Research on the Spatial Integration of Traditional Villages under the Concept of "Live Heritage"—Taking Chang'an district of Xi'an as an example

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Abstract. The protection and sustainable development of traditional villages is an important issue of common concern in all walks of life. Taking the Yaotou Village of Weinan City in Shansi Province as an example, this paper simulates the spatial and temporal evolution process of the Sansheng space in Yaotou Village through questionnaire interview and GIS spatial analysis method. For the revitalization of the handicraft village provides a reference.

1. Introduction
In recent years, with the rapid advancement of new urbanization the unique rural characteristics of the diversified traditional villages have disappeared [1]. The most representative achievement of foreign scholars in the study of traditional village space is to establish it on the theoretical basis of agroecology and agricultural development. In the 1990s, Western countries achieving the coordinated development of ecological space and living space. Domestic scholars' research on traditional villages mainly focuses on the values of traditional villages, public space, material and intangible cultural heritage and spatial distribution characteristics [2][3][4][5]. In summary, foreign scholars pay attention to the role of new technologies and new materials in rural development. Domestic scholars' research on traditional village space mainly focuses on the coupling symbiotic relationship between ancient village values, public space and residents' life [6][7], Sansheng space ecosystem [8][9], spatial structure form [10][11][12] and its evolution mechanism, but lack of systematic research on the traditional village Sansheng space, and rarely involves the perspective of the inheritance of intangible cultural heritage to explore the traditional village three space. This paper takes Yaotou Village as an example, and analyzes the spatial and temporal evolution of the Sansheng space and the living heritage of ceramics. The development of production, the beauty of life and the harmonious development of ecological harmony provide reference.

2. Research area overview and research methods

2.1 Research area overview
Yaotou Village is located one kilometer west of the township of Yaotou Town, Chengcheng County, Weinan City, Shaanxi Province. It by experts as the living stone of ancient porcelain kiln.
2.2 Research methods

2.2.1 Field research Through a systematic field survey of the site and surrounding areas of Yaotou Kiln, 200 questionnaires were distributed on July, 2018, and 197 copies were collected to obtain the current distribution of various sites and relics.

2.2.2 Nuclear density estimation This study uses ArcGIS 10.2 software to estimate the nuclear density of the production space in the traditional village three living spaces. Its calculation formula is as follows:

\[ f'(x) = \frac{1}{nh^d} \sum_{i=1}^{n} k\left(\frac{x-x_i}{h}\right) \]

In equation (1), \( K(x-x_i/h) \) is the nuclear density equation, which means that the density distribution is highest at the center of each \( x_i \) point, and decreases outwards. When the distance reaches a certain threshold range (edge of the window), the density It becomes 0; \( h \) is the threshold, \( n \) is the number of points in the threshold range, and \( d \) is the dimension of the data.

2.3 Data Sources

The data in this paper mainly comes from field research and interviews. Combined with the relevant data of the local government department population economy and the remote sensing image map of Yaotou Village from 1995 to 2015, the GIS nuclear density spatial analysis method is used to study the fusion of the village Sansheng space.

3. Temporal and Spatial Evolution Analysis of Sansheng Space

3.1 Three-dimensional spatial structure relationship The three-life spaces interact and interact with each other and follow a certain logical relationship (Figure 1).

![Figure 1. Composition of the three-space system under the concept of living heritage](image)

3.2 Living inheritance and three-life space compatibility construction Through combing the content of the concept of living heritage and the characteristics of "three living spaces", the compatibility relationship between the two is summarized. As shown in Table 1:

| Space type  | Type feature                                           | Compatibility analysis | Compatibility |
|------------|--------------------------------------------------------|------------------------|---------------|
| Production space | The level of socialization and scientific production is high, and the regional cultural characteristics are obvious. | The production space carries manual craftsmanship, process flow and production methods. | +++++ +++++ |
| Living space  | The layout of the village is reasonable and the rural living space is interactive and harmonious. | Living space inherits regional culture, customs, lifestyle. | +++++ +++++ |
Ecological space Good ecological environment quality and landscape diversity. The environment show the characteristics and atmosphere of intangible cultural heritage +++

Note: (“+” means compatibility, the greater the number, the greater the compatibility)

Living space is the soil that produces handicrafts and intangible cultural heritage. The production space and live State heritage has great compatibility. The ecological space is the material carrier and environmental basis of the production and living space. It has general compatibility with living heritage. In summary, the integration of the Sansheng space, especially the production space and the living space, is beneficial to the living inheritance and development of the intangible cultural heritage.

3.3 The current situation of the evolution of the Sansheng space in Yaotou Village
In the Ming and Qing Dynasties, the hand-made porcelain industry in Yaotou Village was developed. With the development of new rural construction, the change of village production methods and the lack of production space structure make the villages hollow, the production space begins to slump, the living space is shrinking, and the production space and living space begin to occur Isolation.

3.4 Temporal and Spatial Evolution Analysis of Sansheng Space

3.4.1 Analysis of space-time evolution of production space
Through the selection of production space layout data in 1995, 2005 and 2015, GIS software was used to visualize and analyze the nuclear density of Yaotou Village.

![Production space in Han Dynasty](image1)
![Production space in the Qing Dynasty](image2)
![Modern production space](image3)

Figure 2. Production space nuclear density analysis chart

From figure 2a, in all parts of the village, the distribution of production space is relatively concentrated and large, and the living space of the villagers is consistent, the production space and living space are combined. By the end of the Qing Dynasty in Figure 2b, the production space and living space have been gradually separated. Up to now (shown in Figure 2c), there are only a few scattered places where there is a distribution of production space. Upgrade, the production space has been showing a decreasing trend, and the economic role of the village production space has been disappearing.

3.4.2 Analysis of the spatial and temporal evolution of living space
According to the geographic data visualization, the living space of Yaotou Village was presented in the map by GIS spatial analysis method, so as to more clearly and visually see the change of living space in Yaotou Village (Figure 3).
a map of living space in the Han Dynasty b. Distribution of living space during the late Qing Dynasty and the Republic of China

C. Residential space distribution map in the 1970s after the founding of New China

d.modern living space map

Figure 3. Analysis of living space change analysis

It can be seen from Fig.3a that the living space in the Han Dynasty was distributed along the street from west to east, and there are certain rules to follow. By the end of the Qing Dynasty (as shown in Figure 3b), with the decline of the Yaotou ceramic industry, the living space gradually dispersed. As shown in Figure 3c, after the construction of the new town area 1 km east of the village, the focus of the villagers' lives gradually shifted eastward. The production space is scattered and the living space is concentrated in the east. At this time, the village living space is seriously isolated from the production space (as shown in Figure 3d).

3.4.3 Analysis of Spatial and Temporal Evolution of Ecological Space

Combined with the remote sensing image base map visual interpretation results and GIS data analysis, as shown in Figure 4a, in the Ming and Qing Dynasties, the ecological space of the undeveloped areas around the village is intact. However, in the residential areas where village residents live, the layers continue to collapse, resulting in poor ecological environment in the site. There are almost no green plants and ecological functions are destroyed serious. Up to now, as shown in Figure 4b, the development of tourist attractions and the improvement of residents' environmental awareness, the green area of the village has been increasing, and the ecological environment has been greatly improved.

a. Early ecological space map b. Current ecological space map

Figure 4. Analysis of ecological spatial change

From the above analysis of the spatial and temporal evolution of the production space, living space and ecological space, it can be seen from the comprehensive figure5 that the spatial layout of the village has changed greatly, mainly due to the migration of the residence and the ceramics.
3.5 Analysis of the Factors Affecting the Temporal and Spatial Evolution of "Three-Life Space"

3.5.1 Productivity change With the renewal of production technology and tools, the farming society has transformed into an industrial society, and the industrial structure of the village is lacking. The existing craftsmen are generally too old, and most of them are rarely fired due to physical strength.

3.5.2 Urbanization promotion The government's practice of building new towns has shifted the material space of traditional ceramic craftsmanship carrying intangible cultural heritage. At the same time, due to the unique resource endowments of the villages and its original production, living and ecological functions changed, and it became a commercial display space.

3.5.3 Ecological environment deterioration Production and construction activities, especially on both sides of Yaotou Old Street, have been damaged due to changes in climate, and water levels have declined. The balance of ecological space is declining, the ecological functions are difficult to maintain, and the production and living space are affected.

4. Suggestions for the integration of village Sansheng space based on living heritage

4.1 Establish a museum of ruins to restore the function of production space economy With the unique historical and cultural resources and local cultural characteristics, the museum is built. The ruins of the porcelain kiln were displayed to gradually transform its production function into an ornamental function.

4.2 Residents participate in interaction and promote the integration of production space and living space Do a good job in relevant propaganda work, and promote local people to integrate into the operation and perfection of the museum to form the original ecological porcelain museum. Making the influence of the separation of production space and living space can be eliminated, and the porcelain art can be passed down in the process of production and life of the people. At the same time, speed up the restoration of the village production space, to achieve the purpose of the integration of production space and living space.

4.3 Integrating modern technology to promote the integration and development of Sansheng space

The well-preserved Yaotou Kiln ruins area, family ancestral hall, ancient street alley, and Guzhaibao have been developed into scenic spots for tourists to visit. Open up the porcelain experience space in the scenic spot, let visitors join the process of ceramic production, while retaining the elements of traditional porcelain cooking techniques and their main forms, and adding modern elements to their functions. At the same time, gradually improve the living infrastructure so that it can meet the basic needs of the people's daily entertainment and leisure shopping.

5. Conclusion and discussion

5.1 Conclusion

The Sansheng space of Yaotou Village has undergone great changes, as follows:
(1) The production space was transformed from original porcelain-making space to the tourism space.
(2) There is a great degree of isolation between the living space of the village and the production space.
(3) The ecological space and ecological environment of the village are continuously improved.

5.2 Discuss This study provides a reference the spatial integration and inheritance of traditional village intangible cultural heritage through the use of the concept of “live inheritance” to the study of the three-story space integration of the traditional village. In the future, when studying the integration of the three living spaces of the village, it is necessary not only to serve the residents of the village, but also to meet the basic needs of foreign tourists.

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References
[1] Li B H, Zeng C, Dou Y, Liu P L. The Evolution and Driving Mechanism of Traditional Village Habitat Environment Based on "Three-Life" Space—Taking Lanxi Village, Jiangyong County, Hunan Province as an Example[J].Progress in Geography Science, 2018, 37 (05): 677-687.
[2] Ge Y Q, Wang R C. Reconstruction of Rural Space under the Guidance of Pastoral Complex—Taking the Picking Village of Yangshan Town, Wuxi as an Example[J].Resource Development & Market, 2019, 35(03):430-433 +444.
[3] Li J L, Chu J L, Ye J Y, Liu W. The spatial evolution characteristics and driving mechanism of traditional Huizhou traditional villages[J]. Economic Geography, 2018, 38(12): 153-165.
[4] Liu Y M, Li B H, Zhou X, Yang J R. Study on the Spatial Shape and Optimization of Traditional Villages Based on Spatial Syntax—Taking Zhang Guying Village as an Example[J].Resource Development & Market, 2017, 33(11):1289-1294.
[5] Chen Chi, Li Bohua, Yuan Jiali, Yu Wen. Cognition of Spatial Forms of Traditional Villages Based on Spatial Syntax-A Case Study of Qinchuan Village in Hangzhou[J]. Economic Geography, 2018, 38(10):234-240.
[6] Shao X Y, Zhai C, Liu Y, Shi J H. Coupling and Coordination Research on Tourism and Community Development of Ancient Villages-Taking the Hougou Ancient Village in Shanxi as an Example[J].Arid Zone Resources and Environment, 2019, 33(05): 203-208.
[7] Li B H, Liu P L, Dou Y X. Study on the Evolution of Traditional Village Habitat Environment Based on CAS Theory-Taking Zhang Guying Village as an Example[J].Geographical Research, 2018, 37(10):1982-1996.
[8] Wu Q X, Zhu L Q, Han L F. Analysis of the Complexity of Ancient Village Ecosystem——Taking the Ancient Village of Wuyuan in Jiangxi Province as an Example[J]. Regional Research and Development, 2010, 29(06): 80-84.
[9] Dai W Y, Jiang F Q, Huang W L, Liao L H, Jiang K. Research on Land Use Function Transformation and Ecological Service Value Based on "Three-Life Space"—Taking Fuzhou New Area as an Example[J].Journal of Natural Resources, 2018, 33(12): 2098-2109.
[10] Li B H, Zhou X, Liu P L, Chen C, Liu Y M. Functional Transformation and Spatial Reconstruction of Zhang Guying Village in the Process of Urbanization[J]. Geography Science, 2018, 38(08): 1310-1318.
[11] Guan M Z, Wang T W, Shi X X. The Temporal and Spatial Patterns of the Distribution of Traditional Villages in the Central Plains Economic Zone and Their Causes of Formation[J]. Economic Geography, 2017, 37(09): 225-232.
[12] Ye M S, Li Z, Wang D. The spatial structure characteristics of traditional villages in southern
Anhui based on the perspective of beautiful rural construction [J]. Industrial Construction, 2018, 48 (05): 89-94+88.