

Article

The Impact of the Integration of the Culture Industry and Tourism on Regional Green Development: Empirical Evidence from China

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Abstract: The concept of “green development” has garnered increasing recognition and prominence in recent years, attracting the attention of various countries and regions. How to achieve green development has become a pressing issue for the government. The integration of the culture industry and tourism has had a profound impact on regional green development. This paper employs the entropy method to assess the level of regional green development, and it employs the coupling coordination model to evaluate the degree of integration of the culture industry and tourism across 30 provincial administrative regions in China from 2011 to 2021. Additionally, an econometric model is constructed to empirically examine the impact of the integration of the culture industry and tourism on regional green development, as well as its underlying mechanism. The findings of this study indicate the following: (1) The integration of the culture industry and tourism significantly enhances regional green development. (2) With the improvement in the regional green development level, the integration of the culture industry and tourism is playing a gradually stronger role in promoting regional green development. (3) Further analysis of the mechanism reveals that the integration of the culture industry and tourism enhances regional green development by facilitating the upgrading of the tourism industrial structure. (4) Environmental regulation policies reinforce the role of the integration of the culture industry and tourism in promoting regional green development. These research findings contribute to enhancing our understanding of the impact of the integration of the culture industry and tourism on regional green development, providing empirical evidence and policy recommendations for the government to facilitate the integration of the culture industry and tourism and further promote green development.

Keywords: green development; integration of culture industry and tourism; tourism industrial structure; environmental regulation; policy synergy



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1. Introduction

With economic and social development, the relationship between human beings and nature, especially the interplay between economic growth and ecological environment protection, has transformed. The ecological environment has increasingly become a critical factor constraining sustainable economic development [1]. Building on a new comprehension of the relationship between human beings and nature, the concept of the green economy was introduced to foster sustainable development [2]. Since the beginning of the 21st century, the United Nations Environment Programme has advocated for the concept of a “green economy”. This advocacy has led to the emergence of various related concepts, such as the “circular economy”, “green growth”, and “low-carbon development” [3]. The concept of “green development” has been progressively refined and has garnered increasing attention from countries and regions around the world. On a global scale, the majority of countries have proposed their own policies to foster green economies. In Asia,

South Korea has devised a development strategy to achieve green growth [4], while China has elevated green development to a basic concept of economic development. Various European nations have also implemented specific practices in different industrial and social sectors to promote environmentally friendly growth [5]. However, the global pattern of green development is highly imbalanced, with developed regions consistently maintaining a leading position in green development [6]. Developing regions often prioritize economic growth over environmental protection. To achieve green development, particularly in less developed areas, prioritizing the growth of industries with minimal environmental impact is advisable.

With the escalating demand in the tourism market, the tourism economy accounts for approximately 10% of the global economy; however, it has also had a substantial environmental impact [7]. The tourism industry exerts a positive influence on economic growth through diverse direct and indirect mechanisms [8]. However, this is accompanied by a range of environmental challenges [9], including the escalation of carbon emissions [10] and the exacerbation of environmental degradation [11]. In comparison to other industries, the tourism industry can mitigate pollution and foster economic growth [12], thereby making a positive contribution to the advancement of ecological economics [13]. Consequently, the tourism industry inherently possesses a distinct green attribute. With the continuous evolution of the tourism industry, culture has emerged as a fundamental element of the tourism system [14]. The integration of the culture industry and tourism is an important development trend in tourism [15]. The skillful design of cultural experiences has the potential to enhance tourists' overall travel experiences [16] while simultaneously boosting the revenue generated from tourism activities [17]. The culture industry itself has a significant driving effect on the tertiary sector and constitutes one of the key factors for regional economic growth [18]. In terms of the environmental impact, the essence of culture industry products and services lies in the capacity to innovate them. Compared to other categories of commodities, they may have a more positive influence on sustainable development [19]. Nowadays, the importance of cross-departmental cooperation is increasing, and industrial integration has emerged as a new economic phenomenon that facilitates the mutual penetration and extension of technology, products, and services across industries [20]. There is a robust complementary relationship between the cultural industry and the tourism sector. Culture can serve as the core of the tourism industry, expanding the scope of tourism products and infusing them with cultural significance, while tourism products and services facilitate the promotion of relevant culture while shaping its distinctive image. The integration of these two industries has achieved interconnectivity in terms of resources, technology, products, and other aspects. As a result, it facilitates the transfer of resource factors from low-productivity sectors to high-productivity ones, enhancing the resource utilization efficiency and ultimately stimulating economic development. The integration of these two industries may give rise to novel complementary or alternative industries [21]. Specifically, the integration of the cultural and tourism sectors has fostered the emergence of the cultural tourism industry, which exhibits certain green characteristics with cultural elements as the core. Hence, the integration of the culture industry and tourism has the potential to promote regional green development.

Currently, there is a lack of empirical studies that have examined the impact of the integration of the culture industry and tourism on regional green development. Some studies have extensively examined the influence of tourism on regional sustainable development [22,23] and the efficiency of urban green development [24,25] from a tourism economic perspective. Alternatively, separate analyses have been conducted on the economic growth driven by the cultural and tourism industries [8,18]. The research findings on green development have become increasingly comprehensive. Pearce initially introduced the concept of a "green economy" in his seminal work, *Blueprint for a Green Economy*, published in 1989, emphasizing the necessity of imposing environmental constraints on economic growth. In the realm of the research on the "green economy", the majority of studies primarily focus on the economic and environmental dimensions, while a few

studies also explore social issues [3]. Green development is a highly intricate system that encompasses economic, ecological, and social aspects [26]. The existing literature primarily assesses the extent of green development using two approaches: firstly, by constructing a comprehensive indicator system for evaluating green development [27–29]; secondly, by quantifying the efficiency of green development [30–32]. One of the primary contributors to pollutant emissions is energy utilization. The implementation of sustainable green energy strategies and technologies plays a pivotal role in attaining sustainable development [33]. Furthermore, industrial integration [34] and the adoption of digital technology [35] can significantly enhance energy efficiency and facilitate regional green development. The efficiency of capital allocation [36,37], technological innovation [38], internet development, and the digital economy [39] all exert influences on green development. Reasonable environmental regulations and policies can effectively reconcile the conflict between economic development and environmental protection [40]. Several studies have examined the impact of macroeconomic policies, such as fiscal policy [41], fiscal decentralization [42], and environmental decentralization [40], on promoting green development. Furthermore, some studies have employed methods like Difference-in-Differences (DID) analysis to evaluate the effects of specific policies on green development [43–45].

To address the limitations of the existing research, this study utilizes provincial-level panel data from China to explore the impact of the integration of the culture industry and tourism on regional green development. The choice of China as the research subject is primarily due to its representative status as a developing country. While the Chinese economy is experiencing rapid growth, there has been a persistent rise in total carbon emissions, accompanied by significant environmental pressures from economic activities. To mitigate these pressures and enhance people's well-being, the Chinese government has put forward the concept of green development. Exploring the impact of the integration of the culture industry and tourism on regional green development is of significant practical importance for identifying pathways to achieve sustainable growth.

This article makes the following three marginal contributions. First, based on the measurement of the integration level of the culture industry and tourism, as well as the regional green development level, this study specifically empirically analyzes the impact of the integration of the culture industry and tourism on regional green development. This effectively compensates for the lack of research on the green development effects of the integration of the culture industry and tourism in the existing literature. Second, this study investigates the mediating effect of the upgrading of the tourism industrial structure to explore how the integration of the culture industry and tourism affects regional green development, further complementing the deficiencies of the existing research. Third, from the perspective of policy coordination, this study analyzes how the integration of the culture industry and tourism can synergize with environmental regulation policies, and it provides empirical evidence for the government to improve the regional green development policy system.

The remaining contents of this article are organized as follows: The second part provides a theoretical analysis on how the integration of the culture industry and tourism influences regional green development and proposes the research hypotheses. The third part describes the sources of the research data, the selection of the variables, and their statistical characteristics. In the fourth section, we empirically analyze the effects of the integration of the culture industry and tourism on regional green development. After implementing robustness tests on the baseline regression results and considering potential endogenous issues, we utilize instrumental variables for the 2SLS estimation. Furthermore, quantile regression is used to investigate the heterogeneity of the effects of the integration of the culture industry and tourism on regional green development across different levels of green development. This study delves into the mediating effect of upgrading the tourism industrial structure in this process, as well as the moderating role of environmental regulation. The fifth part presents the main conclusions of this paper. The sixth part discusses the research deficiencies of this paper and the research prospects.

2. Theoretical Mechanism and Research Hypothesis

Green development encompasses three dimensions: the economic, environmental, and social dimensions. The tourism industry also exerts an influence on the economy, the environment, and society [46]. The integration of the culture industry and tourism can facilitate regional green development by expanding the economic scale, mitigating pollution and enhancing social welfare.

The concept of industrial integration originated from Rosenberg's analysis of the evolution of the American machinery and equipment industry in the 1960s [47]. As an economic phenomenon, industrial integration refers to the contraction or disappearance of industrial boundaries that occur in response to the demands of industrial growth. The integration of the culture industry and tourism represents a dynamic process characterized by continuous changes in industrial boundaries. The integration of technology serves as the fundamental basis for merging the tourism and cultural industries. The amalgamation of research and development technology in cultural product production within the cultural industry, along with tourism resource development technology in the tourism industry, establishes the technological groundwork for the amalgamation of these two pivotal industries. On the basis of technological integration, the utilization of these unique and scarce cultural resources not only safeguards and perpetuates traditional cultural heritage but also fosters the advancement of the tourism industry. The hypothesis of tourism-driven economic growth has been substantiated in various regions [48,49], while the integration of the culture industry and tourism has extended the existing industrial boundaries and fostered expansion within the tourism sector [50]. Moreover, as cultural displays for tourists continue to evolve towards commercialization, they have fostered corresponding industrial chains, thereby further boosting the region's tourism revenue. Consequently, the integration of the culture industry and tourism can facilitate the expansion of the economic scale.

The development of tourism depletes the natural capital of destinations, and tourism-related activities lead to the release of greenhouse gases and pollutants, which negatively impacts the local ecological environment. Once cultural resources are recognized as a key factor of production in tourism, their cultural attributes become the core of the tourism product. Cultural resources are typically non-material in nature [51], with greater emphasis on the spiritual aspect. Therefore, the design of tourism products emphasizes attracting tourists through culture and the rational use of natural capital, aiming to reduce environmental damage. Moreover, the integration of culture and the tourism industry leads to an increase in tourism revenue, which can be used to boost investment in environmental protection, thereby benefiting the ecological environment. The development of cultural tourism necessitates strong ecological support, compelling local governments to enforce more stringent environmental regulations. The residents' awareness of environmental protection is further enhanced, leading to the establishment of both formal and informal mechanisms for monitoring various environmental behaviors. This induces a crowding-out effect on industries with high emissions and pollution, indirectly promoting environmental improvement.

The approach to sustainable tourism development does not focus on maximizing the exploitation of tourism resources for immediate financial gains but rather emphasizes the importance of respecting the local populations and customs in tourist destinations, as well as of ensuring that the benefits of tourism development are shared [52]. This holistic approach aims to foster personal and societal well-being [53]. First, as culture is continuously transformed into cultural tourism products, the commercial benefits from these products drive industrial development, creating new industries and value chains and, in turn, generating new job opportunities for tourism destinations. The involvement of local residents in cultural tourism activities allows them to offer services directly to tourists, thereby increasing their income and reducing income disparities. Additionally, to enhance the appeal and market competitiveness of cultural tourism, it is crucial to cultivate a positive regional image. This involves integrating environmental preservation into development decision making and providing high-quality public goods that improve

living conditions, elevate the quality of life for local residents, and foster the advancement of the tourism industry [54].

After conducting a comprehensive analysis, we propose the following research hypotheses:

Hypothesis 1. *The integration of the culture industry and tourism contributes to the enhancement of regional green development.*

The integration of the culture industry and tourism can facilitate the structural upgrading of the tourism industry. First, the convergence of the culture and tourism industries has progressively blurred the demarcation between these two distinct sectors. The functions and value links originally associated with the cultural industry chain or tourism industry chain intersect and permeate other industries, thereby optimizing and restructuring the two major industry value chains [55]. The interconnection of resources, technology, products, and other links has been achieved, facilitating the transformation of the market division of labor between the cultural and tourism industries into an enterprise division of labor within the tourism industry. This promotes the flow and allocation of resource factors from sectors with lower productivities to those with higher productivities in the tourism industry, ultimately leading to an enhancement and optimization of the structure of this sector. Second, the integration of the culture industry and tourism is predicated on technological amalgamation. The technological fusion within the culture and tourism industries enhances the resource development efficiency while simultaneously driving output towards high-value-added domains, such as creativity [56]. Meanwhile, the integration of the two major industries continuously facilitates the enhancement and optimization of products and services, thereby fostering economies of scale and ultimately bolstering the total productivity factor of the tourism industry.

The optimization of the tourism industry structure indicates that the technological and economic interconnections among the various sectors within the tourism industry, which primarily offers products and services to meet the tourism demand, have undergone shifts. As the factors of production are increasingly allocated and transferred to sectors with higher labor productivities, this results in an increasing share of these sectors, which thereby fosters a collective rise in the labor productivities across different sectors [57]. The adjustment of the industrial structure has disrupted the interdepartmental equilibrium, resulting in an escalating emphasis on energy and resource conservation, as well as a notable enhancement in the energy and resource utilization efficiency [58]. The enhancement of the overall resource allocation efficiency signifies a shift in the economic growth of tourism destinations from extensive to intensive, which thereby promotes regional green development;

Hypothesis 2. *The integration of the culture industry and tourism contributes to the upgrading of the tourism industrial structure, thereby enhancing regional green development.*

Maintaining a sound ecological environment is one of the essential requirements for the growth of the tourism economy. Tourist destination governments, in their pursuit of developing the tourism sector, enact stricter environmental regulations. The integration of the culture and tourism industries, combined with environmental regulation, creates policy synergies that promote sustainable regional development. Additionally, the Porter hypothesis suggests that reasonable environmental regulations can stimulate corporate innovation and counterbalance the associated costs [59]. The implementation of environmental regulations acts as a catalyst for companies to adopt innovative practices [60]. In the pursuit of profit maximization, companies select greener and more efficient technologies to mitigate carbon emissions and enhance their production efficiencies. Concurrently, it is crucial to phase out enterprises with significant pollution and emissions to encourage the sustainable development of the entire industry in line with environmental regulations. At this stage, the integration of the culture industry and tourism allows enterprises to delve into resource elements, imbue products with more creative cultural connotations,

and increase the resource utilization efficiency, thereby fully harnessing the promoting role of the cultural and tourism industries in regional green development;

Hypothesis 3. *Environmental regulation can strengthen the promoting effect of the integration of the culture industry and tourism on agricultural green development.*

3. Research Design

3.1. Construction and Description of the Measurement Model

3.1.1. Benchmark Model

This article constructs an econometric model to further examine the impact of the integration of the culture industry and tourism on regional green development and establishes the following benchmark regression model:

$$Gre_{it} = \alpha_0 + \alpha_1 IC_{it} + \sum \alpha_j controls_{jit} + \mu_i + \nu_t + \varepsilon_{it} \quad (1)$$

where Gre_{it} represents the level of regional green development in province i in year t , which is the explanatory variable in this article. IC_{it} serves as the explanatory variable, representing the integration level of the culture industry and tourism in province i in year t . $controls_{jit}$ denotes a set of control variables that influence the level of regional green development, encompassing government support, the urbanization level, the industrial structure, technological progress, and the economic development level. μ_i and ν_t represent province and year dummy variables, respectively, to control for bidirectional fixed effects. ε_{it} represents the random error. The coefficient α_1 is the core estimation parameter that gauges the impact of the integration of the culture industry and tourism on green development. If α_1 is significantly greater than zero, it suggests that the integration of the culture industry and tourism positively contributes to regional green development; otherwise, there is an inhibitory effect.

3.1.2. Mediating-Effect Model

To further investigate the potential impact of the integration of the culture industry and tourism on regional green development through the upgrading of the tourism industrial structure, this study establishes the following model to examine the mediating effect, using a methodology commonly used for testing mediating effects:

$$TSH_{it} = \beta_0 + \beta_1 IC_{it} + \sum \beta_j controls_{jit} + \mu_i + \nu_t + \varepsilon_{it} \quad (2)$$

$$Gre_{it} = \gamma_0 + \gamma_1 IC_{it} + \gamma_2 TSH_{it} + \sum \gamma_j controls_{jit} + \mu_i + \nu_t + \varepsilon_{it} \quad (3)$$

In the aforementioned equations, TSH denotes the upgrading of the tourism industrial structure. If the integration of the culture industry and tourism significantly influences regional green development, implying that α_1 in Equation (1) is significant, then we further examine whether this integration can enhance regional green development by promoting the upgrading of the tourism industrial structure. If both β_1 in Equation (2) and γ_2 in Equation (3) are significant, it suggests that the integration of the culture industry and tourism can facilitate regional green development by promoting the upgrading of the tourism industrial structure. In this case, if γ_1 remains significant, it implies that the upgrading of the tourism industrial structure functions as a partial mediating variable. This integration will not only affect regional green development through the upgrading of the tourism industrial structure but will also have a direct or indirect influence on regional green development through other mechanisms. If γ_1 is no longer significant, it indicates that the upgrading of the tourism industrial structure functions as a complete mediating variable. The integration of the culture industry and tourism can only enhance regional green development through the upgrading of the tourism industrial structure, without any direct or other indirect mechanisms.

3.1.3. Moderating-Effect Model

To attain sustainable development, the relevant impacts can be enhanced through the coordination of environmental regulatory policies. Therefore, this study constructs a regression model, as depicted in Equation (4), to examine whether environmental regulatory policies can effectively strengthen the facilitating role of the integration of the culture industry and tourism in promoting regional green development.

$$Gre_{it} = \alpha_0 + \alpha_1 IC_{it} + \alpha_2 er_{it} + \alpha_3 IC_{it} \times er_{it} + \sum \alpha_j controls_{jit} + \mu_i + \nu_t + \varepsilon_{it} \quad (4)$$

In Equation (4), the environmental regulation variable (er_{it}) and the interaction term between the integration of the culture industry and tourism and environmental regulation are added on the basis of Equation (1), while keeping the other control variables unchanged. By estimating the results of α_3 , we can determine whether environmental regulation enhances the impact of the integration of the culture industry and tourism on regional green development.

3.2. Evaluation Index System of Regional Green Development Level

The existing research on green development has reached a certain consensus, narrowly defining it as the achievement of a balance between economic and ecological benefits, and more broadly considering social benefits. Measuring the level of green development is primarily performed by calculating the green development efficiency or by developing indicator systems. In a study by Xiong et al. [61], taking into account other studies' indicators [27–29], the authors construct an evaluation index system for the level of regional green development from three dimensions: green production, green ecology, and green living. These three dimensions correspond to economic, ecological, and social aspects, respectively, as detailed in Table 1. Among them, green production encompasses 3 secondary indicators: the quality of the economic growth, the intensity of the pollution emissions, and the intensity of the resource utilization, in addition to 12 tertiary indicators. Green ecology encompasses three secondary indicators: ecological protection, environmental governance, and resource endowment, in addition to seven tertiary indicators. Green living encompasses two secondary indicators: green behavior and the living environment, along with eight tertiary indicators.

Table 1. Evaluation index system of regional green development level.

First-Level Indicators	Secondary Indicators	Tertiary Indicators	Indicator Attribute	
Green production	Quality of economic growth	GDP per capita growth rate	+	
		Proportion of industrial added value to GDP	+	
		Proportion of added value of the tertiary industry to GDP	+	
	Intensity of pollution emissions	Intensity of pollution emissions	Per capita disposable personal income	+
			Wastewater discharge per unit of GDP	–
			Sulfur dioxide emissions per unit of GDP	–
			Carbon dioxide emissions per unit of GDP	–
			Smoke and dust emissions per unit of GDP	–
			Total electricity consumption per unit of GDP	–
	Intensity of resource utilization	Intensity of resource utilization	Water consumption per unit of GDP	–
			Unit of GDP built-up area	–
			Energy consumption per unit of GDP	–

Table 1. Cont.

First-Level Indicators	Secondary Indicators	Tertiary Indicators	Indicator Attribute
Green ecology	Ecological protection	Proportion of afforestation area to jurisdictional area	+
		Forest coverage rate	+
	Environmental governance	Domestic sewage treatment rate	+
		Harmless treatment rate of household waste	+
		Comprehensive utilization rate of industrial solid waste	+
		Per capita water resources	+
Resource endowment	Per capita garden and green space area	+	
	Per capita living electricity consumption	–	
Green living	Green behavior	Per capita daily water consumption	–
		Passenger volume of urban public transportation per 10,000 population	+
	Living environment	Green coverage rate in built-up areas	+
		PM2.5	–
		Urban tap water penetration rate	+
		Urban gas penetration rate	+
Number of public toilets per 10,000 population	+		

Data source: The China Environmental Statistics Yearbook (2012–2022) and Provincial Statistical Yearbook (2012–2022). Note: “+” indicates that the larger the index value, the higher the regional green development level; “–” indicates that the larger the index value, the lower the regional green development level.

3.3. Evaluation System of the Integration Level of the Culture Industry and Tourism

Various methodologies, such as the input–output approach and the evaluation of the coupling coordination degree, are commonly employed in contemporary research to quantify the integration levels across diverse industries [62]. The assessment of the degree of coupling primarily evaluates the level of interaction and influence among various elements within the economic system, aiming to determine their degree of coupling. This measurement can partially reflect the extent of the integration between two industries. Therefore, this article chooses to calculate the coupling coordination between the culture industry and tourism, thereby indicating the level of integration between these two sectors. The specific calculation method can be found in the subsequent formulas [63]:

$$C = \sqrt{\frac{U_c \times U_t}{(U_c + U_t)^2}} \quad (5)$$

$$T = \alpha \times U_c + \beta \times U_t \quad (6)$$

$$IC = \sqrt{C \times T} \quad (7)$$

where C represents the system coupling degree of the two industries, and T is the comprehensive coordination index of their integrated development. α and β are undetermined coefficients, representing the respective contributions of the culture industry and tourism to regional economic development. Given the equal importance of these two industries to economic development, they are both set at 0.5 in this study. U_c and U_t are the comprehensive evaluation values for the culture industry and tourism industry, respectively, as calculated by the entropy method. Based on the existing studies [50,63–65], this paper constructs the evaluation index system of these two industries from the two dimensions of industrial factors and industrial performance, covering a total of eight tertiary indicators, as shown in Table 2.

Table 2. Evaluation index system of the integration level of the culture industry and tourism.

First-Level Indicators	Secondary Indicators	Tertiary Indicators	Indicator Attribute		
Tourism development level	Tourism performance	Domestic tourism revenue (CNY 100 million)	+		
		Foreign exchange revenue from tourism (USD 100 million)	+		
		Number of domestic tourists (10,000 person-times)	+		
		Number of inbound tourists (10,000 person-times)	+		
	Tourism factors	Number of travel agencies	+		
		Number of star-rated hotels	+		
		Number of scenic spots above the 4A level	+		
		Number of employees in tourism (ten thousand)	+		
		Development level of culture industry	Culture industry performance	Total operating revenue of cultural market (CNY 100 million)	+
				Cultural undertakings (CNY 100 million)	+
Number of museum visitors (ten thousand)	+				
Culture industry factors	Number of audiences for performances by art groups (10,000 person-times)		+		
	Number of cultural market operating institutions		+		
	Number of arts performance venues		+		
		Number of mass cultural institutions	+		
		Employees in culture industry (ten thousand)	+		

Data source: China Cultural Relics and Tourism Statistical Yearbook (2012–2022) and China Tourism Statistical Yearbook (2012–2018). Note: “+” indicates that the larger the index value, the higher the regional green development level.

3.4. Variable Descriptions

(1) Dependent and independent variables: The regional green development index (Gre) is used as the dependent variable in this study, with the integration of the culture industry and tourism index (IC) considered as the primary explanatory variable. The final evaluation result is derived using the calculation method outlined in the preceding section;

(2) Mediating variables: This paper employs the concept of the evolution of the tourism industrial structure (TSH) to gauge its structural upgrading. This concept describes the continuous flow of tourism factors from industry segments with lower technological contents and labor productivities to those with higher technological contents and labor productivities. Among the vector angle method [66], the proportion of highly elastic sector revenue in the total tourism revenue, and the weighted product of the output proportion and labor productivity across the three major tourism sectors, this paper employs the third method to measure the level of the evolution of the tourism industrial structure. The measurement formula is as follows:

$$TSH_{it} = \sum_{j=1}^n \frac{Y_{jt}}{Y_t} LP_{jt} \quad (8)$$

In the formula, TSH_{it} represents the level of the upgrading of the tourism industrial structure in region i during period t ; Y_{jt} denotes the tourism revenue of department j during period t ; LP_{jt} signifies the departmental labor productivity standardized by employing the range transformation method; n stands for the number of departments. According to statistical criteria, this section primarily encompasses three key sectors: travel agencies, star-rated hotels, and scenic attractions;

(3) Moderating variables: Environmental regulation (er) is one of the moderating variables in this study. The majority of the existing studies employ environmental policies or pollution levels as measures of environmental regulation, including, for instance, pollution emissions [67,68], the treatment of pollutants [69], industrial investment in pollution control and the added value of the secondary industry [70], pollution control expenses [71], per

capita environmental governance investment [72], and local environmental fiscal expenditures [73]. The existing methods for measuring environmental regulations have determined that a majority of environmental pollutants come from the secondary industry. The tourism and cultural industries are considered part of the tertiary sector, which is why this study employs the local environmental fiscal expenditure as a key indicator for assessing environmental regulations. Furthermore, given the differences in the economic conditions and populations across different regions, we use the ratio of the local environmental fiscal expenditure to the regional GDP to assess environmental regulations. Because local governments generally play a leading role in environmental governance, their environmental expenditure relative to the local GDP offers a more accurate reflection of their efforts and objectives in this regard;

(4) Control variables. According to relevant literature research, numerous factors exert influence green development. This article selects the following indicators as the control variables for empirical analysis:

Government support (gov) [74]. China is currently in a transition phase from rapid economic growth to high-quality development, in which the macro-regulation role of government departments is paramount. To foster coordinated and sustainable regional economic growth, the government has implemented a series of policies and measures and demonstrated significant financial support, indicating its strong commitment. The level of government support is represented in this study by the ratio of the local fiscal expenditure to the GDP;

The urbanization level (Urb) [75]. China has a dualistic urban–rural society. Although urbanization is rapidly accelerating, there are significant differences among regions, widening the gap in urban–rural economic development. The pace of urbanization can, to some extent, affect the progress of green development infrastructure and the quality of environmental governance. In this study, urbanization is represented by the urban population ratio within a given region;

The industrial structure (ind) [76]. The industrial structure refers to the composition and proportional relationship of various industries in the national economy, namely, the proportional relationship between agriculture, industry, and services in the national economy. This article mainly focuses on the integration of the culture industry and tourism, so it uses the ratio of the added value of the tertiary industry to the GDP to represent it;

The degree of technological progress (SCI) [38]. Technological progress plays a pivotal role in enhancing the efficiency of economic development. The scale of R&D investment has consistently expanded over the years, accompanied by the continuous optimization of the investment structure. This proactive approach has effectively facilitated the implementation of innovative and green development strategies, thereby providing essential resource support and reserves for regional green development. The degree of scientific and technological progress in this paper is quantified by the intensity of funding allocated to scientific and technological research and development, specifically measured as the ratio of the research and experimental development funding intensity to the GDP.

The economic development level (lnperGDP) [6]. The existing research literature suggests a significant correlation between green development, environmental pollution, and economic growth, which is represented by an inverted U-shaped curve known as the Kuznets curve. The level of economic development, therefore, emerges as a pivotal determinant that influences the effectiveness of the green development. In this paper, the level of economic development is quantified by using the logarithm of per capita GDP;

(5) Data sources and descriptive statistics

Due to the availability of data, this study uses panel data from 30 provincial-level administrative regions in China (excluding Tibet, Hong Kong, Macao, and Taiwan) from 2011 to 2021. The primary data sources include the China Environmental Statistical Yearbook (2012–2022), the China Cultural Relics and Tourism Statistical Yearbook (2012–2021), as well as regional statistical yearbooks spanning from 2012 to 2022.

The descriptive statistics of the variables are shown in Table 3. There is a significant imbalance in the levels of regional green development and the integration levels of the culture industry and tourism among the different provinces, with substantial disparities observed between regions characterized by the highest and lowest levels of development. According to the calculation results, the minimum value of regional green development is 0.025, and the maximum value is 0.646. The primary factor can be attributed to the disparate levels of economic development across regions, where regions with lower economic development tend to prioritize economic construction while neglecting environmental protection. The disparity in the levels of the integration of the culture industry and tourism is more pronounced, and there are more significant variations in the integration levels across different regions from a standard deviation perspective. Both the culture industry and tourism require specific resource endowments for their development. Meanwhile, the advantageous industries in different regions vary, and the industries receiving development support also differ, all of which are potential reasons for this outcome.

Table 3. Descriptive statistics of variables.

Variable	Mean	p50	SD	Min.	Max.	N
Gre	0.436	0.434	0.0840	0.232	0.706	330
IC	0.323	0.325	0.123	0.0190	0.653	330
HIT	0.229	0.191	0.116	0.0850	0.877	330
er	0.757	0.648	0.482	0.216	3.614	330
gov	24.87	22.59	10.25	10.66	64.30	330
urb	59.59	58.09	12.14	35.03	89.6	330
ind	47.63	47	9.733	29.68	83.87	330
sci	0.459	0.358	0.269	0.136	1.405	330
lnperGDP	4.723	4.706	0.193	4.215	5.265	330

4. Empirical Results and Analysis

4.1. Benchmark Regression

The results of the random-effects regression are presented in columns (1) and (2) of Table 4, while columns (3) and (4) display the outcomes of the panel-fixed-effects-model regression. The Hausman test yielded a result of 35.33, indicating significance at the 0.00 level. Consequently, it successfully passed the Hausman test, and it is evident that adopting the panel fixed-effects model is appropriate. The panel fixed-effects model, as depicted in Equation (1), effectively controls for the differences in individual characteristics and trend characteristics over time among different provinces by controlling for bidirectional fixed effects. Column (3) represents the baseline regression results without adding the control variables, while column (4) represents the baseline regression results after adding the control variables. The findings demonstrate that the coefficient is positive, affirming Hypothesis 1, which states that the integration of the culture industry and tourism fosters regional green development. After controlling for other variables, the coefficient of the integration level of the culture industry and tourism in column (4) decreased from 0.289 to 0.137. The levels of government support, technological progress, and regional economic development play significant roles in fostering regional green development. The level of government support indicates the extent to which financial assistance is provided by the governing body. Increased financial support leads to a greater allocation of fiscal resources towards promoting coordinated regional economic development and green initiatives, thereby facilitating the advancement of sustainable practices. The higher the level of technological progress, the more conducive it becomes to economic development by the acquisition of advanced technology and the implementation of superior management practices, which can enhance the resource utilization efficiency and promote green development. The level of regional economic development refers to the overall degree of economic advancement within a given region. Generally, a more developed economy tends to place greater emphasis on environmental governance. However, urbanization is not significant

at the 10% significance level, which may be due to the fact that urbanization leads to high pollution, potentially exerting an adverse influence on the environment.

Table 4. Benchmark regression results.

	(RE) Gre	(RE) Gre	(FE) Gre	(FE) Gre
IC	0.356 *** (0.049)	0.293 *** (0.049)	0.289 *** (0.067)	0.137 ** (0.062)
gov		−0.085 (0.059)		0.225 *** (0.079)
urb		0.000 (0.001)		0.001 (0.001)
ind		−0.145 *** (0.048)		0.021 (0.056)
sci		4.850 *** (1.438)		3.279 ** (1.307)
lnperGDP		0.054 * (0.031)		0.300 *** (0.046)
Year	N	N	Y	Y
Province	N	N	Y	Y
_cons	0.320 *** (0.020)	0.141 (0.125)	0.550 *** (0.029)	−1.034 *** (0.242)
N	330	330	330	330
Provinces	30	30	30	30
R ²	0.348	0.453	0.228	0.411

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, standard errors in parentheses.

4.2. Robustness Test

4.2.1. The Modification of the Measurement Indicators for the Dependent Variable

To validate the effectiveness of the benchmark regression, this study modified the metrics used to assess regional green development. The quality of the economic growth within the scope of green production encompasses various dimensions, with the per capita GDP being the most perceptible indicator. Therefore, this article uses the per capita GDP as a proxy for the indicator of the economic growth quality, replacing the initial system's indicators for measuring this quality. The other indicators in green production remain unchanged, and the entropy method is used to re-evaluate the level of regional green development. The regional green development (Gre*) after modifying the measurement indicators shows a positive coefficient in Table 5, column (1), indicating that the integration of the culture industry and tourism has made a significant contribution to promoting regional green development, which is consistent with the findings from the benchmark regression model.

Table 5. Results of the robustness test.

	(1) Gre*	(2) Gre	(3) Gre*
IC	0.288 *** (0.822)		
IC*		0.098 ** (0.042)	0.142 *** (0.053)
Control	Y	Y	Y
Year	Y	Y	Y
Province	Y	Y	Y
_cons	0.468 *** (0.105)	0.653 *** (0.049)	0.527 *** (0.102)
N	330	330	330
R ²	0.405	0.302	0.395
Provinces	30	30	30

Note: *** $p < 0.01$, ** $p < 0.05$, standard errors in parentheses.

4.2.2. The Modification of the Method Used to Calculate the Explanatory Variables

To further validate the effectiveness of the baseline regression, we altered the method for assessing the integration of the culture industry and tourism. In the baseline regression, this study employed the entropy method to calculate the composite evaluation indices for both the culture industry and tourism, followed by the computation of their coupled coordination degree. Here, we modified our calculation approach by using the entropy method to derive a composite evaluation index for the integration of the culture industry and tourism, considering a total of 16 indicators for both sectors. The integration of the culture industry and tourism, as represented by IC*, is depicted in Table 5, column (2), which presents the regression results following this modification. The coefficient is positive, aligning with the benchmark regression findings. Column (3) presents the regression results after modifying both the regional green development metrics and the approach for assessing the integration of the culture industry and tourism, maintaining consistency with the benchmark regression results, thereby demonstrating that the integration of the culture industry and tourism significantly enhances regional green development.

4.2.3. Test for Endogeneity

To achieve the objective of green development, a region will actively foster green industries. Compared to the secondary industry, the cultural tourism industry is “greener” and produces less pollution emissions from industrial activities. Therefore, the increasing demand for green development will drive a deeper integration of the culture industry and tourism, potentially leading to endogeneity issues arising from reverse causality. This paper employs a two-stage least-squares method and utilizes instrumental variables to address concerns regarding endogeneity. The museum industry provides a prime example of the integration of the culture industry and tourism. In terms of reflecting the prosperity of the local cultural tourism industry, the number of museum visitors is a more accurate indicator compared to the quantity of regional museums. Therefore, this article uses the number of museum visitors and the lagged one-period variable of the integration of the culture industry and tourism as the instrumental variables. Then, we use the 2SLS method for further verification. The specific findings are presented in Table 6. The Hausman test was initially employed to test the endogeneity of the explanatory variable, resulting in a p -value of 0.0052. At a significance level of 1%, we rejected the null hypothesis that all the explanatory variables are exogenous, thereby indicating that the integration of the culture industry and tourism is considered an endogenous variable. The p -value of the overidentification test is 0.819, leading to the acceptance of the null hypothesis that the instrumental variable (L.IC) exhibits exogeneity and lacks correlation with the disturbance term. After further investigation into the correlation between the instrumental variables and endogenous variables, we obtained a first-stage F-statistic of 57.677 with a corresponding p -value of 0.000. Consequently, it can be concluded that the selected instrumental variables in this study are not weak instrument variables. The results of the 2SLS regression demonstrate consistently significant positive findings that align with the benchmark regression results.

Table 6. 2SLS results.

	(First Stage) IC	(Second Stage) Gre
IC		0.180 * (0.102)
IV	0.413 *** (0.104)	
L.IC	0.499 *** (0.060)	
Control	Y	Y
Year	Y	Y

Table 6. Cont.

	(First Stage) IC		(Second Stage) Gre
Province	Y		Y
First-stage F-statistic (P)		F = 57.677 (0.000)	
N	300		300
R ²	0.983		0.956
Provinces	30		30

Note: *** $p < 0.01$, * $p < 0.1$, standard errors in parentheses.

4.3. Heterogeneity Analysis under Different Levels of Regional Green Development

Furthermore, for provinces across various regions with varying levels of green development, the facilitating role of the cultural and tourism industry integration on regional green development may differ. To explore the differentiated impact of the cultural and tourism integration on the regional green development across different levels of green development, we formulate a panel quantile regression model, as depicted in Equation (9):

$$Gre_{q,it} = \alpha_{q,0} + \alpha_{q,1}IC_{q,it} + \sum \alpha_{q,j}controls_{q,jit} + \mu_{q,i} + \nu_{q,t} + \varepsilon_{q,it} \quad (9)$$

where q represents the quantile point, and $Gre_{q,it}$ denotes the level of regional green development corresponding to the q quantile point. $\alpha_{q,1}$ indicates the impact of the integration of the culture industry and tourism on regional green development when the level of regional green development is at the corresponding level of the q quantile. Heterogeneity in the impact of the integration of the culture industry and tourism on regional green development is evident at various regional green development levels, as indicated by variations in the estimated values of α across different quantiles. The quantile regression model presented in Equation (9) is estimated using five selected quantiles, specifically 10%, 25%, 50%, 75%, and 90%. The corresponding results are reported in Table 7.

Table 7. Quantile regression results.

	(q10) Gre	(q25) Gre	(q50) Gre	(q75) Gre	(q90) Gre
IC	0.196 * (0.104)	0.254 ** (0.123)	0.264 ** (0.120)	0.286 ** (0.126)	0.336 ** (0.153)
Control	Y	Y	Y	Y	Y
Year	Y	Y	Y	Y	Y
Province	Y	Y	Y	Y	Y
_cons	0.496 *** (0.049)	0.428 ** (0.173)	0.299 * (0.152)	0.250 * (0.147)	0.577 *** (0.062)
N	330	330	330	330	330
Pseudo R ²	0.752	0.767	0.757	0.772	0.789
Provinces	30	30	30	30	30

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, standard errors in parentheses.

Provinces with lower levels of regional green development tend to allocate less attention to the environmental consequences arising from tourism activities, instead prioritizing the reduction in high-pollution and high-energy consumption activities as a means to alleviate the ecological pressures associated with tourism. At this stage, the integration of the culture industry and tourism may have a relatively limited impact on regional green development. Conversely, in provinces characterized by high levels of green development, the pursuit of green development requires an increased emphasis on the empowering role of cultural industries. This involves strengthening the application of cultural industries within the tourism sector and further advancing their integration with the tourism

industry. At this time, the integration of the culture industry and tourism has facilitated the promotion of regional green development. From Table 7, the estimated coefficients of the variable for the integration of the culture industry and tourism are significantly positive at all quantiles. Whether it pertains to regions characterized by relatively low levels of green development or regions distinguished by relatively high levels of green development, the integration of the culture industry and tourism can effectively facilitate regional green development, thereby supporting the aforementioned conclusion. At the 10% percentile, when regional green development is at a lower level, the coefficient of the variable for the integration of the culture industry and tourism is relatively small. As the percentile rises, the coefficient of the integration of the culture industry and tourism gradually increases. This suggests that, in regions with low levels of green development, although the integration of the culture industry and tourism can contribute to regional green development, its marginal impact remains relatively small. The integration of the culture industry and tourism has progressively strengthened its role in promoting green development, as the regional levels of green development continue to improve.

4.4. Analysis of Mediating Mechanism

The advancement of the tourism industry is used as a proxy variable to indicate its structural upgrading in this article. The variable settings in Equations (2) and (3) are consistent with those in Equation (1). Subsequently, estimation is conducted on the mediating-effect model comprising Equations (1)–(3), and the results are presented in Table 8. The results indicate that, consistent with previous estimations, the estimated coefficient of the variable for the integration of the culture industry and tourism is significantly positive at the 5% level. Column (2) demonstrates that the integration of the culture industry and tourism has a significant promotional effect on the upgrading of the structure of the tourism industry. Moreover, column (3) shows that the upgrading of the tourism industrial structure also has a significant promotional effect on regional green development. The integration of the culture industry and tourism facilitates the upgrading of the tourism industrial structure, thereby fostering regional green development, as inferred from the findings in columns (2) and (3). Consequently, Hypothesis 2 was substantiated. The mediating effect was also confirmed through the Sobel test. After taking into account the mediating effect of upgrading the structure of the tourism industry, we still observe a significantly positive coefficient for the IC variable in column (3), indicating that upgrading the structure of the tourism industry acts as a partial mediator. The integration of the culture industry and tourism can indirectly promote regional green development through various mechanisms.

Table 8. Test results of the mediating effect.

	(1) Gre	(2) TSH	(3) Gre
IC	0.142 ** (0.064)	8.763 *** (3.265)	0.106 * (0.064)
TSH			0.004 *** (0.0011)
Control	Y	Y	Y
Year	Y	Y	Y
Province	Y	Y	Y
Sobel test		0.03584 (z = 2.153, p = 0.0313)	
N	330	330	330
R ²	0.365	0.828	0.475
Provinces	30	30	30

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, standard errors in parentheses.

4.5. Moderating-Effect Test

The moderating-effect model, as formulated in Equation (4), was estimated, and the corresponding results are presented in Table 9. Column (1) represents the estimated

outcomes of the model, while column (2) substitutes the dependent variable with the regionally recalculated green development variable from the previous robustness test, thereby further illustrating the model's resilience. The estimation results reveal that both the IC and er exhibit positive coefficients at the 5% significance level. The interaction term between the two is also significantly positive at the 1% significance level, indicating that environmental regulations enhance the promoting effect of the integration of the culture industry and tourism on regional green development. Hypothesis 3 has been confirmed. Based on this result, the government should account for the multidimensional and systematic nature of regional green development, highlighting the synergy between environmental regulatory policies and the advancement of the integration of the culture industry and tourism, to maximize the impact of the integration of the culture industry and tourism on promoting regional green development.

Table 9. Test results of the moderating effect.

	(1) Gre	(2) Gre*
IC	0.142 ** (0.061)	0.198 *** (0.733)
er	0.031 ** (0.013)	0.044 *** (0.156)
IC × er	0.189 *** (0.467)	0.173 *** (0.559)
Control	Y	Y
Year	Y	Y
Province	Y	Y
_cons	−1.129 *** (0.236)	−2.025 *** (0.282)
N	330	330
R ²	0.448	0.552
Provinces	30	30

Note: *** $p < 0.01$, ** $p < 0.05$, standard errors in parentheses.

5. Conclusions and Policy Recommendations

As a key driver of economic growth in developing countries, tourism is becoming increasingly important in the overall economy. Currently, studies on tourism generally believe that tourism can promote economic growth [77], but with the expansion of tourism, the environmental problems it brings cannot be ignored. Therefore, some scholars have begun to study how to shift tourism towards a green economy [22], including by the greening of tourism activities, the development of sustainable tourism [78], the introduction of digital technology, the development of smart tourism [79], the promotion of green innovation [80], and other methods. This article primarily examines how excavating the cultural connotation of tourism products and integrating cultural elements into tourism can further develop tourism, promote economic growth, reduce pollution emissions caused by tourism activities, and improve social welfare. Therefore, the integration of the culture industry and tourism is an important way to achieve regional green development. This study establishes an evaluation index system to assess the level of regional green development, quantifies the status of regional green development across 30 provincial administrative regions in China from 2011 to 2021, employs the coupling evaluation method to quantify the level of integration between the culture industry and tourism, and analyzes the influence, heterogeneity, and mechanism of the integration of the culture industry and tourism on regional green development during the inspection period. The research shows the following: First, the integration of the culture industry and tourism can foster regional green development. Even after conducting rigorous robustness tests, such as modifying the indicators used to measure regional green development, revising the measurement method for assessing the level of the integration of the culture industry and tourism, and employing instrumental

variable methods, this conclusion remains valid. Second, the quantile regression results reveal a progressive enhancement in the overall trend of the promotion effect of the integration of the culture industry and tourism on regional green development as the level of regional green development continues advancing. Third, the analysis of the impact mechanism reveals that the integration of the culture industry and tourism can promote the upgrading of the tourism industrial structure, thereby elevating the level of regional green development. Fourth, from the perspective of policy coordination analysis, environmental regulatory policies can enhance the facilitative role of the integration of the culture industry and tourism in promoting regional green development.

Based on the aforementioned conclusions, this article proposes the following policy recommendations. First, improved support systems should be established to facilitate the integration of the culture industry and tourism. The integration of the culture industry and tourism is not solely a spontaneous process, as certain barriers exist among different sectors. Achieving such integration is a long-term process. The integration of the culture industry and tourism serves as a crucial driving force for upgrading the structure of the tourism industry. Therefore, it is imperative for the government to establish a favorable policy environment that facilitates the integration and development of these two industries, ultimately promoting regional green development. Second, policies should be customized according to the local conditions and grounded in the current state of the green development in each region. In provinces characterized by high levels of green development, it is imperative for local governments to proactively facilitate the integration of the culture industry and tourism in order to fully harness the potential of such an integration in driving regional green development. In regions with lower levels of green development, it is imperative for the government to facilitate the integration of the culture industry and tourism, steer the tourism sector towards exploring cultural resources, and provide support for the emerging cultural tourism industry. This will further enhance the role of the integration of the culture industry and tourism in promoting regional green development. Third, the synergy between environmental regulatory policies and the integration of the culture industry and tourism needs to be enhanced. This may be accomplished by fully leveraging the environmental regulation policy tools to be used, such as in a guiding role in the integration of the culture industry and tourism in green development, strengthening policy coordination, and maximizing the role of the integration of the culture industry and tourism in promoting regional green development.

6. Research Deficiencies and Prospects

This article confirms the green development effect of the integration of the culture industry and tourism, which is of significant practical importance. Nevertheless, there are still some deficiencies within this article. The research sample of this paper includes 30 provinces across China from 2011 to 2021. The COVID-19 pandemic has had a long-term negative impact on tourism and the economy, and this negative impact exceeds that observed during previous pandemic crises [81]. However, at the end of the pandemic, consumer optimism is high, as consumers in China are regaining confidence [82]. Therefore, since COVID-19 has been effectively controlled, tourism on the Chinese Mainland has recovered quickly. Tourists have a strong desire to travel in order to alleviate the depression related to the fatigue of the pandemic. Secondly, the government has issued policies to support the tourism industry. Thirdly, tourism enterprises are working to rebuild the destination image and launch promotional activities [83]. Therefore, the government is focusing even more on building the images of tourist destinations and demanding more environmentally friendly tourism practices. Tourism enterprises, in an effort to enhance the appeal of their tourism products, place greater emphasis on shaping the cultural connotations of these products. Moreover, to enhance their profits, enterprises enhance their resource efficiencies while meeting the government's basic requirements, thereby achieving the goal of promoting regional green development. However, due to the limited data sample, which covers only the first two years of the COVID-19 pandemic, the sample

size is too small, and corresponding empirical results are not provided. In subsequent research, micro-level data can be used for further empirical testing. Furthermore, this article focuses solely on the mediating impact of the integration of the culture industry and tourism on regional green development through the lens of the tourism industrial structure. Therefore, a more comprehensive analysis and examination of other mediating mechanisms is necessary. For instance, the integration of the culture industry and tourism can facilitate the synergistic agglomeration of these sectors, leading to economies of scale and ultimately enhancing the level of regional green development. This article did not investigate the potential mechanisms of action mentioned above due to the challenges associated with data acquisition. A thorough investigation into the mechanism by which the amalgamation of the cultural and tourism industries facilitates regional green development is a crucial matter that requires consideration in future research.

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