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Research on the Contribution of Ecotourism to Economic Growth Based on Regression Models—A Case Study of Qinghai Province

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Abstract: *The tourism, as a crucial component of the national economy, has experienced rapid development in recent years. Investigating sustainable development is of significant importance to mitigate the adverse environmental resulting from the exponential growth in this sector. Sustainable development is high potential for any community within economic, social, cultural, ecologic and physical constraints. The Qinghai province in China possesses distinctive ecological resources and a significant proportion of environmentally sensitive areas[1]. The present study discusses the potentialities of sustainable development in Qinghai Province through ecotourism and investigates the impact of the tourism industry on the economy of Qinghai Province from 2010 to 2019. The study utilizes the number of tourists as a direct and primary indicator to examine the relative attractiveness of different forms of ecotourism to visitors. It aims to provide valuable insights for the sustainable development of the tourism industry and ultimately derive conclusive findings and recommendations[2].*

Keywords: *ecotourism, regression models, tourism resources, Qinghai province*

1. Introduction

The tourism industry, as a vital component of the tertiary sector, has witnessed a consistent increase in its contribution to the country's Gross Domestic Product (GDP) in recent years. The tourism industry a comprehensive sector with significant interconnections, wide-ranging impact, and strong reliance. (WU Chun-you, 2009). It encompasses various aspects such as dining, accommodation, transportation, sightseeing, shopping, and entertainment[3].The tourism industry plays a crucial role in enhancing national income, addressing employment challenges, stimulating consumer spending, and optimizing industrial structures.

The value-added of China's tourism and related industries in 2019 amounted to 44,989 billion yuan, representing 4.56% of the total GDP, as per the relevant data released by the National Bureau of Statistics of China.The tourism industry was significantly affected by the global outbreak of the COVID-19. In 2021, the value-added of China's tourism and related industries decrease of 0.6 percentage points compared to the year 2019. The tourism industry makes a substantial contribution to facilitate local economic development. Due to the implementation of effective control measures to contain the spread of the virus,the economy of the tourism and related industries has shown signs of recovery, with notably rapid rebounds observed in tourism catering, tourism shopping, and tourism entertainment sectors. Therefore, taking measures to optimize the structure of the tourism industry, enhance the quality and standards of tourism services, strengthen the construction of tourism infrastructure and promote the integration of tourism with other industries can drive local sustainable economic development. Concurrently,the rapid expansion of the tourism industry has resulted in significant regional environmental pollution,resource constraints and ecosystem degradation[4]. The aforementioned phenomenon is especially evident in regions characterized by fragile ecosystems, which present formidable obstacles for post-damage restoration efforts.The effective management of the intricate interplay between economic development in tourism and the imperative for ecological conservation is crucial. In 1983, Ceballos Lascurain introduced “ecotourism” upon establishing nature organizations in Mexico.The concept of ecotourism entails embarking on a purposeful expedition to relatively undisturbed or unpolluted natural areas, with the aim of studying and appreciating wildlife, plants, and local cultures. This form of "green travel" represents a return to nature. (FENNELL D A 2017). Ecotourism plays a pivotal role in safeguarding local ecosystems from pollution and devastation, while placing paramount importance on the preservation of indigenous cultures, traditions, and communities. Furthermore, it serves as a platform for disseminating environmental culture and

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highlighting the intricate interplay between mankind and nature[5].

2. Background and literature review

The term ‘sustainable development’ has been used, with multiple meanings, in very different fields. The term ‘sustainable development’ has expressed in the so-called Brundtland Report (WCED, 1987). According to this report ‘‘Sustainable development is meet the present needs without compromising the future generations ability to meet their own needs’’. Ecotourism may be a means for sustainable development of an area. Different indicators are commonly used to take decision-making in ecotourism development in any place. The indicators like gross domestic product, population growth rate, literacy rate and trade balance are commonly used as national or regional success for development (Li, W. 2004). The disparities in geographical conditions, tourism resources, levels of economic development, social culture and development policies across diverse regions in China delineate a nuanced landscape marked by regional clustering, differentiation, and coordinated patterns within the trajectory of tourism industry growth (Mu,fanfan. 2021). During the 2023 National Ecological Environment Protection Conference, General Secretary Xi stressed that the establishment of ecological civilization is currently facing an urgent phase characterized by multiple pressures and substantial challenges. The imperative of advancing a green, low-carbon developmental paradigm necessitates the unwavering adherence to the principle of harmonious coexistence between humanity and nature[6].The concurrent promotion of sustainable growth in the tourism economy necessitates a simultaneous focus on environmental conservation, ensuring a well-coordinated equilibrium between economic advancement and ecological preservation (Gu, J. 2004)

Located in the Qinghai-Tibet Plateau, Qinghai Province is widely recognized as the "Water Tower of China". It boasts the largest area and highest-altitude natural wetlands in China, serving as the origin of the Yangtze River, Yellow River, and Lancang River. The distinctive natural geographical environment has bestowed the local area with unparalleled resource advantages for ecotourism.(Zeng X.H. 2021) However, due to the ecological fragility and complexity of the Qinghai-Tibet Plateau, restoration efforts face different challenges, characterized by the difficulty and slow pace of recovery. The short-term comprehensive restoration is difficult to achieve, with notable issues such as grassland degradation, land desertification, and soil erosion particularly prominent in certain localities. Ecotourism as a form of tourism which prioritizes the preservation of natural environmen, strives to minimize negative impacts on the environment. Simultaneously, it fosters sustainable development at the local level. This approach aims to strike a harmonious balance between economic, social, and environmental aspects within tourism activities. The paramount value of Qinghai lies in its ecological assets, with the greatest responsibility centered on ecological preservation. The vast potential for development is intrinsically connected to its ecological abundance.Therefore, the utilization of Qinghai Province as a case study to examine the contribution of ecotourism to economic development is of significant importance[7].

The current research on forecasting demand for ecological tourism still exhibits certain limitations. The predictive model variables lack comprehensiveness, primarily focusing on economic and social indicators for ecological tourism demand forecasting, while neglecting ecological indicators and thus failing to adequately capture the essence of ecological tourism. Secondly, there is a lack of consensus on the scientific selection of variable indicators. The selection of research objects in many studies is often driven by data availability rather than a comprehensive consideration of the scientific nature, rigor, and accuracy of variable indicators and conceptual frameworks (Yang L.X 2008). Therefore, this study adopts a multidimensional approach by selecting key variable indicators related to economic, social, and ecological factors, based on the geographical scope and enhance ecological features of the empirical research subjects.

3. Methods and Results

3.1 Descriptive Statistics

The methodology used in this study for a systematic review of considered articles is the statistical analysis and prediction methodology (LAW R & GE P Y, 2019&2009). It helps in a systematic review of published work and analyses current research trends, and research gaps associated with the considered area. The article has chosen data from the period between 2010 and 2019 in order to mitigate the influence of unforeseen circumstances such as viral outbreaks, armed conflicts, and other

ISSN 2616-5902 Vol. 5, Issue 25: 153-159, DOI: 10.25236/AJBM.2023.052523

force majeure factors. The data is obtained from the National Bureau of Statistics, local statistical bureaus, media data and Ma fengwo website.

This article classifies ecological resources into five distinct categories: natural landscape, aquatic landscape, biological landscape, physiographic landscape and cultural resource. The scope of natural landscapes includes celestial phenomena, climate patterns, hydrological features, and other related elements. The aquatic landscapes encompass various ecosystems such as wetlands, lakes, hot springs, and marshes. The biological landscapes consist of diverse elements including forests, trees, grasslands, and animals. The category of human resources encompasses intangible cultural heritage, historical artifacts, folklore traditions, traditional attire, religious practices, and more[8].

3.1.1 The relationship between tourism and economy in Qinghai Province

Based on the examination of various authors' works, the tourism industry exerts a substantial impact on economic growth. Simultaneously, it plays an instrumental role in propelling the development of various service sectors on a global scale. The tourism and related industries not only offer a wide range of services, including accommodation, dining, transportation, and entertainment for tourists but also play a crucial role in generating numerous employment opportunities. The 2021 statistical results indicate a consistent annual growth of over 20% in the total revenue of tourism and related industries in Qinghai Province for four consecutive years. The tourism and related industries play a crucial role in the tertiary sector, with the contribution of the tertiary industry to the local gross domestic product (GDP) remaining stable at around 50% from 2010 to 2019. The continuous contribution of the tertiary industry to GDP growth indicates its persistent role in driving local economic expansion (Figure 1).

Figure 1 The relation between tourism and economy

3.1.2 Tourism growth rates in different regions of the province

This study conducts a statistical analysis on tourism revenue (including income from accommodation, dining, and attractions tickets), tourist numbers (accounting for repeated counts such as day trips and self-driving tours), and per capita expenditure data for nine regions (Xining city, Haidong City, Haibei Tibetan Autonomous Prefectur, Huangnan Tibetan Autonomous Prefectur, Hainan Tibetan Autonomous Prefectur, Guoluo Tibetan Autonomous Prefectur, Yushu Tibetan Autonomous Prefectur, Haixi Mongolian-Tibetan Autonomous Prefectur, Qinghai Lake Management Bureau) within Qinghai Province from 2010 to 2019.

The Qinghai province experienced a consistent upward trend in both tourist arrivals and overall tourism revenue. The total tourism revenue surged from 5.21 billion yuan to an impressive 67.779 billion yuan, reflecting a remarkable growth rate of 12.01%.Over the same period, the total number of tourists in the entire province increased from 21.53 million person-times to 103.81 million person-times, with a growth rate of 3.822% (figure 2).

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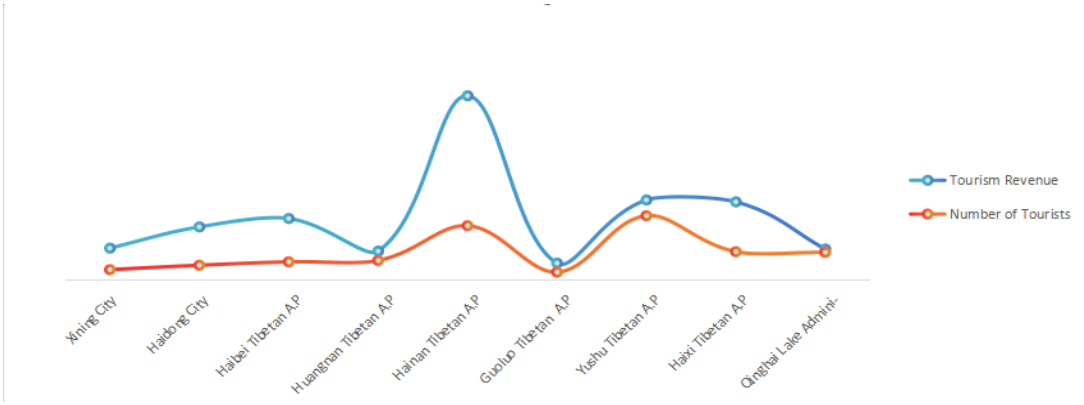

Figure 2 Tourism growth rates in different regions of the province

3.1.3 The level of tourist consumption per capita

The per capita tourist consumption in various regions of Qinghai Province from 2010 to 2019 exhibits a upward trend. Influenced by the pricing factors of consumer goods and services in various urban areas, the per capita consumption level in Xining City is the highest (figure 3).

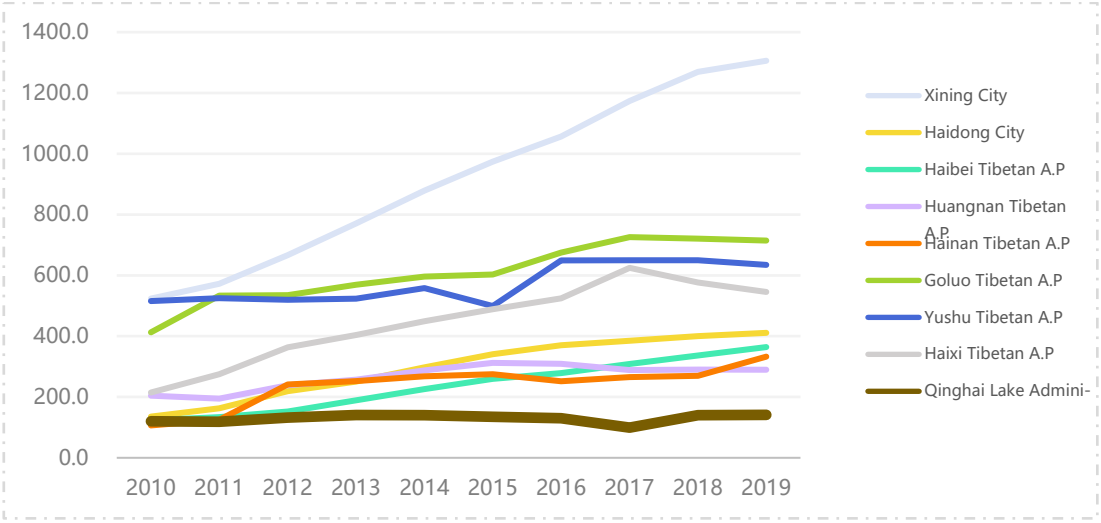

Figure 3 Per capita consumption in 9 regions

3.1.4 Number of A-level Scenic Spots in Nine Regions

The foundation of an ecological tourism area lies in its unique ecological resources，natural landscapes, and the symbiotic relationship with human ecological elements. Its primary objective is to facilitate tourists' comprehension and acquisition of knowledge regarding nature and ecology, enhance a sense of responsibility towards the ecological environment development, and establish a sustainable tourism region[9].

As of 2019, 58.7% of the total number of A-level scenic spots in Qinghai province are designated as ecological tourism destinations with a primary focus on safeguarding the ecological environment. This includes one World Natural Heritage site, three national ecological tourism demonstration areas, seven nature reserves, one scenic area, thirteen water conservancy scenic areas, sixteen forest parks, twenty wetland parks, eight geological parks, and twelve desert parks.

When comparing the growth rates of tourist numbers in scenic spots from 2010 to 2019, Yushu Tibetan Autonomous Prefecture, Hainan Tibetan Autonomous Prefecture, and Haixi Mongolian-Tibetan Autonomous Prefecture exhibited highest growth rates at 14.24%, 12.01%, and 6.22%, respectively (figure 4).

ISSN 2616-5902 Vol. 5, Issue 25: 153-159, DOI: 10.25236/AJBM.2023.052523

Figure 4 Per capita consumption

By investigating the relevant data on the fastest-growing tourist destinations in the top three cities, a comparison was conducted using the number of A-level scenic spots in each city as published by the National Tourism Administration. In 2018, owing to its characteristic high-altitude climate, the ecological system in Yushu Tibetan Autonomous Prefecture is extremely fragile. The qualifications for Longbaotan Tourist Area and Yellow River Source Tourist Area were revoked in order to safeguard and restore the natural ecological environment in the Sanjiangyuan region. The number of A-level scenic spots in Yushu Tibetan Autonomous Prefecture has decreased, while the tourism volume has increased. Hainan Tibetan Autonomous Prefecture has expanded its offerings with the addition of four new folk cultural tourist areas, and Haixi Mongolian-Tibetan Autonomous Prefecture has recently expanded its tourism offerings with the addition of one forest park, two industrial tourist areas, two cultural tourist areas, and three natural landscape tourist areas. The aforementioned statement indicates that ecological conservation takes precedence over economic development.

3.2 Regression

After basic statistical analysis above, we have listed some related variables which may be related to tourist revenue. Tourism industry have developed rapidly and tourist quantity is definitely the most visualized representative for that. That is also why we want to better develop the research on the related area of tourism industry. The following research is going to analyze on the relative data and try to build regression model and illustrate the result we get.

3.2.1 Dependent Variable

The dependent variable utilized in this report is the tourist quantity, which represents the cumulative number of tourists in Qinghai Province.

3.2.2 Independent Variable

This report concludes 20 independent variables into four kinds: economic, ecological geographical and social factors. The economic factors include retail price index(RPI), Consumer Price Index(CPI), price index of service items, the contribution of the tertiary industry to the growth of GDP, per capita disposable income, Per capita tourism expenditure. The ecological factors consist of physiographic landscape, aquatic landscape, biological landscape, natural landscape and cultural resource. Geographical factors encompass the spatial extent of seven cities, scenic attractions, the density of railway stations, bus terminals, airports, and the altitude of scenic spots. The social factors include variations in ratings, the size of the local population, and the availability of accommodations[10].

3.2.3 Results

The present study employs a multidimensional approach that takes into account the economic, ecological, geographical, and social characteristics of the empirical research subjects. By scientifically selecting relevant key indicators of ecological tourism resources, the study aims to analyze which types of resources can better attract tourists and contribute more effectively to regional growth.

ISSN 2616-5902 Vol. 5, Issue 25: 153-159, DOI: 10.25236/AJBM.2023.052523

The research aims to enhance the model's accuracy by incorporating additional data, the tracking of tourist visits to specific scenic spots continues to pose inconveniences, resulting in the R-square remaining at 0.84. If only considering ecological factors, the model results indicate that natural landscapes and aquatic scenery are more likely to attract tourists (figure 5).

Regression Statistics	
Multiple R	0.918848659
R Square	0.844282858
Adjusted R Square	0.800211969
Standard Error	2.223472439
Observations	69

ANOVA

	df	SS	MS	F	Significance F
Regression	15	1420.662508	94.71083384	19.15738199	3.05876E-16
Residual	53	262.0229735	4.943829689		
Total	68	1682.685481			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-13.37150351	4.772549447	-2.801752744	0.007081177	-22.94402545	-3.798981568	-22.94402545	-3.798981568
scenic attractions	0.209444964	0.047492405	4.410072803	5.08636E-05	0.114187263	0.304702666	0.114187263	0.304702666
Ratings	0.000528764	0.000122844	4.304351313	7.2541E-05	0.00028237	0.000775159	0.00028237	0.000775159
transportation	2.705356552	0.927502577	2.916818369	0.005175455	0.845021974	4.565691131	0.845021974	4.565691131
Numlocal populatic	0.194310211	0.076094221	2.553547532	0.013576104	0.041684531	0.34693589	0.041684531	0.34693589
altitude	0.137071015	0.053689885	2.553013775	0.013594594	0.029382744	0.244759287	0.029382744	0.244759287
Numhotels	-0.263390467	0.120208149	-2.191119892	0.032860757	-0.504497481	-0.022283453	-0.504497481	-0.022283453
natural landscape	1.11515985	0.738138011	1.510774181	0.136785652	-0.36535751	2.595677209	-0.36535751	2.595677209
water landscape	0.000143585	0.000125233	1.14654292	0.256720602	-0.0001076	0.00039477	-0.0001076	0.00039477
biological landsca	-0.459134094	0.434671441	-1.05627849	0.295632117	-1.330974596	0.412706409	-1.330974596	0.412706409
physiographic land	-0.000113016	0.000126483	-0.893521336	0.37561754	-0.000366709	0.000140678	-0.000366709	0.000140678
cultural resource	-0.098906356	0.131362553	-0.75292657	0.454825527	-0.362386271	0.164573558	-0.362386271	0.164573558
space	0.544990116	0.836631686	0.651409844	0.517596668	-1.133080537	2.22306077	-1.133080537	2.22306077
RPI	-0.013588102	0.026291842	-0.516818181	0.607433117	-0.06632286	0.039146656	-0.06632286	0.039146656
price index of ser	-0.246334466	0.725743008	-0.339423822	0.735631819	-1.701990598	1.209321666	-1.701990598	1.209321666
tourism expenditur	0.001334607	0.009500679	0.1404749	0.888817309	-0.017721341	0.020390555	-0.017721341	0.020390555

Figure 5 Regression Statistics

4. Conclusion

In this paper, according to the analysis of the statistical findings, strategies for enhancing the advancement of ecotourism will be proposed. Adhering to the principle of prioritizing ecological development, ensuring the rational planning and development of tourist sites based on the ecological characteristics of the region. The model results indicate that regions characterized by natural landscapes and aquatic landscape are more likely to exert a magnetic pull on tourists.

The rapid development of the tourism industry has expedited local economic expansion. How to protect the ecological environment while vigorously developing the economy is a research worthy of long-term study. The development of each region should be based on its unique circumstances, taking into account factors such as geographical location, transportation accessibility, ecological system recovery capacity, local income and so on. Developing ecological resources tailored to local sustainable development.

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