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Tourism resource assessment and spatial analysis of wine tourism development: a case study of the eastern foothills of China's Helan Mountains

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Abstract: The reasonable development and utilization of mountainous regions closely relates to local economic development and ecological security. The wine production region in the eastern foothills of the Helan Mountains in Ningxia, Ningxia Hui Autonomous Region, with its excellent terroir, is emerging as one of China's three major geographical attractions. Based on surveys of tourism resources and spatial analysis for this wine producing region, we propose a highly representative and practicable path for wine tourism development. Based on China's national standard in *Classification, Investigation and Evaluation of Tourism Resources* (GB/T 18972-2003), which recommended the types and grades of tourism resources in one area, we conduct an analysis of resource characteristics and the current state of development. Using ArcGIS software, spatial autocorrelation analysis, average nearest neighbor analysis, as well as clustering and outlier analysis, we are able to derive the spatial distribution characteristics of tourism resources. Our survey showed that tourism resources in this area are relatively abundant and have good quality and clear combination advantages. Nonetheless, there are resources shortage for wine tourism and poor integration of wine production with the tourism industry. Regarding the spatial distribution of resources, we revealed the current states of and issues surrounding regions with concentrated resources, as well as characteristics of this clustering. Finally, we proposed a development path for wine tourism in this region based on the five dimensions of management mode, industrial path, product development, spatial optimization, and market development.

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Introduction

The ecosystems of mountain regions are complex and characterized by ecological diversity and differ from human environments. Ecosystems not only contribute to human well-being, but are also an important component of ecological security. Furthermore, mountainous regions tend to have low levels of economic development (Chen et al. 2010). Therefore, an important and practical research topic question is how to achieve harmonious ecological and socioeconomic development that benefits the communities of these regions.

The Helan Mountains are an important geographical boundary in China, dividing the temperate desert into grasslands and deserts, a monsoon climate and a non-monsoon climate. The selection and optimization of methods of utilization and development modes of Helan Moutains must consider many factors related to local ecological security and sustainable development, such as socioeconomic, industrial development, and welfare of the communities living in the mountain regions. The eastern and western parts of the Helan Mountains are geographically different: the slopes are relatively gentle in the west, gradually transitioning into the Inter-Mongolian Plateau. The eastern slopes of the mountains are steep, with vertical drops of up to 2000 meters to the Yinchuan Plain, forming a natural barrier that weakens the high-pressure cold Siberian airflows, and also blocking the eastward expansion of the Tennger Desert and preventing the westward encroachment of monsoon moisture from the southeast. These characteristics cause different climates, water conditions, and vegetation in the east and western segments of the mountain chain. An alluvial fan formed by flash floods has caused the eastern foothills of the Helan Mountains to become a perfect area for producing grapes, and gives the wines a unique terroir (Mo et al. 1995). The region is known as “the Bordeaux of China,” and is one of three main geographical attractions in China. Using these unique advantages, the Ningxia Hui Autonomous Region is vigorously promoting the construction and development of the wine-producing region in the eastern foothills of the Helan Mountains in harmony with the local conditions, and has transformed the land in front of the mountains into an impressive vineyard. While promoting local socioeconomic development, the region has also protected the ecology, and has effectively prevented landslides, flash floods, and other natural disasters. Presently, the wine-producing region in the eastern foothills of the Helan Mountains has 184 wineries and a unique regional landscape and social culture that cater to the pursuit of diverse rural landscapes, a slow lifestyle, and eco-tourism experiences of modern tourism. In addition, the region provides an excellent resource base for the development of wine tourism.

Wine tourism is a combination of wine industry and tourism. For the tourism industry, the winery's pastoral scenery, wine making experience, wine tasting and festivals, etc., are important components of the attractiveness of a destination and can be major motivating factor for visitors. For the wine industry, wine tourism can achieve direct interaction with winners and customers, so as to establish a loyal customer relationship and promote the sale of wine. Therefore, the wine industry and the tourism industry have a natural coupling relationship. Wine tourism is defined by Hall et al. (1998, p. 197-224.) as “tourists whose primary motivation is tasting wine or experiencing the characteristics of wine producing regions taking part in vineyard and winery activities, and participating in wine festivals or wine shows”. Wine tourism can be traced back to the Grand tour era, even earlier in ancient Greece, the ancient Roman times. At that time, visiting the winery was included in the team tour line (Hall et al. 2000). Wine tourism involves rural tourism, eco-tourism, and leisure tours. Moreover, because of the ever-increasing demand by tourists for creative experiences in tourism activities, the capacity of tourism destinations for sustainable development has increased, causing rapid development in a global context (Beverland 1998; Szivas 1989). After 2000, wine tourism as a new tourist attraction has been very popular, especially in the "New World" countries (Morris 1998), forming the United States’ Napa Valley, Canada's Okanagan Valley and some other well-known wine tourism destination. Today, wine has become the main reason for attracting visitors to certain areas, not just auxiliary activities of travel (Sánchez 2017).

In 1984, Becker first mentioned wine tourism

in his paper, but it was not until the 1990s that the study of wine tourism was developed quickly, driven by scholars such as Gilbert, Hall and Getz, characterized by emphasis on descriptive and comparative research. It was aimed at adjusting and exploring the dimensions of this new subfield of tourism (Carlsen 2004), focus on the analysis of its economic impact on rural areas and on the behavior of tourists (Gilbert 1992; Hall 1997). The First Australian Wine Tourism Conference was held in 1998, indicating that wine tourism research had entered a new stage of development (Getz and Brown 2006a). This meeting identified the direction and scope of wine tourism research in addition to exploring the linkages between the wine and tourism industries (Getz and Brown 2006b). However, during this period, due to lack of applied research and an overall theoretical framework, studies were only about the description of the phenomenon of wine tourism. Over the past decade, the research achievements of wine tourism have become more widespread. Some universities co-operated with government, tourism agencies and wine industry institutes, with industry and government needs as the guidance, formed the industry related and multidisciplinary empirical study atmosphere, highlighted the practicability of research results. Achievements have been gained in wine tourism market and product research.

Although China has a 2000-year history of wine making, it was not until the 20th century that Chinese wine was internationally recognized (Alonso et al. 2015). Furthermore, in the short period between 2000 and 2013, China's wine consumption and production surged, making it the fifth largest wine-consuming nation, and the seventh-largest wine-producing nation (Hung et al. 2013). At the same time, a perceptible increase in research regarding wine production and wine consumption behavior in China has been observed. However, studies on wine tourism, especially from a geographic perspective and using production regions as spatial measures, are scarce. In comparison, there are several studies on the wine-producing region in the eastern foothills of the Helan Mountains, although most of them focus on the development modes (Zhang et al. 2012; Liang 2013), formation mechanisms (Liang 2013), and marketing (Chen 2013). Basic research on the type of tourism resources in this region—grade, characteristics, and spatial distribution—is yet to be developed. This study uses a general survey of tourism resources for the wine-producing region in the eastern foothills of the Helan Mountains as its basis, and further applying a geographic information system (GIS) technology in the analysis of tourism resources. A comprehensive analysis and assessment of the volume, grade, spatial distribution, and clustering characteristics of tourism resources was conducted, and the study proposed countermeasures for the development of tourism in the eastern foothills of the Helan Mountains. Further, the study explores modes of development, and provides a reference for other wine-producing regions with a view to contribute to the development of China's wine tourism research.

1 Study Area

The Helan Mountains are located between 105°45′-106°27′ E and 37°43′-39°05′ N, in the "golden belt" of grape growing (between 30° and 45° N). These mountains stretch 220 km from north to south, are 20 to 40 km wide from east to west, have an elevation of 2000–3556 m, with the highest peak being Aobao Geda, at 3556 m. According to official administrative area delineations, the wine-producing region in the eastern foothills of the Helan Mountains stretch all the way to the Ningxia Hui Autonomous Region, and primarily contain parts of Yinchuan, Shizuishan, Wuzhong, Qingtongxia, Pingluo County, Zhongning County, and Hongsibu District. It has a total area of 200,000 ha (Guo 2012) (see Figure 1). The Helan Mountains form the northern segment of a geographical landform dividing north from south. From west to east, this landform consists of the base of the Helan Mountains, piedmont alluvial plains, the Yellow River alluvial plains, and the Lingyan terrace; together, in this order, these form a belt-like strip of landforms.

The lithological composition of the Helan Mountains is primarily a conglomerate of granite, limestone, quartzite, sandstone, and slate and is suitable for growing wine grapes. The wine-producing region is located in a piedmont alluvial plain, and the soil has a depth of 40–100 cm. The soil is rich in minerals (pH < 8.5) and is primarily

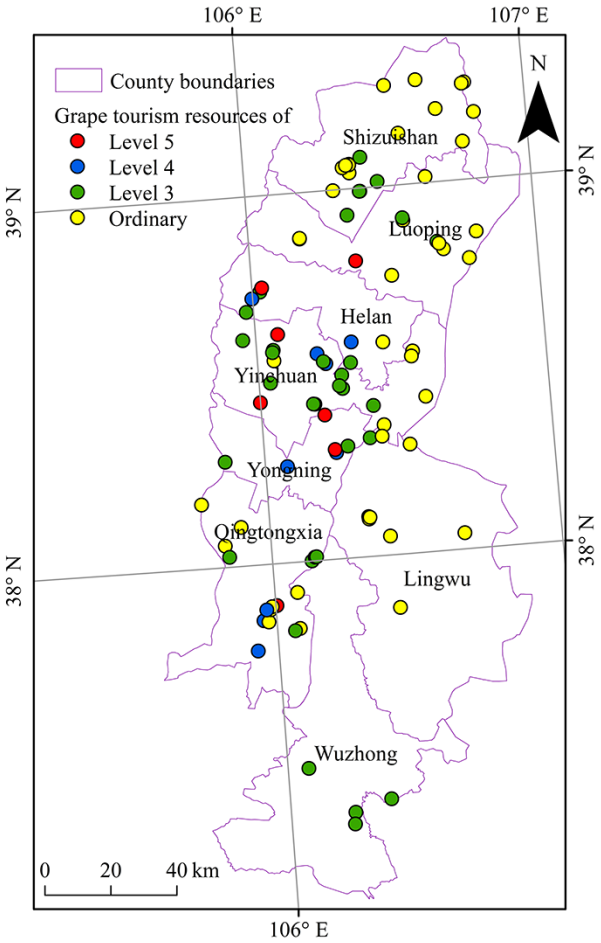

Figure 1 Research area and distribution of tourism resource in Helan Mountains.

composed of sandy loam and light-gray calcareous loam. The soil here experiences light erosion and has strong permeability, while some soil contains gravel. The terrain is flat, with small undulations, small and shallow gullies, abundant irrigation, and appropriate rainfall. In this regard, the conditions of the Ningxia Yellow River irrigation zone guarantees sufficient water prior to the grape growing season; on the other hand, due to the vertical zonal nature of the mountain, areas of higher elevation receive rainfall up to 430 mm, while the piedmont plains receive only 200–300 mm of rain. In August and September, when wine grapes ripen, the average annual rainfall should be below 193.4 mm; the amount of rainfall experienced by grapes in the month prior to picking is negatively correlated with wine quality, therefore, lower rainfall can guarantee higher wine quality.

Finally, the Helan Mountains serve as a dividing line between Eastern and Western China, and the region has a transition climate falling between monsoon and continental. The vertical climate belts of the Helan Mountains are clearly distinguishable, while the landscape and agricultural production vary significantly from east to west. The Tengger Desert and Ulan Buh Desert are situated to the north and west of the Helan Mountains and the north and west of the mountains have a dry, windy, sandy climate, which is hot in summer and cold in winter, with little precipitation and strong evaporation. The east of the Helan Mountains is located in the Yinchuan Plain, which has a long frost-free period, abundant heat resources, 2850–3105 hours of annual sunlight, an annual average temperature of ≥10°C, effective accumulated temperature totaling 1535°C, and effective accumulated temperature in July–September totaling 962°C. This provides sufficient sunlight for the grapes to maximize photosynthesis. Large temperature changes between day and night cause effective storage of organic matter, ensuring high-quality grapes.

2 Results and Analysis

2.1 Abundance of tourism resources

From a collation of relevant literature, discussions with experts, on-site fieldwork, and resource object survey reports, this study conducts a general survey of resource development in the field of study. Furthermore, according to China's national standard *Classification, Investigation and Evaluation of Tourism Resources* (GB/T 18972-2003), we conduct a classification of all unitary tourism resources collected from the pre-study survey. Our results show that there are 106 unitary tourism resources in this area; this covers 8 main categories, 26 of 31 subcategories, and 80 of 155 basic types. These results cover 83.87% of subcategories, and 51.61% of basic types (Table 1). From this, we observe that the wine-production region in the eastern foothills of the Helan Mountains not only boasts of a varied landscape and a rich combination of tourism resource types, but is also a high-quality tourism belt with complementary resources and a high degree of integration.

Table 1 Types of tourism resources in the east Foot area of the Helan Mountains

Main category		Subcategory				Basic type	
		Obj.	T (%)	Subcategory Name (No. of Basic Types)	Pro. ND (%)	Types	Pro.ND (%)
Natural tourism resources	A. Geographical Landscape	13	12.26	AA. Comprehensive natural tourist destination (3) AB. Sedimentary and tectonic (2) AC. Geomorphic processes (4)	9.68	9	5.8
	B. Water Landscape	18	16.98	BA. Rivers (1) BB. Natural wetlands and marshes (2) BC. Waterfalls (1) BD. Springs (2)	12.9	6	3.87
	C. Ecological Landscape	9	8.49	CA. Woodland (2) CB. Grasslands (1) CC. Flowered areas (1) CD. Wildlife habitat (1)	12.9	5	3.22
	D. Astronomical and Climate Landscape	1	0.09	DA. Light phenomena (1)	3.23	1	0.6
	Subtotal	41	38.68	12	38.71	21	13.55
Manmade and cultural tourism resources	E. Heritage sites	6	5.66	EA. Prehistoric site (1) EB. Cultural and economic monument (4)	6.45	5	3.22
	F. Architecture and infrastructure	47	44.34	FA. Comprehensive cultural tourism destinations (9) FB. Dedicated activity sites (4) FC. Landscape architecture and attached buildings (8) FD. Residential areas and communities (6) FE. Burial grounds (2) FF. Transportation architecture (3) FG. Hydraulic structures (3)	22.58	35	22.58
	G. Tourism products	5	4.71	GA. Local tourism products (3)	3.23	3	1.94
	H. Cultural Activities	7		HA. Memorials (2) HB. Art (2) HC. Folk customs (8) HD. Modern festivals (4)	12.9	16	10.32
	Subtotal	65	61.32	14	45.16	59	38.06
	Grand Total	106	100	26	83.87	80	51.61

Notes: Obj. = No. of Objects; T = Proportion of Total; Pro. ND = Proportion of National Designations; Types = No. of Types.

2.2 Quality of tourism resources

We assess the values of each resource object retrieved from the survey according to the tourism resources index evaluation system (Table 2). Based on scores out of 100 given by 15 experts with tourism and geography backgrounds, we derive average scores for 94 tourism resource objects in the wine-production region in the eastern foothills of the Helan Mountains, excluding tourism products and cultural activities that are not assessed. According to these scores, tourism resources are divided into five grades. Grade 1 and 2 tourism resources are referred to as "standard grade tourism resources," while grades 3, 4, and 5 are referred to as "excellent grade tourism resources."

The results of this assessment are shown in Figure 1. The wine-production region in the eastern foothills of the Helan Mountains contains 19 grade 4 and 5 resources, or 20% of all resources. There are 31 grade 3 resources, or 32% of the total.

Table 2 Index evaluation system of tourism resources

Evaluation item	Evaluation factor	Score
Resource element value	Sightseeing & recreation value	30
	Historical, cultural, science and Artistic value	25
	Rare & singularity	15
	Scale, abundance and probability	10
	Integrity	5
	Visibility & influence	10
Resource influence	Appropriate tour period or using range	5
Added value	Environmental protection & environmental safety	Positive or negative

Tourism resources of at least grade 3 comprise more than half of the total, illustrating that most tourism resources in this area are of high quality. Shahu, and the Zhenbeibao Film Art Center, both Chinese National 5A tourist sites and tourism research objects of high value, are within the area of study. However, of the 19 excellent grade tourism resources in the eastern foothills of the Helan Mountains, only the Yuchuan Wine Village and Chateau Yuchang Moser XV are involved in the commercial wine industry, indicating that wine tourism resources in the eastern foothills of the Helan Mountains are limited in number and further development of the local wine tourism is necessary. This is especially so for cultural activities related to wine; there are almost no wine festivals or special events related to wine. With regard to resource quality, irrespective of whether wineries serve as centers of tourism to attract new construction, or integrated with tourism resources at a basic level, wineries have a low level of integration in the tourism industry.

2.3 Spatial analysis of tourism resources

There is a large volume of tourism resource data for the wine production region at the eastern foothills of the Helan Mountains, and this includes data types with a broad scope of coverage. For visualizing and computing data, it is necessary to establish a spatial database for data management, presentation, and queries. First, the geographic coordinate data for tourism resource locations are entered in the ArcGIS software, and a graphical database is generated. Next, attribute data (e.g., resource name, type, grade, and area) are classified and coded, and an attribute database is established. Finally, by combining the two databases, we establish a tourism resource spatial database for the eastern foothills of the Helan Mountains, and this forms a distribution map of resource objects for the area (see Figure 1). Based on these databases and using cluster analysis, we conduct global cluster tests on the tourism resources in the area of study, analyze this clustering, and conduct local cluster tests and local quality cluster tests. This analysis helps us to determine the areas exhibiting clustering of tourism resources and to judge the quality of clustering; in addition, it provides a scientific basis for the development of the wine tourism industry.

2.3.1 Spatial distribution of tourism resources

First, we conduct spatial autocorrelation analysis of the research object using Moran's I and we conduct a z-test as follows:

$$I = \frac{n}{S_0} \cdot \frac{\sum_i^n \sum_{j=1}^n W_{ij}(X_i - \bar{X})(X_j - \bar{X})}{\sum_i^n (X_i - \bar{X})^2} \quad (1)$$

Here, n is the number of research objects; and X_i and X are the attribute values of i and j, respectively. $\bar{X}$ is the average of all attribute values, while W_{ij} is the spatial weights matrix. This study calculates the spatial correlation of points, and thus, we choose to use the spatial weights matrix, where $\bar{X}$ is the mean of the distance between all points.

Moran's I takes a value between [−1, 1]. A value of 0 shows there is no spatial autocorrelation; a value greater than 0 shows there is spatial clustering; while a value less than 0 shows that there is spatial dispersion. It is often necessary to conduct significance tests on global Moran's I values, using the equation below:

$$Z_I = \frac{I - \mathrm{E}(I)}{\sqrt{\mathrm{VAR}(I)}} \quad (2)$$

Here, E(I) is expected value, and VAR(I) is variance. When spatial correlation exists, Z takes a value greater than 0, indicating positive spatial correlation, while a value less than zero indicates negative spatial correlation.

By calculating the Global Moran's I for the number of tourism resources in the eastern foothills of the Helan Mountains, we analyze whether tourism resource distribution is concentrated in certain areas (e.g., towns and counties); this analysis can be observed in Figure 2. The global index is used to test the characteristics of spatial distribution in all research areas; this value reflects the degree of autocorrelation in the research area. Moran's I takes a value [−1, 1]; when the value is 1, there is total positive correlation, while a value of −1 shows total negative correlation. When Moran's I takes a value of 0, there is no correlation. Our calculations derive a value for Moran's I of 0.14, a z-score of 2.16, and a p-value of 0.03, thereby passing the 1% significance test (see Figure 2).

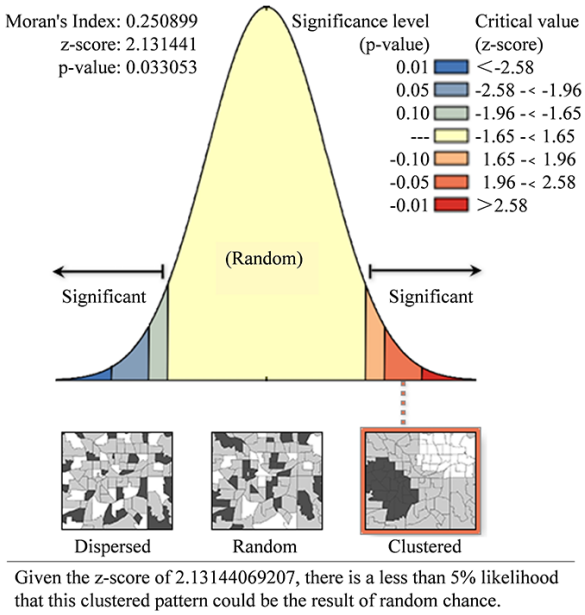

Figure 2 Spatial clustering test of tourism resources in Helan Mountains.

2.3.2 Areas of resource clustering

Based on our global cluster test, we proceed to conduct average nearest neighbor analysis on the tourism resources in the eastern foothills of the Helan Mountains to find out which localities exhibit significant levels of tourism resource clustering. The average nearest neighbor method is used to test the area occupied by each point, namely, by comparing the average distance from each point to its nearest neighbor with the average distance to nearest neighbors in a random normal distribution. The ratio between these two values, R, is used to determine deviation from a random distribution. When R=1, point features are random; when R>1, point features tend toward dispersion; and when R<1, point features tend toward clustered distribution.

For any point x_i, we calculate the distance between it and the remaining $n-1$ points, and obtain the minimum value; this value shows the distance between point x_i and its nearest neighbor. The method for calculating d_n is shown as follows:

$$d_n = (1/n)\sum_{i=1}^{n} \min(d_{ij} | i \neq j, i = 1,2,\ldots,n) \quad (3)$$

To calculate R, $R = d_n/d_{ran}$, where d_{ran} is the theoretical average distance for a random distribution. This value is generally $0.5\sqrt{A/N}$, where N is the total number of samples, and A is the area of the research area.

In these results, R=0.71, the z score is −5.424641, and the p value approaches 0, passing a significance test at the 1% level, thereby showing the presence of tourism resource clustering at a local level. Furthermore, through point density analysis of areas with local clusters, we conduct data visualization, and construct a tourism resource cluster distribution map (Figure 3). We observe from Figure 3 that areas of high tourism resource density center around Yinchuan, Shizuishan, and Qingtongxia; there are relatively few tourism resources in the areas surrounding Wuzhong and Lingwu.

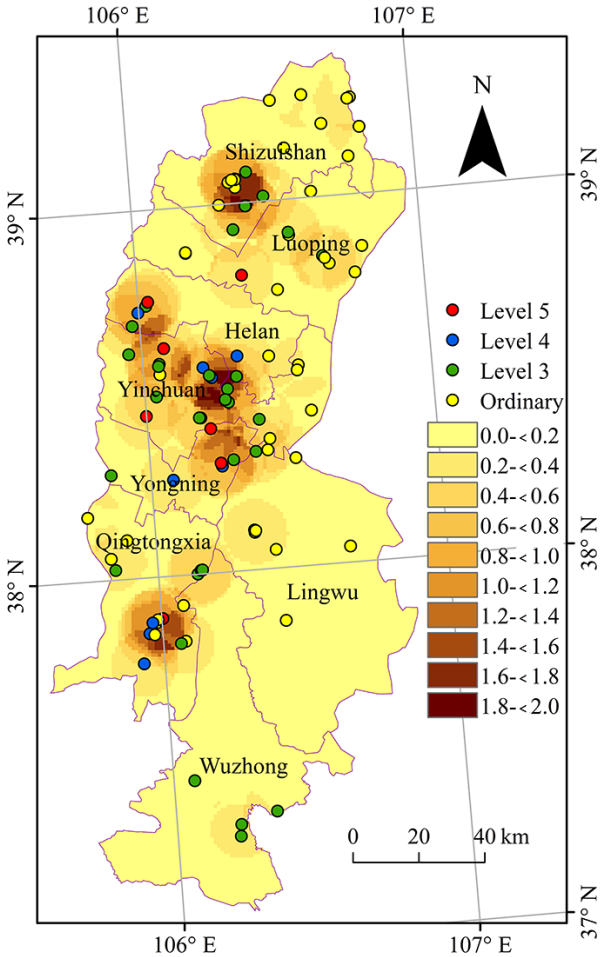

Figure 3 Cluster analysis of tourism resources in Helan Mountains.

2.3.3 Agglomeration features

The Moran scatterplot can be used to explore local patterns of spatial correlation and to identify spatial anomalies and local instability. By plotting the observed values of variables at each location on

the horizontal axis, and the spatial lag (normalized local spatial autocorrelation Moran's I) on the vertical axis, the correlation between the two can be expressed with a scatterplot within a coordinate system.

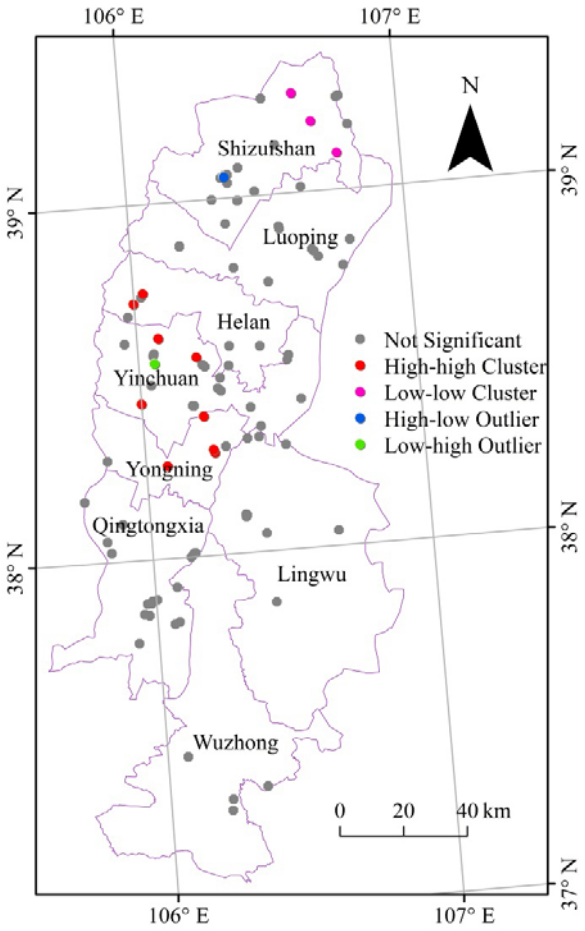

Figure 4 Local quality analysis of tourism resources in Helan Mountain.

The Moran scatterplot is divided into four quadrants that correspond to four different types of local spatial correlation. The top-right quadrant (H–H) has above-average observed values (high), and above-average lagged values (high). The lower-left quadrant (L–L) has below-average observed values (low) and below-average lagged values (low). The top-left quadrant (L–H) has below-average observed values and above-average lagged values, while the lower-right quadrant (H–L) has above-average observed values and below-average lagged values. The top-right quadrant (H–H) and the lower-left quadrant (L–L) reflect positive spatial autocorrelation, showing that the observed values at these locations are similar to the observed values for their neighbors. The top-left (L–H) and bottom-right (H–L) quadrants correspond to negative spatial autocorrelation, showing that the observed values in these locations are different to the observed values for their neighbors.

Through the local cluster quality test, we derive the distribution of resource objects of different qualities in an area, as shown in Figure 4. We observe from Figure 4 that for Yinchuan, Yongning, and Helan, patterns of clustering for resource objects tend toward H–H clustering; for Shizuishan, the pattern mostly follows L–L clustering. The results for Qingtongxia and Wuzhong are not significant, indicating that not only do tourism resources in Yinchuan exhibit clustering, but that the quality is comparatively high, and the city forms very strong tourism resource linkages with Helan and Yongning, forming a cluster area of high resource quality. Shizuishan has relatively low resource quality, and the quality of tourism resources in the surrounding area is relatively low. Although the results for Qingtongxia and Wuzhong are not significant, these areas have potential for joint development.

3 Recommendations

3.1 Ensuring healthy development of wine tourism through scientific design

First, Ningxia's wine bureau and tourism development committees can collaborate to establish an organization for the management of wine tourism, and transform the overall service system for wine tourism through a wine industry-oriented factor configuration. This will enable tourism factors, such as "food, lodging, travel, touring, shopping, entertainment, business, hospitality, education, leisure, love, and novelty," to be introduced into the development process of the wine-production region. In establishing an industrial service system centered on industrial development, introducing the concept of "global tourism" for upgrading the tourism industry, and establishing wine-culture demonstration projects would form an excellent basic service system that would finally materialize into a globally coordinated, gradually advancing, and highly focused wine-tourism development structure.

Next, we consider the operational model of innovation organizations. The eastern foothills of the Helan Mountains include farmland, woodland, villages, and rural settlements, in addition to land owned by, government, businesses, research institutions, local residents, and tourists, thereby forming a diverse group of interests. Because of varied land use, multi-headed management, and diverse benefit structures, the work of developing tourism is essentially complex. In order to avoid inconsistent policies in which interest groups act selfishly, it is necessary to establish an organizational operation model that combines a wine tourism management department, an industry association, business oriented operation, and business service marketization. Based on protecting and utilizing rural tourism resources and the environment, and planning the format of the wine tourism industry in view of the sustainable development of tourism, the coordination of relationships between various interests emphasizes the optimization, reorganization of residential and community spaces, and tourism development spaces. This, in addition to achieving long-term development and win–win outcomes for each interest group, also achieves the unification of three major interests: ecology, economy, and community.

3.2 Forming core attractiveness through industrial integration

Wine tourism is a hybrid product of the wine industry and the mass tourism industry (Hall et al. 1998). Its charm lies in its integration into the primary sector or the agricultural sector, the secondary sector or the manufacturing sector via the wine-making industry, and the tertiary sector or the service sector via the tourism industry, combining rural tourism, industrial tourism, and leisure travel (Wang 2016). The development of the wine tourism industry has promoted industrial integration (Lin and Zhou 2009), that is, a type of industrial format innovation that has created core attractiveness to enrich the content and development space of the tourism industry. This integration also satisfies the personalized and diversified demands of the tourism market, and extends the industrial linkages of traditional agriculture and industry. Wine tourism is based on the primary sector, is focused on the secondary sector, and is centered on the tertiary sector; and linking these sectors is the path to industrial integration (Figure 5).

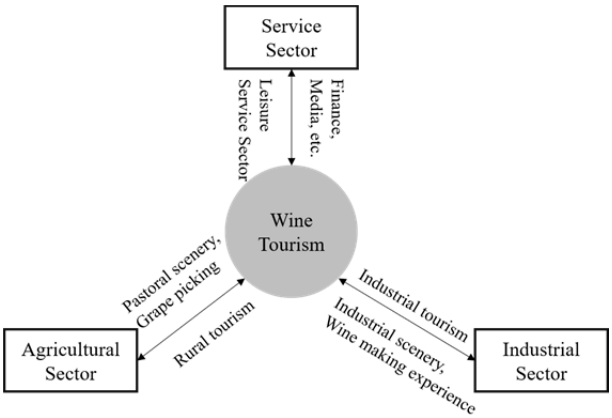

Figure 5 Schematic diagram wine industry integration.

3.3 Enriching tourism products through cultural creativity

Wine tasting, enjoyment of food, the same or complementary culture，the natural scenery and lifestyle of the wine producing region are important components of wine tourism(Sparks 2007). The industrial qualities of wine tourism require that culture becomes a form of production capacity; thus, new cultural connotations bestowed by cultural innovation are inevitable. Furthermore, cultural innovation activities always include some geographical characteristics (Rong 2004), and innovative industries are generally distributed in specific geographical locations. The wine-production region in the eastern foothills of the Helan Mountains must fully utilize the advantages of its geographical environment. Based on the rich history and culture of Ningxia Province, the region brings into play cultural elements that are compatible with the development of wine tourism. Yuan et al. (2005) believes that wine tourism is motivated by multiple dimensions, including wine, festivals, landscapes, family gatherings, social sharing, etc. By making history, culture, and folk resources fashionable, and by designing products and lifestyles out of these resources and through contextual and conceptual design, the industrial linkages between the wine and tourism industries are strengthened, and the overall quality and content of wine tourism is improved. The following

three tourism products are abundant in the region: cultural experiences, natural landscapes, and leisure. These form an excellent product line (see Figure 6).

3.4 Implementing differentiated development through spatial layout optimization

Gates and Brown argue that different geographical features are critical factors for potential wine tourists to select destination (Getz and Brown 2006b). Based on tourism resource distribution in the eastern foothills of the Helan Mountains (Figure 4), combined with urban and population distribution in the area of interest, clustered development of wine tourism with different spatial scale and characteristics should be implemented in order to achieve a development pattern of large clusters and small enclaves. Currently, we can identify three levels of development areas. First, the core area consists of Yinchuan, which is the capital of Ningxia province and has relatively good overall service capacities, as well as appropriate cultural- business- and exhibition-focused tourism capacities. Thus, Yinchuan should be at the core of development, serving as a driving force of Ningxia's wine tourism, and exerting a spillover effect on the neighboring areas. Next, Qingtongxia and Wuzhong have potential for future development as they have an ecologically suitable climate for grape production, although tourism, land resources, and economic conditions are not currently sufficient for sustainable development. Finally, Shizuishan and Lingwu, areas with poor resource object quality and low levels of integration, are classified as standard development zones.

3.5 Mass tourism market as a driver of wine tourism development

Although China has already entered mass-market tourism, wine tourism remains a niche area compared to traditional tourism based on sightseeing, leisure, and vacationing. In 2015, Ningxia Province hosted more than 18.4 million domestic tourists, generating tourism revenue of 16.1 billion RMB (Statistics Bureau of the Ningxia Hui Autonomous Region 2015). Compared to the mature mass-market tourism in Ningxia Province, the market for wine tourism is still in its infancy. Wine tourism experience is beyond the scope of wine (Roberts et al. 2006). Thus, the development of wine tourism should "give full play to the driving forces of tourism, and its catalytic and integrating role" (Li 2015). The maturity and scale of the mass-market tourism are drivers of development in the wine tourism market. With mass-market tourism leading the way, the wine industry oriented toward "tourism +" serves as a model for expanding the market capacity for wine tourism, and thereby, the development level and overall value of wine tourism.

4 Discussion and Conclusion

This study uses a survey of tourism resources in the wine making region of the eastern foothills of the Helan Mountains to determine the number, quality, and abundance of tourism resource objects in the area. This study utilizes GIS to analyze the distribution and clustering characteristics of resources, and on this basis, proposes development countermeasures based on local conditions. Wine

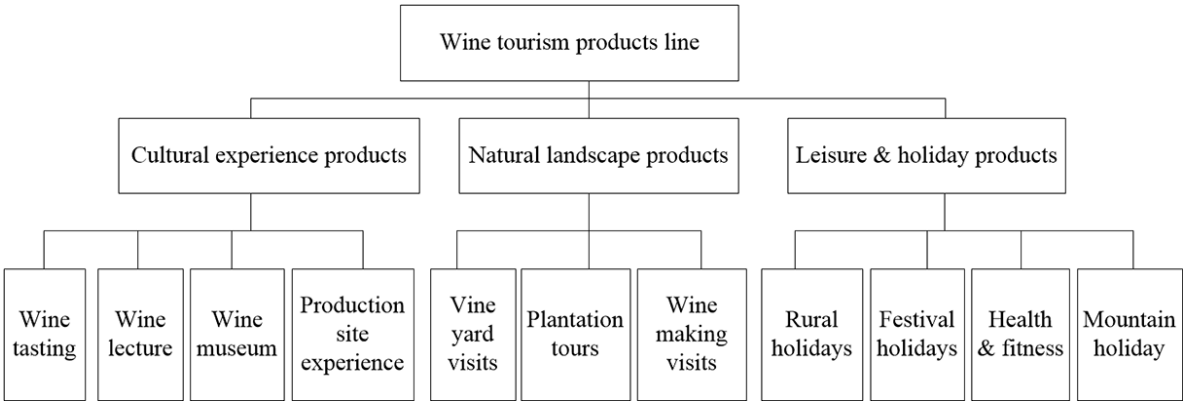

Figure 6 Wine tourism product lines in the eastern foothills of the Helan Mountains.

tourism research worldwide has evolved from conceptual and case-study approaches to more comprehensive and expansive investigations of the phenomenon (Carlsen and Charters 2006). The study of wine tourism has revolved around three major themes: (1) the provisions of the product; (2) the marketing strategies; and (3) the visitor experience at the destination (Yuan et al. 2013), which cover most of the research publications on this topic. A suggested approach to develop a more comprehensive view of the phenomenon is to recognize that wine production and tourism are essentially at opposite ends of the industrial spectrum. Therefore, it is very meaningful to understand how these two industries – "wine" and "tourism" – diverge and converge at the different regional, national, and international levels. So, future research will draw on the Western countries' research paradigm and the specific national conditions in China in the following directions. At a government policy level, research can address unified urban and rural development and wine tourism, and the correlation between transformation and upgrading rural tourism and rural beautification. At the industry level, research can address the standardization of the wine tourism industry and the establishment of industrial standards. At firm level, there should be further research on wine tourism marketing, brand development, and linear design; and finally, at a tourist level, further research should focus on wine tourism perceptions and experiences, and consumer behavior. We believe that by engaging in an in-depth study of wine tourism in the eastern foothills of the Helan Mountains, it is possible to provide scientific and theoretical guidance for the development of wine tourism activities, thereby allowing wine tourism to become a new area of growth for Ningxia tourism. This enables the transformation and upgrading of new products, thereby enabling the eastern foothills of the Helan Mountains to become an emerging tourist destination with international influence.

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