

# A Research on Pingshan Village's Sustainable Development Based on Space Syntax Theory-Take the Improvement of Tourism Format Quality for Example

Zhiyuan Zheng<sup>1\*</sup>, Qi Zhu<sup>1</sup>, Jun Fu<sup>1</sup>

<sup>1</sup> School of Architecture and Art, Hefei University of Technology, Hefei, China

## Email Address

350226758@qq.com (Zhiyuan Zheng)

\*Correspondence: 350226758@qq.com

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## Abstract:

Tourism provides new opportunities for the development of ancient villages. Meanwhile, in the process of village development, the unsustainable characteristics are gradually emerging. This paper takes the improvement of Pingshan Village tourism format quality as an example to explore the sustainable development of Huizhou Traditional Ancient Village Tourism to achieve a win-win situation between tourism development and ancient village development. Following the sustainable development principle, through on-the-spot investigation, this paper explored tourism format types, spatial distribution characteristics and combination forms of tourism industry, forming basic data, which was analyzed based on the function number theory. The result shows some such problems as unreasonable distribution of business format, serious homogenization, etc have existed. On this basis, the space syntax theory was used to analyze the integration and comprehensibility of the village. The results show that the overall spatial integration of the village is good, but the comprehensibility is low. In the future business format layout, different types of business format should be combined properly, and public service industry format such as museums and exhibition halls should be arranged in Skylight Lane to enhance the settlement identity.

## Keywords:

Sustainable Development, Huizhou Ancient Village, Business format, Pingshan Village, Space Syntax

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## 1. Research Background

The traditional ancient villages, as the “living fossil” of history and culture, truly reflect the rural social life in the agricultural civilization era. They are rich in cultural resources and ecological landscape and are the precious heritage left by Chinese agricultural civilization [1]. Since the 1980s, the unique traditional cultural value of ancient villages has made tourism industry develop rapidly, achieving great success. However, with the rise of tourism, its “unsustainable” characteristics are gradually

emerging, and the characteristics of ancient villages are declining, so how to achieve the sustainable development of traditional villages has become an important issue. Since Hongcun and Xidi were listed as world cultural heritage in 2000, Huizhou ancient villages, as an important carrier of Huizhou culture, have shown a blowout-like development trend in cultural tourism activities. In the meantime, some prominent problems such as rough development and serious destruction of ancient villages have arisen.

Under the background of the new era, we should protect and improve the development of Huizhou ancient villages and guide residents to live in harmony with the villages and its surrounding environment, promoting the ancient villages' sustainable development. Pingshan Village, known as "a peaceful and poetical human habitation with rivers and bridges" and located in Yixian County, Huangshan City, is a typical water village in the south of the Yangtze River. As the main student sketch base in Huizhou area, in recent years, Huizhou ancient villages' tourism development has risen to a new stage, bringing certain economic benefits to villages. Its business mainly focuses on business storefronts and its business type has typical bottom-up characteristics. This paper takes Pingshan Village as an example to explore the sustainable development of Huizhou's traditional ancient villages Tourism to achieve a win-win situation between tourism's and ancient villages' development.

## **2. Related Concepts**

### ***2.1. Sustainable Development***

After re-examining the relationship between human being and nature, contemporary people, who are faced with energy shortage, ecological destruction and environmental deterioration, put forward the sustainable development, a new concept about environmental values and survival development. The sustainable development refers to the development which can meet contemporary people's needs without damaging future generations' ability to meet their needs. Its basic characteristics can be simply summarized as economical sustainable development, ecological sustainable environment, environmental sustainable development and social sustainable development [2], which encourage economic growth, but require economic construction to be carried out under the conditions of protecting the environment and sustainable utilization of resources.

### ***2.2. Ancient Villages in Southern Anhui***

Ancient villages in southern Anhui, represented by Xidi and Hongcun, are located in the mountainous area south of the Yangtze River in Anhui Province [3]. Its regional culture is distinct and its social organization is based on clan. The villages' overall layout, architectural style, decoration and architectural technology feature strong Huizhou cultural characteristics. Southern Anhui has a long history and profound cultural accumulation. The unique Huizhou culture has created unique Huizhou architecture and village form [4].

### ***2.3. Tourism Format***

#### ***2.3.1. The Concept of Tourism Format***

With the rapid development of tourism industry, the term "format" describing retail industry has been introduced to make it more reasonable to describe the current

situation of tourism. Because more researches about tourism industry have been conducted at home and abroad and no unified definition has been reached, this paper chose Zhang Wenjian's definition about tourism pattern, tourism pattern or enterprise group' business form, which is closely related to enterprises' business model. In addition, the broad tourism format also includes the structural type and organizational form of tourism, which is manifested in many industry types and many industry conditions based on the industry level [5].

### 2.3.2. Classification of Tourism Format

So far, no authoritative and unified definition of tourism format classification has been achieved. This paper classified tourism pattern into catering, accommodation, traffic, recreation, shopping and entertainment according to the six elements of tourism, namely eating, living, traffic, traveling, shopping, entertainment and the existing business format characteristics of ancient villages in southern Anhui [6]. In addition to meeting their own development, ancient villages, as tourism industry, are developed. So life service format, as the seventh category of ancient village tourism, is introduced to tourism format. Besides, because Pingshan is a typical student sketch base in Huizhou, supermarket painting materials account for a certain proportion in Pingshan tourism format distribution. So supermarket painting materials, as the eighth category, is added. The classification system is shown in Table 1 as follows:

*Table 1. Tourism format classification.*

<b>Classification Basis</b>	<b>Tourism Format Classification</b>	<b>Specific Business Format</b>
Eating	Catering Format	Club House, Restaurant, Fast Food Restaurant, Snack Bar, Milk Tea Beverage Shop, Barbecue Stall, Etc.
Living	Accommodation Format	Mass Hotel, Express Inn, Youth Hostel, Social Hostel, Farmhouse Entertainment, Resort, Holiday Villa, Etc.
Traffic	Transportation Format	Car Rental And Maintenance, Bicycle And Battery Car Rental And Maintenance, Scenic Bike Rental, Etc.
Traveling	Recreation Format	Characteristic Pedestrian Streets, Art Galleries, Characteristic Shopping Streets, Etc.
Shopping	Shopping Format	Characteristic Storefronts, Local Products, Handicrafts Shops, Tourist Commodity Stores, Ethnic Costumes, Etc.
Entertainment	Entertainment Format	Bar, Coffee, Water Bar, Teahouse, Theatre, KTV, Etc.
Supermarket Painting Materials	Supermarket Painting Material Format	Supermarket, Painting Material
Life Service	Life Service Format	Clothing, Shoe And Hat Stores, Barber Shops, Tailor Shops, Etc.

Because southern Anhui is mainly mountainous and hilly regions, there is no good agricultural and industrial development environment. In terms of ancient villages, it is a must to seek new development model, therefore, it is a natural choice to make use of rich and unique Huizhou cultural resources to develop tourism. The sustainable development of ancient villages in southern Anhui is implemented by means of

tourism development to meet its growth of economy benefits, creating employment opportunities for villagers, increasing villagers' income, transforming former village structures, adjusting ancient villages' industrial structures, making ancient villages free from single agricultural development model and switching to economic structure where tourism is prioritized and agriculture as well as forestry are weighed equally. Meanwhile, villages' social and cultural developments are promoted. Ancient villages' cultural value is sustainably developed to protect cultural resources and create new opportunities for ancient villages' development [7]. Through on-the-spot investigation, following the principle of sustainable development and applying the space syntax theory, this paper analyzed the Pingshan village's business format, attempting to make the village develop from immoderate development to sustainable development by improving the tourism format and injecting new vitality into the development of the village to realize the win-win situation between tourism development and ancient village development.

### **3. Characteristics of Tourism Development in Pingshan Village**

#### **3.1. Data Sources**

Business format distribution of Pingshan Village has distinct characteristics and commercial distribution is mainly around Jiyang Stream. Therefore, when investigating business format of Pingshan Village, the author chose the front street, back street, Skylight Lane and a bystreet as the main research objects of the survey and mainly surveyed Pingshan village's existing business format types, spatial distribution and business format combination. The author carried out this survey and investigated 151 storefronts on May 5, 2018.

#### **3.2. Business Format Type**

According to the existing business format classification criteria and the field survey results, it is found that there are six main types of tourism format in Pingshan Village, including life service, supermarket painting materials, shopping, catering, entertainment and transportation (Figure 1), among which, the catering industry (89) accounted for 58.9% of the total industry in Pingshan, followed by shopping industry (32), accounting for 21.2%; supermarket painting materials(14) accounted for 9.3%; entertainment industry (10)accounted for 6.7%; life services (3) and transportation industry (3) accounted for 2% (Figure 2) [8]

The author analyzed the business format of the front street, which was regarded as the main representative. There are 105 storefronts in the front street, of which 56 are catering business, accounting for 53.3%, which is the highest; 25 are shopping business, accounting for 23.8%; 12 are supermarket painting materials, accounting for 11.4%; 7 are entertainment business, accounting for 6.7%; 3 are traffic business, accounting for 2.9% and 2 are life service category, accounting for 1.9%, which is the lowest (Figure 3). In shopping business pattern, there are five types including jewelry, experiential business, special products, and clothing and souvenir goods. There are 13 storefronts for jewelry items, accounting for 13% of the total number of the front street business. They are mainly handicraft products with ancient village characteristics (such as ox horn comb, silver jewelry, Huizhou antiques, etc.); secondly, there are seven storefronts for Huizhou specialties, including tea, Huizhou cake and Huangshan cake, etc. only 4 storefronts are for souvenir products, which accounts for lowest proportion.

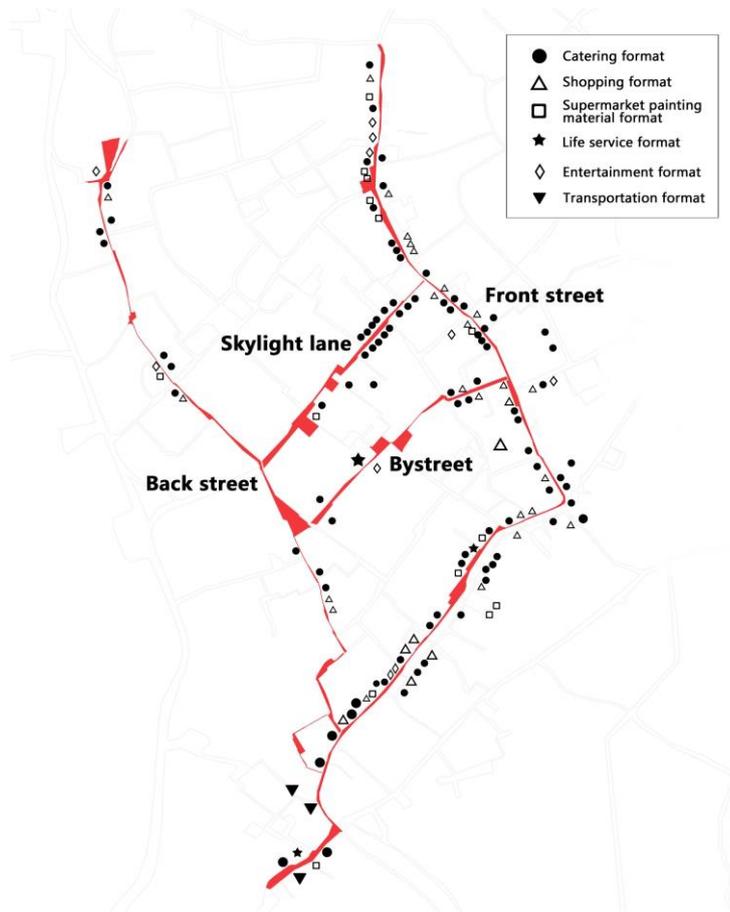


Figure 1. Business pattern distribution of Pingshan Village.

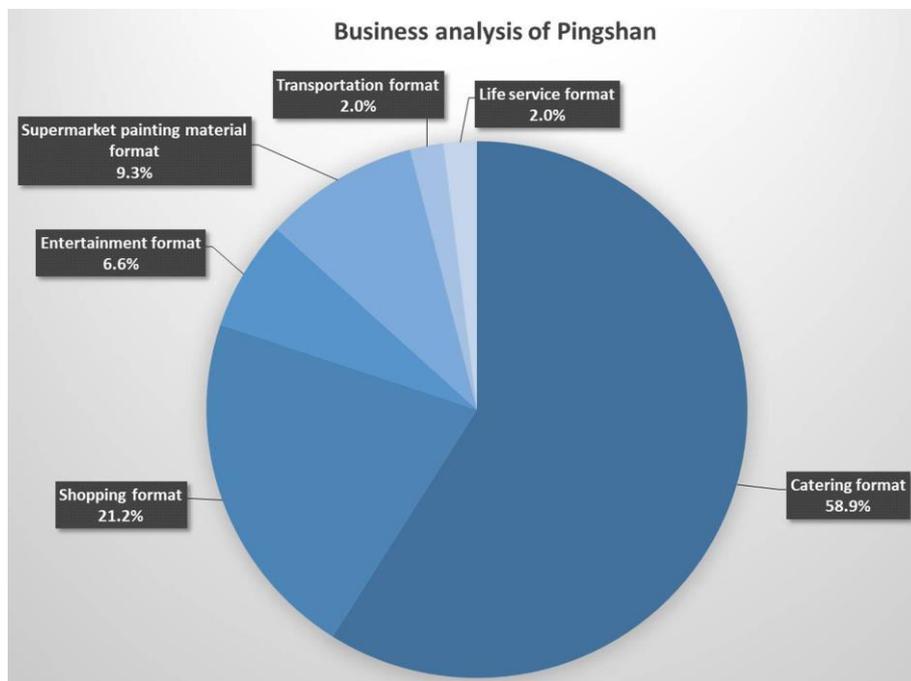


Figure 2. Business analysis of Pingshan.

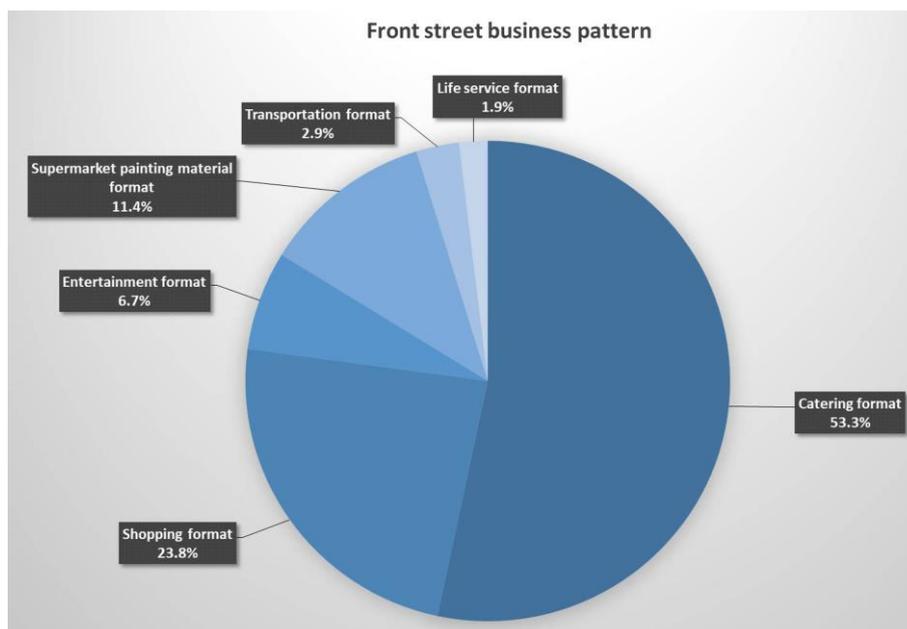


Figure 3. Front street business pattern.

The business format of Pingshan Village is dominated by catering while shopping is secondary. Supermarket painting materials and life service are supplementary to the business format of Pingshan Village.

There exists an obvious symbiosis among the entertainment and catering, shopping formats and other business formats.

Experiential business, commemorative business and cultural exhibition business account for a small proportion and their scale is also small.

### 3.3 Spatial Distribution of Business Format

According to the analysis of the spatial distribution of business pattern, catering businesses with the largest number and scale are the most widely distributed, which are scattered in various streets and lanes of Pingshan, but are relatively concentrated in front street, back street and skylight Lane. Shopping businesses are mainly distributed on either side of the front street; supermarket painting materials are mainly distributed near Jiyang River and the sketch base. There are a very small number of life service businesses, which mainly serves local villagers, so they are scattered in Pingshan village. Accommodation business is mainly distributed around the villages—the construction control area. The entertainment industry has strong symbiosis with catering and shopping industry, and its distribution is more intensive in the north of the front street-north of Skylight Lane.

Pingshan village's spatial distribution map of business pattern shows that its business patterns are mainly distributed in the front and back streets as well as a few bystreets, which is directly related to Pingshan Village's tourism route and villagers' activity space. Pingshan village's tourism route is from Shuikou to Xiaqiao Pavilion, Pingshan Arch Temple, Dundao Hall, Hulu Well and Imperial Bodyguard, and then goes eastward to enter Skylight Lane, passes through Shuguangyu Temple and Xianyitang Hall and finally returns to the back street and arrives at Sangu Temple in the north of the village. Water Street beside Jiyang Stream is the most intensive activity space for villagers and tourists to visit, and tourism pattern space has a very high overlap with it [9].

The business pattern of Pingshan is mainly influenced by the sketching crowd, and the catering business format is distributed where students often practice sketching.

The business format of Pingshan presents obvious linear characteristics, which forms a stable business format around several streets and lanes in the village.

### 3.4. Combination of Business Format

The function number is the quantity of goods and services that the business center can provide, which means that the business center can provide more goods and service function, indicating the diversity of tourism business format combination[10]. Using the specific tourism business as the calculation unit of the function number, this paper divided the front street, as a representative, into 4 sections, namely, from the village entrance to the Xiaqiao Pavilion, from the Xiaqiao Pavilion to the Shangting Bridge, from the Shangting Bridge to the Skylight Lane and from the Skylight Lane to the end. By calculating the function ratio P ( $P = \frac{\text{the number of shops}}{\text{the number of functions}}$ ), this paper explored the combination characteristics of tourism business pattern in each section of the front Street. When P value is closer to 1, the business pattern combination is more reasonable and the business format homogenization is smaller; when the P value is greater than 1, the business format combination is more unreasonable and the business format homogenization is more serious.

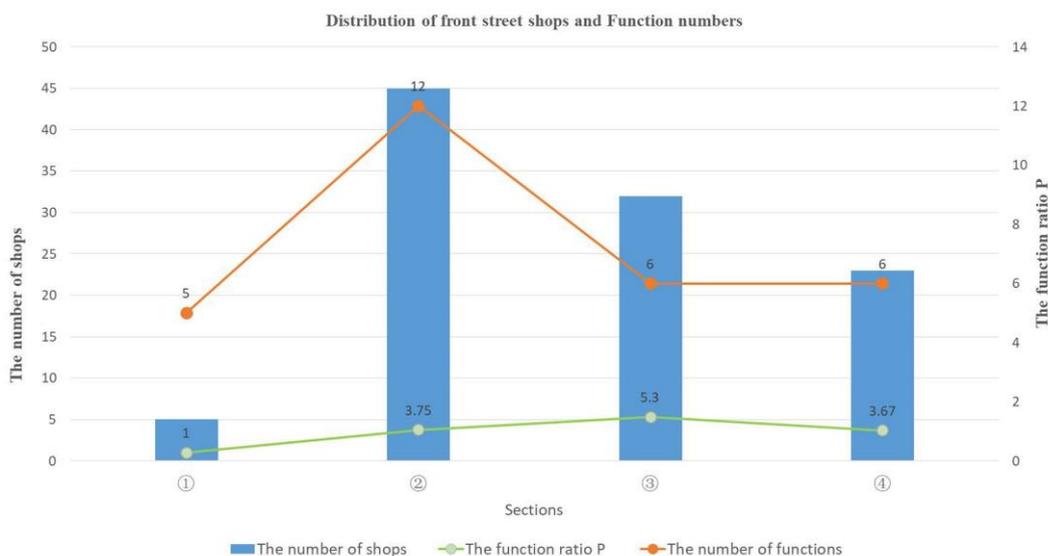


Figure 4. Distribution of front street shops and function numbers.

According to the statistical analysis of the number of shops and functions, the number of shops in the front street is 105, the number of functions is 14 and the function ratio of shops is 7.5, which shows that the business format combination in the front street is unreasonable on the whole and the business format homogenization is serious. From south to north, the characteristics of tourism business format combination in each section of the former street are different. Among them, five shops are in the first section, namely from the village entrance to Xiaqiao Pavilion. The function number is 5 and the function ratio P is 1, which shows that the business format combination in this section is the most reasonable and the business format homogenization is smaller. 45 shops are in the second section, namely from Xiaqiao Pavilion to Shangting Bridge. The function number is 12, the highest one and the P value is 3.75, which shows that the business format combination is unreasonable. 32 shops are in the third section, namely from Shangting Bridge to Skylight Lane. The

function number is 6 and the P value is 5.3, which shows that the business format combination is unreasonable and the business format homogenization is serious. 23 shops are in fourth section, namely from Skylight Lane to the end. The function number is 6 and the P value is 3.67 (Figure 4).

## 4. Preliminary Research on Tourism Format in Pingshan

### 4.1. Analyzing Pingshan Space Integration Degree Based on Space Syntax

#### 4.1.1. Analyzing Space Integration Degree

i. Integration degree represents a concentration or dispersion degree between a unit space and other spaces in the system. Based on the axe analysis method of space syntax, the space integration degree of Pingshan village was analyzed, in which the results were divided into ten numerical segments from the maximum to the minimum. And the highest numerical segment was marked in red and the lowest numerical segment in blue. Namely, the red indicates the highest integration degree in the region while the blue indicates the lowest integration degree [11]. In highly integrated areas, the accessibility is higher, economy is prosperous and population is very large in the process of village construction. The most frequent, maximum and refined requirements about substantive elements such as buildings should be taken into consideration in the process of developing villages [12]. (Figure 5)



*Figure 5. Analysis of the integration degree of Pingshan.*

ii. Ping Shan village's overall spatial integration degree is good. The analysis shows, the zone with the highest spatial integration degree of villages is where Skylight Lane and the front street intersect. Here is the core protection area of Pingshan Temple and also Huizhou ancient villages' core area [13]. Therefore, museums, exhibition halls

and other business patterns with Huizhou culture transmission can be arranged here. Many village roads derive from the red axis, whose accessibility is weaker than that of the red area, but it still has certain accessibility. Such business formats with public service nature as health rooms, post offices and commercial facilities can be arranged close to the area. The blue axis at the outermost part represents the convenience is the worst and far from the core axis. They are mostly village roads formed when villagers built their own houses. The accessibility of this area is low. When arranging business formats, such business types as accommodation and transportation that do not require high accessibility can be considered.

#### 4.1.2. Spatial Comprehensibility Degree Analysis

i. Comprehensibility describes the correlation between local variables and integral variables, that is, when people are in a certain space in a village, it seems that they can establish the cognition of the whole spatial morphological structure through the local vision of the space [14]. Through the analysis of comprehensibility degree, Pingshan village's spatial form is studied and the space complexity is quantified. Comprehensibility degree is a linear relationship between partial integration ( $R_3$ ) and global integration ( $R_n$ ), which simulated the trend of the scatter plot by means of regression curve value  $R^2$  (fitting degree) to see its consistency [15]. When the value of  $R^2$  is 0-1 and  $R^2$  is above 0.5, the fitting degree is considered good. In other words, if the numerical value is bigger, the connection degree between the part and the whole is better; if the comprehensibility is higher, the space is closer to the single-core space.

ii. Pingshan village's s comprehensibility value is  $R^2=0.3796$ . So when  $R^2$  is lower than 0.5, the comprehensibility degree is a little low. That is to say, people will get lost after entering the village. It is mainly because of tourism development in Pingshan that the village's settlement space continuously spread outwards. A large number of commercial development and traffic development have changed the original structure in the Pingshan villages, shifting the original structure with "villages' ancestral hall" as the core deviate. Many new student sketch bases have been built on the east side of the village to meet the needs of commercial development. The spatial correlation between the new and the old space is weak, and the increasing differences between different spaces in the village decrease the comprehensibility of the village which also reduces people's sense of identity for the settlement space. (Figure 6)

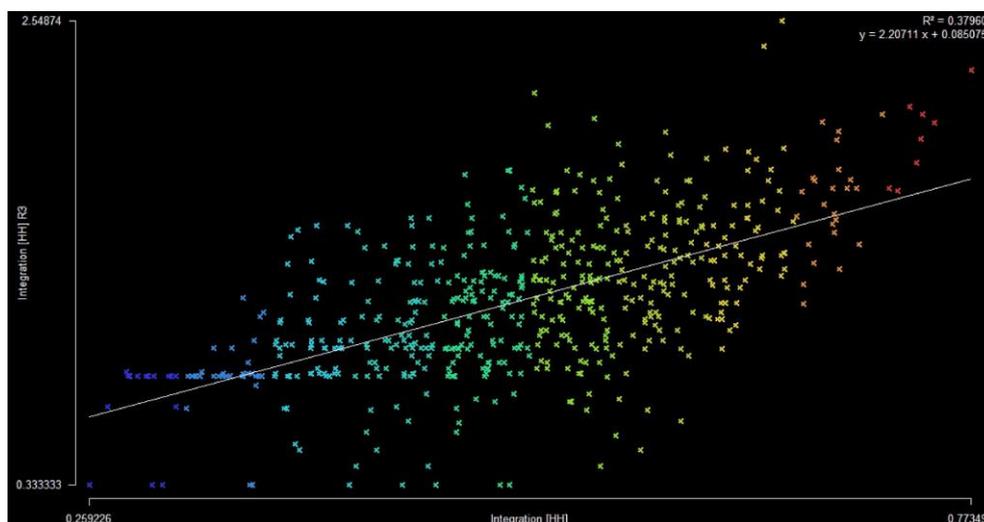


Figure 6. The comprehensibility analysis of Pingshan Village.

iii. Different traditional settlement spaces in Huizhou created unique villages and culture. Pingshan was rich in unique “clan culture”. However, the immoderate development of tourism has reduced the sense of settlement identity, and the recognition of Skylight Lane, an important space of the villages, has also been weakened. In the coming development of village commerce, the recognition of Skylight Lane, an important joint space, should be strengthened. Such physical space as ancestral hall, etc can be used to study Huizhou science and carry out folk activities and exhibitions, etc. Besides, the bond between the new and old spaces should be strengthened. In addition to the architectural form and village texture, the allocation of business format should also be considered and planned as a whole. In the new space, small-scale business and service facilities should be added. In the meantime, as Pingshan is now the largest student sketch base in Huizhou, we should try to avoid students’ sketch squeezing and occupying residents’ living space.

## 5. Conclusion and Suggestions

The sustainable development of ancient villages in Huizhou is implemented by means of tourism development to meet its growth of economy benefits, increasing villagers’ income, adjusting ancient villages’ industrial structures, making ancient villages free from single agricultural development model and switching to economic structure where tourism is prioritized and agriculture as well as forestry is weighed equally. Meanwhile, villages’ social and cultural developments are promoted. Ancient villages’ cultural value is sustainably developed to protect cultural resources and create new opportunities for ancient villages’ development. Huizhou’s ancient villages’ tourism industry has developed rapidly in recent years. As an important carrier of Huizhou culture, this paper took Pingshan as an example to explore tourism industry format types and its spatial distribution characteristics and analyze Pingshan’s integration degree and comprehensibility degree based on space syntax to provide important scientific basis for Pingshan’s business format layout, thus realizing sustainable development of the villages.

i. Pingshan Village’s business format is still incomplete, with catering as the dominant type, shopping as the secondary type, supermarket painting materials and life services as the supplement of Pingshan Village business format. It is suggested that Pingshan should properly increase experience-oriented business format, attach importance to integrating Huizhou’s unique cultural characteristics and strengthen the protection and inheritance of Huizhou’s intangible cultural heritage. Developing shopping industry format, we should attach importance to the classification of tourism commodities, upgrade low-end tourism commodities and increase their cultural and artistic properties [16]. In the meanwhile, cultural and artistic industry such as Huizhou opera should be added to enhance people’s appreciation and learning about tourism.

ii. Spatial distribution of Pingshan tourism industry presents obvious linear characteristics. Although relatively concentrated, the tourism format combination is extremely unreasonable. Serious homogenization exists in many streets and lanes. Especially in Skylight Lane, Of the 18 shops, 17 are catering and the function ratio of shops is 7. Different types of business formats should be combined properly in future business format layout. Based on spatial integration and comprehensibility degree from spatial syntactic analysis, business distribution should be carried out reasonably. The whole and part, centralized and decentralized business format combination relationship should be taken into account in the layout.

iii. By analyzing and studying spatial syntax, we have found that tourism development has a certain impact on Pingshan's village forms and settlement identity. Pingshan has a unique "clan culture". The recognition of Skylight Lane, an important joint space, should be strengthened. Such physical space as ancestral hall, etc can be used to study Huizhou science and carry out folk activities and exhibitions, thus enhancing villagers' and tourists' settlement identity. Skylight Lane is the most highly-integrated area in the village. So it is very vital to set up museums, exhibition halls, etc to propagate Huizhou culture.

iv. There are quite a few people engaged in sketching and tourists in Pingshan. The tourism activities beyond the capacity of tourism environment have caused serious damage to the environment of Jiyang Stream. When business formats are arranged, the business which damages the environment of Jiyang Stream should be moved and transformed and new business format should also be introduced to manage these industries sustainably and environmentally.

### Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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