Research On China's Tourism Competitiveness and its Coordination Degree Based on the Three-Dimensional Perspective Of Market, Resources and Environment

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Abstract. Tourism competitiveness and its development coordination are of great significance for tourism destinations, scenic spots, and tourist areas to occupy an excellent position in the tourism market and maintain a competitive advantage. Based on the three-dimensional perspective of market, resources and environment, this paper used entropy method, proportion method, tourism competitiveness index method and coordination degree model to study China's tourism competitiveness and its coordination degree. The results showed that the competitiveness of China's tourism was gradually enhanced. The competitiveness of the domestic market was gradually enhanced, and the coordination degree between the competitiveness of the domestic market and the competitiveness of the inbound market presented the characteristics of volatility. The competitiveness of resources showed a slow upward trend, the competitiveness of reception capacity was greater than that of human resources, and the coordination degree between the competitiveness of resources and reception capacity was high. The degree of coordination between resource competitiveness and human resource competitiveness was slowly declining year by year. The environmental competitiveness was on the rise rapidly, and the economic environmental competitiveness, facility environmental competitiveness and ecological environmental competitiveness were on the rise. The overall coordination between economic environment, facility environment and ecological environment was improving year by year. Finally, some countermeasures and suggestions related to improving the tourism competitiveness were put forward, so as to provide some references for the development of China's tourism industry.

Keywords: tourism competitiveness, market, resources, environment, China

1 Introduction

The tourism industry involves multiple daily and productive services, which can effectively promote multi-level consumption and repeated consumption [1]. Tourism includes

F. Cao et al. (eds.), *Proceedings of the 2023 5th International Conference on Economic Management and Cultural Industry (ICEMCI 2023)*, Advances in Economics, Business and Management Research 276,
https://doi.org/10.2991/978-94-6463-368-9_97

six major elements: food, housing, transportation, travel, shopping, and entertainment, so the tourism industry is a comprehensive industry. The tourism industry is an important component of the national economy, according to the theory of tourism economy [2], tourism can create more possibilities for national economic development [3]. For example, the development of the tourism industry is believed to effectively stimulate residents' consumption and drive economic growth [4]. At the same time, as an important component of modern service industries, tourism can increase employment opportunities, national income, and facilitate foreign exchange sources. Tourism can also increase social integration and promote cultural diversity development [5]. Overall, the development of the tourism industry has also driven the development of its surrounding industries, making it a vibrant economic growth point. Especially in the context of the country's transformation of economic growth mode and the implementation of sustainable strategies, the tourism industry has played a huge role in expanding employment, promoting urban and rural construction, and improving people's living standards due to its pollution-free and sustainable development characteristics [6]. However, with the development of the tourism industry, the trend of economic globalization and regional development integration has strengthened, and the relationship between tourist destinations has become more complex. The competition in the tourism industry has shifted from simple attraction competition to regional competition [7]. Moreover, various types of consumption brought about by tourism activities promote the development of the local economy, but excessive pursuit of economic effects while neglecting the protection of the natural environment can lead to environmental pollution or exacerbate the destruction of tourism resources, thereby affecting the ecological environment of tourism destinations [8]. Therefore, tourism competitiveness and its development coordination are essential for tourist destinations, tourist areas, scenic spots, or tourism products to maintain a good position in the tourism market and maintain excellent competitive advantages [9].

In the early 1990s, Porter systematically elaborated on the theory of competitive advantage from the perspective of studying national competitive advantage in his book *national competitive advantage*. The theory of competitive advantage has great applicability to the development of the tourism industry. Because the development of modern tourism has shifted from a purely factor driven stage to an investment driven and innovation driven stage, the theory of competitive advantage provides theoretical guidance for the acquisition and maintenance of regional tourism competitiveness [7]. At the same time, tourism competitiveness refers to the market utility value reflected within the tourism system. Based on its own internal advantages, it utilizes and optimizes external macro environmental conditions to clarify the development situation and prospects of tourism as the main body. It not only represents the existing development capacity, but also an important indicator of the sustainable development capacity of future tourism [10]. Based on this, tourism competitiveness can be divided into two categories: one is to view the country as the main body of competitiveness, and the connotation of tourism competitiveness refers to a country's comprehensive tourism competitiveness. The other type is based on the competitiveness of regions, cities, scenic spots, and tourism products, with its connotation being a specific aspect of competitiveness [11]. Therefore, as a comparative ability, the core scientific issue that urgently needs to be paid attention

to in the context of China's economic and social transformation and development is what China's tourism competitiveness is, and whether it has achieved regional coordinated development.

Many scholars have conducted extensive theoretical and empirical research on tourism competitiveness. Scholars evaluate tourism competitiveness from three aspects: infrastructure competitiveness, tourism environment competitiveness, and economic strength competitiveness [12]. Scholars have selected representative, comprehensive, and obtainable principles based on evaluation indicators to construct a comprehensive evaluation index system for the competitiveness of the entire tourism industry from three levels of competitiveness: performance, resources, and support [13]. Wu et al. studied tourism competitiveness from the perspectives of resource competitiveness, environmental competitiveness, and market competitiveness [14], and it is proposed that market competitiveness refers to the current market development status of regional tourism industry, and the market is another important condition for the development of tourism industry. Resource competitiveness refers to the tourism and human resources possessed by a region, and resources are the foundation for the development of the tourism industry. Environmental competitiveness refers to the economic environment, green environment, and infrastructure of a region, and the environment is a necessary condition for the development of tourism industry [14]. These research results provide good reference value for the evaluation and coordination of China's tourism competitiveness. Therefore, this article constructs a basic framework for the study of China's tourism competitiveness based on three dimensions: market competitiveness, facility competitiveness, and environmental competitiveness. Meanwhile, the coordination degree of China's tourism competitiveness is studied using the three dimensions of market competitiveness, facility competitiveness, and environmental competitiveness, as well as their corresponding sub indicators. On this basis, this article applies four methods to study China's tourism competitiveness and its coordination. Which are the models of the entropy method [15], specific gravity method [16], tourism competitiveness index method [15], and coordination model [17]. Therefore, studying tourism competitiveness and its coordination degree from the perspectives of market, facilities, and environment has a theoretical and methodological foundation, which further demonstrates the feasibility, reference, and operability of studying China's tourism competitiveness and its coordination degree.

2 Data Source

The data used in this study is sourced from the *China Statistical Yearbook 2011-2020*. Among them, the number of A-level and above scenic spots came from the website https://bbs.pinggu.org/. On this basis, an evaluation index system for the study of China's tourism competitiveness and coordination was constructed based on the principles of scientificity, comprehensiveness, effectiveness, and feasibility. For example, primary indicators, secondary indicators, and tertiary indicators were constructed to study China's tourism competitiveness and its coordination degree (Table 1). The first

level indicators are market competitiveness, resource competitiveness, and environmental competitiveness. The secondary indicators corresponding to market competitiveness were domestic market and inbound market respectively; the secondary indicators corresponding to resource competitiveness were reception capacity and human resources; the secondary indicators corresponding to environmental competitiveness were economic environment, facility environment, and ecological environment. At the same time, each secondary indicator had some corresponding tertiary indicators, and the data characteristics of each tertiary indicator were statistically described using mean and standard deviation.

Table 1. Selection of China's tourism competitiveness indicators

Primary indicators	Secondary indicators	Third level indicators	Average	Standard deviation
Market competitiveness	Domestic market	Domestic tourism revenue (100 million US dollars)	33895.44	14451.71
		Domestic tourists (100 million people)	39.56	12.82
	Inbound market	International tourism revenue (100 million US dollars)	868.31	385.77
		Inbound tourists (10000 person times)	13574.20	535.72
Resource competitiveness	Reception capacity	Number of A-level or above scenic spots (individual)	8400.90	2778.21
		Number of travel agencies(individual)	28565.10	5447.12
		Number of star rated hotels(individual)	11907.70	1763.61
	Human resources	Employment in Tertiary sector of the economy (10000 persons)	31102.43	3370.10
		Average number of students in higher education institutions per 100000 population (person)	2482.79	196.77
Environmental competitiveness	Economic environment	GDP of Tertiary sector of the economy (100 million yuan)	343567.97	118722.15
		General Public budgeting revenue (100 million yuan)	143202.60	35103.52
	Facility environment	Railway operating mileage (10000 kilometers)	11.41	1.71
		Highway mileage (10000 kilometers)	450.78	33.15
		Regular flight route mileage (10000 kilometers)	552.89	230.85
		Health personnel (person)	10480840.10	1580431.30
		Number of domain names (10000)	2694.88	1520.23
		Number of web pages (10000)	18974417.47	8253153.44
		Internet broadband access ports (10000)	53553.60	26925.40
	Ecological environment	Industrial pollution control completed investment (10000 yuan)	6699756.57	1921520.99
		Total ecological water consumption (100 million cubic meters)	142.62	48.53
		Total afforestation area (hectares)	6640967.40	882268.50

3 Research Methods

3.1 Entropy Method

The main principle of entropy method is that in the evaluation process of *n* index factors and *m* evaluated objects, the entropy of the *i* th evaluation index is defined as [15]:

$$H_j = -k\sum_{i=1}^{m} f_{ij}\ln f_{ij} \tag{1}$$

$$f_{ij} = \frac{I_{ij}}{\sum_{i=1}^{m} I_{ij}},\ \mathrm{k} = \frac{1}{\ln m},\ H_j \geq 0,\ \mathrm{k} \geq 0 \tag{2}$$

$$\omega_j = \frac{1-H_j}{\sum_{i=}^{m}(1-H_j)} \tag{3}$$

In the equation, I_{ij} represents the standardized value of the third level indicator, f_{ij} represents the proportion of tertiary indicators, H_j represents entropy, *k* represents parameter, ω_j represents the weight.

3.2 Specific Gravity Method

The nature of the proportion method for standardizing data is that the relative difference within the same indicator remains unchanged, the relative difference within different indicators is uncertain, interval stability, total amount invariance, monotonicity, difference ratio invariance, and scaling independence. Due to the fact that all data used are numbers greater than zero, the specific gravity method can be used to standardize the data [16]:

$$I_{ij} = \frac{\alpha_{ij}}{\sum_{i=1}^{n}\alpha_{ij}} \tag{4}$$

In the formula, I_{ij} represents standardized processing data, α_{ij} represents actual data.

3.3 Tourism Competitiveness Index

Using a comprehensive evaluation model with multiple evaluation indicators, calculate the corresponding tourism competitiveness index for China from 2010 to 2019. The basic principle of its evaluation model is [15]:

$$F_i = \sum_{i=1}^{m} I_{ij}w_i \tag{5}$$

In the formula, F_i is the comprehensive index of the development level of the *i* th evaluation unit; I_{ij} is the standardized value of the *i* th evaluation unit on the *j* th indicator of the *i* th evaluation unit; w_i is the weight of the *j* th indicator; *j* is the number of indicators (*j*=1,2,3,..., *n*); *i* is the number of evaluation units (*i*=1,2,3,..., *m*).

3.4 Coordination Model

Using the tourism competitiveness index to calculate the pairwise coordination degree C_{xy} in the market resource environment, simultaneously calculating the overall coordination degree C_{all} corresponding to the market, resources, and environment [17]. The calculation formula is as follows:

$$C_{xy} = \frac{F_1(x) \times F_2(y)}{\left[\frac{F_1(x)+F_2(y)}{2}\right]^2} \tag{6}$$

$$C_{all} = \frac{F_1(x_1) \times F_2(x_2) \times \cdots \times F_n(x_n)}{\left[\frac{F_1(x_1)+F_2(x_2)+\cdots+F_n(x_n)}{2}\right]^2} \tag{7}$$

In the equation, $F_1(x)$, $F_2(y)$ and $F_n(x_n)$ represents the tourism competitiveness index in the dimensions of market, resources, and environment, or represents the tourism competitiveness index in the corresponding sub indicators in the dimensions of market, resources, and environment.

4 Overall Competitiveness and Coordination Evaluation

4.1 Overall Competitiveness Evaluation

As shown in Table 2, China's tourism competitiveness showed an upward trend from 2010 to 2019, with competitiveness indices of 0.143, 0.154, 0.163, 0.182, 0.195, 0.220, 0.238, 0.249, 0.266, and 0.289 in 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2019, respectively. Among them, market competitiveness, resource competitiveness, and environmental competitiveness were also showing an upward trend.

Table 2. Overall tourism competitiveness

Competitiveness	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Overall competitiveness	0.143	0.154	0.163	0.182	0.195	0.220	0.238	0.249	0.266	0.289
Market competitiveness	0.025	0.028	0.030	0.031	0.034	0.043	0.047	0.050	0.054	0.058
Resource competitiveness	0.043	0.044	0.045	0.047	0.049	0.051	0.052	0.052	0.057	0.060
Environmental competitiveness	0.075	0.081	0.089	0.103	0.112	0.126	0.140	0.146	0.155	0.171

As shown in Table 3, market competitiveness had the smallest contribution to overall competitiveness, followed by resource competitiveness, and environmental competitiveness had the largest contribution to overall competitiveness. At the same time, the contribution of environmental competitiveness to overall competitiveness exceeded 50%. For example, in 2019, the contributions of market competitiveness, resource competitiveness, and environmental competitiveness to overall competitiveness were 20.03%, 20.72%, and 59.25%, respectively. The impact of market competitiveness on overall competitiveness was gradually increasing. For example, from 2010 to 2019, the contribution of market competitiveness to overall competitiveness ranged from 17.17% to 20.03%, was showing a slow upward trend. The impact of resource competitiveness was decreasing year by year, with corresponding contribution proportions of resource

competitiveness to overall competitiveness being 30.20% and 20.72% in 2010 and 2019, respectively. The contribution of environmental competitiveness to overall competitiveness was gradually increasing, such as 52.63%, 52.86%, 54.32%, 56.74%, 57.55%, 57.29%, 58.69%, 58.73%, 58.40%, 58.40%, and 59.25% in 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2019, respectively. The proportion of market competitiveness showed a trend of fluctuating and increasing year by year, the proportion of resource competitiveness showed a trend of decreasing year by year, and the proportion of environmental competitiveness showed a trend of increasing year by year.

Table 3. Contribution of market, resource, and environmental competitiveness to overall competitiveness

Year	Proportion of market competitiveness (%)	Proportion of resource competitiveness (%)	Proportion of environmental competitiveness (%)
2010	17.17	30.20	52.63
2011	18.27	28.87	52.86
2012	18.19	27.50	54.32
2013	17.28	25.98	56.74
2014	17.45	25.00	57.55
2015	19.54	23.18	57.29
2016	19.56	21.75	58.69
2017	20.23	21.04	58.73
2018	20.33	21.27	58.40
2019	20.03	20.72	59.25

4.2 Coordination Evaluation

According to Table 4, from 2010 to 2019, there was an increasing trend in the coordination between competitiveness and market competitiveness, as well as between competitiveness and resource competitiveness. The range of changes in $C_{\text{market competition}}$ and $C_{\text{resource competition}}$ was [0.501, 0.556] and [0.568, 0.712], respectively; The $C_{\text{environment competition}}$ showed an upward trend from 2010 to 2016, with a range of changes between [0.904, 1]. By comparing the three factors of $C_{\text{Tall competition – market competition}}$, $C_{\text{Tall competition – resources competition}}$, and $C_{\text{Tall competition – environment competition}}$, it can be concluded that $C_{\text{Tall competition – environment competition}} > C_{\text{Tall competition – resources competition}} > C_{\text{Tall competition – market competition}}$. This indicated that the key to enhancing tourism competitiveness lied in the development of tourism industry entities, namely excellent environment and distinctive tourism resources. Only good tourism industry entities can attract tourists or objects like tourists, which led to the expansion and redevelopment of the tourism market. The range of changes in $C_{\text{market competition –resource competition}}$ is [0.925, 1.000], indicating that the coordination between market competitiveness and resource competitiveness had been increasing from 2010 to 2019, was indicating a close relationship between the market and resources. At the same time, with the development of the times and the impact of tourism resource diversity, the importance of relying on resources to expand the market in

the tourism industry is increasing. Meanwhile, the range of changes in the $C_{\text{market competition- environment competition}}$ is [0.743, 0.755], which indicated that the coordination between market competitiveness and environmental competitiveness was increasing, but the increase was relatively small. The expansion of market size causes environmental pressure and carrying capacity pressure within tourist attractions, as well as traffic pressure between tourist sources and destinations, which to some extent promotes the objective reality that the larger the market size, the greater the environmental pressure. And the change range of $C_{\text{resource competition- environment competition}}$ was [0.768, 0.927], which indicated that the coordination between resource competitiveness and environmental competitiveness was declining. On the one hand, it implied that the diversification of tourism resources had reduced the dependence of resources on the environment. Besides, it indicated that the overexploitation of resources may have a certain impact on the environment, which also made the coordination between resource competitiveness and environmental competitiveness decline. C_{all} represented the overall coordination among market, resource, and environmental competitiveness, with a variation range of [0.016, 0.028]. This indicated that the overall coordination between market, resource, and environmental competitiveness was relatively low. However, over time, the overall coordination between market, resource, and environmental competitiveness was gradually increasing, and the relationship between the three tended to be harmonious. However, the amplitude of change among the three was still very small. Therefore, there was still a long way to go to achieve comprehensive coordination between the market, resources, and environment.

Table 4. Coordination among market-resources-environment

Year	C Tall Competition – Market competition	C Tall Competition – Resource competition	C Tall Competition – Environment competition	C Market Competition – Resource competition	C Market Competition – Environment competition	C *Resource Com*petition – Environment competition
2010	0.501	0.712	0.904	0.925	0.743	0.927
2011	0.523	0.695	0.905	0.950	0.764	0.914
2012	0.520	0.676	0.913	0.958	0.751	0.892
2013	0.502	0.655	0.924	0.959	0.716	0.862
2014	0.506	0.640	0.927	0.969	0.714	0.844
2015	0.547	0.611	0.926	0.993	0.758	0.820
2016	0.548	0.587	0.932	0.997	0.750	0.789
2017	0.560	0.574	0.932	1.000	0.762	0.777
2018	0.561	0.579	0.931	0.999	0.766	0.783
2019	0.556	0.568	0.935	1.000	0.755	0.768

5 Research on Competitiveness and Coordination From a Three-Dimensional Perspective of Market, Facilities, and Environment

5.1 Market Competitiveness and Coordination Evaluation

According to Table 5, the corresponding market competitiveness indices for 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2019 were 0.025, 0.028, 0.030, 0.031, 0.034, 0.043, 0.047, 0.050, 0.054, and 0.058, respectively. From 2010 to 2012, the competitiveness index of the inbound market was greater than that of the domestic market. From 2013 to 2019, the domestic market competitiveness index was greater than the inbound market competitiveness index. Meanwhile, from 2010 to 2019, market competitiveness, domestic market competitiveness, and inbound market competitiveness showed an increasing trend year by year, and the increase in domestic market competitiveness was greater than that in inbound market competitiveness.

Table 5. Market competitiveness index

Year	Market competitiveness	Domestic market competitiveness	Inbound market competitiveness
2010	0.025	0.009	0.015
2011	0.028	0.013	0.016
2012	0.030	0.014	0.016
2013	0.031	0.016	0.015
2014	0.034	0.018	0.016
2015	0.043	0.020	0.023
2016	0.047	0.023	0.024
2017	0.050	0.026	0.024
2018	0.054	0.029	0.025
2019	0.058	0.032	0.026

According to Table 6, the range of $C_{\text{market competition-domestic market competition}}$ was [0.792, 0.918], the range of $C_{\text{market competition- inbound market competition}}$ was [0.853, 0.947], and the range of $C_{\text{domestic market competition-inbound market competition}}$ was [0.936, 1]. The coordination between market competitiveness and domestic market competitiveness showed an increasing trend year by year, while the coordination between market competitiveness and inbound market competitiveness showed a decreasing trend year by year. Meanwhile, from 2010 to 2012, $C_{\text{market competition- inbound market competition}} > C_{\text{market competition- domestic market competition}}$. From 2013 to 2014, $C_{\text{market competition- inbound market competition}} < C_{\text{market competition - domestic market competition}}$. From 2015 to 2016, $C_{\text{market competition- inbound market competition}} > C_{\text{market competition- domestic market competition}}$. From 2017 to 2019, $C_{\text{market competition- inbound market competition}} < C_{\text{market competition- domestic market competition}}$. This indicated that although the competitiveness of the domestic market was gradually increasing. At the same time, there had been twists and turns in the coordination between domestic market competitiveness and inbound market competitiveness, which also corresponded to the fluctuating characteristics of

the coordination between domestic market competitiveness and inbound market competitiveness. Meanwhile, $C_{\text{domestic market competition- inbound market competition}}=C_{\text{all}}$ (overall coordination between domestic market and inbound market competitiveness). Although there was a trade-off between domestic market size and inbound market size, the value of C_{all} was above 0.9, was indicating a high overall coordination between domestic market competitiveness and inbound market competitiveness. On the one hand, this was because in recent years, the rapid development of the Chinese economy, the continuous improvement of people's quality of life, and the realization of a comprehensive well-off society in China had all prompted people to have more money and time to carry out a series of tourism related activities. Besides, tourism also promoted a better life for people.

Table 6. Coordination among market competition - domestic market competition- inbound market competition

Year	$C_{\text{market competition- inbound market competition}}$	$C_{\text{market competition- inbound market competition}}$	$C_{\text{domestic market competition- inbound market competition}}$
2010	0.792	0.947	0.936
2011	0.851	0.919	0.987
2012	0.875	0.902	0.998
2013	0.894	0.884	1.000
2014	0.906	0.870	0.996
2015	0.869	0.907	0.996
2016	0.881	0.896	0.999
2017	0.898	0.879	0.999
2018	0.910	0.865	0.994
2019	0.918	0.853	0.988

5.2 Evaluation of Resource Competitiveness and Coordination Degree

According to Table 7, the resource competitiveness index showed a slow upward trend from 2010 to 2019. The corresponding resource competitiveness indices for 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2019 were 0.043, 0.044, 0.045, 0.047, 0.049, 0.051, 0.052, 0.052, 0.057, and 0.060, respectively. Among them, the competitiveness index of reception capacity and the competitiveness index of human resources showed a slow upward trend. The range of the competitiveness index of reception capacity from 2010 to 2019 is 0.026 to 0.037, and the competitiveness index of human resources from 2010 to 2019 were 0.018 to 0.023. At the same time, the contribution of competitiveness in reception capacity to resource competitiveness was greater than that of human resource competitiveness.

Table 7. Resource competitiveness index

Year	Resource competitiveness	Reception capacity competitiveness	Human resource competitiveness
2010	0.043	0.026	0.018
2011	0.044	0.027	0.018
2012	0.045	0.027	0.018
2013	0.047	0.028	0.019
2014	0.049	0.029	0.020
2015	0.051	0.031	0.020
2016	0.052	0.031	0.021
2017	0.052	0.031	0.021
2018	0.057	0.035	0.022
2019	0.060	0.037	0.023

According to Table 8, from 2010 to 2019, the variation range of $C_{\text{resources competitiveness - reception capacity competitiveness}}$ was between 0.934 and 0.944, was showing an upward trend, indicating a high degree of coordination between resource competitiveness and reception capacity competitiveness. From 2010 to 2019, the range of changes between $C_{\text{resources competitiveness - human resources competitiveness}}$ was between 0.801 and 0.823, showing a downward trend. This indicated that the coordination between resource competitiveness and human resource competitiveness was slowly decreasing year by year. From 2010 to 2019, the variation range of $C_{\text{reception capacity competitiveness -human resource competitiveness}}$ was between 0.946 and 0.967, indicating a high degree of coordination between the competitiveness of reception capacity and human resources. Meanwhile, $C_{\text{all}}=C_{\text{reception capacity competitiveness - human resources competitiveness}}$, and the overall coordination degree was equal to the coordination degree between reception capacity competitiveness and human resources competitiveness. The results indicated that resource competitiveness was mainly influenced by the competitiveness of reception capacity and human resources. However, over time, the improvement speed of reception capacity was faster than the development speed of human resources, resulting in lower competitiveness of human resources compared to reception capacity. Therefore, in terms of resource competitiveness, we should continue to strengthen the construction of measures to enhance human resource competitiveness.

Table 8. Coordination degree among resources competitiveness, reception capacity competitiveness, and human resources competitiveness

Year	$C_{\text{resources competitiveness - reception capacity competitiveness}}$	$C_{\text{resources competitiveness - human resources competitiveness}}$	$C_{\text{reception capacity competitiveness -human resource competitiveness}}$
2010	0.934	0.823	0.966
2011	0.936	0.820	0.963
2012	0.935	0.822	0.965
2013	0.935	0.821	0.964
2014	0.934	0.824	0.967
2015	0.937	0.817	0.961
2016	0.938	0.816	0.960
2017	0.936	0.821	0.964
2018	0.943	0.804	0.949
2019	0.944	0.801	0.946

5.3 Evaluation of Environmental Competitiveness and Coordination Degree

According to Table 9, environmental competitiveness showed a rapid upward trend from 2010 to 2019. Specifically, the corresponding environmental competitiveness indices for 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2019 were 0.075, 0.081, 0.089, 0.103, 0.112, 0.126, 0.140, 0.146, 0.155, and 0.171, respectively. Meanwhile, from 2010 to 2019, the competitiveness of the economic environment, facility environment, and ecological environment showed an upward trend. From 2010 to 2019, the range of changes in economic environmental competitiveness was 0.011 to 0.029. The variation range of facility environmental competitiveness was 0.040-0.105. The range of changes in ecological environmental competitiveness was 0.024-0.038. In terms of the contribution of environmental competitiveness, the contribution of facility environmental competitiveness was the largest, the contribution of ecological environmental competitiveness ranks second, and the contribution of economic environmental competitiveness was the smallest.

Table 9. Environmental competitiveness index

Year	Environmental competitiveness	Economic and environmental competitiveness	Facility environmental competitiveness	Ecological environment competitiveness
2010	0.075	0.011	0.040	0.024
2011	0.081	0.014	0.044	0.024
2012	0.089	0.015	0.050	0.024
2013	0.103	0.017	0.057	0.029
2014	0.112	0.019	0.063	0.031
2015	0.126	0.021	0.074	0.032
2016	0.140	0.022	0.084	0.033
2017	0.146	0.025	0.089	0.033
2018	0.155	0.027	0.094	0.034
2019	0.171	0.029	0.105	0.038

According to Table 10, it can be seen that the $C_{\text{environment competitiveness -economic environment competitiveness}}$ was slowly increasing in fluctuations, indicating that the coordination between environmental competitiveness and economic environmental competitiveness was slowly increasing in fluctuations, and the range of $C_{\text{environment competitiveness -economic environment competitiveness}}$ was [0.454, 0.505], indicating that the role of economic environmental competitiveness in environmental competitiveness was relatively weak. The range of $C_{\text{environment competitiveness -facility environment competitiveness}}$ was [0.909, 0.942], and the coordination between environmental competitiveness and facility environmental competitiveness showed a gradually increasing trend over time. Additionally, the impact of facility environmental competitiveness on environmental competitiveness was strong, reaching over 0.9. The range of $C_{\text{environment competitiveness -ecological environment competitiveness}}$ was [0.593, 0.728], indicating that the coordination between environmental competitiveness and ecological competitiveness was increasing, and the role of ecological competitiveness in environmental competitiveness was relatively strong. In addition, $C_{\text{environment}}$

$C_{\text{competitiveness - facility environment competitiveness}} > C_{\text{environment competitiveness - ecological environment competitiveness}} > C_{\text{environment competitiveness - economic environment competitiveness}}$, indicating that the order of dependence for improving environmental competitiveness from large to small was the competitiveness of facility environment, ecological environment, and economic environment. The range of changes in the $C_{\text{economic environment competitiveness - facility environment competitiveness}}$ was [0.663, 0.723], and at the same time, there was a slight fluctuation in the trend of changes between the economic environment competitiveness and the facility environment competitiveness, and the upward trend was not obvious. The range of changes about $C_{\text{economic environment competitiveness -ecological environment competitiveness}}$ was [0.875, 0.986], indicating a clear upward trend in the coordination between economic environment competitiveness and ecological environment competitiveness. Moreover, there was a complementary effect between economic environment competitiveness and ecological environment competitiveness. The improvement of economic environment competitiveness can promote the improvement of ecological environment competitiveness. This was because good economic development can enable the government and relevant management departments to allocate more funds for the protection and construction of the ecological environment, which can further improve the quality of the ecological environment. The range of changes about $C_{\text{facility environment competitiveness -ecological environment competitiveness}}$ was [0.780, 0.932], indicating that the coordination between facility environmental competitiveness and ecological environmental competitiveness was decreasing in fluctuations. This indicated that the improvement of facility environmental competitiveness can lead to a decrease in ecological environmental competitiveness. Meanwhile, with the passage of time, the increase in tourism demand had led to the construction of tourism facilities, which had led to an increase in the damage to the ecological environment. The change range of C_{all} was [0.008, 0.016], which meant that the overall coordination between the economic environment, facility environment, and ecological environment was increasing year by year. At the same time, the overall coordination degree showed a relatively low value, which implies that in order to achieve a benign interaction and coordinated development between the economy, facilities, and ecology, it was necessary to adhere to economic development and facility construction.

Table 10. Coordination among environment competitiveness- economic environment competitiveness -facility environment competitiveness- ecological environment competitiveness

Year	$C_{\text{environment competitiveness -economic environment competitiveness}}$	$C_{\text{environment competitiveness -facility environment competitiveness}}$	$C_{\text{environment competitiveness -ecological environment competitiveness}}$	$C_{\text{economic environment competitiveness - facility environment competitiveness}}$	$C_{\text{economic environment competitiveness - ecological environment competitiveness}}$	$C_{\text{facility environment competitiveness - ecological environment competitiveness}}$
2010	0.454	0.909	0.728	0.684	0.875	0.932
2011	0.492	0.911	0.699	0.723	0.928	0.910
2012	0.502	0.922	0.662	0.718	0.956	0.870
2013	0.488	0.916	0.688	0.711	0.931	0.897
2014	0.492	0.921	0.671	0.708	0.944	0.879
2015	0.485	0.931	0.641	0.685	0.957	0.840
2016	0.476	0.939	0.617	0.663	0.964	0.807
2017	0.495	0.940	0.600	0.682	0.980	0.790
2018	0.505	0.940	0.592	0.693	0.986	0.783
2019	0.494	0.942	0.593	0.678	0.982	0.780

6 Conclusions

China's tourism competitiveness was gradually increasing, which meant that market competitiveness, resource competitiveness, and environmental competitiveness were also gradually increasing. At the same time, there were differences in the contributions of market competitiveness, resource competitiveness, and environmental competitiveness to China's tourism competitiveness. The improvement of China's tourism competitiveness was mainly caused by the enhancement of environmental competitiveness, with market competitiveness having the smallest contribution to overall competitiveness, followed by resource competitiveness.

In addition, the impact of market competitiveness on overall competitiveness was gradually increasing, showing a slow upward trend. The impact of resource competitiveness was decreasing year by year, while the contribution of environmental competitiveness to overall competitiveness was gradually increasing. There was an increasing trend in the coordination between tall competitiveness and market competitiveness, tall competitiveness and resource competitiveness, as well as tall competitiveness and environmental competitiveness.

The key to enhancing tourism competitiveness lied in the excellent environment and distinctive tourism resources. The coordination between market competitiveness and resource competitiveness was increasing, indicating a very close relationship between the market and resources. At the same time, with the development of the times and the impact of tourism resource diversity, the importance of relying on resources to expand the market was increasing. It indicated that the coordination between market competitiveness and environmental competitiveness was increasing. The expansion of market size had caused environmental pressure and carrying capacity pressure within tourist attractions, as well as traffic pressure between tourist sources and destinations, which to some extent promotes the objective reality that the larger the market size, the greater the environmental pressure. The coordination between resource competitiveness and environmental competitiveness was declining, it implied that the diversification of tourism resources has reduced the dependence of resources on the environment. On the other hand, it indicated that the overexploitation of resources may have a certain impact on the environment, which also made the coordination between resource competitiveness and environmental competitiveness decline.

The overall coordination between market, resource, and environmental competitiveness was relatively low, but over time, the overall coordination between market, resource, and environmental competitiveness was gradually increasing, and the relationship between the three tends to be harmonious. However, the magnitude of changes between the three was still very small.

In terms of market competitiveness, the increase in domestic market competitiveness was greater than the increase in inbound market competitiveness. At the same time, in the early stages of market competitiveness development, the competitiveness of the inbound market was higher than that of the domestic market. When the market competitiveness improved to a certain extent, the domestic market competitiveness was greater than the inbound market competitiveness, and the market competitiveness mainly relied

on the improvement of the domestic tourism market to drive its development. The coordination between market competitiveness and domestic market competitiveness was increasing year by year, while the coordination between market competitiveness and inbound market competitiveness was showing a decreasing trend year by year. The competitiveness of the domestic market was gradually increasing, and the coordination between the competitiveness of the domestic market and the competitiveness of the inbound market also showed a characteristic of volatility. Meanwhile, the overall coordination between domestic market competitiveness and inbound market competitiveness was high.

In terms of resource competitiveness, there was a slow upward trend in resource competitiveness. The competitiveness of reception capacity was greater than that of human resources, indicating that the improvement of resource competitiveness mainly relies on reception capacity. The coordination between resource competitiveness and reception capacity competitiveness was high, and the coordination between resource competitiveness and human resource competitiveness was gradually decreasing year by year. There was a high degree of coordination between the competitiveness of reception capabilities and the competitiveness of human resources. The competitiveness of resources was mainly influenced by the competitiveness of reception capacity and human resources. However, over time, the improvement speed of reception capacity exceeded the development speed of human resources, resulting in lower competitiveness of human resources compared to reception capacity.

In terms of environmental competitiveness, environmental competitiveness was showing a rapid upward trend, while economic environmental competitiveness, facility environmental competitiveness, and ecological environmental competitiveness were showing an upward trend. The enhancement of environmental competitiveness mainly relied on the contribution of improving facility competitiveness, while the contribution of improving ecological and economic environmental competitiveness to the improvement of environmental competitiveness decreased in sequence. The coordination degree between environmental competitiveness and economic environmental competitiveness was fluctuating and slowly increasing.

The coordination degree between environmental competitiveness and facility environmental competitiveness showed a gradually increasing trend over time, and the coordination degree between environmental competitiveness and ecological environmental competitiveness was increasing. The order of dependence for improving environmental competitiveness, from large to small, was the competitiveness of the facility environment, the competitiveness of the ecological environment, and the competitiveness of the economic environment. There was a slight fluctuation in the trend of changes between economic environmental competitiveness and facility environmental competitiveness, and the upward trend was not obvious. The competitiveness of the economic environment and the competitiveness of the ecological environment complement each other, and the improvement of the competitiveness of the economic environment can promote the improvement of the competitiveness of the ecological environment. The improvement of facility environmental competitiveness can lead to a decrease in ecological environmental competitiveness. The overall coordination between the economic

environment, facility environment, and ecological environment was increasing year by year, and the overall coordination showed a relatively low value.

7 Suggestions

7.1 Improved Market Competitiveness

Continuously improved market competitiveness, strengthening the domestic tourism market, and expanding the inbound tourism market. China was rich in tourism resources. The government, tourism enterprises and relevant administrative departments should fully explore the resource advantages and cultural characteristics of tourist attractions, and optimize resource allocation [18], so as to create a tourism brand with history of China, culture, resource characteristics and details. On this basis, China should constantly improve its tourism image in the world market. Inbound tourism played an important role in improving China's internationalization level. It was necessary to achieve regional linkage between tourism products, tourist attractions, tourist attractions, tourist destinations, and tourist areas, in order to attract more international tourists to visit and visit China. It was worth emphasizing that we should promote the coordinated and balanced development of the domestic tourism market and the inbound tourism market, in order to further promote the healthy and sustainable development of China's tourism market.

7.2 Strengthened Resource Competitiveness

Continuously strengthened resource competitiveness, enhancing the competitiveness of tourism reception capabilities, especially improving the cultivation of professional talents in tourism. The government departments, relevant tourism management departments and tourism enterprises should actively build a platform for tourism research, development and display, so as to deeply explore the cultural characteristics, resource characteristics, historical relics and folk art of scenic spots, tourist destinations and tourist areas, and effectively combine physical resources with non-material resources to develop products with local and national characteristics. Which was to meet the diversity of tourists personalized needs. At the same time, used models such as internet, television advertisements, tourism APP, specific festivals, and events to promote related tourism products' image. In the context of informatization, networking, and globalization, it was necessary to adopt some model of smart tourism to continuously strengthen the competitiveness of tourism resources. In addition, it was necessary to deeply study the tourism market structure and develop reception facilities that meet the needs of tourists, such as accommodation, catering, travel, sightseeing, entertainment and shopping.

It was necessary to continuously increase the intensity and quality of talent cultivation in the tourism industry, and broaden the breadth and depth of knowledge and skills of tourism professionals [19-22]. The government needed to create an excellent employment environment, with good acceptance and effective salary treatment for students graduating from tourism universities and vocational colleges in the job market, and to

earn respect in their career related to tourism. In this process, tourism professionals can develop a deep love for tourism and feel a sense of happiness and pride from it.

7.3 Enhanced Environmental Competitiveness

Continuously enhanced environmental competitiveness, enhance economic development environmental competitiveness, improved infrastructure and public service facilities, and strengthened ecological environment protection. To create an excellent business environment, government departments and relevant management departments and platforms should provide certain support for the breeding and growth of large, medium, small, and micro tourism enterprises, thereby was improving the competitiveness of tourism enterprises in obtaining priority support in the national economic development environment. At the same time, continue to improve the infrastructure, service facilities, and amusement facilities related to road transportation, telecommunications, networks, healthcare, sanitation, accommodation, catering, shopping, conferences, exhibitions, etc. in tourist attractions or tourist areas.

It was necessary to design reasonable and high value-added tourism routes to provide convenient and enjoyable facilities and environment for tourists to carry out related tourism activities, and improve their tourism experience. Finally, ecological environment protection was a necessary condition for the tourism industry to maintain sustainable competitiveness.

Relevant management departments needed to make efforts in garbage cleaning and wastewater, waste, and exhaust gas treatment, in order to firmly create a good green development environment for scenic spots, tourist destinations, and tourist areas. The concept of ecotourism should develop, and the economic and social capacity, resource capacity, psychological capacity, environmental capacity, and ecological capacity of tourist attractions should improve. Effectively protected the natural resources, cultural resource management and historical sites in the scenic spot, improved the awareness of biodiversity protection in the scenic spot, and maintained the dynamic equilibrium of the ecosystem. At the same time, integrated environmental protection management mechanisms into the tourism industry's related aspects of food, housing, transportation, tourism, shopping, and entertainment.

Acknowledgements

This article is one of the phased achievements of the national natural science foundation of China youth project "research on the transformation mechanism of Tibetan highland barley production culture from perspective of actor network theory: taking Shigatse city as an example" (42101229).

Authors' contributions

Yan Sun designs the article frame, processes and analyzes the data, and wrote the article. Weiwei Wang proposes some suggestions on the article's English language, and edits the article.

References

1. J.H.Li, X.W.Xin, S.B.Lin, et al. (2021) Competitiveness analysis of tourism from the perspectives of economy, ecology and culture: Taking Guangdong province for instance. China Standardization, 21:98-102+107.
2. R.W.Y.Luo. (2021) A Study on the coordinated development strategy of the tourism industry and regional economy in Jiangxi province. Western Travel, 17:10-13.
3. J.Chen, F.M. Cui, T.Balezentis, et al. (2021) What drives international tourism development in the Belt and Road Initiative?. Journal of Destination Marketing & Management ,19:100544.
4. C.X.Han. (2022) Analysis of the multiplier effect between tourism consumption and expanding domestic demand under the background of dual cycle development. Journal of Commercial Economics, 10:55-58.
5. M.A.Selim, N.A.Abdel-Fattah, Y.S.Hegazi. (2021) A composite index to measure smartness and competitiveness of heritage tourism destination and historic building. Sustainability,13, 13135.
6. L.Wang. (2014) Research on the tourism industry cluster competitiveness in Anhui province. Hefei: Anhui Agricultural University.
7. Y.Wu. (2007) The cooperation-competition of regional tourism of Chizhou City in Anhui province. Wuhui: Anhui Normal University.
8. Q. Wu, R.P.Xie, C.Song. (2021) Research on the coordinated development of tourism, economy and environment in Guangdong province[J]. Ecological Economy, 37,4:140-146+155.
9. Z.Y. Jia, Y.Jiao, W.Zhang, et al. (2022) Rural tourism competitiveness and development mode, a case study from Chinese township scale using integrated multi-source data. Sustainability,14, 4147.
10. X.J.Sun. (2022) Evaluation of urban tourism competitiveness in Shanxi province from the perspective of global tourism[J]. Market Forum, 2:34-38.
11. H.Xu, K.Lu. (2015) Tourism destination management. Tianjin: Nankai University Press, 220-222.
12. L.X.Pan, J.Peng, Z.L.Pang, et al. (2015) Study of urban tourism competitiveness in Anhui province. Tourism Research, 7,2:32-39.
13. C.H.Xu, L.Ding. (2019) Research on the evaluation and integrated development of Zhejiang's global tourism competitiveness under the background of the construction of the "big garden". Business & Economy,6:77-80.
14. D.M.Wu, H.Yi, W.Wang, et al. (2022) Measurement and evaluation of the competitiveness of Yunnan province's tourism industry. Management and Administration, 5:170-177.
15. J.Y.Wang, H.Zhang. (2019) Evaluation of tourism competitive potential and research on competitiveness of countries along the "the Belt and Road". Qinghai Social Sciences, 240,6:62-68+77.
16. J.Y.Liu, K.Zhang, G.H.Wang. (2018)Comparative study on data standardization methods in comprehensive evaluation. Digital Technology & Application, 36,6:84-85.

17. Y.X.Li, Y.J.Teng, B.H.Pan, et al. (2022) Study on the coordination degree of urban tourism development and economy society-environment system: Taking Jiangsu province as an example. Ecological Economy, 5:1-12.
18. F. Yu. (2021) A comparative study on the operational efficiency of the three major markets of travel agency industry. Journal of Jiangsu University of Technology, 27,3:58-67.
19. G.Y. Yang. (2021) Luoyang cultural tourism integration development ideas[J]. Co-Operative Economy & Science, 24:53-55.
20. J.Ridderstaat, R. Croes, P. Nijkamp. Modeling Tourism Development and Long-Run Economic Growth in Aruba[J].Social Science Electronic Publishing, 2013, 16(5):472–487
21. D. Getz, G. Brown. Benchmarking wine tourism development[J]. International Journal of Wine Marketing, 2006, 18(2):78-97.
22. G.W.Richards. Tourism development trajectories- From culture to creativity?[J].Revista Encontros Científicos - Tourism & Management Studies, 2010(6):9-15.