement characteristics on residents' life satisfaction, while the horizontal axis depicts residents' evaluations (satisfaction) of the performance of these characteristics. This approach yields four quadrants (Figure 4). Each environmental characteristic is allocated to a quadrant based on its level of importance and performance score. The initial quadrant encompasses human settlement characteristics that exert a considerable influence on life satisfaction and demonstrate commendable actual performance. It is imperative that these characteristics be preserved and maintained. The second quadrant encompasses characteristics that are of significant importance but exhibit suboptimal performance, necessitating immediate improvement and representing a crucial area of focus for planners and policymakers. The third quadrant comprises characteristics with low importance and poor performance, which are therefore of lesser priority for improvement. The fourth quadrant represents characteristics with good actual performance but low importance. It is therefore inadvisable to invest limited resources in these areas, as this would result in a waste of resources and potentially counterproductive effects [18,20].

#### (2) Three-factor analysis

One of the basic assumptions of IPA analysis is that attributes have a linear effect on satisfaction [35], but in reality there are non-linear relationships in many situations, and some attributes may have a greater effect on overall satisfaction than overall dissatisfaction. Second, the IPA method ignores the relationship between importance and attribute performance, and it assumes that attribute performance and importance are independent of each other. However, in reality there is a causal relationship between attribute performance and importance because if some attributes perform well, then consumers will perceive the attribute as not very important and vice versa. Changes in performance lead to changes in importance, so attribute performance and importance are not independent of each other. In light of the limitations of the conventional IPA approach, scholars have incorporated the three-factor analysis (Three-factor analysis) into related investigations and merged it with the IPA method to address the shortcomings of the latter in isolation. This integration has led to the emergence of the IPA-Kano model, which offers a more comprehensive and nuanced understanding of consumer preferences.

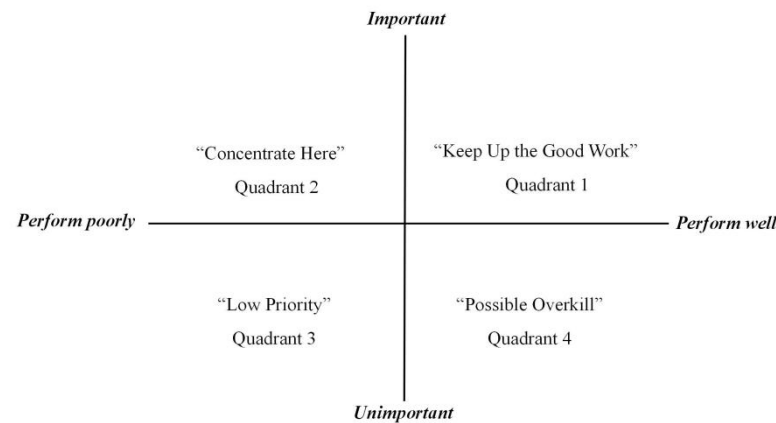


**Figure 4.** Importance-Performance Analysis.

The three-factor analysis, as developed by Kano et al. [36] in 1984, categorizes the model into three distinct factors: basic factors, key performance factors, and excitement factors. This categorization is based on the varying levels of importance attributed to the attributes in relation to overall satisfaction. One method for differentiating between the three factors in the IPA-Kano model is to perform a quadrant analysis using implicit and explicit importance (Figure 5). If both explicit importance and implicit importance are high, the factor is classified as a key performance factor. Conversely, if both types of importance are low, the factor is considered unimportant. If the level of implicit importance is low and the level of explicit importance is high, the factor in question can be classified as a basic factor. The opposite is true for factors related to excitement. The impact of basic and excitement factors on overall satisfaction exhibits a non-linear relationship. When expectations are met, a basic factor does not necessarily lead to increased satisfaction. Conversely, when expectations are not met, it can result in dissatisfaction. In contrast, an excitement factor, when expectations are not met, does not necessarily cause dissatisfaction. However, when expectations are fulfilled, it can enhance overall satisfaction. A linear relationship exists between the two types of performance factors and overall satisfaction or dissatisfaction. If the attribute is achieved, it will cause satisfaction; if it is not achieved, it will cause dissatisfaction. The IPA-Kano model specifies the priority level for increasing satisfaction. The most important factor for residents is the basic factor, and planners should focus on the basic factor of dissatisfaction of the residents, followed by the key performance factor of dissatisfaction. The excitement factor has the lowest importance.

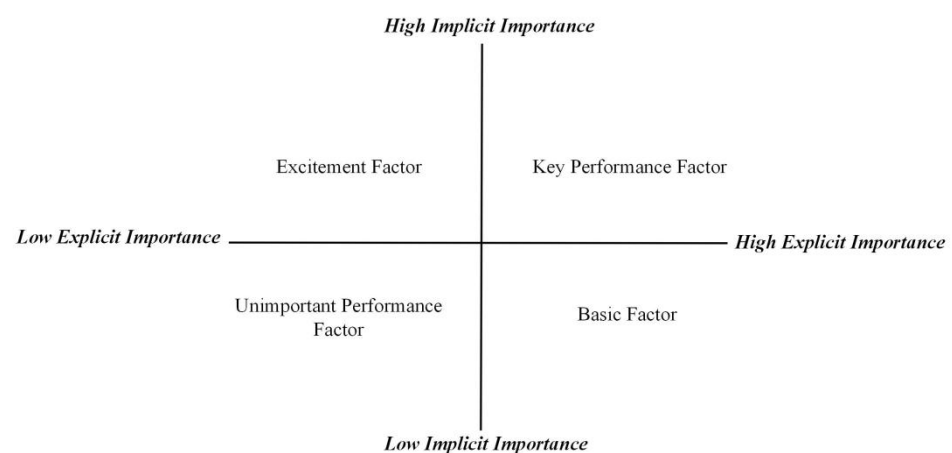


**Figure 5.** Importance grid.

### 3. Importance and Actual Performance of Community Habitat Environment

Based on the questionnaire data, the 21 neighborhood habitat characteristics were evaluated for importance and actual performance. As previously stated, the significance of this section is reflective of the respondents' residential preferences and is explicitly important, as evidenced by the scores presented in Table 1. There are common preferences among residents of the three types of communities: county seat, township, and village; good community security, higher quality of water bodies, quiet environment, and fresh air are very important, while public buildings, external transportation, and the number of neighborhood interactions with relatives and friends are less important. Residents of the three types of communities also have differentiated preferences, for example, county seat residents consider street lighting and housing costs to be more important, while township and village residents value the proximity of their homes to major arterials. Additionally, village residents are very concerned about the availability of high quality elementary and secondary schools in their neighborhoods.

**Table 1.** Explicit importance of habitat environment characteristics in three types of communities.

|                                                       | County Seat |      | Township |      | Village |      |
|-------------------------------------------------------|-------------|------|----------|------|---------|------|
|                                                       | Point       | Rank | Point    | Rank | Point   | Rank |
| Good security and low crime rate                      | 3.77        | 1    | 3.75     | 2    | 3.74    | 1    |
| Good street lighting                                  | 3.77        | 2    | 3.62     | 6    | 3.60    | 6    |
| Clean and clear surrounding water, no water pollution | 3.73        | 3    | 3.76     | 1    | 3.67    | 3    |
| Fresh air around the residence                        | 3.72        | 4    | 3.75     | 3    | 3.72    | 2    |
| Quiet and noiseless environment                       | 3.70        | 5    | 3.74     | 4    | 3.61    | 5    |
| Neat surroundings, no accumulation of garbage         | 3.68        | 6    | 3.64     | 5    | 3.56    | 8    |
| Housing costs (house price/rent) can be affordable    | 3.66        | 7    | 3.4      | 12   | 3.54    | 9    |
| Hospitals/clinics are available and easily accessible | 3.64        | 8    | 3.55     | 8    | 3.53    | 10   |
| Easy access to major arterials                        | 3.63        | 9    | 3.55     | 7    | 3.59    | 7    |
| Low prices and affordable consumption                 | 3.51        | 10   | 3.54     | 9    | 3.28    | 16   |
| Easy access to transit stop/station                   | 3.50        | 11   | 3.36     | 14   | 3.36    | 15   |
| Easy access to shopping mall                          | 3.43        | 12   | 3.38     | 13   | 3.41    | 13   |
| Close to where I work                                 | 3.35        | 13   | 3.45     | 11   | 3.43    | 11   |
| High quality k-12 schools                             | 3.28        | 14   | 3.47     | 10   | 3.64    | 4    |
| Parks and open spaces nearby                          | 3.28        | 15   | 3.23     | 16   | 3.39    | 14   |
| Residents in the area are kind and friendly           | 3.15        | 16   | 3.26     | 15   | 3.43    | 12   |
| Lots of interaction among neighbors                   | 3.10        | 17   | 3.2      | 17   | 3.13    | 18   |
| Public buildings nearby (library/gymnasium)           | 3.03        | 18   | 3.04     | 20   | 3.08    | 19   |
| Convenient transportation to other places             | 3.02        | 19   | 3.11     | 18   | 3.16    | 17   |
| Economic level of neighbors similar to my level       | 2.76        | 20   | 2.79     | 21   | 2.80    | 21   |
| More relatives and friends around                     | 2.63        | 21   | 3.11     | 19   | 3.03    | 20   |

The actual performance of the community habitat environment is contingent upon the subjective perception of the respondents. As illustrated in Table 2, there is a greater degree of divergence than convergence in the actual performance of the habitat environment in county seats, towns, and rural communities. With regard to similarities, the three types of communities exhibit superior performance in the domains of community security and residential proximity to major arterials, while exhibiting inferior performance in the domains of open space, proximity to public buildings, and proximity to work. With regard to the discrepancies, county seat communities exhibited superior performance in the following areas: proximity to bus stops, street lighting, and proximity to hospitals and shopping venues. In contrast, township and village communities demonstrated superior performance in the following areas: a quiet environment, clean air, high levels of neighborhood interaction, and friendly residents. Additionally, there are notable discrepancies between the perceptions of township and village communities. The findings revealed that township communities exhibited a significantly higher level of satisfaction with street lighting and proximity to

bus stops, while village communities demonstrated a greater level of satisfaction with the water and sanitation environments.

**Table 2.** Actual performance of habitat environment characteristics in three types of communities.

|                                                       | County Seat |      | Township |      | Village |      |
|-------------------------------------------------------|-------------|------|----------|------|---------|------|
|                                                       | Point       | Rank | Point    | Rank | Point   | Rank |
| Good security and low crime rate                      | 3.68        | 1    | 3.73     | 2    | 3.89    | 1    |
| Easy access to transit stop/station                   | 3.63        | 2    | 3.57     | 8    | 3.02    | 19   |
| Easy access to major arterials                        | 3.59        | 3    | 3.75     | 1    | 3.69    | 3    |
| Good street lighting                                  | 3.56        | 4    | 3.61     | 4    | 3.58    | 8    |
| Hospitals/clinics are available and easily accessible | 3.51        | 5    | 3.49     | 13   | 3.44    | 12   |
| Clean and clear surrounding water, no water pollution | 3.51        | 6    | 3.42     | 15   | 3.56    | 9    |
| Fresh air around the residence                        | 3.50        | 7    | 3.60     | 5    | 3.66    | 4    |
| Easy access to shopping mall                          | 3.49        | 8    | 3.44     | 14   | 3.34    | 15   |
| Quiet and noiseless environment                       | 3.48        | 9    | 3.62     | 3    | 3.65    | 5    |
| Residents in the area are kind and friendly           | 3.46        | 10   | 3.60     | 6    | 3.81    | 2    |
| Housing costs (house price/rent) can be affordable    | 3.45        | 11   | 3.56     | 9    | 3.42    | 13   |
| High quality k-12 schools                             | 3.38        | 12   | 2.94     | 20   | 2.77    | 20   |
| Low prices and affordable consumption                 | 3.34        | 13   | 3.33     | 17   | 3.10    | 17   |
| Neat surroundings, no accumulation of garbage         | 3.33        | 14   | 3.50     | 11   | 3.58    | 7    |
| Convenient transportation to other places             | 3.30        | 15   | 3.50     | 12   | 3.53    | 11   |
| Parks and open spaces nearby                          | 3.24        | 16   | 3.01     | 19   | 3.10    | 18   |
| Lots of interaction among neighbors                   | 3.21        | 17   | 3.58     | 7    | 3.61    | 6    |
| Close to where I work                                 | 3.17        | 18   | 3.27     | 18   | 3.21    | 16   |
| Economic level of neighbors similar to my level       | 3.10        | 19   | 3.42     | 16   | 3.40    | 14   |
| More relatives and friends around                     | 3.04        | 20   | 3.51     | 10   | 3.53    | 10   |
| Public buildings nearby (library/gymnasium)           | 2.62        | 21   | 2.25     | 21   | 2.08    | 21   |

#### 4. Three-Factor Analysis of Life Satisfaction Improvement

##### 4.1. Implicit Importance Analysis

As previously stated, there are additional limitations to conducting an IPA analysis with only explicit importance and actual performance data. In this paper, we integrate the IPA with the Kano model to perform a three-factor analysis. Specifically, we employ both explicit and implicit importance for quadrant analysis. Explicit importance is derived from the questionnaire survey (Table 1), while implicit importance is calculated using the methodology of Yin et al. [20] and Chen et al. [37]. This involves a bivariate correlation analysis of explicit importance and life satisfaction, with the aim of obtaining the implicit importance of the habitat environment characteristics of the 21 communities (Table 3). The analysis revealed significant differences in the implicit importance attributed by residents of the three community types. For respondents in county seat communities, the most important environmental attributes were ease of access to shopping, a clean environment, proximity to major roadways, and ease of access to external transportation. In contrast, for respondents in township communities, the most important environmental attributes were the presence of high-quality primary and secondary schools, ease of access to public transportation, the presence of open spaces such as parks, and ease of access to shopping. For respondents in the village community, the most important environmental attributes were easy access to bus stops, external transportation, high-quality primary and secondary schools in the vicinity, and proximity to hospitals and clinics. Among the environmental attributes with low implicit importance, county seat respondents did not consider price level, housing cost, and similarity of economic level with the surrounding residents to be of significant importance. In contrast, township respondents considered economic similarity, community policing, and price level to be of low importance, while village respondents did not consider friendly residents, the presence of numerous family and friends in the surrounding area, and fresh air to be of importance.

**Table 3.** Implicit importance of habitat environment in three types of communities.

|                                                       | County Seat |      | Township |      | Village |      |
|-------------------------------------------------------|-------------|------|----------|------|---------|------|
|                                                       | Point       | Rank | Point    | Rank | Point   | Rank |
| Easy access to shopping mall                          | 0.350       | 1    | 0.174    | 4    | 0.036   | 13   |
| Neat surroundings, no accumulation of garbage         | 0.324       | 2    | 0.138    | 8    | 0.039   | 12   |
| Easy access to major arterials                        | 0.311       | 3    | 0.035    | 17   | 0.022   | 15   |
| Convenient transportation to other places             | 0.304       | 4    | 0.110    | 12   | 0.203   | 2    |
| Easy access to transit stop/station                   | 0.297       | 5    | 0.291    | 2    | 0.204   | 1    |
| Fresh air around the residence                        | 0.287       | 6    | 0.139    | 6    | 0.007   | 19   |
| More relatives and friends around                     | 0.266       | 7    | 0.129    | 10   | 0.004   | 20   |
| Good security and low crime rate                      | 0.257       | 8    | 0.019    | 20   | 0.025   | 14   |
| Hospitals/clinics are available and easily accessible | 0.233       | 9    | 0.138    | 7    | 0.103   | 4    |
| High quality k-12 schools                             | 0.195       | 10   | 0.299    | 1    | 0.120   | 3    |
| Good street lighting                                  | 0.164       | 11   | 0.107    | 13   | 0.065   | 9    |
| Quiet and noiseless environment                       | 0.151       | 12   | 0.034    | 18   | 0.015   | 17   |
| Public buildings nearby (library/gymnasium)           | 0.135       | 13   | 0.093    | 14   | 0.083   | 6    |
| Lots of interaction among neighbors                   | 0.105       | 14   | 0.112    | 11   | 0.018   | 16   |
| Close to where I work                                 | 0.097       | 15   | 0.045    | 16   | 0.060   | 10   |
| Parks and open spaces nearby                          | 0.088       | 16   | 0.238    | 3    | 0.087   | 5    |
| Residents in the area are kind and friendly           | 0.085       | 17   | 0.144    | 5    | 0.004   | 21   |
| Clean and clear surrounding water, no water pollution | 0.085       | 18   | 0.082    | 15   | 0.009   | 18   |
| Low prices and affordable consumption                 | 0.061       | 19   | 0.020    | 19   | 0.082   | 8    |
| Housing costs (house price/rent) can be affordable    | 0.057       | 20   | 0.131    | 9    | 0.083   | 7    |
| Economic level of neighbors similar to my level       | 0.004       | 21   | 0.019    | 21   | 0.060   | 11   |

#### 4.2. Habitat Environment Impact Factors for Life Satisfaction

In this paper, the mean value of the explicit and implicit importance of the habitat environment characteristics of 21 communities is selected as the threshold value for quadrant analysis. Through analysis, the basic factor, key performance factor, and excitement factor of the three types of communities, namely, county seat, township, and village, are obtained (Table 4). The preceding analysis indicates that the basic factors are those environmental characteristics whose fulfillment will not enhance satisfaction, but whose absence will diminish satisfaction. Excitement factors are community characteristics that, when achieved, will lead to an increase in satisfaction, whereas their absence will not result in a decrease in satisfaction. Performance factors are community characteristics that, when achieved, will result in satisfaction; conversely, failure to achieve them will result in dissatisfaction. Of these, the key performance factor exerts a more pronounced influence on life satisfaction and represents a primary area of interest. Accordingly, the ensuing discussion will concentrate on the basic factor, key performance factor, and excitement factor.

The three types of factors for county seats, townships, and village communities exhibit both similarities and notable differences. Five of the 21 environmental characteristics are common to all three types of communities. These include a quiet environment and no water pollution for the basic factor, easy access to medical care for the key performance factor, and a similar economic level of the residents and more neighborhood interactions for the unimportant performance factor. In particular, the village community exhibits the highest number of basic factors (9), followed by county seats (7) and townships (5). The three types of communities share two common basic factors: a quiet environment and the absence of water pollution. Two common basic factors are observed in county seats and townships: the presence of good street lighting and low consumer prices. In contrast, villages and townships exhibit a greater degree of homogeneity, sharing three fundamental characteristics: proximity to work, residential proximity to major arterials, and good neighborhood security.

**Table 4.** Three-factor division of the three types of communities.

|                                | County Seat                                                         | Town               | Village           |
|--------------------------------|---------------------------------------------------------------------|--------------------|-------------------|
| Basic factor                   | Quiet and noiseless environment (Quiet)                             | Quiet              | Quiet             |
|                                | Clean and clear surrounding water, no water pollution (Clean water) | Clean water        | Clean water       |
|                                | Good street lighting (Lighting)                                     | Lighting           | Close to work     |
|                                | Low prices and affordable consumption (Prices low)                  | Prices low         | Major arterials   |
| Key performance factor         | Housing costs can be affordable (Afford)                            | Close to work      | Crime low         |
|                                | Hospitals/clinics are available and easily accessible (Hospital)    | Major arterials    | Fresh air         |
|                                | Neat surroundings, no accumulation of garbage (Neat surroundings)   | Crime low          | Neat surroundings |
|                                | Fresh air around the residence (Fresh air)                          |                    | Friendly          |
| Excitement factors             | Easy access to major arterials (Major arterials)                    | Hospital           | Hospital          |
|                                | Good security and low crime rate (Crime low)                        | Neat surroundings  | School            |
|                                | Easy access to shopping mall (Shopping)                             | Fresh air          |                   |
|                                | Easy access to transit stop/station (Transit stop)                  | School             |                   |
| Unimportant performance factor | More relatives and friends (Relative)                               | Relative           | Transit stop      |
|                                | Convenient transportation to other places (External transport)      | Transit stop       | Open spaces       |
|                                | High quality k-12 schools (School)                                  | Open spaces        | Lighting          |
|                                |                                                                     | Shopping           | Afford            |
|                                | Economic level of neighbors similar to my level (Similar)           | Friendly           | Transportation    |
|                                | Lots of interaction among neighbors (Interaction)                   | Afford             | Library           |
|                                | Public buildings nearby (Library)                                   |                    | Prices low        |
|                                | Residents in the area are kind and friendly (Friendly)              | Similar            |                   |
|                                | Close to where I work (Close to work)                               | Interaction        | Similar           |
|                                | Parks and open spaces nearby (Open spaces)                          | Library            | Interaction       |
|                                |                                                                     | External transport | Relative          |
|                                |                                                                     |                    | Shopping          |

For key performance factors, the county seat exhibits seven factors, a figure that exceeds that of townships and villages (which both exhibit four factors). The three types of communities exhibit a common key performance factor, namely the ease of access to medical care. The county seat and township communities exhibit a shared key performance factor, namely clean air and well-maintained surroundings. Similarly, the villages and township communities demonstrate a shared key performance factor, namely the presence of high-quality elementary and secondary schools in the neighborhood.

With regard to the excitement factors, the township communities exhibited the greatest number of excitement factors (6), followed by the villages and the county seats, which demonstrated 5 and 3 excitement factors, respectively. No common excitement factors were identified for the three types of communities. The common excitement factor for the county seat and township is the presence of numerous relatives and friends. Two common excitement factors for the township and village communities are the availability of convenient bus routes and the proximity of open spaces, such as parks and squares. The common excitement factor for the county seat and village communities is the accessibility of external transportation options (Figure 6).

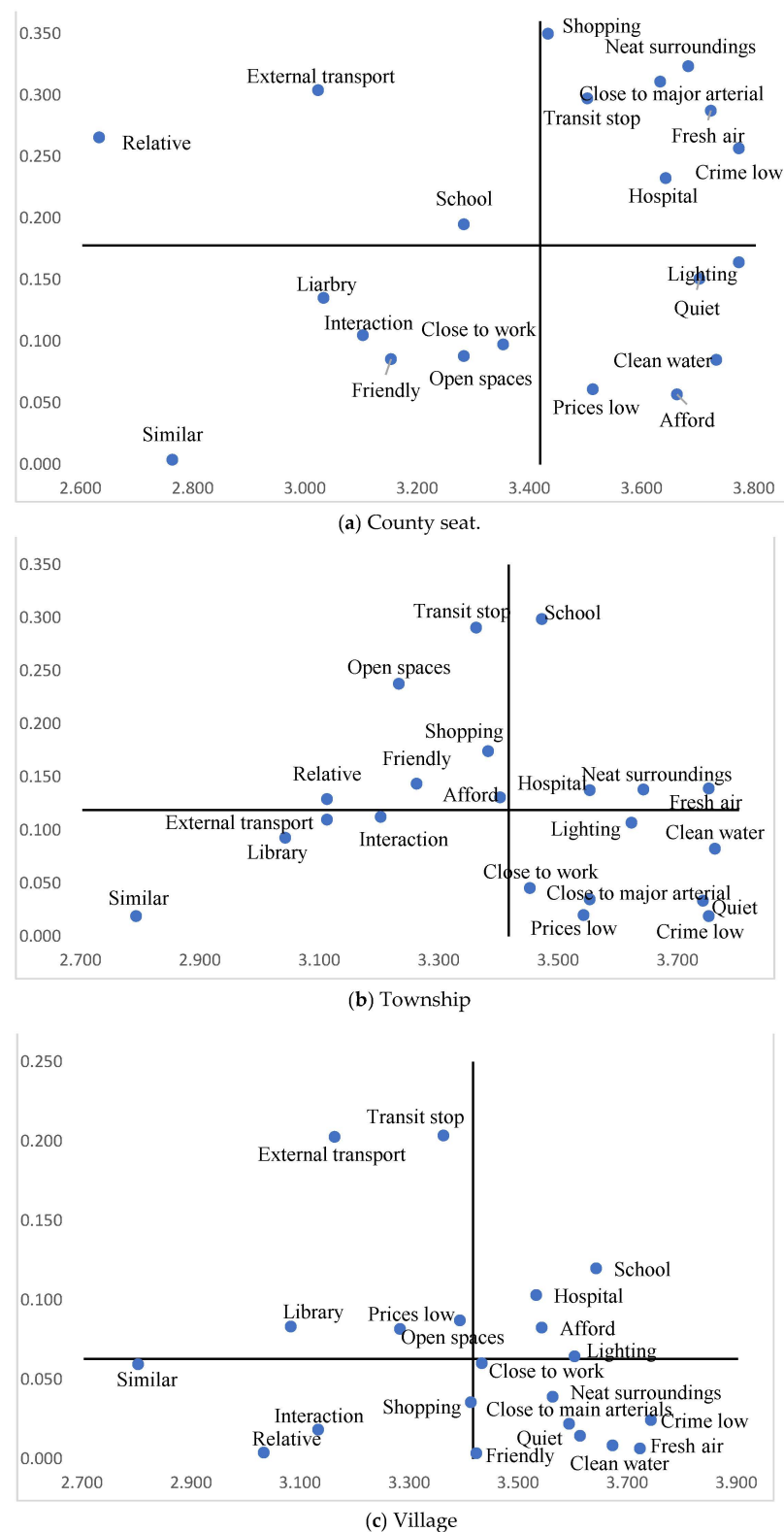


**Figure 6.** Three-factor quadrant diagram for the three types of communities. (This figure includes the analysis of the IPA-Kano model for three different types of communities in this study, namely the county seat, the township area, and the rural community).

#### 4.3. Pathways for Habitat Environment Enhancement in Three Types of Communities

The delineation of the three types of factors for different types of communities is not yet sufficient to directly provide targeted recommendations. Further work is required on the basis of the actual performance of each of the habitat environment attributes in order to prioritize community environment enhancement. In order to achieve this objective, the actual performance of the 21 habitat environment attributes of different types of communities (Table 2) was categorized into three groups, reflecting the different tiers of these environment attributes. The top seven attributes (1st to 7th percentile) are those that perform well, the bottom seven attributes (15th to 21st percentile) are those that perform poorly, and the middle seven attributes (8th to 14th percentile) are those that perform centrally. In consideration of the characteristics of the three factors, the basic factor is identified as the most significant community characteristic. Consequently, the community environment attributes that are positioned towards the lower end of the list require immediate attention and improvement. The key performance factor is regarded as the second most important factor, subsequent to the basic factor. Accordingly, in this paper, the basic factor in the lowest 7th percentile of the actual performance rankings is identified as the initial priority for improvement, followed by the key performance factor in the lowest 7th percentile of the actual performance rankings. The third priority is the basic factor in the middle 7th percentile of the actual performance rankings, and the fourth priority is the key performance factor in the middle 7th percentile of the actual performance rankings (Table 5).

**Table 5.** Definition of upgrading priority.

| Improvement Priority | Factors                 | Performance Ranking |
|----------------------|-------------------------|---------------------|
| 1                    | Basic factors           | 15–21               |
| 2                    | Key performance factors | 15–21               |
| 3                    | Basic factors           | 8–14                |
| 4                    | Key performance factors | 8–14                |

Table 6 illustrates the prioritization of habitat environments that require enhancement in the county seat, townships, and village communities. Both the county seat and township communities have six environmental attributes that require upgrading, while village communities have seven such attributes that require urgent attention. The improvement of community public health conditions and the provision of a neat and clean community environment are common priorities for all three types of communities, although the priority levels differ. The impact of the sanitation environment on village residents' life satisfaction and the urgency to improve it have been confirmed by numerous studies. Wang et al. [12], for instance, based their findings on a study of 12 townships in less developed counties in China. They found that respondents were relatively satisfied with the natural environmental conditions (4.123) and slightly dissatisfied with the sanitation conditions (3.404). Li et al. [38] conducted a case study in Jiangsu Province, one of China's developed regions, and found that villages exhibited higher scores for sanitation and infrastructure. This suggests that initiatives to enhance the habitat environment in response to inadequate infrastructure and public services in villages have yielded positive outcomes. Consequently, for urban and rural communities in counties at this stage, the strengthening of environmental sanitation should be the core content of the construction of liveable villages, which is of great significance in the promotion of rural development.

**Table 6.** Priorities for enhancement in three types of communities.

|            | County Seat                | Township                                   | Village                          |
|------------|----------------------------|--------------------------------------------|----------------------------------|
| Priority 1 |                            | Clean water<br>Prices low<br>Close to work | Close to work                    |
| Priority 2 | Neat surroundings<br>Quiet | School                                     | School                           |
| Priority 3 | Prices low<br>Afford       |                                            | Clean water<br>Neat surroundings |
| Priority 4 | Fresh Air<br>Shopping      | Hospital<br>Neat surroundings              | Hospital<br>Lighting<br>Afford   |

The upgrading of townships and village communities frequently prioritizes the provision of convenient access to healthcare, high-quality primary and secondary schools, good water quality, and proximity to workplaces. The current level of public services in villages and townships is significantly lower than that in large cities or even county seats [25,39]. This is particularly relevant to the well-being of local residents, as basic education [40] and medical care [26] are essential for their quality of life. Therefore, it is crucial to enhance village and township medical care, education, and other public services to improve residents' satisfaction and sense of access. Similarly, the promotion of sewage treatment and the improvement of water quality represent urgent concerns for village communities [41]. Currently, there is a significant disparity between the environmental management standards observed in urban and rural areas of China. Statistical data indicates that in 2022, the national urban sewage treatment rate will exceed 98%, with the sewage treatment rate of designated towns reaching 77%. Conversely, the rate in rural areas will be less than 37%. There is a notable regional disparity in the construction of sewage and waste treatment facilities. Furthermore, the proximity of workplaces is of equal importance for residents of village communities. The results of field research indicate that as China's urbanization progresses and the rural industrial structure undergoes restructuring, the proportion of non-farming employment for village and township residents is on the rise [42]. The county seat has emerged as the primary destination for many village and township residents seeking employment. In 2023, 297.53 million rural migrant workers are expected to leave their homes for employment in cities and towns, representing a 1.91 million increase from 2022. Additionally, a significant proportion of rural migrant workers have left their homes to work in cities and towns. They frequently opt to reside in villages and towns due to the limitations imposed by factors such as the cost of living in county seats [43]. The extended commuting distances and associated costs often result in a lack of satisfaction [44,45]. To this end, two avenues for improvement can be pursued. Firstly, the pace of development of non-farm industries in villages and towns can be accelerated to provide residents with more non-farm employment opportunities in the vicinity. Secondly, the transportation conditions between villages and towns and county seats can be improved, and transportation costs can be reduced.

The stabilization of prices is also a crucial factor in enhancing life satisfaction in county and township communities. As illustrated in Table 6, a reduction in the cost of goods and services is a frequently cited priority for enhancement in county seat and township communities. In contrast to those residing in villages, residents of counties and townships are less self-sufficient. As a result, stabilizing commodity prices is of particular importance for enhancing their well-being. Furthermore, the affordability of housing is a common priority for both county seat and village communities. However, the two types of communities differ in that housing costs in county seats are primarily used to purchase commercial housing, while in village communities they are used to build their own homes. In order to reduce the cost of housing consumption for county seat residents, it would be beneficial to expand the scope of guaranteed housing supply and relax application

requirements. Similarly, in order to reduce construction expenses for village residents, it would be advantageous to guide rational housing construction and grant subsidies for housing construction, thereby effectively improving residents' satisfaction with their lives.

In addition to these common priorities, the creation of a quiet environment, access to fresh air, and the provision of convenient shopping facilities are also urgent improvements to be made to county seat neighborhoods. Presently, a considerable number of county seats in China exhibit deficiencies in their planning standards, with the majority of residential areas situated in close proximity to major transportation routes. These areas experience high traffic and pedestrian flow, as well as a multitude of sources of noise, collectively contributing to a noisy living environment. It is therefore imperative to implement measures to reduce noise pollution and create a tranquil living environment. The demand of county seat community residents for convenient shopping locations may appear to be at odds with the reality on the ground, given that county seat residents enjoy greater convenience in terms of shopping options compared to those in townships and villages. However, given that the analysis in this paper is primarily based on the significance and actual functionality of habitat environmental attributes, county seat residents can be distinguished from those residing in villages and towns. Their demand for shopping space prioritizes the quality of the shopping venue and the convenience of the shopping environment, rather than merely the quantity. Consequently, this outcome is logical and justified. Despite the abundance of shopping venues in the county seat, there is a dearth of high-end retail destinations, such as expansive shopping malls and commercial centers. The enhancement of these facilities has the potential to elevate the quality of life for residents. For rural communities, the improvement of road lighting represents a significant enhancement priority. The issue of village lighting is frequently neglected in the context of village research and construction practices. Indeed, the enhancement of village communities extends beyond mere aesthetic considerations; it also encompasses the crucial matter of pedestrian safety at night. This is of particular importance to the residents of these communities, as it directly impacts their ability to engage in daily activities and pursue their livelihoods. Consequently, the provision of practical, aesthetically pleasing, low-carbon and environmentally friendly roadway lighting facilities that are in keeping with the character of the village represents a significant avenue for enhancing the quality of life in rural communities.

## 5. Conclusions

China has long pursued an urban-biased policy, with public resource allocation heavily oriented towards cities. Counties outside urban areas, especially rural areas, have been largely neglected, contributing to a widening gap between urban and rural quality of life. The implementation of the rural revitalization strategy has led to significant improvements in the rural habitat environment and a notable enhancement in the well-being of its residents. This strategy, which coordinates the construction of villages and towns with counties as the basic unit and promotes the optimal allocation of infrastructure and public utilities within counties, has been instrumental in driving these positive changes. In light of the dearth of studies examining rural habitat environment satisfaction, the paucity of research on rural areas and small towns between urban and rural areas, and the tendency to prioritize identifying the importance of habitat environment attributes without considering their actual performance, which limits their utility as a reference for decision-making, this paper employs field survey data from Xingping in Shaanxi Province and the IPA-Kano modeling approach to elucidate the influence of the habitat environment on life satisfaction across three community types: county seats, townships, and villages. The influence of the habitat environment on life satisfaction and the most pressing areas for improvement and enhancement are identified in relation to actual performance.

The empirical analysis revealed that there are notable distinctions in the distribution of fundamental, key performance, and excitement factors across the three community types. Additionally, their improvement priorities exhibit considerable divergence. Consequently, differentiated improvement measures are essential for effectively addressing the unique

needs of each community type. In general, the enhancement priorities of township and village communities are more similar, whereas the differences between the two types of communities and county seat communities are more pronounced. For county seat communities, the focus of efforts should be on improving the sanitary environment, reducing noise and air pollution, stabilizing prices, and providing high-grade shopping space. For townships and village communities, the priority should be on strengthening sewage treatment and domestic garbage disposal, providing more employment opportunities in the vicinity, reducing the cost of commuting, and improving basic education, medical care, and other public service facilities. This will facilitate the equalization of public services in villages and townships. Furthermore, village communities should endeavor to enhance the quality of street lighting, whereas township communities should prioritize the stabilization of commodity prices and the reduction of the cost of living for residents.

## 6. Discussion

The findings of this study can provide a more precise foundation for decision-making regarding the allocation of urban and rural public resources in Xingping County. Additionally, the results may serve as a valuable reference for the construction and urbanization development of other similar county areas. Secondly, this study employs the use of IPA analysis and three-factor theory in order to examine the correlation between the habitat environment and life satisfaction. The IPA-Kano model takes into account both implicit and explicit importance when distinguishing the three types of factors that have different degrees of influence on life satisfaction. By identifying the basic factors, key performance factors, and excitement factors and incorporating the actual performance of the habitat environment, the study identified the development priorities for community self-improvement. The present study offers a case study of the western region, yet its scope extends beyond this. The IPA-Kano model employed herein represents a replicable theoretical framework, and this thesis may serve as a foundation for subsequent research to introduce this model into a wider field.

The findings of this study can inform the allocation of public resources in urban and rural areas of Xingping County. Additionally, the results may serve as a reference for the construction of villages and the development of county urbanization in other comparable regions. It is important to acknowledge the limitations of this study. Firstly, the categorization of the three factors in the three-factor analysis is dependent on the position of the horizontal and vertical axes. Consequently, the selection of the threshold value affects the categorization of the three factors, which results in the lower credibility of the environmental characteristics that are in close proximity to a certain axis. This is a common issue associated with quadrant analysis. Secondly, the selection of habitat environment characteristics may be inappropriate when studying the three types of urban and rural communities (county seats, townships, and villages) in a unified county due to the significant differences in their spatial characteristics. This issue requires further investigation to ensure the accuracy and precision of the research findings.

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**Conflicts of Interest:** The authors declare no conflicts of interest.

## Appendix A. Questionnaire on Rural Revitalization in Shaanxi Province

### Part I Environmental Perception and Residential Choice

A1. Is your living place able to meet your family's needs? (Answers include seven levels, with 1 indicating that it does not meet your family's needs at all and you are very dissatisfied with your place of residence; and 7 indicating that it meets your family's needs at all and you are very satisfied with your place of residence):

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

A2. Do you agree with the following statements? (Answers are on a seven-point scale, with 1 indicating total disapproval, 4 indicating neutrality, and 7 indicating total approval.)

|                                                      |                            |                            |                            |                            |                            |                            |                            |
|------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| My quality of life is perfect                        | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 6 | <input type="checkbox"/> 7 |
| I've achieved something important in my life         | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 6 | <input type="checkbox"/> 7 |
| I'm very happy with my life                          | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 6 | <input type="checkbox"/> 7 |
| In most ways, my daily commute meets my expectations | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 6 | <input type="checkbox"/> 7 |
| My mobility makes my daily life easier               | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 6 | <input type="checkbox"/> 7 |
| I'm completely satisfied with my daily commute       | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 6 | <input type="checkbox"/> 7 |

### A3. The average monthly cost of each category in your household.

| Typology                      |                          | Amounts/RMB | Typology                 |                               | Amounts/RMB |
|-------------------------------|--------------------------|-------------|--------------------------|-------------------------------|-------------|
| Food                          |                          |             | Favors and gifts         |                               |             |
| Clothing                      |                          |             | maintenance grant        |                               |             |
| Housing                       | Residential expenditures |             | education                | Children's education          |             |
|                               | housing expenditure      |             |                          | adult education               |             |
| Household equipment, supplies | consumer durables        |             | Medical                  | Individuals pay out of pocket |             |
|                               | consumer goods           |             |                          | Non-individual out-of-pocket  |             |
| Transportation                |                          |             | cultural recreation      |                               |             |
| Communications                |                          |             | Family business expenses |                               |             |

A4. The average monthly income for your family is \_\_\_\_\_;

1. 0–2500 RMB; 2. 2501–5000 RMB; 3. 5001–10,000 RMB; 4. 10,001–20,000 RMB; 5. Above 20,000 RMB

A5. Where do you think your family's economic situation belongs to in the local area?

☐ Far below average ☐ Below average ☐ Average ☐ Above average ☐ Far above average

A6. Your current house covers an area of \_\_\_\_\_ square meters, with a floor area of \_\_\_\_\_ square meters, number of floors \_\_\_\_\_, and was built in \_\_\_\_\_.

A7. Do you have any other housing in the village/community? ☐ No; ☐ Yes; Floor area \_\_\_\_\_ square meters, building area \_\_\_\_\_ square meters, number of floors \_\_\_\_\_ floors, built in \_\_\_\_\_ year.

A8. Has your household purchased a commercial home outside the village/community?

☐ Yes: Where was the home purchased? ☐ town ☐ county seat ☐ city ☐ other \_\_\_\_\_;

The year of purchase \_\_\_\_\_ and the cost of the home was \_\_\_\_\_;

A9. In the next 5 years, do you plan to change your place of residence? 0 = No; 1 = Yes; (a) If yes, where will you choose to live?

1. village; 2. town; 3. county seat; 4. urban area; 5. provincial capital; 6. other \_\_\_\_\_

A10. When choosing where to live, please indicate how important some of the following factors are (answers include four levels, with 1 indicating not at all important, 4 indicating very important):

|                                                           | Not Important              |                            | Very Important             |                            |
|-----------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| 1. Housing costs (house price/rent) can be affordable     | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 2. Neat surroundings, no accumulation of garbage          | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 3. Easy access to major arterials                         | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 4. Low prices and affordable consumption                  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 5. High quality k-12 schools                              | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 6. Hospitals/clinics are available and easily accessible  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 7. Easy access to transit stop/station                    | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 8. Parks and open spaces nearby                           | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 9. Easy access to shopping mall                           | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 10. Convenient transportation to other places             | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 11. Public buildings nearby (library/gymnasium)           | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 12. Close to where I work                                 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 13. Good security and low crime rate                      | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 14. Quiet and noiseless environment                       | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 15. Good street lighting                                  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 16. Clean and clear surrounding water, no water pollution | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 17. Fresh air around the residence                        | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 18. Lots of interaction among neighbors                   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 19. Economic level of neighbors similar to my level       | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 20. Residents in the area are kind and friendly           | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 21. More relatives and friends around                     | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |

A11. Please describe the characteristics of the home in which you currently live (answers include four levels, with 1 indicating a completely incorrect description and 4 indicating a completely correct description):

|                                                           | Not Important              |                            | Very Important             |                            |
|-----------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| 1. Housing costs (house price/rent) can be affordable     | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 2. Neat surroundings, no accumulation of garbage          | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 3. Easy access to major arterials                         | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 4. Low prices and affordable consumption                  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 5. High quality k-12 schools                              | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 6. Hospitals/clinics are available and easily accessible  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 7. Easy access to transit stop/station                    | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 8. Parks and open spaces nearby                           | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 9. Easy access to shopping mall                           | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 10. Convenient transportation to other places             | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 11. Public buildings nearby (library/gymnasium)           | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 12. Close to where I work                                 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 13. Good security and low crime rate                      | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 14. Quiet and noiseless environment                       | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 15. Good street lighting                                  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 16. Clean and clear surrounding water, no water pollution | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 17. Fresh air around the residence                        | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 18. Lots of interaction among neighbors                   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 19. Economic level of neighbors similar to my level       | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 20. Residents in the area are kind and friendly           | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |
| 21. More relatives and friends around                     | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |

Note: Because the questionnaire was too extensive, this appendix section includes only the content related to this study, specifically the first part of the questionnaire: the environmental perception and residence section, in which questions related to the entrepreneurial environment that are not relevant to this study were not included.

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