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Sustainable Development Countermeasures of Ecotourism and Environmental Protection Based on Background of Internet Big Data

Li Fu[1,*] and Yi Yao[2]
[1] School of Economics and Management, Taiyuan Normal University, Jinzhong, Shanxi, 030619, China
[2] School of Economics and Management, Xinzhou Normal University, Xinzhou, Shanxi, 034000, China
Corresponding authors: (e-mail: fuli2520@126.com).

Abstract Environmental protection is a topic that has been raised repeatedly, but the frequent occurrence of uncivilized incidents of eco-tourism in society has caused panic among the masses. The concept of sustainable development is also a hot topic in recent years, and there is more application space for sustainable development in the ecological field. In order to solve the problems in the tourism environment, this paper analyzed the current situation of the tourism environment, and proposed targeted countermeasures according to the current situation, and analyzed the proposed countermeasures, and finally drew a feasible conclusion. In terms of the survey of garbage quality scores, it was concluded that the garbage environment of the scenic spot has been greatly improved after strengthening garbage management. In the investigation of the vehicle exhaust gas score, it was concluded that taking measures to the environment can improve the vehicle exhaust gas score and greatly reduce the vehicle exhaust emission. In the investigation of sewage scoring, it was concluded that the management of sewage in the scenic spot has achieved excellent results. In terms of the investigation of noise score, it was concluded that the noise score of Scenic Area D after the renovation has increased by 11 points, which was nearly double the original value. In terms of the survey on the score of renewable resources, it was concluded that the improvement of renewable resources can greatly improve the sustainable development ability of scenic spots. The majority of cities have achieved their economic development targets, indicating that sustainable development measures have had a real impact on economic growth and have contributed to economic development.

Index Terms Internet Big Data, Ecological Tourism, Environmental Protection, Sustainable Development

I. Introduction

Environmental protection is the consensus of mankind, because environmental protection is a major event that benefits future generations and people all over the world. Environmental pollution problems are more likely to occur during travel, which brings a lot of inconvenience to residents' lives. Tourists littering garbage, sewage is discharged casually, and the cries are mixed together, which is not conducive to the sustainable development of the environment. Based on this phenomenon, it is necessary to analyze the sustainable development of eco-tourism and environmental protection.

Environmental protection is a topic that is widely concerned by the society at present, and many scholars have conducted research on this topic. Paramati S R studied the role of renewable energy consumption on the economic output and carbon dioxide emissions of the world's next fastest growing economy [1]. Maleki H elaborated the contribution of aerogels as heterogeneous catalysts and photocatalysts to decontamination of air and water media during environmental remediation [2]. Pavelek Z discussed the impact of mining on the environment [3]. Ladaru G R examined the consistent impact of environmental protection expenditures on economic growth in Romania based on a data series of environmental protection expenditures and the evolution of GDP [4]. Wong W H investigated long-term trends in total phosphorus concentrations in 20 rivers in central Massachusetts from 1999 to 2013 [5]. Costuleanu C L compared the aluminum packaging waste generation in two districts (rural and urban) in Iasi County [6]. Oloko M interviewed 60 women between the ages of 20 and 60, he understood the importance of the environment to their livelihoods and how they protect it [7]. Environmental protection has gradually become the consensus of the public, and the public has also made its own efforts in environmental protection.

In the Internet era, big data technology has become a technology that everyone can use. Tang Y used the mathematical algorithm of neural network to simulate the structure of brain neural network to predict the future tourism market [8]. Gong J analyzed the current situation of ecotourism and applied big data technology to ecotourism, and put forward some suggestions for the future development trend of ecotourism [9]. An T G

empirically verified the relationship and influence between the motivation and satisfaction of ecotourism tourists based on the Internet of Things [10]. Asrianny analyzed the gap between tourists' perceptions and expectations for better development of the ecotourism potential of Bantimurong-Blusalon National Park [11]. Tinelle D examined the promotion of educational products on the Internet by international ecotourism operators that were viewed as interpretive products, as well as interpretive sustainability practices. The main focus was to understand the differences between certified and non-certified operators in promoting educational products on the Internet [12]. Mohd Sadiq understood how tourists use the Internet to search for information related to ecotourism [13]. Mengesha Endalew assessed and identified ecotourism attractions in the Jouki Mountain watershed to develop a web-based GIS mapping portal for improving nature-based ecotourism activities [14]. There have been many studies on the Internet in ecotourism, but there is no study on the sustainable development of ecotourism and environmental protection.

In order to promote the sustainable development of ecology, this paper analyzed the environmental protection of ecotourism under the background of Internet big data, and proposed a random answer model. The model is applied to the protection of the ecological environment, and investigations are carried out from the aspects of garbage, automobile exhaust, sewage, noise, etc., and the feasibility conclusion is drawn. This paper was devoted to raising tourists' awareness of sustainable development, and the result has a certain commemorative significance [15].

II. Internet Big Data

Big data is a process in which information data is processed and organized by conventional software and contained within a certain period of time [16]. In general, big data is a new concept that is ubiquitous in people's daily life. At the same time, big data is very dynamic because it is constantly updated, such as in QQ, WeChat and other online platforms. Big data comes in many forms, from images and videos to speech data and other types of unstructured data. Processing data with new technological tools has the potential to completely change the times and fundamentally change the history of human society.

Data can also be defined as a large amount of unstructured or structured information from various sources [17]. From an academic perspective, the advent of big data has stimulated innovative research on a variety of topics, which also led to the development of various statistical methods for processing large amounts of data. Big data does not involve statistical sampling, but simply observing and tracking what is happening. As a result, the scale of big data often exceeds what traditional software can handle in a reasonable amount of time. Given recent technological advancements, the ease with which new data is released, and the demands for greater transparency by most governments around the world, big data analytics is increasingly important in modern research.

III. Specific Research on Randomized Response Models

The randomized answer model is designed based on Internet big data technology, and its algorithm is:

Assuming a given set of data in a big data environment:

$$A=\{a_1,a_2,\cdots a_t\} \tag{1}$$

Then the mean of the data elements is:

$$\overline{A}=\frac{1}{l}\sum_{i=1}^{l}a_i \tag{2}$$

$$\sigma_A^2=\frac{1}{l-1}\sum_{i=1}^{l}\left(a_i-\overline{A}\right)^2 \tag{3}$$

In the formulas: l represents the attribute value of the data; i represents the feature vector of the data; a_i is the information loss of the data.

Given a data set in a big data environment:

$$B=\{b_1,b_2,\cdots b_m\} \tag{4}$$

$$\overline{B}=\frac{1}{m}\sum_{i=1}^{m}\left(b_i-\overline{B}\right)^2 \tag{5}$$

$$\sigma_B^2 \frac{1}{m-1}\sum_{i=1}^{m}\left(b_i-\overline{B}\right)^2 \tag{6}$$

In the formulas: m represents the proportion of the data in the sample; b_i represents the training sample of the data [18], [19].

The data x randomization function of the numeric class is:

$$r(x)=ax+b \tag{7}$$

In the formula: a∈A is an element randomly selected from the data set A, and b∈B is an element randomly selected from the data set B, the transformed data can be calculated by the following formula:

$$y=r(x) \tag{8}$$

Then the value of the data attribute At corresponding to a record in the published data set D is:

$$Y=\{y_1,y_2,\cdots y_n\} \tag{9}$$

It can be converted to:

$$y=r(x)=ax+b \tag{10}$$

When the mean $\overline{A}\neq 0$ of the data elements, the estimator of the original number x is:

$$\hat{x}=\frac{y-\overline{B}}{\overline{A}} \tag{11}$$

Assuming that X conforms to the Gaussian distribution, $N\left(\mu_x,\sigma_x^2\right),\sigma_x^2$ represent the standard deviation of the data; $\overline{x}$ is the unbiased estimator of μ_x, and the expression is as follows:

$$\overline{x}=\frac{1}{n}\sum_{i=1}^{n}x_i \tag{12}$$

In the formula, x_i represents the randomization parameter of the data, which is unknown, and $\overline{x}_i$ is used to replace x_i, and the data estimator is obtained as:

$$\overline{x}_i=\frac{1}{n}\sum_{i=1}^{n}\hat{x}_i=\frac{1}{n}\sum_{i=1}^{n}\frac{y_1-\overline{B}}{\overline{A}}=\frac{\overline{y}-\overline{B}}{\overline{A}} \tag{13}$$

In order to reduce the amount of calculation, $\overline{B}=0$ can be set, and the estimated value of the mean value of the original data x is obtained as:

$$\overline{x}=\frac{\overline{y}}{\overline{A}}\frac{1}{n\overline{A}}\sum_{i=1}^{n}y_i \tag{14}$$

On the other hand, the calculation formula of the mean variance of the original network privacy data is:

$$\mathrm{var}(x)=\sigma_A^2\bullet\overline{x}^2+\sigma_B^2 \tag{15}$$

In the formula, $\overline{x}_2$ represents the unbiased estimation of the fake samples of the data, and weighted fusion can be converted into the following formula for calculation:

$$\mathrm{var}(x)=\frac{\mathrm{var}(y)-\sigma_A^2\bullet\overline{x}_2-\sigma_B^2}{\sigma_A^2+\overline{A}^2} \tag{16}$$

In the formula: $\overline{x}$ is the unknown quantity, which can be replaced by:

$$\bar{x} = \frac{\bar{y}}{\bar{A}} \tag{17}$$

Get an estimate of the variance of the original data x:

$$S^2 = \frac{\frac{1}{n-1}\sum_{i=1}^{n}(y_i - \bar{y}) - \frac{\sigma_A^2 \bullet \bar{y}^2}{A^2} - \sigma_B^2}{\sigma_A^2 + \bar{A}^2} \tag{18}$$

IV. Specific Analysis of Ecotourism Environmental Protection

(1) Current situation of tourism environment

The current tourism environment has aroused the concern of the masses, and there are many environmental pollution problems in scenic spots. Garbage everywhere, serious water pollution, automobile exhaust pollution and noise pollution have brought a lot of trouble to local residents. The specific content is shown in Figure 1:

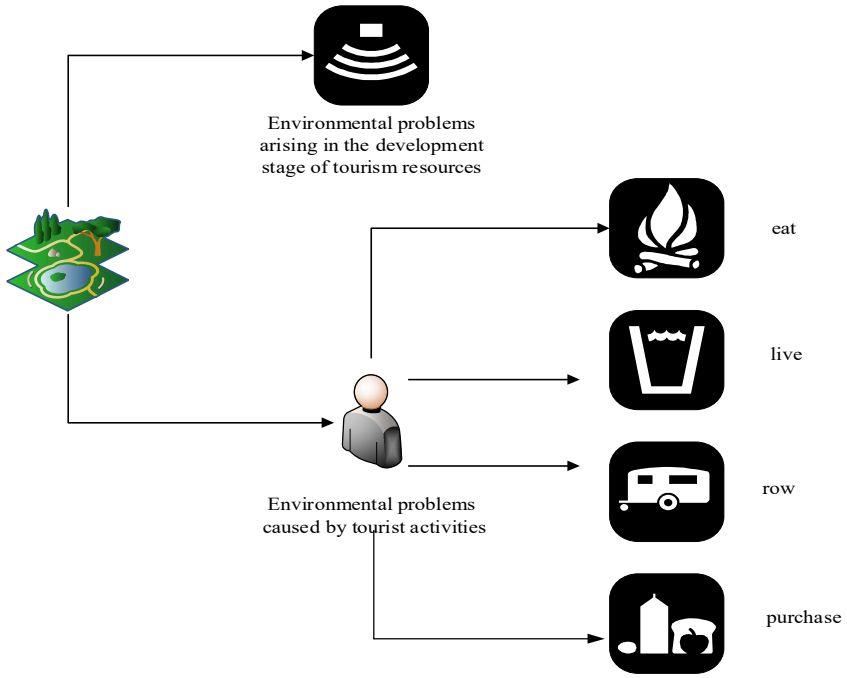

Figure 1: Current status of tourism environment

a) Environmental problems arising from the development stage of tourism resources

Tourism resources are the support of tourism activities, and the development of tourism resources has a direct and significant impact on tourism [20]. Tourist attractions are one of the main means to improve the experience of tourists in terms of dining, accommodation, walking, shopping, sightseeing, and leisure. The success of its development and implementation depends on the economic benefits of tourism in the respective territories, on the one hand, and its direct impact on the environment, on the other. As a result, some regions and governments are trying to gain economic benefits at the expense of the environment, regardless of environmental benefits. The impact on local tourism resources and tourism environment lacks comprehensive research and comprehensive scientific basis, and the impact on local tourism resources and tourism environment lacks comprehensive research and comprehensive scientific evidence. Blind and excessive development would eventually lead to the destruction of tourism resources, especially non-renewable resources. Renewable resources are severely damaged. Improper land use has resulted in soil erosion or soil degradation in some areas [21], [22]. Scenic area developers' emphasis on development at the expense of conservation is grossly irresponsible to the environment and future generations.

b) Environmental problems caused by tourist activities

Tourists carry out tourism activities in tourist destinations, and their food, housing, transportation, shopping, travel, entertainment and other activities all depend on local resources, which would inevitably have a new impact on the local environment.

Tourists go to the scenic spot by means of transportation. Most long-distance tourists choose to travel with a group, but short-distance tourists prefer to travel on their own, and scattered tourists play in the scenic spot. They need to solve the problem of food and accommodation by themselves [23]. They do not focus on environmental protection during the process of eating. They casually discard food packaging bags on the ground, and throw food residues in the scenic area at would, and do not properly dispose of the garbage. It pollutes the scenic spot seriously, and also causes a certain burden to the scenic spot to clean up the garbage.

Tourists often choose to stay on the spot when they travel in other countries [24], which inevitably leads to local water shortage, and some tourists' bad water habits would cause certain pollution to local water sources. There are many pollutants in the water, which lead to unqualified water body transparency, chroma, and odor indicators. Suspended solids, oil pollution, garbage and other substances have greatly polluted the water body and affected the original appearance of the scenic spot.

Tourists are engaged in tourism activities and have to rely on transportation from one place to another, which greatly increases the pollution of automobile exhaust to the environment [25]. Especially this year's car tours are getting hotter as tourists don't use public transport. Vehicle exhaust contains carbon dioxide, sulfur dioxide, carbon monoxide, etc., as well as a large amount of fluoride, causing local air pollution [26]. Air pollution reduces the quality of the tourist environment in the scenic area, resulting in the destruction of vegetation in the scenic area; acid rain corrodes the skeletal structure, etc.

Tourists often spend money in the scenic area when they play in the scenic area. In order to attract tourists to buy goods, some businesses would loudly sell goods, which would cause noise pollution and seriously affect the normal life of residents around the scenic area. Living in a noisy environment for a long time would not only cause damage to people's hearing, but also cause certain damage to people's heart and lung functions, causing serious social crises. Severe noise pollution can also affect people's emotions and affect the quality of tourists' play.

(2) The importance of environmental protection

People live in the natural environment, so the natural environment is the main condition for human survival and the material source for production development and economic prosperity. With the rapid growth of the population and the development of productivity, the rapid development of science and technology, and the increase of industrial waste and living, the pollution of air, water and soil has become more and more serious, and the natural ecological balance has become more and more serious. Resources are increasingly scarce and in danger of being depleted. Soil erosion and desertification are becoming more and more serious, and food production and human health are seriously threatened. Therefore, maintaining ecological balance and protecting the environment are fundamental issues related to human survival and social development.

To improve people's quality of life without compromising the interests of future generations, governments, local governments and industries should develop and implement stricter rules and regulations, such as cleaner production and efficient use of natural resources, to reduce local pollution and the environment. Environmental protection is to study and prevent the deterioration of the natural environment caused by human life, industry and construction activities, and then strive to control, control and eliminate environmental pollution and damage caused by various factors, strive to improve the environment, and better meet the needs of human life and work.

(3) Environmental protection and sustainable development

The development of green industries is stable and sustainable for the reason that green and environmental protection is the consensus of all mankind, and only if green industries can continue and develop for a long time can people's environmental needs be met continuously.

The implementation of sustainable development strategy helps to combine environmental benefits, economic benefits and social benefits. It promotes the transformation of economic growth mode from extensive to intensive, and realizes the coordinated development of economic development and people, resources and environment. It contributes to the sustainable, stable and healthy development of the national economy, and the improvement of people's living standards and quality of life. From immediate interest and local interest-driven development to long-term interest and global interest-driven development, it has changed from material resource-driven development to intangible resource or information resource-driven development.

In a sense, environmental protection and sustainable development are closely related, and both are indispensable. More specifically, environmental protection is a necessary condition for sustainable development. Only by effectively protecting the natural environment and enabling humans to live in harmony with nature can sustainable development be achieved. Modern society no longer meets material needs, but creates a better living environment and achieves better goals. Environmental protection is an important guarantee for sustainable

development. At the same time, sustainable development is the main standard of environmental protection. Only by adhering to the concept of sustainable development and always insisting on ecologically sustainable development can people successfully protect the environment and reduce environmental degradation.

The environment is part of every citizen's home, and conservation is directly related to everyday life. Therefore, to protect the environment, it is important to raise awareness and actively encourage all citizens to raise environmental awareness, starting from small things, such as saving every electricity, a piece of paper, and using small things to influence others. By encouraging more people to care about and practice environmental protection, it creates a harmonious atmosphere where everyone can protect the environment.

V. Countermeasures for Sustainable Development of Ecotourism and Environmental Protection

Green business is closely related to people's lives, and only by analysing aspects that are closely related to people's lives can people ensure that research is meaningful and that the measures taken are effective. In order to improve the current tourism environment and improve the quality of tourists, the following countermeasures can be put forward for the sustainable development of tourism environmental protection, as shown in Figure 2:

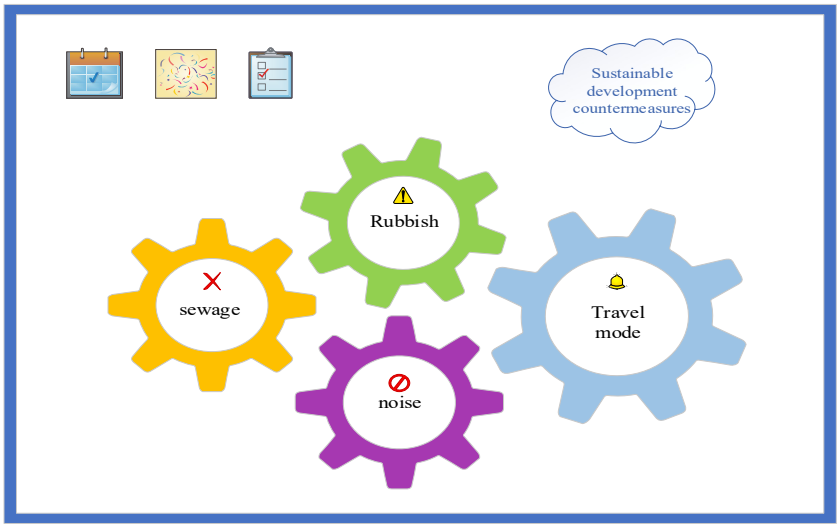

Figure 2: Sustainable development countermeasures for ecotourism and environmental protection

(1) Strengthening waste management

Trash cans can be set up at designated spots in the scenic area and posted with warm slogans to remind tourists to consciously abide by social rules, throw garbage in the trash can, and not throw garbage on the ground. Moreover, in response to the problem of tourists eating, the scenic spot needs to provide tourists with places for tourists to eat, so that tourists can eat in special places, and regulate the dining behavior of tourists, so as to prevent tourists from throwing garbage casually. At the same time, the garbage in the scenic spot should be treated regularly to avoid the accumulation of a large amount of garbage, which would affect the beauty of the scenic spot.

(2) Strengthening sewage treatment work

There are two main types of wastewater in the scenic area: domestic sewage and oily wastewater. The domestic sewage first flows to the septic tank, then flows to the collection tank and the adjustment tank, and is treated by the sewage treatment equipment. When the water quality reaches the standard, it is discharged. The treatment method of oily wastewater only has one more step to deal with oil pollution. Before flowing to the septic tank, it needs to pass through the grease trap, which not only separates the oil and water, but also solves the problem of sewage discharge. The treated water can also be used for toilet flushing, landscaping, greening, farming, etc. The path for the treatment of domestic sewage can be seen in Figure 3:

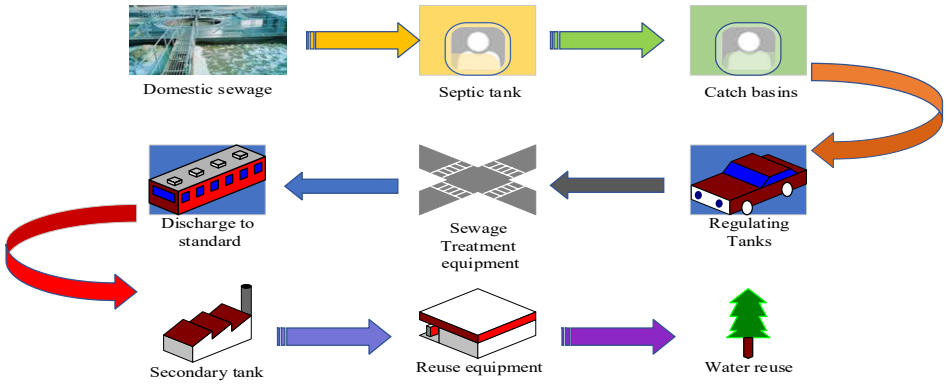

Figure 3: Domestic sewage treatment work

(3) Strengthen the management of travel mode

The management of vehicles in the scenic area is mainly to allow the vehicles entering the scenic area to park in special parking spaces, to encourage passengers to travel on foot, and to reduce vehicle exhaust emissions. If there are tourists in the scenic spot who are inconvenient to walk, bicycle or tram services can be provided to tourists to promote civilized tourism. In addition, the scenic spot can also carry out some activities to exchange steps for small prizes, and small prizes can be selected from environmental protection bags. In this way, the effect of killing two birds with one stone can be achieved, which not only promotes the green travel of passengers, but also enhances the environmental protection awareness of passengers. Managing the travel mode of passengers can effectively avoid the damage caused by car exhaust to the scenic spot, thereby improving the environmental protection awareness of passengers.

(4) Strengthening noise management

In response to the noise problem in the scenic spot, people can start from the root cause and manage the vendors in the scenic spot. Vendors in the scenic area can be gathered together and sold on special streets. The optional sales place should be far away from the residence of the residents, and it is stipulated that the volume of the selling equipment should be controlled within the acceptable range, and malicious sales are not allowed, which would affect the normal life of the people in the scenic area.

VI. Effect of Sustainable Development Countermeasures

According to the solutions proposed in this paper, this paper adopted social survey method and literature analysis method to investigate five famous scenic spots in a certain place, marks A, B, C, D, and E respectively, and recorded the basic situation before the transformation of the scenic spots in Table 1:

Table 1: Situation before the renovation of the scenic spot

scenic spot	Features	Rating
Scenic A	a lot of rubbish	20
Scenic B	Serious car exhaust	20
Scenic C	Serious sewage	20
Scenic D	loud noise	20
Scenic E	Few renewable resources	20

The development of green industries also provides new impetus and new economic growth points for the sustainable and healthy development of the national economy. For individuals, the development of green industries can greatly improve people's living environment, the air is cleaner, people can eat and drink with more confidence and live more comfortably. In the experiment, the garbage, vehicle exhaust, sewage, noise and renewable resources of the sustainable scenic environment were evaluated by scoring, and the score for each item was 20 points, with a total of 100 points. The results of the experiment were recorded, and finally the results were summarized.

(1) Garbage quality score

Garbage is the most intuitive factor affecting the environment, and the environment can be scored according to the pollution of garbage. In this paper, the garbage situation of the five scenic spots before and after the renovation is scored, and the results are recorded in Figure 4:

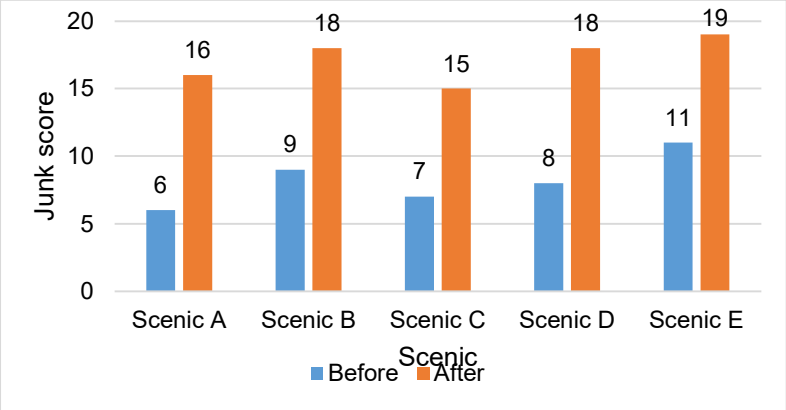

Figure 4: Spam score situation

The garbage quality score in the reconstruction foreground area A was the lowest, and then after the renovation, the garbage quality score of the scenic spot A increased by 10 points, and the garbage quality score of the scenic spot B increased by 9 points. The garbage quality score of Scenic Area C increased by 8 points, and the garbage quality score of Scenic Area D increased by 10 points. The garbage quality score of Scenic Area E has increased by 8 points, so the garbage quality score of each scenic spot has increased by a large margin. The garbage quality scores of 4 scenic spots have all doubled. Therefore, the garbage environment in the scenic spot has been greatly improved after the strengthening of garbage management.

(2) Scoring of vehicle exhaust

Automobile exhaust brings great harm to the environment and affects the sanitation and air quality of the environment, so it is extremely necessary to investigate the exhaust situation of automobile exhaust. This paper investigated the vehicle exhaust conditions of the five scenic spots before and after the transformation, and recorded the results in Figure 5:

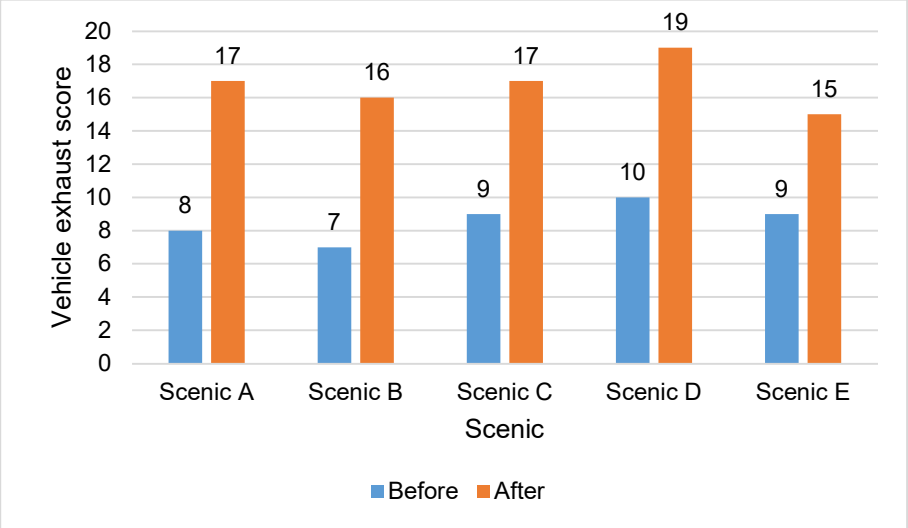

Figure 5: Vehicle exhaust score

The vehicle exhaust score in the transformation prospect area B is the lowest, but the vehicle exhaust score of each scenic spot is not very different. After the transformation, the vehicle exhaust score of Scenic A is 17 points, that of Scenic B is 16 points, and that of Scenic C is 17 points. The vehicle exhaust score of Scenic D is 19 points, and the vehicle exhaust score of Scenic E is 15 points, both above 10 points. It shows that taking measures to the environment can improve the vehicle exhaust score and greatly reduce vehicle exhaust emissions.

(3) Scoring of sewage

Sewage not only affects the environment of the scenic spot, but also brings bad consequences to the normal life of the residents in the scenic spot, and brings great inconvenience to people's life. For this reason, this paper

investigated the sewage scores before and after the transformation of the five scenic spots, and recorded the results in Figure 6:

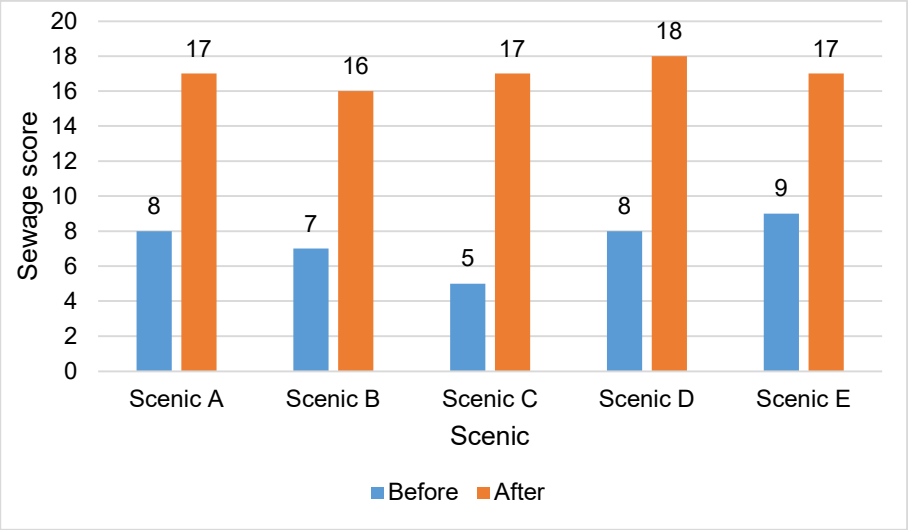

Figure 6: Sewage scoring situation

Before the renovation, the sewage scores of the five scenic spots were all lower than 10 points, so the five scenic spots had serious sewage problems before the renovation. Both local people and tourists feel that the sewage problem has brought great inconvenience to their lives. After the renovation, the sewage quality score of each scenic spot has been improved, and all of them are above 15 points. It shows that the management of sewage in the scenic spot has played an excellent effect, protecting the environment of the scenic spot and benefiting the environment of the scenic spot.

(4) Noise score

Noise pollution interferes with people's normal work, study and life. Long-term dealing with noise environment would lead to hearing damage of the public. In order to evaluate the management of the noise in the scenic spot, this paper recorded the noise score in Figure 7:

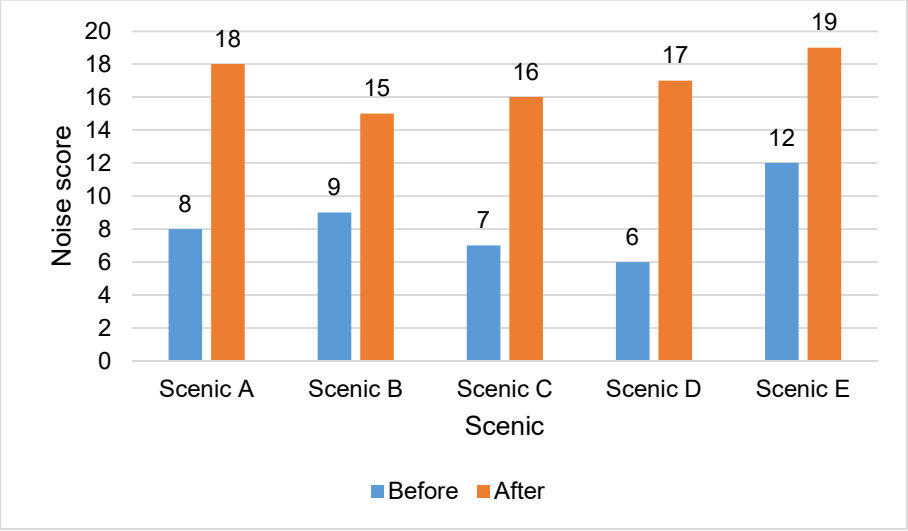

Figure 7: Noise score situation

The noise score of the reconstruction foreground area D is the lowest, and the noise score of the scenic area E is the highest, but both are at a low level. After the renovation, the noise score of Scenic Spot D has increased by 11 points, which is nearly double the original value. Therefore, the measures against noise have the best effect on Scenic Spot D. Among them, the score of Scenic Area B improved the slowest, but it also increased from 9 points

to 15 points, indicating that sewage treatment has achieved good results and brought security to the lives of residents. The reason is that the relevant departments realize the importance of protecting the environment and the living environment of residents, and put them into practice to improve their own consciousness.

(5) Scoring of renewable resources

Renewable resources are the most valuable resources for human beings and are of great significance to sustainable development. The score of renewable resources can reflect the sustainable development ability of the environment, so this paper scored the renewable resources of each scenic spot, and records the results in Figure 8:

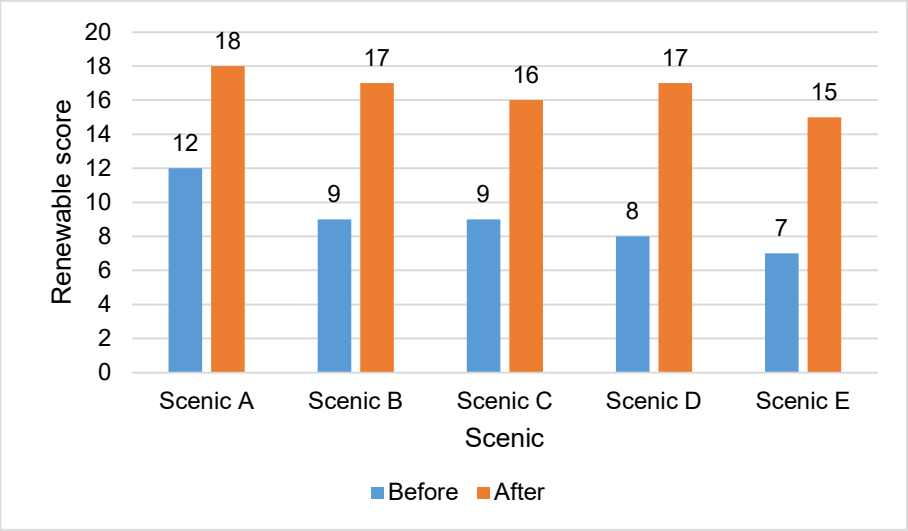

Figure 8: Renewable resource score

The scores of the renewable resources of the five scenic spots before the renovation are quite different, but the score of the scenic spot E is the lowest, indicating that the renewable resources of the scenic spot E cannot meet the situation of the residents of the scenic spot. After the renovation, the renewable resource scores of the five scenic spots have been improved, and the renewable resource score of scenic spot A has increased to 18 points. The renewable resource score of scenic spot B has increased to 17 points, and the renewable resource score of scenic spot C has increased to 16 points. The renewable resource score of Scenic Area D has been increased to 17 points, and the renewable resource score of Scenic Spot E has been increased to 15 points. To sum up, the improvement of renewable resources can greatly improve the sustainable development capacity of scenic spots.

VII. Conclusions

In order to protect the ecotourism environment and promote the sustainable development of ecology, this paper proposed a random answer model based on the background of Internet big data, and analyzes the environmental data. According to the problems in the current ecotourism environment, this paper proposed solutions, analyzed the effects of the solutions, and drew conclusions. The environmental protection measures proposed in this paper can improve the garbage quality score, vehicle exhaust score, sewage score, noise score and renewable resource score. Therefore, the improvement measures proposed in this paper can be adopted in various scenic spots with similar environmental problems, thereby expanding the application scope of the measures in this paper.

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