

Research on Evaluation of Spatial Vitality and Influencing Factors of Guesthouses Public Areas Based on Rural Tourism Development*

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In recent years, China has continued to promote the strategy of rural revitalization. The rural tourism industry has developed rapidly in the context of rural revitalization. Now the rural B&B industry has become an important pillar in solving the problem of rural tourism accommodation. Most of the villages in China have begun to carry out the construction of rural lodging, for example, there are residents who use idle houses to carry out construction on their own initiative and projects developed by village collectives, so the rural lodging industry has been vigorously developed. The vitality of supporting industries and landscape resources around the distribution of rural lodging has become a hot spot of rural issues research in recent years. Therefore, we can use the method of data analysis to analyze the industry and function of the public area around the distribution of rural B&B. Through the comparison of data and the interpretation of related cases, the core elements affecting the spatial vitality of B&B public areas can be identified. We will analyze and improve the related elements to find a reasonable way to enhance the spatial vitality value. Finally, the article will put forward suggestions to improve the related spatial vitality as a way to promote the development of rural B&B industry and the progress of rural tourism.

Keywords: rural tourism, rural lodging, public areas, spatial vitality value, data analysis

Background

Traditional villages are the “local and original” activity places in China, and are the living inheritance of our “farming civilization”. However, with the continuous development of urbanization, traditional villages in China have been abandoned and their development has stagnated. In this process, China has seen the phenomenon of spatial structure and brain drain. This phenomenon has led to a decline in the spatial vitality of China’s villages, and therefore the development of villages has been hindered and gradually gone into decline (Ding & Shen, 2023). In recent years, China strongly supports and develops rural characteristic tourism to attract tourists into the countryside, thus promoting the development of the countryside. Therefore, rural B&B has become an important pillar to solve the problem of rural tourism accommodation. There is a very important connection between the attraction of rural B&Bs to tourists and the value of spatial vitality in the

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surrounding public area. Therefore, the spatial vitality of the countryside has become an important object to study the problems of rural tourism.

Rural spatial vitality is an important indicator for evaluating the degree of development of a rural area. It is often used to characterize the capacity, use, and intensity of economic and social activities of the built-up space within the scope (Zeng, Song, He, & Shen, 2018). Therefore, the higher the value of spatial vitality of the rural public area, the higher the intensity of economic and social activities in the overall rural area, and the more positive effect on the development of rural tourism. These will also increase the income of the overall rural area and promote the further development of the rural tourism industry.

In order to accelerate the process of urban-rural integration and promote the development of rural tourism, it is necessary to explore the important factors that enhance the spatial vitality value around rural lodging. Spatial vitality is influenced by a wide range of factors, such as transportation accessibility, building density, functional mixing degree, and historical resources aggregation degree. This paper is based on the data analysis and comparison of two different types of villages, which can find the indicators affecting spatial vitality. Based on the results of related data, the article will put forward some suggestions, which will help to improve the spatial vitality in the village, and attract more tourists to visit and drive the development of rural tourism.

Evaluation of Spatial Vitality of Guesthouses Public Areas

The public area around the rural B&B is the core site for leisure activities for tourists and residents, which best reflects the changes in the spatial vitality value within the overall village area. The evaluation criterion of this study is the attraction of space to people, and it is considered that the spatial vitality of public areas around B&Bs refers to the public spaces that are very attractive and energetic in the overall village area. These spaces can be some traditional forms of public places, such as parks, squares, and traditional architecture residential landscape. They can also be informal spaces, such as public activity nodes, public areas with attractive natural landscapes, and new community complexes (Bai & Qin, 2023). Therefore, the basis for defining the connotation of rural public space vitality in this study mainly includes the following aspects:

Table 1

Spatial Vitality Impact Factor Analysis Table (Drawn by the Author)

Factors affecting space vitality	Relationship to spatial vitality
Natural landscape elements	Foreign scholars have studied the connotation of public space vitality from the perspectives of biodiversity and ecology, pointing out that there exists a certain relationship between the vitality of public space and natural ecological elements in the rural unit area. Therefore, we can promote the sustainable development of the natural ecology of the countryside through landscape design, sustainable design, and maintenance of landscape features and other initiatives. This can not only provide a more beautiful living environment for the rural residents but also attract tourists to visit the natural landscape, thus promoting the development of the tourism industry.
Transportation facilities	Transportation facilities are important for the vitality of rural public spaces. Therefore, optimizing these transportation facilities not only facilitates the arrival of community residents and tourists to the public space, but also helps to enhance the interaction between community residents and tourists. These can enhance the vitality value of the regional public space.
Social activity center	The focus of the vitality of the rural public space is on the interactive activities between visitors. This kind of interaction includes both festival celebrations, gatherings, the creation of performance-oriented spaces, etc., as well as visual intersections and the implantation of leisure spaces. These activities can not only attract foreign tourists to actively participate, but also promote communication among local residents. These social activities can further enhance the vitality value of rural public space.

Table 1 to be continued

Cultural heritage and experience	The vitality of village public space is closely related to local cultural experience. Traditional villages are generally rich in local culture. Therefore, the vitality of public space is often reflected in the rich cultural heritage and experience, such as experiencing the local traditional cultural history, visiting handicrafts, and tasting local food. These can make it easier for community residents and foreign visitors to gain a deeper understanding of local culture and history, and enhance the cohesion and sense of identity of rural public areas.
Historic resource aggregation area	The degree of aggregation of historic resources is an important factor in the spatial vitality of public areas. Areas with a high degree of aggregation of historical resources are more attractive to tourists. Whether it is the traditional houses arranged along the landscape or the scenic landscapes, they all contain cultural heritage. Therefore, it can attract a large number of tourists to visit. Villages can also attract tourists by gathering historical resources and enhance the spatial vitality of public areas.
Netflix category buildings and structures	In recent years, public area hit spots have begun to attract tourists to them. And the spatial activation of the countryside is even stronger in the areas where the Netflix punch card spots are located. First of all, Netflix punch card spots attract a large number of tourists to visit because of their unique charm. These tourists will share their experiences and feelings through social media, further enhancing the visibility and attractiveness of the space. When the space attracts more people, its vitality value will also increase.
Business facilities	There is a close relationship between commercial support facilities and spatial vitality. Spatial vitality usually refers to the frequency, variety, and interaction of people's activities in an area. Commercial support facilities, on the other hand, refer to the variety of services and facilities provided to meet the needs of these activities. Some commercial support facilities, such as cafes, libraries, and public rest areas, provide places for people to communicate and interact. These facilities can promote social interaction among people and enhance the social attributes of the space, thus increasing the vitality value of the space.

The Spatial Vitality of B&B Public Areas and Its Influencing Factors—Taking Hongcun B&B Area in Anhui Province and Tonglu Township B&B Cultural and Creative Complex in Zhejiang Province as Examples

Types of Guesthouses

Tonglu County's "Putting Words in the Air" Country Lodging Cultural and Creative Complex (Figure 1) is a home for lodging, which builds an ecological complex in an artistic way by enriching the functionality of the business and perfecting the supporting services of the lodging. This complex introduces the excellent works of many architects to implant cultural and artistic elements in the countryside (Gao, 2020). It belongs to a more modern cultural and tourism community space, and the public areas in this type of community have both beautiful natural landscapes and a new type of net red carding place, attracting a large number of tourists to come to carding and enhancing the economy of the countryside. It also promotes the enhancement of spatial vitality in the rural area, thus enabling further development of the countryside.

Hongcun (Figure 2) is a village that relies on its natural landscape to attract tourists. It is protected by the Protection of Cultural Relics Law and preserves many beautifully crafted Huizhou-style buildings, making it popular among tourists. Meanwhile, due to its close proximity to Huangshan Mountain, a famous tourist attraction in Anhui Province, and its well-developed public service facilities, the spatial vitality index around B&Bs is high. This type of countryside is rich in natural landscape resources and historical resources, and it can rely on such resources to create public activity venues and enhance spatial vitality. It can also create a good walking space through the promotion of architectural resources and the optimization of the street environment to attract tourists to take the initiative to visit and enhance spatial vitality (Wang, Chen, & Lin, 2020).



Figure 1. Putting words to empty countryside lodging cultural and creative complex (from Gudesign.com).



Figure 2. Hongcun, Anhui Province (from Gudesign.com).

Analysis of Factors Influencing Spatial Vitality in B&B Public Areas

In this paper, Anhui Hongcun lodging area and Zhejiang Tonglu rural lodging complex are selected as research objects. Based on two research methods, Baidu Heat Map Data and spatial grammar, the spatial vitality influencing factors of different types of villages are analyzed. Finally, the key factors affecting the spatial vitality of B&B public areas are concluded, and then relevant strategies to enhance the value of spatial vitality are proposed.

Baidu Heat Map Data (BHMD) is based on the geographic location information of intelligent mobile terminal devices, updated every 15 minutes, and clustered according to location which can show the direction of population flow and spatial aggregation status (Wang & Chang, 2020). In addition to this, the Baidu database has more comprehensive coordinate information within the study area, which can be used to study whether the surrounding supporting services are perfect, so as to compare the spatial vitality value. The data base of Baidu heat map is huge, which is a real reflection of the location of a large number of people. Moreover, many scholars

have tested the correlation between the heat map data and the census data in some areas, and finally came to the conclusion that the heat data in these areas can reflect the real population distribution to a certain extent. Therefore, according to Baidu Heat Map Data, to do some with the population activities and regional supporting business distribution of qualitative research is still more feasible (Yang, 2023).

Spatial syntax is a quantitative expression of urban spatial organization created by Professor Bill Hillier's team in the UK to study the relationship between spatial organization and human society (Michael, 2001), and it is a broad theoretical explanation of architecture and urban form (Das, 2001). The main function of spatial syntax is a research method to analyze adjacent spatial accessibility by simulating road traffic conditions and path comparisons. The accessibility is related to the overall transportation planning of the region, road network structure, and so on. In recent years, spatial syntax has also been heavily applied to the study of rural areas. The theory and analysis methods of spatial syntax are also progressing, becoming broader and broader from spatial analysis to traffic demand simulation, and from a single road network structure to the functional attributes of the land on both sides of the road network. As shown in Figure 3, the theory of spatial syntax categorizes road situations into series, parallel, and fishbone types. The accessibility of different types of road network is different, and parallel and fishbone type land parcels have better accessibility and freer spatial activities.

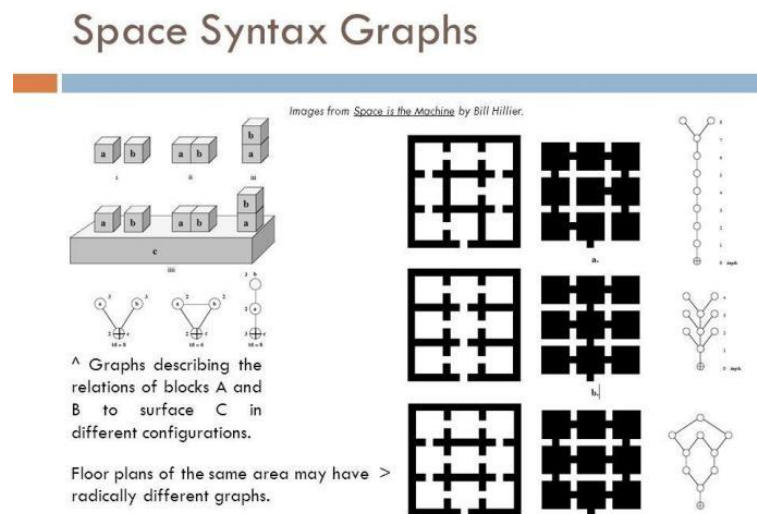


Figure 3. Diagram of the syntactic structure of space (from the web).

People flow analysis. The research on the influencing factors of pedestrian flow data mainly focuses on four aspects: natural landscape elements, the degree of cultural inheritance, the degree of aggregation of historical resources, and the abundance of Netflix buildings. The investigation scope of Hongcun is dominated by the areas with high degree of natural landscape elements and historical resources gathering, and the complex is dominated by the areas with high degree of richness of surrounding supporting service areas and Netflix buildings. According to the crowd heat data of Baidu heat map, fixed time nodes (12:00-16:00) on weekdays and holidays were selected for data query (Wang, Liu, Zhuo, & Zhang, 2023). The heat map data were collected continuously for one month, and the heat map with higher average value was finally selected as the evaluation standard. As a result, the overall foot traffic heat data of Anhui Hongcun is high in weekdays, but the area around the Putonghua Hollow Countryside Lodging Complex has low foot traffic in weekdays. During holidays, the heat value of people flow in Anhui Hongcun is very high, but the people flow in Putonghua Empty Countryside Lodging Complex is

low. So the fixed human flow of Hongcun is obtained to be higher (Figure 4-Figure 7). Thus, it can be seen that Hongcun in Anhui Province, which has a higher degree of aggregation of historical resources and rich natural landscape resources, is more attractive to the flow of people.

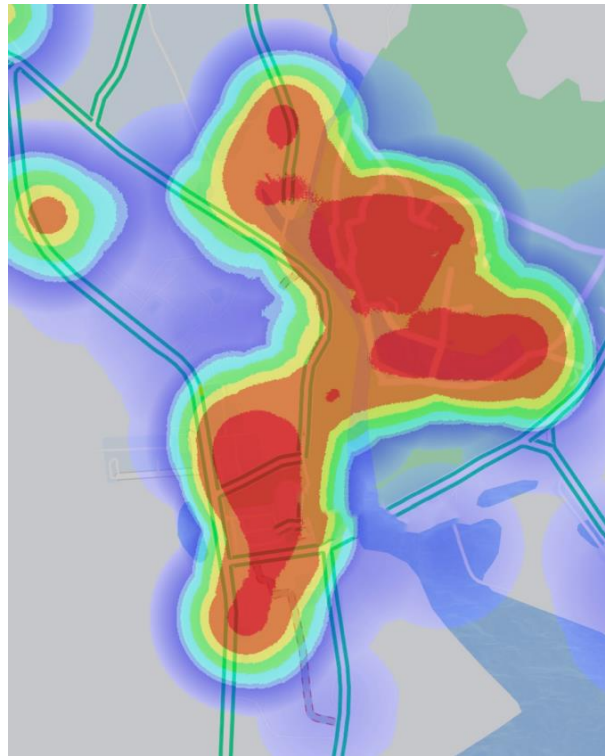


Figure 4. Heat map of pedestrian flow in public areas of Hongcun on weekdays (the bottom of the map is from Baidu heat map).

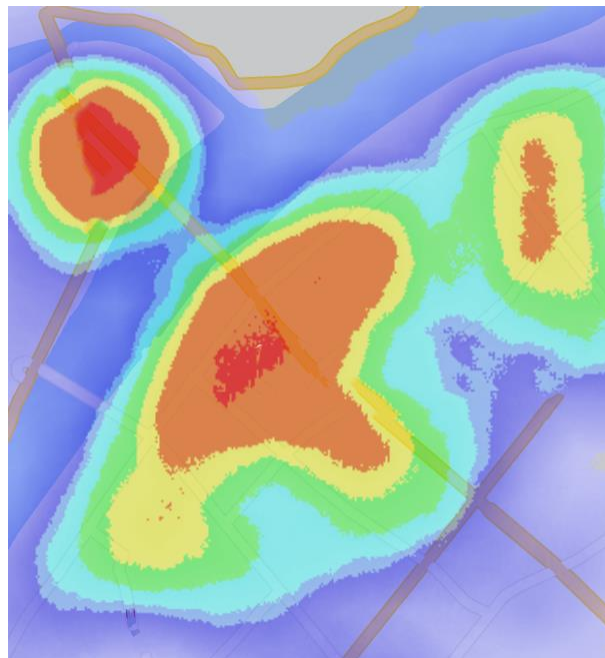


Figure 5. Heat map of pedestrian flow in public areas of Tonglu County on weekdays (bottom of map from Baidu heat map).

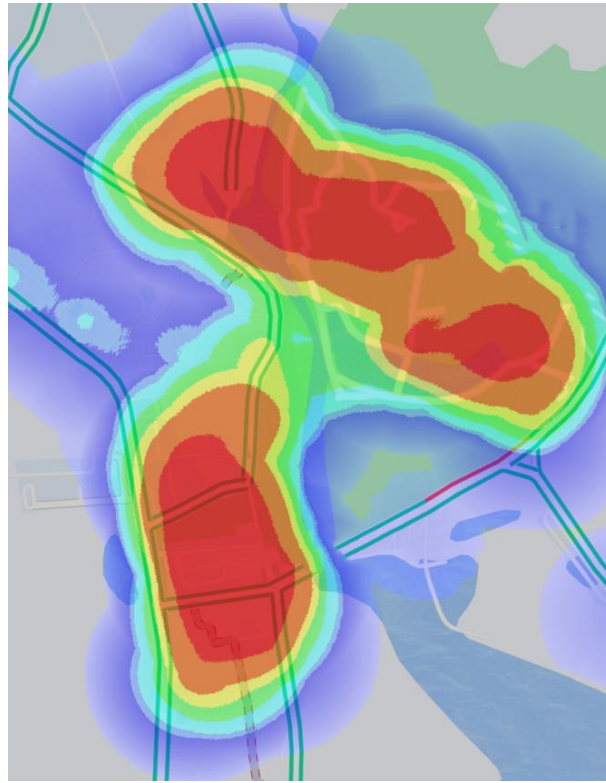


Figure 6. Heat map of pedestrian flow in public areas of Hongcun during holidays (the bottom of the map is from Baidu heat map).

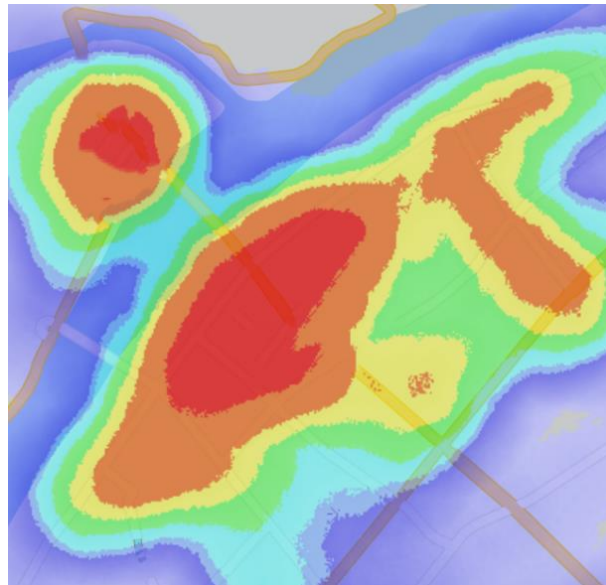


Figure 7. Heat map of pedestrian flow in public areas of Tonglu County during the holiday season (the bottom of the map is from Baidu heat map).

Analysis of industry distribution. The industry supporting facilities are an important factor affecting the spatial vitality of the B&B public area. According to the data summary of Baidu heat map (as shown in Table 2), the number of industry distribution in Hongcun in Ganxian County, Anhui Province is all greater than that of the Putting Language Empty Country Lodging Complex. So it can be seen that the distribution of business forms in

Hongcun is more concentrated, and thus a relatively high spatial vitality experience can be obtained. It can be seen that the spatial vitality near the B&B in Hongcun, Anhui Province is higher, and the surrounding supporting resources are richer.

Table 2

Comparison table of business distribution (Drawn by the Author)

Regional business content	Playing the language of the empty countryside lodging cultural and creative complex	Hongcun, Gan County, Anhui
Number of meals	57	261
Number of retail sales	28	154
Number of leisure and recreation	178	107
Number of education and training	3	20
Number of sports and fitness	2	5
Number of life services	23	92
Number of financial insurances	7	8

Distribution density analysis. The implantation of social activity centers is related to the distribution density of resource allocation. According to the data of Baidu heat map, it can be seen that, taking the five kilometers around the core B&B area as the research scope, and comparing the data on the surrounding functional configurations, the following view can be obtained. Cultural and creative complex (Figure 8) is surrounded by fewer supporting facilities. These supporting facilities are basically located on the main road, and they have fewer types of functions, and also have a certain distance from the core area, which is not convenient for tourists to use. The core B&B area of Hongcun in Anhui (Figure 9) is adjacent to the road, so the distribution of the surrounding functions is relatively more, in a dense distribution, with relatively diversified functions and comprehensive types, and the range of activities is relatively wide, so you can get a livelier experience of the activities, and the intensity of activity is higher in comparison.

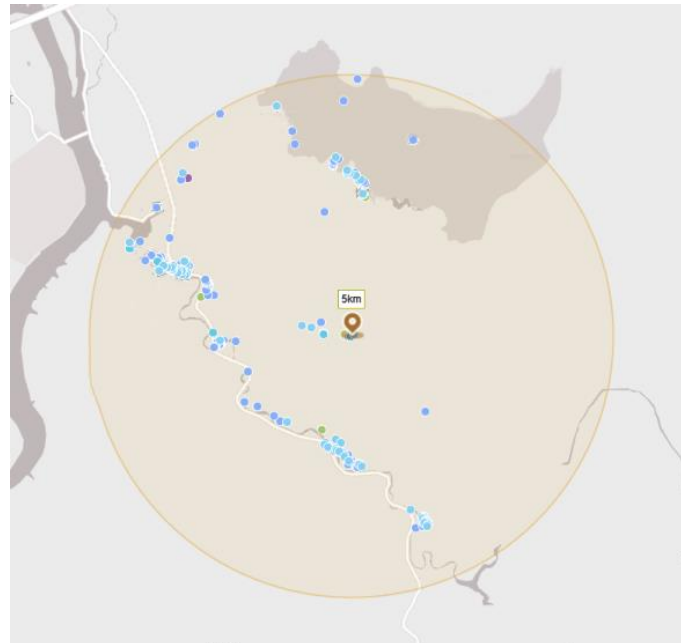


Figure 8. Density map of the distribution of supporting resources for the complex (the bottom of the map is from Baidu heat map).

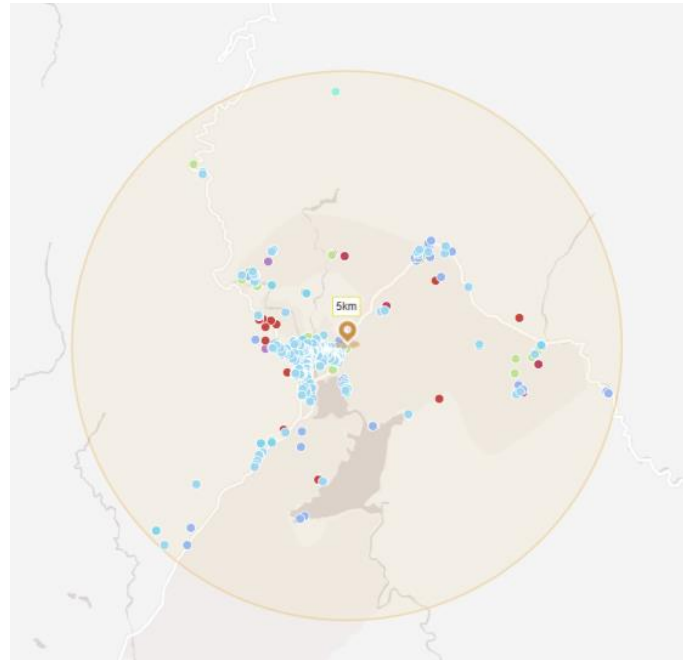


Figure 9. Density map of distribution of supporting resources in Hongcun (the bottom of the map is from Baidu heat map).

Accessibility analysis. Transportation facilities as well as transportation roads are important factors affecting the spatial vitality of the B&B public area, which play an important role in connecting different functions and have an impact on the accessibility. Therefore, based on the study of the integration variable in the spatial syntax, it is possible to analyze the accessibility from the rural center area to the B&B area. Thus the effect of accessibility to B&B public areas on spatial vitality can be determined. Integration degree indicates the degree of agglomeration or decomposition of a space with other spaces in the system. The higher the integration degree, the stronger the centrality, the more concentrated the crowd activities, and the better the road conditions, the higher the overall spatial vitality value of the region, and the stronger the correlation between the two regions (Zhang, Lv, & Rong, 2024). From Figures 10-11, it can be seen that the road network structure with bright colors indicates that the accessibility of adjacent areas is higher and the surrounding supporting facilities are more complete. The rural B&Bs in Hongcun, Anhui Province are distributed in the center of the ancient town. As can be seen from the figure, the road structure of public areas around Hongcun is in series or parallel. The B&Bs are closer to the supporting functions of the neighboring buildings, with higher accessibility and higher overall correlation. Therefore, the overall spatial vitality value of the public area around the B&B in Hongcun is high. The complex B&B is farther away from the village center service area. The overall road layout is in series, and the functional distance from the neighboring units is farther, with poorer service type. The distance between neighboring units is farther and the service functions are fewer, so the overall accessibility is poor. Moreover, the areas with high accessibility in the complex have fewer service-oriented spatial functions, resulting in a lower spatial vitality value of the whole area.

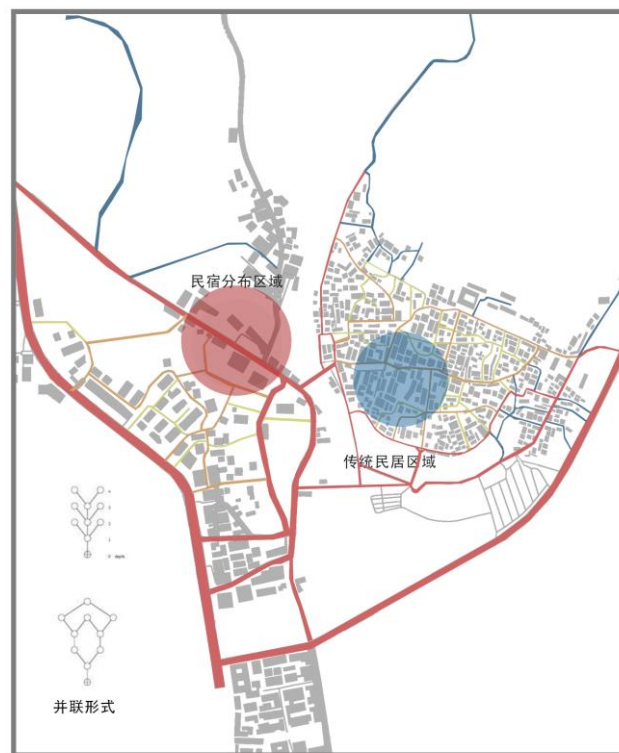


Figure 10. Accessibility analysis of public areas around Hongcun (drawn by the author).

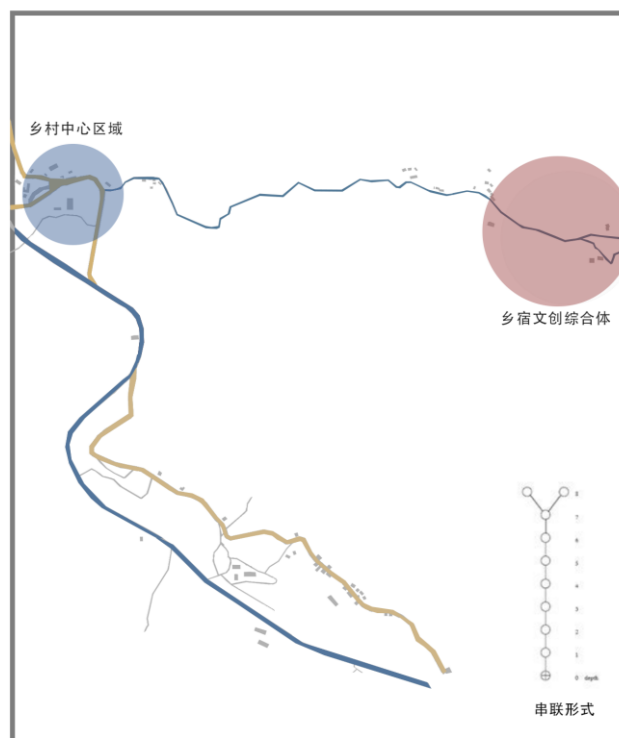


Figure 11. Accessibility analysis of public areas around the Country House Cultural and Creative Complex (drawn by the author).

Conclusion

Through the data analysis of the above research methods, it can be seen that natural landscape elements, historical resources gathering areas, industry supporting facilities, and transportation road network facilities are the key factors affecting the vitality of B&B public area space. Natural landscape elements provide unique visual charm and environmental atmosphere for B&B public area space, which plays an important role in attracting tourists and enhancing spatial vitality. It enables tourists to enjoy the scenery while enjoying the accommodation services, and also provides them with rich leisure activities, such as hiking, cycling, picnic, etc. These activities not only enhance the interaction and communication of tourists, but also improve the vitality of the B&B public area space. Historical resource gathering areas usually have rich cultural heritage and unique historical backgrounds, which are important for enhancing the attractiveness of B&B public area spaces. Historical resource gathering areas can provide unique thematic features for B&B public area spaces, which usually have high tourism attraction, and tourists will choose to stay in nearby B&Bs during their visits, thus driving the development of the B&B industry. The supporting facilities of the industry can promote social interaction among people and enhance the social attributes of the space, thus increasing the vitality value of the space. Transportation road network facilities are an important guarantee for the spatial vitality of B&B public areas, which has an important impact on the travel convenience of tourists and the accessibility of B&Bs. A perfect transportation road network will attract more tourists to stay and increase the occupancy rate of the B&B, and also shorten the travel time of tourists and improve the accessibility of the B&B. However, social activity centers and cultural heritage experience centers, etc., have become too commercialized in their development, leading to uniformity, loss of tourists' favor, and no longer have a strong attraction. Netflix buildings and structures can also only become hotspots for a short period of time, and cannot play a role in enhancing spatial vitality in the long term. Therefore, in order to promote the development of rural tourism, the above key factors should also be combined in order to play a long-term and continuous role.

Strategies to Enhance the Spatial Vitality of Rural Public Areas

Optimize Spatial Layout

Rational planning of rural layouts is based on the geographic, cultural, and social characteristics of the rural environment. An example is the "Cloud Stage" designed by Fujimoto Josuke Architects. He designed it with the help of the original terraced terrain of Tonglu, Zhejiang Province. In the open architectural space, the highest point of the building is designed to match the neighboring lodges, and the roof floats all the way to the river. This gives the whole building a sense of continuity and integrates the building with nature. At the same time, the house on the roof is a transition between the traditional village and the new building. This building is also integrated with the mountain. The configuration of the terraced landscape and the building are integrated with each other, forming a better landscape effect. It not only serves to attract tourists to come and play, but also enhances the spatial vitality of this place and promotes the development of rural tourism. There is also a Fengwu Village in Qian County, Anhui Province, which focuses on natural landscape. It retains a large number of Huizhou-style buildings and a beautiful rural landscape, but the spatial vitality of the public space is insufficient. Therefore, the architects carried out some micro-environmental renovation here, such as the design of water channels, corridor bridges, and Huizhou alleys. These are good landscape nodes and form unique viewing angles. Similar ways can be used to attract tourists to come to enjoy and play, thus enhancing the overall spatial vitality value of the village.

Perfect Infrastructure

Improving the infrastructure of the countryside will not only bring convenience to tourists, but also to local residents. Strengthening the infrastructure of the countryside can improve the chance and convenience of tourists coming to visit (Xie et al., 2023). In addition, some public service facilities, such as libraries and fitness facilities, can be built. This can not only enrich the cultural life of villagers, but also provide the services needed by tourists. For example, the village capsule bookstore in the “Putting Words in the Air” cultural and creative complex. The bookstore is designed with traditional architectural forms and unique design techniques, injecting the power of culture into the development of rural tourism. The bookstore is not only a Netflix attraction, but also allows tourists returning to the countryside to concentrate on reading. It not only enriches the cultural life of the elderly and children, but also promotes the development of rural tourism in this way, thus enhancing the vitality of the space.

Protection of Traditional Culture

Rural culture is an important part of the vitality of rural space. Therefore, the protection and inheritance of traditional culture in the countryside should be strengthened, such as the repair and maintenance of ancient buildings and the protection and maintenance of traditional landscapes, so as to attract tourists to visit the attractions (Zhu, 2023). For example, Qian County in Anhui Province repairs and protects the historical villages on the spot. It not only continues the original architectural style, but also implants a number of landscape nodes, so as to enhance the vitality of the traditional village.

Development of Characteristic Industries

The countryside can develop special agriculture or tourism industry according to its own industrial base. And it can attract tourists to experience and visit according to the renewal of the industry, so as to enhance the value of spatial vitality around the industrial area (Bai & Qin, 2023). For example, the overall design of “rural B&B complex”. It is a rural B&B service industry chain formed on the basis of B&Bs, and the supporting facilities are basically perfect (Shen & Wen, 2021). In the countryside it is interspersed with a variety of product features such as bookstores, B&Bs, Netflix buildings, and other businesses. This allows tourists to get a good sense of experience in the countryside B&B, thus enhancing the vitality of the countryside.

Introducing External Resources

The development and construction of rural spaces can be facilitated through the introduction of external resources such as corporate investment. For example, the Fengwu Village Renovation Project in Qian County, Anhui Province. It attracts many tourists to visit through a certain number of industrial renewal projects. Thus, it promotes the development of rural tourism industry as a way to enhance the spatial vitality.

Convenience of Transportation

The accessibility of transportation between various types of industries is a key factor affecting spatial vitality. In the countryside, the radius of the living service circle needs to be considered to ensure that the industrial density around the B&B can be improved, so as to enhance the spatial vitality (Zhao & Sun, 2019). Therefore, the five-minute living circle can be modeled after the urban community, by improving the walkability of rural streets, implanting landscape node space and other ways to enhance the overall spatial area of vitality.

Summary and Prospect

In the context of the booming development of rural tourism, the spatial vitality of B&B public areas is

characterized by diversity and innovation. Through the above theoretical studies and case studies, the key factors affecting the spatial vitality of B&B public areas can be deduced. Therefore, the relevant factors are analyzed, and relevant suggestions for improving and enhancing the value of spatial vitality are put forward.

The results obtained in this study have a positive effect on enhancing the spatial vitality of the public area of the B&B as well as developing rural tourism. And they have certain academic significance and practical value for promoting the mechanism of rural spatial vitality. However, there are certain limitations and shortcomings. For example, the cases selected in this paper are all villages in the southern region of China, and there is a lack of data statistics on the factors influencing the spatial vitality value in winter in the northern region of China. When comparing rural data, due to technical and geographical reasons, it lacks certain practical research, so it needs to be improved and perfected in future research. Based on the shortcomings of this study, future research on the spatial vitality of B&B public areas can be explored in depth from the following aspects:

(1) Expanding the scope of the study: Future studies could collect more data from rural communities with different geographical and cultural backgrounds. In this way, a more comprehensive and accurate understanding of the characteristics and influencing factors of spatial vitality around the distribution of rural lodgings can be obtained;

(2) Strengthening data analysis and mining: analyzing and mining massive data with the help of more technologies such as big data analysis, machine learning, and artificial intelligence. In this way, the spatial vitality characteristics around the distribution of rural lodgings and their influencing factors can be analyzed more deeply and accurately;

(3) Deepening the rural public space vitality evaluation system: Future research can try to build a more comprehensive and scientific rural public space vitality evaluation system. It can assess the vitality characteristics and influencing factors of the space around the distribution of rural lodgings from multiple perspectives and at multiple levels. Finally, it can provide more targeted suggestions for policy makers and practitioners.

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