

Tourism Ecological Efficiency

Subjects: Urban Studies

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Tourism ecological efficiency is a critical branch of ecological efficiency research that explores the impact of tourism on the environment. To promote sustainable tourism development, it is essential to consider not only the economic and social benefits but also the environmental impact of tourism.

Keywords: tourism sustainability ; tourism ecological efficiency ; tourism

1. Introduction

Tourism is a vital, comprehensive, and supporting industry that has experienced sustained, high-speed, and stable growth in the global economic system ^{[1][2]}. With the deepening of economic globalization, the tourism industry has entered a golden age and has emerged as one of the fastest-growing sectors in the global economy ^[3]. However, the rapid development of tourism has led to a range of social and environmental problems, including ecological damage and the erosion of cultural heritage ^[4]. As a result, the development of sustainable tourism has become a crucial solution to address these issues and has drawn the attention of both the tourism industry and academia ^[5].

Sustainable tourism is a new approach to tourism development that prioritizes the preservation of the ecological environment, the protection of cultural heritage, the advancement of community economies, and social development ^[6]. This model requires careful consideration of the impacts on ecology, culture, and society in all aspects of tourism planning, management, and operation to achieve a harmonious balance between tourism development, ecological protection, cultural heritage preservation, and community development ^{[7][8]}. Sustainable tourism is not only a growing trend in the tourism industry but also an essential component of global economic sustainability.

Against the backdrop of economic globalization, resource depletion, environmental degradation, and population growth have become increasingly prominent issues, with ecological and environmental challenges posing significant obstacles to sustainable development ^{[9][10]}. The Hanjiang River Basin, known for its rich historical heritage and abundant tourism resources, is one of the most important tourist regions in China and a crucial economic support and ecological barrier in the Yangtze River Basin ^[1]. However, excessive development and unreasonable utilization have led to varying degrees of damage to the tourism ecological environment in the area. According to multiple data sources, China welcomed 6.002 billion domestic tourists and 145.31 million inbound tourists and generated a total tourism revenue of 6.63 trillion yuan in 2019 ^{[11][11]}. The intensive human activities associated with tourism inevitably magnify the pressure on the ecological environment of the Hanjiang River Basin ^{[12][13]}. As a vital component of the tertiary industry, high-quality tourism development is an imperative requirement. Therefore, balancing the development of the tourism economy and ecological environmental protection has become a pressing issue that must be addressed in the Hanjiang River Basin ^{[14][15]}.

Ecological efficiency refers to achieving maximum economic output while consuming the least amount of resources and incurring the least environmental cost under certain ecological conditions ^[16]. This concept evaluates the relationship between economic development and resource utilization, and is commonly used to assess the degree of resource and environmental utilization ^{[17][18]}. In the tourism industry, which has both economic and ecological benefits, measuring tourism ecological efficiency is crucial to evaluate the impact on the local ecological environment while promoting economic development ^[19]. Tourism ecological efficiency can be defined as the relationship between the economic value created by tourism activities and the utilization of ecological resources ^{[20][21]}. Optimizing tourism resource allocation, strengthening environmental protection management, and improving technology levels within the tourism industry can improve tourism ecological efficiency ^[22]. By doing so, the tourism industry can achieve economic benefits while maximizing the protection of the ecological environment, laying a solid foundation for sustainable development ^{[23][24][25]}.

It is important to avoid prioritizing economic benefits over ecological environmental protection when improving tourism ecological efficiency ^[26]. Thus, adhering to the concept of sustainable development, balancing economic development and ecological environment protection, and adopting effective measures to ensure the long-term sustainability of the tourism

industry are crucial ^[27]. By evaluating tourism ecological efficiency and implementing sustainable development practices, we can achieve economic growth while minimizing negative impacts on the environment. This will help ensure the long-term sustainability of the tourism industry and contribute to the protection of the ecological environment.

2. Tourism Ecological Efficiency

2.1. Sustainable Tourism

The concept of sustainable tourism is derived from the broader theory of sustainable development, which prioritizes long-term, stable, and sustainable development while emphasizing fairness among contemporaries, future generations, countries, and ethnic groups ^[28]. This theory reflects a growing recognition of the destructive impact of human activities on the ecological environment and underscores the importance of balancing efficiency and fairness goals ^{[29][30]}.

Sustainable tourism aims to promote the sustainability of the tourism industry by reducing tension and conflict that may arise from the complex interactions between the industry, tourists, the environment, and local communities while maintaining the quality of natural and cultural resources ^{[31][32]}. Its central goal is to protect and enhance opportunities for future use while meeting the needs of tourists and local communities, ensuring the preservation of essential ecological processes and biodiversity, and supporting local livelihoods ^{[5][33]}.

To achieve sustainable tourism development, several requirements must be met, including addressing the needs of local residents, meeting the growing demand for tourism, and protecting the environment ^{[8][34]}. Achieving this balance is essential for promoting sustainable tourism development, which can help to preserve natural and cultural resources, support local communities, and promote economic growth in a responsible and sustainable manner ^{[35][36]}.

2.2. Ecological Efficiency

Ecological efficiency is a critical concept in ecology that measures the efficiency of energy, matter, and information use in an ecosystem ^{[37][38]}. It is crucial for the stability and sustainability of an ecosystem and its ability to respond to external disturbances ^[39]. By understanding ecosystem function and implementing protection and restoration measures, we can strike a balance between environmental protection and healthy economic development ^{[40][41]}. This is essential to minimize negative environmental impact during rapid economic growth and to achieve ecological civilization ^{[42][43]}.

Two key indicators of ecological efficiency are production efficiency and ecological efficacy ^{[44][45][46]}. Production efficiency measures an ecosystem's ability to produce biomass in a given unit of time ^{[47][48]}, while ecological efficacy measures how well an ecosystem converts solar energy into useful chemical energy ^{[49][50]}. Improving ecological efficiency requires enhancing both production efficiency and ecological efficacy, which can be achieved by increasing nutrient input, reducing ecosystem losses, and improving material cycling and energy utilization efficiency ^{[51][52]}.

Balancing economic development with environmental protection is crucial for achieving ecological efficiency, which can be seen as a means of achieving sustainable development ^{[53][54]}. By promoting ecological efficiency, we can support sustainable economic growth while minimizing negative environmental impacts ^[55]. This requires a comprehensive and integrated approach that takes into account the economic, social, and environmental dimensions of sustainable development.

2.3. Tourism Ecological Efficiency

Tourism ecological efficiency is a critical branch of ecological efficiency research that explores the impact of tourism on the environment ^[56]. To promote sustainable tourism development, it is essential to consider not only the economic and social benefits but also the environmental impact of tourism ^{[57][58][59]}. The concept of tourism ecological efficiency aims to achieve a sustainable balance between ecology, society, and the economy by considering the development of the tourism industry from the perspective of ecological efficiency ^{[60][61][62]}.

Tourism ecological efficiency is based on the core concept of reducing the use of the environment and resources while producing goods and services ^[63]. Various research methods can measure tourism ecological efficiency, including life cycle costs, life cycle assessment, and input-output analysis ^{[64][65]}. The study of tourism ecological efficiency is critical for achieving sustainable development in the tourism industry, protecting the environment and enhancing the economic benefits of tourism ^{[66][67]}.

The goal of tourism ecological efficiency is to minimize tourism resource input while maximizing tourism economic benefits and minimizing negative impacts on the environment, thus achieving a friendly coexistence between the tourism economy

and the ecological environment [68][69][70][71]. The evaluation criteria of tourism ecological efficiency can include multiple indicators, such as the efficient utilization of tourism resources, the quality of the ecological environment, and the economic benefits of tourism. By studying and evaluating tourism ecological efficiency, researchers can provide useful references and guidance for the sustainable development of the tourism industry.

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