Research Article

A Model and Its Application of Quantitative Evaluation for Exploitable Value of Hot Spring Landscape Resources

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The accurate and objective quantitative evaluation of hot spring landscape resources is helpful to understand the value of the resources, has great practical significance for their protection, exploitation, and utilization, and is also an important basis for the exploitation and planning of the hot spring resources. On the basis of summarizing and analyzing previous research works, this study expounded the research status and significance of the exploitation of spring landscape resources, elaborated the development, background, current status, and future challenges of the quantitative evaluation of landscape resources’ exploitable value, introduced the methods and principles of analytic hierarchy process and fuzzy synthesis process, formulated the evaluation index scoring standards for the exploitable value of hot spring landscape resources, analyzed the grading standard of comprehensive evaluation value, conducted the process analysis of quantitative evaluation of the exploitable value of hot spring landscape resources, established the evaluation index system of the exploitable value of hot spring landscape resources, determined evaluation index weight coefficient, constructed a quantitative evaluation model of the exploitable value of hot spring landscape resources, and finally carried out a case application and its result analysis by taking Chicheng Hot Spring in Chicheng County, Hebei Province, northern China as an example. The study results show that the three categories of factor weights in the subobjective layer of comprehensive evaluation system of hot spring landscape resources are landscape resource quality, environmental conditions, and resource exploitation and construction conditions. The purpose of quantitative evaluation of hot spring landscape resources is to use mathematical methods to quantify the fuzzy attributes of landscape resources so that some vague evaluations become relatively accurate, thereby improving the objectivity and reliability of evaluation results. Therefore, the establishment of a tourism preference index based on the hot spring tourism market and the subjective will of tourists as the evaluation standard has played a role in market restrictions, combining the evaluation of hot spring tourism resources with the dynamics and trends of the hot spring tourism market, and establishing comprehensive evaluation system of hot spring landscape resources. Those results of this study are expected to provide a reference for further research on the quantitative evaluation model for exploitable value of hot spring landscape resources.

1. Introduction

Hot springs are a kind of tourism resources with similar natural resource characteristics, homogeneous exploitation models, and high concentration in geographical distribution, and their operations are heavily dependent on the revisit rate. Therefore, if the exploitation planning is wrong, it is very easy to lead to disorder market competition and chaotic space competition for the hot spring tourism in the same area with multiple tourism resources [1]. It can be seen from this that it is necessary to establish a general quantitative evaluation model that can measure the size of its exploitability, which can be used to uniformly evaluate, distinguish the pros and cons, and determine the status and exploitation sequence of multiple hot spring tourism resources in a certain area [2]. Hot spring resources are the main material basis for the exploitation of hot spring tourism destinations, one of the main factors for tourism attraction, and an objective and necessary condition for determining the location of hot spring tourism exploitation. The exploitation value of hot spring tourism resources can be evaluated from the geological and geo-morphological
background, temperature, flow, water quality, and other aspects [3]. Specifically, the geological and geo-morphological background determines the stability of hot springs; temperature and flow determine the reserves of hot springs, which in turn affect the capacity and scale of hot spring tourism exploitation and the ability of tourism destinations to continue to exploit; water quality determines the therapeutic function of hot springs; flow and water quality have the greatest impact on hot spring tourism exploitation and become the main factor attracting tourists [4].

The research on the tourism spatial organization of hot spring landscape is to comprehensively analyze and reasonably evaluate the resource endowment, geographical location, economic background, etc. The priority and sequence of tourism exploitation in the whole region is to construct the overall tourism spatial structure [5]. The exploitation of mountain-type hot spring resource water landscape is not only the exploitation of hot spring water landscape but also includes the exploitation of the water system within the resource. Specifically, its index system should focus on the characteristics of the sustainability of hot spring landscape resources and the health of natural ecosystems. Whether the hot spring landscape resources can be used sustainably is the key to the future economic exploitation of this area [6]. The networking of tourism spatial structure of hot spring landscape refers to the process that the spatial structure of regional tourism is formed by taking the hot spring landscape as the tourism node and various transportation routes as the tourism channel evolves continuously under the interaction of tourism and finally reaches the network complex [7]. An accurate and objective quantitative evaluation of hot spring landscape resources is helpful to understand the value of hot spring landscape resources, has great practical significance for the deep protection, exploitation, and utilization of these landscape resources, and is also an important basis for hot spring resource exploitation planning [8].

On the basis of summarizing and analyzing previous research works, this study expounded the research status and significance of the exploitation of spring landscape resources, elaborated the development background, current status, and future challenges of the quantitative evaluation of landscape resources’ exploitable value, introduced the methods and principles of analytic hierarchy process and fuzzy synthesis process, formulated the evaluation index scoring standards for the exploitable value of hot spring landscape resources, analyzed the grading standard of comprehensive evaluation value, conducted the process analysis of quantitative evaluation of the exploitable value of hot spring landscape resources, established the evaluation index system of the exploitable value of hot spring landscape resources, determined evaluation index weight coefficient, constructed a quantitative evaluation model of the exploitable value of hot spring landscape resources, and finally carried out a case application and its result analysis by taking Chicheng Hot Spring in Chicheng County, Hebei Province, northern China as an example. The detailed chapters are arranged as follows: Section 1 introduces the methods and principles of analytic hierarchy process and fuzzy synthesis process; Section 2 conducts the process analysis of quantitative evaluation of the exploitable value of hot spring landscape resources; Section 3 constructs a quantitative evaluation model of the exploitable value of hot spring landscape resources; Section 5 carries out a case application and its result analysis; Section 6 is conclusion.

2. Methods and Principles

2.1. Analytic Hierarchy Process. It can be seen from the hierarchical ranking result of the comprehensive evaluation index of hot spring landscape resources by the analytic hierarchy process method that the weights of three types of factors in the subtarget layer of the comprehensive evaluation system of hot spring landscape resources are landscape resource quality, environmental conditions, and resource exploitation and construction conditions [9]. Among them, the quality of hot spring landscape resources has the largest weight, indicating that it is in the most important position among the three categories of factors and is the material basis for attracting tourists. The exploitation of hot spring landscape resources is based on the quality of hot spring resources. The attractiveness and exploitation value of landscape resources determine the exploitation of ecotourism. The weight value of environmental conditions reflects the requirements of tourists for the scenic environment. With the improvement of living standards and cultural quality, tourists have higher and higher requirements for the environment. In addition to viewing the landscape, tourists mostly need a fresh, clean, quiet, and comfortable environment. The exploitation and construction conditions of hot spring resources reflect the exploitation status and exploitation potential of the reserve; although it is not dominant, it directly restricts and affects the exploitation level and speed of hot spring resources. The weighted average method introduces a weighted value according to the different effects of each evaluation index on landscape resources, which is equivalent to a revision of the evaluation standard, so as to highlight the importance of a subindicator in the entire evaluation index system.

In view of the differences in the composition of different hot spring landscape resources, in order to eliminate this influence and achieve the purpose of comprehensive evaluation of different regions and different types of hot spring landscape resources, the basic idea of comprehensive evaluation is to use each independent cultural unit that constitutes the overall hot spring landscape resources as the basic evaluation object. According to its category and the level of each evaluation item, the model calculates its score separately, and based on the score of each basic cultural unit, it conducts a comprehensive evaluation of the entire hot spring landscape resources. The weight of each index in the composite system is determined according to the original information load of the three subsystems of hot spring resources. The resulting deviations make the evaluation results more realistic; the higher the utility value is, the greater the evaluation importance is. In the utilization of hot springs, the utilization of its abundant thermal energy resources should be fully considered. All seven evaluation
items are set according to the internal and external attributes of hot spring landscape resources, among which three evaluation items are set according to external attributes: influence, integrity, and rarity; according to internal attributes, three evaluation items of historical value, cultural value, and social value are set. Therefore, in actual operation, the applicability of the proposed evaluation method should be carefully screened according to the characteristics of hot spring landscape resources and evaluation objectives.

2.2. Fuzzy Synthesis Process. From the perspective of hot spring treatment, the treatment effect close to body temperature is better; from the perspective of suitable bathing, 34–40°C may feel better, the high temperature is too hot, and the low temperature is too cold. The flow of hot springs determines its reserves, which in turn affects the capacity and scale of hot spring tourism exploitation. The capacity threshold of hot spring tourist destinations is insurmountable, and hot springs are the main purpose for tourists to choose hot spring tourist destinations. When the number of tourists overflows the basic capacity of hot springs, hot spring tourist destinations lose their attractive value, and the calculation index of the capacity of hot spring tourism is mainly the flow of hot springs. Therefore, the flow has become an important factor affecting the exploitation value of hot spring landscape resources. The quality of hot spring water quality is a key factor affecting the attractiveness of hot springs, and the quality of water quality is related to its composition [10]. At a certain time, a cell can only have one state, and the state is taken from a finite set; each cell communicates or exchanges information with a finite number of other cells to form a geometrically consistent neighborhood; the initial role of the state and neighboring cells determines the state of the next moment; and the cell rules define the rules of cell state transitions. The fuzzy synthesis method is based on fuzzy mathematics, through quantitative description and operation, comprehensive evaluation of multiple mutually influencing factors in the system.

After the weight value of the impact factor is determined, according to the meaning of the evaluation factor measurement, each evaluation factor index is divided into fuzzy grades; then the evaluation factor index is assigned to make it quantified, and a continuous real number interval is used to represent the factor index score, each score interval corresponds to the above grade. According to the factors of each hot spring landscape resource, the above interval is scored and assigned. In the hot spring landscape resource evaluation system, five experts were invited to give fuzzy scores to the listed characteristic resources, and finally the average value of the index scores corresponding to each evaluation factor for each characteristic resource was obtained as the index score of the characteristic resource. When customers feel valued by the characteristic resource was obtained as the index score of the characteristic resource. When customers feel valued by measuring perceived benefits and perceived costs, they are more likely to revisit. This feature of hot springs makes it necessary to fully consider what factors may affect the perceived cost and perceived benefit of customers in the exploitation of hot springs, thereby affecting the perceived value of customers. The hot spring landscape resource in a certain area is usually a complex system with multifactor coupling, and the relationship between the factors is intricate, with great uncertainty and randomness. Therefore, the fuzzy synthesis process is very useful in the hot spring landscape resource evaluation. Then, according to the weight distribution of each index in the system, the quantitative solution value of the evaluation is obtained through fuzzy matrix synthesis.

3. Process Analysis of the Quantitative Evaluation of Exploitable Value of Hot Spring Landscape Resources

3.1. Scoring Standard Formulation for Evaluation Indexes. The construction of the evaluation index system of the quantitative evaluation model for the exploitable value of hot spring landscape resources takes the evaluation of the exploitation potential of hot spring tourism resources as the target layer. Hot spring medical care value, altitude, slope, main distance to the river, regional economic exploitation level, main distance to traffic, and distance to surrounding tourist destinations are the total ten evaluation indicators used as the index layer. The weights of the criterion layer are ranked from large to small as hot spring resource endowment, socio-economic factors, and natural geographical factors; the hot spring resource endowment has the highest weight value, indicating that the quality of hot spring resources plays a dominant role in the exploitation of resource value. Among the hot spring resource endowment elements, the hot spring water temperature has the highest weight value, followed by the daily flow rate, indicating that temperature and water volume are the primary considerations for its exploitation. Among the socio-economic factors, the distance from the main traffic has the highest weight value, followed by regional economic exploitation level, indicating that the good traffic conditions are the priority conditions for tourists to choose hot springs. Among geographical elements, the weight value of slope is the highest, indicating that hot springs with gentle slopes have great exploitation potential, and slope factors have an impact on hot spring project exploitation decisions (Figure 1).

Figure 2 shows the scoring standard formulation for evaluation indexes in hot spring temperature, water quality, water flow, and geography. Quantitative evaluation indicators of the exploitable value of resources are used to predict impacts, compare alternatives, and monitor whether exploitation activities meet the objectives of exploitation plans. Therefore, the evaluation of the impact of exploitation and construction on the ecology is also the content of the evaluation of resource exploitation planning. In the process of regional exploitation, most of the socio-economic elements are gathered at points, and these points are linked together by linear infrastructure to form axes. In other aspects, such as the exploitation of plant landscape,
the model of trees, shrubs, and grasses not only emphasizes imitating the natural combination of plants but also emphasizes natural or near-natural plant communities and structures. Public participation is one of the important factors to ensure the effectiveness of the environmental assessment, and the protection of the ecological environment depends on the full participation of the public. Promoting the full participation of the public is one of the purposes of the hot spring landscape resource exploitation project. After the exploitation of hot spring landscape resources, the land use structure will undergo fundamental changes, resulting in changes in the industrial structure, which will have a greater impact on the social economy, which in turn will affect the natural ecosystem. The survey also found that the local public cares more about social and economic issues than about ecological and environmental issues [11].

The establishment process of the quantitative evaluation index system for the exploitable value of hot spring landscape resources is actually a process of analyzing problems using systematic thinking. Compare the relationship between the influencing factors, screen the indicators, and finally determine the level and structure of the indicators after optimization, that is, get the final evaluation indicator system. The basic principle of the fuzzy synthesis method is to regard the evaluation object as a fuzzy set composed of various factors. By establishing a fuzzy mapping from the evaluation index set to the comment set, the membership degrees of each index to the comments at all levels are obtained, and a judgment

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**Figure 1:** Process analysis framework of the quantitative evaluation of exploitable value of hot spring landscape resources.

**Figure 2:** Scoring standard formulation for evaluation indexes in hot spring temperature (a), water quality (b), water flow (c), and geography (d).
matrix is formed. Therefore, enterprises can consider how to improve the perceived value of customers in the exploitation of hot spring tourism from the perspective of customer perceived value, thereby increasing the revisit rate of customers. Regardless of customer perceived value or customer value, both are inseparable from the understanding of customer needs and perceptions [12]. The starting point of this research is to consider the exploitation of hot spring tourism from the perspective of customers so as to formulate exploitation strategies that can improve customer perceived value.

3.2. Grading Standard Formulation for Comprehensive Evaluation Value. Theoretically, the more comprehensive the requirements for the measurement index system of tourism resource potential, the better. However, considering the selection of quantitative research methods and the limitations of the data indicator itself, the evaluation model needs to comprehensively consider the comparability of indexes, comparability, representativeness, generality and data availability. As shown in Figure 3, the model needs to reflect the essential characteristics of hot spring landscape resources, maintain the ecological value of environmental resources and the value orientation of sustainable exploitation from different angles, and objectively, comprehensively, and accurately reflect the current situation and exploitation potential of hot spring landscape resources in tourist destinations and the hot spring landscape. When the tourism product life cycle theory is applied to the exploitation of hot spring landscape resources, it can provide a certain scientific basis for the prediction of the potential scale of the tourism market and the exploitation of the potential market of tourism products [13]. When the market quantity of a tourist area remains unchanged, it will always enter the connotation of resources and sustainable exploitation and the degree of achievement of goals. Only when the tourist area continuously develops new tourist sources, can the time of this process be slowed down. The spatial characteristics of tourists’ travel behavior are the driving forces for hot spring resources exploitation and provide an important basis for the judgment of the potential of tourism resources.

The entropy value method is to analyze the degree of connection between the indicators through the index variability and to determine the index weight by the judgment matrix composed of the evaluation index values. This method is widely used in the evaluation of resources and environment, whose essence is to use the utility value of the index information to be calculated (Figure 4). For the construction of the tourism industry, exploitation planning should be done according to the conditions of volcanic lava resources, small workshop-style exploitation should be cleaned up, and a large-scale stone exploitation and processing base should be built to make it a building stone brand commensurate with volcanic hot spring resources. There are many indicators in the quantitative evaluation of the exploitable value of hot spring landscape resources, especially for the heterogeneity between different indicator layers under the same system layer, and the subjective judgment of the subjective weighting method is quite different, so it needs to be determined by the entropy weighting method [14]. This kind of discussion is really about the hot spring resources from the perspective of the three major subsystems of tourism and their unified relationship, fully considering the attraction ability of tourism resources to locate the scope of the source market, the accessibility of time distances that are more in line with real life, and the use of objective index weights. Other tourism resources exploitation potential index system and the construction of evaluation model have certain reference value.

Hot springs are highly polluted tourism resources; sewage recharge, groundwater level drop, etc. will cause serious damage to hot springs and even directly affect the exploitation of hot spring landscape resources. The distribution of hot springs is affected by the geological structure, which is a nonubiquitous tourism resource and is scarce. Therefore, high-level overall planning should be carried out before the exploitation of hot spring landscape resources to ensure the scientific and rational utilization of scarce resources. In the process of regional exploitation, most of the socio-economic elements are gathered at points, and these points are linked together by linear infrastructure to form axes. A mature network structure is an ideal model for the evolution of regional tourism spatial structure. In this model, the flow efficiency of tourism flow, information flow, capital flow, and human resource flow is maximized, and the utility of regional tourism exploitation is also maximized. The sustainability of hot spring landscape resources depends on the maintenance of ecological health. The exploitable value of hot spring landscape resources emphasizes the creation of multilevel and multispecies structures, and the establishment of biological self-sustaining systems, thereby promoting balanced and coordinated exploitation between systems. Therefore, it is necessary to fully coordinate the harmonious relationship between nature and human beings.
and to maintain the diversity and stability of biological communities.

4. Model Construction for the Quantitative Evaluation of Exploitable Value of Hot Spring Landscape Resources

4.1. Establishment of the Evaluation Index System. The purpose of model construction is to strive to form a quantitative evaluation system for the actual exploitable value of hot spring tourism resources that can be used in various places. Therefore, the selected indicators should be universal to ensure that the model can be popularized and applied. As mentioned above, some scholars take the area of cultivated land as one of the indicators to evaluate the ecological conditions of hot springs, which is meaningless for hot spring tourism resources distributed in forest areas, deserted beaches, and other places [15]. In regional conditions, in order to ensure a clearer and more scientific way of thinking, consider the objective requirements of tourism resource exploitation, and the two factors natural ecology and human economy are separated. Therefore, two factors, environmental ecological conditions and socio-economic support conditions, were selected. Hot spring tourism is greatly affected by temperature factors, and open-air hot springs have become the preferred activity and exploitation trend. In particular, modern hot spring tourism places equal emphasis on recuperation, outdoor entertainment, and leisure vacations, and has higher requirements for the natural environment. Therefore, in terms of environmental and ecological conditions, climate conditions, air quality, water quality, environmental relaxation and harmony, and soil and water conservation were selected (Figure 5).

Tourists of different cultural levels have different appreciation and perception processes of hot spring tourism landscape. The level of cultural accomplishment and spiritual realm directly affects tourists’ appreciation level of hot spring landscape. However, the current exploitation is still in the stage of manual workshops, the scale is small, and the environmental protection is not paid attention to. Some of them cause pollution to the atmospheric environment and nearby water bodies; some also cause damage to the natural landscape and city appearance, which affects the overall image of the tourism industry. The exploitation of hot spring landscape resources has three levels of exploitation structure: exploitation, scientific exploitation, and artistic conception exploitation. Among them, morphological exploitation is the basic condition for the utilization of hot spring landscape resources; scientific exploitation is the key to a deep understanding of hot spring landscape resources. Aesthetics is a special form of human grasping the world, which means that people form a nonutilitarian, figurative, and emotional relationship with the world so as to appreciate the beauty of things or works of art. Corresponding to evaluation grades of scientific value, aesthetic value, and tourism exploitation value, the qualitative evaluation index of hot spring landscape is obtained. The evaluation index system is determined, and the basic model of quantitative hot spring
landscape evaluation based on the analytic hierarchy process is constructed. The environmental resource conditions of volcanic hot springs are very superior, which provides very favorable conditions for the exploitation of hot spring resources and the exploitation of related industries, which is not available in other types of hot springs. In terms of resource utilization, it is worth mentioning about the exploitation and utilization of volcanic lava rock resources, which is a resource with great exploitation and utilization potential, broad market prospects, and convenient mining conditions among volcanic hot spring resources [16]. Through the analysis of different viewing processes, the model can provide methods of hot spring landscape aesthetic education and strive to help viewers to appreciate the hot spring landscape according to the characteristics and laws of its formation so as to better discover the unique and strange beauty of the hot spring landscape. The purpose of quantitative evaluation of hot spring landscape resources is to use mathematical methods to quantify the fuzzy attributes of landscape resources so that some vague evaluations become relatively accurate, thereby improving the objectivity and reliability of evaluation results. For the complex landscape system full of randomness and uncertainty, any scientific evaluation method has certain limitations. The excess thermal energy in the hot spring water can be exchanged to warm the normal temperature water through heat exchange technology, which can be used for domestic hot water supply in tourist attractions or for other purposes to reduce ineffective heat emissions and thermal pollution to the environment.

4.2. Determination of Index Weight Coefficient. Due to the difference in the types of hot spring resources, different tourists have different preferences for different types of hot spring tourism resources, which results in the tourism resources with higher evaluation by experts which may not be favored by tourists. If it is only based on the evaluation and analysis of experts, it is obviously inconsistent with the performance of the market. In order to solve this problem, it is necessary to introduce a limiting factor, and this factor must be derived from the market and should be dynamic. Therefore, the establishment of a tourism preference index based on the hot spring tourism market and the subjective will of tourists as the evaluation standard has played a role in market restrictions, combining the evaluation of hot spring tourism resources with the dynamics and trends of the hot spring tourism market, and establishing restrictive tourism resource evaluation system [17]. After the evaluation of the restricted evaluation system, the evaluation results obtained can truly reflect the different value levels of hot spring tourism resources. The analytical hierarchy process is to divide the orderly levels of the inter-relationships among the factors through the analysis of multiple factors in the system, and then invite experts to make a more objective judgment, and then give a quantitative index of relative importance to establish a mathematical model, and finally calculate the weight of the relative importance of all factors at each level. In this way, the whole evaluation process can be made quantitative as much as possible under the guidance of qualitative one in order to improve the accuracy of evaluation. The establishment of evaluation index system of the

![Figure 5: Relationship between the evaluation level and weight coefficient in hot spring temperature (a), water quality (b), water flow (c), and geography (d).](image-url)
quantitative evaluation of exploitable value of hot spring landscape resources is shown in Figure 6.

Hot spring resources are a kind of renewable energy. In the most cases, as long as there are no major geological changes, the supply of hot spring resources will generally remain unchanged. The quality of hot spring water resources is affected by factors such as water temperature, water quantity, and water quality; investors have ensured their long-term monopoly in tourist destinations through double insurance of land and hot spring water resources. As far as the current exploitation of hot spring tourist destinations is concerned, the construction of hot spring villas, the construction of large-scale hot spring entertainment projects, and the construction costs of related infrastructure have become the most important part of the total cost and the main source of income for hot spring tourist resorts [11]. Considering the characteristics of hot spring resources, investors generally lease the land near the spring where it is easier to obtain hot spring water resources during land acquisition so as to ensure their monopoly on resources, avoid other investors, and reduce competition risks. Therefore, once developers have determined their exclusive use of hot spring resources, it is difficult to realize the separation management of hot spring tourism resources and land.

The advantages of resource exploitation mainly include location conditions and geographical combination conditions of resources. The location condition greatly affects the source market of hot springs and determines the accessibility of hot springs, which specifically includes two meanings: one is the appropriate spatial distance from the city and the other is the smoothness of traffic. Most of the suburban hot spring areas have relatively developed economies, and local leaders and governments have high enthusiasm for exploitation and actively provide preferential tax policies for investment promotion. The geographical combination conditions of resources include the amount of hot spring resources, whether there are composite resources, and the thematic nature of binding with other hot spring resources. The main hot spring resources are relatively rich, which can complement each other in tourism exploitation; in terms of the type of hot spring area, a comprehensive hot spring area can be formed, which is focused on hot springs and integrates fitness, fishing, mountain climbing, forest bathing, sightseeing agriculture, and farm food [18].

5. Case Application and Its Result Analysis

5.1. Case Background and Research Design. This paper chose Chicheng Hot Spring in Chicheng County, Hebei Province, northern China as an example to carry out an application research on the quantitative evaluation model of the exploitable value of hot spring landscape resources. Chicheng Hot Spring is located 6.5 kilometers southwest of Chicheng County. The total area of the spring area is about 5 km², but the overflow point of the springs is less than 1 km²; the altitude of Chicheng Hot Spring is between 1000 and 1060 m; the highest temperature is 20.1°C, and the lowest temperature is −12.6°C. It is surrounded by luxuriant forests and historical sites and is a good place for recuperation, tourism, and vacation. Especially, the excellent water quality has the exploitation prospect of balneotherapy and drinking.
Chicheng Hot Spring is located at the intersection of the Nanbeigou and Dongxigou clustered granite-cut fault layers; after a considerable period of exploitation of the faults, it has formed a good channel for the groundwater to contact the deep crustal heat source. Chicheng Hot Spring is distributed in a feather-like gully as a whole, and the main gully is about 2500 m in length. Due to the well-developed vegetation, the Quaternary stratum in the gully has the deepest deposition of 9 m. According to sampling analysis, the lithology is mostly black silt with extremely poor water permeability. Except for the eye spring, the overflow points of the springs are all exposed on the west side of the valley, and there is pressurized bedrock fracture water; the maximum flow of the spring water is 44 m$^3$/h; and the temperature of the hot spring is represented by the total spring with the highest temperature of 68°C.

Hot spring resources are the main material basis for the exploitation of hot spring tourism destinations, one of the main factors that generate tourism attractiveness, and an objective and necessary condition for determining the location of hot spring tourism exploitation. To evaluate the exploitation value of hot spring tourism resources, the water quality of hot springs determines the therapeutic function of hot springs, while the temperature and flow of hot springs affect the scale of hot spring tourism exploitation and the ability of tourism destinations to continue to exploit [19]. The high scores of natural landscape resources, human landscape resources, and environmental quality in the secondary evaluation index layer indicate that landscape resources are not only of high quality in natural landscape resources but also very rich in human landscape resources with remarkable characteristics, and the ecological environment in the area is very good. The more types of natural and cultural landscapes and the higher the resource level of a hot spring area, the greater its overall tourism attraction intensity. The hot spring tourist resort is different from the general resource-based tourist destination, which is a high-investment tourism project that utilizes the reexploitation of hot spring resources. The exploitation level of the regional economy largely determines the exploitation scale and consumption level of the hot spring tourist destination.

5.2. Result Analysis. In the first-level evaluation index layer, the highest score is the resource quality, indicating that Chicheng Hot Spring landscape resources are not only rich in eco-tourism resources but also have a high grade of eco-tourism resources. The lower score is the exploitation conditions, which shows that the current exploitation and utilization of Chicheng Hot Spring landscape resources is general, which has hindered the exploitation and utilization of the hot spring landscape resources and eco-tourism resources. It is difficult to guarantee a large number of tourists throughout the year if the hot spring tourist destination simply relies on the hot spring tourism project. In order to solve this bottleneck problem, the hot spring tourist destination must carry out comprehensive tourism exploitation, and the surrounding natural and cultural landscapes of the hot spring tourist destination are rich. It has become a key factor that determines the success of the comprehensive exploitation of hot spring tourism. The environmental capacity score is relatively low, indicating that the ecological environment of Chicheng Hot Spring landscape resources is relatively fragile, and the tourism environment capacity is limited. The location characteristic score is also not ideal mainly because the Chicheng Hot Spring landscape resources are far away from the tourist source market, the cooperation conditions with the surrounding mature scenic spots are poor, and the external transportation such as planes, trains, and highways are not perfect [20]. The lowest score for regional conditions is mainly due to the poor internal traffic conditions of Chicheng Hot Spring landscape resources, poor accessibility to most high-grade scenic spots, insufficient investment in tourism infrastructure, and poor reception capacity (Figure 7).

As shown in Figure 8, the exploitation of hot spring landscape resources takes the road of sustainable exploitation, which is the inevitable meaning of hot spring landscape resource culture and the ultimate goal of building hot spring landscape resource culture. First of all, the hot spring project mainly relies on geothermal resources; therefore, the environmental capacity of the tourist destination and its environmental impact need to be considered in the landscape design, and the balance between operational benefits and resource conservation should also be considered. Second, in the landscape planning, the topography and landform should be changed as little as possible to maintain the integrity of the ecological chain. Finally, when the function mining and theme positioning of the hot spring project are carried out, the needs of local social exploitation should be fully considered [21]. Sustainable tourism requires tourism to be integrated with nature, culture, and human living environment; the balanced relationship between nature, culture, and human living environment makes tourism destinations unique. Therefore, in the exploitation of hot spring resources in various potential areas, attention should be paid to the coordinated exploitation between regions, and a sustainable exploitation path should be followed with special emphasis on the overall sustainable utilization of symbiotic resources in the fault zone.

From the point of view of environmental value, the exploitation and utilization of hot spring resource area has obviously improved urban exploitation, and hot spring elements should be integrated into the exploitation of urban functions, urban landscape, urban history and culture, and urban economic structure. First of all, the exploitation of hot springs has significantly improved urban functions, making the service functions of the city’s tertiary industry more complete and diversified, and at the same time driving the rapid exploitation of urban commerce, culture, and entertainment and other real estate industries, further enhancing the city’s attractiveness for investment. Second, the hot spring elements are integrated into the urban landscape to make the culture of the city more distinctive and the scenery of the city richer. Third, the combination of natural resources and history and culture can better reflect the characteristics of urban history and culture and realize the effective combination of urban natural resources and social
and historical resources of hot springs. Form the exploitation of a hot spring complex, and then multifaceted exploitation of hot spring resources is conducted to form a chain-type all-round experiential consumption. While improving the level of the hot spring real estate, the hot spring land must be integrated into the urban transportation system, accommodation, catering, finance, and business system. In the linkage planning, other urban municipal systems should also be integrated with the exploitation of hot spring resources.

6. Conclusions

This study formulates the evaluation index scoring standards for the exploitable value of hot spring landscape resources, analyzes the grading standard of comprehensive evaluation value, conducts the process analysis of quantitative evaluation of the exploitable value of hot spring landscape resources, establishes the evaluation index system of the exploitable value of hot spring landscape resources, determines evaluation index weight coefficient, constructs a quantitative evaluation model of the exploitable value of hot spring landscape resources, and finally carries out a case application and its result analysis by taking Chicheng Hot Spring in Chicheng County, Hebei Province, northern China as an example. Hot spring resources are the main material basis for the development of hot spring tourism destinations, one of the main factors that generate tourism attractiveness, and an objective and necessary condition for determining the location of hot spring tourism development. The purpose of model construction is to strive to form a quantitative evaluation system for the actual developable value of hot spring tourism resources that can be used in various places. The hot spring landscape resource in a certain
area is usually a complex system with multifactor coupling, and the relationship between the factors is intricate, with great uncertainty and randomness. The study results show that the three categories of factor weights in the subjective layer of comprehensive evaluation system of hot spring landscape resources are landscape resource quality, environmental conditions, and resource exploitation and construction conditions. Therefore, the establishment of a tourism preference index based on the hot spring tourism market and the subjective will of tourists as the evaluation standard has played a role in market restrictions, combining the evaluation of hot spring tourism resources with the dynamics and trends of the hot spring tourism market, and establishing comprehensive evaluation system of hot spring landscape resources. Those results of this study are expected to provide a reference for further research on the quantitative evaluation model for exploitable value of hot spring landscape resources.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest or personal relationships that could have appeared to influence the work reported in this paper.

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