Research on Sports Tourism Promoting Sustainable Development of Coastal Rural Areas Based on Fuzzy Fault Tree

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Abstract: This paper discusses the problems and countermeasures of sports tourism in promoting sustainable development of coastal rural areas through literature data and fuzzy fault tree analysis. Based on the tourism supply chain theory and the actual situation of coastal rural revitalization, analyze the possible reasons for influencing sports tourism to promote rural sustainable development, and finally establish a fuzzy fault tree. Problems in rural sports tourism include the lack of social capital that hinders the sustainable development and construction of coastal villages; the lack of diversified forms of sports tourism to revitalize rural areas; and the neglect of the construction of urban-rural blending areas in coastal rural sports tourism. Conclusions: sports tourism should adapt to the development of the rural economy and actively absorb social capital; establish a development-oriented thinking of poverty alleviation through sports, and use subjective initiative to enrich sports tourism; take advantage of the difference in endowment of sports factors and make full use of urban-rural blending areas.

1. INTRODUCTION

The COVID-19 caused huge damage to national security and economic development. The national economic system and management system was forced to make major adjustments to its internal structure in order to adapt to the development of the new era. A series of opportunities for change and innovation are coming [1]. The implementation of the national tourism poverty alleviation policy and the promulgation of “Healthy China 2030” have made the pace of development of coastal rural sports tourism in China significantly faster. In 2018, domestic tourism revenue reached $72.282 billion, a year-on-year increase of 12.3% in 2017. Judging from the current sports performance of people in coastal rural non-epidemic areas, people's demand for health is becoming stronger and stronger. Sports tourism, as a leisure sports industry with a health port forward, will surely welcome the popular pursuit of the people.

The report of the 19th National Congress of the Communist Party put forward the strategy of rural revitalization, insisting on the integration of urban and rural development, and insisting on the harmonious coexistence of man and nature [2]. Sports tourism provides a high-quality living environment for coastal rural residents and guarantees a high-quality consumption environment for...
urban and rural travelers. In recent years, the Engel coefficient of rural residents has continued to decline (Table 1), to a certain extent, it is a testament to the trend of coastal rural revitalization [3]. In the industrial operation of rural sports tourism, it brings multidimensional exchanges between urban and rural residents. The material consumption generated by urban residents in the tourism process can input a large amount of funds for rural development, stimulate rural economic development, and generate huge positive external effects, which in turn reduces the huge economic difference between urban and rural areas [4].

Table 1. Engel coefficient in China from 2016 to 2018 a

| Year | Overall Engel Coefficient/% | Down from last year% | Town/% | Rural area/% |
|------|-----------------------------|----------------------|-------|-------------|
| 2016 | 30.1                        | 0.5                  | 29.3  | 32.2        |
| 2017 | 29.3                        | 0.8                  | 28.6  | 31.2        |
| 2018 | 28.4                        | 0.9                  | 27.7  | 30.1        |

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We can really clarify this issue by constructing analytical elements from the relationship between rural sports tourism and rural sustainable development under the specific historical background. It is this kind of coastal sports tourism in the context of urbanization that provides the possibility of flat rural governance [5]. Coastal rural sports tourism can provide more publicity opportunities for these rural sports cultures, provide a dynamic mechanism for sustainable development, and are more conducive to the preservation of rural sports culture [6].

Figure 1. The realistic relationship between rural sports tourism and rural sustainable development

2.METHODS

2.1 Literature method

Adopt the literature method, integrate relevant journals, official website policies, documents, etc. about sports tourism revitalization before and after the occurrence of the COVID-19, and carry out in-depth research on tourism supply chain theory and rural revitalization. Combining the rich results of previous studies, the basic events of this study are listed, and the probability is evaluated by experts. Finally, all literature is integrated for comprehensive research.

2.2 Fuzzy fault tree analysis method

The fuzzy fault tree analysis method is used to study the reliability of related systems [7]. First, build a fault tree. Through the “Tencent Conference APP”, we conducted interviews and surveys with 3 experts in the field of leisure sports management and 2 teachers in the field of fuzzy fault trees in Guangzhou Institute of Physical Education and Capital Institute of Physical Education, combining previous research results and the bottom events and intermediate events listed by several experts. The logic of each event builds a fault tree. Secondly, quantitative analysis and research are carried out, using the basic structure of the fault tree and the probability of occurrence of each event, so as to conduct a reliability assessment of the coastal rural tourism promotion in the post-epidemic era to identify weak links.
3. EXPERIMENT DESIGN

Through the “Tencent Conference APP”, we conducted interviews and surveys with the above five expert teachers and listed the 18 basic events based on the previous rich research results and expert opinions (Table 2), then build a fault tree of the sports tourism supply chain based on the logical relationship between them (Figure 2).

Table 2. Basic event table of sports tourism supply chain fault tree

| Number | Event Name                                           | Number | Event Name                                           |
|--------|------------------------------------------------------|--------|------------------------------------------------------|
| T      | Sports tourism supply chain failure                  | X7     | Poor ability to respond to market changes           |
| M1     | Sports tourism supplier failure                      | X8     | The services of sports tourism provider 3 do not meet the needs of tourists |
| M2     | The operator of sports tourism is invalid            | X9     | Information communication is not timely and accurate |
| M3     | Sports travel agency failure                         | X10    | Mistakes in connection between upstream and downstream enterprises |
| Si     | The supplier i of sports tourism is invalid (i = 1, 2, 3) | X11    | Ignore the construction of urban-rural blending areas |
| Di     | Sports travel agent i expires (i = 1, 2)             | X12    | Insufficient diversification of sports tourism      |
| X1     | Sports travel supplier 1 conveys information is not accurate and timely | X13    | Mistakes in the forecast of demand for the sports tourism market |
| X2     | Sports tourism supplier 1 has breach of contract     | X14    | Sports travel agent 1 information communication is not timely and accurate |
| X3     | The quality of the products or services provided by the sports tourism supplier 1 has not reached the standard | X15    | The price of sports tourism agents is inelastic     |
The lack of rural social capital leads to the termination of supplier 1 cooperation

The quality of products or services provided by the sports tourism supplier 2 has not reached the standard

The price of sports tourism suppliers is inelastic

Service that failed to fulfill the promise to tourists

Customer problem solving time is too long

Poor tracking and feedback capabilities

4. RESULTS

After listing the basic events and fault tree, the above five expert teachers give the probability of occurrence of each basic event, use the average as the fuzzy value so as to conduct a comprehensive calculation (Table 3). The fuzzy value of the system failure:

$$g(\hat{Q}(x)) = g(Q(\hat{X}_1, \hat{X}_2, \hat{X}_3, \ldots, \hat{X}_n))$$  \( (1) \)

Table 3. Fuzzy value assessment of influencing sports tourism to promote rural sustainable development

| Basic event | Comprehensive probability | Fuzzy value | Basic event | Comprehensive probability | Fuzzy value |
|-------------|---------------------------|-------------|-------------|---------------------------|-------------|
| X1          | 0.02~0.03                 | 0.025       | X10         | 0.06~0.2                 | 0.13        |
| X2          | 0.01~0.02                 | 0.015       | X11         | 0.07~0.25                | 0.16        |
| X3          | 0.03~0.04                 | 0.035       | X12         | 0.09~0.3                 | 0.195       |
| X4          | 0.1~0.35                  | 0.225       | X13         | 0.05~0.15                | 0.1         |
| X5          | 0.03~0.04                 | 0.035       | X14         | 0.02~0.03                | 0.025       |
| X6          | 0.04~0.15                 | 0.095       | X15         | 0.03~0.05                | 0.04        |
X7 0.04~0.15 0.095 X16 0.05~0.1 0.075
X8 0.03~0.04 0.035 X17 0.05~0.1 0.075
X9 0.02~0.03 0.025 X18 0.04~0.25 0.145

It can be obtained from the above: the maximum fuzzy value is 0.225, indicating that there are weak links in rural sports tourism including X4, and the lack of social capital hinders the development of rural areas; the second largest fuzzy value of the median of the comprehensive probability value is 0.195, indicating that X12: The form of tourism revitalization in rural areas is insufficient; the number 0.16 indicating that X11: rural sports tourism ignores the construction of urban-rural blending areas. When the sports tourism supply chain fails, relevant departments and units can find the source of the failure from these weak links and improve the efficiency of solving the problem.

5. DISCUSSION

5.1 The lack of social capital that hinders the sustainable development and construction of coastal villages
The misunderstanding of “traditional small holder economy” to “rural sports tourism” hinders the rural revitalization from absorbing rural sports tourism capital. The “traditional small peasant economy” believes that only when the countryside develops farming steadily, the grain harvest is the last word. During that period, rural social capital was mainly derived from the special trust among acquaintances, and households who farmed whole basically had no other forms of income. After the reform and opening up in 1978, China's national governance model and family system were innovated, the acquaintance society gradually became semi-acquaintance society, and the foundation of the old rural social capital generation no longer exists. The implementation of the policy is certainly gratifying, and various forms of prosperity ideas are blossoming, but if the spring breeze of the policy fails to reach this place, then relying stubbornly on the traditional model cannot meet social capital required for the development of modern rural sports tourism [8].

5.2 The lack of diversified forms of sports tourism to revitalize rural areas
In the 1940s, Mr. Pan Guangdan studied the word “weiyu” in Confucianism, translated it into the English word “adaptation”, and also translated as a career, meaning that people and nature are accommodating, inclusive, and interdependent to achieve the purpose of life [9]. Now it seems that most sports tourism packages natural resources and sells them to passengers, and some of them are transported to this part of the natural resources in an ingenious and strange way to achieve the purpose of interdependence between man and nature. Activities such as mountaineering and cycling have become more homogenous products in rural leisure sports tourism. The single form of tourism products has led to vicious competition in the homogenization of rural sports tourism, which inevitably weakens the attractiveness of rural sports tourism products and customer stickiness[10]. When developing sports tourism resources, other countries pay more attention to local conditions and coordinate with local economic development.

5.3 The neglect of the construction of urban-rural blending areas in coastal rural sports tourism
The main relationship between rural society is the relationship between people and land, so the key issue of social transformation is land. The rural market needs to face the world market, and rural labor and rural land elements need to be released. For this reason, the use of the urban-rural blending area is inevitable [11]. At present, many large cities around China have formed urban-rural blending areas based on manufacturing and service industries. With the prevalence of consumerism, urban-rural blending areas based on cultural and sports entertainment and leisure pension projects have gradually increased. Street dance and other performances are expected to form a sports-rich urban-rural blending area [12]. The report of the Nineteenth National Congress of the Communist Party of China clearly emphasized that the “regional coordinated development strategy” should be used to resolve the
imbalance of the industrial space layout. The urban-rural blending area is the core area for the rapid
development of the sports industry and the multi-layer interaction and coupling development of the
sports space. It is a key area neglected by the rural revitalization of our country. It is also a strategic
high ground for the integrated development of urban and rural areas (Figure 3).

Figure 3. Spatial structure of urban, rural and urban-rural blending areas

6.COUNTERMEASURES

6.1 Sports tourism should adapt to the development of the rural economy and actively absorb social
capital
The development of rural sports tourism must solve the contradiction between economic fluctuations
and rigid welfare growth in the post-epidemic era, take advantage of the end of the well-off society to
improve people’s livelihood, maximize the use of vibrant and efficient sports tourism, and establish
coastal sports tourism Effective mechanism. In the absorption of rural social capital, we cannot rely
solely on the state to provide low-interest loans. We must form a standard through local “ sports
culture, township conventions” etc., strengthen the relationship network, and enhance social trust with
“ sports tourism effectiveness.”

6.2 Establish a development-oriented thinking of poverty alleviation through sports, and use subjective
initiative to enrich sports tourism
The values of rural residents are the foundation of the development of the entire rural society, and are
often the precursor of its transformation. To develop rural sports tourism, the correct lever orientation
is essential, but the correct lever is often difficult to find. The thinking of development-oriented
precision poverty alleviation cannot erupt in a short time, but needs to be built on the formation and
cultivation of a long-term demographic dividend of the new generation. Improving the leadership of
the village committee in rural construction is the key to the strategy of rural development. At the same
time, pay attention to the collection of the villagers’ ideas of getting rich and pay attention to the
subjective initiative of the villagers. We must work hard on the specific form of rural sports tourism,
tap the local culture, use existing resources, seize the new fashion of national fitness and sports
consumption, make a real effort on the form of sports tourism, and promote the implementation of the
rural revitalization strategy [13].

6.3 Take advantage of the difference in endowment of sports factors and make full use of urban-rural
blending areas
The urban-rural blending area should clearly define the regional functions and serve as an
intermediary role connecting coastal urban and rural development. It will effectively integrate urban
and rural sports, help form a new sports space value highland, and promote the efficient interaction
between cities and rural areas and the integration of urban and rural development [14]. Therefore, the
construction of urban-rural blending areas should consider the construction of small and medium-sized
sports venues that are conducive to the common use of urban residents and rural residents, and the
construction or renovation of fitness facilities, fitness trails, outdoor leisure sports bases and other
venues and facilities. In particular, it is necessary to dig deep into the sports endowment, Integration and cultivation to achieve a balanced and full development of coastal urban-rural blending area.

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