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Coupling Mechanisms and Development Patterns of Revitalizing Intangible Cultural Heritage by Integrating Cultural Tourism: The Case of Hunan Province, China

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Abstract: The integration of the cultural/creative and tourism industries is one way to present different types of regional cultural heritage to the world. This study examined the coupling of intangible cultural heritage and cultural tourism development in Hunan, seeking a pattern for the development of the former under the latter. The study included analyzing the coupling between tourism resources and ICH and exploring modes of revitalizing or developing ICH in the context of cultural tourism. We used methods of GIS spatial technology, including nearest neighbor indexing, kernel density estimation, and queuing analysis, to estimate the kernel density of a buffer of points (high-speed railway stations, and 5A and 4A scenic spots) and lines (high-speed railways and highways). The results show (1) the overall spatial aggregation of Hunan's ICH resources; (2) how tourist attractions drive ICH resources, as illustrated by the coupling between the spatial distribution of ≥4A attractions and ICH; and (3) the pattern of high-speed road and railroad network development, featuring region-wide guidance for the development of Hunan's ICH resources. This research not only provides development patterns and concepts for the study of intangible cultural heritage and tourism development planning in Hunan, but also provides useful references for the combination of the two in other regions.

Keywords: cultural tourism; coupling mechanism; development patterns; IHC; GIS

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1. Introduction

China's cultural heritage consists of different traditional cultures from various regions and ethnic groups. With the growth of scenic towns and the revitalization of rural areas due to mass tourism, intangible cultural heritage has become an important tourism and cultural resource [1]. The numbers of domestic and foreign tourists visiting these traditional cultural resources are on the rise every year. Many areas with rich cultural resources rely on tourism to alleviate poverty and achieve revitalization [2]. However, a region's tourism resources are not always proportional to its cultural heritage. It is important to carefully study the methods of regional tourism resource development, while also fully integrating cultural resources.

There are advantages to combining intangible cultural heritage (ICH) and tourism in China. In March 2018, the former China National Tourism Administration (CNTA) and the Ministry of Culture (MOC) merged to form the Ministry of Culture and Tourism of the People's Republic of China. This merge indicates that policies related to the integration of the cultural and tourism sectors had become popular in developments throughout the country. Integrating the culture and tourism sectors also enriched the development of intangible cultural heritage (ICH). As a result, in August 2021, the General Office of

the Chinese Communist Party and the General Office of the State Council of the PRC issued the Opinion on Further Strengthening the Protection of Intangible Cultural Heritage. Research on ICH has been conducted from multiple perspectives, such as value-based cultural tourism [3], sustainable development [4] and revitalization [5], and economic and industrial development [6].

In the current environment of positive policies and the benign development of the ICH industry, the subject is of contemporary theoretical research significance. The development of cultural heritage and tourism involves complex and controversial problems. For example, one concern is how to simultaneously protect and develop ICH. For a long time, part of the ICH in Hunan Province was mainly protected by local professionals with support from the government. However, the strength of the protection work was weak considering the huge scale of cultural heritage [7]. The practical significance of this research is to find a suitable pattern for integrating ICH and cultural tourism development in each region of Hunan Province to provide "living" protection for ICH, protect future development, and offer a more sustainable impetus to preserve ICH. This study also serves as a theoretical and practical reference for the integration of ICH into tourism development in other provinces, such as those with a high concentration of ethnic minorities and mountainous areas.

As an important home to ethnic minorities in Southwest China, Hunan is a diverse carrier of ethnic culture. Therefore, one of the main purposes of our research was to increase the development of intangible cultural heritage and transform cultural resources into tourism resources while cooperating with the national policy of integrating culture and tourism. Second, the disparity in regional development in Hunan Province is significant, and the characteristics of ICH resources are different in each region, so finding a model for regulating the problems between ICH resources and regional development was another purpose of this study. Overall, this study was focused on determining the distribution of ICH resources and revealing the spatial distribution characteristics of ICH in Hunan in terms of overall and typological differences, aiming to find a way to fully unleash its potential regarding the expression of its living heritage and foster its optimal development.

2. Literature Review

2.1. Cultural Heritage and Tourism

Although forms of integrating culture and tourism have been around for a long time, there is no general or formal definition for this fusion. Early on, this integration was seen as a kind of special-interest tourism, with tourists seeking mainly cultural experiences [8], distinguished from leisure tourism in its intention to pursue antique or artistic products. The destinations can be associated with various types of cultural heritage, such as language, religion, festivals, customs, and architecture [9]. In the 1990s, cultural-oriented tourism was incorporated into revitalization projects in Europe and North America, particularly urban cultural tourism [10].

Every cultural tour has a purpose and motivation [11], through which tourists can enjoy a deep cultural experience [12,13]. Tourists become involved in certain cultural aspects of the destination, and the experiences gained from that involvement have a long-term impact on cultural tourism [14]. Chen's research demonstrated that tourist engagement significantly influences the degree of cultural exposure, and cultural exposure moderates the relationship between tourist engagement and experiences, which in turn has a significant positive effect on cultural tourism [15]. In addition, when economic pressure threatens endangered cultures, researchers resort to tourism as a solution to the conflict between the economy and culture, e.g., by bundling tourism with cultural attractions. This can bring tangible economic benefits to local governments and help to support the preservation of cultural heritage [16,17]. Ramírez-Guerrero proposed an approach for the management of intangible cultural heritage based on the fact that it is a component of the social system. From the point of view of available services and technical equipment, this approach breaks down existing barriers between heritage conservation and its social and touristic use, quantifies and diagnoses the current tourism potential, and enhances

the tourist experience of cultural heritage in order to obtain benefits for society [18]. With these advantages, cultural tourism is gradually becoming a major part of the global tourism market, accounting for up to 40% [19].

Cultural tourism also acts as a driving force for rural development. Although the relationship between culture and tourism is mainly driven by private interests, it can stimulate the local economy. Cultural tourism cannot be the main driving force of rural development, but it can be an essential complementary activity that brings both economic and non-economic benefits. The combination of cultural tourism with tangible or intangible heritage and material or immaterial elements enables destinations to attract tourists by way of entertainment or the appeal of the destination itself [20]. Cultural tourism activities affect local people in many areas of their lives, and tourism in rural areas can improve the quality of life of local populations; in particular, smaller tourist destinations can find vital opportunities to develop sustainable tourism by organizing cultural activities [21,22]. Reyes et al. proposed improving the utilization of cultural heritage by evaluating tourist destinations in terms of cultural tourism media resources, facilities, and connectivity to fully explore the possibilities of local cultural development [23]. Therefore, cultural tourism is considered to have huge potential for local cultural preservation and sustainable development in general.

As a part of cultural tourism, heritage tourism has been the focus of numerous academic studies in recent years [24–26], especially intangible cultural heritage tourism [27]. Sammells (2016) suggested that intangible cultural heritage creates new spaces for interactions with tourists, and the resulting host–guest relationships and social activities should be carefully evaluated, as they must be planned and managed from the perspective of long-term conservation and development [28]. Therefore, the mission of heritage tourism is primarily to preserve cultural heritage in as pristine a condition as possible.

2.2. Intangible Cultural Heritage

Cultural heritage includes the interdependent components of tangible and intangible culture [29], and the boundaries between the two are not obvious. Earlier discussions on cultural heritage were centered on tangible heritage [30–32], and only a few practical and theoretical studies have been conducted on intangible cultural heritage. Indeed, the two types of culture are considered to be interconnected and complement each other [33]. On the one hand, tangible and intangible cultural heritage share several values [34]. On the other hand, intangible cultural heritage provides key contextual information for understanding and appreciating tangible heritage.

The difficulty of interpreting intangible cultural heritage has not prevented scholars from studying it, and the research focus has begun to shift from tangible to intangible heritage [35,36].The 2003 UNESCO Convention for the Safeguarding of Intangible Cultural Heritage (CSICH) pointed out the link between the two types of cultural heritage, specifying that intangible cultural heritage is "the practices, representations, expressions, knowledge and skills (such as musical instruments and artifacts) that exist in culture", as well as "the instruments, objects, artifacts and cultural spaces associated therewith" [19]. The CSICH also noted that ICH derives from the expression of human skills, practices, traditions, etc., and reveals interrelationships within society, i.e., human civilization is transmitted through elements of intangible cultural heritage. Intangible cultural heritage, as a multidimensional, rich, and dynamic system of human and historical values, is thus a valuable asset of traditional cultures around the world. This further expands the definition of heritage from that of the 1972 World Heritage Convention. Intangible cultural heritage is more interactive, dynamic, inclusive, and cohesive compared to the static and deterministic nature of tangible cultural heritage [37]. This represents a change toward embracing a more diverse and inclusive view of heritage by identifying and legitimizing intangible cultural expressions [38]. There are a variety of ways to describe, justify, and evaluate intangible cultural heritage, which also adds to its attractiveness [39,40].

In recent years, scholars have studied intangible cultural heritage starting from the definition of its concepts and characteristics, before gradually delving into ICH resources, categories, dissemination, and many other areas [41,42]. In addition, researchers have studied ICH from different perspectives, such as cultural creativity, national soft power, and various approaches to safeguarding tourism [43,44]. The difficulties of explaining intangible cultural heritage have not hindered research in this area. The fragmented knowledge of ICH is nowadays commonly associated with technology and marketing, wherein the economic and social benefits are regarded as a kind of cultural capital. Furthermore, the cultural capital itself is built into a cultural industrial chain, bringing more changes to the way that ICH is developed and produced [45].

However, under these changes, the integrity and authenticity of ICH have become a matter of controversy [46]. The impact from profits brought by tourism can easily compromise the limits of authenticity. In contrast, Li and Zhou's study found that local music under tourism is not affected by tourists if it is grounded in the local music culture itself. This suggests that in rapidly changing modern society, ICH should still be grounded in local culture, and the opportunities provided by technology should rely on regional identity for sustainable development [47]. Therefore, the foundation of ICH is rooted in locality. In this way, the discovery and utilization of various local resources that coexist with the competitive aspects of ICH are maximized [48].

2.3. Legislative Practice of ICH Preservation

China's efforts to protect and develop intangible cultural heritage began in the 1980s, when administrators enacted legislation in individual areas, such as copyright protection for literature, musical drama, and dance forms. Subsequently, traditional medicine and martial arts were given protective regulation and legislative provisions.

The Regulations on the Protection of Traditional Arts and Crafts, implemented in 1997, established an overall framework for traditional Chinese crafts [49,50], covering both intangible and tangible cultural heritage [51]. Although this was insufficient in practice, since the beginning of the 21st century, China's safeguarding efforts have been increasingly integrated into the international framework of UNESCO, strictly following the definition of ICH according to the 2003 UNESCO Convention. It is worth mentioning that the Law of the People's Republic of China on Intangible Cultural Heritage, enacted in 2011, was confined to native culture and did not adopt the ICH categories of the 2003 UNESCO Convention. Instead, it selected and designated those ICH items that were considered more directly relevant to traditional Chinese culture [52]. Following this, the Chinese government implemented a number of practical policy initiatives in the area of ICH preservation. Intangible cultural heritage items are associated with cultural services in the market in order to increase cultural consumption. Additionally, ICH preservation is directly linked to regional economic health, and is even integrated with the fight against poverty. In 2018, China's Ministry of Culture and Tourism introduced a series of precise poverty alleviation programs to revitalize traditional handicrafts in poor areas, requiring provincial governments to establish design, showcase, and sales platforms for traditional crafts produced in poverty-stricken areas.

In general, although significant changes and initiatives have been implemented in a top-down approach at the state and cultural and tourism sector levels, there are still several challenges to implementing and promoting ICH in each region.

2.4. Use of GIS in Cultural Heritage

A geographic information system (GIS) collects, calculates, analyzes, displays, and describes geographic distribution data for the whole or part of the Earth's surface, and the distribution and aggregation of a resource in geographic space can be obtained relatively accurately by using this system. It has been widely employed in many aspects of cultural heritage preservation and cultural resource management. Spano and Pellegrino analyzed the situation of handicrafts in the Mediterranean region through the use of GIS. This

spatial technique can help in the effective reconstruction of human cultural heritage and rationalize the way it is preserved by providing various types of heritage information [53]. Moreover, it can establish technical routes for geospatial-survey-based planning and amend existing conservation planning methods. Administrations can effectively monitor and manage cultural heritage through GIS spatial information databases. In a study on the distribution of intangible cultural heritage in the Yellow River Basin and the factors affecting its distribution, Lei et al. conducted GIS data analysis and concluded that economic and transportation conditions affect the development of intangible cultural heritage.

Therefore, the use of GIS to analyze the distribution, planning, and management of cultural heritage has certain practicality. In this research, we focused on the spatial characteristics of ICH in the Hunan region as a case study, conducting a spatial analysis of the association between tourism resources and ICH and discussing methods to promote ICH in the Hunan region.

3. Data Sources and Research Methods

3.1. Geography of Hunan Province

In this paper, we selected Hunan Province as the main case study. Located between 24.7–30.1° north and 108.8–114.2° east, Hunan has mountains in the east, west, and south and lakes in the north, as well as high terrain in the west (Figure 1). Most of the summits are 1000 m above sea level, and the mountains bordering Hunan and Hubei in the west reach 2099 m above sea level, which is the highest point in the province. The average elevation of Dongting Lake in the north is below 50 m. The elevation of the northeastern region is only 23 m, which is the lowest point in the province; most of the central area in Hunan is hilly. The central eastern region is the focal point of economic development in Hunan Province, with the city of Changsha as the administrative center. The ethnic minorities reside in the western region, with the main population being Miao, Tujia, and Dong. This geographical environment provides unique spatial characteristics for Hunan's intangible cultural heritage.

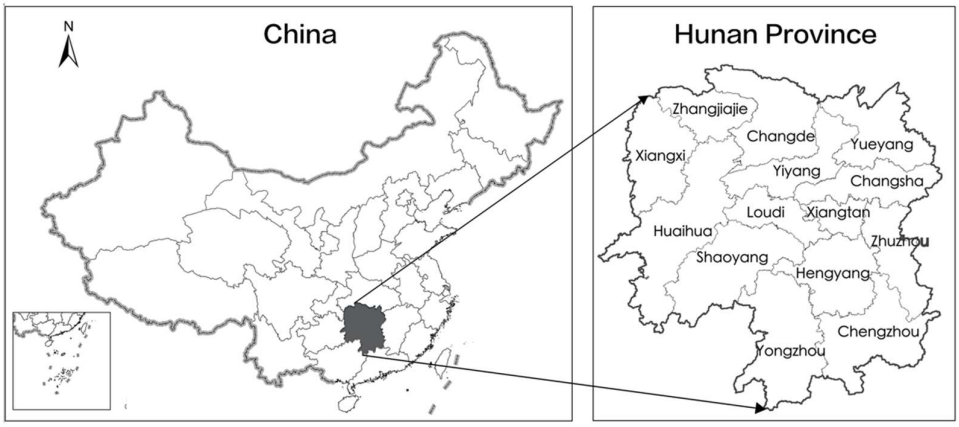

Figure 1. The geographical location of Hunan Province and research range. Source: the authors.

3.2. ICH Statistics in Hunan Province

We determined the types, cities, prefectures, and geographical locations of the 137 ICH items in Hunan Province that are listed in the five batches of China's ICH network, published by the ICH digital museum. Under the guidance of culture and tourism directives, destinations with prominent characteristics and high popularity are given potential tourist selection guidance status. Therefore, scenic spots above level 4A in Hunan Province (as of August 2021) were selected as research elements. The base map was derived from 1:1,000,000 original vector data covering the whole province in the basic map database published by the Ministry of Natural Resources. Additionally, with the advent of the era of "spending less time on the road and more time at scenic spots", patterns of tourist travel and destinations have become optimized. The reasonable construction of tourist areas and

transportation structures has become an important reference indicator for tourist travel plans and patterns. According to the Medium and Long-Term Railway Network Plan for Hunan Province, high-speed railway stations and road networks are considered relevant research points. The spatial structures of buffer zones based on points and lines and the statistics of different types of ICH resources were evaluated using ArcGIS spatial analysis functions. We expected to obtain spatial integration scenarios pertaining to ICH resources and the culture and tourism industries in Hunan Province by analyzing such point and line elements, thus providing references for the further development of ICH and tourism.

3.3. Research Methods

As of 2021, 137 items had applied for national ICH status in Hunan Province. The total number of ICH items and the average nearest neighbor ratio of each type were obtained by calculating the average nearest neighbor in ArcGIS 10.1 software. The previous data were selected and differences in the spatial distribution of different types of ICH throughout the province were analyzed based on the average nearest neighbor index, kernel density, and a buffer zone in order to measure the degree of clustering and the structure of ICH across the province.

We analyzed scenic spots above level 4A and intangible cultural heritage resources. Such scenic spots have special advantages in regional tourism development, and intangible cultural heritage resources adjacent to scenic spots have development momentum due to their geographical location. In particular, scenic spots at level 5A have a certain influence on the gathering and diversity of tourists. Combining the geography and distribution of scenic spots in the mountainous areas of Hunan Province, we found that they are mostly distributed within the mountainous areas, about 20–30 km from the city. Considering the relative density of scenic spots (37 items), the analysis used 20 km as the radius.

3.3.1. Average Nearest Neighbor

The degree of dispersion of various types of ICH was measured by the average nearest neighbor tool in the ArcGIS 10.2 spatial analysis program. The average nearest neighbor index is expressed as follows:

$$rE = \frac{1}{2\sqrt{\frac{n}{A}}} \quad (1)$$

where n and A denote the number of elements and the area of the smallest circumscribed rectangle containing all elements, respectively, and R represents the average nearest neighbor index, reflecting the spatial clustering of specified elements measured by the distance from their centroid to the centroid of the nearest similar element. $R > 1$ indicates that the distribution of elements tends to be dispersed; $R < 1$ suggests that the distribution of elements tends to be clustered.

3.3.2. Analysis of Kernel Density

The kernel density of nodes in space is used as the measurement index to reflect the clustering area and intensity of the spatial distribution of geographical elements. Using the kernel density tool in ArcGIS 10.2, the density of the counties, prefectures, and cities wherein ICH items are situated and the 5A and 4A scenic spots was analyzed across the province using the following formula:

$$f(x,y) = \frac{1}{nh^2}\sum_{i=1}^{n} k\left(\frac{di}{h}\right) \quad (2)$$

where $f(x, y)$ represents the density at spatial position (x, y); h indicates the smoothing parameter or bandwidth, which can be set according to the scope of the study area and elements; and di, n, and k denote the distance from position (x, y) to the ith observation point, the observed value, and the kernel function, respectively. The kernel density estimation was used to study the density distribution of overall ICH in the studied province.

3.3.3. Analysis of Buffer Zones

A buffer zone is a sphere of influence or service area of geospatial targets. In this paper, the buffer zone analysis based on point and line elements mainly considered scenic spots and tourism traffic. In view of the spatial structure of ICH resources in Hunan Province, which is characterized by a clustered distribution and mountainous terrain, the impact coverage of ICH projects was determined by k-nearest neighbor (KNN) to determine the radius of the buffer zone (20 km, for example), taking into account the travel time and experiential aspect of ICH projects. The formula is defined as follows:

$$D_{(x,y)} = \sqrt{\sum_{i=1}^{n} \left[w_{i(x_i - y_i)} \right]^2} \quad (3)$$

where $D_{(x,y)}$ represents the distance between samples x and y; n indicates the characteristic dimension; and x_i and y_i denote the ith attributes of samples x and y, respectively.

4. Analysis and Results

4.1. Spatial Structure of ICH in Hunan Province

Average proximity analysis was conducted for the 137 intangible cultural heritage items in Hunan. The results demonstrated that the overall average nearest neighbor index of the ICH items was 0.45 ($Z = -12$, $P = 0$), indicating that they are significantly clustered in spatial terms (Figure 2). Based on the distribution of each type of ICH, the nearest neighbor ratios of various ICH items differed. The average nearest neighbor ratios of traditional skills and traditional drama were 0.760 and 0.788, indicating that as specific types of ICH, they are significantly clustered in terms of spatial layout and structure. The nearest neighbor ratios of folklore and traditional art were 1.090 and 0.948, indicating a random distribution. The nearest neighbor ratios of other items ranged from 1.383 to 2.432, suggesting that as specific types of ICH, they tend to be discrete in terms of spatial layout. The total percentages of traditional skills and traditional drama were 13.8 and 23.4%, respectively (Table 1). Therefore, the degree of clustering of ICH items in Hunan Province was further ascertained by considering traditional skills and traditional drama.

Table 1. The average nearest neighbor results. Source: the authors.

Category	Item	Percentage (%)	Nearest Neighbor Ratio	Z-Score	*P*-Value	Distribution Pattern
Folk literature	9	6.6	1.383	2.200	0.028	Dispersed
Traditionaml music	16	11.7	1.431	3.300	0.001	Dispersed
Traditional dance	13	9.5	1.324	2.236	0.025	Dispersed
Traditional drama	32	23.4	0.788	−2.291	0.022	Clustered
Quyi	6	4.4	1.384	1.800	0.072	Dispersed
Traditional sports/ amusement/acrobatics	4	2.9	2.432	5.478	0.000	Dispersed
Traditional art	15	10.9	0.948	0.947	−0.388	Random
Traditional skills	19	13.8	0.760	−2.004	0.045	Clustered
Traditional Medicine	6	4.4	1.406	1.903	0.057	Dispersed
Folklore	17	12.4	1.090	0.710	0.478	Random
Total	137	100	0.448	−12.369	0.000	Clustered

On this basis, the regions of clustering were further analyzed. It was concluded that Tujia and Miao Autonomous Prefecture in western Hunan had the largest proportion of ICH resources, followed by Changsha City, Huaihua City, and Shaoyang City in western Hunan, while Zhuzhou City and Xiangtan City had the smallest proportion, each with two items (Figure 3).

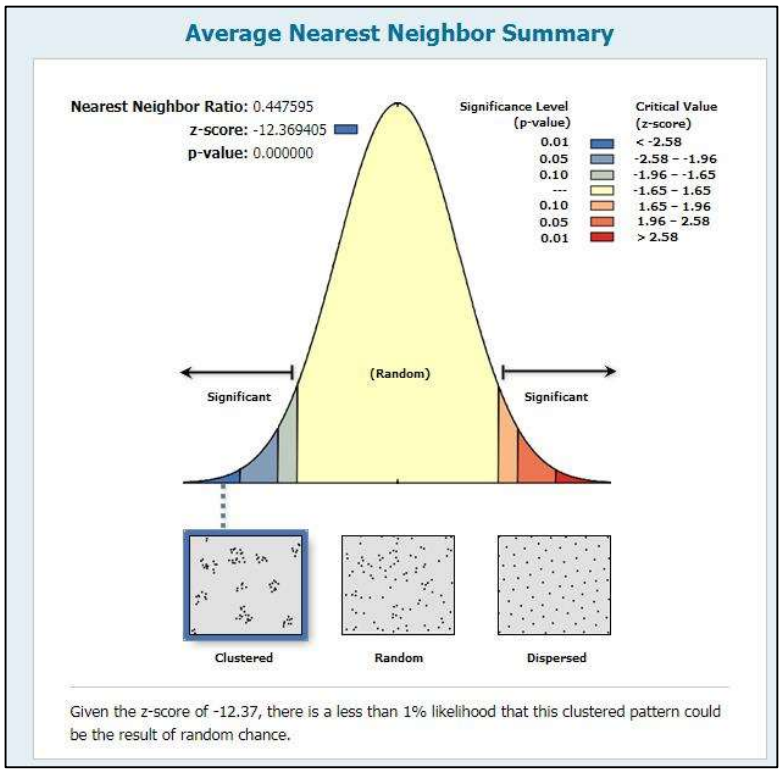

Figure 2. The results of the average nearest neighbor summary of ICH in Hunan Province. Source: the authors.

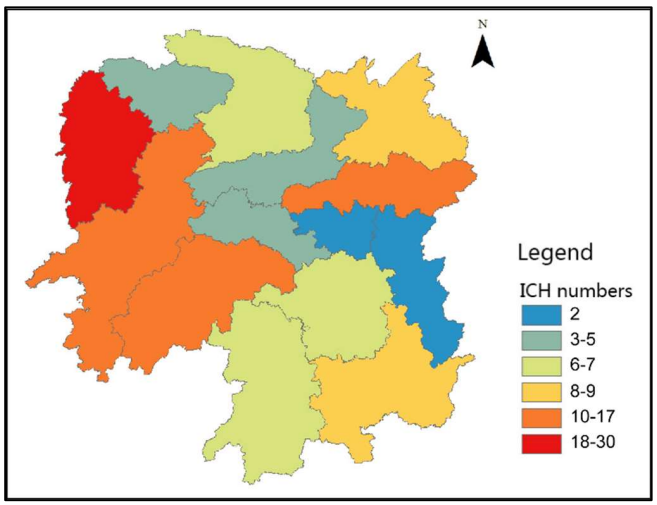

Figure 3. Distribution of ICH items in Hunan Province. Source: the authors.

4.2. Coupling of ICH Resources and Scenic Spots in Hunan Province

We further analyzed the coupling relationship between intangible cultural heritage resources and tourist attractions in Hunan Province. First, taking 5a scenic spots into consideration, it was found that when 20 km was set as the maximum buffer radius, the Shaoshan, Yuelu Mountain, Huaminglou, and Hengshan scenic spots in the center of Hunan Province were merged into one (likewise for the Wulingyuan and Tianmen Mountain scenic spots in Zhangjiajie City). Nine buffer zones were formed throughout the province (Figure 4). These nine buffer zones contained 34 ICH resources, accounting for 41% of the total number, of which traditional drama and folklore made up the largest proportion. In terms of regional distribution, 5A scenic spots clustered in Hunan Province and the Changsha–Xiangtan area in central Hunan were the most prominent, with 14 ICH

items, including mainly Flower-Drum Opera and Hunan Opera. The Aizhai Spectacle scenic spot in Western Hunan Autonomous Prefecture took second place, with 13 ICH items. There were no ICH items in the buffer zone of the Taohuayuan scenic spot in Changde City, and one or two in the buffer zones of other scenic spots.

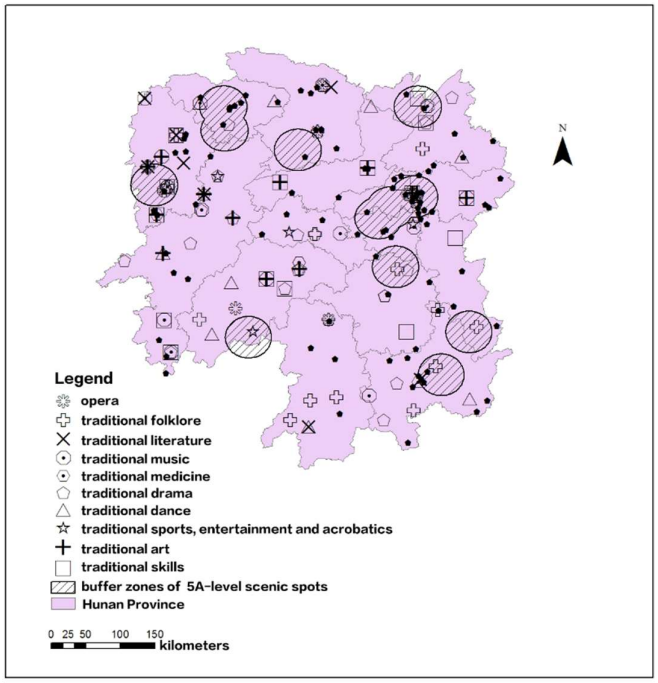

Figure 4. Buffer zones of 5A scenic spots. Source: the authors.

Based on the above analysis, we further analyzed 93 4A tourist attractions and ICH resources in the province. When the maximum buffer radius was 20 km, the buffer zones of 25 4A scenic spots partially overlapped to form 15 buffer zones. These 15 buffer zones included 86 ICH resources, accounting for 62.8% of the total. Among them, traditional drama, handicraft, and folklore accounted for the largest proportions (37, 22, and 19.8%, respectively). Traditional sports, medicine, and operatic art accounted for the lowest proportions (4.6, 6.9, and 6.9%, respectively). ICH resources were the most abundant in the two integrated buffer zones based on 4A scenic spots in central and north-western Hunan Province. There were no ICH resources in 8 of the 15 buffer zones, as demonstrated in Figure 5.

In addition, by analyzing the kernel density of 5A and 4A scenic spots in Hunan Province (Figure 6), it could be seen that major tourist attractions are mainly clustered in the northwest and east-central areas of Hunan, followed by the south. Other regions have a relatively sparser distribution. From Figures 6 and 7, it can be seen that the spatial distribution of ICH in Hunan Province also shows clustering in the northwest and east-central regions. Therefore, there is a relatively high correlation between the spatial distribution of ICH and the major scenic tourist spots in the province. Based on the spatial correlation, the practice of combining ICH projects with cultural tourism shows promise.

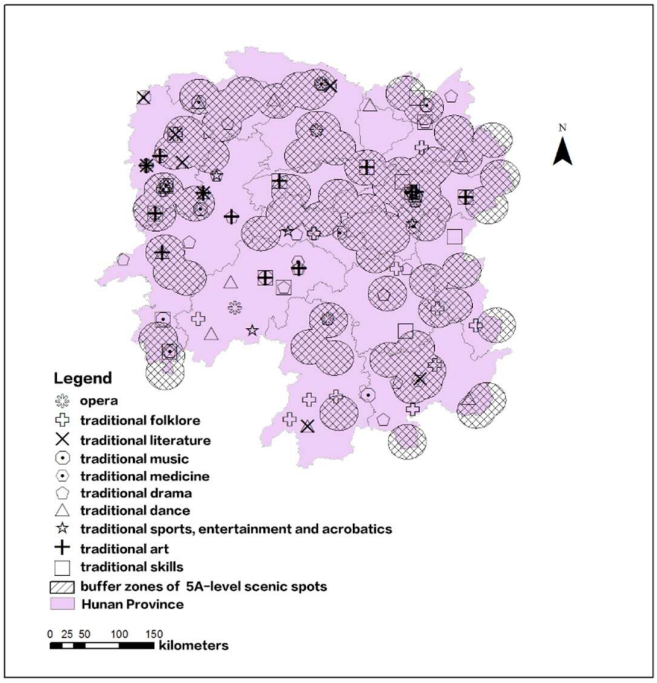

Figure 5. Buffer zones of 4A scenic spots. Source: the authors.

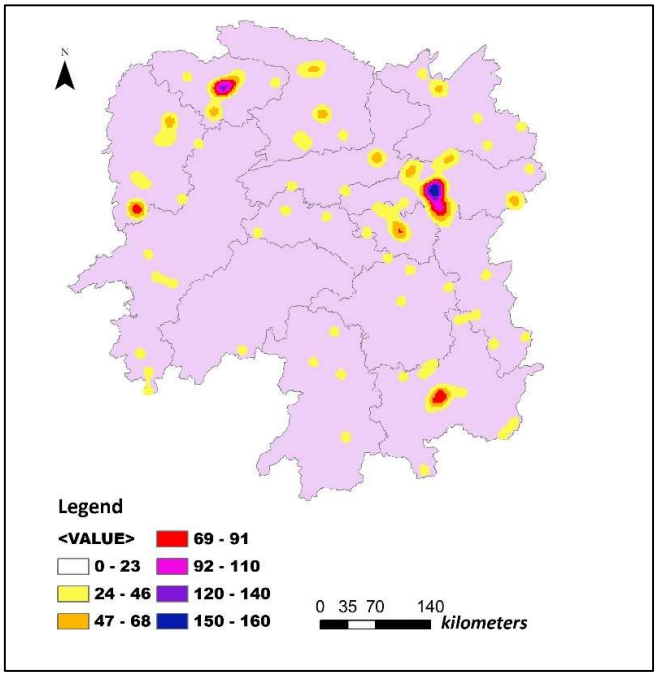

Figure 6. Kernel density of scenic spots. Source: the authors.

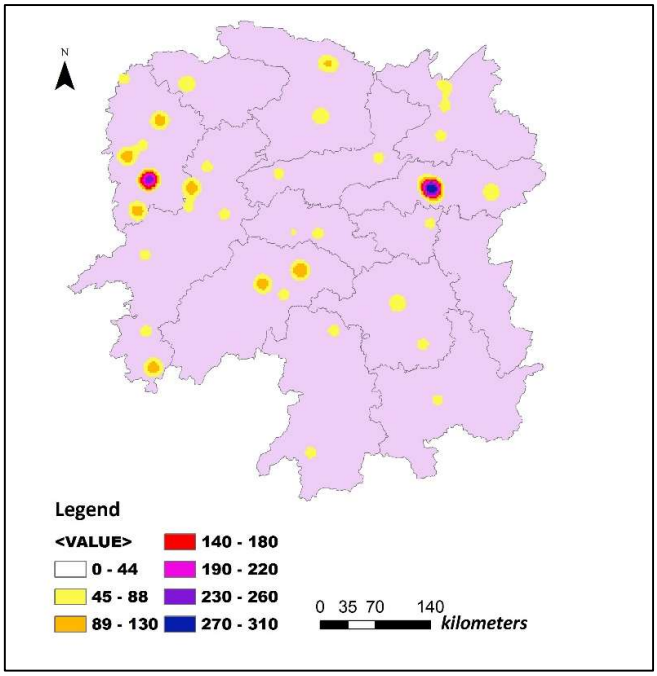

Figure 7. Kernel density of ICH. Source: the authors.

4.3. Distribution of ICH Resources and Transportation

In the context of culture and tourism, spending less time on the road and more time at scenic spots has become increasingly important. The accessibility of ICH items via various transportation systems provides a foundation for development by utilizing tourism resources. We analyzed the spatial coverage of the high-speed railway stations around the ICH items within a certain radius. In the Medium and Long-Term Railway Network Plan for Hunan Province, there are 77 stations on the Beijing–Guangzhou and Shanghai–Kunming high-speed railways and the Changsha–Zhuzhou–Xiangtan Urban Railway. Of these, 64 stations were selected by taking the passenger flow and number of trains passing through as weight indicators and eliminating stations on the Changsha–Zhuzhou–Xiangtan Urban Railway, considering the integration of Changsha City, Zhuzhou City, and Xiangtan City. Through calculations, calibrations, a review of the relevant research, and a consideration of Hunan's varied geography, we established a maximum buffer radius of 20 km for 64 stations and mapped the spatial distribution of the buffer zones of ICH tourism resources against high-speed railway stations. As illustrated in Figure 8, within a maximum buffer radius of 20 km, the buffer zones of 64 stations intersected to form 21 buffer zones, which covered 62 ICH resources, accounting for 45.2% of the total. Among them, traditional drama accounted for the largest proportion, mainly concentrated in the Changsha–Zhuzhou–Xiangtan and Loudi–Shaoyang regions in central Hunan (15 items in total). These were followed by the buffer zones of stations in central and southwestern Hunan Province, which contained 14 ICH resources in total. This layout makes up for the lack of scenic spots at level 4A and above in the southwest and forms a rational basis for using ICH resources in the integrated development of the cultural and tourism sectors. However, in regions where ICH resources are concentrated, such as western and southern Hunan, there is a lack of high-speed railway station coverage.

Considering that some of the ICH resources mentioned above are in mountainous areas, driving is also used as a flexible mode of transportation. This has a direct impact on the developmental planning of tourism resources. Including the highway network to analyze the status of ICH items covered by transportation provides a basis for the reasonable development of IHC resources. Considering this, the expressway network was added to analyze the status of ICH items. Taking the expressway route in Hunan Province as an element and combining it with the geographical conditions in the province,

multi-ring buffer analysis was performed in ArcGIS, and buffer zones with a maximum radius of 15 km and an interval of 5 km were established. Based on this, the coverage of ICH resources based on the buffer zones along expressways was mapped. As shown in Figure 9, there were 127 ICH items in the expressway buffer zones across the province, accounting for 92.7% of the total. From the perspective of spatial distribution, the buffer zones along the expressways from north to south covered all ICH items in these regions of the province, accounting for the largest proportion, 84 items. The buffer zone along the expressways in the east–west direction only included 43 ICH items.

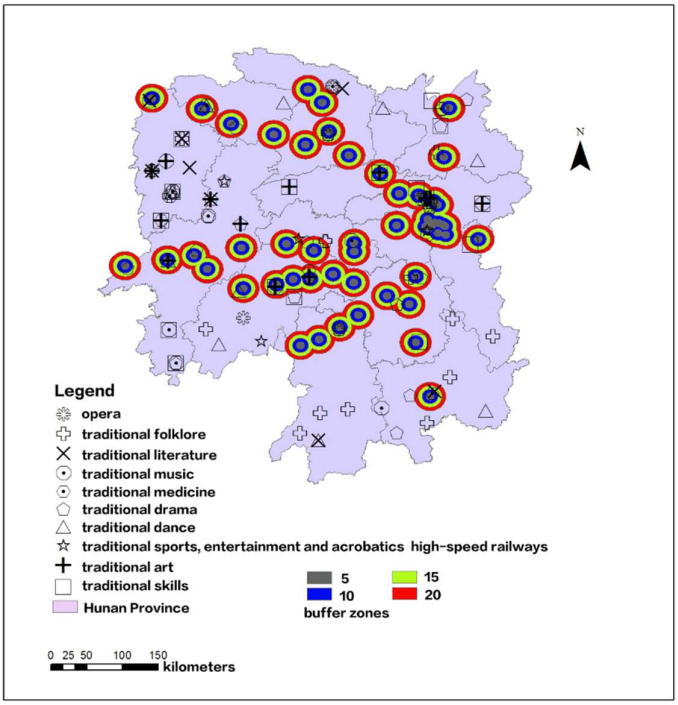

Figure 8. Buffer zones of high-speed railway stations. Source: the authors.

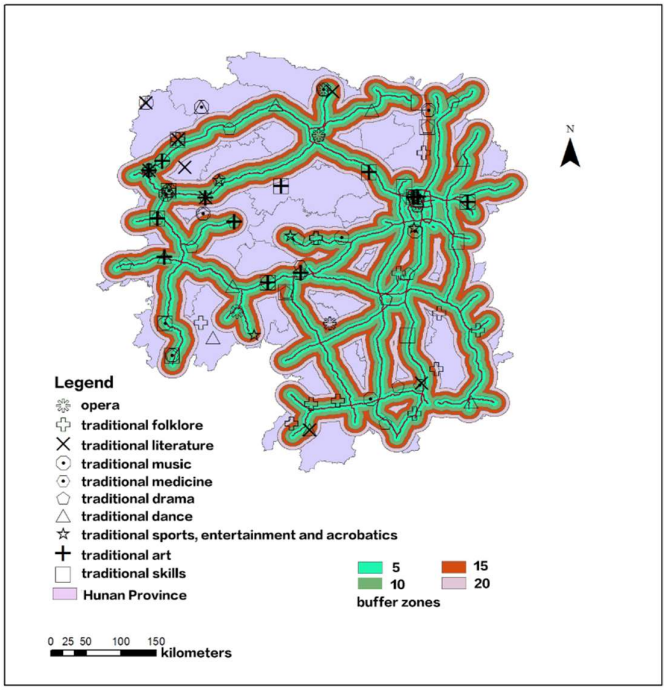

Figure 9. Buffer zones of highways. Source: the authors.

5. Discussion

In this study, we analyzed the spatial distribution characteristics of intangible cultural heritage in Hunan. The results of the study demonstrated that the distribution of intangible cultural heritage in Hunan has substantial spatial variation, showing overall aggregation but differences in the spatial distribution of the various categories of intangible heritage. Our results confirmed the findings of Zhang and Dippon et al. [54,55], who suggested that significant imbalances exist in the spatial distribution of ICH, both globally and from the perspective of individual countries. Our study highlighted the significant imbalance in the distribution of ICH in the inland regions of China from a provincial perspective, and we analyzed the characteristics of the distribution of individual items of ICH in Hunan Province. Although this was a case study for Hunan Province, it can serve as a general reference. Our findings were consistent with Xu's research on the distribution of ICH in Sichuan Province [56]. He identified an uneven spatial distribution of intangible cultural heritage in Sichuan province, which was characterised by geographical and ethnic differences, with intangible cultural heritage being distributed in groups, and minority autonomous prefectures and their surrounding areas possessing widespread intangible cultural heritage. Similar results were obtained in our analysis, which shows that the distribution of ICH in Hunan is not exceptional but is similar to that of most mountainous provinces located in inland China, such as Sichuan and Guizhou, which are provinces with a large number of ethnic minorities and mountainous terrain that contain a wealth of ICH resources. Our results can be used as a reference for further research into the development of ICH in other inland mountainous and minority-populated provinces [3].

In addition, our research further highlights that the distribution of ICH within Hunan is mainly concentrated in the western and central-eastern regions. This is mentioned in Zhang's study of the spatial distribution of traditional music in western Hunan [55], but he only points out that the main trend in the distribution of ICH in western Hunan is aggregation. In addition to our results showing a trend of clustering for ICH in Hunan Province as a whole, we further analyzed the coupling of ICH with the buffer zones of tourist attractions and transport networks. Tourism and transport are opportunities for the living development of intangible cultural heritage [20–23]. Tourism transport infrastructure has a positive impact on regional economic growth [6,57–59], and the combination of ICH and tourism contributes to economic development.

However, as ICH becomes increasingly popular and begins to attract more and more tourists, a range of negative social impacts may arise, such as regional development imbalances brought about by differences in transport infrastructure [60,61]. In his study, Gareth Butler [62] pointed out the need to pay attention to the different traffic conditions in order to avoid negative traffic effects in the development of cultural heritage and tourism. Therefore, this paper examined the combination of both high-speed railways and highway transport networks with ICH within Hunan Province to avoid the negative effects of a single developmental model. The findings showed that high-speed railways cover the clustering points of ICH in the central-eastern part of Hunan, while highways connect ICH items in the west and other regions. This finding validates the research by Huang [63] and Wang [64]. Huang pointed out that China's inland mountainous regions are covered by a large number of high-speed rail networks, but differences exist in the construction of high-speed railways within the inland regions. The tourism industry in the city cluster around Changzhutan aims for high-quality development, while the development of high-speed railways in other regions is relatively weak [64]. We performed a coupling analysis of the distribution of high-speed railways and ICH items and found that the ChangZhuTan area is the main beneficiary of the developmental advantages of a combination of high-speed railway networks and ICH. Although the western Hunan region does not benefit from the tourism development brought about by a high-speed railway transportation network, intangible cultural heritage and minority cultural resources are strengths resulting from tourism development within this region. Some studies have argued that the resource characteristics of a tourism destination can also have an impact on tourism development patterns [65,66].

Kim's study concluded that the resource characteristics of a tourism destination can even influence tourists' decisions [67]. The western Hunan region is abundant in characteristic minority resources, and although it is located in a relatively closed-off mountainous area, the wealth and diversity of its native intangible cultural heritage are extremely unique and form a special cultural ecology. Therefore, the development of ICH in western Hunan could take the form of widely distributed highways with distinctive ICH tourism patterns. This offers a promising developmental path for poorer regions such as western Hunan, especially those in which the utilization of intangible cultural heritage is low [7]; in these regions, ICH improves economic development [2,18], which in turn promotes the preservation of ICH [16,17].

6. Conclusions and Limitations

The main conclusions of our research are as follows: (1) Hunan's IHC resources as a whole are spatially aggregated and are mainly concentrated in the integrated economic centers of central-eastern and southern Hunan and the minority-populated areas in the western region. (2) Tourist attractions drive ICH resources with suboptimal characteristics, meaning there is superior coupling between the spatial distribution of 4A scenic spots and ICH resources. (3) At a macroscopic level, the spatial distribution of ICH resources corresponds to a developmental traffic-flow pattern with highways and high-speed road networks as the main lines and the high-speed railroad network as a supplement. In contrast, ICH and tourism resources in the central–eastern part of Hunan correspond to a traffic-flow pattern with the high-speed railroad network as the main line.

In the future, the spatial distribution of each type of ICH could be studied independently. Additionally, the generalizability of the proposed developmental model based on the geographical and cultural environment of Hunan still needs to be investigated with regard to other regions. Therefore, exploring the connection between the ICH of Hunan and that of other regions is a potentially important direction for our future work.

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