

Research on the Sustainable Development Path of Ecotourism under the Background of a Low-Carbon Economy

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ABSTRACT

In the context of the global promotion of low-carbon economic development, ecotourism, as an important model for sustainable development in the tourism industry, faces new opportunities and challenges. This paper explores the sustainable development path of ecotourism under the background of a low-carbon economy by deeply analyzing the current development status and issues of ecotourism, combined with relevant theoretical foundations. The paper explores innovative paths for sustainable development, including the construction of low-carbon facilities, the development of low-carbon tourism products, and the cultivation of tourists' low-carbon awareness. It also analyzes the effectiveness of these paths through typical case studies, discusses the challenges faced in the development process, and offers strategies for coping. The aim is to provide theoretical references and practical guidance for achieving sustainable development in ecotourism in the era of low-carbon economy.

KEYWORDS

Low-carbon economy; Ecotourism; Sustainable development; Environmental protection; Tourism industry transformation

1 Introduction

With the intensification of global climate change, the low-carbon economy has become an important direction for the development of countries. Ecotourism, as an activity that balances environmental protection with economic development, is facing opportunities and challenges for transformation. How to achieve the sustainable development of ecotourism under the background of a low-carbon economy is not only related to the maintenance of the ecological environment but also to the growth of local economies. This paper aims to provide guidance and reference for the actual operation and policy formulation of ecotourism.

2 The Relationship Between Low-Carbon Economy and Ecotourism

2.1 Basic Concepts and Objectives of Low-Carbon Economy

A low-carbon economy refers to the economic model aimed at decoupling economic growth from greenhouse gas emissions by reducing emissions. The core concept is to promote economic structural transformation, enhance resource efficiency, and develop renewable energy. The goals of a low-carbon economy are: on one hand, to reduce environmental pressures caused by carbon emissions; on the other hand, to promote technological innovation and the development of green industries, thus achieving sustainable economic growth. This transformation not only focuses on gradually replacing traditional energy sources but also emphasizes resource conservation and minimal environmental impact at every link in the industrial chain, guiding economic activities toward a greener, low-carbon direction.

2.2 Impact of Low-Carbon Economy on Various Industries

The impact of a low-carbon economy on various industries is far-reaching. In the energy sector, traditional fossil fuels will gradually be replaced by renewable energy sources such as solar and wind energy, prompting technological innovation in the energy industry and improving energy efficiency and environmental sustainability. Manufacturing also faces transformation pressures, as enterprises need to reduce energy consumption and waste emissions in production processes through technological advancements and management innovations to meet the demand for low-carbon products. The transportation sector is also transitioning toward low-carbon development, with the promotion of electric vehicles and public transport reducing carbon emissions and improving air quality. Similarly, the construction industry is embracing the concept of green buildings, which focus on optimizing design and material selection to improve energy efficiency and reduce energy consumption during operation.

3 Ecotourism Characteristics

3.1 Definition and Core Concept of Ecotourism

Ecotourism is a form of tourism based on natural environments, aimed at protecting the ecological environment, respecting local cultures, and promoting sustainable development. It emphasizes that tourists, while enjoying the natural scenery and local culture, actively participate in environmental protection behaviors and experience nature with minimal environmental impact. The core concepts of ecotourism include sustainability, environmental awareness, and local participation. Sustainability emphasizes balancing economic development and ecological protection in tourism activities to ensure long-term utilization of ecological resources. Ecotourism also focuses on environmental education, encouraging tourists to understand the natural and cultural background they are experiencing. This education aims to enhance tourists' environmental awareness, so they consciously participate in environmental protection actions during their travel, thus achieving the goal of eco-friendly tourism development.

3.2 Social, Economic, and Ecological Benefits of Ecotourism

Ecotourism brings significant social, economic, and ecological benefits. Socially, it helps enhance public environmental awareness and the concept of sustainable development. Through tourism activities, tourists can gain a deeper understanding of the importance of ecological environments and the impact on biodiversity, thereby enhancing their sense of responsibility for environmental protection. Additionally, ecotourism often involves local community participation, which facilitates cultural exchange and mutual understanding and helps preserve local traditional cultures. Economically, ecotourism provides new growth opportunities for local communities. By developing ecotourism, communities can generate income from tourists, create employment opportunities, and promote sustainable economic development. The revenue from ecotourism can also be reinvested in environmental protection and infrastructure improvements.

4 Integration of Low-Carbon Economy and Ecotourism

4.1 Mutual Promotion Between Low-Carbon Economy and Ecotourism

There exists a close, mutually reinforcing relationship between a low-carbon economy and ecotourism. Firstly, the promotion of a low-carbon economy provides a favorable policy environment and market opportunities for the development of ecotourism. With countries focusing on emission reduction targets, governments have introduced a series of policies and regulations to encourage low-carbon tourism, thereby supporting ecotourism in areas such as resource development and infrastructure construction. For example, the development of green transportation and the creation of low-energy tourism facilities lay a good foundation for ecotourism development. Meanwhile, ecotourism, as a tourism model with minimal environmental impact, contributes to the low-carbon economy. By reducing carbon emissions in tourism activities, such as promoting walking, cycling, and using public transportation, ecotourism can effectively reduce the negative environmental impact of the tourism industry.

4.2 The Role of Ecotourism in a Low-Carbon Economy

In the context of a low-carbon economy, ecotourism plays multiple important roles. Firstly, it serves as a demonstration of low-carbon practices, showing the possibilities and advantages of sustainable tourism. Ecotourism projects often adopt green technologies and renewable resources, set environmental protection standards, and become examples for other sectors to learn from. Secondly, ecotourism can inject vitality into local economies. By attracting tourists, local governments can generate more fiscal revenue, which can be reinvested in green infrastructure and environmental protection projects, further promoting the development of the low-carbon economy. In addition, ecotourism also promotes the sale of local agricultural products and handicrafts, helping local residents increase their income and improve their quality of life.

5 Theoretical Foundation for Sustainable Development of Ecotourism under a Low-Carbon Economy

5.1 Overview of Relevant Theories

5.1.1 Theoretical Connotation and Development Model of Low-Carbon Economy

The low-carbon economy refers to reducing carbon emissions in economic activities by using green technologies and renewable energy, thus promoting sustainable economic development. Its connotation includes the efficient use of

resources, the development of clean energy, and environmentally friendly production methods. Based on different stages of economic development, the development model of a low-carbon economy can be divided into several levels: first, energy conservation and emission reduction through technological innovation and management optimization to improve energy efficiency; second, clean production that introduces green production methods to reduce environmental impacts in production processes; and third, the promotion of low-carbon lifestyles to encourage public participation in low-carbon activities, realizing broad social participation. In terms of development models, the low-carbon economy mainly reflects the combination of policy guidance, technological innovation, and market mechanisms. Government policies can effectively guide the behavior of enterprises and individuals, while technological innovation provides the necessary tools and means for low-carbon economic development.

5.1.2 Core Content of Ecotourism Sustainable Development Theory

Ecotourism is a form of tourism based on natural conservation, with environmental education as its core, and aims at the harmonious development of ecology and culture. The core content of its sustainable development theory includes three aspects: environmental protection, economic benefits, and social cultural harmony. Environmental protection is the foundation of ecotourism, requiring minimal environmental destruction during tourism activities to protect and restore ecosystems. Economic benefits emphasize using sustainable business models so that local communities can benefit from ecotourism and enhance their survival and development capacity. Social and cultural harmony refers to respecting and preserving local cultures during ecotourism, promoting interaction and understanding between tourists and local residents. Only when these three aspects work in a virtuous cycle can ecotourism achieve true sustainable development.

5.1.3 The Guiding Significance of Ecological Carrying Capacity Theory for Ecotourism

The theory of ecological carrying capacity emphasizes the ability of an ecosystem to support human activities, including the number of tourists the environment can bear, the level of resource consumption, and its ecological recovery capacity. The evaluation of ecological carrying capacity provides important guidance for the sustainable development of ecotourism. Excessive tourist activity can lead to ecological degradation, so scientifically allocating tourism resources and setting reasonable tourist limits is key to achieving sustainable development in ecotourism. Under this theory, tourism managers need to conduct scientific assessments to determine the upper limit of ecological carrying capacity and implement management measures such as setting visitor flow controls, strengthening environmental education and publicity, etc., to ensure that ecotourism continues to attract tourists and promote economic development without damaging the ecological environment.

5.2 The Relationship Between Low-Carbon Economy and Ecotourism Sustainable Development

5.2.1 Low-Carbon Economy Provides Direction for Ecotourism Sustainable Development

The core goal of a low-carbon economy is to reduce greenhouse gas emissions, conserve energy and resources, and promote economic development transformation. In this context, ecotourism, as a low-impact and low-consumption tourism model, becomes an effective way to achieve low-carbon goals. The low-carbon economy provides a clear direction for the sustainable development of ecotourism. Firstly, the low-carbon economy emphasizes environmental protection and resource conservation, which aligns with the goals of ecotourism. Ecotourism promotes activities in natural environments while striving to reduce negative environmental impacts. Therefore, the low-carbon economy can encourage ecotourism practitioners to adopt more environmentally friendly methods in their operations, such as using new energy, reducing energy consumption, and implementing environmental management. Secondly, the development of the low-carbon economy has promoted green technology innovation, providing more tools and means for ecotourism, such as applying low-carbon technologies in transportation, accommodation, and guiding, enhancing the sustainability of ecotourism.

5.2.2 Sustainable Development of Ecotourism as an Important Practice of Low-Carbon Economy

The sustainable development of ecotourism is not only about the protection of natural resources but also a shift in economic behavior. It has been shown that ecotourism can become part of the low-carbon economy by protecting the ecological environment, generating economic benefits, and reducing carbon emissions and resource consumption. Firstly, ecotourism directly promotes local economic transformation. On the basis of environmental protection, ecotourism helps local economic growth and provides employment opportunities for residents. This economic model brings economic benefits to tourism enterprises and enhances the overall living standards of local communities. Secondly, ecotourism raises public awareness by involving tourists in environmental protection activities, forming a green

consumption concept. This awareness can directly promote the widespread adoption of low-carbon lifestyles, thus implementing the concept of low-carbon economy on a larger scale. Furthermore, ecotourism provides practical examples for the development of the low-carbon economy. Through the rational use and development of tourism resources, not only is the ecological environment preserved, but it also provides a demonstration effect for other industries, such as agriculture and fisheries, helping them transition to low-carbon practices.

5.2.3 The Internal Logic and Mechanism of Synergistic Development of Both

The synergistic development of low-carbon economy and ecotourism is not accidental, but an inevitable result of their internal logic. In the development process, the two complement each other and form multiple interactive relationships. Firstly, from an economic perspective, the development of ecotourism requires the policy support and market environment provided by the low-carbon economy, such as tax incentives, subsidy policies, etc., to promote green investment and optimize resource allocation. At the same time, the success of ecotourism provides a solid foundation for the sustainability of the low-carbon economy, making economic activities more focused on environmental and resource carrying capacity. Secondly, from a societal perspective, the sustainable development concept promoted by ecotourism is consistent with the goals of the low-carbon economy. Both promote public recognition and participation in environmental protection and sustainable development, enhancing overall green behavior in society. For example, through various forms of environmental education and participation activities, public environmental awareness is increased, and a social trend of low-carbon consumption is formed. Additionally, ecotourism provides local residents with an important platform to participate in the low-carbon economy, and through interaction with tourists, it promotes the comprehensive development of communities.

6 Exploring the Sustainable Development Path of Ecotourism Under the Background of Low-Carbon Economy

6.1 Low-Carbon Tourism Facility Construction

6.1.1 Promoting Green Building Technologies to Create Low-Carbon Tourism Infrastructure

The promotion of green building technologies is the first step in constructing low-carbon tourism facilities. This technology not only focuses on the design of buildings but also involves the use of materials, construction techniques, and energy consumption management during operation. First, the use of renewable and environmentally friendly materials, such as bamboo and recycled wood, can effectively reduce the consumption of natural resources. In addition, scientific and rational architectural design can optimize natural lighting and ventilation, reducing dependence on traditional energy sources. To ensure the effective implementation of green buildings, the government should formulate and improve assessment standards, encouraging developers to improve the market competitiveness of their projects by obtaining green building certifications.

6.1.2 Using Clean Energy to Reduce Operational Energy Consumption of Tourism Facilities

In the construction of low-carbon tourism infrastructure, controlling operational energy consumption is crucial. Using clean energy sources such as solar and wind energy can significantly reduce the consumption of traditional energy by tourism facilities during operation. During the design phase, solar panels should be installed on building roofs to supply part of the electricity needs. Additionally, wind power generation can provide sustainable electricity for larger tourism facilities. To maximize effectiveness, local governments are encouraged to cooperate with clean energy companies, providing economic support and subsidies to promote investment in clean energy by more tourism enterprises. Meanwhile, guiding tourists to choose renewable energy as part of their tourism activities (e.g., choosing green hotels) can increase awareness and acceptance of clean energy tourism, further promoting its utilization.

6.1.3 Building Intelligent Management Systems to Optimize Resource Utilization Efficiency

In the construction of low-carbon tourism facilities, achieving intelligent resource management is essential. By introducing modern information technology and building intelligent management systems, the efficiency of resource use can be effectively optimized, thus reducing environmental impact. For example, installing intelligent monitoring systems in tourism facilities to monitor water, electricity, gas, and other resource consumption in real time, and adjusting and optimizing resource allocation accordingly, can help reduce waste. Moreover, intelligent management systems can dynamically regulate visitor flows, guiding their activities to alleviate resource and facility pressures during peak times. For

instance, during peak periods, data analysis can be used to guide visitors to less popular attractions, reducing overcrowding at popular sites and promoting the rational use of resources. The system can also enhance the interaction between tourists and facilities, pushing real-time information about energy-saving and environmentally friendly actions through mobile apps or platforms, encouraging participation in energy-saving activities, such as walking or cycling.

6.2 Development of Low-Carbon Tourism Products

6.2.1 Designing Low-Carbon Themed Travel Routes to Reduce Transportation Carbon Emissions

Designing low-carbon themed travel routes is the first task in developing low-carbon tourism products. This process can reduce carbon emissions during travel by optimizing routes and selecting appropriate transportation methods. For example, encouraging group tourists to use public transportation, shared bicycles, and other low-carbon travel modes can reduce the frequency of private car use, alleviating traffic congestion and carbon emissions. In planning low-carbon themed travel routes, the local natural environment, cultural features, and ecological attractions can be incorporated to create a series of attractive routes. By offering activities like hiking and cycling, both tourists' desire for unique experiences and their recognition of low-carbon travel can be enhanced. Moreover, this design not only reduces carbon emissions but also encourages tourists to understand the destination's natural and cultural heritage, thus improving the overall quality of tourism.

6.2.2 Developing Ecological Experience-Based Tourism Products to Enhance Tourist Participation

The development of ecological experience-based tourism products aims to enhance tourists' participation and environmental awareness. These products typically combine the natural environment and local culture, attracting visitors to engage in ecological activities and experience nature's charm. For example, activities like farm picking, ecological hiking, and wildlife observation can allow visitors to connect with nature and understand the importance of ecological protection. For family tourists, eco-friendly family experience projects can be designed to involve children in nature observation and environmental protection practices, cultivating their love for nature and sense of responsibility for the environment. Travel agencies and tourism businesses can also cooperate with local ecological organizations to hold volunteer activities, such as tree planting and beach cleaning, encouraging tourists to contribute to the sustainable development of ecotourism through hands-on actions. In this way, tourists not only enjoy the fun of travel but also develop a deep understanding of the low-carbon lifestyle.

6.2.3 Innovating Low-Carbon Educational Tourism Products to Promote Environmental Protection Concepts

Educational tourism, as an emerging tourism form, combines education and tourism activities, becoming an important channel for promoting environmental protection concepts. Developing low-carbon educational tourism products not only allows tourists to gain knowledge but also stimulates their attention to sustainable development and ecological protection. For example, courses themed on "low-carbon living" can be designed, focusing on renewable energy, ecological protection, and other topics. Practical activities can help students understand the importance of a low-carbon economy. To enhance the appeal of educational tourism, collaboration with local universities and research institutions can be fostered to organize green technology lectures, ecological experiments, and other activities, guiding tourists to learn the latest environmental knowledge and technologies while experiencing tourism. By combining practice and theory, participants can realize how their actions affect the natural environment, motivating them to actively practice environmental protection concepts in their lives.

6.3 Cultivating Low-Carbon Awareness Among Tourists

6.3.1 Carrying Out Low-Carbon Tourism Publicity and Education Activities

Carrying out publicity and education activities on low-carbon tourism is the foundation and premise for enhancing tourists' low-carbon awareness. Through various channels and forms, tourists can be informed about the importance of low-carbon tourism and the necessity of choosing low-carbon travel and participating in ecological protection. First, information boards, brochures, and environmental knowledge lectures can be set up at tourist destinations to introduce low-carbon economy, ecological protection, and related knowledge. By presenting the information in vivid and engaging ways, tourists are more likely to accept and understand it. For example, organizing themed lectures, environmental knowledge competitions, and other activities can mobilize tourists' participation and simultaneously convey the core concept of low-carbon tourism. Secondly, social media platforms and tourism websites can be used to carry out online publicity activities by sharing successful low-carbon tourism cases and experience stories to raise public awareness and

understanding. For instance, a low-carbon tourism special topic can be created, with content updated regularly, attracting more followers and sparking discussions, thereby forming a good low-carbon tourism atmosphere in society.

6.3.2 Establishing Incentive Mechanisms for Low-Carbon Behavior Among Tourists

To encourage tourists to actively participate in low-carbon tourism, it is necessary to establish effective incentive mechanisms for low-carbon behavior. This can be achieved through various methods to enhance tourists' sense of participation and belonging. Setting up an environmental protection points system is an effective incentive measure. For example, tourists can earn points when participating in low-carbon travel modes (such as using public transportation, cycling, or walking), engaging in ecological volunteer activities, or choosing low-carbon tourism products. These points can be redeemed for discounts or coupons in future travels, motivating tourists to continue choosing low-carbon travel modes. In addition, collaborating with local businesses and enterprises to offer discounts or special offers to tourists who engage in low-carbon behaviors is another effective way. This not only enhances tourists' willingness to participate but also creates a favorable low-carbon economic ecosystem that promotes green consumption locally.

6.3.3 Using Digital Technology to Guide Tourists' Low-Carbon Behavior

In modern society, the development of digital technology provides new opportunities to guide tourists' low-carbon behavior. Through smartphones, social media, and big data technologies, tourists' low-carbon actions can be more effectively guided and promoted. First, developing low-carbon tourism apps that provide real-time information and suggestions can guide tourists' low-carbon behavior. For example, the app can recommend green travel options, low-carbon accommodations, and provide information on low-carbon activities, encouraging tourists to consciously choose low-carbon ways of traveling. At the same time, data analysis can be used to record tourists' travel methods and behaviors, offering personalized low-carbon suggestions. Secondly, on social media platforms, a low-carbon tourism community can be established to share tourists' low-carbon travel experiences and inspire more tourists to participate. Through user experience sharing and interaction, a good public opinion orientation can be formed, enhancing tourists' recognition of low-carbon tourism.

7 Case Analysis of Ecotourism's Sustainable Development Under the Low-Carbon Economy

7.1 Case Selection and Background Introduction

7.1.1 Ecotourism Resources and Development Foundation in the Selected Case Area

This case analysis selects the Aba Tibetan and Qiang Autonomous Prefecture in Sichuan Province, China. The region is famous for its beautiful natural scenery and rich ethnic culture, with national-level nature reserves and world natural heritage sites, such as Jiuzhaigou and Huanglong. In terms of ecotourism resources, Aba Prefecture boasts rich biodiversity and a unique plateau ecological system, attracting a large number of domestic and international tourists. Additionally, the foundation for developing ecotourism in the region has been increasingly solid. In recent years, the local government has actively promoted ecological civilization construction and focused on developing tourism projects centered on natural protection. In terms of infrastructure, roads, accommodations, and tourism services have been gradually improved, and a cooperative model between the private and public sectors has been established, forming a diversified ecotourism management system. This provides a solid foundation for the sustainable development of ecotourism.

7.1.2 Implementation of Low-Carbon Economic Policies in the Selected Case Area

Under the promotion of low-carbon economic policies, Aba Prefecture has actively formulated and implemented multiple environmental protection policies and measures aimed at reducing carbon emissions and promoting the green transformation of the economy. For example, the local government encourages ecotourism operators to use clean energy and promotes the harmonious coexistence of tourism projects with the local ecological environment. Meanwhile, Aba Prefecture has actively participated in the national carbon trading system, improving resource use efficiency and striving for a win-win result between the economy and ecology. The government has also provided financial support and tax incentives to encourage the application of environmental protection technologies, the development of low-carbon tourism products, and the construction of ecological demonstration projects. The implementation of these policies has made ecotourism projects not only commercially successful but also positively impactful in environmental protection, effectively promoting the sustainable development of the local economy.

7.2 Implementation Process of Sustainable Development Pathways

7.2.1 Specific Measures for Building Low-Carbon Tourism Facilities

In Aba Prefecture, the construction of low-carbon tourism facilities is fundamental to supporting the sustainable development of eco-tourism. Specific measures include adopting green building standards, requiring newly built hotels and tourism facilities to use eco-friendly materials, and ensuring the energy efficiency of these buildings. Additionally, many tourist attractions are designed to harmonize with the natural environment, incorporating technologies such as natural ventilation, solar heating, and rainwater collection to reduce energy consumption and resource depletion. In terms of transportation, local governments are promoting green transportation systems, such as electric buses and shared mobility options, to reduce carbon emissions during peak tourism periods. The construction of walking and cycling paths also encourages tourists to choose low-carbon travel options. Meanwhile, intelligent traffic management systems are utilized to optimize traffic flow, reduce emissions, and enhance the overall tourism experience.

7.2.2 Strategies for Developing and Promoting Low-Carbon Tourism Products

To promote the development of low-carbon eco-tourism, Aba Prefecture emphasizes the development and promotion of low-carbon tourism products. First, tourism routes with an eco-friendly core are developed, featuring eco-friendly attractions that highlight nature conservation and respect for local culture. Combining local cultural characteristics, special tourism projects are launched, blending historical and cultural tourism with ecological preservation, attracting environmentally conscious tourists. Moreover, low-carbon tourism products such as organic farm tourism and eco-hiking tours have become market highlights. These products not only reduce the negative environmental impact of tourism but also increase visitors' awareness of local ecology. Additionally, online marketing and social media platforms are leveraged to strengthen the promotion of green tourism products and expand market influence, attracting more environmentally aware consumers.

7.2.3 Activities to Foster Tourists' Low-Carbon Awareness

Raising tourists' low-carbon awareness is crucial for achieving the sustainable development of eco-tourism. Aba Prefecture has organized various forms of environmental education and awareness activities to enhance tourists' environmental responsibility. For example, educational displays are set up at major tourist attractions and hotels to explain the importance of ecological protection and the benefits of low-carbon tourism. Moreover, environmental workshops and experiential activities such as tree planting and garbage cleaning are organized to encourage tourists to participate in ecological preservation. During tourism reception, a "green itinerary" concept is promoted to guide tourists towards low-carbon transportation and eco-friendly accommodation. Feedback mechanisms are provided, allowing tourists to evaluate the environmental practices encountered during their travels, creating a positive interaction and encouraging more visitors to engage in ecological protection.

8 Challenges and Countermeasures for Sustainable Development of Eco-Tourism under a Low-Carbon Economy

8.1 Challenges Faced

8.1.1 High Costs of Low-Carbon Technology Application and Promotion

The application of low-carbon technologies is crucial for the sustainable development of eco-tourism. However, introducing and applying many low-carbon technologies requires significant upfront investment, which can pose a huge financial strain on many small tourism enterprises, especially startups. These enterprises often lack funding and technical support, making it difficult to implement low-carbon facilities and technologies. On the other hand, while larger enterprises can afford higher initial investments, low-carbon technologies may not significantly reduce operating costs in the short term, affecting profitability. This reduces the incentive to invest in low-carbon technologies, restricting the overall upgrading of eco-tourism.

8.1.2 Incomplete Standards and Regulatory Systems for Low-Carbon Eco-Tourism Development

Currently, there is a lack of unified industry standards and effective regulatory systems for the low-carbon development of eco-tourism. This results in significant differences in the implementation of low-carbon measures across different regions and enterprises, affecting the overall image and market competitiveness of low-carbon eco-tourism. The absence of effective regulation also leads some enterprises to ignore ecological protection in pursuit of economic

benefits, further exacerbating environmental degradation. Moreover, the lack of evaluation tools and methods makes it difficult to quantify and objectively assess the low-carbon performance of eco-tourism, hindering public understanding and trust in low-carbon tourism.

8.1.3 Lagging Low-Carbon Development Concepts among Some Stakeholders

The sustainable development of eco-tourism requires the joint efforts of multiple stakeholders, including governments, enterprises, and local communities. However, many stakeholders still lag in their understanding of low-carbon development. Some enterprises continue to prioritize short-term profits, neglecting long-term environmental responsibilities, making it difficult to achieve low-carbon goals in eco-tourism. Additionally, local governments' policy support often focuses more on economic growth than on environmental protection and low-carbon development, leading to insufficient attention to these areas. The lack of effective communication mechanisms and cooperation platforms limits the collaborative efforts of different stakeholders.

8.1.4 Insufficient Market Awareness of Low-Carbon Eco-Tourism Products

Despite the growing promotion of low-carbon eco-tourism concepts, the market's awareness of low-carbon eco-tourism products remains low. Many consumers have limited understanding of the actual advantages and value of low-carbon tourism products, leading them to overlook low-carbon features when choosing tourism options. This situation not only affects the market demand for low-carbon eco-tourism products but also weakens the motivation of market competitors to promote low-carbon transformation. Inadequate information dissemination and insufficient market promotion make it difficult for many environmentally friendly tourism products to gain the attention they deserve, which undoubtedly restricts the sustainable development of eco-tourism.

8.2 Countermeasures

8.2.1 Increase Investment in Low-Carbon Technology Research and Policy Support

To achieve the low-carbon transformation of eco-tourism, it is essential to enhance research and application of low-carbon technologies. The government should increase financial investments and consolidate resources to encourage research institutions, universities, and enterprises to jointly conduct innovation and application research on low-carbon technologies. Additionally, special funds for technology should be established to support the promotion and application of low-carbon technologies in tourism facilities and services. Both national and local governments can implement tax incentives for eco-tourism enterprises to reduce their costs of using low-carbon technologies. Furthermore, a mechanism for the transformation of low-carbon technology achievements should be established to promote practical applications of research results. Encouraging cooperation between enterprises and sharing of low-carbon technology experiences can help create model demonstrations, driving the overall green transformation of the industry.

8.2.2 Improve Standards and Regulatory Mechanisms for Low-Carbon Eco-Tourism Development

Improving the standards and regulatory mechanisms for low-carbon eco-tourism development is key to achieving sustainable development. On the one hand, national and industry associations should establish unified, scientific standards for low-carbon eco-tourism development, covering facility construction, operation management, and environmental impact assessments, providing a basis for various enterprises. These standards should also be flexible to accommodate the specific conditions of different regions and ecosystems. On the other hand, a sound regulatory mechanism should be established, including regular inspections and evaluations of low-carbon development in eco-tourism. By collecting data, monitoring the environment, and gathering visitor feedback, the low-carbon effects and environmental impacts of various tourism projects can be assessed. Enterprises that fail to meet standards should be provided with guidance and penalties to create a healthy competitive environment, ensuring that low-carbon practices become a self-regulated pursuit in the eco-tourism industry.

8.2.3 Strengthen Stakeholder Education on Low-Carbon Development

Sustainable eco-tourism requires the concerted efforts of various stakeholders. To this end, governments, industry organizations, and enterprises should collaborate to provide targeted training, enhancing stakeholders' understanding of low-carbon development. Training should include tourism professionals, management personnel, and local community members. The content should cover the concept of low-carbon economics, its necessity for development, and practical applications in eco-tourism. Through case studies and field visits, participants' sense of involvement and practical skills

should be strengthened. Additionally, encouraging knowledge sharing and experience exchange between regions can help establish a low-carbon tourism awareness network, deeply ingraining low-carbon concepts and creating a favorable atmosphere for promoting low-carbon eco-tourism throughout society.

8.2.4 Innovate Marketing Models for Low-Carbon Eco-Tourism Products

Innovating marketing models for low-carbon eco-tourism products is an important way to increase market awareness and expand market share. Firstly, by using digital marketing technologies, such as social networks and online travel platforms, the concept and value of low-carbon eco-tourism can be widely promoted. Sharing real experiences and success stories can guide tourists to embrace low-carbon consumption. Secondly, cross-industry collaborations with sectors like green transportation and eco-agriculture can be leveraged to offer integrated tourism products that include low-carbon elements. Detailed eco-travel routes and discounted packages can be set up to attract consumers to choose low-carbon tourism options. Finally, strengthening long-term relationships with tourists through loyalty programs and eco-friendly reward systems can encourage repeat visits and enhance the competitiveness of low-carbon eco-tourism brands.

9 Conclusion

Under the backdrop of a low-carbon economy, the sustainable development of eco-tourism is particularly important. By analyzing the relationship between eco-tourism and a low-carbon economy, identifying the main challenges in the development process, and proposing practical development pathways, this research will provide strong support for the continued development of eco-tourism, achieving harmonious coexistence between the economy and the environment. It is hoped that this study will promote further exploration and practice in the field of eco-tourism.

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